

Application Type Amendment,  
Major  
Facility Type Industrial  
Major / Minor Major

**NPDES PERMIT FACT SHEET  
ADDENDUM**

Application No. PA0002208  
APS ID 884428  
Authorization ID 1096515

**Applicant and Facility Information**

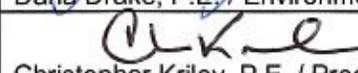
Applicant Name	<u>Shell Chemical Appalachia LLC</u>	Facility Name	<u>Shell Chemical Appalachia Petrochemicals Complex</u>
Applicant Address	<u>300 Frankfort Road Monaca, PA 15601</u>	Facility Address	<u>300 Frankfort Road Monaca, PA 15061</u>
Applicant Contact	<u>H. James Sewell</u>	Facility Contact	<u>***same as applicant***</u>
Applicant Phone	<u>(281) 731-3287</u>	Facility Phone	<u>***same as applicant***</u>
Client ID	<u>311950</u>	Site ID	<u>102360</u>
SIC Code	<u>3339</u>	Municipality	<u>Potter Township</u>
SIC Description	<u>Manufacturing - Primary Nonferrous Metals, Not Elsewhere Classified</u>	County	<u>Beaver</u>
Date Published in PA Bulletin	<u>September 3, 2016</u>	EPA Waived?	<u>No</u>
Comment Period End Date	<u>October 18, 2016</u>	If No, Reason	<u>Major NPDES</u>
Purpose of Application	<u>Application for an NPDES permit for discharges of treated industrial wastewater and storm water</u>		

**Comment Responses**

At the request of the Environmental Integrity Project (EIP), the public comment period for the draft permit was extended by 15 days to October 18, 2016. Additional comments were also accepted following a December 15, 2016 public meeting and hearing. Comments received after the designated comment periods were also accepted and considered.

DEP received comments by mail, email, and through oral and written testimony from 324 individual commenters with a portion of those commenters representing over 40 companies and organizations. In addition to comments on the terms and conditions of the draft NPDES permit amendment, DEP also received numerous requests to hold a public meeting to answer questions about the draft NPDES permit amendment for Shell's Petrochemicals Complex. In response to these requests, DEP agreed to hold both a public meeting and a public hearing.

The content of over 85% of the comments received by DEP, consisting primarily of those received by email, were identical; presumably those emails were prepared comments from Clean Water Action's online comment campaign given the similarity of the emails to Clean Water Action's testimony. The bulk of the public's interest in the draft permit amendment expressed in those emails and in oral and written testimony was focused on four main issues including: 1) DEP's decision to amend NPDES Permit PA0002208 to cover discharges from Shell's proposed Petrochemicals Complex (hereafter "Complex") rather than issue a new NPDES permit for those discharges; 2) the grandfathering and transfer of Horsehead Corporation's previously authorized Total Dissolved Solids loading to Shell Chemical Appalachia pursuant to 25 Pa. Code § 95.10 and related guidance; 3) the removal of effluent limits and monitoring requirements from the permit for storm water discharges; and 4) the absence of flow limits. DEP's responses to comments pertaining to these primary areas of concern are provided below. Responses to more detailed comments on those and other issues are provided later in this Fact Sheet Addendum.

Approve	Return	Deny	Signatures	Date
✓			 Ryan Decker, P.E. / Environmental Engineer	6/20/17
✓			 Dana Drake, P.E. / Environmental Engineer Manager	6/22/17
✓			 Christopher Kriley, P.E. / Program Manager	6/22/17

## Comment Responses

### Responses to Public Comments:

It is DEP's mission to protect Pennsylvania's air, land, and water from pollution and to provide for the health and safety of its citizens. It is important for citizens to have confidence in the agency that works on their behalf to accomplish that mission.

As part of the National Pollutant Discharge Elimination System (NPDES) permitting process, DEP must evaluate wastewater discharges to ensure that all uses of waters of the Commonwealth are protected. Those uses, as established by Pennsylvania's regulations (25 Pa. Code Chapter 93) include, but are not limited to uses for aquatic life, potable water supply, and recreation. DEP evaluated discharges from the proposed Complex and established the necessary requirements in the NPDES permit to ensure that those uses are protected. DEP also imposed federal technology-based treatment requirements that apply to the Complex's wastewaters. Those federal treatment requirements are standardized for all facilities in the nation that manufacture products within the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) industry. Between technology-based effluent limits and water quality-based effluent limits, all discharges from the Complex will be regulated to 1) require a level of treatment system performance consistent with national performance standards and 2) protect Pennsylvania's waters from pollution and provide for the health and safety of citizens of the Commonwealth.

### New Permit versus Amended Permit

DEP received numerous comments requesting that DEP either require Shell to submit a new application for a new permit or reject the NPDES permit amendment application. Shell already has an NPDES permit and is now proposing substantial alterations to its permitted activities. These alterations require the establishment of permit conditions that are different or absent from Shell's existing permit. State and federal regulations allow for the modification of a permit as an appropriate action in these circumstances (see p.9, Response to EIP Comment III.A.2 in this document for regulatory citations and further explanation). The terms and conditions of the amended permit will regulate Shell's specific discharges at the site. The procedures for issuance of a major NPDES permit amendment, including public notification requirements, are the same as those that apply when issuing a new permit.

### Factors Considered for Application Denial or Withholding of Permit

DEP may deny an application when cause exists to do so. Statutes, regulations, and guidance all describe factors that DEP would consider when determining whether to act on an NPDES permit application. These factors are considered below.

### Clean Streams Law on Withholding of Permit for Compliance History

Section 609 of the Clean Streams Law (35 P.S. Section 691.609) provides that a permit may be withheld if DEP finds, after investigation and an opportunity for informal hearing that:

- (1) the applicant has failed and continues to fail to comply with any provisions of law which are in any way connected with or related to the regulation of mining or of any relevant rule, regulation, permit or order of the department, or of any of the acts repealed or amended hereby
- (2) the applicant has shown a lack of ability or intention to comply with such laws as indicated by past or continuing violations. Any person, partnership, association or corporation which has engaged in unlawful conduct as defined in section 611 or which has a partner, associate, officer, parent corporation, subsidiary corporation, contractor or subcontractor which has engaged in such unlawful conduct shall be denied any permit required by this act unless the permit application demonstrates that the unlawful conduct is being corrected to the satisfaction of the department. Persons other than the applicant, including independent subcontractors, who are proposed to operate under the permit shall be listed in the application and those persons shall be subject to approval by the department prior to their engaging in surface mining operations and such persons shall be jointly and severally liable with the permittee for violations of this act with which permittee is charged and in which such persons participate.

To evaluate Shell's ability to comply with relevant rules and regulations, DEP reviewed the environmental compliance history for facilities owned and operated by Shell in Pennsylvania. Pursuant to Section 609 of the Clean Streams Law, DEP would consider withholding the NPDES permit amendment for the Complex if Shell's compliance history reveals persistent and ongoing violations of applicable laws and regulations. DEP's compliance check did not reveal any unresolved violations for Shell facilities located in Pennsylvania.

### Comment Responses

As an additional consideration beyond those required by Section 609 of the Clean Streams Law, DEP requested that Shell provide DEP with the 10-year water permitting compliance history for Shell's Geismar Plant located in Geismar, Louisiana. Although the Geismar Plant does not produce the same products that the Complex will produce, operations at the Geismar Plant most closely resemble those operations proposed for the Monaca, PA facility as there are no similar petrochemical facilities operated by Shell in the northeastern United States. The water permitting compliance history for the Geismar Plant (attached) does show permit violations primarily related to laboratory contamination and heavy rainfall, but there are no ongoing compliance problems that suggest an inability or unwillingness to operate a wastewater treatment system properly.

Shell has worked cooperatively with DEP since 2012—four years before committing to build the Complex—to ensure that all applicable rules and regulations are followed and all necessary permits are obtained for the proposed Complex. Throughout that time, Shell has maintained regular communications with DEP regarding regulatory compliance requirements and permitting and has demonstrated its intention and willingness to comply with applicable environmental laws and regulations.

#### Regulatory Requirements on Withholding of Permit

25 Pa. Code § 92a.36 provides that:

The Department will not issue an NPDES permit unless the application is complete and the documentation submitted meets the requirements of this chapter. The applicant, through the application and its supporting documentation, shall demonstrate that the application is consistent with:

- (1) Plans approved by the Department under the Pennsylvania Sewage Facilities Act (35 P. S. § 750.1—750.20), wastewater facility capabilities, service areas, selected alternatives and any adverse effects on the environment of reasonably foreseeable future development within the area of the project resulting from construction of the wastewater facility.
- (2) Other applicable environmental laws and regulations administered by the Commonwealth, Federal environmental statutes and regulations, and if applicable, river basin commission requirements created by interstate compact.
- (3) Standards established for the wastewater facilities through permits to implement the requirements of 40 CFR Parts 122, 123, 124 (relating to EPA administered permit programs: the National Pollutant Discharge Elimination System; State program requirements; and procedures for decisionmaking) and the Federal Act.

Some commenters have questioned the completeness of the application. Specific concerns are addressed later in this Fact Sheet Addendum. However, the permit amendment application consisting of the original submission and updates provided at DEP's request is complete and consistent with applicable statutes and regulatory requirements.

#### Guidance on Application Denial

Under Section 201.4 of DEP's Policy and Procedure Manual, grounds for denial of an application include:

- a. Under the provisions of Section 609 the Clean Streams Law, where the applicant is in violation of the Clean Streams Law or other environmental statutes or regulations, and where issuance of the NPDES permit would not resolve these violations.
- b. For new discharges, where the discharger would clearly be unable to comply with effluent limitations or other permit requirements.
- c. Where the applicant refuses to provide necessary information critical to the development of effluent limitations and other requirements.

There are no violations at the Monaca site that would not be corrected by issuance of the NPDES permit (e.g. the unpermitted seep discharge at Outfall 015 will be permitted by issuing the amendment). Horsehead's activities that resulted in permit violations have ceased. Shell will be able to comply with the effluent limitations and other permit requirements and will further demonstrate such ability when it applies for a Water Quality Management permit for wastewater treatment facilities at the Complex. Shell has not refused to provide any information requested by DEP.

**Comment Responses**

Total Dissolved Solids

The transfer of the existing authorized TDS discharge loading already occurred when the NPDES permit was renewed and transferred from Horsehead to Shell in June 2015. Under the NPDES permit amendment, DEP is documenting the magnitude of the authorized load that was transferred in 2015 because a change in waste stream—such as that proposed by Shell with this permit amendment—is the relevant factor that prompts DEP to determine the existing authorized TDS discharge loading that existed prior to August 21, 2010. When the permit was transferred in 2015, DEP calculated the existing authorized TDS discharge loading, but did not include it in the renewed permit because Horsehead’s activities immediately preceding the permit renewal and transfer and Shell’s activities immediately after the permit renewal and transfer were essentially the same. There was no change in waste stream at the time of permit renewal and the changes that occurred previously (cessation of zinc smelting and related discharges) would not have resulted in a net increase in TDS discharge loading to waters of the Commonwealth.

Ohio River Impacts

Commenters have expressed concern about the potential for discharges of TDS from the Complex to cause harm to waters of the Commonwealth. Commenters state that, “Allowing an amended permit would essentially exempt Shell from DEP’s laws limiting Total Dissolved Solids (TDS), which DEP describes as having ‘adverse effects on aquatic life, human health, and drinking water supplies,’ and welcome these discharges at a rate that is significantly higher than the standard that was created specifically to prevent the oil and gas industry from harming our waterways.”

The amended permit does not exempt Shell from laws limiting the discharge of total dissolved solids (TDS). Condition X in Part C of the amended permit establishes the existing authorized TDS discharge loading consistent with 25 Pa. Code § 95.10. Although not specified in Part A of the permit, the existing authorized TDS discharge loading functions as a limit above which Shell may be subject to TDS treatment requirements under § 95.10.

There are two effluent standards for TDS in 25 Pa. Code § 95.10. The first is the 500 mg/L end-of-pipe standard in § 95.10(b)(3) that applies to new and expanding treated discharges of wastewater resulting from fracturing, production, field exploration, drilling or well completion of natural gas wells. The 500 mg/L end-of-pipe standard is the standard that was created to control discharges from the fracturing and production portion of the oil and gas industry. The Complex will not discharge wastewaters from oil and gas fracturing, production, field exploration, drilling, or well completion of natural gas wells, so that standard does not apply to Shell. The other standard is the 2,000 mg/L end-of-pipe standard in § 95.10(c) that applies to facilities that are not addressed in §§ 95.10(a) or (b). Sections 95.10(a) and (b) describe 1) the circumstances under which a discharge of TDS is exempt from § 95.10’s treatment requirements, and 2) the requirements that apply to the aforementioned oil and gas fracturing and well-production discharges. If a facility is addressed in § 95.10(a) or § 95.10(b), then the 2,000 mg/L standard does not apply. Shell is exempt under § 95.10(a)(1) up to the level of its maximum existing authorized loading, so the 2,000 mg/L standard does not apply to Shell. However, the fact that Shell is not subject to either of § 95.10’s TDS standards does not mean that Shell’s discharges will cause harm to waters of the Commonwealth.

Irrespective of § 95.10’s requirements, DEP evaluates discharges for compliance with the 500 mg/L TDS water quality criterion from 25 Pa. Code § 93.7. That criterion protects drinking water use—the primary use about which the commenters are concerned. DEP evaluated Shell’s discharges for compliance with that criterion as part of the draft permit amendment. Pursuant to 25 Pa. Code § 96.3(d), the 500 mg/L TDS criterion applies at the point of all existing or planned surface potable water supply withdrawals. DEP has identified the closest downstream withdrawal as NOVA Chemicals’ withdrawal, which is located on the Ohio River approximately one mile downstream of Shell’s Outfall 001. Contrary to comments suggesting that DEP should focus on municipal public water supply withdrawals, the closest of which is the Midland Borough Municipal Authority’s withdrawal located approximately eight miles downstream of Outfall 001, it is more conservative to evaluate compliance with the 500 mg/L criterion at NOVA’s withdrawal than it is to evaluate compliance with the 500 mg/L criterion eight miles downstream of Outfall 001 at Midland’s withdrawal.

DEP has already determined that potable water supplies will not be affected by Shell’s discharges. In response to public comments and to further demonstrate that discharges from Outfall 001 will not affect potable water supplies, DEP has re-run the PENTOXSD water quality model using more conservative assumptions. The model was previously run using a regulated minimum flow of 4,730 cfs for the Ohio River and a partial mix factor of 0.20. A partial mix factor of 0.20 provides Shell with 20% of the river’s 4,730 cfs regulated minimum flow for mixing and dilution (20% of 4,730 cfs is 946 cfs). The same flow conditions are used for this demonstration analysis. An ambient background TDS concentration of 300 mg/L is input for the Ohio River, which further reduces the assimilative capacity available to Shell. Note that a 300 mg/L background concentration

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overestimates the ambient background concentration of TDS in the Ohio River; the median TDS concentration is closer to 200 mg/L based on sampling conducted by ORSANCO (*Characterization of Dissolved Solids in the Ohio River and Selected Tributaries*, February 2014—see attached pages). The discharge is also modeled using the highest expected discharge flow rate at Outfall 001 (3.75 MGD) and the highest estimated TDS concentration reported on the application (7,375 mg/L). Note that these values are only being used to demonstrate that Shell’s discharges will comply with the 500 mg/L TDS criterion even under significant loading conditions. Those discharge conditions will not occur because the 7,375 mg/L concentration is only representative of process wastewaters from IMP 101 and not the combined process wastewater and cooling water discharge at Outfall 001, which only has a maximum estimated TDS concentration of 3,317 mg/L.

The PENTOXSD modeling results (attached) show that, even under these overly conservative modeling conditions, Shell could discharge up to 33,110 mg/L of TDS from Outfall 001 at a flow rate of 3.75 MGD (a loading of about 1,035,515 pounds per day of TDS) without violating the 500 mg/L TDS criterion at NOVA Chemicals’ withdrawal. By extension, discharges from Shell at lower TDS concentrations, lower flow rates, and lower TDS loadings—including those estimated by Shell for the combined discharge of process wastewater and cooling water at Outfall 001—will not result in violations of the 500 mg/L criterion at NOVA Chemicals’ withdrawal or at any other potable water supply withdrawals downstream of NOVA Chemicals.

The TDS requirements of 25 Pa. Code § 95.10 provide an additional layer of protection for waters of the Commonwealth. The overarching goals of Section 95.10 are to reserve a portion of the assimilative capacity for TDS in Pennsylvania’s waters as necessary to allow for future growth and to ensure ongoing compliance with Pennsylvania’s potable water supply water quality criterion for TDS while recognizing that a portion of the assimilative capacity is already consumed by existing TDS dischargers. The NPDES permit amendment for Shell accomplishes the goal of reserving assimilative capacity and ensuring compliance with the 500 mg/L TDS water quality criterion.

Based on the modeling discussed above, the Ohio River could assimilate over 1 million pounds of TDS per day from the Complex without exceeding the TDS potable water supply criterion of 500 mg/L at NOVA Chemicals’ withdrawal. Even though the Ohio River could theoretically assimilate that much TDS, § 95.10 caps dischargers at their pre-August 21, 2010 existing authorized TDS loading to ensure that assimilative capacity for TDS is available in waters of the Commonwealth. Under § 95.10, DEP has determined that the maximum existing authorized TDS loading is 73,184 lb/day, which represents approximately 7% of the Ohio River’s available assimilative capacity with only 20% of the river’s Q<sub>7-10</sub> flow available to Shell (946 cfs) and with an assumed background TDS concentration of 300 mg/L. Additional modeling conditions and results are summarized in the following table.

Modeled Q <sub>7-10</sub> Stream Flow (cfs)	Ambient Background TDS Concentration (mg/L)	Most Stringent WQBEL (mg/L)	Available Assimilative Capacity (pounds/day)	Maximum Discharge TDS Loading (pounds/day)	Percentage of Available Assimilative Capacity Consumed at Max Discharge TDS Loading
946 †	300	33,110	1,035,515	91,442 ††	8.8%
946 †	300	33,110	1,035,515	73,184	7.1%
946 †	300	33,110	1,035,515	50,078 †††	4.8%
946 †	205	48,600	1,519,965	91,442 ††	6.0%
946 †	205	48,600	1,519,965	73,184	4.8%
946 †	205	48,600	1,519,965	50,078 †††	3.3%
4,730	205	241,020	7,537,900	91,442 ††	1.2%
4,730	205	241,020	7,537,900	73,184	1.0%
4,730	205	241,020	7,537,900	50,078 †††	0.7%

† Flow represents 20% of the Ohio River’s Q<sub>7-10</sub> regulated minimum flow (4,730 cfs).

†† Maximum estimated TDS discharge loading at Outfall 001 (including cooling water TDS sourced from the river)

††† Maximum estimated TDS discharge loading at Outfall 001 (excluding cooling water TDS sourced from the river)

At a more representative ambient background TDS concentration of 205 mg/L (based on the median TDS concentration from the aforementioned ORSANCO study), the Ohio River could assimilate 1.5 million pounds of TDS with a discharge loading of 73,184 lb/day consuming 4.8% of the available assimilative capacity (that is, 4.8% of the assimilative capacity of just 20% of the river’s minimum regulated flow). Using the full minimum regulated flow of the Ohio River (4,730 cfs), over 7.5 million pounds of TDS could be assimilated per day with a discharge loading of 73,184 lb/day consuming just 1.0% of the available assimilative capacity.

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It is clear that Shell's maximum allowable TDS loading under Condition X in Part C of the amended permit and the lower estimated actual TDS loading from the Complex (excluding the TDS loading associated with cooling water that is simply being withdrawn and returned to the river) will not impact potable water supply uses or the capacity of the Ohio River to assimilate TDS.

Extra training and resources for local water treatment plants is not necessary because the water quality standards specified in Pennsylvania's regulations for the protection of water supply uses (including drinking water use) are quantified at levels such that water treatment plants do not have to perform any additional treatment steps beyond what they already do to comply with the Federal Safe Drinking Water Act and the Pennsylvania Safe Drinking Water Act. Since the NPDES permit requirements imposed on Shell and other dischargers to the Ohio River control pollutants at levels that are protective of the Ohio River's water supply uses, the water treatment plants that source their water from the Ohio River are not subject to any additional treatment requirements.

#### Removal of Effluent Limits and Monitoring Requirements for Legacy Pollutants

Throughout the NPDES permitting process, including the transition in ownership from Horsehead Corporation to Shell Chemical Appalachia LLC and the associated decommissioning and demolition of the former zinc smelting facilities, DEP, Horsehead, and Shell have worked to ensure that potential sources of pollution at the site are controlled. This included a requirement for Horsehead and Shell to collect and treat storm water runoff from the site presuming that the runoff may be contaminated during site redevelopment by exposure to materials remaining at the site from Horsehead and its predecessors. The requirement to treat storm water was primarily a preventative measure due to the possibility that zinc slag and related materials would contaminate storm water. Data available to DEP at the time the permit was renewed did not suggest that significant concentrations of metals would leach from any slag encountered during earthmoving (see attached SPLP results from the March 20, 2014 Fact Sheet for the 2015 NPDES permit renewal). DEP's expectation at the time the permit was renewed in 2015 was that the potential for storm water contamination would increase as earthmoving intensified and then decrease as earthmoving reached completion. Effluent monitoring data collected under the renewed permit would confirm whether this expected trend in storm water quality was true and those data could be used to support the removal of effluent limits and monitoring requirements, if warranted.

Regardless of DEP's expectations, Shell did provide for the treatment of storm water runoff during site redevelopment and continues to do so as of this writing (June 2017). In the early stages of redevelopment, Shell proposed to use Horsehead's existing Industrial Wastewater Treatment Plant (IWTP) to treat storm water runoff. Horsehead previously directed storm water runoff from its site to the IWTP as a way to manage storm water with elevated zinc concentrations. Two Interim Treatment Systems (ITs) were permitted and installed in 2014/2015 to replace the IWTP through the end of early site redevelopment. The ITs would allow storm water treatment to continue while the IWTP was demolished. Based on Shell's proposal to continue using Horsehead's IWTP and with the replacement ITs designed to replicate the performance of the IWTP, DEP maintained the technology-based effluent limits that previously applied to discharges from Horsehead's IWTP. The presumption was that the IWTP and ITs would be able to remove pollutants to the same levels as previously permitted. However, those limits were originally developed based on the discharge of wastewaters from zinc smelting operations. Such wastewaters no longer exist at the site and Shell would reasonably not be subject to those effluent limits in perpetuity, particularly when the limits are being achieved, not as a result of treatment and removal, but because the pollutants are not present in the influent storm water or are present in low concentrations.

Attached to this Fact Sheet Addendum are graphs summarizing analytical results for samples of untreated storm water collected by Shell. The graphs compare Shell's results to the average monthly limits (AML) and maximum daily limits (MDL) in the current permit. The graphs show that the measured concentrations of limited pollutants in untreated storm water generally are less than the current effluent limits. Most results are at or near laboratory reporting limits with only a few pollutants following DEP's expected trend of increasing and then decreasing during earthmoving. TSS concentrations in untreated storm water are intermittently high, but those results are not unusual for untreated storm water runoff from construction activities.

As part of Shell's activities to prepare the site for construction of the Complex, the elevation of the site was raised by bringing fill onsite. This has effectively capped the site and isolated underlying materials from direct surface exposure. Underground utilities, structural footers, and sewers have already been installed, so any future earthmoving at the site should not result in exposure of underlying materials to storm water runoff. Pre-cleanup areas that exhibited greater levels of contamination are localized to certain areas of the site and those areas have more controls than just a soil cap including the placement of geomembrane liners and concrete pads to limit infiltration and prevent future excavation into the underlying materials. These activities have minimized the potential for any legacy contamination of storm water.

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As stated above, the limits currently imposed on storm water discharges were originally based on the discharge of zinc smelting process wastewaters. Process wastewaters from zinc smelting no longer exist at the site and the limited pollutants, when detected above laboratory reporting limits, are not present in storm water in treatable concentrations and should not cause or contribute to excursions above water quality standards. Those results combined with the status of Shell's earthmoving provide a reasonable basis to remove the interim numerical effluent limits from Outfalls 004 and 013.

The different interim and final monitoring requirements at other storm water outfalls, including those specified for Outfalls 007, 008, 009, and 010, do not represent a relaxation of requirements between the interim and final limiting periods. As explained in the Fact Sheet:

Outfalls 007 – 010 are currently used to monitor discharges of storm water. The drainage areas for these outfalls, as identified in the current permit, will be substantially modified as part of Shell's transitional activities, eventually resulting in the elimination of the outfalls and the redirection of storm water to other discharge locations (either clean rainwater ponds or the "Accidentally Contaminated" Pond for contaminated/potentially contaminated storm water associated with the future petrochemical plant). Since the outfalls will be eliminated, the 007 – 010 outfall designations will be reused as described in the "Discharge, Receiving Waters and Water Supply Information" section following this summary.

What this means is that *interim* Outfalls 007, 008, 009, and 010 are not the same as *final* Outfalls 007, 008, 009, and 010. For example, once Shell eliminates Outfall 007 as it currently exists, the "Outfall 007" designation will be reused as the designation for overflows from the Complex's South Ponds. At that time, the discharged water will no longer be associated with Horsehead's prior industrial activities or Shell's construction activities—discharges will be new and distinct discharges associated with the Complex and the final limiting period's monitoring requirements at Outfall 007 reflect the pollutants of concern that will be associated with the Complex's industrial activities. This same rationale applies to Outfalls 008, 009, and 010. DEP is not eliminating monitoring requirements during the final limiting period; DEP is simply retaining an outfall designation that will no longer be used and applying that designation to a new outfall.

Other discharges, including Outfalls 104, 204, 304, 404, 504, 604, and 713, will be eliminated from the Permit because they no longer exist. Those outfalls were intended to authorize overflows from temporary pumping basins that were used to pump storm water from low areas across the site to one of the storm water collection ponds for later treatment. As Shell explained in its comment letter on the draft permit amendment:

The pumpback areas were designed so that low areas of the site could be dewatered by collecting excess stormwater during initial site earth moving/filling activities and conveying to the two ponds for treatment and discharge through the interim treatment system (ITS).

We are requesting to delete these outfalls as most of the site has essentially been leveled and many of these areas do not exist. If there is a need to dewater an area, portable pumps can be utilized to convey the stormwater to the two ponds.

Groundwater may still encounter buried contaminants, but site cleanup and redevelopment is being conducted under Pennsylvania's Act 2 Land Recycling Program, which requires Shell to demonstrate attainment of statewide health standards (set forth in 25 Pa. Code Chapter 250) and/or site-specific standards for regulated substances in soil and groundwater and to otherwise comply with all applicable environmental statutes such as the Clean Streams Law. Since the NPDES permit does not directly address soil or groundwater contamination, the Clean Water Program refers interested parties to DEP's website for more information on Act 2: <http://www.dep.pa.gov/Business/Land/LandRecycling/Pages/default.aspx>.

#### Maximum Amount of Wastewater Discharged

Shell does not have an "unlimited license to pollute." Discharges from the Complex are limited by the design capacity of the facility and the permit requirements were developed to prevent pollution based on that design capacity.

By letter dated October 17, 2016 Shell Chemical Appalachia LLC provided comments on the draft NPDES permit amendment for the proposed Complex. An addendum to those comments was provided by Shell on May 10, 2017. DEP's responses are provided below.

**Comment Responses**

**Response to Shell Comment 1 – Hexachlorobenzene**

The hexachlorobenzene mass and concentration limits at IMP 101 are corrected to match those listed in the Fact Sheet for the draft permit amendment as follows:

Parameter	Mass (lbs/day)		Concentration (mg/L)		
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Instant Maximum
Hexachlorobenzene	0.160	0.299	0.015	0.028	0.035

**Response to Shell Comment 2 – Delete Pumpback outfalls**

Because of Shell’s elimination and re-routing of storm water from outfalls 104, 204, 304, 404, 504, 604, and 713, those outfalls will be removed from the final amended permit.

**Response to Shell Comment 3 – Interim Stormwater Outfalls**

The normal NPDES permitting process for discharges associated with construction activities involves the issuance of an NPDES permit that is effective for the duration of construction. That NPDES permit terminates once construction is complete. A separate NPDES permit is then issued for any post-construction industrial waste, sewage, or industrial storm water discharges.

In Shell’s case, both construction discharges and industrial waste discharges exist at the site. When both construction discharges and industrial waste discharges exist at a site, or when discharges associated with construction activities may be impacted by industrial contaminants, the industrial waste NPDES permit establishes requirements for both types of discharges. For these reasons, the 2015 NPDES permit and the amended NPDES permit incorporate Erosion and Sediment Control requirements and Post-Construction Stormwater Management requirements.

Based on untreated storm water data collected by Shell, certain industrial pollutants may still be present in storm water runoff from the site. Therefore, DEP will maintain Outfalls 008, 009, 010 in the permit with mercury, selenium, and thallium added to those outfalls’ monitoring requirements for both the interim and final limiting periods (if not already imposed). Monitoring for mercury, selenium, and thallium also will be added to Outfalls 002, 003, 006, 007, 012, 013, 014, 113, 114, and 813. The end of the interim period for Outfalls 004, 007, 008, 009, 010, and 013 will be specified as the end of construction.

**Response to Shell Comment 4 – Construction Stormwater Outfalls**

Because Shell has eliminated discharges from Outfalls 017, 018, and 019, those outfalls will be removed from the final amended permit.

**Response to Shell Comment 5 – Emergency Discharge from Accidentally Contaminated (AC) Pond**

Pursuant to Shell’s May 10, 2017 letter, any overflows from the AC Pond would be direct discharges to Poorhouse Run through an overflow structure (Outfall 004) constructed as part of AC Pond. Since the removal of the ITSs will eliminate the interim discharge to the Ohio River, the Outfall 004 discharge location for the interim period (during construction) will be the same as the final discharge location. Latitudes and longitudes are updated accordingly.

**Response to Shell Comment 6 – Interim Treatment System (ITS)**

As explained in the Responses to Public Comments, DEP is removing the interim effluent limits from Outfalls 004 and 013. The word “treated” will be removed from the effluent descriptions for those outfalls. Note that Shell must still control storm water through a combination of best management practices including pollution prevention and exposure minimization, good housekeeping, erosion and sediment control, and spill prevention and response.

By letter dated October 18, 2016, Environmental Integrity Project (EIP), et al. (hereafter “Commenters”) provided comments on the draft NPDES permit amendment. DEP’s responses are provided below. Due to the length of Commenters’ comments, only the headings for each comment are provided below. Commenters’ full comments are attached. Note that the comment headings below do not necessarily reflect the entire content of each comment to which responses are provided.

## Comment Responses

### **Response to Request for a Meeting with DEP and EPA Regarding this Permit**

To clarify comments regarding a public meeting/hearing: at the time a public meeting was initially requested, DEP was in receipt of comments from only two or three interested parties. Since interest was limited, DEP proposed to meet with the interested parties individually to answer questions and address concerns more effectively rather than hold a public meeting with the potential, at the time, of low attendance. This proposal was initially rejected by Commenters.

Subsequently, DEP received many comments on the draft NPDES permit. Therefore, a public meeting (Q&A session) immediately followed by a public hearing to gather testimony on both the draft NPDES permit amendment and an Air Quality Plan Approval modification for the Complex was held on December 15, 2016. As previously proposed, DEP also met with EIP and representatives of signatories to EIP's comment letter on December 20, 2016. Responses to testimony given during the public hearing are provided later in this Fact Sheet Addendum.

### **Response to EIP Comment III.A.1. DEP cannot allow Shell to call its Petrochemical Plant a "new facility" for some purposes and an "existing facility" for other purposes when doing so only serves to allow Shell to evade permit application requirements or more stringent effluent limitations.**

Generally, references to the Complex as a "new facility" by Shell and DEP are not intended to invoke of a specific term of art except in certain instances (see p.16, Response to EIP Comment III.D.1.) and even then the Complex or a specific unit at the Complex may qualify as both an "existing facility" and a "new source" as those terms are defined in applicable regulations.

With respect to specific sections of the application mentioned by Commenters: the prompts for production data, laboratory information, and whole effluent toxicity information on the application forms refer to past data and operations. Because Shell has not constructed the Complex, Shell is unable to provide any information pertaining to past data or operations.

To date, Shell has not submitted a PPC Plan for operations at the proposed Complex. However, Condition III.E in Part C of the permit requires that: "For new facilities, the PPC Plan must be submitted to DEP no later than prior to startup of facility operation." DEP recognizes that applicants may not have a PPC Plan ready to submit with the permit application for a proposed facility, which is acceptable provided a PPC Plan is submitted prior to operation. It is unlikely that the Complex will be ready to operate within the five-year term of the current NPDES permit, so a PPC Plan for the Complex may not be submitted for some time.

Shell's references to an existing facility in the application are related to the Cooling Water Intake Structure, which is a structure previously operated by Horsehead that was not demolished with the rest of Horsehead's zinc smelting facilities. Further clarification regarding the intake structure and Commenters' reference to Shell's cooling tower system is provided in the Response to EIP Comment III.D.1 on p.16.

### **Response to EIP Comment III.A.2. DEP must reject Shell's amendment application and require Shell to submit an application for a new, distinct NPDES permit for the Petrochemical Plant because an amendment application fails to require data, fees, and other information required for a new permit.**

Commenters incorrectly state that Shell was subject to different permit application requirements than those applicable to new facilities (excepting the application fee). If an application for a new permit was submitted, then Shell would have provided the same information it provided with the permit amendment application. The full passage of the Instructions for Application for Permit Amendment cited by Commenters states:

**Important Note:** this amendment application is made available as a convenience so that the applicant can bypass completion of the lengthier individual NPDES permit applications. However, there are elements of the individual NPDES permit applications that may still need to be completed and submitted as part of the amendment application. For example, the addition of a new process wastewater stream and outfall may necessitate the completion of Analysis Results Tables contained in the individual permit application to estimate discharge concentrations. A general recommendation is that for industrial waste facilities and sewage facilities that are required to complete the "Major Sewage Facility" application (3800-PM-BPNPSM0009b), check with the regional office that issued your permit to determine what, if any, modules or tables from the individual NPDES permit applications may need to be completed and submitted.

### Comment Responses

As stated above, there are elements of the individual NPDES permit application that may need to be completed and submitted as part of a permit amendment application. Although the amendment process allows applicants to bypass parts of an individual NPDES permit application, Shell did not bypass any requirements of the individual NPDES permit application. DEP and Shell discussed the application requirements prior to application submittal and it was determined that Shell should submit all information required for an Application for Individual Permit to Discharge Industrial Wastewater with the two-page Application for Permit Amendment as the cover for that application. Shell has not avoided additional regulatory or public scrutiny, bypassed any application requirements, or failed to disclose any of the information that is required of a new facility.

#### New Application for New Permit

A new application for a new permit is not necessary and it is within DEP's authority to make that determination in accordance with 25 Pa. Code § 92a.24(a) and the causes for modification under 40 CFR § 122.62(a):

25 Pa. Code § 92a.24. New or increased discharges, or change of waste streams.

(a) *Sewage discharges and industrial waste discharges.* Facility expansions, production increases, process modifications, or any change of wastestream, that may result in an increase of pollutants that have the potential to exceed ELGs or violate effluent limitations specified in the permit, or that may result in a new discharge, or a discharge of new or increased pollutants for which no effluent limitation has been issued, must be approved in writing by the Department before the permittee may commence the new or increased discharge, or change of wastestream. The Department will determine if a permittee will be required to submit a new permit application and obtain a new or amended permit before commencing the new or increased discharge, or change of wastestream. [emphasis added]

40 CFR § 122.62(a) *Causes for modification.* The following are causes for modification but not revocation and reissuance of permits except when the permittee requests or agrees.

(1) *Alterations.* There are material and substantial alterations or additions to the permitted facility or activity (including a change or changes in the permittee's sludge use or disposal practice) which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit.

An NPDES permit was issued to Shell in June 2015. Shell has operated under that permit for two years. Transferring the permit when it was renewed in June 2015 was appropriate because Horsehead's activities immediately preceding the permit renewal and transfer and Shell's activities immediately after the permit renewal and transfer were essentially the same. Shell is now proposing substantial alterations to its permitted activities which will occur after permit issuance that justify the application of permit conditions that are different or absent in the existing permit. Pursuant to 40 CFR § 122.62(a) and DEP's authority under 25 Pa. Code § 92a.24, permit modification is an appropriate action.

#### **Response to EIP Comment III.B. DEP incorrectly failed to apply the ELGs for the petroleum refining point source category to IMP 101, allowing Shell to escape limits on toxic pollutants such as hexavalent chromium.**

Effluent limitations from 40 CFR Part 419 – Petroleum Refining Point Source Category do not apply to the proposed Complex. Subcategorization under the Petroleum Refining Effluent Limitations Guidelines (ELGs) is related to the degree of process integration at a refinery with each subpart including another process type that is additive to the previous subpart's processes (except Subpart D, which is partly additive of other subparts, and Subpart E, which includes the processes identified in all Subparts A through D). The applicability descriptions are organized as follows: Subpart A applies to facilities using topping; Subpart B applies to facilities that use topping and cracking; Subpart C applies to facilities that use topping, cracking, and petrochemical operations; Subpart D applies to facilities that use topping, cracking, and lube oil manufacturing processes; Subpart E applies to facilities that use topping, cracking, lube oil manufacturing processes, and petrochemical operations. Topping is the process of separating crude oil into hydrocarbon groups by desalting, atmospheric distillation, or vacuum distillation.

The feedstock received by the Complex will be composed of natural gas liquids containing ethane. No crude oil will be received by or processed at the Complex. Since every subpart under Part 419 includes topping (crude oil processing), Part 419 does not apply to the Complex or to any standalone cracking or petrochemical manufacturing facilities; the attached figures (Figures III-1 and V-1) from the *Final Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category* (October 1987) illustrate this. The Complex's SIC Codes

### Comment Responses

(2821 and 2869) and Figure III-1 show that the facility is within the Petrochemical Industry and not the Feedstock Industry. Figure V-1 shows that the Complex's operations fall under OCPSF Plant Operations and not Refinery Operations. Cracking is also identified as a process conducted within the OCPSF industry (see attached Table III-8 from the OCPSF ELG Development Document).

**Response to EIP Comment III.B.1. Shell cannot use the permit amendment process to escape compliance with TDS treatment requirements and, anyway, is not eligible for an exemption from these requirements even through the permit amendment process.**

The TDS mass loadings were authorized by DEP prior to August 21, 2010 and that authorization remained valid upon renewal and transfer of the NPDES permit from Horsehead to Shell. The discontinuance of discharges by Horsehead does not eliminate DEP's prior authorization to discharge TDS loading. As explained below in the "25 Pa. Code § 95.10" section of this comment response, discharges can be discontinued, but the TDS discharge loading authorized by an NPDES permit prior to August 21, 2010 will continue to exist under an active NPDES permit. Also, changes in waste streams, including new discharges, can be accommodated under an active NPDES permit's authorized TDS discharge loading without triggering TDS treatment requirements if there is no net increase in TDS discharge loadings.

Prior to August 21, 2010, a TDS discharge loading authorized by NPDES Permit PA0002208 existed at the site and that loading was approved by permits issued to Horsehead before August 21, 2010 (most recently when the NPDES permit was renewed in 2001). The authorized load was transferred to Shell when NPDES Permit PA0002208 was renewed and transferred in 2015. It is the existence of a pre-August 21, 2010 authorized TDS discharge loading associated with NPDES Permit PA0002208 that makes Shell eligible for the 25 Pa. Code § 95.10(a)(1) exemption under that same NPDES permit.

Previously Authorized TDS Loading under Horsehead Corporation Ownership

With respect to Horsehead's existing TDS discharge loading authorized prior to August 21, 2010, DEP's calculations are consistent with DEP's "Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) -- 25 Pa. Code §95.10" (pp.6-7):

The permit writer should determine the existing mass loading of TDS for a discharge. The general process to establish this should follow the procedure shown below, and relies primarily on existing effluent limits or application data to establish the existing mass loading. The existing mass loading determination should be performed using one of the following options in descending order of preference:

- a. If there are existing mass- or production-based TDS effluent limits, use these as the basis for the existing mass loading.
- b. If there are existing concentration-based TDS effluent limits, use the average concentration and average annual design flow to determine the average existing mass loading, and the maximum daily concentration and the maximum daily design flow (or other peak flow value) to determine the maximum existing mass loading.

NOTE: Loading (lb/day) = Flow (MGD) \* Concentration (mg/L) \* 8.34

Loading (lb/day) = Flow (cfs) \* Concentration (mg/L) \* 5.4

- c. If no effluent limits for TDS are applicable, use TDS analysis data from the current and/or the prior permit applications as the basis for the average and maximum existing mass loading. Perform concentration/flow calculations as described above in subsection b. If no effluent limits for TDS are applicable, but monitoring and reporting through the DMR process has been performed, TDS analysis data from the DMRs also may be used as a basis for establishing the average and maximum existing mass loading. In general, the highest representative data may be selected from the average data values and the maximum data values that are available, provided that the representative data are consistent with DEP authorizations issued prior to August 21, 2010. In addition to TDS analytical data, the permit writer may consider the full design operating capacity of the production process, or authorized treatment process, as part of the previous authorization and a basis for determining the existing mass loading.

Horsehead had no existing mass, production, or concentration-based TDS effluent limits, so TDS discharge loading based on those sources of information could not be determined. Therefore, option (c) applies. Horsehead's discharges were authorized by NPDES permits issued prior to August 21, 2010 and, as the guidance states, it is acceptable to use representative data that

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are consistent with DEP authorizations issued prior to August 21, 2010 to establish existing authorized TDS loading and those loadings “do not expire and may be carried forth through permit reissuance.” DEP used TDS analytical data from the most recent permit application (submitted in 2006) to calculate the existing authorized loading of TDS. Horsehead’s application data from 2006 pre-date August 21, 2010 and were based on representative samples of Horsehead’s discharges that were authorized under previous issuances of NPDES Permit No. PA0002208 (prior to August 21, 2010). Therefore, the 2006 application data may be used to establish the TDS discharge loading that was implicitly authorized by previous issuances of NPDES Permit PA0002208.

25 Pa. Code § 95.10

Section 95.10 of the regulations generally requires, among other things, dischargers to treat new and expanding mass loadings of TDS. Section 95.10(a)(1) provides an exemption to this treatment requirement. Specifically, the subsection exempts from treatment any maximum daily discharge of loads of TDS that were authorized by the Department prior to August 21, 2010. The Department considers these authorized discharges as existing mass loadings, for which the enhanced treatment requirements set forth in § 95.10(c) do not apply. The Department has consistently applied the term “authorized” in § 95.10(a)(1) in the broadest possible manner. This interpretation is consistent with the goals of Section 95.10.

Specifically, the overarching goals of Section 95.10 are to reserve a portion of the assimilative capacity for TDS in Pennsylvania’s waters as necessary to allow for future growth and ensure ongoing compliance with Pennsylvania’s potable water supply water quality criterion for TDS while recognizing that a portion of the assimilative capacity is already consumed by existing TDS dischargers. The draft NPDES permit amendment for Shell accomplishes the goal of reserving assimilative capacity and ensuring compliance with the 500 mg/L TDS water quality criterion.

The evaluation of Shell’s exemption eligibility hinges not on whether Horsehead is still discharging, but whether an authorized TDS discharge loading associated with NPDES Permit PA0002208 existed prior to August 21, 2010. If a previously authorized TDS discharge loading existed under an NPDES permit issued prior to August 21, 2010 and that NPDES permit remains in effect, then the TDS discharge loading authorized by that permit remains in effect independent of the types of discharges currently authorized by that NPDES permit. This rationale draws from the following section of the preamble to the Section 95.10 rulemaking (40 Pa.B. 4835):

Further, the Board also recognizes that discharges from industries are production-based. A currently-authorized discharge load may not reflect past authorizations due to changes in product lines or current economic conditions. Therefore, the regulation identifies the existing discharge load of TDS as the maximum daily discharge load authorized "prior to" the effective date of the final-form rulemaking. This provision allows a discharger to have past authorized, or preexisting, TDS loads considered as existing loads.

The Board recognizes that what exists at a facility now is not necessarily representative of what existed prior to August 21, 2010. A facility and its discharges may have changed since that date with substantial changes being more likely as permit renewals become farther removed from the effective date of the Section 95.10 rulemaking. For this reason, the existing discharge load of TDS is determined using the maximum daily discharge loading authorized prior to August 21, 2010. Once DEP determines the TDS discharge loading authorized prior to August 21, 2010, the effluent sources used to calculate the authorized TDS discharge loading are decoupled from the calculated load. The TDS discharge concentrations and flow rates of a facility’s discharges would still be used to determine the facility’s TDS discharge loading at any given time to determine whether there are increases in TDS loading rates. However, once it is calculated, the authorized TDS discharge loading is only used as a comparative value to determine the magnitude of a net increase in the TDS discharge loading over what was previously authorized (to determine whether § 95.10 treatment requirements apply).

As explained in the Fact Sheet, DEP considers Shell’s discharges to be exempt under 25 Pa. Code § 95.10(a)(1). DEP acknowledges that 25 Pa. Code § 95.10(a)(7) exemption cited in the Fact Sheet does not apply because Shell is not increasing TDS mass loadings. The preamble to the final form rulemaking (40 Pa.B. 4835) explains the Environmental Quality Board’s intent with the § 95.10(a)(1) exemption:

§ 95.10(a)(1). This section makes it clear that discharge loads of TDS authorized by the Department, under NPDES permits or other authority that were issued or reissued prior to the effective date of this final-form rulemaking, are exempt from the regulation until the net load is to be increased. It is important to note that only an increase in net TDS load is considered to be a new or expanding discharge loading.

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Discharge loads of TDS may be authorized by the Department without actual effluent limitations or monitoring requirements having been placed in an NPDES permit. In most cases, discharge TDS data (or in the case of mining operations, specific conductivity and sulfates data) are submitted with the sample results required for permit applications. Upon review of those data, the Department may determine that these loads do not pose a threat to receiving water quality and thus limitation [sic] are not needed. In these cases, the TDS discharge has been authorized, but not limited. Therefore, if TDS (or conductivity) data have been reviewed by the Department as part of an application for an authorized discharge, the discharge load of TDS has been authorized upon issuance of the permit (or other vehicle), regardless of whether there is an actual limitation or monitoring requirement.

Further, the Board also recognizes that discharges from industries are production-based. A currently-authorized discharge load may not reflect past authorizations due to changes in product lines or current economic conditions. Therefore, the regulation identifies the existing discharge load of TDS as the maximum daily discharge load authorized "prior to" the effective date of the final-form rulemaking. This provision allows a discharger to have past authorized, or preexisting, TDS loads considered as existing loads.

Currently, authorized loadings of TDS, and its components such as sulfates and chlorides, are considered to be the existing discharge loads, even if the facility has in fact typically discharged at a lower load than that authorized by its permit. If a facility applies for a net increase in its authorized TDS loading rate, only the amount of the net increase in its authorized TDS loading will be considered as a new and expanding discharge of TDS subject to the requirements in this rule. The section also clarifies that authorized loads are not subject to the rule if they are merely being combined or relocated from one point in a watershed to another, so long as net mass loadings are not increased by the combination or relocation activity. [...]

The Department also received inquiries regarding the proper method for establishing existing discharge loads for the purpose of separating them from proposed load expansions. Guidance materials will be developed to accompany this regulation and will be completed prior to the rule becoming effective. [...]

Finally, it should be noted that the requirements in § 95.10 are expected to be implemented through the Department's administration of the NPDES permitting program. Section 95.10 sets forth treatment requirements which will be implemented in accordance with the framework established by § 92.2a (relating to treatment requirements).

Integral to understanding Section 95.10 is the concept of net mass loadings of TDS. As stated in the preamble passage cited above, "only an increase in net TDS load is considered to be a new or expanding discharge loading." DEP explained in the Fact Sheet that the Ohio River previously received a load of TDS from Horsehead and will continue to receive a load of TDS from Shell. The magnitude of Shell's anticipated TDS discharge loading is less than the TDS discharge loading from Horsehead and Shell is otherwise restricted by 25 Pa. Code § 95.10 and Condition X in Part C of the permit from discharging TDS at levels greater than what Horsehead discharged without being subject to an evaluation regarding the need for TDS treatment under § 95.10.

Cooling water discharges are exempt from TDS requirements for the same reason—there is no net increase in the mass loading of TDS. Example 10 in Appendix B on p.28 of DEP's "Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) -- 25 Pa. Code §95.10" explains this rationale:

Section 95.10 applies only to net loadings of TDS as described in the preamble to the final rulemaking. The primary source of TDS in blowdown is natural, and the closed-cycle cooling system merely concentrates the natural concentrations of TDS, so it does not represent a net increase in TDS loading. This applies whether the source of makeup water is from public supply, groundwater or surface water. Non-contact cooling water discharges, including blowdown, generally do not have any applicable requirements under §95.10.

**Response to EIP Comment III.C. DEP's deletion or weakening of limits and monitoring requirements at the end of an "Interim Period" is not well-defined, fails to ensure remediation of discharges, and violates the anti-backsliding provisions of the Clean Water Act.**

Removing effluent limits and/or monitoring requirements is not a contravention of the Clean Water Act or its implementing regulations (specifically, 40 CFR § 122.44(l) regarding anti-backsliding) when there is a justification to remove effluent limits and/or monitoring requirements. DEP contends that such justification exists or, alternatively, that anti-backsliding does not apply as explained in the following responses.

### Comment Responses

**Response to EIP Comment III.C.1. The Draft Permit removes limits and monitoring requirements for toxic pollutants at several outfalls after an “Interim Period” without ensuring the pollution has ceased.**

Commenters state that the removal of effluent limits and monitoring requirements at the end of the Interim Period is illegal because the draft permit does not require that the discharges of the limited/monitored pollutants cease upon construction of the Complex. However, the draft permit amendment already accounts for this. The changes between the interim and final limiting periods at Outfalls 007, 008, 009, and 010 are not subject to anti-backsliding for the reasons explained in the Responses to Public Comments and the Response to EIP Comment III.C.2 below. To summarize, the Interim Period ends and the Final Period begins when Shell stops discharging the wastewaters listed in the permit for the Interim Period and starts discharging the wastewaters listed in the permit for the Final Period. Page 1 and Pages 12 through 15 of the Fact Sheet explained how the transition would work for each of those outfalls. Anti-backsliding is not a factor because DEP is not relaxing effluent limits during the Final Period; DEP is applying new monitoring requirements to new discharges that reuse outfall numbers from discharges that will be eliminated.

With respect to interim and final limits for Outfalls 004 and 013 in the draft permit amendment, the end of the Interim Period and start of the Final Period would occur once DEP determines that storm water no longer requires treatment. If pollutants are still present in storm water at levels that require treatment, then the Interim Period would not end. Put another way, the removal of effluent limits and monitoring requirements would not occur until the discharges qualify for less stringent effluent limits and monitoring requirements in accordance with the exceptions to anti-backsliding given under 40 CFR § 122.44(l).

As explained in the Responses to Public Comments (see p.6), the effluent limits and monitoring requirements included in the current permit were based on the potential for storm water runoff to encounter slag and related materials remaining at the site. The basis for the removal of effluent limits and monitoring requirements would be that the pollutants are not present in treatable concentrations and there is no reasonable potential for the pollutants to be present in discharges at levels that would cause or contribute to an excursion above water quality standards. Based on available information, DEP has determined that storm water treatment is no longer required.

By capping the site with at least two feet of fill, the potential for storm water runoff to be contaminated has decreased because the materials that would have impacted storm water runoff are now buried. Areas with more concentrated metals were capped with liners and concrete pads (see p.16, Response to EIP Comment III.C.3). Construction of the Complex will further isolate any underlying material so that storm water runoff from the Complex will only be impacted by Shell’s activities (with storm water monitoring requirements being imposed based on Shell’s industrial activities). The graphs attached to this Fact Sheet Addendum support the conclusion that pollutants are not present in treatable concentrations. Therefore, the numerical effluent limits at Outfalls 004 and 013 will be removed from those outfalls’ Interim Periods. This relaxation of effluent limits is consistent with the exceptions to anti-backsliding given by 40 CFR § 122.44(l)(2)(i)(A) (material and substantial alterations including site capping and liner and concrete pad installation) and § 122.44(l)(2)(i)(B)(1) (new information including actual storm water quality as opposed to estimated storm water quality based on SPLP testing results).

Some pollutant concentrations in untreated storm water suggest potential upward trends and DEP has added monitoring requirements to the permit for those pollutants (mercury, selenium, and thallium).

**Response to EIP Comment III.C.2. DEP fails to define when the “Interim Period” ends and the “Final Period” begins.**

DEP understands that the draft NPDES permit amendment did not clearly define the basis for the transition from the Interim Period to the Final Period for outfalls that are subject to interim and final limits. However, the transition between interim and final limiting periods was explained in the Fact Sheet accompanying the draft permit amendment and Commenters cited the portion of the Fact Sheet that explains the difference between the interim and final limiting periods at Outfalls 007, 008, 009, and 010. To quote fully the relevant passage from Page 1 the Fact Sheet:

Many existing monitoring locations will be eliminated as demolition, earthmoving and construction activities move toward completion. The outfall numbers assigned to the eliminated monitoring locations will be reused for monitoring locations proposed as part of the final site plan for the petrochemical plant (i.e., post-plant construction). The permit amendment will be structured so that all discharges in the existing permit are maintained. Monitoring locations with outfall numbers that will be reused for discharges from the future petrochemical plant will have an interim effective period during which the existing permit limits will be in effect and a final effective period for discharges associated with the petrochemical plant.

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The current permit authorizes existing discharges at Outfalls 007, 008, 009, and 010. The interim limiting period in the draft permit amendment maintains the existing permit limits for the existing discharges at those outfalls. Eventually, those existing discharges will be eliminated. Once the discharges are eliminated, the final limiting periods for Outfalls 007, 008, 009, and 010 will take effect with monitoring requirements that apply to the new discharges that will exist after the Complex is built.

Misunderstandings regarding interim and final limits may be a result of the permit including requirements for one interim period and one final period when theoretically there will be two interim periods and one final period with two different triggers for when those limits would take effect: 1) when DEP determines that storm water treatment is no longer required and 2) when construction of the Complex is complete. The draft permit was simplified by presuming that construction storm water would be impacted by Shell's industrial activities, thus eliminating the interim period between DEP's determination that storm water treatment is no longer required and the end of construction. The two tables below show the anticipated phases for Shell's interim and final storm water discharges at Outfalls 004, 007, 008, 009, 010, and 013 and how DEP intended to permit those discharges in the draft permit amendment.

**Anticipated Discharge Phases**

<b>Interim Period 1 Effluent Sources</b>	<b>End of Interim Period 1 Start of Interim Period 2</b>	<b>Interim Period 2 Effluent Sources</b>	<b>End of Interim Period 2 Start of Final Period</b>	<b>Final Period Effluent Sources</b>
Storm water associated with Horsehead's industrial activities (i.e., construction storm water impacted by Horsehead legacy contaminants)	DEP determines that storm water treatment is no longer required based on analytical results from Shell and completion of major earthmoving	Construction storm water (pollutants not present in treatable concentrations and no reasonable potential to violate water quality criteria)	Construction of Petrochemicals Complex is complete; new discharges from the Complex commence	Storm water associated with Shell's industrial activities

**Draft Permit Amendment Requirements for Anticipated Discharge Phases**

<b>Interim Period Effluent Sources</b>	<b>End of Interim Period Start of Final Period</b>	<b>Final Period Effluent Sources</b>
Storm water associated with Horsehead's industrial activities (i.e., construction storm water impacted by Horsehead legacy contaminants)	DEP determines that storm water treatment is no longer required based on analytical results from Shell and completion of major earthmoving	Storm water associated with Shell's industrial activities. For this limiting period, DEP is presuming that construction storm water is associated with Shell's industrial activities, which 1) eliminates the need for a second interim limiting period applicable to construction storm water and 2) is more conservative because it assumes that construction storm water will be impacted by industrial activities that do not exist yet

As discussed in the Responses to Public Comments, DEP has determined that storm water treatment is no longer required. Based on the table above, that decision would eliminate the need for the interim period in the amended permit because the trigger for the final period to take effect has occurred before issuance of the permit amendment. However, DEP will maintain interim and final limiting periods with the final limits taking effect once the Complex is constructed. This shifts the monitoring requirements imposed on construction storm water from Shell-based constituents to Horsehead/legacy-based constituents. The effective date for monitoring requirements applicable to storm water discharges associated with Shell's industrial activities will be delayed until completion of construction. Note that numerical effluent limits at Outfalls 004 and 013 will be removed from the final amended permit, but some monitoring associated with legacy constituents will remain at those outfalls until the Complex is constructed. Presently, discharges from Outfalls 004 and 013 are pumped discharges from storm water collection ponds (water is pumped from the ponds, treated, and discharged). Like the other storm water outfalls, the interim limits will apply until the Complex is constructed, at which time those discharges will transition to pond overflows. As stated previously, the requirement to treat storm water will be eliminated as part of this permit amendment.

**Final Permit Amendment Requirements for Anticipated Discharge Phases**

<b>Interim Period Effluent Sources</b>	<b>End of Interim Period Start of Final Period</b>	<b>Final Period Effluent Sources</b>
Storm water associated with Horsehead's industrial activities (i.e., construction storm water impacted by Horsehead legacy contaminants). No limits at Outfalls 004 and 013 based on analytical results from Shell and completion of major earthmoving; however, monitoring is still required.	Construction of Petrochemicals Complex is complete; new discharges from the Complex commence	Storm water associated with Shell's industrial activities

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**Response to EIP Comment III.C.3. Existing contamination at the site is pervasive, and Shell has stated openly and flagrantly that its demolition and construction activities under Act 2 will not clean up the existing contamination.**

See Responses to Public Comments (see p.7). The NPDES permit does not address site remediation activities conducted under Act 2. The effluent limits and monitoring requirements Commenters reference are for point source discharges to the Ohio River, Rag Run, and Poorhouse Run and DEP considered the potential effects of soil and groundwater contamination on those point source discharges (see p.6, Responses to Public Comments and p.14, Response to EIP Comment III.C.1). Otherwise, the NPDES permit only peripherally relates to soil and groundwater contamination in the context of post-construction stormwater management.

Even though the NPDES permit does not address site remediation, DEP notes that Commenters' concerns were addressed as part of Act 2 site cleanup. Shell stated the following in its Post-Construction Stormwater Management Plan:

As discussed in the Act 2 Remedial Investigation/Risk Assessment report and Cleanup Plan (ERM 2015), there are seven areas on the former Smelter Property and one area on the Fly Ash Landfill that exceed Site-Specific soil to groundwater standards (areas identified on ERM Figure 4-8 that are north of existing SR-18). The soils exceeding these standards which remain after any necessary re-location to facilitate future unit/building foundations or general site development will be graded smooth and covered with a 40 mil PVC geomembrane prior to installing a soil cover that is minimum 2-foot thick. One location on the former Smelter Property will be under the concrete abutment for the new bridge crossing the CSX rail line. Soils in the three northern-most areas on the former Smelter Property (described above) will be designated as "no dig zones" based on the presence of mercury above non-residential direct contact standards. These three areas will be graded smooth and a bentonite mat, or equivalent, will be installed prior to installing an 8-inch thick fiber reinforced concrete slab to create a no dig barrier. The concrete slab will be buried with unimpacted soil to match the new grade.

Additional information on soil and groundwater contamination and cleanup activities to ensure the protection of human health and the environment would be available in the Act 2 Remedial Investigation/Risk Assessment Report and Cleanup Plan.

**Response to EIP Comment III.D.1. DEP must not allow Shell to artificially reduce the capacity of its cooling system in order to evade permit requirements.**

Commenters appear to identify correlations between effluent limits for cooling tower blowdown at IMP 201 and the proposed intake flow rate at the cooling water intake structure (CWIS). The existing CWIS and the proposed cooling tower are separate structures with separate requirements. Section 316(b) relates to standards for entrainment and impingement at the intake, not effluent limits for discharges of blowdown from a cooling tower.

CWA Section 316(b)

The proposed Petrochemicals Complex does not fit the definition of "new facility" under 40 CFR § 125.83 and is therefore classified as an existing facility as defined under the same regulation ("Existing facility means any facility that is not a new facility."). Although it may seem counterintuitive, the Complex can be both an existing facility and a new source depending on which requirements are being applied (Cooling Water Intake Structure Requirements under Section 316(b) versus Federal Effluent Limitations Guidelines). DEP's references to the Complex as a "new facility" in draft permit documents are not intended as references to the Section 316(b)-specific definition of "new facility" in § 125.83, which states:

New facility means any building, structure, facility, or installation that meets the definition of a "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4) and is a greenfield or stand-alone facility; commences construction after January 17, 2002; and uses either a newly constructed cooling water intake structure, or an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water. New facilities include only "greenfield" and "stand-alone" facilities. A greenfield facility is a facility that is constructed at a site at which no other source is located, or that totally replaces the process or production equipment at an existing facility (see 40 CFR 122.29(b)(1)(i) and (ii)). A stand-alone facility is a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site (see 40 CFR 122.29(b)(1)(iii)). New facility does not include new units that are added to a facility for purposes of the same general industrial operation (for example, a new peaking unit at an electrical generating station).

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Based on this definition, to be a “new facility,” the Complex must be classified as a “new source” or a “new discharger”; must be a greenfield or stand-alone facility; must commence construction after January 17, 2002; and must use either a newly constructed cooling water intake structure (CWIS) or an existing CWIS whose design capacity is increased. All of the listed criteria must be met for the Complex to be a “new facility” under Section 316(b).

Shell will make use of the existing CWIS without increasing the design capacity of that CWIS. Therefore, the Complex is not a new facility for the purposes of Section 316(b). Shell is not evading Section 316(b) permitting requirements for new facilities because by not increasing the CWIS’s design intake flow, the Complex is, by definition, an “existing facility” under the Section 316(b) regulations. That the cooling towers are not yet constructed is irrelevant to the “new facility” determination for Section 316(b) requirements.

The circumstances at Shell are most closely referenced in 40 CFR § 125.83(1)(ii):

(1) Examples of “new facilities” include, but are not limited to: the following scenarios:

(ii) A facility is demolished and another facility is constructed in its place. The newly-constructed facility uses the original facility’s cooling water intake structure, but modifies it to increase the design capacity to accommodate the intake of additional cooling water.

Horsehead’s zinc smelter was demolished and another facility (Shell’s Petrochemicals Complex) will be constructed in its place. The newly-constructed facility will use the original facility’s cooling water intake structure without increasing the design capacity. To be subject to Section 316(b) requirements for new facilities, the design capacity would have to increase. Since the design capacity is not increasing, the Complex is subject to Section 316(b) requirements for existing facilities.

IMP 201 Cooling Tower Blowdown

As Commenters state, DEP has applied its BPJ to impose effluent limits for cooling tower blowdown based on the effluent limits given by 40 CFR Part 423. The IMP 201 limits are unrelated to Section 316(b) and its implementing regulations, which are not considered when imposing effluent limits on discharges of cooling tower blowdown.

**Response to EIP Comment III.D.2. DEP must require reporting of cooling water intake flow monitoring data to the agency on at least a monthly basis with the required DMR data from all outfalls.**

Commenters state that DEP must require monitoring and reporting of daily intake flow to confirm Shell’s reduced design capacity and that this somehow relates to weaker permit limits for Shell’s cooling system. As explained in the Response to Comment III.D.1 above, requirements for the CWIS and permit limits for cooling tower blowdown are not related.

Shell is not modifying the existing CWIS to increase its flow capacity. Shell has represented to DEP that the Complex will be designed to use a maximum of 21.4 MGD of flow from the CWIS. It is not necessary to confirm this with frequent intake flow reporting because the design of the Complex and the maximum amount of flow that may be needed to conduct petrochemical manufacturing and associated operations (21.4 MGD) will not change from day-to-day. If there is an increase in the operating flow rate and/or intake flow rate, then Shell would have to report that increase to DEP pursuant to the reporting requirements listed in Part A.III.C of the permit.

The minimum daily monitoring of intake flows required by the permit will be used to establish the Actual Intake Flow for future evaluations of Section 316(b) requirements and such evaluations would be performed when the permit is renewed.

**Response to EIP Comment III.D.3. Shell’s application failed to disclose estimated discharges from its “existing” cooling tower system.**

See p.16, Response to Comment III.D.1.

**Response to EIP Comment III.D.4. DEP should limit and must require monitoring of chromium and zinc from cooling tower discharges at IMP 201.**

The quality of cooling tower blowdown was reported indirectly—and satisfactorily at this stage of development—through the reporting of effluent quality for IMP 101 and Outfall 001. DEP’s rationale for not including chromium and zinc limits is

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reasonable. The federal regulation referenced for limits at IMP 201 specifically relates the limitation of chromium and zinc to chemicals added for cooling tower maintenance. If limits for chromium and zinc are applied to cooling tower blowdown under 40 CFR Part 423 based on an allowance for the presence of those metals in chemicals used for cooling tower maintenance and Shell is not using chemicals containing chromium or zinc, then chromium and zinc limits are reasonably unnecessary.

The permit is also more stringent than 40 CFR Part 423 because, by not limiting chromium or zinc at IMP 201, Condition I.L. in Part C of the permit effectively extends the prohibition on detectable amounts of priority pollutants contained in cooling tower maintenance chemicals to chromium and zinc. Imposing limits for chromium and zinc at IMP 201 would incorporate the exception for those pollutants allowed by 40 CFR 423. Not imposing the limits means that chromium and zinc are not excluded from the priority pollutant prohibition.

Condition IX in Part C of the amended permit will ultimately require full analyses of Shell's actual effluent consistent with the requirements of the Application for Individual Permit to Discharge Industrial Wastewater. Those results will confirm which pollutants are present in Shell's effluent and the permit will be modified as necessary based on those results.

**Response to EIP Comment III.D.5. DEP must require at least monitoring and reporting of the 126 priority pollutants from IMP 201 in order to ensure compliance with ELGs that represent BAT for these discharges.**

Regular monitoring for the 126 priority pollutants listed in 40 CFR Part 423 Appendix A is not a regulatory requirement. The requirements specified in Condition I.L in Part C of the permit are consistent with § 423.13(d)(3) and § 423.15(b)(10)(iii) regarding alternative demonstrations of compliance with the prohibition on the discharge of the 126 priority pollutants as a result of the use of cooling tower maintenance chemicals. The alternative to regular monitoring would include one-time calculations (i.e., "engineering calculations") to demonstrate that priority pollutants are not present due to the use of cooling tower maintenance chemicals. Shell has confirmed with its chemical supplier that priority pollutants will not be present in the cooling water effluent as a result of Shell's use of the chemical additives listed in the application. DEP has added a requirement to Condition I.L in Part C of the permit that requires Shell to submit engineering calculations to demonstrate compliance with the priority pollutant prohibition whenever Shell proposes to use a cooling tower maintenance chemical that has not been approved for use at the Complex.

**Response to EIP Comment III.E.1. DEP should use its discretion to impose limits as set forth in 40 C.F.R. § 414.91 and monitoring requirements for chromium, copper, nickel, and total cyanide, as well as lead and zinc, from IMP 101.**

DEP's decision to forgo effluent limitations for chromium, copper, lead, nickel, zinc, and total cyanide is consistent with the regulatory basis for doing so under 40 CFR § 414.91(b). Shell will not produce or discharge any of the metal or cyanide-bearing waste streams identified in Appendix A of Part 414 and the metals that may be present as a result of incidental pipe corrosion are not expected to be present in significant concentrations. Therefore, Shell is not subject to the metals or total cyanide limitations of § 414.91.

**Response to EIP Comment III.E.2. Outfall 015 authorizes discharges from an illegal seep from a coal combustion residual landfill and must include TBELs for oil and grease as well as limits and monitoring requirements for additional coal ash pollutants.**

The existence of the groundwater seep was not known until May 2013. Horsehead divested itself of Mall Lot 2 and the fly ash landfill under bankruptcy several years ago. The property was an orphan site until it was purchased by Shell.

An investigation of the fly ash landfill was already conducted in 2013 by Michael Baker Jr., Inc. under DEP contract pursuant to the Hazardous Site Cleanup Act (HSCA) program. The extent of contamination is already known.

Oil and grease limits (15 mg/L average monthly and 20 mg/L maximum daily) will be added to Outfall 015 with 2/quarter, grab sampling. Monitoring for antimony, arsenic, boron, cadmium, iron, lead, manganese, mercury, nickel, selenium, and zinc also will be added to Outfall 015 with 1/quarter, grab sampling. Shell's effluent characterization of the seep, as reported on the permit amendment application, did not indicate that most of those pollutants would be present in the discharge at Outfall 015, which is why DEP did not require monitoring for those pollutants in the draft permit amendment. However, those constituents were present in soil and groundwater samples from Mall Lot 2 as reported in Michael Baker Jr., Inc.'s Final Site Investigation Report summarizing the results of the company's 2013 investigation. Consequently, some quarterly baseline monitoring will be required.

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**Response to EIP Comment III.F. DEP failed to limit flow from any of the pipes allowed to release pollutants from this plant and must revise the permit to limit flow.**

The effluent limits in the permit are consistent with regulatory requirements that prescribe how effluent limits are to be expressed in permits. The permit's effluent limits already restrict the total loading of toxic and other pollutants in accordance with applicable laws and regulations. The flow monitoring required by the permit is consistent with the regulatory requirements of 25 Pa. Code § 92a.61, which does not require flow limits. Shell has one process wastewater discharge, which will be controlled on both a mass basis and a concentration basis at Internal Monitoring Point 101. Notably, 40 CFR Part 414 only requires mass limits for OCPSF-industry dischargers, but DEP decided to impose mass limits and concentration limits for the reasons explained in the Fact Sheet. Shell's other discharges, including storm water discharges and precipitation-induced overflows, are transient in nature and discharge at variable flow rates. Such discharges, if subject to effluent limits, would appropriately be controlled on a concentration basis and not a mass basis.

Shell will not be able to discharge "unlimited flow." Discharges from the Complex are limited by the design capacity of the facility and the permit requirements were developed based on that design capacity.

**Response to EIP Comment III.G. The petrochemical industry has an extensive record of noncompliance with permit limits, this site has a history of significant violations, and Shell has a record of noncompliance at its other petrochemical facilities.**

DEP reviewed and considered Horsehead's compliance history at the site and Shell's compliance history at other sites within the state when NPDES Permit PA0002208 was renewed in 2015 and determined that the reported violations did not restrict reissuance or transfer of the permit to Shell Chemical Appalachia LLC. Most of the effluent violations cited by Commenters were associated with Outfall 006 from Horsehead's former captive landfill located along Raccoon Creek. That landfill and its sole outfall were retained by Horsehead and permitted separately under NPDES PA0254584. A Consent Order and Agreement was executed concurrently with issuance of that permit to address noncompliance at Outfall 006.

Also, the Outfall 006 violations and the rest of the violations Commenters cite occurred under Horsehead's ownership. Since those violations were associated with Horsehead's operations and those operations were no longer taking place, DEP did not consider those violations to be a hindrance to reissuance or transfer. Essentially, Horsehead's violations under NPDES Permit PA0002208 are not Shell's violations and they would not reflect upon Shell's ability or willingness to comply with the NPDES permit.

Part C.III.E of the permit requires that Shell develop a Pollution, Prevention and Contingency Plan to control potential pollutants and respond to spills or similar incidents that may cause pollution. Other environmental emergency response plans would address pollution prevention measures for other regulated facilities and activities conducted onsite (such as a Spill Prevention Control and Countermeasure plan).

Compliance problems at other petrochemical plants and at other Shell facilities may direct a certain level of vigilance for the Complex, but unless and until any violations are noted, DEP would not take any enforcement action.

**Response to EIP Comment III.H.1. DEP underestimated pollutant loads to the Ohio River from Outfall 001 by relying on an incorrect flow value and Shell failed to provide required information, and DEP must require both deficiencies to be corrected.**

Use of the 3.28 MGD flow rate was explained in Section 001.B of the Fact Sheet as follows:

Shell provided both wet and dry weather estimates for discharge flows and effluent concentrations; the dry weather data will be used because water quality analyses are supposed to be modeled at Q<sub>7-10</sub> low stream flow conditions pursuant to 25 Pa. Code § 96.4(g).

25 Pa. Code § 96.4(g) requires mathematical modeling at Q<sub>7-10</sub> low stream flow conditions. Q<sub>7-10</sub> is defined as the actual or estimated lowest 7 consecutive-day average flow that occurs once in 10 years for a stream with unregulated flow, or the estimated minimum flow for a stream with regulated flow (such as the Ohio River). The 3.75 MGD flow rate is the estimated flow rate at Outfall 001 under wet weather conditions (i.e, when storm water from process areas is treated with process wastewaters). The 3.28 MGD flow rate used for modeling is the dry weather discharge flow rate, which is the discharge flow rate expected to occur at Q<sub>7-10</sub> conditions. Therefore, DEP's calculations were accurate based on applicable regulations.

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However, because contributions to the treatment system from the AC Pond are controlled by Shell and the 3.75 MGD flow could theoretically occur at Q<sub>7-10</sub> conditions if Shell were to pump storm water from the AC Pond to the treatment system while operating at maximum capacity under minimum regulated flow conditions in the Ohio River (an unlikely scenario, but nonetheless possible), DEP has rerun the PENTOXSD model using a discharge flow of 3.75 MGD. The revised analysis results in one new monitoring requirement for copper at Outfall 001 (see attached Toxics Screening Analysis and PENTOXSD modeling results).

**Response to EIP Comment III.H.2. Shell's application lacks required data needed to calculate applicable effluent limitations.**

Based on pre-application discussions with Shell, statements on the analysis results pages of the application to the effect of "Group 2 pollutants not listed above are not expected to be in wastewater based on process engineering and similar reference plants," mean that the reported result of unlisted pollutants would be less than DEP's target quantitation limits. Pollutant concentrations reported as 'less than the target quantitation limit' are not considered to have a reasonable potential to cause or contribute to an excursion above water quality standards. Shell's analysis results tables in the amendment application are otherwise complete because Shell has reported projected effluent concentrations for pollutants expected to be present based on engineering estimates and effluent quality at similar facilities as required by the application instructions.

Condition IX in Part C of the amended permit will require effluent analyses consistent with the Application for Individual Permit to Discharge Industrial Wastewater and those results will confirm whether Shell's estimates are correct. The permit will be modified as necessary based on those results.

**Response to EIP Comment III.H.3. DEP should require Shell to apply for an amendment to its new permit once the Petrochemical plant is operational to reevaluate WQBELs from Outfalls 002, 003, 006-010, and 012-014, for which discharge quality was not available at the time the Draft Permit was issued.**

All of the listed outfalls have monitoring requirements. Numerical effluent limits were not imposed because DEP generally does not develop WQBELs for storm water discharges associated with industrial activities. Pursuant to 25 Pa. Code § 96.4(g), mathematical modeling to develop WQBELs is to be conducted at Q<sub>7-10</sub> design conditions. Precipitation-induced discharges generally do not occur at Q<sub>7-10</sub> design conditions because the precipitation that causes a storm water discharge will also increase the receiving stream's flow and that increased stream flow will provide additional assimilative capacity during a storm event. Monitoring is the appropriate requirement for storm water discharges associated with Shell's industrial activities consistent with how DEP regulates the same types of industrial storm water discharges under the General Permit for Discharges of Storm Water Associated with Industrial Activities (PAG-03).

As part of permitting industrial storm water discharges under the PAG-03 General Permit, DEP requires facilities to implement Best Management Practices to ensure that the water quality standards are attained in the receiving waters. No mathematical modeling is conducted. The discharges from Outfalls 002, 003, 006-010, and 012-014 are industrial storm water discharges and would be subject to the same requirements as the industrial storm water discharges covered by the PAG-03 General Permit, including the requirement to implement BMPs (see Condition III in Part C of Shell's permit) to ensure that the water quality standards are attained.

The monitored parameters in an individual NPDES permit can be different than those listed in the PAG-03 appendix that applies to the facility if the applicable PAG-03 appendix does not account for pollutants that are or may be present in the permitted facility's storm water. Based on storm water data collected by Shell, DEP is adding monitoring requirements for mercury, selenium, and thallium to Outfalls 002, 003, 006, 007, 008, 009, 010, 012, 013, 014, 113, 114, and 813.

Condition IX in Part C of the permit already requires Shell to provide DEP with effluent characterization once the plant is operational. DEP will initiate the permit amendment process if permit modifications are warranted based on Shell's effluent analyses.

**Response to EIP Comment III.I.1. DEP failed to limit discharges of coal ash pollutants from the captive landfill that used to discharge through Outfall 006.**

The captive landfill Commenters reference is located along Raccoon Creek to the south of Shell's property. As stated in the Fact Sheet, Horsehead retains ownership of this former captive landfill and discharges from that landfill are authorized by NPDES Permit PA0254584. Matters pertaining to that discharge do not belong in Shell's NPDES Permit. The landfill currently

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owned by Shell is the fly ash/zinc slag landfill located along the eastern boundary of the site (east of Interstate 376) with associated Outfall 015.

**Response to EIP Comment III.I.2. The Fact Sheet lists a private chemical company as the nearest downstream “public water supply intake” instead of an actual public water supply intake source.**

Water supply intake protections apply to potable water supplies, a subset of which are public (municipal) water supplies. NOVA Chemicals’ potable water supply intake and conventional public drinking water intakes are both protected by water quality criteria for potable water supplies under 25 Pa. Code § 93.3, Table 1. NOVA’s intake, located one mile downstream of Shell’s primary outfall, will be unaffected by Shell’s discharges. Therefore, other potable water supplies intakes, the nearest of which is Midland located eight miles downstream of Outfall 001, also will be unaffected. Any potable water supply withdrawals located upstream of Shell’s site would not be affected by the Complex’s discharges.

**Response to EIP Comment III.I.3. DEP must not remove any storm water outfalls from the permit or allow Shell to stop collecting and treating storm water unless the storm water discharges are clean *in fact* and not just so-called “clean.”**

DEP understands that its use of the term “clean” in the Fact Sheet was imprecise and undefined. The intent was to relate the determination that storm water treatment is no longer required to an evaluation of the quality of storm water runoff from the site with “clean” (in quotes) recognizing that pollutants may still be present, but not in treatable concentrations and not in concentrations with a reasonable potential to cause or contribute to an excursion above water quality standards. DEP explained the basis for removing storm water outfalls and removing effluent limits in its Responses to Public Comments, p.6, and the Response to EIP Comment III.C.1, p.14. To summarize, removing effluent limits and/or monitoring requirements is supported by storm water data; to the extent that it is not, DEP has added monitoring requirements to certain outfalls (see p.8, Response to Shell Comment 3).

Deleting an outfall is classified as a minor permit modification pursuant to 25 Pa. Code § 92a.73 and 40 CFR § 122.63(e)(2). Minor modifications are not processed following the normal procedures for decision-making; applications for minor modifications and public notification of minor modifications are not required.

Any point source discharge of storm water associated with Shell’s industrial activities will appear in the NPDES permit, regardless of whether the storm water is exposed to industrial contaminants and regardless of whether the outfall is subject to effluent limits and/or monitoring requirements. Outfalls are only removed from a permit if the point source discharge is physically eliminated (at which time any environmental or human health impacts would be eliminated—thus the lack of public notification requirements for such modifications) or if the water is re-routed to another outfall.

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By email dated October 19, 2016, EPA provided comments on the draft NPDES permit amendment. EPA’s comments and DEP’s responses are provided below.

**EPA Comments:** Thank you for our multiple phone conversations regarding this matter. Based on our review of the draft permit, we offer the following comments. There is not enough information for us to determine whether the draft permit as written complies with the NPDES requirements for new discharger and new source set forth in 40 CFR Part 122. PADEP should further clarify and document in the draft permit whether the draft permit as written conforms to the NPDES requirements for new discharger and new source set forth in 40 CFR Part 122. Below, please find the NPDES definitions for new discharger and new source as set forth in 40 CFR Part 122. EPA would like to continue to have phone conversations to discuss this matter.

Please address our comments and recommendations, and provide us with any changes to the draft permit, fact sheet, and/or permit components.

**Response to EPA Comments:** The section titled “Federal Effluent Limitations Guidelines and New Source Determination” on pages 21 and 22 of the Fact Sheet for the draft permit amendment provide an evaluation of the Complex’s status as a “new source” and the effluent limits that apply as a result of that determination.

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As a new source, the Complex is subject to New Source Performance Standards under the Organic Chemicals, Plastics and Synthetic Fibers (OCPSF) Point Source Category Effluent Limitations Guidelines, Subpart D (40 CFR § 414.44(a)), Subpart F (§ 414.64(a)), and Subpart I (§ 414.91). New Source Performance Standards from those subparts are imposed in the permit amendment at Internal Monitoring Point 101.

In response to Commenters' request included with the October 18, 2016 draft permit comment letter, DEP met with Lisa Graves-Marcucci and Lisa Hallowell of the Environmental Integrity Project, Myron Arnowitt of Clean Water Action, and Rob Walters of Three Rivers Waterkeeper to discuss the draft permit amendment. The meeting took place on December 20, 2016. On December 26, 2016, Commenters provided additional comments on the draft permit amendment. Responses to EIP's second set of comments are provided below.

**Response to EIP Letter 2 Comment I.A.1. High TDS levels are dangerous for human health and wildlife.**

DEP agrees that high TDS levels can adversely affect aquatic life, human health, and drinking water supplies. However, a general acknowledgment by DEP and Commenters that high TDS levels can cause adverse effects does not mean that discharges from the Complex will cause adverse effects or that it is necessary to impose TDS effluent limits in the permit to mitigate such effects. Based on information available to DEP, there is no indication that Shell's TDS discharge loading will adversely affect the Ohio River (see p.4, *Ohio River Impacts* section in DEP's Responses to Public Comments). The information provided by Commenters does not lead to a different conclusion.

**Response to EIP Letter 2 Comment I.A.2.a. Neither the Shell facility nor Shell's discharges had an authorized TDS load as required under the (a)(1) exemption.**

Prior to August 21, 2010, Horsehead Corporation had an existing industrial waste treatment facility authorized and permitted to accept and discharge TDS. DEP issued state Water Quality Management permits to Horsehead dating back to the 1970s for industrial waste treatment facilities at the Monaca site and issued an NPDES permit in September 2001 (the most recent issuance prior to August 21, 2010) for discharges from those industrial waste treatment facilities. The § 95.10(a)(1) exemption applies if a facility existed prior to August 21, 2010 under permits issued prior to August 21, 2010 for the "acceptance, treatment and discharge of TDS." In Horsehead's case, the authorization to discharge TDS was implicit because DEP did not impose TDS limits in Horsehead's 2001 NPDES permit or in preceding NPDES permits, but Horsehead did report TDS concentrations on the applications for those permits. Since there was a facility permitted to accept and discharge TDS prior to August 21, 2010 and the associated permits have been in continuous effect, the authorized TDS load remains active regardless of whether the specific physical facility from which TDS was discharged still exists.

Any given facility and its discharges may be significantly different than they were in 2010, but the existing authorized TDS loading is still set at levels authorized prior to August 21, 2010. Consider a hypothetical scenario in which Horsehead, after August 21, 2010, decided to produce a completely different product, which resulted in the generation of different waste streams and necessitated the construction of a new industrial waste treatment facility. If Horsehead had demolished its old treatment facility and built a new treatment facility to treat the new waste streams, Horsehead would not have lost its authorized TDS load allowance that was authorized prior to August 21, 2010 and would not be expected to install additional treatment systems for TDS, a parameter for which effluent limitations were not established previously. The authorized TDS discharge loading would remain active in that scenario even though both the source of the wastewater and the treatment facility for that wastewater would be new.

If, in this hypothetical scenario, Horsehead lost its TDS load allowance and was subject to the 2,000 mg/L TDS effluent standard from § 95.10(c), the company essentially would have been punished for changing its business practices and for installing different treatment systems. Section 95.10 was not intended to discourage these types of changes, particularly when there is no difference in the environmental impact before and after the change (i.e., when the net TDS discharge loading is not increased). The only significant difference between this scenario and what happened with Shell is that when the NPDES permit was renewed, it was transferred from Horsehead to Shell. The existing authorized TDS loading was transferred when the permit was transferred, which is consistent with DEP's "Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) -- 25 Pa. Code §95.10" (pp. 5-6):

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Existing mass loadings are tied to the NPDES permit number. They do not expire and may be carried forth through permit reissuances, and facility expansions and redesigns. However, existing mass loadings are terminated if an NPDES permit expires or is voided, or if the authorization was temporary for the purposes of technology demonstration or treatment feasibility. Existing mass loadings are terminated if DEP withdraws the authorization for a facility to treat TDS-laden wastewaters for cause, such as for improper operations or a repeated failure to meet permit conditions. Existing mass loadings are not portable or transferable, with some exceptions. Existing mass loadings transfer with the NPDES permit to any new owner. Existing mass loadings do not transfer with any action that requires a new NPDES permit number. As per §95.10 (a)(1)(i), existing mass loadings are not affected by any relocation of the affected outfall or outfalls. [emphasis added]

**Response to EIP Letter 2 Comment I.A.2.b. “Shell does not qualify for an exemption from the new discharge TDS treatment requirements under (a)(7) because even if DEP were to apply the old TDS limits, Shell’s discharges are expanding, increasing the TDS load by more than 5,000 pounds.”**

DEP’s use of 2006 application data to establish the existing authorized TDS discharge loading that was implicitly approved prior to August 21, 2010 by issuance of an NPDES permit in 2001 is permissible under 25 Pa. Code § 95.10 and related guidance (see p.11, Response to EIP Comment III.B.1). The 2001 NPDES permit is the most recent authorization issued prior to August 21, 2010 and the 2006 application data are the most recent data representing discharges authorized by the 2001 NPDES permit.

Shell provided two estimated concentrations for TDS. A dry weather concentration of 7,375 mg/L and a wet weather concentration of 4,690 mg/L. The dry weather flow is generated from manufacturing operations. Shell estimated this flow to be 557 gpm (about 0.80 MGD) as reported on the estimated effluent quality table at the end of Section 6 of the permit amendment application. The wet weather flow includes the dry weather flow and is estimated to be 1.28 MGD. The total TDS loading associated with dry weather flow could be estimated as:

$$8.34 \times [(0.80 \text{ MGD})(7,375 \text{ mg/L})] = 49,206 \text{ lb/day}$$

The balance of the 1.28 MGD flow at IMP 101 (and the corresponding balance of the 50,078 lb/day TDS loading at IMP 101) will be composed of storm water and non-process wastewaters from the AC Pond, which will have a much lower TDS concentration than the process wastewaters from manufacturing operations. The lower TDS concentration in waters from the AC Pond is the reason why Shell’s estimated TDS concentration during wet weather is only 4,690 mg/L and not 7,375 mg/L. The AC Pond water will dilute the process wastewater, so the TDS concentration will be lower during wet weather, but the wet weather TDS mass loading will be higher because storm water, despite being more dilute, will add TDS mass to the discharge. The dry weather TDS loading will always be less than the wet weather TDS loading, so for the purposes of determining Shell’s maximum TDS loading to compare to the existing authorized TDS discharge loading, the wet weather loading applies. In either case, dry or wet, the TDS loading at IMP 101 is less than the average and maximum existing authorized TDS discharge loadings (65,556 lb/day and 73,184 lb/day, respectively).

Note that DEP’s dry weather TDS loading calculation above and Commenters’ calculations are simplified estimates. Shell did not calculate the 50,078 lb/day figure by multiplying 4,690 mg/L by 1.28 MGD with a unit conversion factor of 8.34. Shell added together the TDS loadings associated with the individual wastewater streams that will make up the Complex’s combined IMP 101 effluent. The TDS loadings Shell reported on the application are correct because those values exclude rounding errors and errors associated with less precise unit conversion factors.

**Response to EIP Letter 2 Comment I.A.3. “Shell has already stated its willingness and ability to comply with these TDS limits.”**

As Commenters state, Shell’s ability or willingness to comply with a 2,000 mg/L effluent standard for TDS is not a factor in whether Shell is required to comply with that standard.

**Response to EIP Letter 2 Comment B. “DEP should reject this permit application and require Shell to submit a new application for an individual NPDES permit.”**

Refer to p.2, Responses to Public Comments. The site on which the Complex will be built is already covered by an individual industrial waste NPDES permit and it is both permissible and appropriate under applicable regulations to modify that permit to incorporate new discharges.

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**Response to EIP Letter 2 Comment B.1. “Shell’s 2015 Amendment Application failed to include information that would have been required in an individual NPDES application for a new discharger.”**

See p.9, Response to EIP Comment III.A.2. Shell provided the same information it would have provided had it applied for a new permit.

The basis for the effluent limits at IMP 201 was explained in the Fact Sheet. Effluent limits for pH and free available chlorine are based on federal technology-based performance standards for cooling tower blowdown.

Shell provided effluent data for Outfall 001 and IMP 101. Therefore, IMP 201 quality was reported with the permit amendment application indirectly. The only substances Shell will add to the cooling water stream other than oil and grease (as allowed by federal regulations) are chemical additives (e.g., biocides, anti-scalants, etc.), which Shell will use at levels that are protective of aquatic life and human health. Since the source of Shell’s cooling water is the Ohio River, any other pollutants in the cooling tower blowdown at IMP 201 will be present only if they are present in the Ohio River. This is consistent with the requirements of Condition I.I in Part C of the permit, which states:

There shall be no net addition of pollutants to non-contact cooling water over intake values except for heat and water conditioning additives for which complete information was submitted in the application or is required to be submitted as a condition of this permit.

The following table summarizes Shell’s estimated effluent quality at IMP 101 and Outfall 001 for two pollutants: sulfate and chromium. As part of operating a recirculating cooling water system with water sourced from the Ohio River, any pollutants present in the river will be concentrated as the cooling water recirculates through the cooling tower, so the concentration of pollutants present in the intake water from the Ohio River will increase when discharged with the cooling tower blowdown. This does not represent an addition of pollutants to the effluent stream.

Stream Conditions	Treated Effluent from WWTP (IMP 101)						Treated Effluent + CWT Blowdown to Outfall 001					
	Daily Maximum			Monthly Maximum			Daily Maximum			Monthly Maximum		
	WET Weather Conc. (mg/L)	DRY Weather Conc. (mg/L)	Mass Loading (lb/day)	WET Weather Conc. (mg/L)	DRY Weather Conc. (mg/L)	Mass Loading (lb/day)	WET Weather Conc. (mg/L)	DRY Weather Conc. (mg/L)	Mass Loading (lb/day)	WET Weather Conc. (mg/L)	DRY Weather Conc. (mg/L)	Mass Loading (lb/day)
Flow (gpm)	887	557	-	887	557	-	2,607	2,277	-	2,607	2,277	-
Sulfate	526	786	5,619	263.1	393.0	2,809	720	812	22,578	360.0	405.8	11,289
Chromium	0.4	0.6	4.1	0.2	0.3	2.0	0.1	0.1	4.1	0.06	0.07	2.0

Sulfate concentrations and loads at Outfall 001 are higher than those at IMP 101 because sulfate is present in water from the Ohio River that will be used for cooling and because recirculation within the cooling tower will increase the sulfate concentrations. The mass loadings for chromium at IMP 101 are the same as the mass loadings at Outfall 001 because Shell expects that the cooling water sourced from the Ohio River will not contain chromium and Shell will not add chromium to the cooling water. Other than oil and grease, all the pollutants with higher loads at Outfall 001 compared to IMP 101 (BOD, COD, TSS, TDS, TOC, Nitrate as N, Nitrite as N, Ammonia as N, Total Phosphorus, Sulfate, Alkalinity, Aluminum, Calcium, Chloride, Fluoride, Iron, Magnesium, Potassium, Silica, and Sodium) are naturally occurring.

As stated previously, Condition IX in Part C of the amended permit will require effluent analyses consistent with the Application for Individual Permit to Discharge Industrial Wastewater and those results will confirm whether Shell’s estimates are correct. The permit will be modified as necessary based on those results.

**Response to EIP Letter 2 Comment II. DEP must require that the monitoring requirements and limits in place during the Interim Period remain in place until there is no evidence of contamination of each pollutant.**

See pp.13-15, Responses to EIP Comments III.C, III.C.1, and III.C.2.

**Response to EIP Letter 2 Comment III. DEP should impose monitoring requirements and limits based on WQBEL calculations modeled using a design flow of 3.75 MGD, not 3.28 MGD.**

See p.19, Response to EIP Comment III.H.1.

**Comment Responses**

**Responses to EIP Letter 2 Comment IV. Select Additional Outstanding Questions**

Response to Question IV.a.i. The fly ash landfill was an orphan site that was no longer owned by Horsehead, so discharges from the landfill were not included in the determination of the existing authorized TDS discharge loading associated with NPDES Permit PA0002208.

The TDS discharge loading from the proposed Complex would be a site-wide load. Thus, discharges from the fly ash landfill (now owned by Shell) would count towards the Complex's expected TDS discharge loading. However, intermittent discharges with low and variable flow rates such as the seep at Outfall 015 would not meaningfully contribute to the Complex's TDS discharge loading.

Based on analytical results submitted by Shell, the TDS loading associated with the seep is 0.71 lb/day, which is negligible compared to Shell's estimated TDS loading at IMP 101 (50,078 lb/day). Adding the TDS loading from the seep to the estimated TDS loading at IMP 101 does not result in a TDS discharge loading that's higher than either the average or maximum existing authorized TDS discharge loading (65,556 lb/day and 73,184 lb/day, respectively).

Response to Question IV.a.ii. Cooling water from IMP 201 contributes the balance of the TDS load at Outfall 001. There are no other sources of TDS at Outfall 001 other than wastewaters from IMP 101 and IMP 201, so any load not contributed by IMP 101 wastewaters would be contributed by IMP 201 cooling waters.

Response to Question IV.b. See p.21, Response to EIP Comment III.I.3.

Response to Question IV.c. DEP did not receive copies of the data from other plants relied upon for Shell's engineering estimates. As part of responding to comments, DEP requested the compliance history for Shell's Geismar Plant (attached) and considered that history (see pp. 2-3, Application Denial section in the Responses to Public Comments).

Response to Question IV.d.i.1. See p.16, Response to EIP Comment III.D.1.

That the Complex's intake structure is subject to requirements for existing facilities and not new facilities is a consequence of regulatory implementation. Shell is not attempting to circumvent federal regulations by using the existing intake structure or by using less water than the existing intake is capable of withdrawing. Shell is reusing an existing intake structure at a flow rate needed for its activities. This is an economical approach to brownfield reuse. It wouldn't be reasonable for Shell to demolish the intake only to build another in its place that accomplishes the same result. The existing facility requirements under 40 CFR Part 125, Subpart J still control impingement mortality and entrainment pursuant to Section 316(b) of the Clean Water Act.

Response to Question d.i.2. See p.17, Response to EIP Comment III.D.4. The basis for forgoing effluent limits for chromium and zinc at IMP 201 was provided in the Fact Sheet. To reiterate, effluent limits for those pollutants in the federal regulations are based on the use of additives that contain chromium and zinc and Shell has not proposed to use any additives that contain chromium or zinc.

Commenters appear to suggest that because chromium and zinc were discharged by Horsehead, effluent limits for those parameters should be imposed at IMP 201. However, other than the cooling water intake structure, none of the water discharged from IMP 201 will come in contact with any facility or material formerly associated with Horsehead. There would not, for example, be any cross-contamination of the cooling tower blowdown with zinc slag.

Response to Question IV.d.i.3. See p.17, Response to EIP Comment III.D.2. Actual intake flow data from daily monitoring will be used to calculate the "Actual Intake Flow (AIF)", which is defined in 40 CFR § 125.92(a) as:

... the average volume of water withdrawn on an annual basis by the cooling water intake structures over the past three years. After October 14, 2019, Actual Intake Flow means the average volume of water withdrawn on an annual basis by the cooling water intake structures over the previous five years. Actual intake flow is measured at a location within the cooling water intake structure that the Director deems appropriate. The calculation of actual intake flow includes days of zero flow. AIF does not include flows associated with emergency and fire suppression capacity.

### Comment Responses

DEP may optionally require Shell to report daily actual intake flows prior to the next permit renewal, but DEP would not use that information until the next permit renewal given that: 1) AIF is a calculated, multi-year value, and 2) AIF is used to determine permit application requirements pursuant to 40 CFR 122.21(r) (e.g., facilities with AIF greater than 125 MGD are subject to additional application requirements). Therefore, it is not necessary for Shell to report actual intake flows to DEP prior to the next permit renewal.

Response to Question IV.d.i.4. See p. 24, Response to EIP Letter 2 Comment B.1.

Response to Question IV.e. As is the case with most streams in the Commonwealth, Poorhouse Run and Rag Run are not monitored waterways, so no stream flow data are available. Plant operations have not and will not reduce stream flows in those waterways (see Responses to Louise Loncar Comments below).

Response to Question IV.f. Water from rail car cleaning will be collected in the AC Pond. The rail car cleaning water will be treated as categorical wastewaters (i.e., as process wastewaters regulated by 40 CFR Part 414) by the Complex's wastewater treatment plant along with process wastewaters from chemical manufacturing and other contaminated non-process wastewaters that are classified as process wastewaters under Part 414. It is not necessary for Shell to characterize that specific wastewater source separately from other sources because the rail car cleaning water will combine with other sources prior to treatment. The relevant explanation was provided by Shell in its July 14, 2016 supplement to the application:

For completeness, we want to clarify that in our application the term process wastewaters includes various non-process contaminated wastewater streams generated from operation of the facility that will be handled and treated as process wastewater. As noted in Table VII-50 of the EPA Development Document for the Effluent Limit Guidelines (ELG) for Organic Chemicals, Plastics and Synthetic Fibers (OCPSF), numerous types of non-process wastewater streams that are generated in operation of an OCPSF facility and that are contaminated are designated as process wastewater for applicability under the ELG.

Many of these [types of] wastewater streams as listed in Table VII-50 will be generated at the facility (i.e., storm water, cleaning of rail cars, cleaning of catalysts, etc.) and will be routed to the wastewater treatment plant [for] treatment prior to discharge.

We are identifying this for completeness purposes. No changes are required as these streams have already been factored into the flow and effluent levels provided in our application.

Response to Question IV.g. See p.20, Response to EIP Comment III.H.2.

Response to Question IV.h. The existence of the groundwater seep was not known until May 2013 when it was identified as part of a site investigation conducted by Michael Baker Jr., Inc. under DEP contract. There is no evidence that anyone was aware of this discharge prior to that site investigation. Shell had difficulty even finding the seep to sample it for the permit amendment. In this circumstance, the appropriate corrective action for that unpermitted discharge is for the discharge to be authorized by a permit, which is being done as part of the NPDES permit amendment.

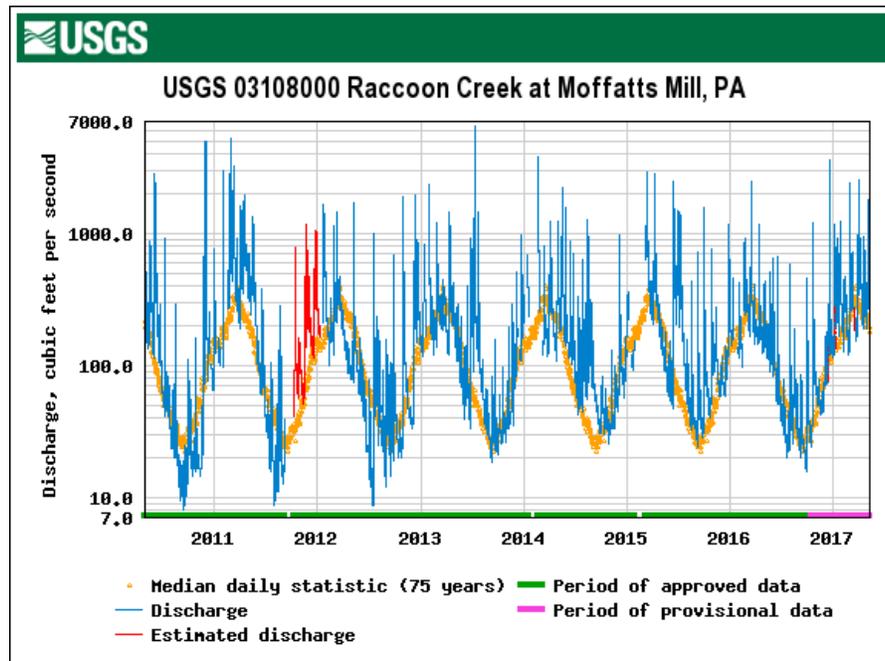
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By letter dated December 22, 2016, Ms. Louise Loncar, through counsel, provided comments on the draft NPDES permit amendment. DEP's responses are provided below:

#### **Response to Louise Loncar Comment I**

The information provided in comments submitted on behalf of Ms. Loncar does not support the assertion that "Shell's significant construction and diversion activities [...] have caused flow loss in Poorhouse Run and Rag Run." First, stream flow and groundwater elevations vary naturally, seasonally, and annually. The photographs attached to the comment letter were taken in different years and appear to have been taken in different seasons. The "before" pictures appear to have been taken in the spring (when there is abundant rainfall) and the "after" pictures were taken in November 2016, which is generally a drier month. The graph below shows stream flow data for Raccoon Creek, which is the nearest stream to Ms. Loncar's property that has a USGS gage on it. Raccoon Creek, as with any stream, shows seasonal and year-to-year variation. It is not unusual for the upper reaches of small streams such as Rag Run to run dry during certain times of the year.

Comment Responses



Additionally, the groundwater below the Shell site is mostly in an overburden aquifer within river deposits at an elevation of approximately 680 to 690 feet. Ms. Loncar's property at 203 Simon Field Road is over 3,000 feet away and over 100 feet higher in elevation with a bedrock aquifer that has no direct conduit or connection to groundwater below the Shell site. Eventually, some portion of groundwater flow from Ms. Loncar's property may reach the Shell site, but none of the activities at the Shell site can reach upward to affect the groundwater at Ms. Loncar's property because of the distance and difference in elevation.

The only way Shell could theoretically impact base flow in nearby streams is if the company were pumping significant volumes of groundwater. However, groundwater pumping has decreased since Shell acquired the former Horsehead property. Horsehead Corporation's network of production wells were reported to operate at a combined pumping rate of 3,500 gallons per minute (5.04 MGD). For comparison, Shell is only pumping groundwater at an annual rate of 12.6 million gallons (or 0.034521 MGD). Also, the Center Township Water Authority formerly operated four water supply wells at the Shell site pumping an average daily production of approximately 830 gallons per minute (1.2 MGD). Pumping from those wells ceased in 2016. Prior to that, CTWA had been pumping for decades without any impacts to nearby streams.

**Response to Louise Loncar Comment II.A**

The draft permit amendment is consistent with both the Clean Water Act and the Clean Streams Law.

DEP did not run PENTOXSD for any of Shell's discharges to Poorhouse Run or Rag Run. Pursuant to 25 Pa. Code § 96.4(g), mathematical modeling to develop WQBELs is to be conducted at Q<sub>7-10</sub> design conditions. The only discharges to Poorhouse Run or Rag Run that are proposed by Shell are precipitation-induced. Precipitation-induced discharges generally do not occur at Q<sub>7-10</sub> design conditions because the precipitation that causes a storm water discharge will also increase the receiving stream's flow and that increased stream flow will provide additional assimilative capacity during a storm event. Therefore, modeling is not necessary for Shell's discharges to Poorhouse Run or Rag Run.

DEP's General Permit for Discharges of Storm Water Associated with Industrial Activities (PAG-03) supports this rationale. As part of permitting industrial storm water discharges under the PAG-03 General Permit, DEP requires facilities to implement Best Management Practices to ensure that the water quality standards are attained in receiving waters. No modeling is conducted. Shell's discharges to Poorhouse Run and Rag Run are industrial storm water discharges and would be subject to the same requirements as industrial storm water discharges covered by the PAG-03 General Permit including the requirement to implement BMPs (see Condition III in Part C of the amended permit) to ensure that water quality standards are attained. Similarly, no modeling is conducted.

**Comment Responses**

The bases for the requirements imposed on Shell's discharges to Poorhouse Run and Rag Run were provided in the Fact Sheet. As explained above, flow information for Poorhouse Run and Rag Run was not necessary to establish requirements for Shell's discharges to those streams.

**Response to Louise Loncar Comment II.B and C**

Any potential use of Poorhouse Run or Rag Run by Ms. Loncar will not be impacted by Shell's discharges because: 1) Shell's discharges will not degrade either stream for the reasons described in the responses above; and 2) Ms. Loncar's property is located upstream of the Complex and will not be affected by Shell's downstream discharges.

DEP gathered testimony on the draft NPDES permit amendment from interested parties during a public hearing held at Central Valley High School, 160 Baker Road Extension, Monaca, PA 15061, on December 15, 2016 from 7:00 p.m. to 10:00 p.m. DEP's responses to testimony are provided below to the extent that testimony relates to the terms and conditions of the NPDES permit amendment.

**Response to Testimony by Rebecca Matsco**

Thank you for your testimony.

**Response to Testimony by Lisa Graves-Marcucci**

Thank you for your testimony.

The terms and conditions of the amended NPDES permit will protect public health and drinking water sources. Shell has not broken, avoided, or attempted to avoid the rules and regulations to which it is subject. The normal procedures and timeframes for public notification of permit actions have been followed and extended upon request.

With respect to requiring Shell to apply for new permit, Shell already has an NPDES permit and is now proposing alterations to its permitted activities. These alterations require the establishment of permit conditions that are different or absent from Shell's existing permit. State and federal regulation allow for the modification of a permit as an appropriate action in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended permit will regulate the specific discharges of Shell at the site. The procedures for issuance of a major NPDES permit amendment, including public notification requirements, are the same as those that apply when issuing a new permit. From a substantive perspective, discharges of TDS up to the existing authorized loading will not impact public health or drinking water sources for the reasons stated previously in this Fact Sheet Addendum.

**Response to Testimony by Elizabeth Joyner**

Thank you for your testimony.

Shell already has an NPDES permit for discharges from the site. Modification of that permit is an appropriate action and is permissible in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended NPDES permit will regulate the specific activities that will be conducted by Shell including the imposition of New Source Performance Standards at Internal Monitoring Point 101 under federal regulations specified in 40 CFR Part 414.

The explanation for retaining Horsehead's existing authorized TDS loading is described earlier in this Fact Sheet Addendum in the Responses to Public Comments (p.4), the Response to EIP Comment III.B.1 (p.11), and the Responses to EIP Letter 2 Comments I.A.2.a and I.A.2.b (pp.22,23).

Shell is reusing a few of Horsehead's outfalls. Shell will ensure that those outfalls are capable of handling the effluent that will be discharged from the Complex.

**Comment Responses**

**Response to Testimony from Adam Tuznik**

Thank you for your testimony. Please refer to the Responses to Public Comments at the beginning of this Fact Sheet Addendum.

DEP did not fail to require cleanup of existing contamination. Under Pennsylvania's Act 2 Land Recycling Program, Shell must demonstrate attainment of statewide health standards (set forth in 25 Pa. Code Chapter 250) and/or site-specific standards for regulated substances in soil and groundwater and otherwise comply with all applicable environmental statutes. Shell may not have removed all materials leftover from Horsehead, but Shell would not be required to do so under Act 2 to the extent that statewide health standards and/or site-specific standards are already achieved.

**Response to Testimony from Kevin Sunday**

Thank you for your testimony.

**Response to Testimony from Michael DiLauro**

Thank you for your testimony.

Shell already has an NPDES permit for discharges from the site. Modification of that permit is an appropriate action and is permissible in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended NPDES permit will regulate the specific discharges from Shell.

**Response to Testimony from Jim Fabisiak**

Thank you for your testimony.

**Response to Testimony from Angelo Taranto**

Thank you for your testimony.

**Response to Testimony from David Smith**

Thank you for your testimony.

**Response to Testimony from Celia Janosik**

Thank you for your testimony.

**Response to Testimony from Kathryn Klaber**

Thank you for your testimony.

**Response to Testimony from Patty Horvatic**

Thank you for your testimony.

**Response to Testimony from Patrice Tomcik**

Thank you for your testimony.

In some instances, facilities may be classified as both existing and new depending on which regulations are being implemented. For example, with respect to regulations for the control of impingement and entrainment at cooling water intake structures, the Complex is classified as existing. However, with respect to regulation of the Complex's industrial wastewaters, the Complex is a new source. Regardless of whether an applicant claims to be either existing or new, the regulatory definitions of terms are used by DEP to determine the appropriate identifier if such determinations are necessary to implement a regulatory requirement. If information necessary to prepare a permit is erroneously omitted from an application because of an applicant's claim of being either new or existing, then DEP will request the missing information.

**Comment Responses**

Requiring Shell to submit a new application is not necessary. Shell already has an NPDES permit for discharges from the site. Applicable state and federal regulations do not require new facilities to obtain a new permit when the site from which the new discharges will occur is already covered by an NPDES permit; it is permissible under those regulations to modify the existing NPDES permit to incorporate the new discharges. Moreover, even though Shell applied for an amendment, Shell supplied, and the Department considered, all of the information that would be required from someone applying for a new permit.

**Response to Testimony from Stephanie Wissman**

Thank you for your testimony.

**Response to Testimony from Rob Walters**

Thank you for your testimony.

The Safe Drinking Water Act does not regulate Shell's proposed discharges. Shell's discharges are regulated by the Clean Water Act and the Pennsylvania Clean Streams Law. Some of the contaminants that are not regulated in drinking water by the Safe Drinking Water Act are regulated in waters of the Commonwealth by the Clean Water Act and the Clean Streams Law including the following pollutants: 1,1-dichloroethane, methyl chloride, hexavalent chromium, manganese, nitrobenzene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2,4-dichlorophenol, and 2,4-dinitrophenol. Title 25 Pa. Code § 93.8c establishes human health and/or aquatic life water quality criteria for those pollutants in waters of the Commonwealth. DEP considered those pollutants as part of the water quality analysis of Outfall 001's discharges and no water quality-based effluent limits were deemed necessary.

Many of those pollutants appear in Shell's NPDES permit because 40 CFR § 414.91 identifies them as pollutants of concern for the large subset of the OCPSF industry that uses end-of-pipe biological treatment. Only a few of the regulated pollutants in § 414.91 are likely to appear in any one OCPSF-production facility's effluent depending on what chemicals are being manufactured by the facility; this is also true for Shell. Except for hexavalent chromium and manganese, Shell does not expect any of the nine pollutants identified above to be present above target quantitation limits in discharges from Outfall 001. This expectation will be confirmed by the effluent analyses required by Condition IX in Part C of the permit.

DEP always imposes the most stringent effluent limits among those derived based on technology, water quality, and regulatory effluent standards as required by applicable regulations.

Based on information available to DEP, both NOVA Chemicals and BASF Corporation are currently in compliance with their NPDES permits. Indications of both facilities being in non-compliance on [echo.epa.gov](http://echo.epa.gov) were primarily related to non-submission of DMRs, which may be documented on [echo.epa.gov](http://echo.epa.gov) when Pennsylvania's eDMR system is experiencing a service interruption and a permittee submits a paper DMR or when data on a paper DMR is not logged into the ICIS system in a timely manner.

**Response to Testimony from Matt Crocco**

Thank you for your testimony.

**Response to Testimony from Lois Bower-Bjornson**

Thank you for your testimony.

Shell already has an NPDES permit for discharges from the site. Modification of that permit is an appropriate action and is permissible in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended NPDES permit will regulate the specific discharges from Shell.

**Response to Testimony from John McGreevy**

Thank you for your testimony.

**Response to Testimony from Mark Dixon**

Thank you for your testimony.

**Comment Responses**

**Response to Testimony from Joanne Martin**

Thank you for your testimony.

Shell already has an NPDES permit and is now proposing alterations to its permitted activities. These alterations require the establishment of permit conditions that are different or absent from Shell's existing permit. State and federal regulation allow for the modification of a permit as an appropriate action in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended permit will regulate Shell's specific discharges from the site. The procedures for issuance of a major NPDES permit amendment, including public notification requirements, are the same as those that apply when issuing a new permit.

Shell submitted the same information with its permit amendment application as it would have had it applied for a new permit. Shell has not bypassed any permit application submission requirements. To the extent that DEP required additional information to prepare the draft NPDES permit amendment, Shell was forthcoming with all requested information. Any other information that was omitted from the permit application was omitted because the information does not exist.

DEP determined that Shell is eligible for an exemption from effluent standards for TDS specified in 25 Pa. Code § 95.10. The exemption does not require Shell to treat for TDS, but a lack of treatment does not mean that the TDS load associated with Shell's discharges will adversely impact the Ohio River (most NPDES-permitted dischargers do not treat for TDS). DEP has evaluated Shell's proposed TDS discharge loading and determined that no adverse impacts will occur.

Under Pennsylvania's Act 2 Land Recycling Program, Shell must demonstrate attainment of statewide health standards (set forth in 25 Pa. Code Chapter 250) and/or site-specific standards for regulated substances in soil and groundwater and otherwise comply with all applicable environmental statutes. Shell may not have removed all materials leftover from Horsehead, but Shell would not be required to do so under Act 2 to the extent that statewide health standards and/or site-specific standards are already achieved.

Effluent limits and/or monitoring requirements for water pollution would be eliminated or reduced on the basis that the potential for pollution is negligible or no longer exists. This is reasonable and supported by untreated storm water data collected by Shell that show low pollutant concentrations (see attached graphs).

None of these decisions are inconsistent with applicable laws or regulations.

**Response to Testimony from Elisa Beck**

Thank you for your testimony.

**Response to Testimony from Terrie Baumgardner**

Thank you for your testimony.

Shell already has an active NPDES permit and modification of that permit is an appropriate action in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended NPDES permit will regulate the specific activities that will be conducted by Shell and those terms and conditions are developed specifically to protect the designated uses of waters of the Commonwealth.

Neither DEP nor Shell have claimed that proposed discharges from the Complex currently exist. An authorization to discharge TDS exists. Prior to August 21, 2010, a TDS discharge loading associated with NPDES Permit PA0002208 existed at the site and that loading was approved by permits issued to Horsehead before August 21, 2010 (most recently when the permit was renewed in 2001). The authorized load was transferred to Shell when NPDES Permit PA0002208 was renewed and transferred in 2015. It is the existence of a pre-August 21, 2010 authorized TDS discharge loading associated with NPDES Permit PA0002208 that makes Shell eligible for the 25 Pa. Code § 95.10(a)(1) exemption under that same NPDES permit.

The 2,000 mg/L effluent standard from § 95.10 is intended to manage the assimilative capacity of waters of the Commonwealth for TDS. Shell's TDS will be limited pursuant to the existing authorized load established by Condition X in Part C of the permit. Horsehead discharged TDS up to a maximum level and Shell will discharge a net amount of TDS that is less than that maximum.

**Comment Responses**

Effluent limits for arsenic, lead, and other toxic pollutants would be eliminated or reduced on the basis that the potential for pollution is negligible or no longer exists. This is reasonable and supported by untreated storm water data collected by Shell that show low pollutant concentrations (see attached graphs).

**Response to Testimony from Marcia Lehman**

Thank you for your testimony.

**Response to Testimony from Chelsea Holmes**

Thank you for your testimony.

Shell already has an active NPDES permit and modification of that permit is an appropriate action in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended NPDES permit will regulate the specific activities that will be conducted by Shell and those terms and conditions are developed specifically to protect the designated uses of waters of the Commonwealth.

DEP has determined that Shell is eligible for an exemption from effluent standards for TDS specified in 25 Pa. Code § 95.10. The 2,000 mg/L effluent standard from § 95.10 is intended to manage the assimilative capacity of waters of the Commonwealth for TDS. The 500 mg/L TDS criterion from 25 Pa. Code Chapter 93 is protective of potable water supply uses. Based on DEP's evaluation (see Responses to Public Comments), the 500 mg/L TDS criterion will not be exceeded and the designated uses of the Ohio River will be protected. Furthermore, the existing authorized loading expressed in Condition X in Part C of the permit constitutes a limit on TDS.

Discharges of organic pollutants such as benzene are evaluated by DEP as part of the permitting process. DEP performed a water quality evaluation for Shell's discharges—an evaluation that accounts for both acute and chronic effects—and imposed the necessary requirements in the permit.

There is no basis for DEP to deny the application.

**Response to Testimony from Tim Wetzel**

Thank you for your testimony.

**Response to Testimony from Joyce Turkaly**

Thank you for your testimony.

**Response to Testimony from James Palmer**

Thank you for your testimony.

**Response to Testimony from Peter Deutsch**

Thank you for your testimony.

**Response to Testimony from Emily Collins on behalf Louise Loncar**

Thank you for your testimony.

Statutory and regulatory requirements regarding public notification of permit applications, draft permits, and public hearings require the publication of notices in a local newspaper and in the *Pennsylvania Bulletin*. Such notices were published for Shell's applications, permits, and the hearing. DEP generally does not notify individual property owners of permit actions.

Responses to other issues raised in Ms. Collins' testimony are provided earlier in this Fact Sheet Addendum (pp.26-28) in response to written comments submitted by counsel for Ms. Loncar.

**Comment Responses**

**Response to Testimony from Bridget Johnson**

Thank you for your testimony.

**Response to Testimony from Aaron Bonnaure**

Thank you for your testimony.

**Response to Testimony from Catherine Greer**

Thank you for your testimony.

The Clean Water Act allows for the regulated discharge of pollutants to waters of the United States as authorized by a National Pollution Discharge Elimination System permit. Similarly, the Pennsylvania Clean Streams Law allows for the regulated discharge of pollutants to waters of the Commonwealth as authorized by a permit. NPDES permits issued pursuant to those statutes establish requirements that are designed to protect waters of the Commonwealth and the United States.

**Response to Testimony from Stephanie Carter**

Thank you for your testimony.

DEP's Bureau of Safe Drinking Water already conducts assessments of the susceptibility of public water systems' water sources to potential sources of contamination. These assessments, which are done in accordance with Pennsylvania's Source Water Assessment and Protection Program and the Safe Drinking Water Act, are not dictated by the terms and conditions of NPDES permits.

Monitoring for benzene is required at Outfall 001 and effluent limits for benzene are imposed at IMP 101 and Outfall 004.

**Response to Testimony from Barbara Grover**

Thank you for your testimony.

**Response to Testimony from Joseph Mirt**

Thank you for your testimony.

**Response to Testimony from Nancy O'Leary**

Thank you for your testimony.

Shell already has an NPDES permit and is now proposing alterations to its permitted activities. These alterations require the establishment of permit conditions that are different or absent from Shell's existing permit. State and federal regulation allow for the modification of a permit as an appropriate action in these circumstances pursuant to 25 Pa. Code § 92a.24 and 40 CFR § 122.62(a). The terms and conditions of the amended permit will regulate Shell's specific discharges from the site. The procedures for issuance of a major NPDES permit amendment, including public notification requirements, are the same as those that apply when issuing a new permit. DEP always imposes the most stringent effluent limits among those derived based on technology, water quality, and regulatory effluent standards as required by applicable regulations. The draft NPDES permit amendment incorporates all water pollution limits that apply.

**Response to Testimony from Fusheela Nemani-Stanger**

Thank you for your testimony.

**Response to Testimony from Sandie Egley**

Thank you for your testimony.

**Comment Responses**

**Response to Testimony from Jack Manning**

Thank you for your testimony.

**Response to Testimony from Jennifer Tanner**

Thank you for your testimony.

**Response to Testimony from Lisa Hallowell**

Thank you for your testimony.

Please refer to the responses to EIP's written comments beginning on p.8 of this document.

**Response to Testimony from Joy Sabl**

Thank you for your testimony.

The NPDES permit incorporates all requirements that Shell is subject to under the Clean Water Act, the Pennsylvania Clean Streams Law, and the regulations that implement those statutes.

**Response to Testimony from David Taylor**

Thank you for your testimony.

**Response to Testimony from Parker Webb**

Thank you for your testimony.

**Response to Testimony from Kate O'Brien**

Thank you for your testimony.

**Response to Testimony from Karmen Mogdam**

Thank you for your testimony.

The terms and conditions of the amended NPDES permit will protect public health and drinking water sources.

**Response to Testimony from Thaddeus Popovich**

Thank you for your testimony.

The terms and conditions of the amended NPDES permit will regulate Shell's specific discharges and those terms and conditions are developed specifically to protect the designated uses of waters of the Commonwealth.

**Response to Testimony from Lisa DeSantis**

Thank you for your testimony.

**Response to Testimony from Robert Nishikawa**

Thank you for your testimony.

Whether issuance of a permit results in the creation of jobs is not a factor in the development of the terms and conditions of an NPDES permit.

**Comment Responses**

**Response to Testimony from Edwin Hill**

Thank you for your testimony.

**Response to Testimony from K. Fitzpatrick**

Thank you for your testimony.

**Response to Testimony from Sister Diane Cauley**

Thank you for your testimony.

The terms and conditions of the amended NPDES permit will protect public health and drinking water sources. Shell is not circumventing any standards.

**Response to Testimony from Sister Kari Pohl**

Thank you for your testimony.

Incidents at other petrochemical facilities such as the explosion at the Williams Olefin Plant in Geismar, Louisiana may direct a certain level of vigilance for similar petrochemical facilities. However, the Williams Olefin Plant is not owned by Shell, so the compliance history for that facility would not inform any decision-making associated with Shell's ability or willingness to comply with environmental regulations.

There are significant differences in the political and regulatory situation between Nigeria and the United States that would not support direct comparisons between those countries' regulatory agencies or regulated entities.

**Response to Testimony from Jeffrey Logan**

Thank you for your testimony.

**Response to Testimony from Lani Fritz**

Thank you for your testimony.

Shell will monitor effluent from the Complex pursuant to the requirements of the NPDES permit. DEP will enforce the terms and conditions of the NPDES permit to protect public health and drinking water sources.

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**Other Changes**

Part A, Section III.B. of the permit was updated to include language regarding the use of eDMR for the reporting of effluent monitoring results consistent with Phase 1 of EPA's NPDES Electronic Reporting Rule. The use of eDMR is no longer optional.

Part C, Section III of the permit was updated to be consistent with the requirements of DEP's recent renewal of the PAG-03 General Permit for Discharges of Stormwater Associated with Industrial Activities, which is used to guide DEP's permitting of industrial storm water in individual NPDES permits. As part of the updated condition, the two forms previously required by the permit—the "Annual Inspection Form for NPDES Permits for Discharges of Stormwater Associated with Industrial Activities" (3800-PM-WSFR0083v) and the "Additional Information for the Reporting of Stormwater Discharge Monitoring" form (3800-PM-WSFR0083t)—are consolidated into one Annual Report.

A footnote was added to Part A referencing modified Part C Condition IX. That condition now specifies "End of Construction" as the first day of the next month following the date on which facilities are placed in operation and begin discharging effluent to waters of the Commonwealth (eDMR requires that effluent limits take effect on the first day of a calendar month). The condition also requires Shell to notify DEP, in writing, of the date that the Complex is ready to be placed in operation and begin discharging to waters of the Commonwealth. Sampling requirements are unchanged except that analytical results for new discharges from the Complex must be submitted within 60 days of End of Construction.

The final permit will be amended with the changes noted in the responses to comments.

Shell Chemical LP - Geismar Plant - 10-Year Water Permitting Compliance History

Date	Outfall	Parameter/Deviation	Comment
5/31/06	001	Visible Foam	Small leak in heat exchanger allowed ethoxylate (soap) to reach river water return. Visible foam was discharged to the Mississippi River.
7/6/06	101	Zinc	Determined in 2008 contamination from lab equipment <sup>(1)</sup>
10/2/06	002	O&G	Excessive Rainfall - Due to excessive rainfall, the site was unable to contain a small amount of oily rainwater.
10/3/06	101	Zinc	Determined in 2008 contamination from lab equipment <sup>(1)</sup>
11/14/07	101	TSS	Process upset resulted in disturbed microbe blanket. This upset cause additional solids to be discharged to Mississippi River.
11/1/07	101	Zinc	Determined in 2008 contamination from lab equipment <sup>(1)</sup>
4/3/08	101	Zinc	Determined in 2008 contamination from lab equipment <sup>(1)</sup>
5/13/08	101	Zinc	Determined in 2008 contamination from lab equipment <sup>(1)</sup>
9/30/08	101	Bypass Primary Treatment	Upset to site related to Hurricane Gustav. The site could not effectively contain and treat wastewater (mostly rainwater).
10/12/09	601	TOC	Lubricant in replaced equipment
5/8/12	004	TOC and O&G	Excessive Rain - Could not contain all of rainwater falling within the plant.
1/27/12	008	TSS	Vendor issue with equipment. A newly installed piece of equipment did not work as designed. Investigation yielded faulty construction that directly resulted in improper treatment (discovered after 7/23/13 event).
1/9/13	101	TSS	Excessive Rain - Could not contain all of rainwater falling within the plant.
7/23/13	008	TSS, BOD	Vendor issue with equipment. A newly installed piece of equipment did not work as designed. Investigation yielded faulty construction that directly resulted in improper treatment.
5/28/14	101	Bypass primary treatment	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>
5/28/14	002	Unauthorized discharge	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>
9/18/15	002	TOC/ Unauthorized Discharge	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>
10/25/15	002/004	Unauthorized Discharge	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>
1/13/16		Unauthorized Discharge	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>
5/1/16	002	Unauthorized Discharge	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>
8/12/16	002/001	Unauthorized Discharge	Excessive Rain - Could not contain all of rainwater falling within the plant. <sup>(2)</sup>

Notes:

- (1) The zinc concentration was the subject of a detailed investigation since the site did not use or manufacture any zinc related chemicals. The investigation discovered that the source of this contaminant was a damaged titrator used for sample preparation. The damaged part had zinc components and leached a small amount of zinc into the samples. Since the discovery there have been no more excursions.
- (2) The discharges noted in the last 7 instances have all been associated with historic rainfall in the area. The site is designed/operated to handle statistically high rainfall. In these cases, the rainfall recorded during certain periods of time was well above the reasonable design capacity of the treatment system.

Characterization of Dissolved Solids in the Ohio River and Selected Tributaries, February 2014

**Sample Holding Times**

The allowable sample holding times for each parameter analyzed are provided in Table 2 below. In most cases, samples were analyzed between 24-48 hours of receipt into the laboratory; exceptions to this were due to instrument down time or staffing shortages. Measurement results for nitrites, nitrates and phosphates were recorded as they were included in the calibration standard mixture; however, the allowable holding times for these analytes were exceeded in many cases due to shipping constraints and other factors. Data for these parameters should be viewed with caution as not all quality assurance objectives were met.

Table 2. Sample holding times by parameter.

<b>Holding Time</b>	<b>Parameters</b>
48 Hours	Nitrite, nitrate, phosphate
7 Days	Total dissolved solids
14 Days	Bicarbonate (alkalinity)
28 Days	Fluoride, chloride, bromide, sulfate, ammonia
180 Days	Sodium, calcium, potassium, magnesium

**Data Management**

All analytical results were reviewed for accuracy then archived in Excel spreadsheets. The ion chromatograph results were initially generated in Dionex Chromeleon software and then transferred to Excel files. TDS and bicarbonate results were provided by Pace in an electronic deliverable format and also archived in Excel. Physical parameter data were manually recorded in a sample log and then transcribed to Excel. Daily stream flow data for each sampling event were queried from ORSANCO’s Access database of daily modeled flow results from the U.S. Army Corps of Engineer Cascade flow model.

**Monitoring Results and Discussion**

**Objective 1: Characterize ambient levels of TDS.**

Minimum concentrations of TDS by site in the Ohio River ranged between 104 mg/L at Steubenville, OH to 166 mg/L at Louisville, KY. Median TDS values across all mainstem sites fell within a fairly narrow range from 188 mg/L to 227 mg/L, with an overall Ohio River median value of 215 mg/L. Peak concentrations by site ranged from 280 mg/L at Moon Township, PA to 368 mg/L at Cheshire, OH. These results indicate that all Ohio River samples collected during the one-year study period had levels well below ORSANCO’s 500 mg/L ambient water quality standard for total dissolved solids.

The TDS results are summarized in Table 3 and graphically presented in Figure 3 below. Complete sample results are provided in Appendix A.

*Characterization of Dissolved Solids in the Ohio River and Selected Tributaries, February 2014*

Table 3. Total dissolved solids results summary.

ORSANCO Total Dissolved Solids Results Summary

River	Mile	Ohio River	TDS Result, mg/L		
			Min	Median	Max
Allegheny	8.2	0	62	161.5	236
Monongahela	4.5	0	113	218.0	362
Ohio	11.7	11.7	124	205.0	280
Beaver	6	25	163	276.0	386
Ohio	65.3	65.3	104	206.0	307
Ohio	86.8	86.8	106	217.0	328
Ohio	137.2	137.2	110	222.0	359
Muskingum	29	172	148	362.0	584
Ohio	190.5	190.5	106	227.0	364
Ohio	260	260	160	222.0	368
Ohio	306	306	126	188.5	301
Big Sandy	23.6	317.1	155	362.0	579
Ohio	462.8	462.8	150	195.0	335
Ohio	600	600	166	215.0	332
Ohio	791.5	791.5	160	223.0	341
Ohio	978	978	142	203.0	339

TDS levels observed in the five tributaries included in the study collectively exhibited more variability than concentrations observed in the mainstem of the Ohio River. The Allegheny River consistently had the lowest levels of all sites sampled with a minimum concentration of 62 mg/L and a maximum of 236 mg/L. The Monongahela River exhibited TDS concentrations comparable to the range of values observed on the Ohio River with minimum, median, and maximum concentrations of 113 mg/L, 218 mg/L, and 362 mg/L, respectively. The Beaver River showed somewhat higher levels, with a median concentration of 276 mg/L which was 21 to 47 percent higher than median values of all Ohio River locations.

The Muskingum and Big Sandy Rivers were appreciably different than other sites included in the study. Median TDS levels on these two tributaries at 362 mg/L each were greater than the maximum concentrations observed at all but two Ohio River locations. These two tributaries had the highest peak concentrations observed in the study at 584 mg/L for the Muskingum River and 579 mg/L on the Big Sandy River. It should be noted that ORSANCO's pollution control standards apply only to the Ohio River mainstem and not to the tributaries, thus these peak concentrations in excess of 500 mg/L do not constitute a standards violation.

TDS Modeling (3.75 MGD Discharge Flow; 946 cfs Stream Flow; 300 mg/L Background TDS):

**PENTOXSD**

**Modeling Input Data**

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	952.70	681.85	22771.80	0.00010	0.00	<input checked="" type="checkbox"/>

**Stream Data**

LFY	Trib Flow (cfs)	Stream Flow (cfs)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Rch Velocity (fps)	Rch Trav Time (days)	Tributary		Stream		Analysis		
								Hard (mg/L)	pH	Hard (mg/L)	pH	Hard (mg/L)	pH	
Q7-10	0.21	0	946	0	240	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

**Discharge Data**

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH
Outfall 001	'A0002208-1	3.75	0	0	0	0	0.2	0.2	0.2	1.3	6

**Parameter Data**

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Stream Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
CHLORIDE (PWS)	313000	0	0.5	0.5	0	0	0	0	1	0
FLUORIDE (PWS)	1100	0	0.5	0.5	0	0	0	0	1	0
PHENOLICS (PWS)	100	0	0.5	0.5	0	0	0	0	1	0
SULFATE (PWS)	812000	0	0.5	0.5	0	0	0	0	1	0
TOTAL DISSOLVED SOLIDS (PWS)	7375000	300000	0.5	0.5	300000	0	0	0	1	0

TDS Modeling (3.75 MGD Discharge Flow; 946 cfs Stream Flow; 300 mg/L Background TDS):

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	951.71	681.67	22772.85	0.00010	216.00	<input checked="" type="checkbox"/>

Stream Data														
LFY	Trib Flow (cfs)	Stream Flow (cfs)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Rch Velocity (fps)	Rch Trav Time (days)	Tributary		Stream		Analysis		
								Hard (mg/L)	pH	Hard (mg/L)	pH	Hard (mg/L)	pH	
Q7-10	0.21	0	946	0	240	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data												
Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH	
		0	0	0	0	0	0	0	0	100	7	

Parameter Data											
Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Stream Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)	
CHLORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
FLUORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
PHENOLICS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
SULFATE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
TOTAL DISSOLVED SOLIDS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	

TDS Modeling (3.75 MGD Discharge Flow; 946 cfs Stream Flow; 300 mg/L Background TDS):

**PENTOXSD Analysis Results**

**Recommended Effluent Limitations**

<u>SWP Basin</u>	<u>Stream Code:</u>	<u>Stream Name:</u>	
20E	32317	OHIO RIVER	

RMI	Name	Permit Number	Disc Flow (mgd)
952.70	Outfall 001	PA0002208-1 a	3.7500

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent	
				WQBEL (µg/L)	WQBEL Criterion
CHLORIDE (PWS)	313000	INPUT	488330.3	4.101E+07	THH
FLUORIDE (PWS)	1100	INPUT	1716.177	328136.6	THH
PHENOLICS (PWS)	100	INPUT	156.016	820.342	THH
SULFATE (PWS)	812000	INPUT	1260000	4.101E+07	THH
TOTAL DISSOLVED SOLIDS (PWS)	7370000	INPUT	1.15E+07	3.311E+07	THH

TDS Modeling (3.75 MGD Discharge Flow; 946 cfs Stream Flow; 205 mg/L Background TDS):

**PENTOXSD**

**Modeling Input Data**

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	952.70	681.85	22771.80	0.00010	0.00	<input checked="" type="checkbox"/>

**Stream Data**

LFY	Trib Flow (cfs)	Stream Flow (cfs)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Rch Velocity (fps)	Rch Trav Time (days)	Tributary		Stream		Analysis		
								Hard (mg/L)	pH	Hard (mg/L)	pH	Hard (mg/L)	pH	
Q7-10	0.21	0	946	0	240	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

**Discharge Data**

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH
Outfall 001	'A0002208-1	3.75	0	0	0	0	0.2	0.2	0.2	1.3	6

**Parameter Data**

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Stream Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
CHLORIDE (PWS)	313000	0	0.5	0.5	0	0	0	0	1	0
FLUORIDE (PWS)	1100	0	0.5	0.5	0	0	0	0	1	0
PHENOLICS (PWS)	100	0	0.5	0.5	0	0	0	0	1	0
SULFATE (PWS)	812000	0	0.5	0.5	0	0	0	0	1	0
TOTAL DISSOLVED SOLIDS (PWS)	7375000	205000	0.5	0.5	205000	0	0	0	1	0

TDS Modeling (3.75 MGD Discharge Flow; 946 cfs Stream Flow; 205 mg/L Background TDS):

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	951.71	681.67	22772.85	0.00010	216.00	<input checked="" type="checkbox"/>

Stream Data														
LFY	Trib Flow (cfs)	Stream Flow (cfs)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Rch Velocity (fps)	Rch Trav Time (days)	Tributary		Stream		Analysis		
								Hard (mg/L)	pH	Hard (mg/L)	pH	Hard (mg/L)	pH	
Q7-10	0.21	0	946	0	240	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data												
Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH	
		0	0	0	0	0	0	0	0	100	7	

Parameter Data											
Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Steam Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)	
CHLORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
FLUORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
PHENOLICS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
SULFATE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
TOTAL DISSOLVED SOLIDS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	

TDS Modeling (3.75 MGD Discharge Flow; 946 cfs Stream Flow; 205 mg/L Background TDS):

**PENTOXSD Analysis Results**

**Recommended Effluent Limitations**

<u>SWP Basin</u>	<u>Stream Code:</u>	<u>Stream Name:</u>			
20E	32317	OHIO RIVER			
RMI	Name	Permit Number	Disc Flow (mgd)		
952.70	Outfall 001	PA0002208-1a	3.7500		
Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent	
				WQBEL (µg/L)	WQBEL Criterion
CHLORIDE (PWS)	313000	INPUT	488330.3	4.101E+07	THH
FLUORIDE (PWS)	1100	INPUT	1716.177	328136.6	THH
PHENOLICS (PWS)	100	INPUT	156.016	820.342	THH
SULFATE (PWS)	812000	INPUT	1260000	4.101E+07	THH
TOTAL DISSOLVED SOLIDS (PWS)	7370000	INPUT	1.15E+07	4.86E+07	THH

TDS Modeling (3.75 MGD Discharge Flow; 4,730 cfs Stream Flow; 205 mg/L Background TDS):

**PENTOXSD**

**Modeling Input Data**

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	952.70	681.85	22771.80	0.00010	0.00	<input checked="" type="checkbox"/>

**Stream Data**

	LFY	Trib	Stream	WD	Rch	Rch	Rch	Rch	Tributary		Stream		Analysis	
		Flow	Flow	Ratio	Width	Depth	Velocity	Trav Time	Hard	pH	Hard	pH	Hard	pH
	(cfsm)	(cfs)	(cfs)		(ft)	(ft)	(fps)	(days)	(mg/L)		(mg/L)		(mg/L)	
<b>Q7-10</b>	0.21	0	4730	0	1200	15	0	0	98	7.33	0	0	0	0
<b>Qh</b>		0	0	0	0	0	0	0	100	7	0	0	0	0

**Discharge Data**

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard	Disc pH
Outfall 001	'A0002208-1	3.75	0	0	0	0	0	0	0	1.3	6

**Parameter Data**

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Steam Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
CHLORIDE (PWS)	313000	0	0.5	0.5	0	0	0	0	1	0
FLUORIDE (PWS)	1100	0	0.5	0.5	0	0	0	0	1	0
PHENOLICS (PWS)	100	0	0.5	0.5	0	0	0	0	1	0
SULFATE (PWS)	812000	0	0.5	0.5	0	0	0	0	1	0
TOTAL DISSOLVED SOLIDS (PWS)	7375000	205000	0.5	0.5	205000	0	0	0	1	0

TDS Modeling (3.75 MGD Discharge Flow; 4,730 cfs Stream Flow; 205 mg/L Background TDS):

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)				Apply FC	
32317	951.71	681.67	22772.85	0.00010	216.00				<input checked="" type="checkbox"/>	

Stream Data														
LFY	Trib Flow (cfs)	Stream Flow (cfs)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Rch Velocity (fps)	Rch Trav Time (days)	Tributary		Stream		Analysis		
								Hard (mg/L)	pH	Hard (mg/L)	pH	Hard (mg/L)	pH	
Q7-10	0.21	0	4730	0	1200	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data												
Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH	
		0	0	0	0	0	0	0	0	100	7	

Parameter Data											
Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Stream Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)	
CHLORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
FLUORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
PHENOLICS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
SULFATE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
TOTAL DISSOLVED SOLIDS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	

TDS Modeling (3.75 MGD Discharge Flow; 4,730 cfs Stream Flow; 205 mg/L Background TDS):

**PENTOXSD Analysis Results**

**Recommended Effluent Limitations**

<u>SWP Basin</u>	<u>Stream Code:</u>	<u>Stream Name:</u>			
20E	32317	OHIO RIVER			
RMI	Name	Permit Number	Disc Flow (mgd)		
952.70	Outfall 001	PA0002208-1a	3.7500		
Parameter	Effluent Limit	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent	
	(µg/L)			WQBEL (µg/L)	WQBEL Criterion
CHLORIDE (PWS)	313000	INPUT	488330.3	2.0408E+08	THH
FLUORIDE (PWS)	1100	INPUT	1716.177	1630000	THH
PHENOLICS (PWS)	100	INPUT	156.016	4081.708	THH
SULFATE (PWS)	812000	INPUT	1260000	2.0408E+08	THH
TOTAL DISSOLVED SOLIDS (PWS)	7370000	INPUT	1.15E+07	2.4102E+08	THH

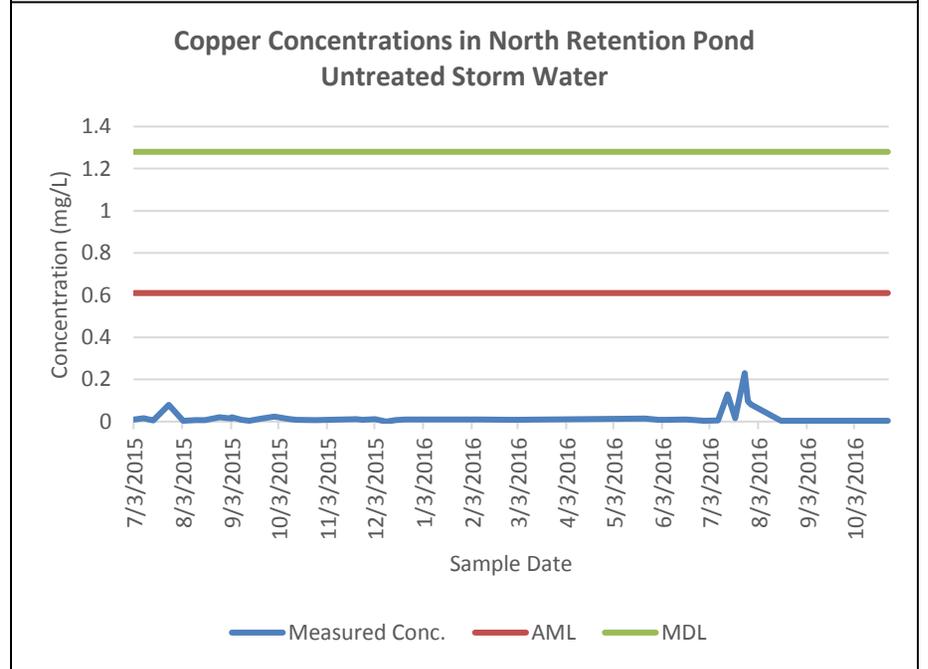
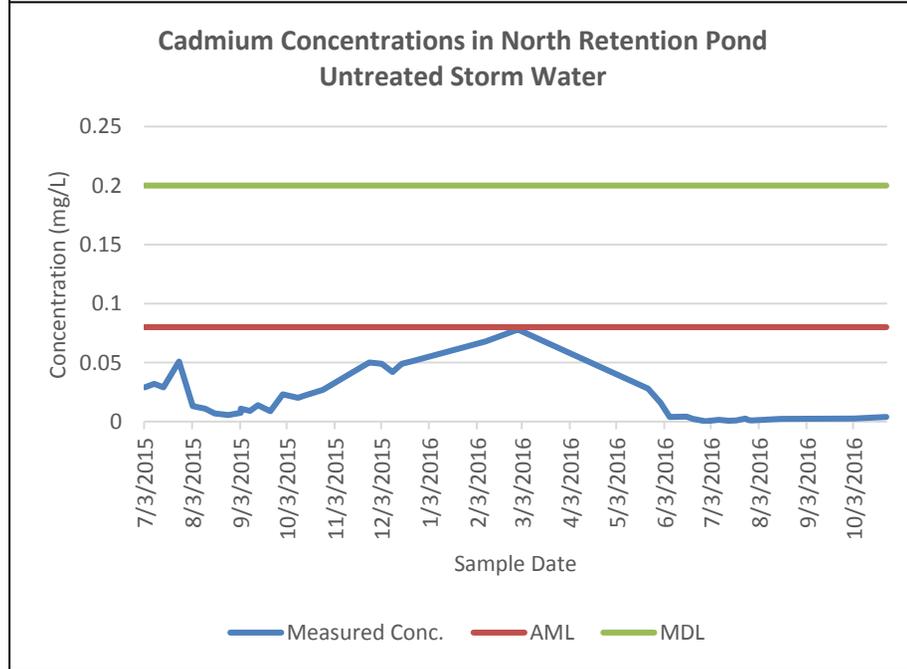
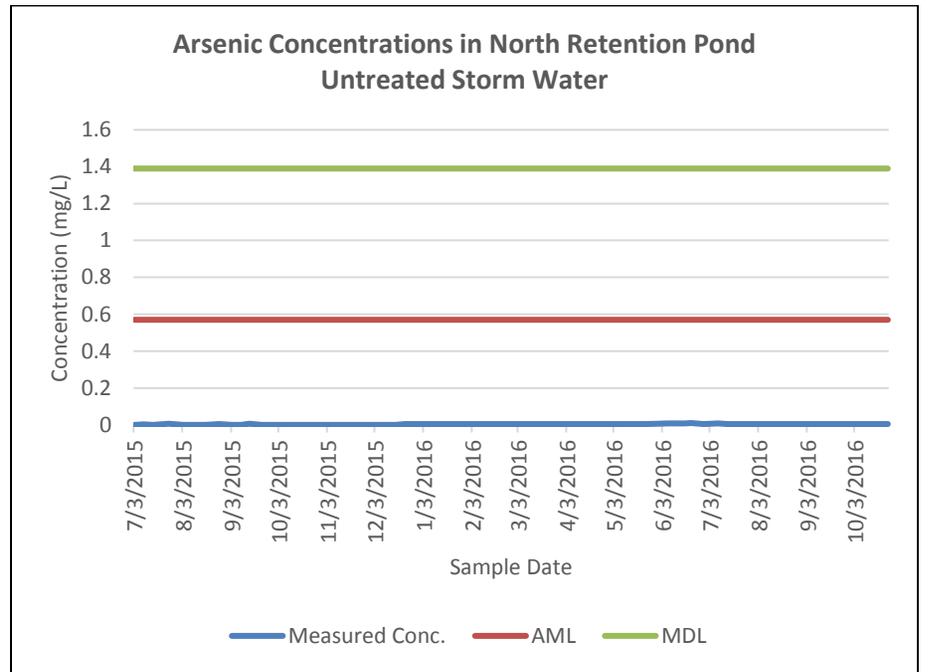
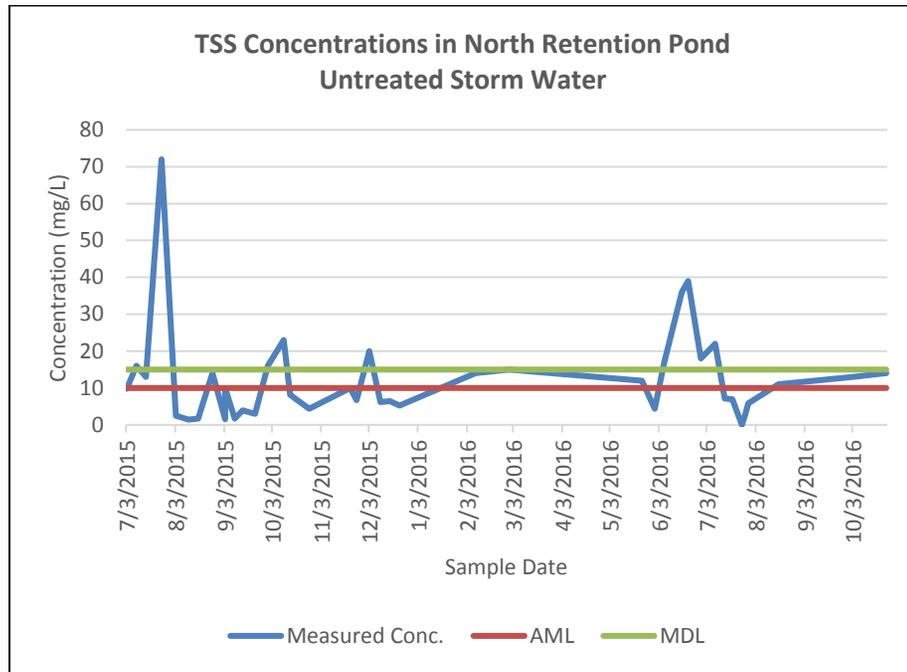
Synthetic Precipitation Leaching Procedure (SPLP) results for onsite slag

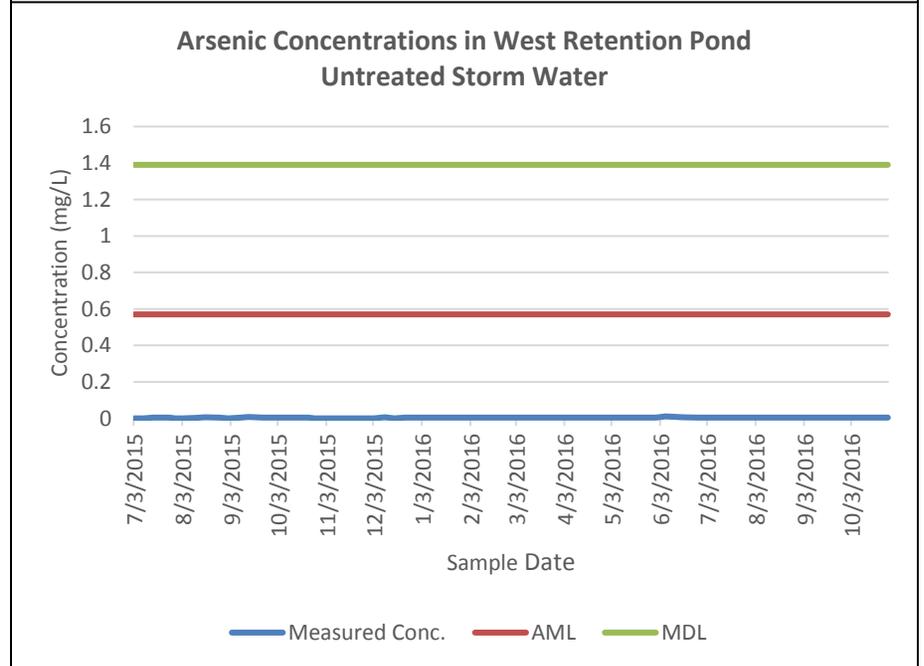
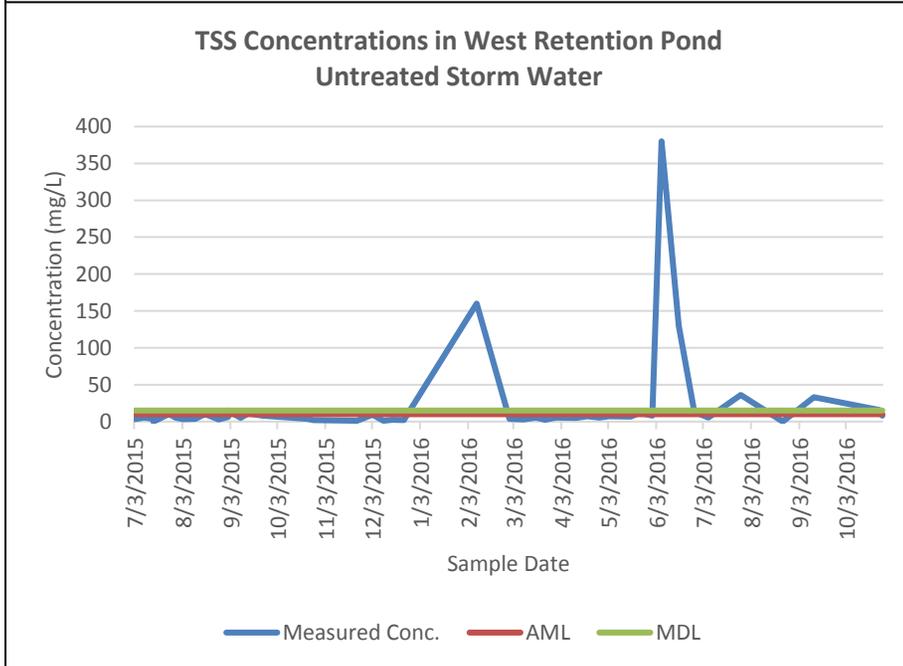
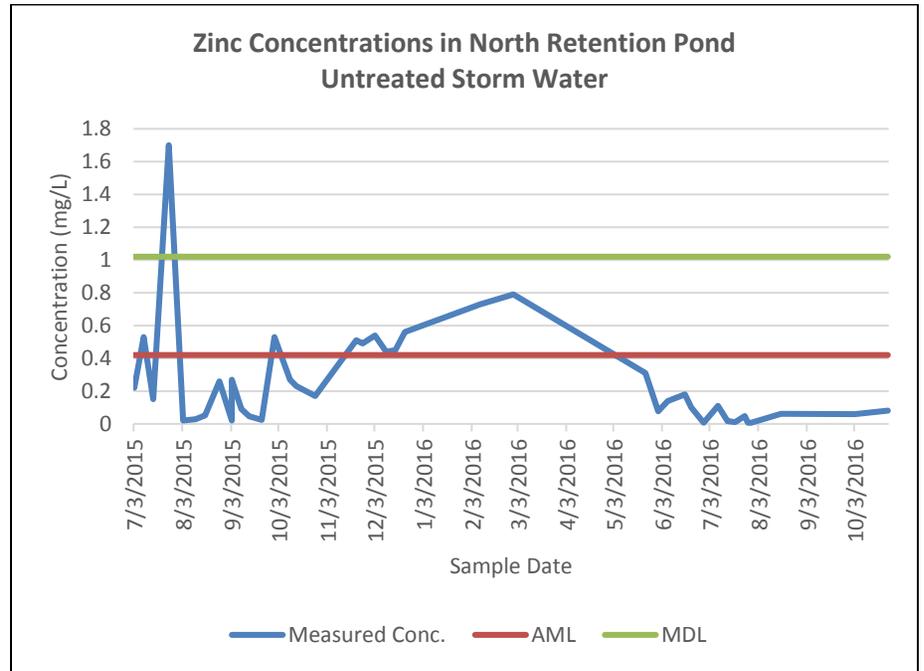
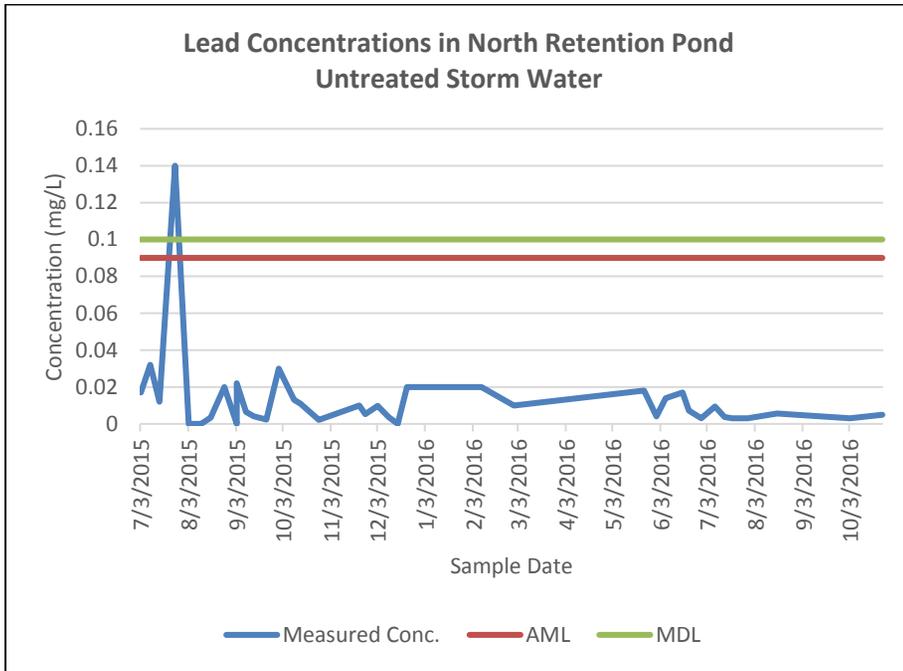
Parameter	Slag "A" Area west of the main plant (mg/L)	Slag "B" Area west of the main plant (mg/L)	Slag "C" Area east of the main plant (mg/L)
Aluminum	0.0418 U	0.0345 U	0.0118 U
Antimony	0.0089 J	0.00401 U	0.00229 U
Arsenic	<0.00274	<0.00274	<0.00274
Barium	0.0159 J	0.00112 J	0.0905 J
Beryllium	<0.00023	<0.000230	<0.000230
Cadmium	<0.00013	<0.00013	0.255
Calcium	14.5	2.61 J	25.6
Chromium	0.00122 U	0.00093 U	0.00062 U
Cobalt	<0.0004	<0.0004	0.00268 J
Copper	0.0138 J	<0.00271	<0.00271
Iron	0.120	<0.0119	<0.0119
Lead	0.00227 J	<0.00126	<0.00126
Magnesium	0.523 J	0.167 U	1.19 J
Manganese	0.00526 J	0.00162 J	0.495
Mercury	<0.0384	0.133 J	0.140 J
Molybdenum	0.00851 J	<0.00138	0.00199 J
Nickel	0.0171 J	<0.00156	0.108
Potassium	<0.750	<0.750	<0.750
Selenium	0.00359 J	<0.00304	<0.00304
Silver	<0.00068	<0.00068	<0.00068
Thallium	<0.00235	<0.00235	<0.00235
Vanadium	<0.00186	<0.00186	<0.00186
Zinc	0.0297	0.0297	1.18

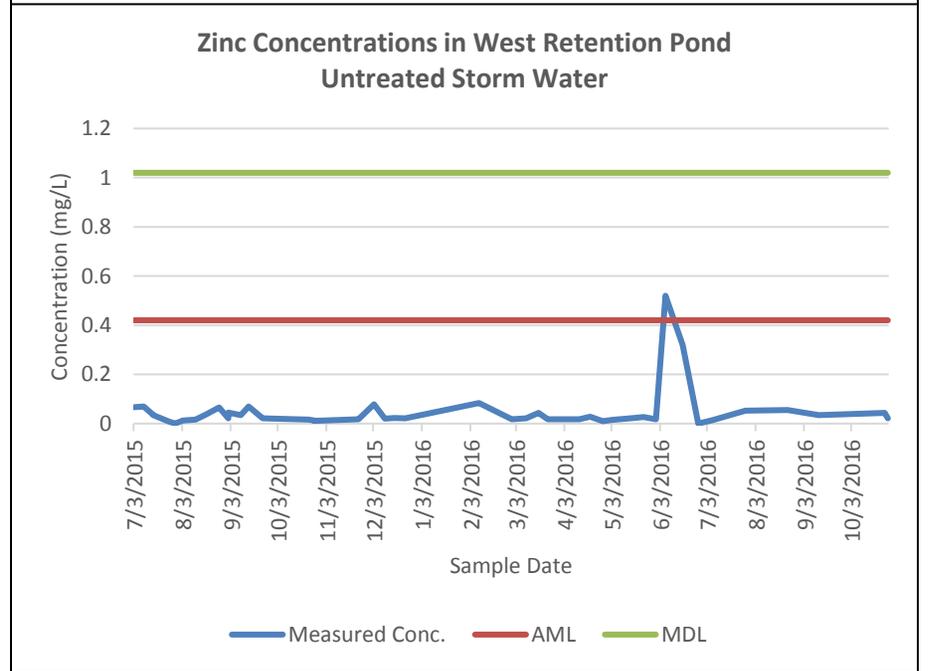
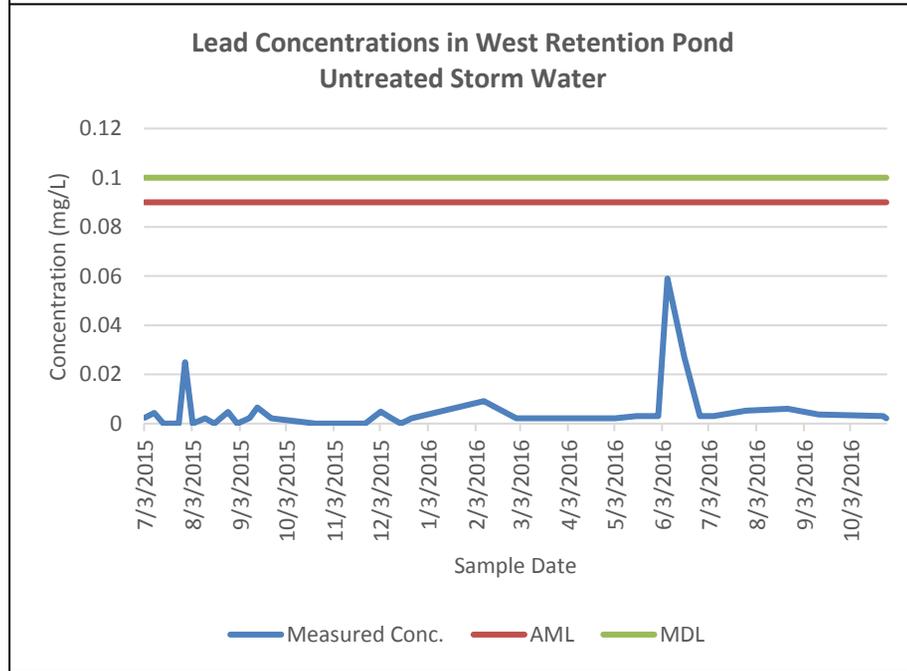
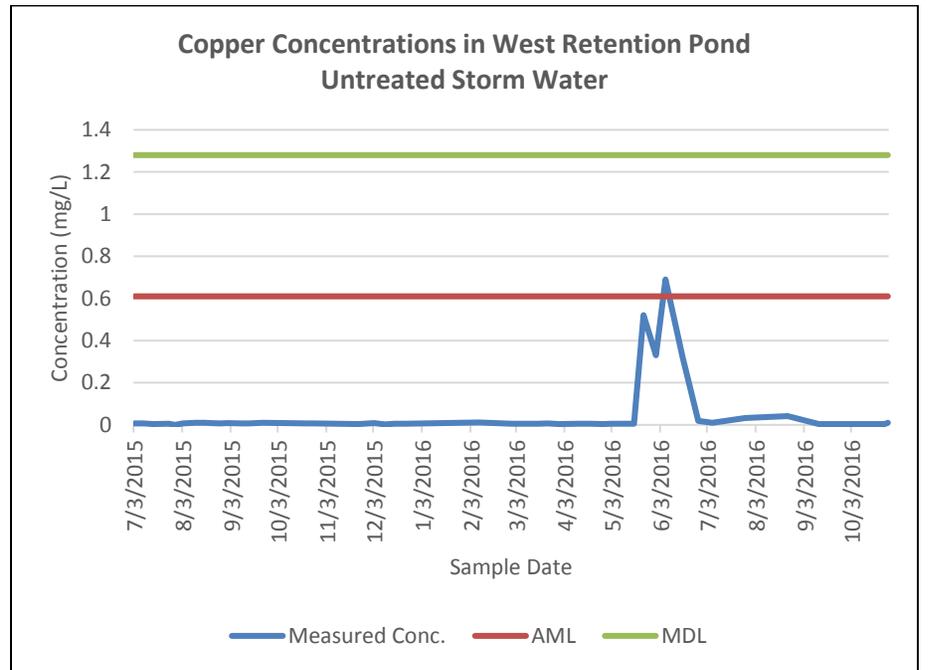
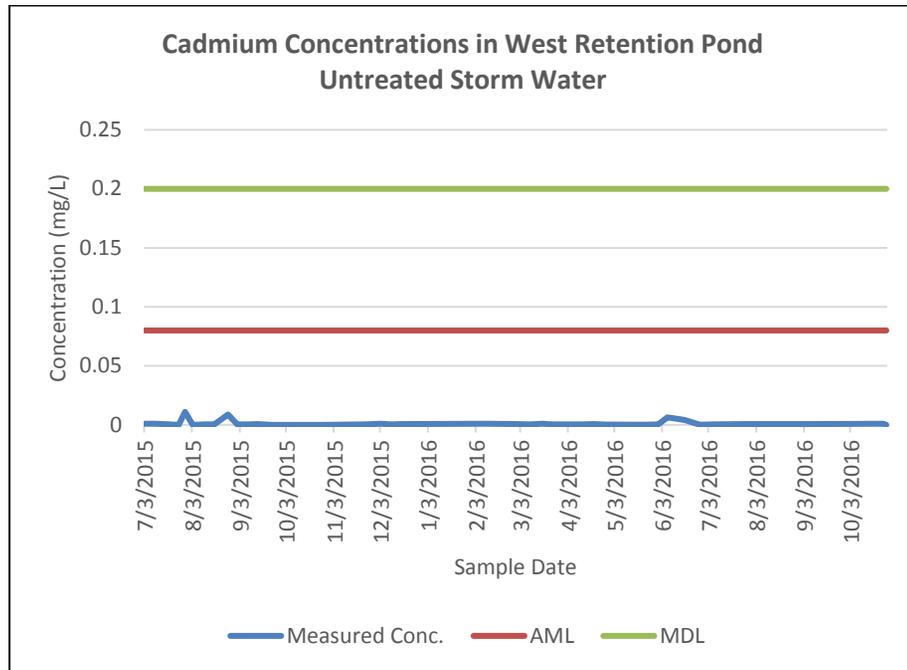
Notes:

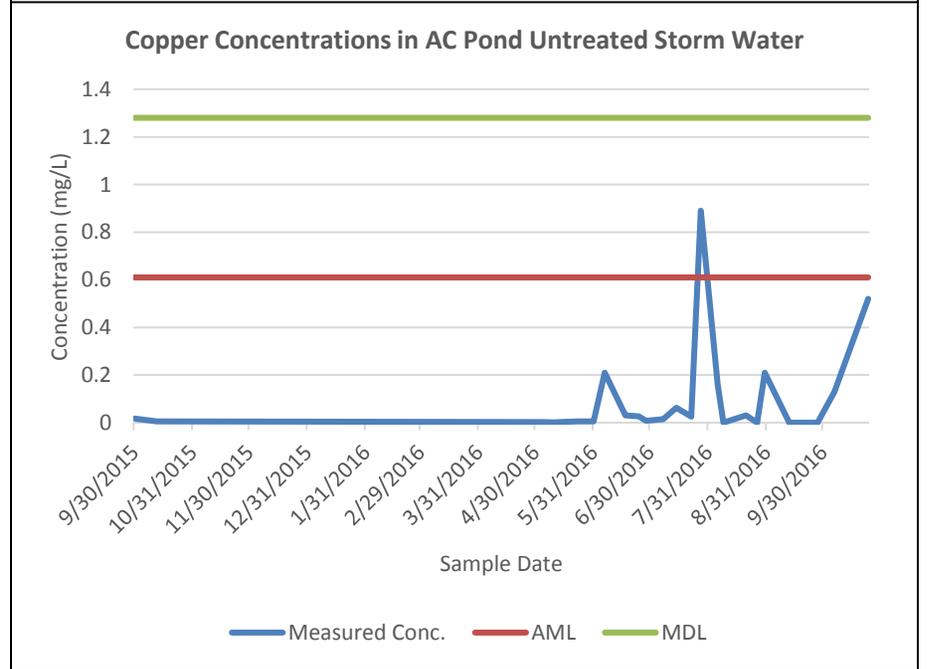
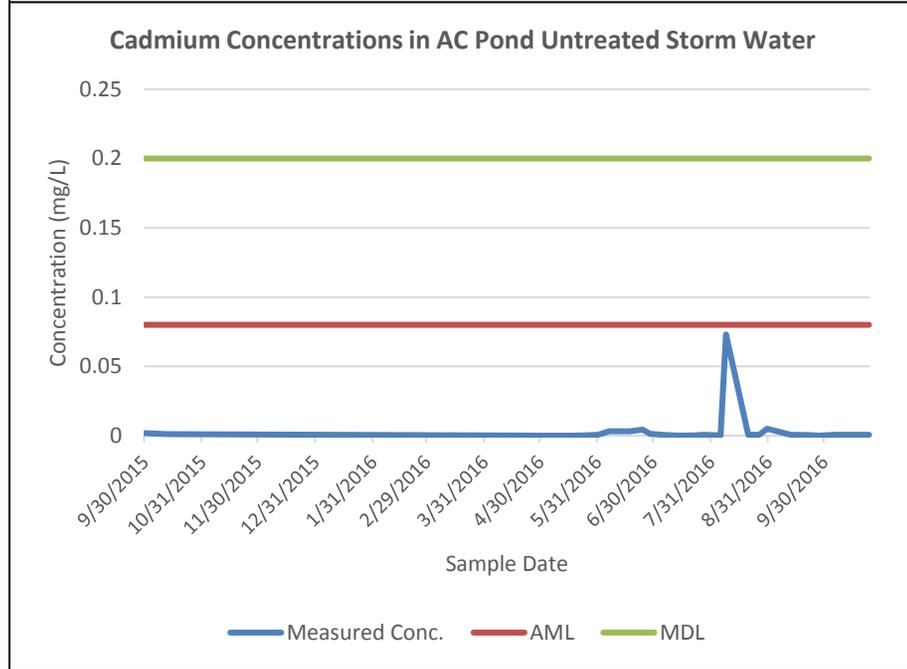
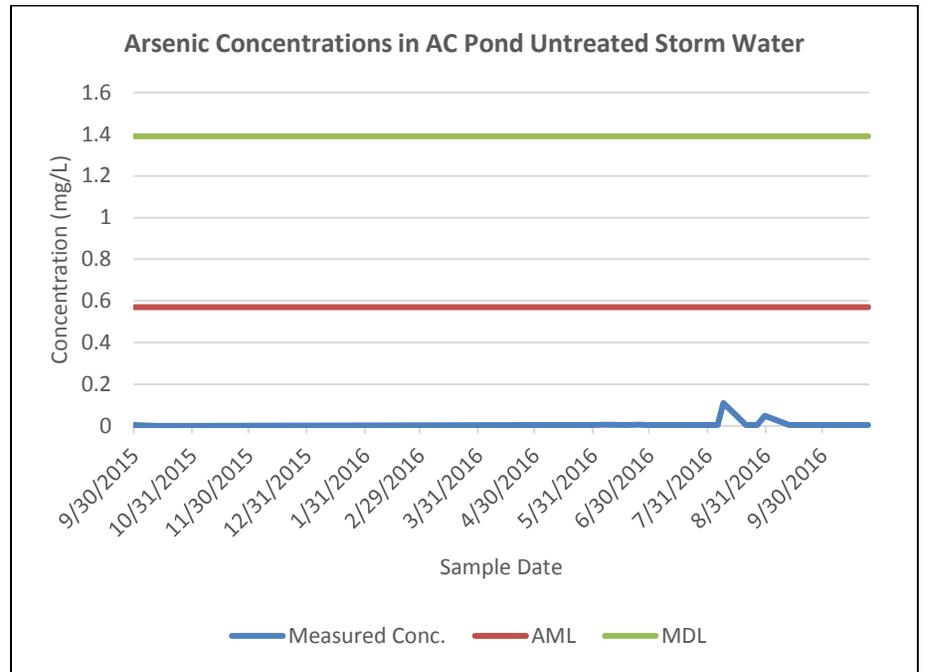
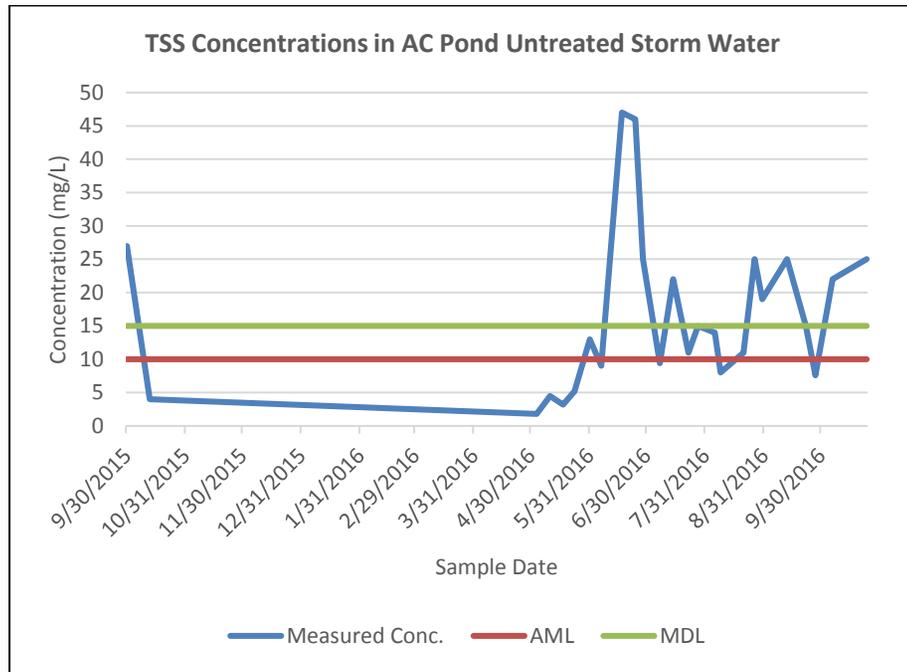
J – estimated value

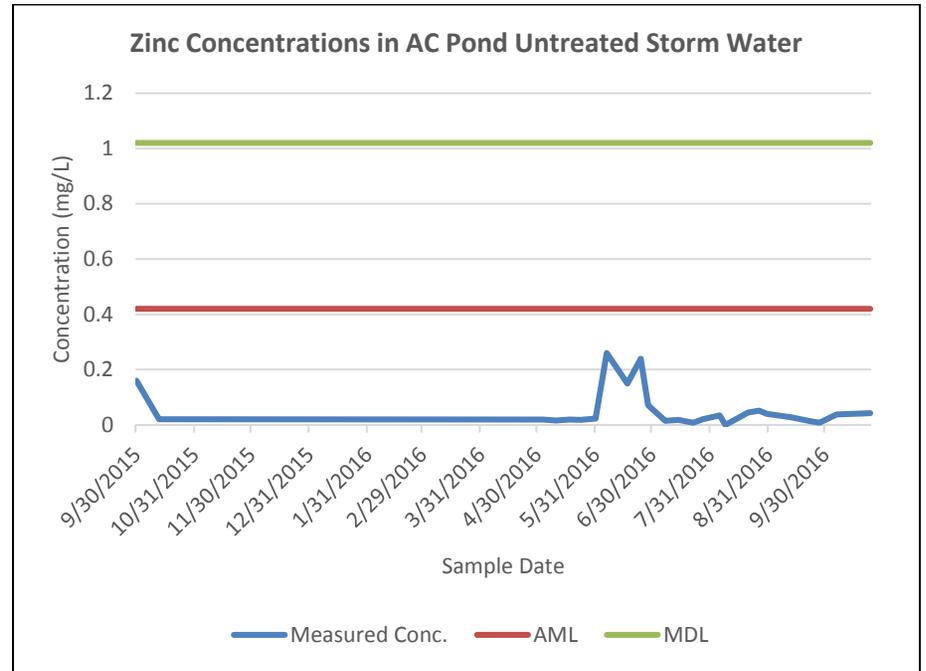
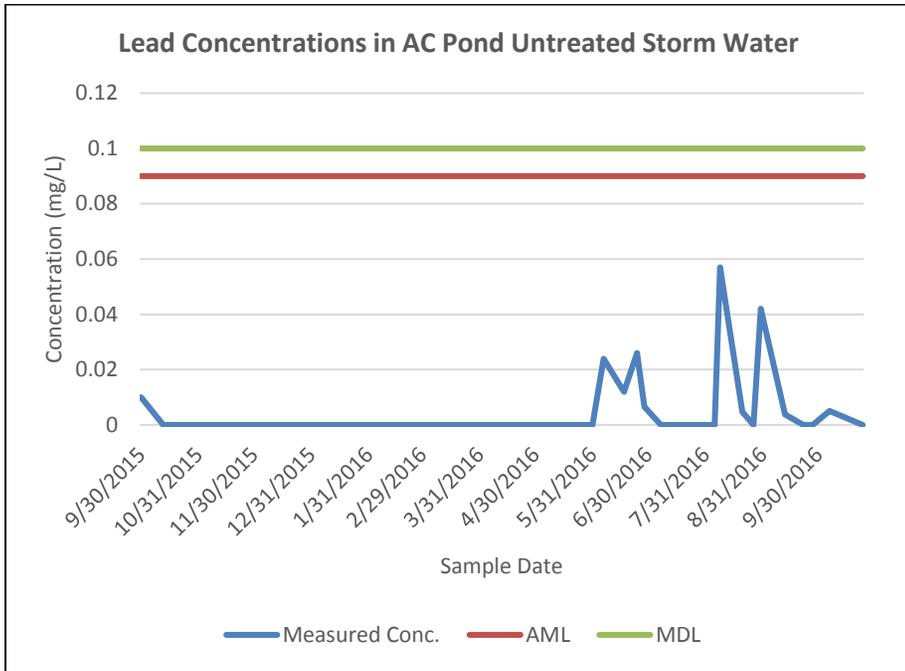
U – analyte not detected at associated numerical sample result



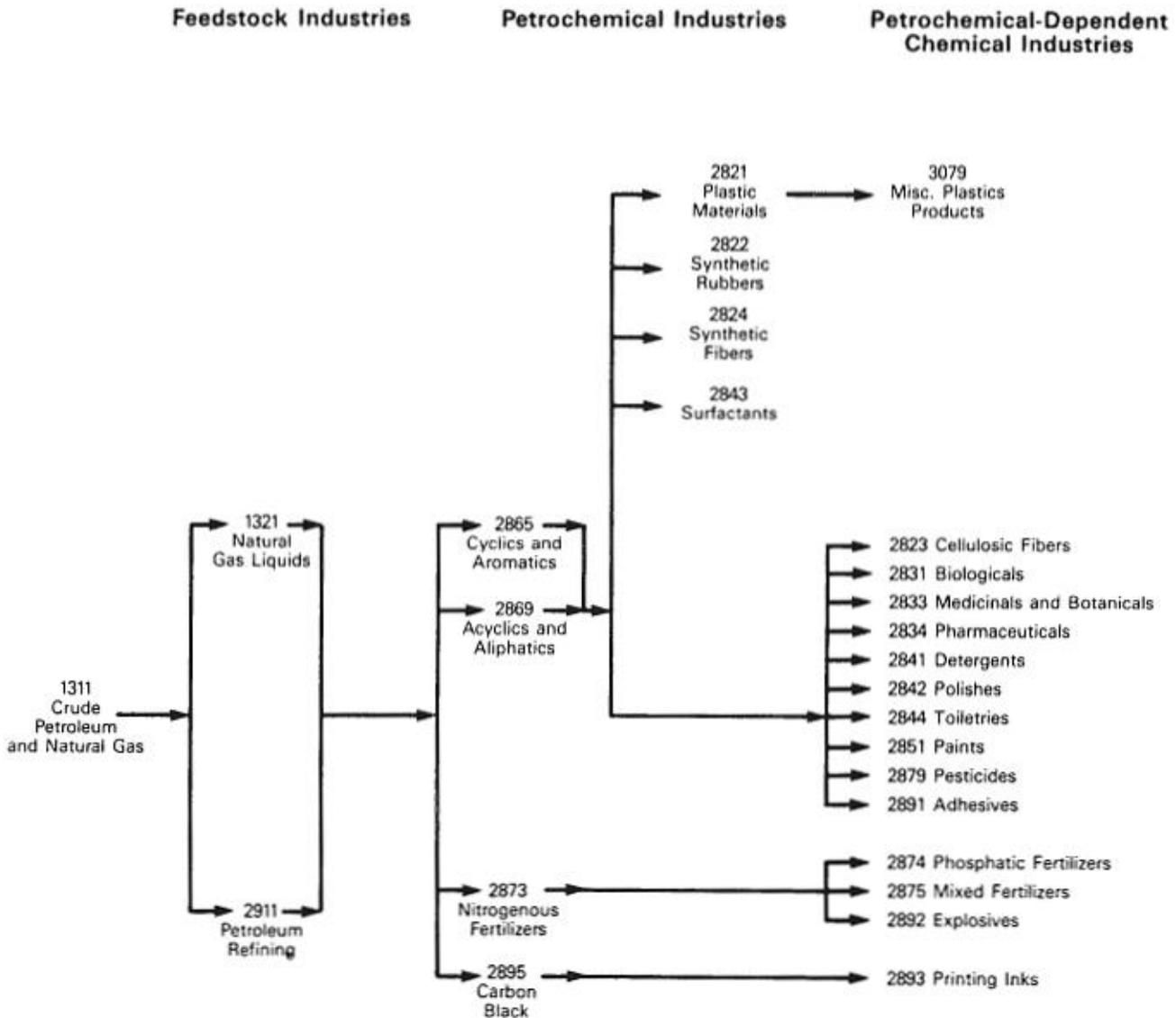








Petrochemical Inter-Industry Relationship



Source: U.S. Department of Commerce, 1981. "1981 U.S. Industrial Outlook." Bureau of Industrial Economics, Washington, D.C.

**Figure III-1.**  
**Relationships Among the SIC Codes Related to the Production of Organic Chemicals, Plastics, and Synthetic Fibers**

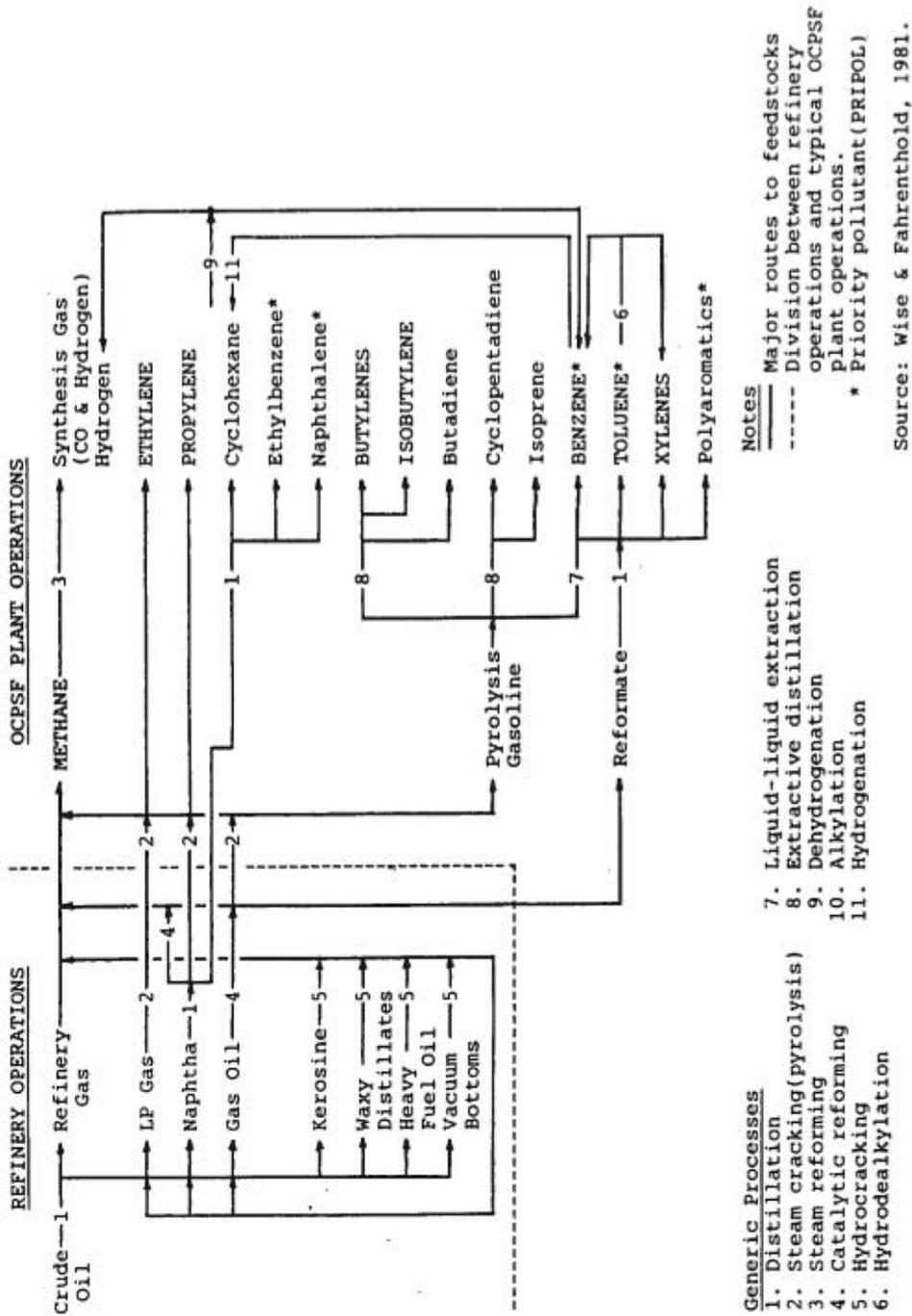


Figure V-1  
 Primary Feedstock Sources

TABLE III-8.  
MAJOR GENERALIZED CHEMICAL REACTIONS AND PROCESSES  
OF THE ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS INDUSTRY

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Acid cleavage	Fiber production
Alkoxylation	Halogenation
Alkylation	Hydration
Amination	Hydroacetylation
Ammonolysis	Hydrodealkylation
Amoxidation	Hydrogenation
Carbonylation	Hydrohalogenation
Chlorohydrination	Hydrolysis
Condensation	Isomerization
Cracking	Neutralization
Crystallization/Distillation	Nitration
Cyanation/Hydrocyanation	Oxidation
Dehydration	Oxyhalogenation
Dehydrogenation	Oxymation
Dehydrohalogenation	Peroxidation
Distillation	Phosgenation
Electrohydrodimerization	Polymerization
Epoxidation	Pyrolysis
Esterification	Sulfonation
Etherification	
Extractive distillation	
Extraction	

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**TOXICS SCREENING ANALYSIS  
WATER QUALITY POLLUTANTS OF CONCERN  
VERSION 2.3**

Facility: **Shell Chemical Appalachia**  
Analysis Hardness (mg/L): **100**

NPDES Permit No.: **PA0002208**  
Discharge Flow (MGD): **3.75**

Outfall: **001**  
Analysis pH (SU): **7**

Parameter	Maximum Concentration in Application or DMRs (µg/L)	Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
<b>Pollutant Group 1</b>					
Total Dissolved Solids	3317000	500000	Yes	408170000	Monitor
Chloride	313000	250000	Yes	204080000	Monitor
Bromide		N/A			Monitor
Sulfate	812000	250000	Yes	204080000	Monitor
Fluoride	1100	2000	No		
<b>Pollutant Group 2 – Metals</b>					
Total Aluminum	4873	750	Yes	26556.23	Monitor
Total Antimony	<	5.6			
Total Arsenic	<	10			
Total Barium	<	2400			
Total Beryllium	<	N/A			
Total Boron	<	1600			
Total Cadmium	<	0.271			
Total Chromium (III)	139	N/A	No		
Hexavalent Chromium	139	10.4	Yes	576.917	Monitor
Total Cobalt	<	19			
Total Copper	55.6	9.3	Yes	478.148	Monitor
Total Cyanide	55.6	N/A	No		
Total Iron	7577	1500	Yes	1220000	No Limits/Monitoring
Dissolved Iron	<	300			
Total Lead	<	3.2			
Total Manganese	139	1000	No	164068.3	
Total Mercury	<	0.05			
Total Molybdenum	<	N/A			
Total Nickel	13.9	52.2	No		

Parameter	Maximum Concentration in Application or DMRs (µg/L)	Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
Total Phenols (Phenolics)	24.5	5	Yes	4081.708	No Limits/Monitoring
Total Selenium	<	5.0			
Total Silver	<	3.8			
Total Thallium	<	0.24			
Total Zinc	<	119.8			
<b>Pollutant Group 3 – Volatiles</b>					
Acrolein	<	3			
Acrylamide	<	0.07			
Acrylonitrile	<	0.051			
Benzene	123	1.2	Yes	501.819	Monitor
Bromoform	<	4.3			
Carbon Tetrachloride	<	0.23			
Chlorobenzene	<	130			
Chlorodibromomethane	<	0.4			
Chloroethane	<	N/A			
2-Chloroethyl Vinyl Ether	<	3500			
Chloroform	<	5.7			
Dichlorobromomethane	<	0.55			
1,1-Dichloroethane	<	N/A			
1,2-Dichloroethane	<	0.38			
1,1-Dichloroethylene	<	33			
1,2-Dichloropropane	<	2200			
1,3-Dichloropropylene	<	0.34			
Ethylbenzene	49	530	No	86956.2	
Methyl Bromide	<	47			
Methyl Chloride	<	5500			
Methylene Chloride	<	4.6			
1,1,2,2-Tetrachloroethane	<	0.17			
Tetrachloroethylene	<	0.69			
Toluene	61	330	No	54142.54	
1,2-trans-Dichloroethylene	<	140			
1,1,1-Trichloroethane	<	610			
1,1,2-Trichloroethane	<	0.59			
Trichloroethylene	<	2.5			
Vinyl Chloride	<	0.025			

Parameter	Maximum Concentration in Application or DMRs (µg/L)	Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
<b>Pollutant Group 4 – Acid Compounds</b>					
2-Chlorophenol	<	81			
2,4-Dichlorophenol	<	77			
2,4-Dimethylphenol	<	130			
4,6-Dinitro-o-Cresol	<	13			
2,4-Dinitrophenol	<	69			
2-Nitrophenol	<	1600			
4-Nitrophenol	<	470			
p-Chloro-m-Cresol	<	30			
Pentachlorophenol	<	0.27			
Phenol	<	10400			
2,4,6-Trichlorophenol	<	1.4			
<b>Pollutant Group 5 – Base Compounds</b>					
Acenaphthene	49	17	Yes	2789.161	No Limits/Monitoring
Acenaphthylene	49	N/A	No		
Anthracene	49	8300	No	1360000	
Benzidine	<	0.000086			
Benzo(a)Anthracene	< 2.5	0.0038	No (Value < QL)		
Benzo(a)Pyrene	< 2.5	0.0038	No (Value < QL)		
3,4-Benzofluoranthene	< 2.5	0.0038	No (Value < QL)		
Benzo(ghi)Perylene	<	N/A			
Benzo(k)Fluoranthene	<	0.0038			
Bis(2-Chloroethoxy)Methane	<	N/A			
Bis(2-Chloroethyl)Ether	<	0.03			
Bis(2-Chloroisopropyl)Ether	<	1400			
Bis(2-Ethylhexyl)Phthalate	<	1.2			
4-Bromophenyl Phenyl Ether	<	54			
Butyl Benzyl Phthalate	<	35			
2-Chloronaphthalene	<	1000			
4-Chlorophenyl Phenyl Ether	<	N/A			
Chrysene	<	0.0038			
Dibenzo(a,h)Anthracene	<	0.0038			
1,2-Dichlorobenzene	<	160			
1,3-Dichlorobenzene	<	69			
1,4-Dichlorobenzene	<	150			

Parameter	Maximum Concentration in Application or DMRs (µg/L)	Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
3,3-Dichlorobenzidine	<	0.021			
Diethyl Phthalate	<	800			
Dimethyl Phthalate	<	500			
Di-n-Butyl Phthalate	<	21			
2,4-Dinitrotoluene	<	0.05			
2,6-Dinitrotoluene	<	0.05			
1,4-Dioxane	<	N/A			
Di-n-Octyl Phthalate	<	N/A			
1,2-Diphenylhydrazine	<	0.036			
Fluoranthene	<	40			
Fluorene	49	1100	No	180475.1	
Hexachlorobenzene	<	0.00028			
Hexachlorobutadiene	<	0.44			
Hexachlorocyclopentadiene	<	1			
Hexachloroethane	<	1.4			
Indeno(1,2,3-cd)Pyrene	<	0.0038			
Isophorone	<	35			
Naphthalene	<	43			
Nitrobenzene	<	17			
n-Nitrosodimethylamine	<	0.00069			
n-Nitrosodi-n-Propylamine	<	0.005			
n-Nitrosodiphenylamine	<	3.3			
Phenanthrene	<	1			
Pyrene	<	830			
1,2,4-Trichlorobenzene	<	26			

PENTOXSD

Modeling Input Data

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	952.70	681.85	22771.80	0.00010	0.00	<input checked="" type="checkbox"/>

Stream Data

	LFY	Trib Flow	Stream Flow	WD Ratio	Rch Width	Rch Depth	Rch Velocity	Rch Trav Time	Tributary		Stream		Analysis	
									Hard	pH	Hard	pH	Hard	pH
	(cfsm)	(cfs)	(cfs)		(ft)	(ft)	(fps)	(days)	(mg/L)		(mg/L)		(mg/L)	
Q7-10	0.21	0	4730	0	1200	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data

Name	Permit Number	Existing Disc Flow	Permitted Disc Flow	Design Disc Flow	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard	Disc pH
		(mgd)	(mgd)	(mgd)						(mg/L)	
Outfall 001	A0002208-1	3.75	0	0	0	0	0.2	0.2	0.2	1.3	6

Parameter Data

Parameter Name	Disc Conc	Trib Conc	Disc Daily CV	Disc Hourly CV	Stream Conc	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc
	(µg/L)	(µg/L)	CV	CV	(µg/L)					(µg/L)
ACENAPHTHENE	1E+07	0	0.5	0.5	0	0	0	0	1	0
ALUMINUM	1E+07	0	0.5	0.5	0	0	0	0	1	0
ANTHRACENE	1E+07	0	0.5	0.5	0	0	0	0	1	0
BENZENE	1E+07	0	0.5	0.5	0	0	0	0	1	0
CHLORIDE (PWS)	5E+08	0	0.5	0.5	0	0	0	0	1	0
CHROMIUM, III	1E+07	0	0.5	0.5	0	0	0	0	1	0
CHROMIUM, VI	1E+07	0	0.5	0.5	0	0	0	0	1	0
COPPER	1E+07	0	0.5	0.5	0	0	0	0	1	0
CYANIDE, FREE	1E+07	0	0.5	0.5	0	0	0	0	1	0
ETHYLBENZENE	1E+07	0	0.5	0.5	0	0	0	0	1	0
FLUORENE	1E+07	0	0.5	0.5	0	0	0	0	1	0
FLUORIDE (PWS)	1E+07	0	0.5	0.5	0	0	0	0	1	0
MANGANESE	1E+07	0	0.5	0.5	0	0	0	0	1	0
PHENOLICS (PWS)	1E+07	0	0.5	0.5	0	0	0	0	1	0
SULFATE (PWS)	5E+08	0	0.5	0.5	0	0	0	0	1	0
TOLUENE	1E+07	0	0.5	0.5	0	0	0	0	1	0
TOTAL DISSOLVED SOLIDS (PWS)	5E+08	0	0.5	0.5	0	0	0	0	1	0
TOTAL IRON	1E+07	0	0.5	0.5	0	0	0	0	1	0

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
32317	951.71	681.67	22772.85	0.00010	216.00	<input checked="" type="checkbox"/>

Stream Data														
LFY	Trib Flow	Stream Flow	WD Ratio	Rch Width	Rch Depth	Rch Velocity	Rch Trav Time	Tributary		Stream		Analysis		
	(cfs)	(cfs)		(ft)	(ft)	(fps)	(days)	Hard	pH	Hard	pH	Hard	pH	
Q7-10	0.21	0	4730	0	1200	15	0	0	98	7.33	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data												
Name	Permit Number	Existing Disc Flow	Permitted Disc Flow	Design Disc Flow	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard	Disc pH	
		(mgd)	(mgd)	(mgd)						(mg/L)		
		0	0	0	0	0	0	0	0	100	7	

Parameter Data											
Parameter Name	Disc Conc	Trib Conc	Disc Daily CV	Disc Hourly CV	Steam Conc	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc	
	(µg/L)	(µg/L)			(µg/L)					(µg/L)	
ACENAPHTHENE	0	0	0.5	0.5	0	0	0	0	1	0	
ALUMINUM	0	0	0.5	0.5	0	0	0	0	1	0	
ANTHRACENE	0	0	0.5	0.5	0	0	0	0	1	0	
BENZENE	0	0	0.5	0.5	0	0	0	0	1	0	
CHLORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
CHROMIUM, III	0	0	0.5	0.5	0	0	0	0	1	0	
CHROMIUM, VI	0	0	0.5	0.5	0	0	0	0	1	0	
COPPER	0	0	0.5	0.5	0	0	0	0	1	0	
CYANIDE, FREE	0	0	0.5	0.5	0	0	0	0	1	0	
ETHYLBENZENE	0	0	0.5	0.5	0	0	0	0	1	0	
FLUORENE	0	0	0.5	0.5	0	0	0	0	1	0	
FLUORIDE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
MANGANESE	0	0	0.5	0.5	0	0	0	0	1	0	
PHENOLICS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
SULFATE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
TOLUENE	0	0	0.5	0.5	0	0	0	0	1	0	
TOTAL DISSOLVED SOLIDS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0	
TOTAL IRON	0	0	0.5	0.5	0	0	0	0	1	0	

**PENTOXSD Analysis Results**

**Hydrodynamics**

<u>SWP Basin</u>		<u>Stream Code:</u>			<u>Stream Name:</u>						
20E		32317			OHIO RIVER						
RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope	Depth (ft)	Width (ft)	WD Ratio	Velocity (fps)	Reach Trav Time (days)	CMT (min)

**Q7-10 Hydrodynamics**

952.700	4730	0	4730	5.80124	0.0001	15	1200	80	0.2631	0.2299	1000+
951.710	4730	334.15	4395.8	NA	0	0	0	0	0	0	NA

**Qh Hydrodynamics**

952.700	12101	0	12101	5.80124	0.0001	22.67	1200	52.934	0.4450	0.1359	1000+
951.710	12101	334.15	11767	NA	0	0	0	0	0	0	NA

**PENTOXSD Analysis Results**

**Wasteload Allocations**

RMI	Name	Permit Number	AFC								
952.70	Outfall 001	PA0002208-1a	Q7-10:	CCT (min)	15	PMF	0.066	Analysis pH	7.193	Analysis Hardness	96.249
Parameter			Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)		
CHROMIUM, III			0	0	0	0	552.202	1747.475	96535.16		
			Dissolved WQC. Chemical translator of 0.316 applied.								
CHROMIUM, VI			0	0	0	0	16	16.293	900.084		
			Dissolved WQC. Chemical translator of 0.982 applied.								
COPPER			0	0	0	0	12.964	13.504	745.988		
			Dissolved WQC. Chemical translator of 0.96 applied.								
CYANIDE, FREE			0	0	0	0	22	22	1215.338		
PHENOLICS (PWS)			0	0	0	0	NA	NA	NA		
BENZENE			0	0	0	0	640	640	35355.3		
ETHYLBENZENE			0	0	0	0	2900	2900	160203.7		
TOLUENE			0	0	0	0	1700	1700	93912.51		
ACENAPHTHENE			0	0	0	0	83	83	4585.14		
ANTHRACENE			0	0	0	0	NA	NA	NA		
FLUORENE			0	0	0	0	NA	NA	NA		
ALUMINUM			0	0	0	0	750	750	41431.99		
CHLORIDE (PWS)			0	0	0	0	NA	NA	NA		
FLUORIDE (PWS)			0	0	0	0	NA	NA	NA		
TOTAL IRON			0	0	0	0	NA	NA	NA		
MANGANESE			0	0	0	0	NA	NA	NA		
SULFATE (PWS)			0	0	0	0	NA	NA	NA		
TOTAL DISSOLVED SOLIDS (PWS)			0	0	0	0	NA	NA	NA		

CFC											
Q7-10:	CCT (min)	720	PMF	0.2	Analysis pH	7.279	Analysis Hardness	97.41			

**PENTOXSD Analysis Results**

**Wasteload Allocations**

RMI	Name	Permit Number						
952.70	Outfall 001	PA0002208-1a						
	Parameter	Stream Conc. (µg/L)	Stream CV	Trib Conc. (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
	CHROMIUM, III	0	0	0	0	72.539	84.348	13838.79
		Dissolved WQC. Chemical translator of 0.86 applied.						
	CHROMIUM, VI	0	0	0	0	10	10.395	1705.492
		Dissolved WQC. Chemical translator of 0.962 applied.						
	COPPER	0	0	0	0	8.757	9.122	1496.647
		Dissolved WQC. Chemical translator of 0.96 applied.						
	CYANIDE, FREE	0	0	0	0	5.2	5.2	853.155
	PHENOLICS (PWS)	0	0	0	0	NA	NA	NA
	BENZENE	0	0	0	0	130	130	21328.88
	ETHYLBENZENE	0	0	0	0	580	580	95159.62
	TOLUENE	0	0	0	0	330	330	54142.54
	ACENAPHTHENE	0	0	0	0	17	17	2789.161
	ANTHRACENE	0	0	0	0	NA	NA	NA
	FLUORENE	0	0	0	0	NA	NA	NA
	ALUMINUM	0	0	0	0	NA	NA	NA
	CHLORIDE (PWS)	0	0	0	0	NA	NA	NA
	FLUORIDE (PWS)	0	0	0	0	NA	NA	NA
	TOTAL IRON	0	0	0	0	1500	1500	1220000
		WQC = 30 day average. PMF = 1.						
	MANGANESE	0	0	0	0	NA	NA	NA
	SULFATE (PWS)	0	0	0	0	NA	NA	NA
	TOTAL DISSOLVED SOLIDS (PWS)	0	0	0	0	NA	NA	NA

**THH**

Q7-10:	CCT (min)	720	PMF	0.2	Analysis pH	NA	Analysis Hardness	NA
	Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
	CHROMIUM, III	0	0	0	0	NA	NA	NA

**PENTOXSD Analysis Results**

**Wasteload Allocations**

RMI	Name	Permit Number							
952.70	Outfall 001	PA0002208-1a							
	CHROMIUM, VI		0	0	0	0	NA	NA	NA
	COPPER		0	0	0	0	NA	NA	NA
	CYANIDE, FREE		0	0	0	0	140	140	22969.56
	PHENOLICS (PWS)		0	0	0	0	5	5	4081.708
			CCT based on PWS at RMI 951.71.						
			CCT based on PWS at RMI 951.71.WQC applied at RMI 951.71 with a design stream flow of 4730.						
	BENZENE		0	0	0	0	NA	NA	NA
	ETHYLBENZENE		0	0	0	0	530	530	86956.2
			CCT based on PWS at RMI 951.71.						
	TOLUENE		0	0	0	0	1300	1300	213288.8
			CCT based on PWS at RMI 951.71.						
	ACENAPHTHENE		0	0	0	0	670	670	109925.8
			CCT based on PWS at RMI 951.71.						
	ANTHRACENE		0	0	0	0	8300	8300	1360000
			CCT based on PWS at RMI 951.71.						
	FLUORENE		0	0	0	0	1100	1100	180475.1
			CCT based on PWS at RMI 951.71.						
	ALUMINUM		0	0	0	0	NA	NA	NA
	CHLORIDE (PWS)		0	0	0	0	250000	250000	2.0408E+08
			CCT based on PWS at RMI 951.71.WQC applied at RMI 951.71 with a design stream flow of 4730.						
	FLUORIDE (PWS)		0	0	0	0	2000	2000	1630000
			CCT based on PWS at RMI 951.71.WQC applied at RMI 951.71 with a design stream flow of 4730.						
	TOTAL IRON		0	0	0	0	NA	NA	NA
	MANGANESE		0	0	0	0	1000	1000	164068.3
			CCT based on PWS at RMI 951.71.						
	SULFATE (PWS)		0	0	0	0	250000	250000	2.0408E+08
			CCT based on PWS at RMI 951.71.WQC applied at RMI 951.71 with a design stream flow of 4730.						
	TOTAL DISSOLVED SOLIDS (PWS)		0	0	0	0	500000	500000	4.0817E+08
			CCT based on PWS at RMI 951.71.WQC applied at RMI 951.71 with a design stream flow of 4730.						

**CRL**

Qh:	CCT (min)	720	PMF	0.2					
Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)		
CHROMIUM, III	0	0	0	0	NA	NA	NA		

**PENTOXSD Analysis Results**

**Wasteload Allocations**

RMI	Name	Permit Number						
952.70	Outfall 001	PA0002208-1a						
	CHROMIUM, VI	0	0	0	0	NA	NA	NA
	COPPER	0	0	0	0	NA	NA	NA
	CYANIDE, FREE	0	0	0	0	NA	NA	NA
	PHENOLICS (PWS)	0	0	0	0	NA	NA	NA
	BENZENE	0	0	0	0	1.2	1.2	501.819
	ETHYLBENZENE	0	0	0	0	NA	NA	NA
	TOLUENE	0	0	0	0	NA	NA	NA
	ACENAPHTHENE	0	0	0	0	NA	NA	NA
	ANTHRACENE	0	0	0	0	NA	NA	NA
	FLUORENE	0	0	0	0	NA	NA	NA
	ALUMINUM	0	0	0	0	NA	NA	NA
	CHLORIDE (PWS)	0	0	0	0	NA	NA	NA
	FLUORIDE (PWS)	0	0	0	0	NA	NA	NA
	TOTAL IRON	0	0	0	0	NA	NA	NA
	MANGANESE	0	0	0	0	NA	NA	NA
	SULFATE (PWS)	0	0	0	0	NA	NA	NA
	TOTAL DISSOLVED SOLIDS (PWS)	0	0	0	0	NA	NA	NA

**PENTOXSD Analysis Results**

**Recommended Effluent Limitations**

<u>SWP Basin</u>	<u>Stream Code:</u>	<u>Stream Name:</u>	
20E	32317	OHIO RIVER	
RMI	Name	Permit Number	Disc Flow (mgd)
952.70	Outfall 001	PA0002208-1a	3.7500

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent	
				WQBEL (µg/L)	WQBEL Criterion
ACENAPHTHENE	2789.161	CFC	4351.54	2789.161	CFC
ALUMINUM	26556.23	AFC	41431.99	26556.23	AFC
ANTHRACENE	1360000	THH	2120000	1360000	THH
BENZENE	501.819	CRL	782.918	501.819	CRL
CHLORIDE (PWS)	2.0408E+08	THH	3.184E+08	2.0408E+08	THH
CHROMIUM, III	13838.79	CFC	21590.74	13838.79	CFC
CHROMIUM, VI	576.917	AFC	900.084	576.917	AFC
COPPER	478.148	AFC	745.988	478.148	AFC
CYANIDE, FREE	778.983	AFC	1215.338	778.983	AFC
ETHYLBENZENE	86956.2	THH	135665.7	86956.2	THH
FLUORENE	180475.1	THH	281570.2	180475.1	THH
FLUORIDE (PWS)	1630000	THH	2540000	1630000	THH
MANGANESE	164068.3	THH	255972.9	164068.3	THH
PHENOLICS (PWS)	4081.708	THH	6368.12	4081.708	THH
SULFATE (PWS)	2.0408E+08	THH	3.184E+08	2.0408E+08	THH
TOLUENE	54142.54	CFC	84471.06	54142.54	CFC
TOTAL DISSOLVED SOLIDS (PWS)	4.0817E+08	THH	6.3681E+08	4.0817E+08	THH
TOTAL IRON	1220000	CFC	1910000	1220000	CFC