# Application for Renewal of NPDES Permit No. IN0000108
# BP Whiting Refinery

Submitted to:
**Indiana Department of Environmental Management**
**Office of Water Quality**
**Indianapolis, IN**

Prepared for:
**BP Products North America, Inc.**
**Whiting, Indiana**

Prepared by:
**ENVIRON International Corporation**
**Denver, Colorado**

Date:
**February 2012**

ENVIRON

# BP PRODUCTS NORTH AMERICA INC. – WHITING REFINERY
# NPDES PERMIT RENEWAL APPLICATION

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| **BP Products North America, Inc. – Whiting Refinery<br>List of Potentially Affected Persons** |
|---|
| 65-42 PS<br>Colleen Aguirre<br>2922 Churchill Ln<br>Highland, In 46322-3565<br>East Chicago, In 46312<br>Tita.Lagrimas@Tradebe.Com |
| 65-42 PS<br>Dorothy Alabach<br>647 N 125 W<br>Valparaiso, In 46385 |
| 65-42-PS<br>Arcelor Mittal. Inc.<br>3210 Watling Street<br>East Chicago, In 46312 |
| 65-42 PS<br>Patrick Bennett<br>Dir Enviro & Energy<br>Indiana Mfg Association<br>Po Box 82012<br>Indianapolis In 46282-0002<br>Patrickkbennett@Gmail.Com |
| 65-42-PS<br>Rose Bergeson<br>1303 121st Street<br>Whiting, In 46394 |
| 65-42-PS<br>Suzanne Boblek<br>2141 Lake<br>Whiting, In 46394 |
| 65-42-PS<br>Jj Bulashi<br>2242 White Oak<br>Whiting, In 46394 |
| 65-42-PS<br>Doreen Carey<br>Grand Cal Task Force<br>2400 New York Avenue<br>Whiting, In 46394 |
| 65-42 PS<br>Warren Canright<br>Chesterton Tribune<br>Po Box 919<br>Chesterton In 46304 |
| 65-42 PS<br>Rose Marie Cazeau<br>Environmental Bureau<br>Illinois Attorney General, 18th Floor<br>69 W. Washington St<br>Chicago, Il 60602<br>Rcazeau@Atg.State.Il.Us |

| **BP Products North America, Inc. – Whiting Refinery**<br>**List of Potentially Affected Persons** |
|---|
| 65-42-PS<br>Cerestar Usa<br>1100 Indianapolis Boulevard<br>Whiting, In 46394 |
| 65-42 PS<br>Roosevelt Allen<br>Lake County 1st District Commissioner<br>County Government Center<br>3rd Floor Building "A"<br>2293 North Main Street<br>Crown Point, In 46307 |
| 65-42 PS<br>Kellee Cobb<br>Reclaimed Energy Company<br>1500 Western Avenue<br>Connersville In 47331<br>Kcobb@Superioroil.Com |
| 65-42-PS<br>John Cogan<br>1722 Central<br>Whiting, In 46394 |
| 65-42 PS<br>Ronald L Collins<br>Facilities/Environmental Engineering<br>Enerdel Inc<br>8740 Hague Rd, Bldg 7<br>Indianapolis, In 46256<br>Rcollins@Enerdel.Com |
| 65-42-PS<br>Dan Deeb<br>Indiana Wildlife Federation<br>950 North Rangeline Road – Suite A<br>Carmel, In 46032 |
| 65-42-PS<br>Daniel & Dorothy Douglas<br>P.O. Box 228<br>Whiting, In 46394 |
| 65-42 PS<br>Frances Dupey<br>Lake County 3rd District Commissioner<br>County Government Center<br>3rd Floor Building "A"<br>2293 North Main Street<br>Crown Point, In 46307 |
| 65-42-PS<br>Bernadette Dvorscak<br>1445 Fred St.<br>Whiting, In 46394 |

| **BP Products North America, Inc. – Whiting Refinery**<br>**List of Potentially Affected Persons** |
|---|
| 65-42-PS<br>Edward Dybel<br>2440 Schrage Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>East Chicago Filtration Plant<br>3330 Aldis Avenue<br>East Chicago, In 46312 |
| 65-42 PS<br>East Chicago Health Dept<br>100 W Chicago Avenue<br>East Chicago In 46312<br>Lake-Echicago@Isdh.In.Gov |
| 65-42 PS<br>Michael Foster<br>Eli Lilly & Company<br>Lilly Corporate Center<br>Indianapolis In 46285<br>Foster_Michael_L@Lilly.Com |
| 65-42 PS<br>Emily Gallagher<br>Emily.Gallagher@Us.Rhodia.Com |
| **65-42 PS**<br>Jim Glass<br>Dept Of Natural Resources Room 274<br>Dir Of Historic Preservation<br>402 W Washington Street<br>Indianapolis In 46204<br>Jglass@Dnr.In.Gov |
| 65-42-PS<br>Don Greer<br>2416 Schrage Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>Joseph Gresko<br>1707 Central Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>Michael Grdina<br>2234 Schrage Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>William Haddad<br>2603 New York Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>John Haluska<br>1700 Cleveland Ave.<br>Whiting, In 46394 |

| **BP Products North America, Inc. – Whiting Refinery**<br>**List of Potentially Affected Persons** |
|---|
| 65-42-PS<br>Hammond Filtration Plant<br>Lakefront<br>Hammond, In 36320 |
| 65-42 PS<br>Craig Hogarth<br>Heritage Environmental Services, Llc<br>7901 West Morris Street<br>Indianapolis, Indiana 46231<br>Craig.Hogarth@Heritage-Enviro.Com |
| 65-42-PS<br>Izaak Walton League<br>1532 E. Main<br>Griffith, In 46319 |
| 65-42-PS<br>Irene Jackim<br>3929 Henry Ave.<br>Hammond, In 46327 |
| 65-42-PS<br>Lee Jackson<br>6405 Olcott<br>Hammond, In 46320 |
| 65-42-PS<br>Mark Kozak<br>1433 Fishcrupp<br>Whiting, In 46394 |
| 65-42 PS<br>Julie Kujawa<br>2000 Michigan<br>Hammond In 46320<br>Julie.Kujawa@Us.Rhodia.Com |
| 65-42 PS<br>Ms Tita Lagrimas, Tradebe Treatment & Recycling Llc<br>4343 Kennedy Avenue<br>East Chicago, IN 46312 |
| 65-42 PS<br>Lake County Health Dept.,<br>2293 N Main Street<br>Crown Point In 46307-1896<br>Doffinx@Lakecountyin.Org |
| 65-42 PS<br>Kurt A. Maddock<br>1604 Old Orchard Rd<br>Vincennes In 47591<br>Maddock@Cinergymetro.Net |
| 65-42-PS<br>Jack & Carolyn Marsh<br>1804 Oliver St.<br>Whiting, In 46394 |

| BP Products North America, Inc. – Whiting Refinery<br>List of Potentially Affected Persons |
|---|
| 65-42 PS<br>Mayor Of Whiting<br>Mayor's Office<br>1443 119th Street<br>Whiting, In 46394 |
| 65-42-PS<br>R.W. McCain,<br>Enviro. Chairman<br>Northwest Indiana Coalition<br>7113 Howard Ave.<br>Hammond, In 46324 |
| 65-42-PS<br>Sen. Frank Mrvan<br>6732 Maryland Ave.<br>Hammond, In 46323 |
| 65-42 PS<br>John Murray<br>Heritage Environmental Services, Llc<br>7901 West Morris Street<br>Indianapolis, Indiana 46231<br>John.Murray@Heritage-Enviro.Com |
| 65-42 PS<br>Paul Myers, Executive Director<br>Marktown Preservation Society<br>405 Prospect Street<br>Marktown Historic District<br>East Chicago, In 46312 |
| 65-42-PS<br>Philip Paulina<br>1732 Atchison Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>Praxair Gas Tech<br>4560 Kennedy Avenue<br>East Chicago, In 46312 |
| 65-42-PS<br>Violet Regan<br>1836 Sheridan Ave.<br>Whiting, In 46394 |
| 65-42-PS<br>Charlotte Reed<br>Save The Dunes Council<br>444 Barker Road<br>Michigan City, In 46360 |
| 65-42-PS<br>Safety-Kleen Oil Recovery<br>601 Riley Road<br>East Chicago, In 46312 |

| **BP Products North America, Inc. – Whiting Refinery**<br>**List of Potentially Affected Persons** |
|---|
| 65-42-PS<br>Sandra Scalp<br>2804 New York<br>Whiting, In 46394 |
| 65-42 PS<br>Gerry Scheub<br>Lake County 2nd District Commissioner<br>County Government Center<br>3rd Floor Building "A"<br>2293 North Main Street<br>Crown Point, In 46307 |
| 65-42 PS<br>Rae Schnapp, Ph.D.<br>Hoosier Environmental Council<br>520 East 12th Street<br>Indianapolis, In 46202 |
| 65-42-PS<br>Paul Seman<br>1712 Sheridan<br>Whiting, In 46394 |
| 65-42-PS<br>Arthur Smith<br>Mgr Enviro. Affairs<br>NiPSco<br>5265 Hohman Ave.<br>Hammond, In 46320 |
| 65-42-PS<br>State Line Energy<br>103rd & Lake Michigan<br>Whiting, In 46394 |
| 65-42-PS<br>Jeannette Stefaich<br>1309 121st<br>Whiting, In 46394 |
| 65-42 PS<br>Phil Shin<br>Drop Code 2645<br>Eli Lilly & Company<br>Lilly Corporate Center<br>Indianapolis In 46285<br>P.Shinn@Lilly.Com |
| 65-42-PS<br>Lorraine Stasek<br>4509 Tod Ave.<br>East Chicago, In 46312 |
| 65-42 PS<br>Town Of Griffith<br>111 N Broad Street<br>Griffith In 46319 |

| **BP Products North America, Inc. – Whiting Refinery**<br>**List of Potentially Affected Persons** |
|---|
| 65-42 PS<br>Sandra Tyszkiewicz<br>2804 New York<br>Whiting In 46394<br>Stewyt-623@Wowway.Com |
| 65-42-PS<br>Unilever Brothers Company<br>1200 Calumet Avenue<br>Hammond, In 46320 |
| 65-42-PS<br>U.S. Gypsum Company<br>3501 Canal<br>East Chicago, In 46312 |
| 65-42-PS<br>US Steel Gary Works<br>1n Broadway<br>Gary, In 46402 |
| 65-42 PS<br>Mr Robert West<br>Environmental Manager<br>Buzzi Unicem Usa<br>3301 S Cr 150 W<br>Greencastle, In 46135<br>Robert.West@Buzziunicemusa.Com |
| 65-42 PS<br>Greg Yates<br>Greg.Yates@Us.Rhodia.Com |
| 65-42-PS<br>James Zatorski<br>2000 Michigan<br>Hammond, In 46320 |

## II. Please complete this form by signing the following statement.

| | | |
|---|---|---|
| I certify to the best of my knowledge I have listed all potentially affected parties, as defined by IC 4-21.5. | | |
| Signature: | | |
| Printed name: Nick Spencer, Whiting Business Unit Leader | | Date: 1/31/12 |
| Facility name: BP Products North America Inc. – Whiting Refinery | | |
| Facility address: 2815 Indianapolis Boulevard | | |
| Facility city: Whiting | Facility state: IN | ZIP code: 46394 |

## III. Type of Action (check one)

- [X] NPDES Permit-327 IAC 5
- [ ] Pretreatment Permit -327 IAC 5
- [ ] Construction Permit-327 IAC 3

**A $50.00 fee is required for a New permit, a Renewal or a Modification; if this is a renewal or modification request, include NPDES permit No. on check and return to:**
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Cashiers Office – Mail Code 50-10C
100 North Senate Avenue
Indianapolis, IN 46204-2251

**If No Fee Is Required (Fee has previously been paid), Return To:**
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Quality – Mail Code 65-42
Room N1255
Permits Branch
100 North Senate Avenue
Indianapolis, Indiana 46204-2251

# EXECUTIVE SUMMARY

## National Pollutant Discharge Elimination System

## Permit No. IN0000108

BP Products North America Inc.
Whiting Refinery
Whiting, Indiana

February 1, 2012

## INTRODUCTION

This Executive Summary and the attached documents constitute the BP Products North America Inc. - Whiting Refinery's (BP Whiting) NPDES Permit Renewal Application for NPDES Permit No. IN0000108 (the "existing permit"). The existing permit, issued June 21, 2007, authorizes BP Whiting to discharge treated process water, once-through cooling water, and stormwater from four point sources into the waters of the State of Indiana as described below.

This application contains the information required as part of the NPDES permitting process, including IDEM General Information Form, USEPA Form 2C, USEPA Form 2F, List of Potentially Affected Parties, and a summary of the analytical results of BP Whiting's effluent testing program.

## BACKGROUND

BP Products North America Inc. owns and operates a petroleum refinery located on approximately 1,400 acres within the boundaries of Whiting, East Chicago, and Hammond, Indiana, near the southern tip of Lake Michigan. The refinery employs approximately 1,850 people and produces a variety of petroleum products, including gasoline of all grades, diesel fuel, heating fuel, jet fuel, asphalt, and petroleum coke. The refinery also produces petroleum intermediates.

BP Whiting discharges three types of wastewater: treated effluent; once-through non-contact cooling water; and stormwater. First, the refinery discharges, as a long-term average, 15.7 million gallons per day (mgd) of treated effluent through Outfall 005 into Lake Michigan. The treated effluent originates from water used in or received by the plant, recovered groundwater, and most of the stormwater from the site, all of which is treated in the refinery's wastewater treatment plant (WWTP) and discharged via a high rate multiport diffuser. Second, the refinery discharges, as a long-term average, 73.7 mgd of once-through non-contact cooling water through Outfall 002, also into Lake Michigan. Third, the refinery intermittently discharges the balance of its stormwater through Outfalls 003 and 004 into the Lake George Branch of the Indiana Harbor Ship Canal.

Prior to discharge through Outfall 005, the refinery's water is treated at an advanced biological WWTP, which occupies twenty acres and includes oil/water separators, equalization and surge tanks, dissolved air flotation (DAF), an activated biological plant, and final filtering processes. The treatment plant is operated 24-hours a day, 365 days per year, and is managed by over twenty employees, eight of whom are Indiana-certified wastewater treatment operators, and two of whom are Class D certified.

**APPLICATION FORMS**

This permit renewal application consists of the following four forms:

1. Form 1 - the general application that applies to all applicants (Indiana form)
2. Form 2C - applies to all existing industrial facilities with process wastewater (Federal form)
3. Form 2F - applies to stormwater discharges related to industrial activity (Federal form)
4. Identification of Potentially Affected Parties Form (IDEM form)

The application also contains supplemental information on BP Whiting's water and wastewater treatment additives and zebra mussel control program.

Form 1 contains general information concerning the location of BP Whiting and the activities that occur on site. Form 1 includes the name and address of the facility, contact information, a list of BP Whiting's existing environmental permits, and a brief statement describing activities at BP Whiting. Attached to Form 1 is a map showing the location of the facility and the location of each outfall.

Form 2C contains information specific to BP Whiting's process and non-contact once-through cooling water discharges (Outfalls 005 and 002). The information provided on Form 2C includes: the latitude and longitude of specific outfalls, BP Whiting's production activities and capacities, the individual sources of wastewater, the quantities and characteristics of the wastewater from each of the listed sources, and the treatment technologies associated with each source. Block flow diagrams of the wastewater treatment systems are also provided with this form.

Form 2F contains information specific to BP Whiting's stormwater discharges (Outfalls 003 and 004). Form 2F includes the latitude and longitude of each of the stormwater outfalls, the corresponding drainage area for each of the outfalls, a description of the stormwater control measures, storm event data, and results from sample analyses for each of the stormwater outfalls. BP Whiting's Spill Prevention, Control, and Countermeasures Plan, Facility Response Plan, and Storm Water Pollution Prevention Plan are referenced within Form 2F.

The Identification of Potentially Affected Parties Form contains a list of all persons that are believed to have an interest in this permit renewal or could be affected by this permit renewal, by law.

**EFFLUENT CHARACTERIZATION**

Section V of Form 2C and Section VII of Form 2F require the presentation of effluent characterization data (concentration and mass) for select constituents. As part of this characterization, a "Believed Absent and Believed Present" assessment for constituents is required in Form 2C Part V.B. BP Whiting used the following steps to determine whether a constituent would be "Believed Present" in Outfalls 005 and 002:

1. Is there a BP Whiting source of the constituent?
2. Is it anticipated that the constituent would not be removed or degraded by the wastewater treatment system?
3. Is the constituent detected at levels greater than the Lake Michigan intake levels?

If the answers to all three steps were "yes" (or a combination of "yes" and "not applicable"), then the constituent was considered to have the potential to be present in the discharge. Some of these "Believed Present" constituents, however, were not detected by analysis.

In regards to sampling and analyses, permit-required conditions were followed. Where no permit requirements were listed, sampling and analyses followed 40 CFR Part 136. Data are presented in Attachment 8 for Outfall 005 additional parameters, including, for

example, chloride, Total Dissolved Solids and specific metals. A summary of effluent characterization procedures is provided below:

Form 2C, Part V.A, V.B, and V.C

These forms present the monitoring data for Outfalls 005 and 002.

*For parameters currently monitored under the NPDES permit:*

- A 4-year DMR database (July 1, 2007 to June 30, 2011) was utilized for all DMR parameters except for mercury. The mercury database includes data collected from February 19, 2008 to December 1, 2011.
- A "j" flag was used to indicate that a maximum monthly average or long-term average concentration included results reported as non-detect (<MDL). The MDL value was substituted for the non-detect result to generate averages.
- For Outfall 005 temperature, summer was defined as July 1 through September 30 and winter was defined as October 1 through June 30.
- The number of analyses has been presented for both the daily values and the monthly average values.
- Maximum monthly values were presented only if there were more than two samples in the calendar month.
- Some parameters were monitored at Outfall 001 (i.e., July 1, 2007 to July 31, 2010 prior to installation of the multiport diffuser) which is the same treated process water as Outfall 005. Outfall 001 data have been integrated into the Outfall 005 database.
- Some data (concentrations) considered not representative of normal operating conditions have been removed as follows from the Outfall 005 DMR database as well as corresponding summary statistics:
  - Sep 13, 2008 to Sep 24, 2008: DMR cover letter describes 100yr 48hr storm which caused WWTP upset – all parameters removed.
  - Jul 25, 2010 to Jul 28, 2010: 25 yr storm event on 7/23 and 7/24 which overwhelmed WWTP – all parameters removed.
  - Apr 18, 2011 to Apr 30, 2011: unexpected loss of one clarifier Apr 18-30 and significant rain event caused exceedances on Apr 21-28 – all parameters removed.
  - Others as described in DMR cover letters: 7/14/08 pH, 8/6/08 COD, and 9/5/08 TSS.
- For Outfall 005, sulfide values reported on the DMRs as zero, were substituted with the Method Detection Limit of 0.01 mg/L for statistical calculations.
- For Outfall 002, TRC non-detect results were reported as < Method Detection Limit for 2007, 2008. These values have been changed to zero for calculating statistics (consistent with permit requirements).

*For parameters not currently monitored under the NPDES permit:*

- A sampling program for Outfalls 005 and 002 was conducted in March 2011. At least one sample was analyzed for required Form 2C parameters during this time period.

- A "<" flag indicated that a concentration result was less than the method detection limit (MDL) or reporting limit, consequently, the corresponding mass value was not quantifiable and was not calculated.

Form 2F Parts VII.A, VII.B, VII.C, and VII.D

These forms present the monitoring data for Outfalls 003 and 004.

*For stormwater characterization:*

- Outfalls 003 and 004 are controlled-valve discharges, hence stormwater samples were not necessarily collected during the first 30 minutes of the storm event, but were collected during the first 30 minutes of discharge release.
- A 4-year DMR database (July 1, 2007 to June 30, 2011) was utilized.
- A "j" flag was used to indicate that a long-term average included concentration results reported as non-detect (<MDL). The MDL value was substituted for the non-detect result to generate averages.
- Stormwater flow rates were either directly measured or determined via calculation (i.e., the time a valve was opened and closed was incorporated into a stormwater model that accounts for rainfall).

## WHITING REFINERY MODERNIZATION PROJECT (WRMP) DESCRIPTION

During the term of the renewed permit, BP will continue the Whiting Refinery Modernization Project (WRMP), known (in part) in the existing permit as the Canadian Extra Heavy Crude Oil (CXHO) project. Construction is currently underway and is anticipated for completion around the end of 2013. Status of WRMP activities are as follows:

### Refinery Process Units

**New - #2 Coker:** The existing coker (No. 11 B Pipe Still) will be shut down and replaced with a new coker (#2 Coker).

**New - Enclosed Coke Handling System:** The existing open coke yard will be shut down and replaced with a new enclosed coke handling system.

**New - GOHT**: A new Gas Oil Hydrotreating Unit (GOHT) will be installed to hydrotreat gas oil.

**New - Cooling Towers:** Two new cooling towers (Cooling Towers 7 & 8) will be installed to meet the cooling requirements for the WRMP.

**New - Flares**: Two new flare stacks will be installed in support of the WRMP.

**Upgrade - No. 12 Pipestill:** The existing No. 12 Pipestill (12PS) will be revamped to allow increased processing of heavy crude.

**Upgrade - Sulfur Recovery Complex**: Due to the higher sulfur content of the heavy crudes, additional lower sulfur fuels units will be installed.

**Upgrade - Distillate Hydrotreating Unit:** A new reactor and a new heater will be installed at the Distillate Hydrotreating Unit .

**Upgrade - No. 11C Pipestill**: Ultra-low $NO_x$ burners will be installed on the 11C PS Heater H-200 to reduce $NO_x$ emissions from this heater.

**Upgrade - Aromatics Recovery Unit:** Some minor modifications will be made at the ARU to process lighter feed.

**Upgrade - No. 4 Ultraformer:** Due to an increase in the naphtha feed rate to the existing 4UF, the front end reactor will be upgraded. .

**Upgrade - Existing Cooling Towers:** High efficiency liquid drift eliminators will be installed on the existing Cooling Towers 2, 3, and 4 to reduce particulate emissions.

**Upgrade - Distillate Desulfurization Unit:** Some minor modifications will be made to the Distillate Desulfurization Unit (DDU).

**Upgrade - Vapor Recovery Unit:** Several modifications will be made to the VRU 300 to process a larger amount of lighter naphtha feed with the WRMP.

**Upgrade - Fuel Gas System:** As part of the WRMP, enhancements will be made to the refinery's fuel gas system to achieve a future potential total reduced sulfur (TRS) content.

**Upgrade - Blending Oil Unit:** Modifications will be made to the Blending Oil Unit heater.

**Upgrade - Fluid Catalytic Cracking Unit 600**: Several modifications will be made on the FCU 600 unit to accommodate an increase in throughput.

**Upgrade - Propylene Concentration Unit**: Modifications and additions will be made to the PCU to produce more RGP (refinery grade propylene) and minimize the production of PGP (polymer grade propylene).

**Shutdowns** - BP will permanently shut down and remove from service a number of units as a result of the installation of new units and the modification of certain existing units comprising WRMP. The following existing units will be permanently shut down as part of WRMP:

- No. 11B Coker Heaters H-101, 102, 103, and 104
- Existing Coke Handling System
- Beavon-Stretford Tail Gas Unit
- SBS Tail Gas Unit
- SBS Cooling Tower

- SRU Incinerator
- No. 12 PS Heaters H-2, H-1AS/1AN, H-1CN, H-1B, H-1CX
- No. 4C Treating Plant
- No. 3 Ultraformer reformer section and heaters H-1, H-2 and F-7
- The 350 section of VRU 300
- No. 1 SPS Boilers

**WWTP Units**

**New - Brine Treatment System:** A new brine treatment system will be installed for treatment of the wastewater brine from the refinery's pipe still operations. The system is designed to separate the oily emulsified solids from the brine using new GLR microbubble technology. Chemistry is used to coagulate and flocculate the oil droplets to trap much of the solids into the oil phase. The GLR Gas Floatation Tanks (GFT) are designed to separate the oil (and consequently any solids entrained in the oil) and the water. The oil and solids that are created and separated by the brine treatment unit will be sent to the refinery solids handling system. The system will consist of four fixed-roof tanks to be located at the WWTP and two off-spec tanks which will be located in the refinery and equipped with external floating roofs.

**New - Stormwater/Equalization Tank**: A new wastewater storage tank (TK-5052) with a capacity of 11,676,000 gallons and equipped with an external floating roof has been installed to provide additional storage volume for stormwater surges and to provide additional equalization capacity. Extra surge capacity allows the WWTP to better respond to high stormwater flows such as those experienced during heavy rain events. The extra equalization capacity allows a better response to process upsets that may temporarily increase the TSS or total nitrogen in the influent flow to the WWTP. The new tank TK-5052 is equipped with foam chambers, a guided wave radar level transmitter, an oil skimmer, an automatic sample collection system, and a jet mixing system to prevent solids accumulation. Start up was completed December 2009 with a corresponding notice sent to IDEM for additional WWTP equipment installation.

**New - Final Filters:** The existing final filters at the WWTP will be replaced with new final filters with a capacity of 32.1 MGD. The new Final Filters are of the gravity mono/multimedia type, with two clusters of four filter cells each, totaling eight filter cells. Influent flow is gravity fed from the clarifiers and splits equally between the two filter clusters. Flow to each of the cells within a cluster is distributed evenly by means of adjustable inlet weirs. Flow from the bottom of each cell is directed to a dedicated effluent chamber with adjustable weirs. The water flows over the adjustable weirs to a common transfer pit. Filtered water from the common transfer pit is tied into the existing 42" effluent piping, and will flow to the interceptor box, and out to the lake via Outfall 005. During backwash operation, seven of the eight total cells continue to operate normally, with one cell being placed in backwash mode.

**New/Upgrade - Dissolved Air Flotation (DAF):** Under the proposed USEPA Consent Decree, BP will be required to complete construction and installation of a new DAF unit that will replace the existing DAF unit.

## OTHER PERMIT RENEWAL ITEMS

1. On August 23, 2007, BP America committed to operating the Whiting refinery in compliance with the TSS and ammonia limitations contained in its 1990 NPDES permit, notwithstanding the revised limitations contained in the current permit, which were properly calculated under the effluent limitations guidelines set forth in 40 CFR 419.22(a), 419.23(a), and 419.24(a), and approved by IDEM in accordance with applicable antidegradation requirements. BP since has invested millions of dollars toward continued research and engineering to further reduce the levels of pollutants discharged from the facility, and remains committed to keeping TSS and ammonia loadings at or below the 1990 authorized levels. As a result, BP requests that IDEM revise the current TSS and ammonia loading limitations to reflect the values established in the 1990 permit.

2. BP Whiting requests the continuation of the Clean Water Act Section 316(a) variance as documented in Part III.A of the existing permit. Phase I of the Thermal Plume Study was completed on March 4, 2011. The Phase II Thermal Variance Study Plan was approved by IDEM July 8, 2011. Per Part III.A.3 of the existing permit, BP has 24 months from plan approval to complete the 316(a) variance/demonstration application.

3. BP Whiting requests that the zebra mussel control program in place be continued. This program has been revised to incorporate year-round chlorination to control zebra as well as quagga mussels as described in the supplemental information at the end of this application.

4. BP Whiting requests the continuation of the alternate mixing zone for the Outfall 005 high rate multiport diffuser, including the application of a 37.1:1 mixing ratio for water quality based effluent limit (WQBEL) development. Per part I.H.1 of the existing permit, BP submitted the diffuser operation and maintenance plan to IDEM (current revision = 8/22/2011). As stated in the existing permit Fact Sheet, BP requests the continuation of the provision to allow effluent bypass to Outfall 001 (shore line discharge) in an emergency or for diffuser maintenance with IDEM notification.

5. BP requests continuation of the 316(b) study approval given in Part III.B and Part I.F.4 of the existing permit.

6. BP requests that IDEM update descriptions to account for existing sources of offsite wastewater. Examples are Whiting Clean Energy, Praxair, Ineos, and Griffith LPG Cavern storage dewatering. In addition, all on site remediation groundwater is sent to the wastewater treatment facility. Further, consistent with 40 CFR 437.1 (b)(2)(b), offsite facilities (both BP and non-BP owned) such as pipelines and terminals may produce other wastewater from activities including tank inspections, hydrotesting of equipment, dewatering operations, equipment clean out from maintenance and turnaround activities, dewatering of equipment, and other wastewater, which may be sent to the BP wastewater treatment plant for oil recovery and wastewater treatment.

7. BP does not manufacture pesticides on site. However, pesticides are occasionally applied to refinery areas by a qualified contractor in accordance with FIFRA regulations. Outfall 005 effluent sampling resulted in no detections of pesticide constituents required in USEPA Form 2C.

8. BP requests the incorporation of a Streamlined Mercury Variance (SMV) in the renewed permit in accordance with the SMV application submitted to IDEM on 11/20/2010. The resulting draft permit modification to incorporate a SMV went to public notice on Nov 14, 2011. An update of the SMV effluent mercury database is provided in Table ES-1 of this application. These data are presented in lieu of mercury results reported in Form 2C Section V.C for Outfall 005.

9. BP is currently engaged in a 5-year compliance schedule for vanadium effluent limitations at Outfall 005 per Part I.E.2 of the existing permit. For the renewed permit, BP requests that IDEM incorporate the most recent available updated vanadium data to revise Tier II water quality criteria.

10. BP requests that the agency allow the option to re-route additional tank dike stormwater runoff into Outfalls 003 and 004. Stormwater would be moved from the following tank areas: (1) Indiana Tank Field; (2) South Tank Field; (3) South Tank Field Annex; (4) Stieglitz Park; and (5) Marine Dock. See Attachment 9 for tank field locations. At this time, BP does not envision having to add another outfall for stormwater; instead BP will build (or utilize existing) infrastructure and capacity to manage these sources subject to the current release operations at Outfall 003 and 004. BP does not anticipate significant changes in stormwater quality characteristics with the additional tank field sources. Additional details of the stormwater re-route project are given in Attachment 10.

11. BP requests the biological survey frequency given in Part I.H.2 of the existing permit be reduced from annually to the first, third, and fifth year of the renewed permit. The frequency may be increased if findings suggest significant changes in monitored biological/chemical characteristics. Annual biological surveys were conducted under the terms of the existing permit in July 2009 (pre-diffuser), August 2010 (post-diffuser), and July 2011. The data have shown that there have been no significant changes (relative to historic lake conditions) to the biotic community from year to year. The reduced monitoring frequency will be sufficient to identify trends in biological community structure and composition in future years.

12. BP requests that Outfall 005 sampling type for sulfide be revised to "grab" instead of the current "composite" requirement, such that preservation of the sample can be done in accordance with 40 CFR 136 Table E.

13. BP requests clarification on the definition of the monitoring frequency of "weekly" in Part I.A for the renewed permit. BP requests this interpretation be a working week of 7 days for Outfalls 005/002. For Outfalls 003/004 BP defines Monday through Sunday as the work week and Monday as the first day of the week.

14. BP requests that, in the renewed permit, IDEM change the language in the Outfall 003 and Outfall 004 descriptions from "non-process stormwater" to

"stormwater associated with industrial activity" from the J&L, Lake George, and tank dike areas of the refinery to maintain consistency with 40 CFR 122.26(b)(14) definition.

15. BP requests that the description of authorized wastewater sources to Outfall 005 be revised to acknowledge that the WWTP receives and treats wastewater from normal refinery operations including maintenance, turnaround activities, excavation dewatering, construction activities, tank cleaning, and temporary flows from upsets or downtime. Such temporary flows would include, as necessary, the re-treatment of off-spec WWTP effluent that has been temporarily stored in alternate storage locations via the firewater recycle system rather than discharged to Lake Michigan. The temporarily stored off-spec WWTP effluent would then be rerouted back through the WWTP for additional treatment and final discharge. In addition, it should be noted that the process sewers are part of the wastewater collection system.

TABLE ES-1. BP WHITING SUMMARY STATISTICS FOR VALID MERCURY DAT/

| Sample Date | Intake (ng/L) | | Intake Duplicate (ng/L) | | *Intake Max (ng/L)* | Outfall 001/005** (ng/L) | | Outfall 001/005 Duplicate (ng/L) | | *Outfall 001/005 Max (ng/L)* |
|---|---|---|---|---|---|---|---|---|---|---|
| 02/19/08 | 5.07 | | --- | | *5.07* | --- | | --- | | *NA* |
| 02/28/08 | --- | | --- | | *NA* | 15.4 | E1 | 6.09 | E1 | *15.4* |
| 02/29/08 | 1.17 | | 0.54 | | *1.17* | 13.6 | | --- | | *13.6* |
| 03/20/08 | 1.15 | | --- | | *1.15* | 10.0 | E1 | 15.0 | E1 | *15.0* |
| 06/19/08 | 0.763 | E2 | --- | | *0.763* | 2.80 | E1 | 2.96 | E1 | *2.96* |
| 10/14/08 | 0.659 | | --- | | *0.659* | 5.90 | | 5.41 | | *5.90* |
| 10/16/08 | 0.878 | | --- | | *0.878* | 5.86 | | 5.94 | | *5.94* |
| 12/04/08 | 1.79 | | --- | | *1.79* | 4.80 | | 7.14 | | *7.14* |
| 12/11/08 | 12.8 | E1 | --- | | *12.8* | 8.00 | E1 | 8.38 | E1 | *8.38* |
| 12/18/08 | <0.500 | B | --- | | *< 0.500* | 5.62 | B | 5.31 | B | *5.62* |
| 01/08/09 | <0.500 | | --- | | *< 0.500* | 4.62 | | 5.31 | | *5.31* |
| 02/05/09 | 0.49 | J | --- | | *0.49* | 4.65 | | 5.18 | | *5.18* |
| 02/13/09 | 2.7 | | --- | | *2.7* | 5.40 | | 6.51 | | *6.51* |
| 02/19/09 | 1.09 | B, E2 | --- | | *1.09* | 3.43 | B, E1 | 3.61 | B, E1 | *3.61* |
| 03/12/09 | 1.34 | | --- | | *1.34* | 5.07 | | 6.44 | | *6.44* |
| 04/02/09 | --- | | --- | | *NA* | 2.54 | | 2.56 | | *2.56* |
| 04/09/09 | --- | | --- | | *NA* | 3.77 | | 3.07 | | *3.77* |
| 04/20/09 | <0.500 | | <0.500 | | *< 0.500* | 2.40 | | 1.88 | | *2.40* |
| 04/22/09 | <0.500 | | <0.500 | | *< 0.500* | --- | | --- | | *NA* |
| 05/07/09 | <0.500 | | <0.500 | | *< 0.500* | --- | | --- | | *NA* |
| 05/14/09 | <0.500 | | <0.500 | | *< 0.500* | --- | | --- | | *NA* |
| 05/21/09 | <0.500 | | <0.500 | | *< 0.500* | 0.196 | J | 0.551 | | *0.551* |
| 06/04/09 | <0.500 | | <0.500 | | *< 0.500* | 7.41 | | 7.04 | | *7.41* |
| 06/12/09 | <0.500 | | <0.500 | | *< 0.500* | 1.20 | | 1.81 | | *1.81* |
| 07/09/09 | <0.500 | | <0.500 | | *< 0.500* | 5.76 | | 7.67 | | *7.67* |
| 07/16/09 | <0.500 | | <0.500 | | *< 0.500* | --- | | --- | | *NA* |
| 08/06/09 | <0.500 | | <0.500 | | *< 0.500* | 5.30 | | 23.1 | | *23.1* |
| 08/13/09 | <0.500 | | <0.500 | | *< 0.500* | 2.58 | | 4.20 | | *4.20* |
| 09/03/09 | <0.500 | | <0.500 | | *< 0.500* | 3.06 | | 3.05 | | *3.06* |
| 09/10/09 | <0.500 | | <0.500 | | *< 0.500* | 2.74 | | 2.70 | | *2.74* |
| 10/01/09 | <0.500 | | <0.500 | | *< 0.500* | <1.00 | | <0.500 | | *< 1.00* |
| 10/12/09 | <0.500 | | <0.500 | | *< 0.500* | 4.27 | | 4.28 | | *4.28* |
| 10/14/09 | <0.500 | | <0.500 | | *< 0.500* | 2.19 | | 2.17 | | *2.19* |
| 10/16/09 | 0.333 | J | 0.216 | J | *0.333* | 2.31 | | 2.28 | | *2.31* |
| 10/21/09 | <0.500 | | <0.500 | | *< 0.500* | 0.367 | J | 0.233 | J | *0.367* |
| 11/16/09 | <0.500 | | <0.500 | | *< 0.500* | 12.7 | | 4.58 | | *12.7* |
| 11/18/09 | 0.544 | | 0.541 | | *0.544* | 2.87 | | 7.52 | | *7.52* |
| 11/20/09 | <0.500 | | <0.500 | | *< 0.500* | 2.29 | | 3.08 | | *3.08* |
| 12/03/09 | 0.955 | | 0.840 | | *0.955* | 7.12 | | 8.09 | | *8.09* |
| 12/10/09 | <0.500 | | <0.500 | | *< 0.500* | 12.4 | | 19.9 | | *19.9* |
| 01/07/10 | <0.500 | | <0.500 | | *< 0.500* | 1.60 | | 1.97 | J, L | *1.97* |
| 01/14/10 | <0.500 | | <0.500 | | *< 0.500* | 6.21 | * | 4.96 | * | *6.21* |
| 02/04/10 | <0.500 | | <0.500 | | *< 0.500* | 8.88 | | 6.60 | | *8.88* |
| 02/08/10 | --- | | --- | | *NA* | 3.86 | | < 2.50 | L | *3.86* |
| 02/11/10 | <0.500 | | <0.500 | | *< 0.500* | 11.9 | | 11.1 | | *11.9* |

TABLE ES-1. BP WHITING SUMMARY STATISTICS FOR VALID MERCURY DATA

| Sample Date | Intake (ng/L) | Intake Duplicate (ng/L) | *Intake Max (ng/L)* | Outfall 001/005** (ng/L) | Outfall 001/005 Duplicate (ng/L) | *Outfall 001/005 Max (ng/L)* |
|---|---|---|---|---|---|---|
| 03/04/10 | <0.500 | <0.500 | *< 0.500* | 3.06 | 3.86 | *3.86* |
| 03/10/10 | --- | --- | *NA* | <2.50 L | <2.50 L | *< 2.50* |
| 04/01/10 | --- | --- | *NA* | <0.500 | <0.500 | *< 0.500* |
| 04/19/10 | --- | --- | *NA* | 2.70 * | 2.55 * | *2.70* |
| 04/23/10 | --- | --- | *NA* | 2.56 | 1.16 | *2.56* |
| 06/03/10 | --- | --- | *NA* | 2.17 | 3.16 | *3.16* |
| 08/06/10 | --- | --- | *NA* | 7.41 | 10.3 | *10.3* |
| 08/12/10 | --- | --- | *NA* | 4.25 | 3.30 | *4.25* |
| 10/07/10 | --- | --- | *NA* | 10.3 | 12.0 | *12.0* |
| 10/13/10 | --- | --- | *NA* | 6.97 | 6.56 | *6.97* |
| 10/15/10 | --- | --- | *NA* | 9.45 | 9.40 | *9.45* |
| 12/02/10 | --- | --- | *NA* | 5.55 | 5.41 | *5.55* |
| 02/03/11 | --- | --- | *NA* | 5.36 | 5.82 | *5.82* |
| 02/10/11 | --- | --- | *NA* | 2.66 | 3.27 | *3.27* |
| 04/11/11 | --- | --- | *NA* | 7.18 | 7.23 | *7.23* |
| 04/13/11 | --- | --- | *NA* | 41.4 * | 39.3 * | *41.4* |
| 04/15/11 | --- | --- | *NA* | 13.9 | 12.7 | *13.9* |
| 06/02/11 | --- | --- | *NA* | 6.13 | 7.09 | *7.09* |
| 06/13/11 | --- | --- | *NA* | 4.75 | 5.88 | *5.88* |
| 08/02/11 | --- | --- | *NA* | 2.28 | 2.26 | *2.28* |
| 08/11/11 | --- | --- | *NA* | 6.18 | 6.17 | *6.18* |
| 10/10/11 | --- | --- | *NA* | 3.89 | 1.77 | *3.89* |
| 10/12/11 | --- | --- | *NA* | 5.17 | 6.6 | *6.6* |
| 10/14/11 | --- | --- | *NA* | 10.7 | 11.2 | *11.2* |
| 12/01/11 | --- | --- | *NA* | 29.4 | 23.8 | *29.4* |
| **Summary Statistics** | | Count | 42 | | Count | 65 |
| | | Average | 1.08 | | Average | 7.21 |
| | | Geomean | 0.69 | | Geomean | 5.08 |
| | | Standard Deviation | 2.02 | | Standard Deviation | 6.88 |
| | | Coefficient of Variation | 1.875 | | Coefficient of Variation | 0.954 |
| | | **Maximum** | **12.8** | | **Maximum** | **41.4** |

**Notes:**

Database for original SMV Application submitted Nov 2010 covered 2/19/08 to 8/12/10

USEPA Method 1631E was used for all Hg analysis; all data presented met QA/QC requirements and are deemed valid unless noted otherwise.

"—" indicates no sample was collected or data was invalid.

"J" indicates that at least one (or both) sample results used to calculate the average was an estimated value between the reporting limit (0.5 ng/L) and method detection limit (0.12 ng/L).

"B" indicates that the method blank had a mercury detection between the detection limit (0.12 ng/L) and the reporting limit (0.50 ng/L). Blank criteria was met (greater of: <0.5 ng/L or up to 1/5 the amount in associated samples).

"E1" indicates that an associated field or equipment blank had a mercury detection between the detection limit (0.12 ng/L) and the reporting limit (0.50 ng/L). Blank criteria was met (whichever is greater: <0.5 ng/L or up to 1/5 the amount in associated

"E2" indicates that an associated field or equipment blank that was technically acceptable, but it should be noted that the amount detected in the blank was greater than 1/5 the amount in associated samples.

"L" indicates that the method detection limit and reporting limits were elevated due to sample dilution.

" * " Indicates sample was rerun due to data quality issues. The results reported are from the re-analysis. Due the large relative percent difference between sample and duplicate, the samples for 1/14/10 and 4/19/10 and were re-analyzed. The 4/13/11 sample was rerun due to MS/MSD failure of original sample analysis.

** Outfall 001 was replaced by Outfall 005 in August 2010

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)**

**GENERAL INFORMATION FORM**

(TO BE SUBMITTED WITH FORMS 2C, 2D AND 2E)

(Replaces EPA General Form 1)

Revised 4/28/97

**1. Name of Facility:** BP Products North America Inc. - Whiting Business Unit

**2. Facility Contact:**

Name: Rose Herrera

Address: 2815 Indianapolis Blvd

City or Town: Whiting State: IN Zip Code: 46394

Telephone: Work: (219) 473-3393

**3. Certified Operator**

Name: Barry L. Cook

Certification #: 14407 Classification: D

Address: 2815 Indianapolis Blvd

City or Town: Whiting State: IN Zip Code: 46394

Telephone: Work: (219) 473-3248 Alt. Work: (219) 473-5298

**4. Facility Mailing Address**

Street or P.O. Box: 2815 Indianapolis Blvd

City or Town: Whiting State: IN Zip Code: 46394

**5. Facility Location**

Street, Route No. or Other Specific Identifier: 2815 Indianapolis Blvd; Whiting, IN 46394

**6. Type of Permit Action:**

New ___ Renewal X Modification ___

**7. EPA I.D. Number:** IND000810861

**8. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the state?** (Form 2B)

Yes___ No X Form Attached ___

**9. Is this a facility which currently results in discharges to waters of the state other than described in 8?**

(Form 2C-Process Wastewater or Form 2E-Nonprocess Wastewater)

Yes X No ____ Form Attached 2C

**10. Is this a proposed facility (other than described in 8) which will result in a discharge to waters of the state?**

Yes___ No X Form Attached _____

**11. SIC Codes (4-digit, in order of priority)**

| | | |
|---|---|---|
| First: | 2911 | Specify: Petroleum Refinery |
| Second: | 2951 | Specify: Asphalt and Paving Mixtures and Blocks |
| Third: | | Specify: |
| Fourth: | | Specify: |

**12. Existing Environmental Permits (Identification #)**

NPDES (Discharges to Surface Waters): IN0000108

UIC (Underground Injection of Fluids): N/A

RCRA (Hazardous Wastes): N/A

PSD (Air Emissions from Proposed Sources): See Attachment 1

Other: Local Air Permits Specify: See Attachment 1

Other: _____ Specify: _____

**13. Nature of Business (Provide a Brief Description)**

The Whiting Refinery is a Class B Petroleum Refinery which receives crude oil by pipeline and refines it into a variety of products including gasoline, heating fuel, jet fuel, diesel, asphalt and coke. Products may be stored prior to shipment by truck, barge or pipeline. This facility employs approximately 1,850 people and may process up to 420,000 barrels per day after completion of the Whiting Refinery Modernization Project (WRMP).

**14. Map** See Attachment 2

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluid underground. Include all springs, rivers and other surface water bodies in the map area.

**15. Signature Block:**

This application must be signed by a person in responsible charge to be valid. This signature attests to the following:

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

Nick Spencer
(Printed Name)

Whiting Business Unit Leader
(Title)

(Signature)

1/31/12
(Date Signed)

**Return Completed Application and Associated Materials to:**

Indiana Department of Environmental Management
Office of Water Management - NPDES Permits Section
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

ATTACHMENT 1

BP Products North America Inc. – Whiting Business Unit
Existing Environmental Permits

Air

*Indiana Department of Environmental Management (IDEM)*

*Operating Permit*

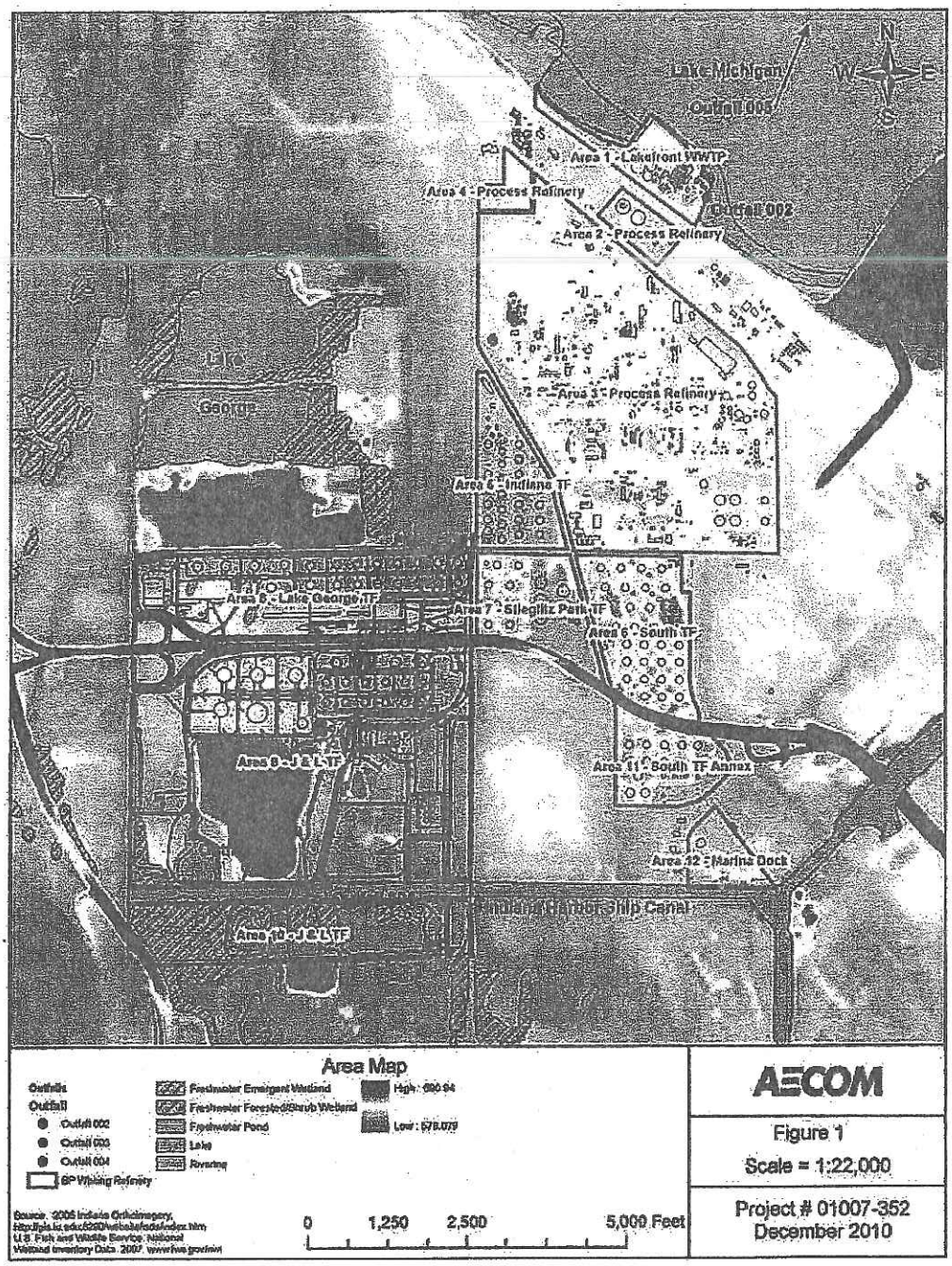
Title V Operating Permit: T089-6741-000453
Significant Permit Modification: SPM 089-25488-00453 (issued June 16, 2008)

*Construction Permits*

Whiting Refinery Modernization Project: MSM 089-25454-00453 (issued May 1, 2008)

MACT II Compliance Project: MSM 089-28934-00453 (issued April 4, 2011)

ATTACHMENT 2 Refinery Area Site Map Depicting Elevation, Facility Boundaries, and Receiving Water



| EPA I.D. NUMBER (*copy from Item 1 of Form 1*) | Form Approved. OMB No. 2040-0086. |
|---|---|
| IND000810861 | Approval expires 3-31-98. |

| FORM 2C NPDES | EPA | U.S. ENVIRONMENTAL PROTECTION AGENCY<br>APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER<br>EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS |
|---|---|---|

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

| A. OUTFALL NUMBER (*list*) | B. LATITUDE | | | C. LONGITUDE | | | D. RECEIVING WATER (*name*) |
|---|---|---|---|---|---|---|---|
| | 1. DEG. | 2. MIN. | 3. SEC. | 1. DEG. | 2. MIN. | 3. SEC. | |
| 005 | 41 | 41 | 03 | 87 | 28 | 05 | Lake Michigan |
| 002 | 41 | 40 | 36 | 87 | 28 | 16 | Lake Michigan |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (*e.g., for certain mining activities*), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. **(See Attachments 3 and 4)**

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

| 1. OUTFALL NO. (*list*) | 2. OPERATION(S) CONTRIBUTING FLOW | | 3. TREATMENT | | |
|---|---|---|---|---|---|
| | a. OPERATION (*list*) | b. AVERAGE FLOW (*include units*) | a. DESCRIPTION | b. LIST CODES FROM TABLE 2C-1 | |
| 005 | Refinery Process Wastewater | | See Attachment 5 | | |
| | Process Units | 11.16 mgd (MMA) | | | |
| | INEOS PIB Chemical Plant | 0.33 mgd (MMA) | | | |
| | Water Treatment Boilers | 1.6 mgd (MMA) | | | |
| | Steam Condensate | 0.7 mgd (MMA) | | | |
| | Off Site Facilities | 2.27 mgd (MMA) | | | |
| | (WCE/Praxair/LPG Caverns/Terminals) | | | | |
| | Cooling Tower Blowdown | 2.45 mgd (MMA) | | | |
| | Recovered Groundwater | 2.52 mgd (MMA) | | | |
| | Ballast Water | 0.1 mgd (MMA) | | | |
| | Stormwater | 1.97 mgd (MMA) | | | |
| | Firewater Recycle | -3.2 mgd (MMA) | | | |
| | TOTAL Outfall 005 | 19.9 mgd (MMA) & 15.7 mgd (LTA) | | | |
| | | | | | |
| | | | | | |
| 002 | Non-Contact Cooling Water | | See Attachment 5 | | |
| | TOTAL Outfall 002 | 86.2 mgd (MMA) & 73.7 mgd (LTA) | | | |
| | | | | | |
| | Note: MMA = maximum monthly average, LTA = long term average | | | | |
| | Flows above are pre-WRMP. Post-WRMP flows anticipated the same for Outfall 005 and decrease for Outfall 002 | | | | |

OFFICIAL USE ONLY (*effluent guidelines sub-categories*)

EPA ID IND000810861

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☐ YES *(complete the following table)* ☒ NO *(go to Sections III)*

| 1. OUTFALL NUMBER *(list)* | 2. OPERATION(S) CONTRIBUTING FLOW *(list)* | 3. FREQUENCY a. DAYS PER WEEK *(specify average)* | 3. FREQUENCY b. MONTHS PER YEAR *(specify average)* | 4. FLOW a. FLOW RATE *(in mgd)* 1. LONG TERM AVERAGE | 4. FLOW a. FLOW RATE *(in mgd)* 2. MAXIMUM DAILY | 4. FLOW b. TOTAL VOLUME *(specify with units)* 1. LONG TERM AVERAGE | 4. FLOW b. TOTAL VOLUME *(specify with units)* 2. MAXIMUM DAILY | 4. FLOW c. DURATION *(in days)* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☒ YES *(complete Item III-B)* ☐ NO *(go to Section IV)*

B. Are the limitations in the applicable effluent guidelines expressed in terms of production *(or other measure of operation)*?

☒ YES *(complete Item III-C)* ☐ NO *(go to section IV)*

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

| 1. AVERAGE DAILY PRODUCTION a. QUANTITY PER DAY | b. UNIT OF MEASURE | c. OPERATION, PRODUCT, MATERIAL, ETC. *(specify)* | 2. AFFECTED OUTFALLS *(list outfall numbers)* |
|---|---|---|---|
| | | See Attachment 6 (Based on historical production data from January 1, 2007 to June 30, 2011) for pre-WRMP<br>See Attachment 7 (Based on WRMP design production) for post-WRMP<br>BP Whiting Refinery is subject to Subpart B (Cracking Subcategory) of<br>40 CFR Part 419 - Petroleum Refining | |

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of waste-water treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ YES *(complete the following table)* ☒ NO *(go to Item IV-B)*

| 1. IDENTIFICATION OF CONDITION AGREEMENT, ETC. | 2. AFFECTED OUTFALLS a. NO. | 2. AFFECTED OUTFALLS b. SOURCE OF DISCHARGE | 3. BRIEF DESCRIPTION OF PROJECT | 4. FINAL COMPLIANCE DATE a. REQUIRED | 4. FINAL COMPLIANCE DATE b. PROJECTED |
|---|---|---|---|---|---|
| | | | | | |

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs *(or other environmental projects which may affect your discharges)* you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

☐ MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
IND000810861

*Form Approved,*
*OMB No. 2000-0059 Approval expires 12-31-85*

## V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding - Complete one set of tables for each outfall - Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D: Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession. **These pollutants only apply to Outfall 005; not applicable for Outfall 002**

| 1. POLLUTANT | 2. SOURCE | 1. POLLUTANT | 2. SOURCE |
|---|---|---|---|
| Strontium, Total (1) | Present in crude | | |
| Vanadium, Total (1) | Present in crude and used as sulfur recovery catalyst | | |
| The following could be potentially discharged: | | | |
| Xylenes | Present in crude and intermediate product | | |
| Naphthenic Acid | Present in crude and a metabolite from WWTP activated sludge plant | | |

NOTES:
(1) Analytical results given in Attachment 8

## VI. POTENTIAL DISCHARGE NOT COVERED BY ANALYSIS

Is any pollutant in Item V-C a substance or component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

[X] YES *(list all such pollutants below)* [ ] NO *(go to Item VI-B)*

2M. Arsenic, Total
5M. Chromium, Total
7M. Lead, Total
9M. Nickel, Total
10M. Selenium, Total
13M. Zinc, Total
15M. Phenols, Total

3V. Benzene
19V. Ethylbenzene
25V. Toluene
10A. Phenol
1B. Acenaphthene
2B. Acenaphthylene
3B. Anthracene
5B. Benzo (a) Anthracene
6B. Benzo (a) Pyrene
7B. 3,4-Benzofluoranthene
8B. Benzo (ghi) Perylene
9B. Benzo (k) Fluoranthene
18B. Chrysene
19B. Dibenzo (a,h) Anthracene
31B. Fluoranthene
32B. Fluorene
37B. Indeno (1,2,3-cd) Pyrene
39B. Naphthalene
44B. Phenanthrene
45B. Pyrene

EPA ID IND000810861

## VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the past 3 years?

[X] YES *(identify the test(s) and describe their purpose below)* [X] NO *(go to Section VIII)*

Yes, for Outfall 001/005

No, for Outfall 002

| Test Date | Fathead Minnow Chronic TUc | Fathead Minnow Acute TUa |
|---|---|---|
| Outfall 001 | | |
| Dec-07 | 1 | <1 |
| Apr-08 | 4 | <1 |
| Oct-08 | 2 | <1 |
| Apr-09 | 2 | <1 |
| Nov-09 | 1 | <1 |
| Apr-10 | 2 | <1 |
| Outfall 005 | | |
| Oct-10 | 2 | <1 |
| Apr-11 | 1 | <1 |
| Oct-11 | 2 | <1 |

## VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

[X] YES *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* [ ] NO *(go to Section IX)*

| A. NAME | B. ADDRESS | C. TELEPHONE *(area code & no.)* | D. POLLUTANTS ANALYZED *(list)* |
|---|---|---|---|
| Test America | 2401 Cumberland Dr.<br>Valparaiso, IN 46384 | (219) 464-2390 | Non-DMR constituents, additional Se and Coliform, fecal. |
| Microbac Laboratories, Inc. | 250 West 84th Drive<br>Merrillville, IN 46410 | (219) 769-8378 | DMR Selenium, Total Residual Chlorine Mercury, and Vanadium |
| ENVIRON International Corp. | 201 Summit View Drive<br>Suite 300<br>Brentwood, TN 37027 | (615) 377-4775 | Whole Effluent Toxicity (WET) |

## IX. CERTIFICATION

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

A. NAME & OFFICIAL TITLE *(type or print)*

Nick Spencer, Whiting Business Unit Leader

B. PHONE NO. *(area code & no.)*

219-473-3179

C. SIGNATURE

D. DATE SIGNED

1/31/12

ATTACHMENT 7. BP WHITING REFINERY WRMP DESIGN PRODUCTION DATA FOR FORM 2C, PART III.C
POST-WRMP

| EPA PROCESS NO. | EPA PROCESS NAME | BP Whiting Process Rate (1000 Bbl/d) | WEIGHTING FACTOR (See Below) | PROCESS RATE / FEEDSTOCK RATE | UNIT PROCESS CONFIGURATION FACTOR |
|---|---|---|---|---|---|
| | **CRUDE PROCESSES** | | | | |
| 1 | Atmospheric Crude Distillation | 420.0 | | 1.000 | |
| 2 | Crude Desalting | 420.0 | | 1.000 | |
| 3 | Vacuum Crude Distillation | 240.3 | | 0.572 | |
| | **Sum** | **1080.3** | **1** | **2.572** | **2.572** |
| | **CRACKING AND COKING PROCESSES** | | | | |
| 6 | Fluid Catalytic Cracking | 172.0 | | 0.410 | |
| 15 | Delayed Coking | 102.0 | | 0.243 | |
| 54 | Hydrotreating | 416.3 | | 0.991 | |
| | **Sum** | **690.3** | **6** | **1.644** | **9.861** |
| | **ASPHALT PROCESSES** | | | | |
| 18 | Asphalt Production | 33.9 | | 0.081 | |
| | **Sum** | **33.9** | **12** | **0.081** | **0.969** |
| | **REFORMING AND ALKYLATION PROCESSES** | | | | |
| 8 | Sulfuric Acid Alkylation | 29.0 | | | |
| 12 | Catalytic Reforming | 70.0 | | | |
| | **Sum** | **99.0** | | | |
| | **FEEDSTOCK RATE (1,000 Bbl/d)** | | **420.0** | **TOTAL** | **13.40** |

Each EPA process rate based on WRMP design

For GOHT production (Hydrotreating subprocess), projected rate of 105 (1,000 Bbl/d) used (unit startup = 2013)

**NOTES:**

**(1) WEIGHTING FACTOR**
Based on the table in 40 CFR 419.42 (b) (3)

**(2) SIZE FACTOR**
Based on the table in 40 CFR 419.22 (b) (1), 419.23 (b) (1), or 419.24 (b) (1)

| 1,000 BBL OF FEEDSTOCK PER STREAM DAY | SIZE FACTOR |
|---|---|
| 150.0 or greater | 1.41 |

Based on the table in 40 CFR 419.22 (b) (2), 419.23 (b) (2), or 419.24 (b) (2)

| PROCESS CONFIGURATION FACTOR | PROCESS FACTOR |
|---|---|
| 9.5 or greater | 1.89 |

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages.

EPA ID NUMBER (*copy from Item 1 of Form 1*): IND000810861

**V. INTAKE AND EFFLUENT CHARACTERISTICS** (*continued from page 3 of Form 2-C*)

OUTFALL NO. 005

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details

| 1. POLLUTANT | 2. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 3. UNITS (specify if blank) a. CONCEN-TRATION | b. MASS | 4. INTAKES (optional) a. LONG TERM AVG. VALUE (1) CONCEN-TRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Biochemical Oxygen Demand (BOD) | 33 | 3,012 | 10.9 | 1256 | 2.4 | 301 | 282/48 | mg/L | lb/day | | | |
| b. Chemical Oxygen Demand (COD) | 207 | 17,657 | 82.3 | 8,964 | 39.2 | 4,973 | 258/48 | mg/L | lb/day | | | |
| c. Total Organic Carbon (TOC) | 8.2 | 1,293 | | | | | 1 | mg/L | lb/day | | | |
| d. Total Suspended Solids (TSS) | 114 | 5,562 | 33 | 2,578 | 9.0 | 1,055 | 474/48 | mg/L | lb/day | | | |
| e. Ammonia (as N) | 11.5 | 1,263 | 2.17 | 281 | 0.41 (j) | 50 (j) | 1025/48 | mg/L | lb/day | | | |
| f. Flow | VALUE 27.4 | | VALUE 19.9 | | VALUE 15.7 | | 1461/48 | | MGD | VALUE | | |
| g. Temperature (winter) | VALUE 38.0 | | VALUE 35.8 | | VALUE 29.3 | | 1093/36 | °C | | VALUE | | |
| h. Temperature (summer) | VALUE 39.0 | | VALUE 38.2 | | VALUE 35.8 | | 368/12 | °C | | VALUE | | |
| i. pH | MINIMUM 6.3 | MAXIMUM 8.2 | MINIMUM 7.0 | MAXIMUM 7.9 | | | 616/48 | STANDARD UNITS | | | | |

PART B- Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for a pollutant which is limited either directly, or indirectly but expressly, in an effluent limitation guideline, you must provide the results of at least one analysis for that pollutant. For oth pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall See the instructions for additional details and requirements

| 1. POLLUTANT AND CAS NO. (if available) | 2. MARK 'X' a. BELIEVED PRESENT | b. BELIEVED ABSENT | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG VALUES (if available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCEN-TRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVG. VALUE (1) CONCEN-TRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Bromide (24959-67-9) | | X | <25 | | | | | | 1 | mg/L | | | | |
| b. Chlorine, Total Residual | | X | 0 | | | | | | 1 | mg/L | | | | |
| c. Color | X | | 43 | | | | | | 1 | Pt-Co | | | | |
| d. Fecal Coliform | | X | <10 | | | | | | 1 | #/100 mL | | | | |
| e. Fluoride (16984-48-8) | X | | 0.63 | 88 | 0.55 | 77 | 0.30 (j) | 40 (j) | 51/7 | mg/L | lb/day | | | |
| f. Nitrate-Nitrite (as N) | | X | <0.1 | | | | | | 1 | mg/L | | | | |

ITEM V-B CONTINUED FROM FRONT

Outfall 005

| 1. POLLUTANT AND CAS NO. (if available) | 2. MARK 'X' a. BELIEVED PRESENT | 2. MARK 'X' b. BELIEVED ABSENT | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (2) MASS | c. LONG TERM AVRG VALUES (if available) (1) CONCENTRATION | c. LONG TERM AVRG VALUES (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCEN-TRATION | 4. UNITS b. MASS | 5. INTAKE (optional) a. LONG TERM AVG. VALUE (1) CONCEN-TRATION | a. LONG TERM AVG. VALUE (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g. Nitrogen, Total Organic (as N) | X | | 1.58 | 249 | | | | | 1 | mg/L | lb/day | | | |
| h. Oil and Grease | X | | 28.7 | 1,340 | 7.52 | 432 | 1.01 (j) | 122 (j) | 284/48 | mg/L | lb/day | | | |
| i. Phosphorus (as P), Total (7723-14-0) | X | | 1.76 | 258 | 1.14 | 153 | 0.30 (j) | 39 (j) | 228/47 | mg/L | lb/day | | | |
| j. Radioactivity | | | | | | | | | | | | | | |
| (1) Alpha, Total | | X | | | | | | | | | | | | |
| (2) Beta, Total | | X | | | | | | | | | | | | |
| (3) Radium, Total | | X | | | | | | | | | | | | |
| (4) Radium 226, Total | | X | | | | | | | | | | | | |
| k. Sulfate (as SO4) (14808-79-8) | X | | 868 | 131,028 | 701 | 107,650 | 375 | 48,837 | 51/7 | mg/L | lb/day | | | |
| l. Sulfide (as S) | X | | 0.06 | 8.8 | 0.02 | 3.33 | 0.01(j) | 1.46(j) | 223/48 | mg/L | lb/day | | | |
| m. Sulfite (as SO3) (14265-45-3) | | X | <1.0 | | | | | | 1 | mg/L | | | | |
| n. Surfactants | X | | 0.372 | 59 | | | | | 1 | mg/L | lb/day | | | |
| o. Aluminum, Total (7429-90-5) | | X | <0.2 | | | | | | 1 | mg/L | | | | |
| p. Barium, Total (7440-39-3) | X | | 0.13 | 20 | | | | | 1 | mg/L | lb/day | | | |
| q. Boron, Total (7440-48-4) | X | | 0.23 | 36 | | | | | 1 | mg/L | lb/day | | | |
| r. Cobalt, Total (7440-48-4) | | X | <0.003 | | | | | | 1 | mg/L | | | | |
| s. Iron, Total (7439-89-6) | X | | 1.1 | 173 | | | | | 1 | mg/L | lb/day | | | |
| t. Magnesium, Total (7439-95-4) | X | | 22 | 3,468 | | | | | 1 | mg/L | lb/day | | | |
| u. Molybdenum, Total | | X | <0.02 | | | | | | 1 | mg/L | | | | |
| v. Manganese, Total (7439-96-5) | X | | 0.12 | 19 | | | | | 1 | mg/L | lb/day | | | |
| w. Tin, Total (7440-31-5) | | X | <0.02 | | | | | | 1 | mg/L | | | | |
| x. Titanium, Total (7440-32-6) | | X | <0.03 | | | | | | 1 | mg/L | | | | |

Note: As per NDPES Permit, Ortho-Phosphate analysis is substituted for Total Phosphorus analysis

CONTINUE ON PAGE V-3

| EPA I.D. NUMBER (Copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 005 |

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in colun 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark colun 2-a (secondary industries, nonproce: wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant y: believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the resu of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2, dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark in column 2b, you must either submit at least one analysis or briefly discribe the reasons the pollutant is expected be discharged. Note that there are 7 pages to this part; please review each carefully. Complete on table *all 7 pages*) for each outfall. See instructions for additional details and requirements

| 1. POLLUTANT AND CAS NUMBERS *(If available)* | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a. TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE *(if available)* (2) MASS | c. LONG TERM VALUE *(if available)* (1) CONCENTRATION | c. LONG TERM VALUE *(if available)* (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| METALS, CYANIDE, AND TOTAL PHENOLS | | | | | | | | | | | | | | | |
| 1M. Antimony, Total (7440-36-0) | X | | | <0.006 | | | | | | 1 | mg/L | | | | |
| 2M. Arsenic, Total (7440-38-2) | X | | | 0.014 | 2.2 | | | | | 1 | mg/L | lb/day | | | |
| 3M. Beryllium, Total (7440-41-7) | X | | | <0.001 | | | | | | 1 | mg/L | | | | |
| 4M. Cadmium, Total (7440-43-9) | X | | | <0.001 | | | | | | 1 | mg/L | | | | |
| 5M. Chromium, Total (7440-47-3) | X | | | <0.01 | | <0.01 | | <0.01 | | 220/48 | mg/L | | 0.0047 | | 1 |
| 6M. Copper, Total (7440-50-8) | X | | | 0.019 | 3.11 | 0.0047 | 0.44 | 0.0034 (j) | 0.45 (j) | 51/7 | mg/L | lb/day | <0.01 | | 1 |
| 7M. Lead, Total (7439-92-1) | X | | | 0.043 | 4.48 | 0.005 | 0.30 | 0.003 (j) | 0.41 (j) | 51/7 | mg/L | lb/day | <0.005 | | 1 |
| 8M. Mercury, Total (7439-97-6) | X | | see Table ES-1 | | | | | | | | | | | | |
| 9M. Nickel, Total (7440-02-0) | X | | | <0.01 | | | | | | 1 | mg/L | | | | |
| 10M. Selenium, Total (7782-49-2) | X | | | 0.038 | 4.6 | 0.035 | 4.0 | 0.023 | 2.9 | 50/7 | mg/L | lb/day | <0.005 | | 1 |
| 11M. Silver, Total (7440-22-4) | X | | | <0.01 | | | | | | 1 | mg/L | | | | |
| 12M. Thallium, Total (7440-28-0) | X | | | <0.005 | | | | | | 1 | mg/L | | | | |
| 13M. Zinc, Total (7440-66-6) | X | | | <0.02 | | | | | | 1 | mg/L | | | | |
| 14M. Cyanide, Total (57-12-5) | X | | | <0.005 | | | | | | 1 | mg/L | | | | |
| 15M. Phenols, Total | X | | | <0.01 | | <0.01 | | <0.01 | | 251/48 | mg/L | | | | |
| DIOXIN | | | | | | | | | | | | | | | |
| 2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6) | | | X | DESCRIBE RESULTS | | | | | | | | | | | |

CONTINUED ON PAGE V-4

Outfall 005

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCENTRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION - VOLATILE COMPOUNDS | | | | | | | | | | | | | | | |
| 1V. Acrolein (107-02-8) | X | | | <100 | | | | | | 1 | µg/L | | | | |
| 2V. Acrylonitrile (107-13-1) | X | | | <100 | | | | | | 1 | µg/L | | | | |
| 3V. Benzene (71-43-2) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 4V. Bis (*Chloromethyl*) Ether (542-88-1) | | | | | Per 46 Federal Register 2264, this analyte was removed from the Priority Pollutants List. | | | | | | | | | | |
| 5V. Bromoform (75-25-2) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 6V. Carbon Tetrachloride (56-23-5) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 7V. Chlorobenzene (108-90-7) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 8V. Chlorodibromomethane (124-48-1) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 9V. Chloroethane (75-00-3) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 10V. 2-Chloroethylvinyl Ether (110-75-8) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 11V. Chloroform (67-66-3) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 12V. Dichlorobromomethane (75-27-4) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 13V. Dichlorodifluoromethane (75-71-8) | X | | | | Per 46 Federal Register 2264, this analyte was removed from the Priority Pollutants List. | | | | | | | | | | |
| 14V. 1,1-Dichloroethane (75-34-3) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 15V. 1,2-Dichloroethane (107-06-2) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 16V. 1,1-Dichloroethylene (75-35-4) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 17V. 1,2-Dichloropropane (78-87-5) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 18V. 1,3-Dichloropropylene (542-75-6) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 19V. Ethylbenzene (100-41-4) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 20V. Methyl Bromide (74-83-9) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 21V. Methyl Chloride (74-87-3) | X | | | <10 | | | | | | 1 | µg/L | | | | |

CONTINUED ON PAGE V-5

CONTINUED FROM PAGE V-4

| EPA I.D.NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 005 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCENTRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION - VOLITILE COMPOUNDS-CONTINUED | | | | | | | | | | | | | | | |
| 22V. Methylene Chloride (75-09-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 23V. 1,1,2,2-Tetrachloroethane (79-34-5) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 24V. Tetrachloroethylene (127-18-4) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 25V. Toluene (108-88-3) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 26V. 1,2-Trans-Dichloroethylene (156-60-5) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 27V. 1,1,1-Trichloroethane (71-55-6) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 28V. 1,1,2-Trichloroethane (79-00-5) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 29V. Trichloroethylene (79-01-6) | X | | | <5 | | | | | | 1 | µg/L | | | | |
| 30V. Trichlorofluoromethane (75-69-4) | | | | Per 46 Federal Register 2264, this analyte was removed from the Priority Pollutants List. | | | | | | | | | | | |
| 31V. Vinyl Chloride (75-01-4) | X | | | <2 | | | | | | 1 | µg/L | | | | |
| GC/MS FRACTION - ACID COMPOUNDS | | | | | | | | | | | | | | | |
| 1A. 2-Chlorophenol (95-57-8) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 2A. 2,4-Dichlorophenol (120-83-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 3A. 2,4-Dimethylphenol (105-67-9) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 4A. 4,6-Dinitro-O-Cresol (534-52-1) | X | | | <26 | | | | | | 1 | µg/L | | | | |
| 5A. 2,4-Dinitrophenol (51-28-5) | X | | | <51 | | | | | | 1 | µg/L | | | | |
| 6A. 2-Nitrophenol (88-75-5) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 7A. 4-Nitrophenol (100-02-7) | X | | | <51 | | | | | | 1 | µg/L | | | | |
| 8A. P-Chloro-M-Cresol (59-50-7) | X | | | <20 | | | | | | 1 | µg/L | | | | |
| 9A. Pentachlorophenol (87086-5) | X | | | <51 | | | | | | 1 | µg/L | | | | |
| 10A. Phenol (108-95-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 11A. 2,4,6-Trichlorophenol (88-06-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |

CONTINUED FROM PAGE V-5

| EPA I.D.NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 005 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TEST-ING RE-QUIRED | b. BE-LIEVED PRESENT | c. BE-LIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCEN-TRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCEN-TRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCEN-TRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCEN-TRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCEN-TRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION -BASE/NEUTRAL COMPOUNDS | | | | | | | | | | | | | | | |
| 1B. Acenaphthene (83-32-9) | X | | | <10 | | | | | | | µg/L | | | | |
| 2B. Acenaphthylene (208-96-8) | X | | | <10 | | | | | | | µg/L | | | | |
| 3B. Anthracene (120-12-7) | X | | | <10 | | | | | | | µg/L | | | | |
| 4B. Benzidine (92-87-5) | X | | | <51 | | | | | | | µg/L | | | | |
| 5B. Benzo (a) Anthracene (56-55-3) | X | | | <10 | | | | | | | µg/L | | | | |
| 6B. Benzo (a) Pyrene (50-32-08) | X | | | 0.15 | 0.0284 | 0.11(j) | 0.0164 (j) | 0.091 (j) | 0.0120 (j) | 48/7 | µg/L | lb/day | | | |
| 7B. 3,4-Benzo-fluoranthene (205-99-2) | X | | | <10 | | | | | | | µg/L | | | | |
| 8B. Benzo (ghi) Perylene (191-24-2) | X | | | <10 | | | | | | | µg/L | | | | |
| 9B. Benzo (k) Fluoranthane (207-08-9) | X | | | <10 | | | | | | | µg/L | | | | |
| 10B. Bis (2-Chloro-ethoxy) Methane (111-91-1) | X | | | <10 | | | | | | | µg/L | | | | |
| 11B. Bis (2-Chloro-ethyl) Ether (111-44-4) | X | | | <10 | | | | | | | µg/L | | | | |
| 12B. Bis (2-Chloroiso-propyl) Ether (102-60-1) | X | | | <10 | | | | | | | µg/L | | | | |
| 13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7) | X | | | <10 | | | | | | | µg/L | | | | |
| 14B. 4-Bromo-phenyl Phenyl Ether (101-55-3) | X | | | <10 | | | | | | | µg/L | | | | |
| 15B. Butyl Benzyl Phthalate (85-68-7) | X | | | <10 | | | | | | | µg/L | | | | |
| 16B. 2-Chloro-naphthalene (91-58-7) | X | | | <10 | | | | | | | µg/L | | | | |
| 17B. 4-Chlorophenyl Phenyl Ether (7005-72-3) | X | | | <10 | | | | | | | µg/L | | | | |
| 18B. Chrysene (218-01-9) | X | | | <10 | | | | | | | µg/L | | | | |
| 19B. Dibenzo (a, h) Anthracene (53-70-3) | X | | | <10 | | | | | | | µg/L | | | | |
| 20B. 1,2-Dichloro-benzene (95-50-1) | X | | | <10 | | | | | | | µg/L | | | | |
| 21B. 1,3-Dichloro-benzene (541-73-1) | X | | | <10 | | | | | | | µg/L | | | | |

CONTINUED FROM PAGE V-6

| EPA I.D. NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 005 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCENTRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION -BASE/NEUTRAL COMPOUNDS (*continued*) | | | | | | | | | | | | | | | |
| 22B. 1,4-Dichlorobenzene (106-46-7) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 23B. 3,3'-Dichlorobenzidine (91-94-1) | X | | | <51 | | | | | | 1 | µg/L | | | | |
| 24B. Diethyl Phthalate (84-66-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 25B. Dimethyl Phthalate (131-11-3) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 26B. Di-N-Butyl Phthalate (84-74-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 27B. 2,4-Dinitrotoluene (121-14-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 28B. 2,6-Dinitrotoluene (606-20-20 | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 29B. Di-N-Octyl Phthalate (117-84-0) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-66-7) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 31B. Fluoranthene (206-44-0) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 32B. Fluorene (86-73-7) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 33B. Hexachlorobenzene (118-74-1) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 34B. Hexachlorobutadiene (87-68-3) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 35B. Hexachloro-cyclopentadiene (77-47-4) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 36B. Hexachloroethane (67-72-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 37B. Indeno (1,2,3-cd) Pyrene (193-39-5) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 38B. Isophorone (78-59-1) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 39B. Naphthalene (91-20-3) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 40B. Nitrobenzene (98-95-3) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 41B. N-Nitro-sodimethylamine (62-75-9) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 42B. N-Nitrosodi-N-Propylamine (621-41-7) | X | | | <10 | | | | | | 1 | µg/L | | | | |

| EPA I.D. NUMBER (copy from Item I of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 005 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a. TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | c. LONG TERM AVRG. VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION -BASE/NEUTRAL COMPOUNDS (*continued*) | | | | | | | | | | | | | | | |
| 43B. N-Nitrosodiphenylamine (86-30-6) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 44B. Phenanthrene (85-01-8) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 45B. Pyrene (129-00-0) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 46B. 1,2,4-Trichlorobenzene (120-82-1) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| GC/MS FRACTION - PESTICIDES | | | | | | | | | | | | | | | |
| 1P. Aldrin (309-00-2) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 2P. α-BHC (319-84-6) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 3P. β-BHC (319-85-7) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 4P. γ-BHC (58-89-9) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 5P. δ-BHC (319-86-8) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 6P. Chlordane (57-74-9) | X | | | <10 | | | | | | 1 | µg/L | | | | |
| 7P. 4,4'-DDT (50-29-3) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 8P. 4,4'-DDE (72-55-9) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 9P. 4,4'-DDD (72-54-8) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 10P. Dieldrin (60-57-1) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 11P. α-Endosulfan (115-29-7) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 12P. β-Endosulfan (115-29-7) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 13P. Endosulfan Sulfate (1031-07-8) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 14P. Endrin (72-20-8) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 15P. Endrin Aldehyde (7421-93-4) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 16P. Heptachlor (76-44-8) | X | | | <1 | | | | | | 1 | µg/L | | | | |

CONTINUED FROM PAGE V-8

| EPA I.D. NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 005 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE | | b. MAXIMUM 30 DAY VALUE (if available) | | c. LONG TERM VALUE (if available) | | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE | | b. NO. OF ANALYSES |
| | | | | (1) CONCENTRATION | (2) MASS | (1) CONCENTRATION | (2) MASS | (1) CONCENTRATION | (2) MASS | | | | (1) CONCENTRATION | (2) MASS | |
| GC/MS FRACTION PESTICIDES (*continued*) | | | | | | | | | | | | | | | |
| 17P. Heptachlor Epoxide (1024-57-3) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 18P. PCB-1242 (53469-21-9) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 19P. PCB-1254 (11097-69-1) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 20P. PCB-1221 (11104-28-2) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 21P. PCB-1232 (11141-16-5) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 22P. PCB-1248 (12672-29-6) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 23P. PCB-1260 (11096-82-5) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 24P. PCB-1016 (12674-11-2) | X | | | <1 | | | | | | 1 | µg/L | | | | |
| 25P. Toxaphene (8001-35-2) | X | | | <10 | | | | | | 1 | µg/L | | | | |

Notes:
"( | )" indicates that the database used to generate averages consists of non-detect and detect values.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages.

EPA ID NUMBER (*copy from Item 1 of Form 1*): IND000810861

**V. INTAKE AND EFFLUENT CHARACTERISTICS** (*continued from page 3 of Form 2-C*)

OUTFALL NO. 002

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

| 1. POLLUTANT | 2. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (*if available*) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (*if available*) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 3. UNITS (*specify if blank*) a. CONCEN-TRATION | b. MASS | 4. INTAKES (*optional*) a. LONG TERM AVG. VALUE (1) CONCEN-TRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Biochemical Oxygen Demand (BOD) | <2 | | | | | | 1 | mg/L | | | | |
| b. Chemical Oxygen Demand (COD) | 11 | 4,092 | | | | | 1 | mg/L | lb/day | | | |
| c. Total Organic Carbon (TOC) | 3.0 | 1,914 | 2.4 | 1,486 | 2.2 | 1,359 | 79/4 | mg/L | lb/day | | | |
| d. Total Suspended Solids | 3.0 | 1,116 | | | | | 1 | mg/L | lb/day | | | |
| e. Ammonia (as N) | <0.1 | | | | | | 1 | mg/L | | | | |
| f. Flow | VALUE 98.7 | | VALUE 86.2 | | VALUE 73.7 | | 1458/48 | | MGD | VALUE | | |
| g. Temperature (winter) | VALUE 39.0 | | VALUE 34.5 | | VALUE 24.9 | | 1093/36 | °C | | VALUE | | |
| h. Temperature (summer) | VALUE 39.0 | | VALUE 38.1 | | VALUE 35.4 | | 368/12 | °C | | VALUE | | |
| i. pH | MINIMUM 7.2 | MAXIMUM 8.6 | MINIMUM 7.7 | MAXIMUM 8.5 | | | 626/48 | STANDARD UNITS | | | | |

PART B- Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for ar pollutant which is limited either directly, or indirectly but expressly, in an effluent limitation guideline, you must provide the results of at least one analysis for that pollutant. For oth pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall See the instructions for additional details and requirements

| 1. POLLUTANT AND CAS NO. (*if available*) | 2. MARK 'X' a. BELIEVED PRESENT | b. BELIEVED ABSENT | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (*if available*) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG VALUES (*if available*) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCEN-TRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVG. VALUE (1) CONCEN-TRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Bromide (24959-67-9) | | X | <0.25 | | | | | | 1 | mg/L | | | | |
| b. Chlorine, Total Residual | X | | 0.06 | 41.8 | 0.015 (j) * | 10.4 (j) * | 0.0003 (j) * | 0.2(j) * | 209/48 | mg/L | lb/day | | | |
| c. Color | | X | 6 | | | | | | 1 | Pt-Co | | | | |
| d. Fecal Coliform | | X | <10 | | | | | | 1 | #/100 mL | | | | |
| e. Fluoride (16984-48-8) | | X | <0.25 | | | | | | 1 | mg/L | | | | |
| f. Nitrate-Nitrite (as N) | X | | 3.6 | 1,339 | | | | | 1 | mg/L | lb/day | | | |

* Nondetect results were reported as < Method Detection Limit for 2007, 2008. These values have been changed to zero for calculating stats (consistent with permit)

ITEM V-B CONTINUED FROM FRONT

Outfall 002

| 1. POLLUTANT AND CAS NO. (if available) | 2. MARK 'X' | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a. BELIEVED PRESENT | b. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE | | b. MAXIMUM 30 DAY VALUE (if available) | | c. LONG TERM AVRG VALUES (if available) | | d. NO. OF ANALYSES | a. CONCEN-TRATION | b. MASS | a. LONG TERM AVG. VALUE | | b. NO. OF ANALYSES |
| | | | (1) CONCENTRATION | (2) MASS | (1) CONCENTRATION | (2) MASS | (1) CONCENTRATION | (2) MASS | | | | (1) CONCEN-TRATION | (2) MASS | |
| g. Nitrogen, Total Organic (as N) | | X | <0.5 | | | | | | 1 | mg/L | | | | |
| h. Oil and Grease | X | | 1.5 | 929 | 0.76 | 470 | 0.56 (j) | 346 (j) | 90/5 | mg/L | lb/day | | | |
| i. Phosphorus (as P), Total (7723-14-0) | X | | 0.2 | 74 | | | | | 1 | mg/L | lb/day | | | |
| j. Radioactivity | | | | | | | | | | | | | | |
| (1) Alpha, Total | | X | | | | | | | | pCi/L | | | | |
| (2) Beta, Total | | X | | | | | | | | pCi/L | | | | |
| (3) Radium, Total | | X | | | | | | | | pCi/L | | | | |
| (4) Radium 226, Total | | X | | | | | | | | pCi/L | | | | |
| k. Sulfate (as SO4) (14808-79-8) | X | | 33.4 | 12,424 | | | | | 1 | mg/L | lb/day | | | |
| l. Sulfide (as S) | | X | <0.05 | | | | | | 1 | mg/L | | | | |
| m. Sulfite (as SO3) (14265-45-3) | | X | <1.0 | | | | | | 1 | mg/L | | | | |
| n. Surfactants | | X | <0.05 | | | | | | 1 | mg/L | | | | |
| o. Aluminum, Total (7429-90-5) | X | | 0.41 | 153 | | | | | 1 | mg/L | lb/day | | | |
| p. Barium, Total (7440-39-3) | X | | 0.027 | 10 | | | | | 1 | mg/L | lb/day | | | |
| q. Boron, Total (7440-48-4) | X | | 0.037 | 14 | | | | | 1 | mg/L | lb/day | | | |
| r. Cobalt, Total (7440-48-4) | | X | <0.003 | | | | | | 1 | mg/L | | | | |
| s. Iron, Total (7439-89-6) | X | | 0.31 | 115 | | | | | 1 | mg/L | lb/day | | | |
| t. Magnesium, Total (7439-95-4) | X | | 14 | 5,207 | | | | | 1 | mg/L | lb/day | | | |
| u. Molybdenum, Total | | X | <0.02 | | | | | | 1 | mg/L | | | | |
| v. Manganese, Total (7439-96-5) | X | | 0.0093 | 3.5 | | | | | 1 | mg/L | lb/day | | | |
| w. Tin, Total (7440-31-5) | | X | <0.02 | | | | | | 1 | mg/L | | | | |
| x. Titanium, Total (7440-32-6) | | X | <0.03 | | | | | | 1 | mg/L | | | | |

CONTINUE ON PAGE V-3

CONTINUED FROM PAGE 3 OF FORM 2-C

| EPA I.D. NUMBER (Copy from Item 1 of Form 1) | OUTFALL NUMBER |
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PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the Instructions to determine which of the GC/MS fractions you must test for. Mark "X" in colum 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark colun 2-a (secondary industries, nonproce wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant yo believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the resu of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2, dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark in column 2b, you must either submit at least one analysis or briefly discribe the reasons the pollutant is expected be discharged. Note that there are 7 pages to this part; please review each carefully. Complete on table *all 7 pages*) for each outfall. See instructions for additional details and requirements

| 1. POLLUTANT AND CAS NUMBERS *(if available)* | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a. TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE *(if available)* (2) MASS | c. LONG TERM VALUE *(if available)* (1) CONCENTRATION | c. LONG TERM VALUE *(if available)* (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| METALS, CYANIDE, AND TOTAL PHENOLS | | | | | | | | | | | | | | | |
| 1M. Antimony, Total (7440-36-0) | | | X | | | | | | | | | | | | |
| 2M. Arsenic, Total (7440-38-2) | | | X | | | | | | | | | | | | |
| 3M. Beryllium, Total (7440-41-7) | | | X | | | | | | | | | | | | |
| 4M. Cadmium, Total (7440-43-9) | | | X | | | | | | | | | | | | |
| 5M. Chromium, Total (7440-47-3) | | | X | | | | | | | | | | | | |
| 6M. Copper, Total (7440-50-8) | | | X | | | | | | | | | | | | |
| 7M. Lead, Total (7439-92-1) | | | X | | | | | | | | | | | | |
| 8M. Mercury, Total (7439-97-6) | | | X | | | | | | | | | | | | |
| 9M. Nickel, Total (7440-02-0) | | | X | | | | | | | | | | | | |
| 10M. Selenium, Total (7782-49-2) | | | X | | | | | | | | | | | | |
| 11M. Silver, Total (7440-22-4) | | | X | | | | | | | | | | | | |
| 12M. Thallium, Total (7440-28-0) | | | X | | | | | | | | | | | | |
| 13M. Zinc, Total (7440-66-6) | | | X | | | | | | | | | | | | |
| 14M. Cyanide, Total (57-12-5) | | | X | | | | | | | | | | | | |
| 15M. Phenols, Total | | | X | | | | | | | | | | | | |
| DIOXIN | | | | | | | | | | | | | | | |
| 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6) | | | X | DESCRIBE RESULTS | | | | | | | | | | | |

CONTINUED ON PAGE V-4

Outfall 002

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE | | b. MAXIMUM 30 DAY VALUE (if available) | | c. LONG TERM VALUE (if available) | | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE | | b. NO. OF ANALYSES |
| | | | | (1) CONCENTRATION | (2) MASS | (1) CONCENTRATION | (2) MASS | (1) CONCENTRATION | (2) MASS | | | | (1) CONCENTRATION | (2) MASS | |
| GC/MS FRACTION - VOLATILE COMPOUNDS | | | | | | | | | | | | | | | |
| 1V. Acrolein (107-02-8) | | | X | | | | | | | | | | | | |
| 2V. Acrylonitrile (107-13-1) | | | X | | | | | | | | | | | | |
| 3V. Benzene (71-43-2) | | | X | | | | | | | | | | | | |
| 4V. Bis (*Chloromethyl*) Ether (542-88-1) | | | X | Per 46 Federal Register 2264, this analyte was removed from the Priority Pollutants List. | | | | | | | | | | | |
| 5V. Bromoform (75-25-2) | | | X | | | | | | | | | | | | |
| 6V. Carbon Tetrachloride (56-23-5) | | | X | | | | | | | | | | | | |
| 7V. Chlorobenzene (108-90-7) | | | X | | | | | | | | | | | | |
| 8V. Chlorodibromomethane (124-48-1) | | | X | | | | | | | | | | | | |
| 9V. Chloroethane (75-00-3) | | | X | | | | | | | | | | | | |
| 10V. 2-Chloroethylvinyl Ether (110-75-8) | | | X | | | | | | | | | | | | |
| 11V. Chloroform (67-66-3) | | | X | | | | | | | | | | | | |
| 12V. Dichlorobromomethane (75-27-4) | | | X | | | | | | | | | | | | |
| 13V. Dichlorodifluoromethane (75-71-8) | | | X | | | | | | | | | | | | |
| 14V. 1,1-Dichloroethane (75-34-3) | | | X | | | | | | | | | | | | |
| 15V. 1,2-Dichloroethane (107-06-2) | | | X | | | | | | | | | | | | |
| 16V. 1,1-Dichloroethylene (75-35-4) | | | X | | | | | | | | | | | | |
| 17V. 1,2-Dichloropropane (78-87-5) | | | X | | | | | | | | | | | | |
| 18V. 1,3-Dichloropropylene (542-75-6) | | | X | | | | | | | | | | | | |
| 19V. Ethylbenzene (100-41-4) | | | X | | | | | | | | | | | | |
| 20V. Methyl Bromide (74-83-9) | | | X | | | | | | | | | | | | |
| 21V. Methyl Chloride (74-87-3) | | | X | | | | | | | | | | | | |

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CONTINUED FROM PAGE V-4

| EPA I.D. NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 002 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCENTRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION - VOLITILE COMPOUNDS-CONTINUED | | | | | | | | | | | | | | | |
| 22V. Methylene Chloride (75-09-2) | | | X | | | | | | | | | | | | |
| 23V. 1,1,2,2-Tetrachloroethane (79-34-5) | | | X | | | | | | | | | | | | |
| 24V. Tetrachloroethylene (127-18-4) | | | X | | | | | | | | | | | | |
| 25V. Toluene (108-88-3) | | | X | | | | | | | | | | | | |
| 26V. 1,2-Trans-Dichloroethylene (156-60-5) | | | X | | | | | | | | | | | | |
| 27V. 1,1,1-Trichloroethane (71-55-6) | | | X | | | | | | | | | | | | |
| 28V. 1,1,2-Trichloroethane (79-00-5) | | | X | | | | | | | | | | | | |
| 29V. Trichloroethylene (79-01-6) | | | X | | | | | | | | | | | | |
| 30V. Trichlorofluoromethane (75-69-4) | | | X | | Per 46 Federal Register 2264, this analyte was removed from the Priority Pollutants List. | | | | | | | | | | |
| 31V. Vinyl Chloride (75-01-4) | | | X | | | | | | | | | | | | |
| GC/MS FRACTION - ACID COMPOUNDS | | | | | | | | | | | | | | | |
| 1A. 2-Chlorophenol (95-57-8) | | | X | | | | | | | | | | | | |
| 2A. 2,4-Dichlorophenol (120-83-2) | | | X | | | | | | | | | | | | |
| 3A. 2,4-Dimethylphenol (105-67-9) | | | X | | | | | | | | | | | | |
| 4A. 4,6-Dinitro-O-Cresol (534-52-1) | | | X | | | | | | | | | | | | |
| 5A. 2,4-Dinitrophenol (51-28-5) | | | X | | | | | | | | | | | | |
| 6A. 2-Nitrophenol (88-75-5) | | | X | | | | | | | | | | | | |
| 7A. 4-Nitrophenol (100-02-7) | | | X | | | | | | | | | | | | |
| 8A. P-Chloro-M-Cresol (59-50-7) | | | X | | | | | | | | | | | | |
| 9A. Pentachlorophenol (87086-5) | | | X | | | | | | | | | | | | |
| 10A. Phenol (108-95-2) | | | X | | | | | | | | | | | | |
| 11A. 2,4,6-Trichlorophenol (88-06-2) | | | X | | | | | | | | | | | | |

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| EPA I.D.NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 002 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCENTRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION -BASE/NEUTRAL COMPOUNDS | | | | | | | | | | | | | | | |
| 1B. Acenaphthene (83-32-9) | | | X | | | | | | | | | | | | |
| 2B. Acenaphthylene (208-96-8) | | | X | | | | | | | | | | | | |
| 3B. Anthracene (120-12-7) | | | X | | | | | | | | | | | | |
| 4B. Benzidine (92-87-5) | | | X | | | | | | | | | | | | |
| 5B. Benzo (a) Anthracene (56-55-3) | | | X | | | | | | | | | | | | |
| 6B. Benzo (a) Pyrene (50-32-08) | | | X | | | | | | | | | | | | |
| 7B. 3,4-Benzo-fluoranthene (205-99-2) | | | X | | | | | | | | | | | | |
| 8B. Benzo (ghi) Perylene (191-24-2) | | | X | | | | | | | | | | | | |
| 9B. Benzo (k) Fluoranthane (207-08-9) | | | X | | | | | | | | | | | | |
| 10B. Bis (2-Chloro-ethoxy) Methane (111-91-1) | | | X | | | | | | | | | | | | |
| 11B. Bis (2-Chloro-ethyl) Ether (111-44-4) | | | X | | | | | | | | | | | | |
| 12B. Bis (2-Chloroiso-propyl) Ether (102-60-1) | | | X | | | | | | | | | | | | |
| 13B. Bis (2-Ethyl- hexyl) Phthalate (117-81-7) | | | X | | | | | | | | | | | | |
| 14B. 4-Bromo-phenyl Phenyl Ether (101-55-3) | | | X | | | | | | | | | | | | |
| 15B. Butyl Benzyl Phthalate (85-68-7) | | | X | | | | | | | | | | | | |
| 16B. 2-Chloro-naphthalene (91-58-7) | | | X | | | | | | | | | | | | |
| 17B. 4-Chlorophenyl Phenyl Ether (7005-72-3) | | | X | | | | | | | | | | | | |
| 18B. Chrysene (218-01-9) | | | X | | | | | | | | | | | | |
| 19B. Dibenzo (a, h) Anthracene (53-70-3) | | | X | | | | | | | | | | | | |
| 20B. 1,2-Dichloro-benzene (95-50-1) | | | X | | | | | | | | | | | | |
| 21B. 1,3-Dichloro-benzene (541-73-1) | | | X | | | | | | | | | | | | |

CONTINUED FROM PAGE V-6

| EPA I.D.NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 002 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TEST-ING RE-QUIRED | b. BE-LIEVED PRESENT | c. BE-LIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCEN-TRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCEN-TRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCEN-TRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCEN-TRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCEN-TRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION -BASE/NEUTRAL COMPOUNDS (*continued*) | | | | | | | | | | | | | | | |
| 22B. 1,4-Dichlorobenzene (106-46-7) | | | X | | | | | | | | | | | | |
| 23B. 3,3'-Dichlorobenzidine (91-94-1) | | | X | | | | | | | | | | | | |
| 24B. Diethyl Phthalate (84-66-2) | | | X | | | | | | | | | | | | |
| 25B. Dimethyl Phthalate (131-11-3) | | | X | | | | | | | | | | | | |
| 26B. Di-N-Butyl Phthalate (84-74-2) | | | X | | | | | | | | | | | | |
| 27B. 2,4-Dinitrotoluene (121-14-2) | | | X | | | | | | | | | | | | |
| 28B. 2,6-Dinitrotoluene (606-20-20 | | | X | | | | | | | | | | | | |
| 29B. Di-N-Octyl Phthalate (117-84-0) | | | X | | | | | | | | | | | | |
| 30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-66-7) | | | X | | | | | | | | | | | | |
| 31B. Fluoranthene (206-44-0) | | | X | | | | | | | | | | | | |
| 32B. Fluorene (86-73-7) | | | X | | | | | | | | | | | | |
| 33B. Hexachlorobenzene (118-74-1) | | | X | | | | | | | | | | | | |
| 34B. Hexachlorobutadiene (87-68-3) | | | X | | | | | | | | | | | | |
| 35B. Hexachloro-cyclopentadiene (77-47-4) | | | X | | | | | | | | | | | | |
| 36B. Hexachloroethane (67-72-2) | | | X | | | | | | | | | | | | |
| 37B. Indeno (1,2,3-cd) Pyrene (193-39-5) | | | X | | | | | | | | | | | | |
| 38B. Isophorone (78-59-1) | | | X | | | | | | | | | | | | |
| 39B. Naphthalene (91-20-3) | | | X | | | | | | | | | | | | |
| 40B. Nitrobenzene (98-95-3) | | | X | | | | | | | | | | | | |
| 41B. N-Nitro-sodimethylamine (62-75-9) | | | X | | | | | | | | | | | | |
| 42B. N-Nitrosodi-N-Propylamine (621-41-7) | | | X | | | | | | | | | | | | |

| EPA I.D. NUMBER (copy from Item I of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 002 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a. TESTING REQUIRED | b. BELIEVED PRESENT | c. BELIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | c. LONG TERM AVRG. VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION -BASE/NEUTRAL COMPOUNDS (continued) | | | | | | | | | | | | | | | |
| 43B. N-Nitrosodiphenylamine (86-30-6) | | | X | | | | | | | | | | | | |
| 44B. Phenanthrene (85-01-8) | | | X | | | | | | | | | | | | |
| 45B. Pyrene (129-00-0) | | | X | | | | | | | | | | | | |
| 46B. 1,2,4-Trichlorobenzene (120-82-1) | | | X | | | | | | | | | | | | |
| GC/MS FRACTION - PESTICIDES | | | | | | | | | | | | | | | |
| 1P. Aldrin (309-00-2) | | | X | | | | | | | | | | | | |
| 2P. α-BHC (319-84-6) | | | X | | | | | | | | | | | | |
| 3P. β-BHC (319-85-7) | | | X | | | | | | | | | | | | |
| 4P. γ-BHC (58-89-9) | | | X | | | | | | | | | | | | |
| 5P. δ-BHC (319-86-8) | | | X | | | | | | | | | | | | |
| 6P. Chlordane (57-74-9) | | | X | | | | | | | | | | | | |
| 7P. 4,4'-DDT (50-29-3) | | | X | | | | | | | | | | | | |
| 8P. 4,4'-DDE (72-55-9) | | | X | | | | | | | | | | | | |
| 9P. 4,4'-DDD (72-54-8) | | | X | | | | | | | | | | | | |
| 10P. Dieldrin (60-57-1) | | | X | | | | | | | | | | | | |
| 11P. α-Endosulfan (115-29-7) | | | X | | | | | | | | | | | | |
| 12P. β-Endosulfan (115-29-7) | | | X | | | | | | | | | | | | |
| 13P. Endosulfan Sulfate (1031-07-8) | | | X | | | | | | | | | | | | |
| 14P. Endrin (72-20-8) | | | X | | | | | | | | | | | | |
| 15P. Endrin Aldehyde (7421-93-4) | | | X | | | | | | | | | | | | |
| 16P. Heptachlor (76-44-8) | | | X | | | | | | | | | | | | |

CONTINUED FROM PAGE V-8

| EPA I.D.NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| IND000810861 | 002 |

| 1. POLLUTANT AND CAS NUMBERS (if available) | 2. MARK "X" | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE (optional) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TEST-ING RE-QUIRED | b. BE-LIEVED PRESENT | c. BE-LIEVED ABSENT | a. MAXIMUM DAILY VALUE (1) CONCEN-TRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCEN-TRATION | b. MAXIMUM 30 DAY VALUE (if available) (2) MASS | c. LONG TERM VALUE (if available) (1) CONCEN-TRATION | c. LONG TERM VALUE (if available) (2) MASS | d. NO. OF ANALYSES | a. CONCEN-TRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCEN-TRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| GC/MS FRACTION PESTICIDES (*continued*) | | | | | | | | | | | | | | | |
| 17P. Heptachlor Epoxide (1024-57-3) | | | X | | | | | | | | | | | | |
| 18P. PCB-1242 (53469-21-9) | | | X | | | | | | | | | | | | |
| 19P. PCB-1254 (11097-69-1) | | | X | | | | | | | | | | | | |
| 20P. PCB-1221 (11104-28-2) | | | X | | | | | | | | | | | | |
| 21P. PCB-1232 (11141-16-5) | | | X | | | | | | | | | | | | |
| 22P. PCB-1248 (12672-29-6) | | | X | | | | | | | | | | | | |
| 23P. PCB-1260 (11096-82-5) | | | X | | | | | | | | | | | | |
| 24P. PCB-1016 (12674-11-2) | | | X | | | | | | | | | | | | |
| 25P. Toxaphene (8001-35-2) | | | X | | | | | | | | | | | | |

Notes:

"( j )" indicates that the database used to generate averages consists of non-detect and detect values.

**ATTACHMENT 8 - OUTFALL 005 AND INTAKE- ADDITIONAL PARAMETERS**
**EPA ID NUMBER: IND000810861**

| Pollutant | Units | | Outfall 005 Effluent | | | | | | | Intake | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | Mass | Maximum Daily Value | | Maximum 30 Day Value | | Long Term Average | | No. of Analyses | Long Term Average | | No. of Analyses |
| | | | Concentration | Mass | Concentration | Mass | Concentration | Mass | | Concentration | Mass | |
| | | | | | | | | | | | | |
| Chlorides | mg/L | lb/d | 611 | 54,223 | 392 | 33,285 | 220 | 26,365 | 53/7 | | | |
| TDS | mg/L | lb/d | 2,143 | 307,945 | 1,721 | 205,269 | 1,059 | 131,754 | 52/7 | | | |
| Hardness | mg/L | lb/d | 250 | - | - | - | - | - | 1 | 140 | | 1 |
| Chromium, (VI) | mg/L | lb/d | <0.005 | - | <0.005 | - | <0.005 | - | 220/48 | <0.01 | | 1 |
| Strontium, Total | mg/L | lb/d | 0.90 | 142 | 0.61 | 92.7 | 0.45 | 57.4 | 51/7 | 0.014 | | 1 |
| Vanadium, Total | mg/L | lb/d | 0.84 | 141 | 0.55 | 71.9 | 0.20 | 28.4 | 98/15 | <0.001 | | 1 |
| | | | | | | | | | | | | |

Notes:
1. Data collected July 1, 2007 - June 30, 2011 as per NPDES permit requirements and on March 23, 2011 as part of permit renewal activities.

Please print or type in the unshaded areas only

EPA I.D. NUMBER (copy from Item 1 of Form 1.
IND000810879

Form Approved OMB No 2040-0086
Approval expires 5-31-92

FORM 2F NPDES

**EPA**

United States Environmental Protection Agency

# Application for Permit To Discharge Stormwater Discharges Associated with Industrial Activity

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 28.6 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of this collection of information, or suggestions for improving this form, including suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM 223, U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503

## I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

| A. OUTFALL NUMBER (list) | B. LATITUDE | | | C. LONGITUDE | | | D. RECEIVING WATER (name) |
|---|---|---|---|---|---|---|---|
| | 1. DEG | 2. MIN | 3. SEC | 1. DEG | 2. MIN | 3. SEC | |
| 003 | N41 | 38 | 59 | W87 | 30 | 17 | Indiana Harbor Ship Canal |
| 004 | N41 | 38 | 48 | W87 | 29 | 51 | Indiana Harbor Ship Canal |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

## II. Improvements

A. Are you now required by any Federal, State, or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

| 1. Identification of Conditions, Agreements, Etc. | 2. Affected Outfalls | | 3. Brief Description of Project | 4. Final Compliance Date | |
|---|---|---|---|---|---|
| | number | source of discharge | | a. req. | b. proj. |
| Spill Prevention, Control and Countermeasure (SPCC) Plan | 003 | Stormwater | Operating procedures implemented to prevent oil spills. Control measures installed to prevent a spill from entering navigable waters or adjoining shorelines. Countermeasures put in place to contain, cleanup and mitigate the effects of an oil spill that impacts navigable waters or adjoining shorelines. | Updated and revised plan submitted to IDEM 6/1/2011 | |
| | 004 | Stormwater | | | |
| Facility Response (OPA) Plan | 003 | Stormwater | Establishes procedures to provide for well coordinated efforts by BP personnel and regulatory agencies in the effective management of a response to an incident. The objective is to eliminate or minimize hazards to life and property and adverse impacts upon the environment. | Revised plan submitted to EPA Region V 12/29/2010. | |
| | 004 | Stormwater | | | |
| Agreed Order Cause No. H-11187 | 003 | Stormwater | Agreement with the Indiana Department of Environmental Management to address environmental concerns at the BP Whiting Refinery. The Agreed Order defined eight interim measures to be implemented at the J&L Site in which Outfalls 003 and 004 are located. | Effective date December 8, 1995. | |
| | 004 | Stormwater | | | |
| Stormwater Pollution Prevention Plan | 003 | Stormwater | The SWPPP identifies potential sources of pollution, describes practices and measures for reducing pollution potential, and assures compliance with the permit. | Submitted in Oct 2008, Updated Dec 2010 | |
| | 004 | Stormwater | | | |

B. You may attach additional sheets describing any additional water pollution (or other environmental projects which may affect your discharges) you now have under way or which you plan. Indicate whether each program is now under way or planned, and indicate your actual or planned schedules for construction.

## III. Site Drainage Map

Attach a site map showing topography (or indicating the outline of drainage areas served by the outfall(s) covered in the application if a topographic map is unavailable) depicting the facility including: each if its intake and discharge structures; the drainage area of each storm water outfall; paved areas and buildings within the drainage area of each storm water outfall, each known past or present areas used for outdoor storage or disposal of significant materials, each existing structural control measure to reduce pollutants in storm water runoff, materials loading and access areas, areas where pesticides, herbicides, soil conditioners and fertilizers are applied; each of its hazardous waste treatment, storage or disposal units (including each area not required to have a RCRA permit which is used for accumulating hazardous waste under 40 CFR 262.34); each well where fluids from the facility are injected underground; springs, and other surface water bodies which receive stormwater discharges from the facility. **See Attachment 9A**



Continued on Next Page

## V. Narrative Description of Pollutant Sources

A. For each outfall, provide an estimate of the area (include units) of surfaces (including paved areas and building roofs) drained to the outfall, and an estimate of the total surface area drained by the outfall.

| Outfall Number | Area of Impervious Surface *(provide units)* | Total Area Drained *(provide units)* | Outfall Number | Area of Impervious Surface *(provide units)* | Total Area Drained *(provide units)* |
|---|---|---|---|---|---|
| 003 & 004 | CURRENT DISCHARGE | | 003 & 004 | FUTURE REROUTE | |
| | J & L Tank Field = 16% imperv | 90.9 acre | | South TF = 22% imperv | 63.5 acre |
| | Lake George TF = 13% imperv | 59.0 acre | | South TF Annex = 27% imperv | 27.4 acre |
| | J & L Outside TF = 2% imperv | 230.8 acre | | Stieglitz Park = 19% imperv | 50.7 acre |
| | Lake George Outside TF = 15.% imperv | 66.6 acre | | Marine Dock = 13% imperv | 9.0 acre |
| | | | | Indiana TF = 25% Imperv | 43.6 acre |
| | For further information, see Attachment 9B | | | | |

B. Provide a narrative description of significant materials that are currently or in the past three years have been treated, stored or disposed in a manner to allow exposure to storm water; method of treatment, storage, or disposal; past and present materials management practices employed in the last three years, to minimize contact by these materials with storm water runoff; materials loading and access areas; and the location, manner, and frequency in which pesticides, herbicides, soil conditioners, and fertilizers are applied

See Attachment 10

C. For each outfall, provide the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of the treatment the storm water receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

| Outfall Number | Treatment | List Codes from Table 2F-1 |
|---|---|---|
| 003 | See Attachment 10 | 1-H/1-U/4-A |
| 004 | See Attachment 10 | 1-H/1-U/4-A |

## V. Nonstormwater Discharges

A. I certify under penalty of law that the outfall(s) covered by this application have been tested or evaluated for the presence of nonstormwater discharges, and that all nonstormwater discharges form these outfall(s) are identified in either an accompanying Form 2C or Form 2E application for the outfall.

| Name and Official Title *type or print)* | Signature | Date Signed |
|---|---|---|
| | N. D. [illegible] | 1/31/12 |

B. Provide a description of the method used, the date of any testing, and the onsite drainage points that were directly observed during a test.

USEPA sampling and analytical methods and guidance were used to collect and generate valid and representative data.

Other than NPDES permit-required monitoring, sampling and analyses were conducted on March 24, 2011.

Drainage points were those outfalls regulated under the current NPDES permit and were verified as discharging during sampling.

## VI. Significant Leaks or Spills

Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutant at the facility in the last three years, including the approximate date and location of the spill or leak, and the type and amount of material released.

| Date | Location | Type | Amount |
|---|---|---|---|
| 6/4/2010 | 3606 tank dike (Stieglitz Park) | Oil spill from sewer backup | 36 bbl |
| 8/3/2010 | 3808 tank containment (J&L field) | Oil spill from sump overflow | >1,000 gal |
| 8/5/2010 | 3606 tank containment (Stieglitz Park) | Oil spill from line leak | >1,000 gal |
| 2/22/2011 | OMD complex pipe alley/rack | Oil spill from line leak | >1,000 gal |


Continue on Page 3

Continued from Page 2

EPA ID Number *(Copy from Item I of Form 1)*
IND000810879

## VII. Discharge Information

A, B, C, & D: See instructions before proceeding. Complete one set of tables for each outfall. Annotate the outfall number in the space provided. Tables VII-A, VII-B, and VII-C are included on separate sheets numbered VII-1 and VII-2.

E. Potential discharges not covered by analysis - is any pollutant listed in Table 2F-2, 2F-3, 2F-4 a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

[X] Yes *(list all such pollutants below)* [ ] No *(go to Section IX)*

| | | | | |
|---|---|---|---|---|
| | Selenium, total | Anthracene | Dibenzo(a,h)anthracene | Vanadium, total |
| Sulfate | Zinc, total | Benzo(a)anthracene | Fluoranthene | Xylenes |
| Cobalt, total | Phenols, total | Benzo(a)pyrene | Fluorene | 1,2,4-Trimethylbenzene |
| Molybdenum, total | Benzene | Benzo(b)fluoranthene | Indeno(1,2,3-cd)pyrene | Cyclohexane |
| Arsenic, total | Ethylbenzene | Benzo(ghi)perylene | Naphthalene | n-Hexane |
| Lead, total | Toluene | Benzo(j)fluoranthene | Phenanthrene | Biphenyl |
| Nickel, total | Phenol | Chrysene | Pyrene | |

## VIII. Biological Toxicity Testing Data

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

[ ] Yes *(list all such pollutants below)* [X] No *(go to Section IX)*

## IX. Contract Analysis Information

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

[X] Yes *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* [ ] No *(go to Section X)*

| A. Name | B. Address | C. Area Code & Phone No. | Pollutants Analyzed |
|---|---|---|---|
| Microbac Laboratories, Inc. | 250 West 84th Drive<br>Merrillville, IN 46410 | (219) 769-8378 | All |

## X. Certification

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

| A. Name & Official Title *(type or print)* | B. Area Code & Phone No. |
|---|---|
| Nick Spencer, Whiting Business Unit Leader | 219-473-3179 |
| C. Signature | D. Date Signed |
| N. Spencer | 1/31/12 |

Outfall 003

EPA ID Number *(copy from Item I of Form 1)* IND000810879

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

VII. Discharge Information *(Continued from page 3 of Form 2F)*

Part A. You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

| Pollutant and CAS Number *(if available)* | Maximum Values *(include units)* Grab Sample Taken During 1st 30 Min. | Maximum Values *(include units)* Flow-weighted Composite | Average Values *(include units)* Grab Sample Taken During 1st 30 Min. | Average Values *(include units)* Flow-weighted Composite | Number of Storm Events Sampled | Sources of Pollutants |
|---|---|---|---|---|---|---|
| Oil and Grease | 8.2 mg/L | | 0.94 mg/L | | 144 | |
| Biological Oxygen Demand (BOD5) | 5.9 mg/L | | | | 1 | |
| Chemical Oxygen Demand (COD) | 70 mg/L | | | | 1 | |
| Total Suspended Solids (TSS) | 8 mg/L | | | | 1 | |
| Total Nitrogen | <0.5 mg/L | | | | 1 | |
| Total Phosphorus | <0.2 mg/L | | | | 1 | |
| pH | Minimum 7.1 | Maximum 8.5 | | | 144 | |

Part B. List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements. (Not reporting Part A list.)

| Pollutant and CAS Number *(if available)* | Maximum Values *(include units)* Grab Sample Taken During 1st 30 Min. | Maximum Values *(include units)* Flow-weighted Composite | Average Values *(include units)* Grab Sample Taken During 1st 30 Min. | Average Values *(include units)* Flow-weighted Composite | Number of Storm Events Sampled | Sources of Pollutants |
|---|---|---|---|---|---|---|
| Ammonia as N | 6.4 mg/L | | | | 1 | |
| Chromium, Total | 0.0028 mg/L | | | | 1 | |
| Chromium, (VI) | <0.01 mg/L | | | | 1 | |
| Phenols | 0.065 mg/L | | | | 1 | |
| TOC | 79 mg/L | | 29.9 mg/L | | 144 | |
| Selenium, Total | 0.0021 mg/L | | | | 1 | |
| Sulfide | <0.05 mg/L | | | | 1 | |
| Temperature | 42.4 °F | | | | 1 | |
| Tot Resid Chlorine | 0.02 mg/L | | | | 1 | |
| Fecal Coliform | <10 col/100mL | | | | 1 | |
| Fluoride | 0.728 mg/L | | | | 1 | |
| Sulfate | 171 mg/L | | | | 1 | |
| Copper | 0.0055 mg/L | | | | 1 | |
| Lead | <0.001 mg/L | | | | 1 | |
| Mercury | 4.55 ng/L | | | | 1 | |
| Benzo(a)pyrene | <0.1 ug/L | | | | 1 | |
| Chloride | 355 mg/L | | | | 1 | |
| TDS | 1100 mg/L | | | | 1 | |
| Strontium, Total | 0.66 mg/L | | | | 1 | |
| Vanadium, Total | 0.0057 mg/L | | | | 1 | |



Continue on Reverse

Continued from pg. VII-1

Part C. List each pollutant shown in Tables 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfal Outfall 003

| Pollutant and CAS Number *(if available)* | Maximum Values *(include units)* | | Average Values *(include units)* | | Number of Storm Events Sampled | Sources of Pollutants |
|---|---|---|---|---|---|---|
| | Grab Sample Taken During 1st 30 Min. | Flow-weighted Composite | Grab Sample Taken During 1st 30 Min. | Flow-weighted Composite | | |
| | | | | | | |

Part D. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

| 1. Date of Storm Event | 2. Duration of Storm *(in minutes)* | 3. Total rainfall during storm event *(in inches)* | 4. Number of hours between beginning of storm measured and end of previous measurable rain event | 5. Maximum flow rate during rain event *(gallons/minute or specify units)* | 6. Total flow from rain event *(gallons or specify units)* | 7. Season sample was taken | 8. Form of Precipitation *(rainfall, snowmelt)* |
|---|---|---|---|---|---|---|---|
| Outfall opened at 9:10AM (CT) on March 21, 2011 and closed at 9:20AM (CT) on March 26, 2011. | N/A | N/A | N/A | N/A | N/A | Spring | rainfall |

9. Provide a description of the method of flow measurement or estimate.

The discharge from the outfall is manually controlled based on a visual inspection of the level of stormwater in the ditch once per day. When the level is high, a valve is opened to control the release of the stormwater to the canal. In general, the source of the discharge is precipitation; however, the actual release via the Outfall is not necessarily dictated by individual storm events.

Outfall 004

EPA ID Number *(copy from Item I of Form 1)* IND000810879

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

VII. Discharge Information *(Continued from page 3 of Form 2F)*

Part A. You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

| Pollutant and CAS Number *(if available)* | Maximum Values *(include units)* Grab Sample Taken During 1st 30 Min. | Maximum Values *(include units)* Flow-weighted Composite | Average Values *(include units)* Grab Sample Taken During 1st 30 Min. | Average Values *(include units)* Flow-weighted Composite | Number of Storm Events Sampled | Sources of Pollutants |
|---|---|---|---|---|---|---|
| Oil and Grease | 8.0 mg/L | | 0.78 mg/L | | 178 | |
| Biological Oxygen Demand (BOD5) | <2 mg/L | | | | 1 | |
| Chemical Oxygen Demand (COD) | 53 mg/L | | | | 1 | |
| Total Suspended Solids (TSS) | 6 mg/L | | | | 1 | |
| Total Nitrogen | <0.5 mg/L | | | | 1 | |
| Total Phosphorus | 0.24 mg/L | | | | 1 | |
| pH | Minimum 7.3 | Maximum 9.3 | | | 181 | |

Part B. List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements. (Not reporting Part A list.)

| Pollutant and CAS Number *(if available)* | Maximum Values *(include units)* Grab Sample Taken During 1st 30 Min. | Maximum Values *(include units)* Flow-weighted Composite | Average Values *(include units)* Grab Sample Taken During 1st 30 Min. | Average Values *(include units)* Flow-weighted Composite | Number of Storm Events Sampled | Sources of Pollutants |
|---|---|---|---|---|---|---|
| Ammonia as N | 0.62 mg/L | | | | 1 | |
| Chromium, Total | 0.003 mg/L | | | | 1 | |
| Chromium, (VI) | <0.01 mg/L | | | | 1 | |
| Phenols | <0.01 mg/L | | | | 1 | |
| TOC | 63 mg/L | | 19.5 mg/L | | 178 | |
| Selenium, Total | 0.0014 mg/L | | | | 1 | |
| Sulfide | <0.05 mg/L | | | | 1 | |
| Temperature | 40.7 °F | | | | 1 | |
| Tot Resid Chlorine | 0.05 mg/L | | | | 1 | |
| Fecal Coliform | <10 col/100mL | | | | 1 | |
| Fluoride | 0.979 mg/L | | | | 1 | |
| Sulfate | 272 mg/L | | | | 1 | |
| Copper | 0.0052 mg/L | | | | 1 | |
| Lead | 0.0016 mg/L | | | | 1 | |
| Mercury | 6.69 ng/L | | | | 1 | |
| Benzo(a)pyrene | <0.1 ug/L | | | | 1 | |
| Chloride | 200 mg/L | | | | 1 | |
| TDS | 760 mg/L | | | | 1 | |
| Strontium, Total | 0.36 mg/L | | | | 1 | |
| Vanadium, Total | 0.004 mg/L | | | | 1 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Continued from pg. VII-1

Part C. List each pollutant shown in Tables 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfa Outfall 004

| Pollutant and CAS Number *(if available)* | Maximum Values *(include units)* | | Average Values *(include units)* | | Number of Storm Events Sampled | Sources of Pollutants |
|---|---|---|---|---|---|---|
| | Grab Sample Taken During 1st 30 Min. | Flow-weighted Composite | Grab Sample Taken During 1st 30 Min. | Flow-weighted Composite | | |
| | | | | | | |

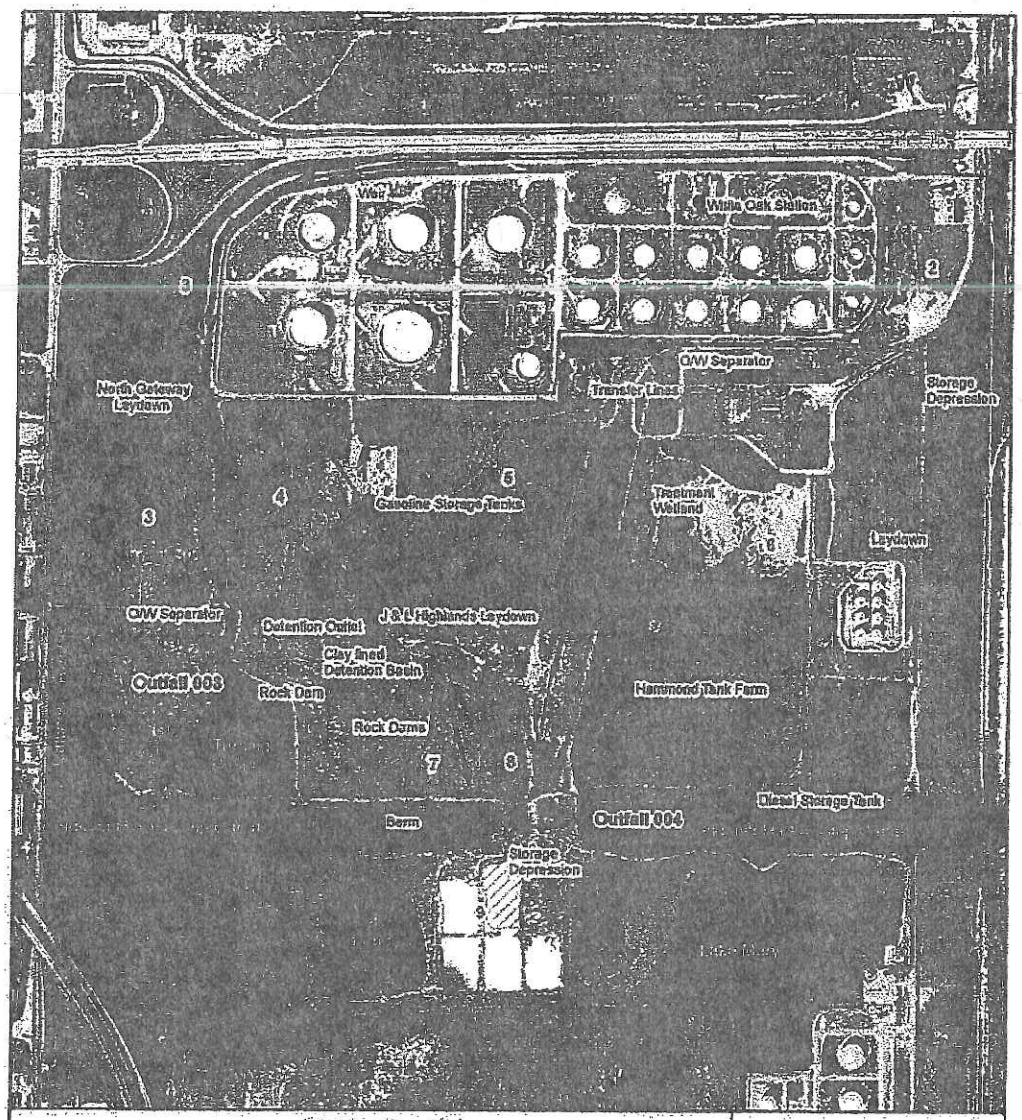
Part D. Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

| 1. Date of Storm Event | 2. Duration of Storm *(in minutes)* | 3. Total rainfall during storm event *(in inches)* | 4. Number of hours between beginning of storm measured and end of previous measurable rain event | 5. Maximum flow rate during rain event *(gallons/minute or specify units)* | 6. Total flow from rain event *(gallons or specify units)* | 7. Season sample was taken | 8. Form of Precipitation *(rainfall, snowmelt)* |
|---|---|---|---|---|---|---|---|
| Outfall opened at 9:30AM (CT) on March 21, 2011 and closed at 1:35PM (CT) on March 25, 2011 | N/A | N/A | N/A | N/A | N/A | Spring | rainfall |

9. Provide a description of the method of flow measurement or estimate.

The discharge from the outfall is manually controlled based on a visual inspection of the level of stormwater in the ditch once per day. When the level is high, a valve is opened to control the release of the stormwater to the canal. In general, the source of the discharge is precipitation; however, the actual release via the Outfall is not necessarily dictated by individual storm events.

ATTACHMENT 9A J & L Storm Water Map




Site Location Map

Flow Direction
J&L Basins
Outfalls
Stormwater Structures
Stormwater Potential Contaminants
Diked Tank Farms
ECI Property
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

Source: 2005 Chicago Urban Area Orthoimagery, http://www.mapa.dus.state.il.us/mediaframe/SDSindex.html U.S. Fish and Wildlife Service, National Wetland Inventory Data, 2007, www.fws.gov/wetl

0 500 1,000 2,000 Feet

AECOM

Figure 5
Scale = 1:8,500

Project # 01007-352
December 2010

**Attachment 10. Form 2F – Section IV.B and IV.C**

**BP Products North America Inc. – Whiting Refinery**

**Current Discharge to Outfalls 003 and 004 - J&L and Lake George Area**

This section describes the area currently contributing to Outfalls 003 and 004, referred to as the J&L and Lake George Area.

The J&L and Lake George Area is located almost entirely in the city of Hammond, with a small portion in the northwest corner located in East Chicago, Indiana. The property is bordered on the north by 129th Street, the Indiana Harbor Ship Canal (south), Calumet Avenue (west), and B&O Railroad right of way (east). See Attachment 9A. Contributing drainage areas include the Lake George Tank Field (59.0 acres), the rest of Lake George outside the tank field (66.6 acres), the J&L Tank Field (90.9 acres), and the rest of J&L outside the tank field (230.8 acres). Whiting Business Unit document E2001 is the Whiting Industrial Storm Water Pollution Prevention Plan (SWPPP) applicable to the J&L Area. The SWPPP identifies potential sources of pollution, describes practices and measures for reducing pollution potential, and assures compliance with the permit.

Land Cover

Approximately 15% of the J&L and Lake George Area consists of impervious refinery structures such as piping and tanks, trailers, and roadways. Natural vegetation occurs in a large section of the J&L and Lake George Area and intermittent landscaped vegetation exists around streets and some buildings. As a result, most of the drainage area routed to Outfalls 003 and 004 is vegetated.

Stormwater Drainage and Outfall Descriptions

Stormwater in the J&L Tank Field can be retained in tank dikes for infiltration and evaporation, or removed via vacuum trucks or manual pumping to the refinery process sewer system if an oil sheen is present. If the stormwater has no visible oil sheen, it can be routed to Outfalls 003 or 004 either manually by vacuum trucks or by a pumping system. Stormwater outside of the tank dikes is either collected in low lying areas for infiltration, or overflows to the west ditch and into the Turning Basin through Outfall 003, or overflows to the East Ditch to the Indiana Harbor Ship Canal through Outfall 004. Outfalls 003 and 004 are fed by vegetated drainage ditches controlled by sluice gates. Additionally, a limited amount of stormwater enters directly into the Indiana Harbor Ship Canal from the south end of the highlands (high ground south of J&L tank fields) during heavy runoff events as overland sheet flow. On the west side of J&L Tank Field, a small amount of runoff enters the Calumet Avenue Drain which drains to the Indiana Harbor Ship Canal.

Stormwater Control Features

Outfalls 003 and 004 currently discharge stormwater runoff from the southwest quadrant of the refinery. The area identified as West Ditch Drainage Area discharges stormwater through Outfall 003 to the Indiana Harbor Ship Canal to the south. The area identified as East Ditch Drainage Basin discharges stormwater through Outfall 004 to the Indiana Harbor Ship Canal. The West Ditch (to Outfall 003) and the East Ditch (to Outfall 004) are oriented from north to south on either side of the J&L Site.

Stormwater from Lake George Tank Field discharges via an underground pipe beneath Cline Avenue to the East Ditch and Outfall 003. Outfalls 003 and 004 are controlled by manually operated sluice gates. These outfalls are inspected daily for any water quality concerns. The sluice gates are opened once per week (usually Monday morning) only after inspection and verification that the discharge is within compliance limits.

Industrial Activities

The northern section of J&L and Lake George Area is a crude oil tank field, whereas the southern section is a multiuse area that is fairly undeveloped and used for material laydown and storage. Lake George Tank Field also contains paved areas for trailers and parking and includes routing of stormwater from the Calumet Avenue warehouse area.

The West Ditch Drainage Basin (Outfall 003) is covered by medium vegetation. This area also contains over 6,400 linear feet of roadway (paved). The J&L Tank Field consists of product storage areas bound on the north by a public roadway, on the east by railroad property, on the south by the Lake George Branch of the Indiana Harbor Ship Canal, and on the west by a public roadway. All tank dikes are typically void of vegetation cover. Vehicle access through and around the areas is via a series of asphalt paved and gravel roads situated on top of the dike walls. The west half of the J&L Tank Field contains 6 large tanks used primarily for the bulk storage of crude oil. Each tank has secondary containment in the form of tank dike. A channel, which originates north of the J&L Tank Field, and runs about 6,180 feet, is approximately 6 feet wide at the bottom and averages approximately 5 feet in depth. There are two flow control gates for regulating stormwater flows. The control measures for this basin include sediment rock check dams, detention basins, diversion channels, control gates, and sediment control structures throughout the area.

The East Ditch Drainage Basin (Outfall 004) is covered by medium vegetation with approximately 1.5 acres covered with heavy vegetation. There are approximately 8,600 linear feet of roads in this drainage basin segment. This area also includes the abandoned Liquid Petroleum Gas (LPG) loading racks and the associated remnant or abandoned rail car access, and laydown areas. A series of drainage channels approximately 3,950 feet in length collect runoff and route it to the East Ditch. Soil erosion controls consist of a detention pond, sediment traps, and slope roughening and diversion dikes.

Stormwater Run-on

Stormwater run-on to the J&L Tank Field occurs from Calumet Avenue and from the B & O Railroad. Calumet Avenue runs the entire western length and its associated drainage ditch connects the Indiana Harbor Ship Canal with Lake George to the north. The J&L Tank Field receives water from Calumet Avenue pavement, 129th Street ditch, Cline Avenue ditches, and properties north of 129th Street including the Lost Marsh Golf Course. This stormwater flows through the Calumet Avenue Ditch on the west side of the property and drains directly to the Indiana Harbor Ship Canal. This run-on will not mix with stormwater from industrial activity because there is no hydraulic connection. At the northeast corner of the property, some stormwater enters the J&L property from the B&O Railroad. However, this run-on is minimal and stays without leaving the property.

Non-Stormwater Discharges

Non-stormwater discharges within the J&L and Lake George Area to Outfalls 003 and 004 may include the following:

- Fire training or system flushing;
- Potable water sources including waterline flushing;
- Uncontaminated ground water;
- Routine exterior building wash down which does not use detergents or other compounds;
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used;
- Air conditioning condensate; and
- Equipment Hydro-testing using fire water.

Specific fire training activities include health, safety, security, and environment (HSSE) training and fire brigade training at the J&L training area, and fire hydrant flushing. HSSE training occurs from June to October, four days per week, with a flow rate of approximately 125 gallons per minute (gpm). Fire brigade training sessions occur once in May, June, and July and use approximately 60,000 gallons per session. This water is retained by natural depressions, infiltrates to ground water, or a small amount drains to a sump pump east of Tank 3915 where it goes to the refinery process sewer.

Additionally, this area is under a forced agreement remediation project with Indiana Department of Environmental Management (IDEM) where multiple well point systems are in operation for ground water remediation. As contaminants are pumped out of the ground there is possibility for some stormwater contamination from condensation or equipment rain wash-off.

Management of Stormwater Under Agreed Order

In 1995, Amoco Oil Company Whiting Refinery voluntarily entered into an agreed order, Cause Number H-11187, with the IDEM. This order was for the mutual purpose of mitigating any threat to human health and the environment, to perform a Resource Conservation and Recovery Act (RCRA) Facility Investigation, and perform a Corrective Measures study to identify and evaluate alternatives for the corrective action necessary to prevent or mitigate any migration of releases of hazardous waste. This order includes a work plan for the J&L site. This work plan identified 27 pits that were generally cleaned up in 1977 and interim measures were put in place to prevent and abate off-site migration of contaminants. It is currently proposed to remove the requirements of this Agreed order for the J&L site and maintain stormwater compliance under the NPDES permit Industrial SWPPP for this area.

**Future Stormwater Reroute to Outfalls 003 and 004**

BP requests the option to re-route additional tank dike stormwater into Outfalls 003 and 004. Stormwater is to be moved from the following tank areas: (1) Indiana Tank Field; (2) South Tank Field; (3) South Tank Field Annex; (4) Stieglitz Park; and (5) Marine Dock. See Attachment 9B for tank field locations. At this time, BP does not envision having to add another outfall for stormwater; instead BP will build (or utilize existing) infrastructure and capacity to handle these sources subject to the current release operations at Outfall 003 and 004. BP does not anticipate significant changes in stormwater quality characteristics (i.e., concentration or release flows) with the additional tank field sources. Although the increased drainage areas from the additional tank fields can generate more stormwater runoff, this flow will still be subject to the release schedules in place for Outfall 003 and Outfall 004. Relevant stormwater information for the additional tank areas is given below.

**Indiana Tank Field**

The BP Whiting Indiana Tank Field (ITF) is located in Whiting, Lake County, Indiana immediately southwest of the main refinery area. The present day tank field has a contributing drainage area of 43.6 acres, which is bounded by Indianapolis Boulevard to the north and east, 129th Street to the south, and railroad tracks and residential housing to the west. The tank field sits over the Calumet aquifer, which is a regional aquifer in the area. A historical aerial dating from 1952 depicts 25 tanks in the area presently known as the ITF; therefore, the ITF was constructed prior to 1952. In 1952, the eastern section of present day ITF contained residential housing. In an aerial dated 1958, the residential area had been demolished. Currently, 30 tanks are present in the tank field with one tank, 3710, awaiting demolition.

Land Cover

The ITF consists of asphalt access roads, gravel tank dike areas, gravel or cement dikes, and tanks with minor pumping/piping systems. There is no vegetation within the drainage area. Land use estimates are 11% asphalt road, 15% tanks, and 74% gravel.

Stormwater Drainage and Outfall Descriptions

The drainage area is all contained within well defined tank dikes and does not run off site. The ITF is not currently connected to the J&L and Lake George Area and does not have the capability to discharge out to Outfalls 003 or 004. Stormwater currently collects within the diked areas and typically infiltrates or evaporates. When ponding water becomes problematic, it is pumped to other dikes within ITF or to the process sewer system for treatment at the Lakefront WWTP. Future infrastructure is anticipated to be installed that would allow stormwater collected in ITF to be discharged to Outfalls 003 and/or 004 in accordance with the discharge limitations set forth in NPDES permit number IN0000108.

Stormwater Control Features

The tank dike features of ITF were originally designed for spill prevention although they also contain stormwater on site. Each tank dike is a small collection basin which can hold stormwater until it needs to be removed from the tank dike. Future infrastructure will provide conveyance of stormwater from the tank dikes to Outfalls 003 and/or 004.

Industrial Activities

Historically, the inventory of materials stored in the tanks within the ITF has included naphtha, gas oils, furnace oils, ultraformates, pentane, Jet-A, diesel fuel, gasoline, distillates, and ethanol. Within the tank field, the tanks are surrounded by concrete dikes as secondary containment. A series of process lines run within the tank field, some of which are header lines to each tank. Three remediation systems are in place within the ITF, one of which is inactive. The systems consist of two wellpoint systems (active) and a recovery well (inactive). The wellpoint systems are located along and in the vicinity of the western boundary of the ITF property, and the inactive recovery well system is situated in the southern part of the property. BP Marketing Terminal C, which is primarily used for loading products, is on the north end of the ITF property.

Stormwater Run-on

Tank dikes definitively separate the ITF from adjacent properties and effectively eliminate any stormwater run-on.

Non-Stormwater Discharges

Non-stormwater discharges within the ITF to Outfalls 003 and 004 may include the following when future infrastructure is in place:

- Firewater system flushing;
- Potable water sources including waterline flushing;
- Uncontaminated ground water;
- Routine exterior building wash down which does not use detergents or other compounds;
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used; and
- Equipment Hydro-testing using fire water.

The ITF contains three groundwater remediation well point systems. As contaminants are pumped out of the ground, there is potential for some stormwater contamination from condensation or equipment rain wash-off.

**Marine Dock**

Four tanks at the Marine Docks are used to store asphalt, gas oil and decanted oil, and two tanks are used for ballast water storage. The tank field is bounded by the boat docks at the south, SafetyKleen to the west and north, and US Gypsum to the east and north. The north end of the Marine Dock consists of gravel laydown and parking areas. The southern end is the dock area for barge loading and in between is a small tank field.

Land Cover

The Marine Dock consists of asphalt and gravel access roads, gravel tank dike areas, gravel dikes, and tanks with minor pumping/piping systems. There is no vegetation within the drainage area. Land use estimates are 13% asphalt road, 15% tanks, and 72% gravel.

Stormwater Drainage and Outfall Descriptions

The drainage area is all contained within well defined tank dikes and does not run off site. The Marine Dock is not currently connected to the J&L and Lake George Area and does not have the capability to discharge to Outfalls 003 or 004. Stormwater currently collects within the diked areas and typically infiltrates or evaporates. When ponding water becomes problematic, it is pumped to other dikes within the Marine Dock or via vac truck to the process sewer system for treatment at the Lakefront WWTP. Future infrastructure is planned to transport stormwater collected in the Marine Docks to Outfalls 003 and/or 004 in accordance with the discharge limitations set forth in NPDES permit number IN0000108.

Stormwater Control Features

The tank dike features of Marine Dock were originally designed for spill prevention although they also contain stormwater on site. Each tank dike is a small collection basin which can hold stormwater until it needs to be removed from the tank dike. Future infrastructure will provide conveyance of stormwater from the tank dikes to Outfalls 003 and/or 004.

Industrial Activities

Four tanks store "black oil" product including asphalt, gas oil and decanted oil for shipment by barge or intermediates for return to the Refinery for further processing. There are also two pipelines that transfer gasoline and distillates to Norco in East Chicago and Schererville. Two ballast water tanks are used to store oily water from area sumps, dirty ballast water from vessels, and oily water from compartment clean outs. Additionally, a diesel fuel tank for the dock crane is located here. Activities center around the loading/unloading of barges for off-site shipment.

Stormwater Run-on

Tank dikes definitively separate the Marine Dock from adjacent properties and effectively eliminate any stormwater run-on.

Non-Stormwater Discharges

Non-stormwater discharges within the Marine Dock to Outfalls 003 and 004 may include the following when future infrastructure is in place:

- Firewater system flushing;
- Uncontaminated ground water;
- Routine exterior building wash down which does not use detergents or other compounds;
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used; and
- Equipment Hydrotesting using fire water.

The Marine Dock contains a groundwater remediation well point system and one recovery well. As contaminants are pumped out of the ground there is possibility for some stormwater contamination from condensation or equipment rain wash-off.

**South Tank Field and Annex**

The South Tank Field Complex has been an active part of the Whiting Refinery since its inception. The tank field was constructed over a former large shallow lake called Berry Lake in the 1800s. The lake was drained for the construction of the Standard Oil Co. of Indiana refinery which began operations in 1889. The tank field has thus been used solely for refinery process operations for its entire industrial history. The largest portion of the complex, containing 27 tanks, is designated the South Tank Field (STF) and is separated from the rest of the complex by Cline Avenue which runs generally east and west through the area. The South Tank Field Annex (STF Annex) is the tank field portion located south of Cline Avenue and contains 13 tanks and four butane storage spheres. All tank areas are contained by dike walls, or berms. The STF Complex is bordered to the north, west, and south by active BP Refinery property and state and municipal roads. To the north is 129th Street, to the west is Indianapolis Boulevard, and to the south is Riley Road. East of the STF Complex is the Indiana Harbor Belt rail yard, beyond which is US Steel Corporation Tin Operations. The approximate contributing drainage area of STF is 63.5 acres and STF Annex is 27.4 acres.

Land Cover

The STF consists of asphalt and gravel access roads, gravel tank dike areas, gravel dikes, and tanks with minor pumping/piping systems. There is no vegetation within the drainage area. Land use estimates are 11% asphalt road, 11% tanks, and 78% gravel. The STF Annex is comprised of the same land use classifications with an estimation of 13% asphalt road, 14% tanks, and 73% gravel.

Stormwater Drainage and Outfall Descriptions

The drainage area is all contained within well defined tank dikes and does not run off-site. Neither the STF nor STF Annex are currently connected to the J&L and Lake George Area and do not have the capability to discharge through Outfalls 003 or 004. Stormwater currently collects within the diked areas and typically infiltrates or evaporates. When ponding water becomes problematic, it is pumped to other dikes within the STF Complex or to the process sewer system for treatment at the Lakefront WWTP. Future infrastructure is anticipated to be installed that would allow stormwater collected in both STF and STF Annex to be discharged to Outfalls 003 and/or 004 in accordance with the discharge limitations set forth in NPDES permit number IN0000108.

Stormwater Control Features

The tank dike features of STF and STF Annex were originally designed for spill prevention although they also contain stormwater on site. Each tank dike is a small collection basin which can hold stormwater until it needs to be removed from the tank dike. Future infrastructure will provide conveyance of stormwater from the tank dikes to Outfalls 003 and/or 004.

Industrial Activities

Gasoline and distillate base components are stored and blended in STF for shipment or for return of intermediates to the Refinery for further processing. The BP Pipeline shipping manifold pumping station is located inside the northeast corner of STF. The STF Complex Control Room is located in STF adjacent to the shipping manifold pumping station. The STF also serves as the refinery distribution point for all butanes into and out of the refinery. A mined butane cavern with vessels and pump (above grade) is located beneath the western edge of the tank field. The cavern is used to supply butane to the gasoline blender and pipelines. The STF Annex is used to store, ship, and receive gasoline, distillate and base blending components. Its primary function is to supply product to pipelines, ships, rail, and truck carriers, but can also be used to store intermediates. The STF Annex also contains four butane storage spheres used to supply the Alkylation Unit and isomerate to the Gasoline Blender.

Stormwater Run-on

Tank dikes definitively separate STF and STF Annex from adjacent properties and effectively eliminate any stormwater run-on. Future infrastructure may involve routing stormwater from the Marine Dock through STF Annex which would then be routed through STF to Outfalls 003 and/or 004.

Non-Stormwater Discharges

Non-stormwater discharges within the STF Complex to Outfalls 003 and 004 may include the following when future infrastructure is in place:

- Firewater system flushing;
- Uncontaminated ground water;
- Routine exterior building wash down which does not use detergents or other compounds;
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used; and
- Equipment Hydrotesting using fire water.

STF contains three groundwater remediation well point systems and multiple recovery wells. STF Annex contains one groundwater remediation well point system and recovery wells. As contaminants are pumped out of the ground there is possibility for some stormwater contamination from condensation or equipment rain wash-off.

**Stieglitz Park Tank Field**

The Stieglitz Park Tank Field (Stieglitz Park) is located in Whiting, Lake County, Indiana. The contributing drainage of the tank field has an area of 50.7 acres and is bounded by the ECI property to the south, Indianapolis Blvd and the South Tank Field to the east, 129th Street and Indiana Tank Field to the north, and the J&L site and the Baltimore Ohio Railroad to the west. Historically, this area has been used as a tank field; however, before 1964, the eastern half of the Stieglitz Park Tank Field was a residential area. Sometime between 1954 and 1964 the houses were demolished and after 1964 the residential streets were removed. Currently, 16 tanks remain on the property, of which 12 are active.

Land Cover

Stieglitz Park consists of asphalt and gravel access roads, gravel tank dike areas, gravel dikes, and tanks with minor pumping/piping systems. There is no vegetation within the drainage area. Land use estimates are 7% asphalt road, 13% tanks, and 80% gravel.

Stormwater Drainage and Outfall Descriptions

The drainage area is all contained within well defined tank dikes and does not run off-site. Stieglitz Park is not currently connected to the J&L and Lake George Area and does not have the capability to discharge through Outfalls 003 or 004. Stormwater currently collects within the diked areas and typically infiltrates or evaporates. When ponding water becomes problematic, it is pumped to other dikes within Stieglitz Park or to the process sewer system for treatment at the Lakefront WWTP. Future infrastructure is anticipated to be installed that would allow stormwater collected within Stieglitz Park to be discharged to Outfalls 003 and/or 004 in accordance with the discharge limitations set forth in NPDES permit number IN0000108.

Stormwater Control Features

The tank dike features of Stieglitz Park were originally designed for spill prevention although they also contain stormwater on site. Each tank dike is a small collection basin which can hold stormwater until it needs to be removed from the tank dike. Future infrastructure will provide conveyance of stormwater from the tank dikes to Outfalls 003 and/or 004.

Industrial Activities

Generally, the inventory of the tanks within the Stieglitz Park Tank Field has historically been jet fuel, gasoline, benzene, NESHAP water and draw, hard paving base, FCU Feed/Asphalt, and diesel fuel. Currently, the tank field handles a variety of reduced crude products including asphalt, gas oil, and decanted oil. In addition, blending and final processing of jet fuel is done at Stieglitz Park. Within the tank field, the tanks are surrounded by gravel dikes that serve as secondary containment. Besides tanks, a series of process lines run within the tank field, some of which are header lines to each tank.

Stormwater Run-on

Tank dikes definitively separate Stieglitz Park from adjacent properties and effectively eliminate any stormwater run-on. Future infrastructure may involve routing stormwater from the Marine Dock through STF Annex and STF which would then be routed through Stieglitz Park to Outfalls 003 and/or 004.

Non-Stormwater Discharges

Non-stormwater discharges within Stieglitz Park to Outfalls 003 and 004 may include the following when future infrastructure is in place:

- Firewater system flushing;
- Uncontaminated ground water;
- Routine exterior building wash down which does not use detergents or other compounds;
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used; and
- Equipment Hydrotesting using fire water.

Stieglitz Park contains one groundwater remediation well point system. As contaminants are pumped out of the ground there is possibility for some stormwater contamination from condensation or equipment rain wash-off.

asphyxiation. Additionally, there is research to suggest that maintaining chlorine residual weakens the byssal threads formed following chlorination. Byssal threads are secreted by adults and are their means of attachment to a hard surface. This results in detachment in areas where water velocity was previously sufficient for settlement.

## III. Program Monitoring

BP and its contractor monitor the kill program. The effectiveness of the kill is based on mortality rates of mussels in the system. Shell impact is observed at the automated strainers located at #3 SPS, Alky Tank 15 and 11C Pipestill. The contractor tests for TRC at the J100 pump (inlet), # 6 Separator inlet and # 6 Separator outlet twice per day to insure that a sufficient residual is maintained throughout the treatment. The contractor tests routinely for TRC at sample locations at 11 Pipestill, #3SPS, Alky, 12 Pipestill and VRU 300. Both total residual chlorine (TRC) and free available chlorine (FAC) readings are taken at the PCU. The satellite bleach feed at the PCU has been put into service for specific oxidant demands at this unit. Changes in bleach feed-rate are made based on J100 pump inlet, refinery and 6 Separator inlet TRC readings.

Total residual chlorine is tested twice daily at the inlet to 6 Separator. The DPD method is used at the compliance point to observe color change only and not used to obtain a concentration. These data are used to monitor outfall compliance. The # 6 separator ORP has a high and low alarm point. High alarm indicates loss of the dechlorination system while low alarm indicates an over feed of dechlorination chemical. This allows operators time to make adjustments and maintain compliance. During the kill program, the contractor provides coverage at 7 AM and 5 PM daily plus 24-hour callout service for problems or questions.

OTCW system is monitored very closely to avoid possible pluggage of strainers and heat exchangers with dead mussels. It is of critical importance that all units on the OTCW system clean their water strainers and backflush critical exchangers regularly. This is the only way to prevent equipment pluggage problems during a kill program.

## IV. Lake Front Operator Duties

During the year-round kill program, BP operators help monitor the treatment by checking the ORP readings at # 6 separator outlet. These readings are necessary to ensure the TRC in 6 Separator effluent remains below the permit limit of 0.06 mg/l. Every four hours the inventories of the bleach and sulfite tanks are recorded. Operations comments regarding the treatment (low chemical levels, leaks, broken ORP units, etc.) are also recorded so the contractor can follow up.

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/2/11

| Additive Name | Demand Trac 490 | Demand Trac 990 | Zinc Chloride - 50% | Phosphoric Acid - 75% | BPC 68169 | BPC 67525 | BPC 68979 | BPC 67289 |
|---|---|---|---|---|---|---|---|---|
| Supplier | Baker Petrolite | Baker Petrolite | Vopak (commodity chemical) | Ashland | Baker Petrolite | Baker Petrolite | Baker Petrolite | Baker Petrolite |
| Existing or New | Existing | Existing | Existing | Existing | Existing | Existing | Existing | Existing |
| Outfall | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 |
| Point of Injection | Cooling Towers (#1 - #9) & SBS Unit | Cooling Towers (#1 - #9) & SBS Unit | Cooling Towers (#1 - #9) & SBS Unit | Cooling Towers (#1 - #9) & SBS Unit | Cooling Towers (#1 - #9) | Cooling Towers (#1 - #9) & SBS Unit | Cooling Towers (#1 - #9) + PIB plant + Administration Building Cooling Tower + SBS Unit | Cooling Towers (#1 - #9) & SBS Unit |
| Feed Rate | 352,896 grams/day | 352,896 grams/day | 63,231 grams/day | 59,575 grams/day | 140,037 grams/day | 5711 grams/day (annual average) | 4,358 grams/day | 1841 grams/day (average daily use) |
| Water Treatment Concentration | 5.0 - 7.0 mg/l (active residual) | 5.0 - 7.0 mg/l (active residual) | 1.6 mg/l | 6.5 mg/l | 2.0 mg/l | 1 - 3 mg/l | 100 - 200 mg/l | 1.0 mg/l |
| Duration of Use (hrs/day) | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | as needed | as needed | Intermittent |
| Duration of Use (days/year) | 365 days/year | 365 days/year | 365 days/year | 365 days/year | 365 days/year | as needed | as needed | Intermittent |
| Final Discharge Concentration at Outfall | 4.69 mg/l (worst case) | 4.69 mg/l (worst case) | 0.84 (worst case) | 0.79 mg/l (worst case) | 1.66 mg/l (worst case) | 1.38 mg/l (worst case) | 11.4 mg/l (worst case) | 0.01 mg/l (worst case) |
| Determination of Discharge Concentration | Removed with the solids in the DAF unit. Any remaining material will be consumed in the Activated Sludge Plant. Expected final discharge concentration should approach zero. | Removed with the solids in the DAF unit. Any remaining material will be consumed in the Activated Sludge Plant. Expected final discharge concentration should approach zero. | Worst case based upon 100% of additive remaining in final discharge and no removal takes place in API separator, DAF, activated sludge plant and final filters. | This phosphoric acid additive serves as a nutrient source for the activated sludge plant, and is augmented with additional phosphoric acid at the WWTP. Typical final discharge concentrations are 0.3 - 0.5 mg/l based on measured results | Worst case based upon 100% of additive remaining in final discharge and no removal takes place in API separator, DAF, activated sludge plant and final filters. | Worst case based upon 100% of additive remaining in final discharge when the additive is used no removal takes place in API separator, DAF, activated sludge plant and final filters. | Worst case assumes the biocide does not react with any organisms prior to final discharge. However, it is likely that the additive will react with microorganisms in the sewer and that the likely concentration entering the WWTP is close to zero. The activated sludge plant will reduce the final discharge concentration to zero. | Removed with the solids in the DAF unit. Any remaining material will be consumed in the Activated Sludge Plant. Expected final discharge concentration should approach zero. |
| Control Description | Each cooling tower is analyzed for dispersant residual and additive rates are adjusted accordingly. | Each cooling tower is analyzed for dispersant residual and additive rates are adjusted accordingly. | Zinc addition is based on analysis of cooling tower supply water which drives addition rate changes. Samples are taken 3 per week and tested for the concentration of zinc. | Each cooling tower has an online phosphate analyzer to control the pump rate to meet the set point concentration. In the event of an analyzer failure, the pump is set based upon manual grab samples. | Additive addition is based on analysis of cooling tower supply water which drives addition rate changes. Samples are taken 3 per week and tested for the concentration of tolyltriazole. | Additive is used dependent upon foam levels in the cooling towers. | The biocide is added based upon tower conditions and microbiological monitoring results. It is used as needed and is not normally dosed in more than one cooling tower at any given time. | Feed rate is based upon tower conditions. When heat exchangers leak off into the cooling water, chemical is added to clean and disperse oil. |
| Hardness of Discharge Water | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l |
| Chemical Composition | 18% Traced Carboxylate Sodium Salt<br>8% HEDP<br>2% Sulfonated Alkylbenzene | 18% Traced Carboxylate Sodium Salt<br>7.5% PBCT<br>1% Sulfonated Alkylbenzene | 50% Zinc Chloride | 75% Phosphoric Acid | 50% Sodium Tolyltriazole | 25% n methyl fatsene in kerosene | 45% Glutaraldehyde | 15% Pluronic L-61<br>75% Pluronic L-64<br>5% Pegol P-2000 |
| Treatment System Blowdown Rate | 2.1 mgd | 2.1 mgd | 2.1 mgd | 2.1 mgd | 2.1 mgd | 2.1 mgd | 2.1 mgd | 2.1 mgd |
| Outfall Flow Rate | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD |
| Treatment System Temperature | 70 - 90 deg F | 70 - 90 deg F | 70 - 90 deg F | 70 - 90 deg F | 70 - 90 deg F | 70 - 90 deg F | 70 - 90 deg F | 70 - 90 deg F |
| Treatment System pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.5 | 7.6 | 7.6 | 7.6 |
| Toxicity Data | Toxicity results are estimated based on data generated on similar chemistry/components and from literature sources. | Toxicity data was not available for the ingredients listed below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. |
| *Danio rerio 96 h LC50* | | | | | | | | |
| *Fathead Minnow 96h/LC50* | | | 19.6 mg/l | | 143 mg/l | | 12 mg/l | 625 mg/l |
| *Fathead Minnow 24h/LC50* | | | | | | >10,000 mg/l | | |
| *Ceriodaphnia 48h/LC50* | | | | | | 205 mg/l | | 2675 mg/l |
| *Daphnia Magna 48h/LC 50* | | | 5.0 mg/l | | 333 mg/l | | 11 mg/l | |
| *Daphnia Magna 24h/EC50* | | | | | | | | |
| *Daphnia Magna 24h/LC00* | | | | | | | | |
| *Daphnia Magna 96h/LC00* | | | | | | | | |
| *Rainbow Trout 96h/LC50* | | | | | 25 mg/l | | 27 mg/l | |
| *Bluegill Sunfish 96h/LC50* | | | | | >173 mg/l | | 34 mg/l | |
| *Lepomis macrochirus 48 hr/LC50* | | | | | | | | |
| *Acartia tonsa 48h/LC50* | | | | | | | | |
| *Pimephales promelas 48h/LC50* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Threespone stickleback 96h/LC50* | | | | | | | | |
| *Threespone stickleback 96h/LC50 (aerated)* | | | | | | | | |
| *Zebra-fish (Brachydanio rerio) 96h/LC50* | | | | | 122 mg/l | | | |
| *Flannelmouth sucker 96h/LC50* | | | | | | | | |
| *Coho salmon 96 h/LC50* | | | | | | | | |
| *Chinook salmon 96h/LC50* | | | | | | | | |
| *Chinook salmon 216h/LC00* | | | | | | | | |
| *Bobwhite quail LD50* | | | | | | | | |
| *Mosquito Fish 24h/LC50* | | | | 135 mg/l | | | | |
| *Scenedesmus subspicatus 96h/EC50* | | | | | | | 1.6 mg/l | |
| *Mallard Duck LD50* | | | | | | | 1035 mg/kg | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | 30 - 100 mg/l | | | | | | | |
| *Freshwater Algae Static Acute EC50* | | | | | | | | |
| *Freshwater Biodegradability 28 Day DECD 301D* | <20% | | | | | 70% | | |
| *Freshwater Biodegradability 5 Day/2.0mg/l* | | | | | | | 71% | |
| *Freshwater Biodegradability 5 Day/3.8mg/l* | | | | | | | 55% | |
| Relationship of toxicity to pH | Effective pH range: 6.0 - 8.3 | Effective pH range: 6.0 - 8.3 | Effective pH range: 7.0 - 8.3 | Effective pH range: 7.0 - 8.8 | Effective pH range: 6.0 - 8.3 | Effective pH range: 6.0 - 8.3 | Effective pH range: 6.0 - 8.3 | Effective pH range: 6.0 - 8.3 |
| Relationship of toxicity to water hardness | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. |
| N Octanol-Water Partition Coefficient | | | | | | | | |

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/2/11

| Additive Name | BPC 97376 | Sodium Hypochlorite - 12.5% | BPC 67015 | BPC 60005 | BPW 75880 | BPB 49356 | Sodium Bisulfite - 40% | Y9BH1233 |
|---|---|---|---|---|---|---|---|---|
| Supplier | Baker Petrolite | K. A. Steel | Baker Petrolite | Baker Petrolite | Baker Petrolite | Baker Petrolite | Brenntag | Baker Petrolite |
| Existing or New | Existing | Existing | Existing | Existing | Existing | Existing | Existing | Existing |
| Outfall | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 |
| Point of Injection | Administration Building Cooling Tower | Cooling Towers (#1 - #6) + BBS Unit | Cooling Towers (#1 - #6) + Administration Building Cooling Tower + BBS Unit | Raw Water to Lime Softeners | Hot Lime Softeners | Boiler Feed Water | Hot Lime Softener Effluent and condensate drum treatment at PIB | Refinery Steam Condensate Treatment |
| Feed Rate | 4378 grams/day | 3,718,813 grams/day | 3822 grams/day | 155,760 grams/day | 540,763 grams/day | 22,543 grams/day | 231,432 grams/day + 6,300 grams/day at PIB | 100 - 150 ppd |
| Water Treatment Concentration | 8 mg/l | 3.2 - 0.6 mg/l free available chlorine | 30 mg/l | 3 - 4 mg/l | 15 mg/l | 0.8 mg/l | 2.9 mg/l (40% Sodium bisulfite) | 20 ppm |
| Duration of Use (hrs/day) | 24 hrs/day | 24 hrs/day | Intermittent | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day |
| Duration of Use (days/year) | 180 days/year (summer) | 365 days/year | before & after tower shutdowns | 365 days/year | 365 days/year | 365 days/year | 365 days/year | 365 days/year |
| Final Discharge Concentration at Outfall | 0.058 mg/l (worst case) | 7.4 mg/l free available chlorine (worst case) | 0.05 mg/l (worst case) | 2.07 mg/l (worst case) | 6.9 mg/l (worst case) | 0.30 mg/l (worst case) | 3.07 mg/l as sulfate. (worst case) | Varies |
| Determination of Discharge Concentration | Worst case based upon 100% of additive remaining in final discharge and no removal takes place in API separator, DAF, activated sludge plant and final filters. | All of free available chlorine will be removed prior to discharge. This is based upon the rate of consumption observed in the cooling towers, and the amount of oxidizable material that this material will contact in the sewer system, in the API separator, DAF and particularly the activated sludge plant. | The orthophosphate in this product will serve as a portion of the nutrient supplied to the activated sludge plant and is augmented with additional phosphoric acid at the WWTP. The Outfall 001 orthophosphate is measured, results are 0.3 to 0.5 mg/l. | Removed with the solids in the DAF unit. Any remaining material will be consumed in the Activated Sludge Plant. Expected final discharge concentration should approach zero. | This worst case is based on all of the sodium aluminate going to the sewer via boiler blowdown and not precipitating in the hot lime softeners. The additive precipitates in the hot lime softener and is removed with the sludge from the softeners. Any filtrate from the sludge dewatering would have the API separator, DAF, activated sludge plant and final filters for additional removal. | The additive should get consumed prior to the WWTP; therefore, the final discharge concentration should approach zero. | This is a reducing agent and all of this material will react to form sulfate prior to final discharge. | Material would most likely be consumed in the process |
| Control Description | The cooling tower is analyzed for disparent residual and additive rates are adjusted accordingly. | Each cooling tower has an online ORP probe or free available chlorine analyzer to control the pump rate to meet the set point concentration. In the event of an analyzer failure, the pump is set based upon manual grab samples. | Feed rate is based upon grab sample analysis for Orthophosphate and total phosphate. | Additive is used based upon a measure of the filtered calcium upstream and downstream of process heat exchangers and also the heat transfer efficiency. | Additive is injected based upon hot lime softener operation. | Pump rate adjusted based upon DEHA sample residuals, and online oxygen analyzer results. | Injection rates are adjusted based upon an online dissolved oxygen meter, checks at PIB done on Dissolved Oxygen and quarterly coupon analysis. | pH control |
| Hardness of Discharge Water | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l |
| Chemical Composition | 7% sodium hydroxide<br>4% PBTC<br>1% sulfonated alkylbenzene<br>4% sodium tolyltriazole | 12.5% Sodium Hypochlorite | 33% Sodium Hexametaphosphate | 50% Polyacrylic Acid (PAA) | 38% Sodium Aluminate | 30% DEHA<br>5% hydroquinone | 40% Sodium Bisulfite | Morpholine<br>Cyclohexyamine<br>Alkyl ether amine |
| Treatment System Blowdown Rate | 7200 gal/day | 2.1 mgd | 2.1 mgd | 1.25 mgd | 0.59 mgd | 0.59 mgd | 0.59 mgd at utilities, 20 gpd at PIB | 1.15 mgd |
| Outfall Flow Rate | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD |
| Treatment System Temperature | 70 - 80 deg F | 70 - 80 deg F | 80 - 80 deg F | 40 - 70 deg F | 230 deg F | 230 deg F | 225 deg F and ambient temp at PIB | 250 - 450 deg F |
| Treatment System pH | 8.2 | 7.8 | 7.0 | 8.0 | 10.0 | 10.0 | 10 at utilities and 4.0 at PIB | 8.0 - 9.0 |
| Toxicity Data | Toxicity results are estimated based on data generated on similar chemistry/components and from literature sources. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results are estimated based on data generated on similar chemistry/components and from literature sources. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity data was not available for the organisms listed below. |
| *Danio rerio 96 h/ LC50* | | | | | | | | |
| *Fathead Minnow 96h/LC50* | | | >1000 mg/l | | | >1000 mg/l | | |
| *Fathead Minnow 24h/LC50* | | | | | | | | |
| *Ceriodaphnia 48h/LC50* | | 1.57 mg/l | 224 mg/l | | | 6.4 mg/l | | |
| *Daphnia Magna 48h/LC 50* | | | | | | | | |
| *Daphnia Magna 24h/EC50* | | | | | | | | |
| *Daphnia Magna 24h/LC50* | | | | | 5 - 40 mg/l | | | |
| *Daphnia Magna 96h/LC50* | | | | | 5 - 40 mg/l | | | |
| *Rainbow Trout 96h/LC50* | | 1.94 mg/l | | | | | | |
| *Bluegill Sunfish 96h/LC50* | | 5.0 mg/l | | | | | | |
| *Lepomis macrochirus 48 h/LC50* | | | | | | | | |
| *Acartia tonsa 48h/LC50* | | | | | | | | |
| *Pimephales promelas 48h/LC50* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Threespine stickleback 96h/LC50* | | | | | | | 127 mg/l | |
| *Threespine stickleback 96h/LC50 (aerated)* | | | | | | | 759 mg/l | |
| *Zebra fish (Brachydanio rerio) 96h/LC50* | | | | | | | | |
| *Flannelmouth sucker 96h/LC50* | | | | | | | | |
| *Coho salmon 96 h/LC50* | | | | | | | | |
| *Chinook salmon 96h/LC50* | | | | | | | | |
| *Chinook salmon 216h/LC50* | | | | | 5 - 40 mg/l | | | |
| *Bobwhite quail LD50* | | | | | | | | |
| *Mosquito fish 24h/LC50* | | | | | | | | |
| *Scenedesmus subspicatus 96h/EC50* | | | | | | | | |
| *Mallard Duck LD50* | | | | | | | | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | 25 - 100 mg/l | | | > 500 mg/l | | | | |
| *Freshwater Algae Static Acute EC50* | | | | | | | | |
| *Freshwater Biodegradability 28 Day OECD 301D* | 20 - 39% | | | 20 - 40% | | | | |
| *Freshwater Biodegradability 5 Day/2.0mg/l* | | | | | | | | |
| *Freshwater Biodegradability 5 Day/5.0mg/l* | | | | | | | | |
| Relationship of toxicity to pH | Effective pH range: 8.0 - 8.3 | Effective pH range: 7.0 - 8.0 | Effective pH range: 8.0 - 8.3 | Effective pH range: 8.0 - 8.3 | Effective pH range: 8.0 - 8.3 | Effective pH range: 8.0 - 8.3 | Effective pH range: 8.0 – 8.3 | |
| Relationship of toxicity to water hardness | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 – 160 mg/l as CaCO3. Literature indicates that toxicity generally increases with decreasing hardness. | |
| N Octanol-Water Partition Coefficient | | | | | | | | |

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/21/11

| Additive Name | BPB 68460 | BPB 69470 | Guardion 9405 | Praestol K122L | Praestol K122L | Praestol K230FL | Praestol K260FL | Praestol K250FL |
|---|---|---|---|---|---|---|---|---|
| Supplier | Baker Petrolite | Baker Petrolite | Baker Petrolite | Ashland Chemical | Ashland Chemical | Ashland Chemical | Ashland Chemical | Ashland Chemical |
| Existing or New | Existing | Existing | Existing | Existing | Existing | Existing | Existing | Existing |
| Outfall | Outfall 005 | Outfall 005 | Outfall 001 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 |
| Point of Injection | Steam condensate system | Boiler Feed Water | Zeolite Resin @ Water Treating Plant | Activated Sludge prior to Clarification | Activated sludge thickening prior to DAF | DAF influent | Activated Sludge prior to Belt Press | Dewatering additive for centrifuges. |
| Feed Rate | 3,403 grams/day | 107,047 grams/day | 114,835 grams/day | 27,853 grams/day | 238,910 grams/day | 303,618 grams/day | 37,040 grams/day | 101,335 grams/day |
| Water Treatment Concentration | 15 mg/l | 9.94 mg/l (annual average) | dosage based on size of bed | 9.3 mg/l | 9.3 mg/l | 4.15 mg/l | 0.5 mg/l | 1.4 mg/l |
| Duration of Use (hrs/day) | 24 hrs/day | 24 hrs/day | one time | 4 hrs/day | 12 hrs/day | 24 hrs/day | intermittent | 24 hrs/day |
| Duration of Use (days/year) | 365 days/year | 365 days/year | 4 times/year | 30 days/year | 365 days/year | 365 days/year | 90 days/year (approximately) | 365 days/year |
| Final Discharge Concentration at Outfall | 9.05 mg/l (worst case) | 1.42 mg/l (worst case) | 1.52 mg/l (worst case) | 0.047 mg/l | 0.9 mg/l | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l |
| Determination of Discharge Concentration | This additive will be consumed in the activated sludge plant. Expected final discharge concentration should approach zero. | This additive will be consumed in the activated sludge plant. Expected final discharge concentration should approach zero. | This worst case is based upon 100% of additive remaining in final discharge when the additive is used. | This concentration would remain in the secondary effluent based on manufacturer's engineered estimate of recovered chemical in the water phase. This residual may react with suspended solids in the filters and be filtered out. | Concentration in final discharge approaches 0.9 mg/l. 0.015 mg/l would remain in the DAF effluent based on manufacturer's engineered estimated recovered chemical in the water phase. Any concentration that is present in the DAF effluent will be oxidized in the activated sludge plant and/or separated in the secondary clarifier and/or filtered in the final filters. | Based on the manufacturer's engineered estimated recovered chemical in the water phase, 0.021 mg/l would remain in the DAF effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. | Based on the manufacturer's engineered estimated recovered chemical in the water phase and a calculation of the volume of filtrate from the rotary drum operation, 0.0025 mg/l would remain in the filtrate which is routed to the activated sludge plant. This residual will be further oxidized in the activated sludge plant and the final discharge concentration will approach 0.0 mg/l. | Based on the manufacturer's engineered estimated recovered chemical in the water phase and a calculation of the volume of filtrate from this press operation, 0.007 mg/l would remain in the press filtrate which is routed to the front end of the WWTP. This residual will be further oxidized in the activated sludge plant and the final discharge concentration will approach 0.0 mg/l |
| Control Description | Pump rate adjusted based upon condensate sample pH and iron results. | Pump rate adjusted based upon condensate sample pH and iron results. | The additive is added to a zeolite bed during the brine step of regeneration and the dosage is based on the size of the bed. | Addition rate is based on stability of the sludge beds in the clarifiers. If the beds are rising, polymer is injected to compress the sludge beds. | Addition rate is based on DAF performance and solids content of the activated sludge. DAF performance is measured by effluent turbidity every 2 hours. | Addition rate is based on DAF performance which includes oil and grease as well as influent and effluent turbidity measured every 2 hours. | Additive is used when additional sludge wasting is required. Addition rate is based on solids content of the activated sludge and performance of the rotary drum thickener. | Addition rate is based on the drain section of the press operation and % cake solids. Drain section is monitored via video cameras. |
| Hardness of Discharge Water | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l |
| Chemical Composition | 40% Cyclohexylamine | 5% aminomethylpropanol<br>35% cyclohexylamine<br>5% dimethylaminopropanol | 7% Organic phosphonate<br>2% Surfactant<br>2% Oxalic Acid | 43% Acrylamide Copolymer<br>56% Petroleum Hydrocarbon | 43% Acrylamide Copolymer<br>30% Petroleum Hydrocarbon | 40% Acrylamide Copolymer<br>30% Petroleum Hydrocarbon | 47% Acrylamide Copolymer<br>30% Petroleum Hydrocarbon | 47% Acrylamide Copolymer<br>30% Petroleum Hydrocarbon |
| Treatment System Blowdown Rate | 59,817 gals per day | 2.85 mgd | N/A | N/A | N/A | N/A | N/A | N/A |
| Outfall Flow Rate | 19.5 MGD | 18.8 MGD | 18.9 MGD | 18.9 MGD | 18.9 MGD | 18.9 MGD | 19.6 MGD | 19.9 MGD |
| Treatment System Temperature | 240 deg F | 300 - 450 deg F | 160 deg F | 80 - 90 deg F | 80 - 90 deg F | 80 - 90 deg F | 80 - 90 deg F | 80 - 90 deg F |
| Treatment System pH | 8.0 - 9.0 | 8.0 - 8.0 | 10.0 | 7.0 - 8.0 | 7.0 - 8.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 |
| Toxicity Data | Toxicity results are estimated based on data generated on similar chemistry/components and from literature sources. | Toxicity results are estimated based on data generated on similar chemistry/components and from literature sources. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below |
| *Danio rerio 96 h/ LC50* | | | | | | | | |
| *Fathead Minnow 96h/LC50* | | | 299 mg/l | | | | | |
| *Fathead Minnow 24h/LC50* | | | | | | | | |
| *Ceriodaphnia 48h/LC50* | | | 150 mg/l | 1.75 mg/l | 1.75 mg/l | 1.75 mg/l | 1.75 mg/l | 1.75 mg/l |
| *Daphnia Magna 48h/LC 50* | | | | | | | | |
| *Daphnia Magna 24h/EC50* | | | | | | | | |
| *Daphnia Magna 24h/LC50* | | | | | | | | |
| *Daphnia Magna 96h/LC50* | | | | | | | | |
| *Rainbow Trout 96h/LC50* | | | | | | | | |
| *Bluegill Sunfish 96h/LC50* | | | | | | | | |
| *Lepomis macrochirus 48 hr/LC50* | | | | | | | | |
| *Acartia tonsa 48h/LC50* | | | | | | | | |
| *Pimephales promelas 48h/LC50* | | | | 11.0 mg/l | 11.0 mg/l | 11.0 mg/l | 11.0 mg/l | 11.0 mg/l |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Threespine stickleback 96h/LC50* | | | | | | | | |
| *Threespine stickleback 96h/LC50 (aerated)* | | | | | | | | |
| *Zebra-fish (Brachydanio rerio) 96h/LC50* | | | | | | | | |
| *Flannelmouth sucker 96h/LC50* | | | | | | | | |
| *Coho salmon 96 h/LC50* | | | | | | | | |
| *Chinook salmon 96h/LC50* | | | | | | | | |
| *Chinook salmon 216h/LC50* | | | | | | | | |
| *Bobwhite quail LD50* | | | | | | | | |
| *Mosquito Fish 24h/LC50* | | | | | | | | |
| *Scenedesmus subspicatus 96h/EC50* | | | | | | | | |
| *Mallard Duck LD50* | | | | | | | | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | 10 - 50 mg/l | 10 - 50 mg/l | | | | | | |
| *Freshwater Algae Static Acute EC50* | 1 - 10 mg/l | 1 - 10 mg/l | | | | | | |
| *Freshwater Biodegradability 28 Day OECD 301D* | >50% | 30 - 50% | | | | | | |
| *Freshwater Biodegradability 5 Day/2.0mg/l* | | | | | | | | |
| *Freshwater Biodegradability 5 Day/3.6mg/l* | | | | | | | | |
| Relationship of toxicity to pH | Effective pH range: 6.0 - 8.3 | Effective pH range: 7.5 - 8.2 | Effective pH range: 7.5 - 8.2 | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's>7.0 | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's>7.0 | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's>7.0 | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's>7.0 | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's>7.0 |
| Relationship of toxicity to water hardness | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity generally decreases with decreasing hardness. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. Toxicity decreases with increasing humic acid concentration. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. Toxicity decreases with increasing humic acid concentration. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. Toxicity decreases with increasing humic acid concentration. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. Toxicity decreases with increasing humic acid concentration. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. Toxicity decreases with increasing humic acid concentration. |
| N Octanol-Water Partition Coefficient | | | | | | | | |

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/21/11

| Additive Name | 71-03 PLUS Antifoam | Ferric Sulfate | Ferric Sulfate | Phosphoric Acid Solution | 50% Caustic | BPB 687115 | Sulfuric Acid | 50% Caustic |
|---|---|---|---|---|---|---|---|---|
| Supplier | ONDEO Nalco | Xenia | Xenia | Ashland | DOW | Baker Petrolite | Marsulex | Old World Industries, Inc. |
| Existing or New | Existing | Existing | Existing | Existing | Existing | Existing | Existing | Existing |
| Outfall | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 |
| Point of Injection | Aeration Basin & Clarifier Inlets | Activated Sludge Plant Clarifiers | Oily sludge feed to centrifuges | Activated Sludge Plant | Barscreen and/or OilWater Separator effluent and/or Activated Sludge Plant | Boiler Feed Water | Cooling Towers (#1 - #6) | SSS Unit Tower |
| Feed Rate | 47,727 grams/day | 486,864 grams/day | 205,457 grams/day | 451,790 gram/day | 7,209,800 grams/day (as needed) | 299,061 grams/day | 1,625,667 grams/day | 30,000 grams/day (estimated) |
| Water Treatment Concentration | conc varies w/ current conditions | 50 mg/l | 21 mg/l | 2.4 mg/l | 47.6 mg/l | 6.0 mg/l | 21.6 mg/l | 30.0 mg/l |
| Duration of Use (hrs/day) | as needed | 24 hrs/day as needed | 24 hrs/day as needed | as needed | as needed | 24 hrs/day | 24 hrs/day | 24 hrs/day |
| Duration of Use (days/year) | as needed | 90 days/yr | 365 days/yr | as needed | as needed | 365 days/year | 365 days/year | 365 days/year |
| Final Discharge Concentration at Outfall | 0.0 mg/l | 1.7 mg/l (worst case) | 0.75 mg/l (worst case) | 0.3 - 0.5 mg/l orthophosphate | 0.0 mg/l | 0.0 mg/l | 21.6 mg/l as sulfate | 0.0 mg/l |
| Determination of Discharge Concentration | 100% of the material is reacted in the system and consumed; therefore, 0 mg/l is expected in the final discharge. | This worst case is based upon 100% of additive remaining in final discharge when the additive is used. | This worst case is based upon 100% of additive remaining in final discharge when the additive is used. | The WWTP orthophosphate concentration is measured. | 100% of the material is reacted in the system and consumed; therefore, 0 mg/l is expected in the final discharge. | 100% of the material is reacted in the system and consumed; therefore, 0 mg/l is expected in the final discharge. | The additive is injected into 6 cooling towers on site. This additive is injected continuously. All acidic properties have been neutralized by the alkalinity of the cooling tower water. | The additive is injected continuously into the cooling tower. All alkaline properties have been neutralized by the acidity of the cooling tower water. |
| Control Description | This additive is fed as needed directly to the aeration basin until foaming is reduced. Addition varies with current conditions and is added manually as needed based on visual inspection of foam in tank. | Additive use is only temporary to help with settling the clarifier bed to normal depths. | Additive use is to reduce H2S concentration in the oily sludge. | Dosage is based on orthophosphate results on WWTP effluent. Final discharge concentration is maintained between 0.3 - 0.5 orthophosphate. | Dosage is based on pH samples taken on the WWTP effluent every 2 hours. The pH of the WWTP effluent is maintained between 7.0 - 7.5 | Feed rate is based on an algorithm which takes into account both boiler feed water flow and hardness which is measured. | Each cooling tower has an online pH meter to control the pump rate to meet the set point pH of 7.8. In the event of a pH meter failure, the pump is set based upon manual grab samples. | The SSS unit cooling tower will have an online pH meter to control the pump rate to meet the set point pH of 7.5. In the event of a pH meter failure, the pump will be set based upon manual grab samples. |
| Hardness of Discharge Water | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l |
| Chemical Composition | 1-5% n-Decanol<br>5-10% n-Octanol<br>0-1% Paraffin Wax<br>10-20% Hydrotreated light distillate<br>40-70% straight run middle distillate | 12.2% Ferric Iron (Fe+3)<br>0.001% Ferrous Iron (Fe+2)<br><0.1% Sulfuric Acid<br>55%-88% Ferric Sulfate | 12.2% Ferric Iron (Fe+3)<br>0.001% Ferrous Iron (Fe+2)<br><0.1% Sulfuric Acid<br>55%-88% Ferric Sulfate | 37% Phosphoric Acid<br>6% Sulfuric Acid<br>1% Nitric Acid | 50% Sodium Hydroxide | Acrylate polymer<br>Sulfonate | 70 - 100% Sulfuric Acid | |
| Treatment System Blowdown Rate | N/A | N/A | N/A | N/A | N/A | 8.2 mgd | 2.1 mgd | 2.1 mgd |
| Outfall Flow Rate | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD |
| Treatment System Temperature | 60 deg F | 80 - 90 deg F | 80 - 90 deg F | 70 deg F | 70 deg F | 400 deg F | 70 - 90 deg F | 70 - 90 deg F |
| Treatment System pH | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 10.0 | 7.8 | 7.8 |
| Toxicity Data | Toxicity results for this additive provided below. | No data. | No data. | No data. | Material is slightly toxic to aquatic organisms on an acute basis (LC50 between 10 - 100 mg/l in most sensitive species). | None of the components of the additive are considered toxic; therefore, no toxicity testing was performed on this additive. | Toxicity results for this additive provided below. | Material is slightly toxic to aquatic organisms on an acute basis (LC50 between 10 - 100 mg/l in most sensitive species). |
| *Danio rerio 96 h LC50* | | | | | | | | |
| *Fathead Minnow 96h/LC50* | 440 mg/l | | | | | | | |
| *Fathead Minnow 24h/LC50* | | | | | | | | |
| *Ceriodaphnia 48h/LC50* | | | | | | | | |
| *Daphnia Magna 48h/LC 50* | 130 mg/l | | | | | | | |
| *Daphnia Magna 24h/EC50* | | | | | | | | |
| *Daphnia Magna 24h/LC50* | | | | | | | | |
| *Daphnia Magna 96h/LC50* | | | | | | | | |
| *Rainbow Trout 96h/LC50* | 310 mg/l | | | | | | | |
| *Bluegill Sunfish 96h/LC50* | | | | | | | | |
| *Lepomis macrochirus 48 hr/LC50* | | | | | | | | |
| *Acartia tonsa 48h/LC50* | | | | | | | | |
| *Pimephales promelas 48h/LC50* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Threespone stickleback 96h/LC50* | | | | | | | | |
| *Threespone stickleback 96h/LC50 (aerated)* | | | | | | | | |
| *Zebra-fish (Brachydanio rerio) 96h/LC50* | | | | | | | | |
| *Flannelmouth sucker 96h/LC50* | | | | | | | | |
| *Coho salmon 96 h/LC50* | | | | | | | | |
| *Chinook salmon 96h/LC50* | | | | | | | | |
| *Chinook salmon 216h/LC50* | | | | | | | | |
| *Bobwhite quail LD50* | | | | | | | | |
| *Mosquito Fish 24h/LC50* | | | | | | | 100 mg/l | |
| *Scenedesmus subspicatus 96h/EC50* | | | | | | | | |
| *Mallard Duck LD50* | | | | | | | | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | | | | | | | | |
| *Freshwater Algae Static Acute EC50* | | | | | | | | |
| *Freshwater Biodegradability 28 Day OECD 301D* | | | | | | | | |
| *Freshwater Biodegradability 5 Day/2.0mg/l* | | | | | | | | |
| *Freshwater Biodegradability 5 Day/3.0mg/l* | | | | | | | | |
| Relationship of toxicity to pH | Toxicity does not change with pH. | | | | Toxicity increases outside the pH range of 5 - 10. | See above. | Effective pH range: 7.0 - 8.5 | Toxicity increases outside the pH range of 5 - 10. |
| Relationship of toxicity to water hardness | Toxicity does not change with water hardness. | | | | Toxicity increases with increasing water hardness. | See above. | Effective hardness 150 - 180 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Toxicity increases with increasing water hardness. |
| N Octanol Water Partition Coefficient | 9.5 | | | | | | | |

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/23/11

| Additive Name | Sodium Hypochlorite - 12.5% | Sodium Bisulfite - 40% | BPB 69488 | BPB 58316 | Potassium Permanganate | Potassium Permanganate | Hydrochloric Acid - 31% | BPW 76453 |
|---|---|---|---|---|---|---|---|---|
| Supplier | K. A. Steel | PVS Chemical Solutions | Baker Petrolite | Baker Petrolite | Mallinkrodt Baker | Mallinkrodt Baker | Vopak (commodity chemical) | Baker Petrolite |
| Existing or New | Existing | Existing | Existing | Existing | Existing | Existing | Existing | Existing |
| Outfall | Outfall 002 | Outfall 002 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 |
| Point of Injection | WWTP Intake | # 6 Separator Effluent | Steam Condensate System | Boiler Feed Water | Activated Sludge Recycle Line | Activated Sludge Plant Influent | Cooling Towers (#1 - #6) | DAF Influent |
| Feed Rate | 2,117,809,000 grams/day | 650,300,000 grams/day | 49,164 grams/day | 292,221 grams/day | 24,760 grams/day | 188,250 grams/day | 1,934,135 grams/day | 187,750 grams/day |
| Water Treatment Concentration | 4.1 mg/l as product and 1.0 mg/l free available chlorine | 2.8 mg/l | 8.5 mg/l | 7.0 mg/l | 4.8 mg/l | 0.3 mg/l | 75 mg/l | 9 mg/l |
| Duration of Use (hrs/day) | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 17 hrs/day | 24 hr/day | 1 hr/day | 24 hrs/day |
| Duration of Use (days/year) | 58 days/year | 59 days/year | 365 days/year | 365 days/year | For 1 day when needed. | 30 days per year | 30 days per year | 365 days/year |
| Final Discharge Concentration at Outfall | < 0.05 mg/l total residual chlorine | 2.8 mg/l as sulfate. (worst case) | 0.65 mg/l (worst case) | 3.08 mg/l (worst case) | 0.0 mg/l | 0.0 mg/l | 0.65 mg/l as chloride (worst case) | 0.0 mg/l |
| Determination of Discharge Concentration | All of free available chlorine will be removed after to discharge. This is accomplished with the injection of sodium bisulfite in # 6 separator. | This is a reducing agent that is applied to scavenge available oxidant during zebra mussel treatment. | This additive will be consumed in the activated sludge plant. Expected final discharge concentration should approach zero. | This additive will be consumed in the activated sludge plant. Expected final discharge concentration should approach zero. | The concentration of potassium permanganate in the final discharge would approach 0.0 mg/l. The $MnO_4^-$ ion reacts immediately to form solid $MnO_2$ which binds with the activated sludge and settles in the clarifier. Any carryover in the secondary clarifier effluent would be filtered in the final filters. | The concentration of potassium permanganate in the final discharge would approach 0.0 mg/l. The $MnO_4^-$ ion reacts immediately to form solid $MnO_2$ as reductant species (phenol) are oxidized. The solid $MnO_2$ will separate with the solids in the API separator, DAF, activated sludge plant and the final filters. The discharge concentration should approach zero. | 0.65 mg/l as chloride in the final discharge from the cooling tower blowdown. Residual based on a calculation of the smallest cooling tower system volume, as a worst case estimate. All acidic properties have been neutralized by the alkalinity of the cooling tower water. | Based on the manufacture's engineered estimated recovered chemical in the water phase, 0.015 mg/l would remain in the DAF effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. |
| Control Description | # 6 separator has an online ORP probe that controls the pump rate to meet the set point concentration. | Injection rates are adjusted based upon an online dissolved oxygen meter. | Feed rate is based upon condensate sample results for pH and iron. | Feed rate is adjusted based upon online control using the inert molybdate tracer. | The specified quantity is injected over the specified time. Settling tests and microscopic examination is conducted to verify performance. | Additive is added to the spent caustic waste slip stream of water while draining. Phenol concentration is monitored in the WWTP influent. | Hydrochloric acid is injected into the cooling water inlet of heat exchangers to remove scale. The low pH effluent flows to the recirculating cooling tower where pH is neutralized by the alkalinity of the cooling tower water. | Addition rate is based on DAF performance which includes oil and grease as well as influent and effluent turbidity measured every 2 hours. |
| Hardness of Discharge Water | 218 mg/l | 218 mg/l | 218 mg/l | 216 mg/l | 218 mg/l | 216 mg/l | 218 mg/l | 216 mg/l |
| Chemical Composition | 12.5% Sodium Hypochlorite | 40% Sodium Bisulfite | 70% Morpholine | 2% Caustic<br>6% Polyacrylate<br>8% Acrylic Polymer<br>1% Sodium Molybdate | 100% Potassium Permanganate | 100% Potassium Permanganate | 31% Hydrochloric Acid | 25% Dimethyldiallylammonium chloride |
| Treatment System Blowdown Rate | N/A | N/A | 6.33 mgd | 6.33 mgd | N/A | N/A | 2.1 mgd | N/A |
| Outfall Flow Rate | 98.2 MGD | 98.2 MGD | 19.9 MGD | 19.9 MGD | 18.8 MGD | 18.9 MGD | 18.9 MGD | 18.9 MGD |
| Treatment System Temperature | 60 - 110 deg F | 60 - 110 deg F | 320 - 450 deg F | 320 - 450 deg F | 90 - 90 deg F | 80 - 90 deg F | 70 - 90 deg F | 80 - 90 deg F |
| Treatment System pH | 7.0 - 9.0 | 7.0 - 8.0 | 8.0 - 9.0 | 8.0 - 9.0 | 7.0 - 8.0 | 7.0 - 8.0 | 7.8 | 7.0 - 9.0 |
| Toxicity Data | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. |
| *Danio rerio 96 h/ LC50* | | | | | | | | |
| *Fathead Minnow 96h/LC50* | | | 177 mg/l | 3316 mg/l | | | 16.6 mg/l | |
| *Fathead Minnow 24h/LC50* | | | | | | | | |
| *Ceriodaphnia 48h/LC50* | 1.57 mg/l | | | 851 mg/l | | | | 6.42 mg/l |
| *Daphnia Magna 48h/LC 50* | | | | | | | 5.0 mg/l | |
| *Daphnia Magna 24h/EC50* | | | 144 mg/l | | | | | |
| *Daphnia Magna 24h/LC50* | | | | | | | | |
| *Daphnia Magna 96h/LC50* | | | | | | | | |
| *Rainbow Trout 96h/LC50* | 1.94 mg/l | | 543 mg/l | | | | | 6.6 mg/l |
| *Bluegill Sunfish 96h/LC50* | 5.3 mg/l | | 500 mg/l | | | | | 0.9 mg/l |
| *Lepomis macrochirus 96 h/LC50* | | | | | 2.7 mg/l | 2.7 mg/l | | |
| *Acartia tonsa 48h/LC50* | | | | | | | | |
| *Pimephales promelas 48h/LC50* | | | | | | | | |
| *Pimephales promelas 96h/LC50* | | | | | | | | 0.69 mg/l |
| *Pimephales promelas 96h/LC50* | | 127 mg/l | | | | | | |
| *Threespine stickleback 96h/LC50* | | 758 mg/l | | | | | | |
| *Threespine stickleback 96h/LC50 (aerated)* | | | | | | | | |
| *Zebra-fish (Brachydanio rerio) 96h/LC50* | | | | | | | | |
| *Hannelmouth sucker 96h/LC50* | | | | | | | | |
| *Coho salmon 96 h/LC50* | | | | | | | | |
| *Chinook salmon 96h/LC50* | | | | | | | | |
| *Chinook salmon 216h/LC50* | | | | | | | | |
| *Bobwhite quail LD50* | | | | | | | | |
| *Mosquito Fish 24h/LC50* | | | | | | | | |
| *Scenodesmus subspicatus 96h/EC50* | | | | | | | | |
| *Mallard Duck LD50* | | | | | | | | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | | | | | | | | |
| *Freshwater Algae Static Acute EC50* | | | | | | | | |
| *Freshwater Biodegradability 28 Day OECD 301D* | | | | | | | | |
| *Freshwater Biodegradability 6 Day/2.0mg/l* | | | | | | | | |
| *Freshwater Biodegradability 5 Day/3.0mg/l* | | | | | | | | |
| Relationship of toxicity to pH | Effective pH range: 7.0 - 8.5 | Effective pH range: 6.0 - 8.3 | Effective pH range: 7.5 - 8.2 | Effective pH range: 7.5 - 8.2 | Effective pH range: 7.0 - 10.0 | Effective pH range: 7.0 - 10.0 | Effective pH range: 7.5 - 8.2 | Effective pH range: 1 - 14 |
| Relationship of toxicity to water hardness | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity generally increases with decreasing hardness. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. |
| N Octanol-Water Partition Coefficient | | | | | | | | |

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/21/11

| Additive Name | BPW 78030 | BPW 78030 | ACS 2125 | Praestol A3025 LA Flocculant | Spectrafloc 876 | BPW76001 | BPW76030 | Praestol A3040 LA Flocculant |
|---|---|---|---|---|---|---|---|---|
| Supplier | Baker Petrolite | Baker Petrolite | Ashland Specialities, Inc. | Ashland | Baker Petrolite | Baker Petrolite | Baker Petrolite | Ashland |
| Existing or New | Existing | Existing | Existing | NEW/ Future use | NEW/ Future use | NEW/ Future use | NEW/ Future use | NEW/ Future use |
| Outfall | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 005 |
| Point of Injection | Desalter Brine Effluent | DAF Influent | DAF Influent | WWTP Brine Treatment | WWTP Brine Treatment and AFU | WWTP Brine Treatment | WWTP Brine Treatment | DAF Influent |
| Feed Rate | 217,082 grams/day | 167,750 grams/day | 167,750 grams/day | 167,750 grams/day | 167,750 grams/day | 167,750 grams/day | 167,750 grams/day | 167,750 grams/day |
| Water Treatment Concentration | 131 mg/l | 2.3 mg/l | 2.3 mg/l | 2.3 mg/l | 2.3 mg/l | 2.3 mg/l | 2.3 mg/l | 2.3 mg/l |
| Duration of Use (hrs/day) | 2 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day | 24 hrs/day |
| Duration of Use (days/year) | 120 days/year | 365 days/year | 365 days/year | 365 days/year | 365 days/year | 365 days/year | 365 days/year | 365 days/year |
| Final Discharge Concentration at Outfall | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l | 0.0 mg/l |
| Determination of Discharge Concentration | Based on the manufacturer's engineered estimated recovered chemical in the water phase, 0.995 mg/l would remain in the desalter brine. This concentration will be oxidized in the activated sludge plant and/or separated in the secondary clarifier and/or filtered in the final filters. | Based on the manufacturer's engineered estimated recovered chemical in the water phase, 0.012 mg/l would remain in the DAF effluent. The organic component will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. The inorganic component will be separated in the clarifier and/or filtered in the final filters | Based on the manufacturer's engineered estimated recovered chemical in the water phase, 0.012 mg/l would remain in the DAF effluent. The organic component will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. The inorganic component will be separated in the clarifier and/or filtered in the final filters | Based on estimated recovered chemical in the water phase, 0.015 mg/l would remain in the Brine treatment effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. | Based on estimated recovered chemical in the water phase, 0.015 mg/l would remain in the Brine treatment effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. | Based on estimated recovered chemical in the water phase, 0.015 mg/l would remain in the Brine treatment effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. | Based on estimated recovered chemical in the water phase, 0.015 mg/l would remain in the Brine treatment effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. | Based on estimated recovered chemical in the water phase, 0.015 mg/l would remain in the Brine treatment effluent. This will be oxidized in the Activated Sludge Plant and/or separated in the clarifier and/or filtered in the final filters. |
| Control Description | Addition rate is based on API gravity of crude oil to the desalters. | Addition rate is based on DAF performance which includes oil and grease as well as influent and effluent turbidity measured every 2 hours. | Addition rate is based on DAF performance which includes oil and grease as well as influent and effluent turbidity measured every 2 hours. | Feed rate is based on flow and performance for oil and grease | Feed rate is based on flow and performance for oil and grease | Feed rate is based on flow and performance for oil and grease | Feed rate is based on flow and performance for oil and grease | Addition rate is based on DAF performance which includes oil and grease as well as influent and effluent turbidity measured every 2 hours. |
| Hardness of Discharge Water | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l |
| Chemical Composition | 30% aluminum chloride hydroxide<br>10% polyalkylammonium chloride | 30% aluminum chloride hydroxide<br>10% polyalkylammonium chloride | 30% aluminum chloride hydroxide<br>10% polyalkylammonium chloride | 20-30% aliphatic hydrocarbon<br>5% ethylodated nonylphenol<br>5% polyoxyethylened nonionic surfactant | 20-30% petroleum distillates<br>oxyalkylated alkylphenol | 20-30% petroleum distillates<br>oxyalkylated alkylphenol | 10-3-% aluminum chloride hydroxide<br>5-10% polyalkylammonium chloride | 30% Petroleum Distillates<br>5-10% Alcohols<br><5% nonylphenol polyethoxylate<br>>5% polyethylene glycol ethyl ether |
| Treatment System Blowdown Rate | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Outfall Flow Rate | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9 MGD | 19.9MGD |
| Treatment System Temperature | 80 - 90 deg F | 80 - 90 deg F | 80 - 90 deg F | 70 -80 deg F | 70 -80 deg F | 70 -80 deg F | 70 -90 deg F | 80 - 90 deg F |
| Treatment System pH | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 | 7.0 - 9.0 |
| Toxicity Data | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. | No data available for Toxicity results for this additive. | Toxicity results for this additive provided below. | No data available for Toxicity results for this additive. | Toxicity results for this additive provided below. | Toxicity results for this additive provided below. |
| *Danio rerio 96 h/LC50* | | | | | | | | |
| *Fathead Minnow 96h/LC50* | | | | | >100 mg/l | | | |
| *Fathead Minnow 24h/LC50* | | | | | | | | |
| *Ceriodaphnia 48h/LC50* | | | | | | | | 16 mg/l |
| *Daphnia Magna 48h/LC 50* | | | | | | | | |
| *Daphnia Magna 24h/EC50* | | | | | | | | |
| *Daphnia Magna 24h/LC50* | | | | | | | | |
| *Daphnia Magna 96h/LC50* | | | | | | | | |
| *Rainbow Trout 96h/LC50* | 1.3 mg/l | 1.3 mg/l | 1.3 mg/l | | | | | 1.5 mg/l |
| *Bluegill Sunfish 96h/LC50* | | | | | | | | |
| *Lepomis macrochirus 48 hr/LC50* | | | | | | | | |
| *Acartia tonsa 48h/LC50* | | | | | | | | |
| *Pimephales promelas 48h/LC50* | | | | | | | | |
| *Pimephales promelas 96h/LC50;* | | | | | | | 5.3 ppm | |
| *Pimephales promelas 96h/LC50;* | | | | | | | | |
| *Threespone stickleback 96h/LC50* | | | | | | | | |
| *Threespone stickleback 96h/LC50 (aerated)* | | | | | | | | |
| *Zebra-fish (Brachydanio rerio) 96h/LC50* | | | | | | | | |
| *Flannelmouth sucker 96h/LC50* | | | | | | | | |
| *Coho salmon 96 h/LC50* | | | | | | | | |
| *Chinook salmon 96h/LC50* | | | | | | | | |
| *Chinook salmon 216h/LC50* | | | | | | | | |
| *Bobwhite quail LD50* | | | | | | | | |
| *Mosquito Fish 24h/LC50* | | | | | | | | |
| *Scenedesmus subspicatus 96h/EC50* | | | | | | | | |
| *Mallard Duck LD50* | | | | | | | | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | | | | | | | | <1 mg/l |
| *Freshwater Algae Static Acute EC50* | | | | | | | | |
| *Freshwater Biodegradability 28 Day OECD 301D* | | | | | | | | |
| *Fresh water Biodegradability 5 Day/2.9mg/l* | | | | | | | | |
| *Freshwater Biodegradability 5 Day/3.8mg/l* | | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's > 7.0 | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's > 7.0 | | | | | |
| Relationship of toxicity to pH | Effective pH range: 1 - 14. Toxicity of cationic polymers decrease at pH's>7.0 | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. | | | | | |
| Relationship of toxicity to water hardness | Effective hardness 150 - 160 mg/l as $CaCO_3$. Literature indicates that toxicity decreases with increasing water hardness and increasing TOC. | | | | | | | |
| N Octanol-Water Partition Coefficient | | | | | | | | |

BP Products North America Inc. - Whiting Refinery
Wastewater & Water Treatment Additive Data
Updated 11/21/11

| | | | | |
|---|---|---|---|---|
| Additive Name | Praestol A 3049 LTR Flocculant | BPBS9439 | CL3OUT1190 | BPC 59005 |
| Supplier | Ashland | Baker Petrolite | Baker Petrolite | Baker Petrolite |
| Existing or New | NSW/ Future use | Existing | Existing | Existing |
| Outfall | Outfall 005 | Outfall 005 | Outfall 005 | Outfall 002 |
| Point of Injection | DAF Influent | SRU/RU steam condensate system | WWTP Effluent Recycle to Cooling Towers | Pipestills |
| Feed Rate | 167,750 grams/day | 29,015 grams/day | 101,364 grams/day | 23,364 grams/day |
| Water Treatment Concentration | 2.3 mg/l | 12 mg/l | 0.30 mg/l | 3 - 4 mg/l |
| Duration of Use (hrs/day) | 24 hrs/day | 24 hrs/day | 24 hrs/day (when using recycle line) | 24 hrs/day |
| Duration of Use (days/year) | 365 days/year | 365 days/year | 365 days/year (when using recycle line) | 365 days/year |
| Final Discharge Concentration at Outfall | 0.0 mg/l | 0.182 mg/l (worst case) | 0.0 mg/l | .05 mg/l (worst case) |
| Determination of Discharge Concentration | Based on estimated recovered chemical in the water phase, 0.012 mg/l would remain in the Biter treatment effluent. This will be removed in the Activated Sludge Plant and/or separated in the clarifier and/or Filtered in the final filters. | Worse case is based upon 100% of additive remaining in the final discharge when the additive is used. Assume no removal at the activated sludge plant. | 100% of the material is reacted in the system and consumed; therefore, 0 mg/l is expected in the final discharge. | Material would most likely be consumed in the process |
| Control Description | Addition rate is based on DAF performance which indicates oil and grease as well as influent and effluent turbidity measured every 2 hours. | Rates will be determined from condensate sample of PH and iron results. | Feed rate is based on flow and halogen residual which is measured. | Additive is used based upon a measure of the filtered calcium upstream and downstream of process heat exchangers and also the heat transfer efficiency. |
| Hardness of Discharge Water | 216 mg/l | 216 mg/l | 216 mg/l | 216 mg/l |
| Chemical Composition | 20-30% aliphatic hydrocarbon<br>5% ethoxylated nonylphenol | Alkyl Ether amine 30-60% | 30-60% Sodium Bromide | 50% Polyacrylic Acid (PAA) |
| Treatment System Blowdown Rate | N/A | 1.15 mgd | N/A | 1.44 mgd |
| Outfall Flow Rate | 19.8MGD | 18.9 MGD | 18.8 MGD | 56.2MGD |
| Treatment System Temperature | 60 - 80 deg F | 50-110 deg F | 70 - 90 deg F | 50-110 deg F |
| Treatment System pH | 7.0 - 9.0 | 7.0-9.0 | 7.8 | 7.0-9.0 |
| Toxicity Data | No data available for Toxicity results for this additive. | | | Toxicity results are estimated based on data generated on similar chemistry/components and from literature sources. |
| *Danio rerio 96 h/LC50* | | | | |
| *Fathead Minnow 96h/LC50* | | | 16,478 mg/l | |
| *Fathead Minnow 24h/LC50* | | | | |
| *Ceriodaphnia 48h/LC50* | | | | |
| *Daphnia Magna 48h/LC 50* | | | 11,000 mg/l | |
| *Daphnia Magna 24h/EC50* | | | >1000 mg/l | |
| *Daphnia Magna 24h/LC00* | | | | |
| *Daphnia Magna 96h/LC00* | | | | |
| *Rainbow Trout 96h/LC50* | | 187 mg/l | >1000 mg/l | |
| *Bluegill Sunfish 96h/LC50* | | | >1000 mg/l | |
| *Lepomis macrochirus 48 hr/LC50* | | | | |
| *Acartia tonsa 48h/LC50* | | | | |
| *Pimephales promelas 48h/LC50* | | | | |
| *Pimephales promelas 96h/LC50;* | | | | |
| *Pimephales promelas 96h/LC50;* | | | | |
| *Threespone stickleback 96h/LC50* | | | | |
| *Threespone stickleback 96h/LC50 (aerated)* | | | | |
| *Zebra-fish (Brachydanio rerio) 96h/LC50* | | | | |
| *Flemsmouth sucker 96h/LC50* | | | | |
| *Coho salmon 96 h/LC50* | | | | |
| *Chinook salmon 96h/LC50* | | | | |
| *Chinook salmon 216h/LC00* | | | >2250 mg/kg | |
| *Bobwhite quail LD50* | | | | |
| *Mosquito Fish 24h/LC50* | | | | |
| *Scenedesmus subspicatus 96h/EC50* | | | 8,000 mg/l | |
| *Mallard Duck LD50* | | | >5633 ppm | |
| *Freshwater Invertebrates & Fish Acute EC50/LC50* | | | >1000 mg/l | >500 mg/l |
| *Freshwater Algae Static Acute EC50* | | | >1000 mg/l | |
| *Freshwater Biodegradability 28 Day OECD 301D* | | | | 20 - 40% |
| *Freshwater Biodegradability 5 Day/2.0mg/l* | | | | |
| *Freshwater Biodegradability 5 Day/3.0mg/l* | | | | |
| Relationship of toxicity to pH | | | | Effective pH range: 6.0 - 8.3 |
| Relationship of toxicity to water hardness | | | | Effective hardness 150 - 180 mg/l as CaCO3. Literature indicates that toxicity generally increases with decreasing hardness. |
| N Octanol-Water Partition Coefficient | | | | |