National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for Casting Solutions LLC

Public Notice No.: 14-03-006
Public Notice Date: March 4, 2014
Comment Period Ends: April 4, 2014

Ohio EPA Permit No.: 0IS00000*LD
Application No.: OH0004901

Name and Address of Applicant:
Casting Solutions LLC
P.O. Box 3148
Zanesville, OH 43702-3148

Name and Address of Facility Where Discharge Occurs:
Casting Solutions LLC
2345 Licking Rd.
Zanesville, OH 43701
Muskingum County

Receiving Water:
Licking River

Subsequent
Stream Network: Muskingum River to Ohio River

Introduction

Development of a fact sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (CFR), Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency (Ohio EPA), as well as the methods by which the public can participate in the process of finalizing those actions.

This fact sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES permit effluent limitations. The technical basis for the fact sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This fact sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act (CWA) and Ohio Water Pollution Control Law, Chapter 6111 of the Ohio Revised Code (ORC). Decisions to award variances to water quality standards (WQS) or promulgated effluent guidelines for economic or technological reasons will also be justified in the fact sheet where necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the CWA. Many of these have already been established by the United States Environmental Protection Agency (U.S. EPA) in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the secondary treatment regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations (WLAs) are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the WLA for a pollutant to a measure of the effluent quality. The measure of effluent quality is called Projected Effluent Quality (PEQ). This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

Summary of Permit Conditions

Limits and monitoring requirements for all outfalls are proposed to remain the same in this permit renewal with the following exceptions:

For outfall 0IS00000001, copper and zinc concentrations were greater than water quality criteria allows. A new fictitious outfall 0IS00000091 has been developed to monitor dry weather events as part of a plan to identify possible sources of these parameters. Additional monitoring with a possibility of a pollution mitigation plan is part of a compliance schedule in the proposed permit.

For outfall 0IS00000003, final effluent limits are proposed for *Escherichia coli*. New water quality standards for *E. coli* became effective in March 2010. These limits will take the place of fecal coliform limits.

For outfall 0IS00000005, new water-quality-based limits are needed for mercury because this parameter falls into group 5 of the Parameter Assessment (Table 10) in the WLA for Casting Solutions and has the reasonable potential to contribute to exceedances of WQS. Casting Solutions has applied for coverage under the general variance for mercury and shall comply with monthly limits of 33ng/L and a daily limit of 1700ng/L.

Current monitoring requirements for oil and grease and acute toxicity using *Ceriodaphnia dubia* are being reduced in the permit because PEQ data suggests that a reduced frequency of monitoring is appropriate. There was a single detection of oil and grease in the past 219 observations over the past five years. There were three detections of acute toxicity in twelve observations over the past four years, none of which were higher than 0.3 TUa. Biomonitoring at outfall 0IS00000801 and 0IS00000901 is proposed to be decreased or removed.

The facility has expressed interest in transferring sludge to the City of Zanesville and thus an additional sludge table has been added to this permit renewal. Sludge removed for disposal to a landfill shall be reported under 0IS00000586 and sludge transferred to another NPDES permit holder shall be reported under 0IS00000588.

For outfall 0IS00000901, monitoring for water temperature, pH, and water hardness is proposed. This data is used for instream value wasteload allocation calculations and is necessary to develop accurate stream specific wasteload allocations

In Part II of the permit, special conditions are included that address the submittal of information pertaining to the cooling water intake structure in order to comply with Section 316(b) of the CWA; operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; and outfall signage.

In Parts IV, V, and VI of the permit, stormwater language is proposed including Storm Water Control Measures and Pollution Prevention Programs, Monitoring and Reporting Requirements, and Definitions and Acronyms. Part IV, Item K includes specific requirements for Gray and Ductile Foundries.

Table of Contents

Page

Introduction 1
Summary of Permit Conditions 2
Table of Contents 3
Procedures for Participation in the Formulation of Final Determinations 4
Location of Discharge/Receiving Water Use Classification 5
Facility Description 5
Description of Existing Discharge 6
Assessment of Impact on Receiving Waters 7
Development of Water Quality Based Effluent Limits 8
Reasonable Potential / Effluent Limits / Hazard Management Decisions 10
Other Requirements 13
Attachment A: Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines 40
Attachment B: Calculation of Additional Pollutant Loadings at Outfall 005 48
Attachment C: Summation of Pollutant Loadings at Outfall 005 50

List of Figures

Figure 1. Location of Casting Solutions 16
Figure 2. Facility Wastewater Schematic 17
Figure 3. Industrial Wastewater Flow Diagram. 18

List of Tables

Table 1. Description of Outfalls for Casting Solutions 6
Table 2. Flow Rates for Casting Solutions Outfalls 7
Table 3. Effluent Characterization Using Ohio EPA Data and Form 2C Data 19
Table 4. Effluent Characterization Using Self-Monitoring Data 24
Table 5. Projected Effluent Quality Values 28
Table 6. Summary of Acute Toxicity Test Results 29
Table 7. Water Quality Criteria in the Study Area 30
Table 8. Instream Conditions and Discharger Flow 31
Table 9. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria 33
Table 10. Parameter Assessment 34
Table 11. Final Effluent Limits and Monitoring Requirements 35

Procedures for Participation in the Formulation of Final Determinations

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

Legal Records Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216-1049

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

The Ohio EPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the draft permit, contact Scott Foster, (740)380-5227, scott.foster@epa.ohio.gov, or Andy Bachman, (614)644-3075, andrew.bachman@epa.ohio.gov.

Location of Discharge/Receiving Water Use Classification

Casting Solutions discharges to the Licking River at river mile (RM) 2.0. Figure 1 shows the approximate location of the facility.

This segment of the Licking River is described by Ohio EPA River Code: 17-200, U.S. EPA River Reach #05040006-001, County: Muskingum, Ecoregion: Western Allegheny Plateau. The Licking River is designated for the following uses under Ohio's WQS (OAC 3745-1-07): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR) Class A.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric WQS are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA goals because of human-caused conditions that cannot be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact) and wading only (Secondary Contact - generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for AWS and IWS.

Facility Description

Casting Solutions manufacturers gray and ductile iron castings, including manifolds, boilers, and radiators, using the following process operations: casting and molding. The process operations at Casting Solutions are classified under the Standard Industrial Classification (SIC) Code 3321, "Gray and Ductile Iron Foundries. The Federal Effluent Guidelines found in Metal Molding and Casting Point Source Category (40 CFR 464 Parts 464.32 and 464.33) apply to the process wastewaters generated at the facility.

The 2013 NPDES renewal application indicates that the Casting Solutions facility manufacturers 400,000 pounds per day, or 200 tons per day. This rate of production is the same that was used to develop limits for the last permit renewal.

Water is supplied to the Casting Solutions from the City of Zanesville, wells operated by the company, and an intake in the Licking River. The river water intake is used for cooling purposes and then discharged through outfall 0IS00000002. City water is used for sanitary purposes such as restrooms, showers, and drinking water, and discharged at outfall 0IS00000003.

Table 1 shows the external discharges or outfalls, the types of plant operations contributing wastewater to each outfall, the treatment systems used prior to each discharge, and the average amount discharged. All of the outfalls discharge directly to the Licking River. The average flow shown in Table 1 for each outfall is based upon the flows reported in the NPDES renewal application.

Table 1: Description of Outfalls for Casting Solutions				
Outfall	Type of Wastewater	Treatment System Used	Discharge Point	Average Discharge (MGD)
001	Air Compressor Cooling, Airset Cooler Classifier, Roof Areas, Heat Exchanger water, Other Cooling water	Sedimentation	Licking River	0.383
002	Cupola Control Panel, Cupola Holding Furance and Shell Cooling, Roof Areas	Sedimentation	Licking River	0.338
003	Sanitary Wastewater	Sedimentation, Disinfection	Licking River	0.003
004	Air Compressor Cooling & Cistern overflow	None	Licking River	0.079
005	Tank drains, Boiler Blowdown, Coke Bin Drainage, Pollution Sludge Press Filtrate, Pressure Test Benches	Sedimentation, Pressure Filtration, Coagulation	Licking River	0.024

*MGD=Million Gallons per Day; Outfalls 008 and 010, not included in the above table, are storm water outfalls

Description of Existing Discharge

The reported flows discharged from the Casting Solutions outfalls are shown in Table 2 for the years 2008 through 2012. This data shows that the flows have remained relatively constant for most outfalls.

The process wastewaters from the Casting Solutions facility flow into an influent wet well prior to discharge into an equalization (EQ) tank. Oil is skimmed from the EQ tank and then a polymer and caustic chemicals are added to the wastewater to promote coagulation. The wastewater flows into a clarifier from the EQ tank where solids are settled out, sent to sludge storage, and then to a filter press prior to transport to a landfill. The wastewater from the clarifier is adjusted for pH before discharge to the Licking River through outfall 0IS00000005. Figure 2 shows the locations of each of the outfalls and wells at the Casting Solutions facility. It also identifies the areas of the facility which contribute wastewater at each outfall. Figure 3 is a schematic of the treatment processes and wastewater flows immediately upstream from the outfall 0IS00000005 discharge.

Table 3 presents chemical specific data compiled from data reported in Ohio EPA Bioassay reports and the NPDES permit application 2C Form filled out by the facility.

Table 4 presents a summary of unaltered Discharge Monitoring Report (DMR) data for outfalls 0IS00000001, 0IS00000002, 0IS00000003, 0IS00000004, and 0IS00000005. Data are presented for the period from January, 2008 through December 2012, and current permit limits are provided for comparison.

Table 5 summarizes the chemical specific data for outfall 0IS00000005 by presenting the average and maximum PEQ values.
Table 6 summarizes the Water Quality Criteria in the Study Area.

Table 7 summarizes the results of acute and chronic WET tests of the final effluent.

Table 2: Flow Rates for Casting Solutions 2008-2012 (MGD)						
Outfall	Year					Overall 2008-2012
	2008	2009	2010	2011	2012	
001						
50th Percentile	0.2	0.2	0.2	0.2	0.2	0.2
95th Percentile	0.326	0.326	0.24965	0.2815	0.25705	0.326
002						
50th Percentile	0.406	0.406	0.406	0.406	0.406	0.406
95th Percentile	0.466	0.466	0.41	0.415	0.411	0.466
003						
50th Percentile	0.0010	0.0010	0.0010	0.0015	0.0010	0.0012
95th Percentile	0.0020	0.0010	0.0015	0.0025	0.0024	0.0022
004						
50th Percentile	0.079	0.079	0.079	0.079	0.079	0.079
95th Percentile	0.079	0.079	0.079	0.079	0.079	0.079
005						
50th Percentile	0.048	0.039	0.0425	0.054	0.054	0.048
95th Percentile	0.072	0.05495	0.067	0.0797	0.075	0.073

*MGD=Million Gallons per Day

Assessment of Impact on Receiving Waters

The most recent biological data available for the Licking River in the vicinity of where the Casting Solutions facility discharges was collected during the summer of 1993. This survey found that 1.8 miles immediately downstream from Dillon Reservoir was in partial attainment while the remainder of the Licking River downstream to its mouth at the Muskingum River was in full attainment. The Appendices to the Year 2000 Ohio Water Resource Inventory includes the following description of this stream segment:

"The area of partial attainment was limited to the reach immediately downstream from Dillon Reservoir, and represented a failure of the benthic community to perform at a Warmwater Habitat level. Through the course of the 1993 study elevated biological oxygen demand, ammonia-nitrogen, and low dissolved oxygen were recorded, likely associated with the hypolimnetic discharge from Dillon Reservoir. These factors coupled with the disruption of expected riverine energy and nutrient cycling on stream impoundments resulted in diminished performance within the benthic invertebrate assemblage. The impact was localized, and rapid recovery was observed about 1.8 miles downstream. Limnilogical data were collected by a Muskingum Tech. professor consisting of basic chemical/physical profile of Dillon Reservoir. These data were not actually incorporated into a technical support document, but aided (as background information) in defining the level of lake stratification. Slightly elevated levels of mercury, and slight to high levels of polychlorinated biphenyls (PCBs) were reported in fish tissue samples."

Finally, the Licking River is listed on Ohio's 303(d) list, indicating that this watershed has water quality impairments. A total maximum daily load (TMDL) is currently being modeled in order to conduct intensive water quality sampling, and then develop a plan to minimize or reduce the impairments.

Development of Water-Quality-Based Effluent Limits

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

Parameter Selection

Effluent data for Casting Solutions was used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA - DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	January 2008 through December 2012
NPDES Application data	4/24/2013
Ohio EPA compliance sampling data	3/20/2012

The data were examined, and the following values were removed from the evaluation to give a more reliable PEQ: Mercury 95.7 ng/L on 8/4/2010.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points. The average and maximum PEQ values are presented in Table 5.

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required. See Table 10 for a summary of the screening results.

Wasteload Allocation

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

The applicable waterbody uses for this facility's discharge and the associated stream design flows are as follows:

Aquatic life (WWH)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10

Ammonia	Average	Summer 30Q10
		Winter 30Q10
AWS		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 8, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

Ohio's WQS implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet WQS at the end-of-pipe, which are 12 ng/L (average) and 1700 ng/L (maximum) in the Ohio River basin.

The data used in the WLA are listed in Tables 3 and 4. The WLA results to maintain all applicable criteria are presented in Table 9. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

Whole Effluent Toxicity WLA

WET is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

WQS for WET are expressed in Ohio's narrative "free from" WQS rule [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs as if they were water quality criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For the Casting Solutions facility, the WLA values are 54.4 TU_a and 216 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the concentration of effluent which has an inhibitory effect on 25% of the test organisms for the monitored effect, as compared to the control (IC_{25}):

$$TU_c = 100/IC_{25}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

$$TU_c = 100/\text{geometric mean of NOEC and LOEC}$$

Where NOEC is No Observable Effect Concentration and LOEC is Lowest Observable Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration of effluent that is lethal to 50 percent of the exposed organisms (LC_{50}) for the most sensitive test species:

$$TU_a = 100/LC_{50}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a wasteload allocation based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 9. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 5, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 10.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 11 presents the final effluent limits and monitoring requirements proposed for Casting Solutions outfalls 0IS00000001, 0IS00000002, 0IS00000003, 0IS00000004, 0IS00000005, 0IS00000008, 0IS00000010, and 0IS00000091 and the basis for their recommendation.

Outfall 001(and Outfall 091)

This outfall discharges wastewater from surface runoff, roof drains, and non-contact cooling water. Limits for pH which are based upon WQS are proposed to continue. In addition, monitoring is proposed to continue for flow rate, water temperature, total suspended solids (TSS), copper, zinc, and oil and grease. Monitoring for temperature is appropriate since this discharge includes cooling water, while TSS and oil and grease monitoring are indicated based upon the contribution of surface water runoff and roof drains. Monitoring for precipitation, copper, and zinc is based upon BPJ. Monitoring for total residual chlorine has been included based upon BPJ since chlorinated City water is sometimes used within the plant.

DMR data from the previous five years suggests that increased monitoring for copper and zinc is justified because the concentration of these metals has been found to be relatively high at this outfall during storm events. Of the last 11 monitoring events, 5 were above the Effluent Limits to Maintain Applicable WQ Criteria (Table 9). Monitoring requirements have been proposed to continue in order to collect data regarding stormwater contamination and additional monitoring has also been proposed.

Because there have been several high concentrations of copper and zinc at outfall 0IS00000001, identification of the source of the pollutants is recommended to located and resolved. Since outfall 0IS00000001 discharges both surface runoff and non-contact cooling water, additional monitoring is necessary to determine where high metal concentrations may be originating. The new fictitious outfall 0IS00000091 has been developed to monitor dry weather events. Therefore, monthly monitoring during wet weather will occur at outfall 0IS00000001, as has been done in the previous permit; and monthly monitoring during dry weather will occur at outfall 0IS00000091.

As can be read in the compliance schedule in Part 1, C of the proposed permit, if reasonable potential is determined, a pollution mitigation plan shall be triggered. Reasonable potential would exist if a detection for either parameter that exceeds the above concentrations of 63 µg/L for copper and 495 µg/L for zinc (110% of the Effluent Limits to Maintain Applicable WQ Criteria) is observed.

Outfall 002

Outfall 002 discharges wastewater from roof drains and non-contact cooling water. Limits for pH are proposed to continue. In addition, monitoring is proposed to continue for flow rate and water temperature. Monitoring for

temperature is appropriate since this discharge includes cooling water, and Casting Solutions has reported some high discharge temperatures at this outfall. Monitoring for precipitation and copper at outfall 002 is based upon best professional judgment. New monitoring for Zinc and TSS is proposed based on best professional judgment. Monitoring requirements have been proposed to continue in order to collect data regarding stormwater contamination and to determine if additional measures are needed to reduce contamination. Monitoring for total residual chlorine has been included based upon BPJ since chlorinated City water is sometimes used within the plant.

Outfall 003

This outfall discharges treated sanitary wastewater generated from the Casting Solutions facility. Limits for pH, dissolved oxygen, and *E. coli* are based upon Ohio WQS. The additional limits for *E. coli* take the place of fecal coliform limits which are proposed to be dropped from the permit. The limits for TSS and 5 day carbonaceous biochemical oxygen demand ($CBOD_5$) are consistent with the secondary treatment standards found in 40 CFR 133. Parameters to check for color and odor of the effluent were removed from this outfall because they are no longer included in monitoring guidance for sanitary discharges. The other parameters which are to be monitored at outfall 003 are appropriate for sanitary discharges, and are proposed to continue from the existing permit.

Outfall 004

The discharges from outfall 004 consist of non-contact cooling water. The draft permit proposes to continue the limits for pH and the monitoring requirements for flow rate and water temperature. Monitoring for temperature is appropriate since this outfall discharges cooling water. Monitoring for total residual chlorine has been added for this outfall based upon BPJ since chlorinated City water is sometimes used within the plant.

Outfall 005

The limits and monitoring requirements for this outfall are determined by: 1) Ohio EPA's risk assessment (Table 10); 2) the loading calculations based upon Federal Effluent Guidelines (FEG); and 3) BPJ. (See Attachments A, B, and C.)

Ohio EPA's risk assessment (Table 10) places Strontium and Nitrate + Nitrites in Group 2; and Chlorides, Magnesium, and Manganese in Group 1. This placement as well as the data in Tables 5 and 6 supports that these parameters should not pose an environmental hazard and neither limits nor additional monitoring is necessary to protect water quality.

Ohio EPA's risk assessment (Table 10) places copper in Group 4; and barium, lead, selenium, total filterable residue (total dissolved solids), nickel, zinc, iron, and phenols in Group 3. For nickel, this placement as well as the data in Tables 5 and 6 supports that these parameters should not pose an environmental hazard and limits are not necessary to protect water quality. However, monitoring is proposed to continue to ensure that pollutant concentrations remain at levels which will not negatively impact water quality. While barium, selenium, total dissolved solids, and iron were all placed in Group 3, none of these parameters had a PEQ greater than 2.5% of the maximum PEL and thus monitoring is not required for these parameters.

Monitoring for cadmium, free cyanide, and silver is proposed to remain because discharges of these pollutants are typical of this type of facility. However, monitoring at the continued reduced frequency is proposed because there were no detections made of any of these parameters.

Monitoring frequencies for oil and grease are proposed to decrease. There was a single detection of oil and grease in the past 219 observations over the past five years. Therefore oil and grease is proposed to be monitored on a quarterly basis.

Monitoring frequencies for acute toxicity using *Ceriodaphnia dubia* are also proposed to decrease. There were three detections of acute toxicity in twelve observations over the past four years, none of which were higher than 0.3 TUa. Therefore annual acute toxicity monitoring is proposed for the life of the permit at Outfall 0IS00000005 without downstream monitoring. Evaluating the whole effluent toxicity data presented in Table 7 and other pertinent data under the provisions of OAC 3745-33-07(B) placed Casting Solutions plant in Category 4 with respect to whole effluent toxicity. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed which will adequately characterize toxicity in the plant's effluent.

Although limits are not required for copper, lead, phenols, TSS, and zinc based upon the reasonable potential analysis, loading limits for copper, lead, phenols, TSS, and zinc are required by the Federal Effluent Guidelines (FEG). (See Attachment C.) Loading limits for copper, lead, phenols, TSS, and zinc are based upon the FEG, and concentration limits for lead and the 30-day average loading limit for zinc have been "back-calculated" from the loading limits. The daily maximum concentration limits back-calculated for copper and zinc are less stringent than the corresponding water quality-based effluent limits (WQBELs) found in Table 9. Since a permit must not impose limits which would not be protective of water quality (i.e., limits less stringent than the WQBELs), the permit includes the WQBELs for copper and zinc daily maximum concentration limits.

The minimum limit for pH of 7.0 standard units is based upon the FEGs, while the maximum pH limit of 9.0 standards units is based upon WQS. In the previous permit pH limits had been removed from the permit and three new reporting codes had been added in order to accommodate excursions from these limits without generating violations. Loading limits for TSS and total phenols are based upon the existing limits based upon FEGs while concentration limits for these parameters have been back-calculated using the loading limits. Concentration limits for oil and grease are based upon the existing limits and back-calculation of loading limits, while the loading limits are based upon the FEG as well as anti-backsliding and anti-degradation. Monitoring for water temperature is appropriate since boiler blowdown is discharged at this outfall, while tracking precipitation provides data regarding the stormwater contribution for the total wastewater flow. Monitoring for total residual chlorine has been added for this outfall based upon BPJ since chlorinated City water is sometimes used within the plant.

The Ohio EPA risk assessment (Table 10) places mercury in group 5. This placement as well as the data in Tables 3, 4 and 6 indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality.

To comply with mercury limits, the permittee has applied for coverage under the general mercury variance, Rule 3745-33-07(D)(10) of the OAC. Based on the results of low-level mercury monitoring, the permittee has determined that it cannot meet the 30-day average water quality-based effluent limit (WQBEL) of 12 nanograms per liter (ng/L). However, the permittee believes that the plant will be able to achieve an annual average mercury effluent concentration of 12 ng/L. The variance application also demonstrated to the satisfaction of Ohio EPA that there is no readily apparent means of complying with the WQBEL without constructing prohibitively expensive end-of-pipe controls for mercury. Based on these factors, the permittee is eligible for coverage under the general mercury variance.

Ohio EPA has reviewed the mercury variance application and has determined that it meets the requirements of the OAC. Items C and D in Part II of the draft NPDES permit list the provisions of the mercury variance, and includes the following requirements:

- A variance-based monthly average effluent limit of 33 ng/L, which was developed from sampling data submitted by the permittee;
- A requirement that the permittee make reasonable progress to meet the WQBEL for mercury by implementing the plan of study, which has been developed as part of the Pollutant Minimization Program (PMP);

- Low-level mercury monitoring of the plant's influent and effluent;
- A requirement that the annual average mercury effluent concentration is less than or equal to 12 ng/L as specified in the plan of study;
- A summary of the elements of the plan of study;
- A requirement to submit an annual report on implementation of the PMP; and
- A requirement for submittal of a certification stating that all permit conditions related to implementing the plan of study and the PMP have been satisfied, but that compliance with the monthly average WQBEL for mercury has not been achieved.

Outfalls 008 and 010

Outfalls 008 and 010 discharge stormwater runoff from facility property. Monitoring is proposed to continue for flow rate, TSS, precipitation, copper, and zinc. Monitoring requirements have been proposed to continue in order to collect data regarding stormwater contamination and to determine if additional measures are needed to reduce contamination.

Benchmarks have been included in the permit renewal for parameters associated with storm water. Benchmarks can be found at outfalls 0IS00000001, 0IS00000002, 0IS00000008, and 0IS00000010. While these benchmarks are not limits, they are guidelines for a permittee to follow in reference to the concentrations of specific parameters in storm water. The benchmarks in this permit include:

Parameter	Benchmark
Total Suspended Solids	100 mg/L
Copper	28.5 µg/L
Zinc	230 µg/L

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: land application, removal to sanitary landfill or transfer to another facility with an NPDES permit.

Additional monitoring requirements proposed at the final effluent, influent and upstream/downstream stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

Other Requirements

Operator Certification

Operator certification requirements have been included in Part II, Item A of the permit in accordance with rules adopted in December 2006. These rules require the Casting Solutions facility to have a Class A wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 0IS00000003.

Operator of Record

In December 2006, rule revisions became effective that affect the requirements for certified operators for sewage collection systems and treatment works regulated under NPDES permits. Part II, Item A of this NPDES permit is included to implement OAC 3745-7-02. It requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works

Outfall Signage

Part II of the permit includes requirements for the permittee to place a sign at each outfall to the receiving stream providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Section 316(b) Compliance

Under Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326), cooling water intakes are required to use best technology available (BTA) to minimize adverse environmental impact resulting from the operation of the intake. Information supplied from the permittee regarding the intake structure and other pertinent data include the following:

- Maximum design intake flow rate – 200 gpm, or 0.288 MGD
- Normal operation of intake flow rate – 80 gpm, or 0.115 MGD
- Percentage of intake flow used for cooling purposes – 100 percent;
- Casting Solutions currently operates the cooling water system as a once-through cooling system;
- Maximum through-screen design intake velocity – 0.095 feet/second for 24 inch intake and 0.417 feet/second for 8 inch intake;
- Impingement/entrainment data – no data is available; permittee noted that supply tank is cleaned yearly;
- Operation of cooling water system – operates daily throughout the year except when during shutdown periods;
- Description of screens, technologies, and operational measures used to reduce I/E – Inlet screens are a Type WI Series Basket Strainer, carbon steel construction with Type 304 Stainless Steel 1/8 inch wire cloth mesh. Pneumatic eductors are used in each inlet port to reduce impingement and are set on a programmed timer. (They cycle every eight minutes for five seconds to maintain screen openings.) Additionally, preventive maintenance is performed to assure the eductors are operating properly. They are checked every shift;

Ohio EPA has evaluated this information, and at this time, has determined that the cooling water intake structure represents BTA in accordance with Section 316(b) of the Clean Water Act. This conclusion has been reached based upon several factors, including:

1) The design intake flow rate is a very small percentage of the critical low flow (7Q10 flow) of the Licking River – less than one percent.
2) The maximum through-screen design flow velocity is well below a threshold value of 0.5 feet per second for the larger intake, and slightly below 0.5 feet per second for the smaller intake. [0.5 feet per second is used as a design standard for new cooling water intake structures (CWIS), and was used in rules for existing power plants with CWIS as a compliance alternative];
3) The intake structure uses screens with 1/8 inch sized openings, which should reduce the number of small organisms passing through the screens.

The draft permit includes information pertaining to the intake structure to be submitted with the next permit renewal application.

Storm Water Compliance

Parts IV, V, and VI have been included with the draft permit to ensure that any storm water flows from the facility site are properly regulated and managed. Explanation of proposed benchmarks at outfalls 0IS00000001, 0IS00000002, 0IS00000008, and 0IS00000010 for storm water are explained in this part of the permit. The

benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation.

Figure 1. Location of Casting Solutions

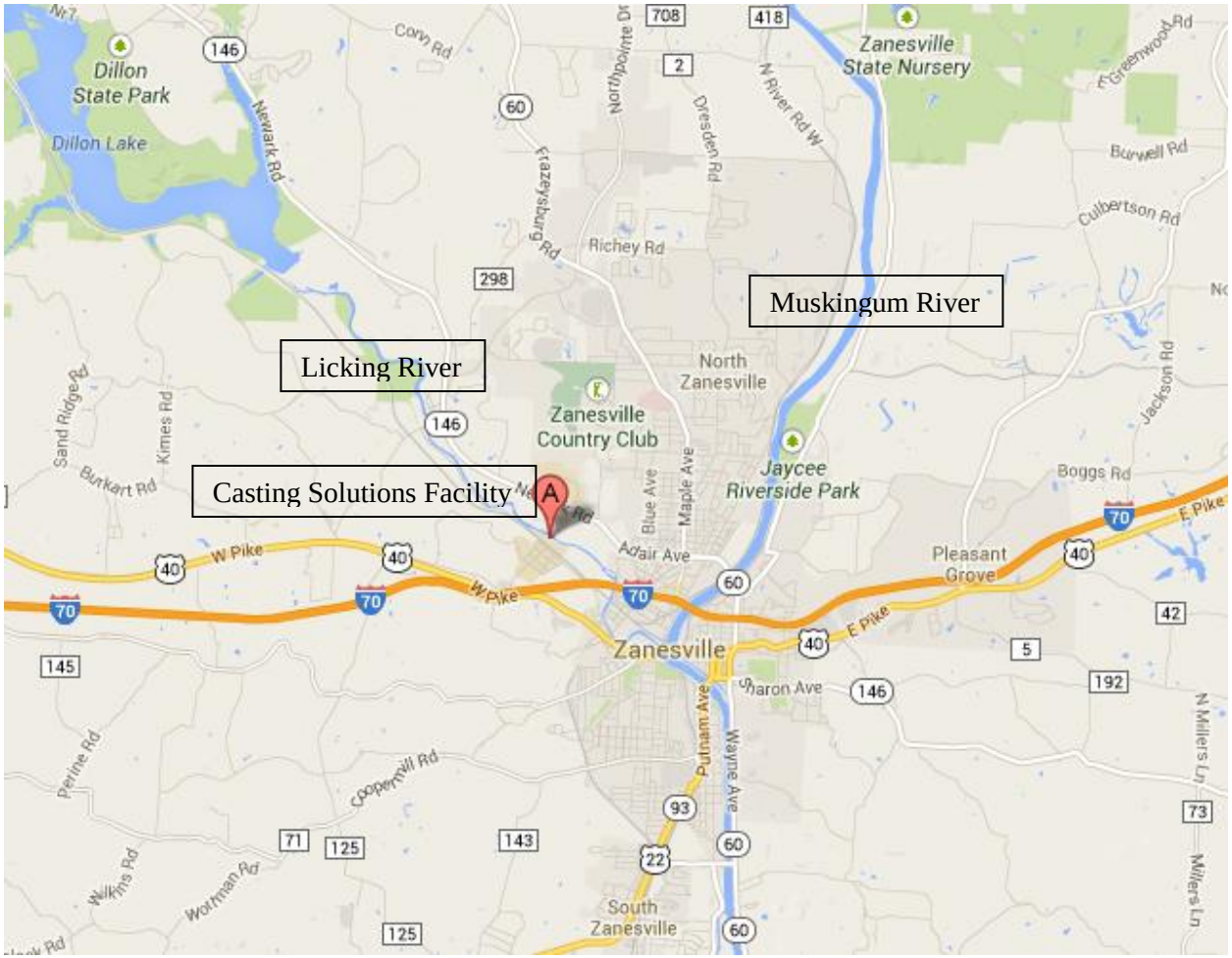


Figure 2. Facility Wastewater Schematic

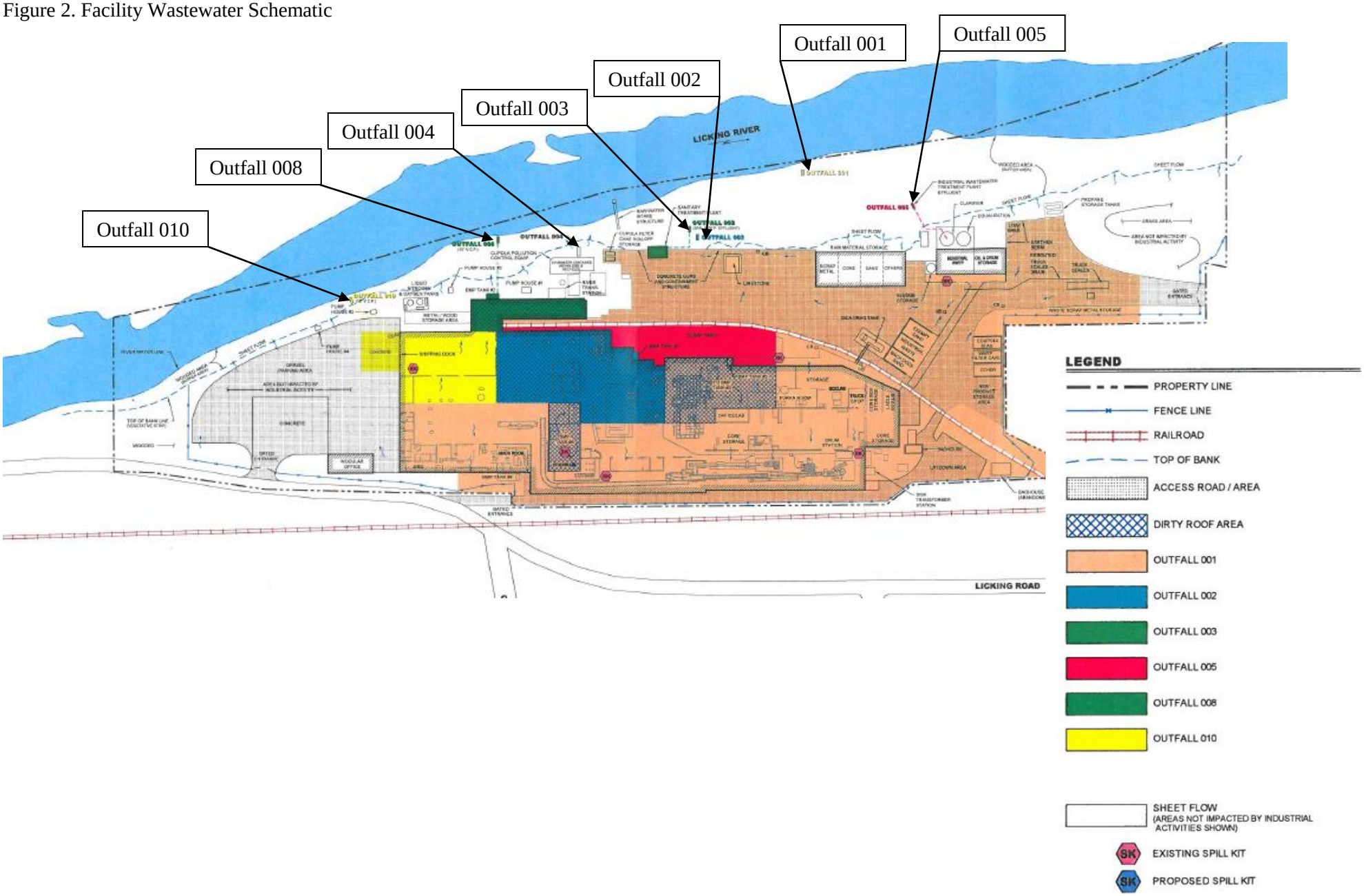
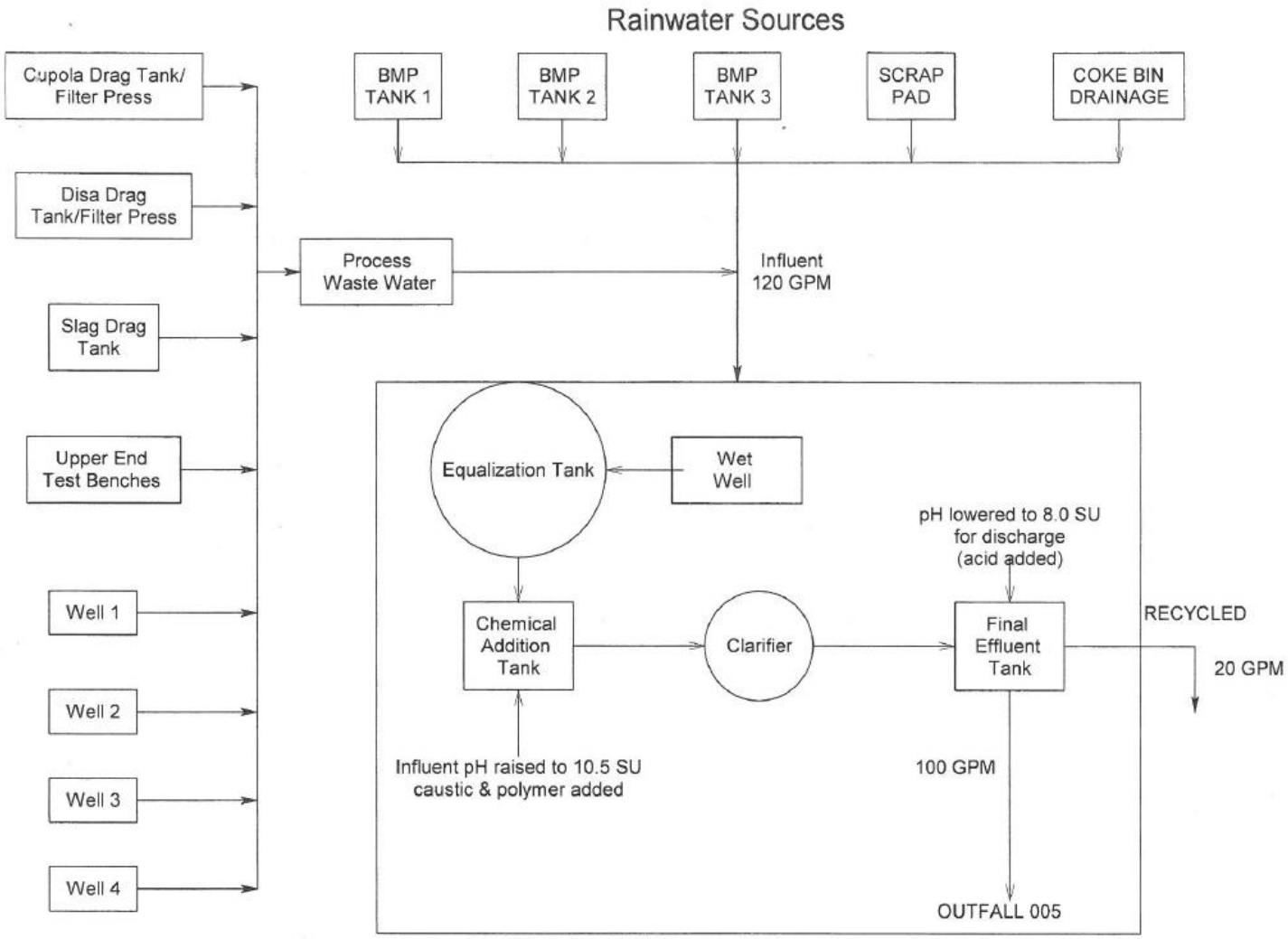


Figure 3. Industrial Wastewater Flow Diagram



Tables 3a through 3e. Effluent Characterization Using Ohio EPA and Form 2C Data

Summary of analytical results for Casting Solutions outfalls 0IS00000001, 0IS00000002, 0IS00000003, 0IS00000004, and 0IS00000005. Units µg/L unless otherwise noted; NA = not analyzed; ND = not detected (detection limit); MGD=Million gallons per day

Table 3a: Effluent Characterization Using Ohio EPA & Form 2C Data						
PARAMETER	**Ohio EPA**	**Form 2C**				
Typical Parmaters	**3/20/2012**	**Outfall 001**	**Outfall 002**	**Outfall 003**	**Outfall 004**	**Outfall 005**
Ammonia (mg/L)	0.208	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.519
Biochemical Oxygen Demand (mg/L)	ND (2)	2	ND (2)	5	2	0.42
Chemical Oxygen Demand (mg/L)	ND (20)	ND (5)	ND (5)	11	ND (5)	ND (5)
Fecal Coliform (#/100mL)	NA	NA	NA	ND (1)	NA	NA
Flow (MGD)	NA	0.248	0.418	0.001	0.079	0.055
Nitrite+Nitrate (mg/L)	1.57	NA	NA	NA	NA	NA
Oil and Grease (mg/L)	ND (2.1)	ND (3)	ND (3)	ND (3)	ND (3)	ND (3)
pH (maximum) (S.U.)	NA	8.4	8.2	7.8	8.3	9
pH (minimum) (S.U.)	NA	7.3	7.2	6.6	7.2	7
Temperature, summer (°C)	NA	32	41	25	34	35
Temperature, winter (°C)	NA	10	10	10	10	10
Total Dissolved Solids (mg/L)	686	NA	NA	NA	NA	NA
Total Organic Carbon (mg/L)	NA	1.7	2.3	6.5	1.7	ND (5)
Total Suspended Solids (mg/L)	8	ND (3)	5	4	ND (3)	7

Table 3b. Effluent Characterization (Continued)		
PARAMETER	**Ohio EPA**	**Form 2C**
Metals, Cyanide, and Phenols	**3/20/2012**	**Outfall 005**
Aluminum	ND (200)	570
Antimony	NA	ND (8)
Arsenic	ND (2)	ND (6)
Barium	16	NA
Beryllium	NA	ND (1)
Cadmium	ND (0.2)	ND (1)
Chromium	ND (2)	ND (10)
Copper	10.5	ND (10)
Iron	314	495
Lead	2.1	9
Magnesium (mg/L)	16	NA
Manganese	26	41
Mercury	NA	ND (1)
Nickel	2.2	ND (20)
Selenium	5.2	ND (40)
Silver	NA	ND (2)
Strontium	229	NA
Thallium	NA	ND (4)
Total Cyanide	ND (10)	ND (0.02)
Total Phenol	64.2	ND (50)
Zinc	12	52

Table 3c. Effluent Characterization (Continued)		
PARAMETER	**Ohio EPA**	**Form 2C**
Volatile Compounds	**3/20/2012**	**Outfall 005**
Accrolein	NA	ND (100)
Acrylonitrile	NA	ND (100)
Benzene	ND (0.5)	ND (5)
Bis(Chloromethyl) Ether	NA	ND (5)
Bromoform	ND (0.5)	ND (5)
Carbon Tetrachloride	ND (0.5)	ND (5)
Chlorobenzene	ND (0.5)	ND (5)
Chlorodibromomethane	NA	ND (5)
Chloroethane	ND (0.5)	ND (5)
2-Chloroethylvinyl Ether	NA	ND (5)
Chloroform	ND (0.5)	ND (5)
Dichlorobromomethane	NA	ND (5)
Dichlorodifluoromethane	ND (0.5)	ND (5)
1, 1-Dichloroethane	ND (0.5)	ND (5)
1, 2-Dichloroethane	ND (0.5)	ND (5)
1, 1-Dichloroethylene	NA	ND (5)
1, 2-Dichloropropane	ND (0.5)	ND (5)
1, 3-Dichloropropylene	ND (0.5)	ND (5)
Ethylbenzene	ND (0.5)	ND (5)
Methyl Bromide	NA	ND (5)
Methyl Chloride	ND (0.5)	ND (5)
Methylene chloride	ND (0.5)	ND (5)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (5)
Tetrachloroethylene	ND (0.5)	ND (5)
Toluene	ND (0.5)	ND (5)
1,2-trans-Dichloroethylene	NA	ND (5)
1,1,1-Trichloroethane	ND (0.5)	ND (5)
1,1,2-Trichloroethane	ND (0.5)	ND (5)
Trichloroethylene	ND (0.5)	ND (5)
Vinyl chloride	ND (0.5)	ND (5)

Table 3d. Effluent Characterization (Continued)		
PARAMETER	**Ohio EPA**	**Form 2C**
Base/Neutral Compunds	**3/20/2012**	**Outfall 005**
Acenaphthene	ND (6.6)	ND (10)
Acenaphthylene	ND (6.6)	ND (10)
Athracene	ND (2.6)	ND (10)
Benzidine	NA	ND (50)
Benzo(a)anthracene	ND (2.6)	ND (10)
Benzo(a)pyrene	ND (2.6)	ND (10)
3,4-Benzofluoranthene	ND (2.6)	ND (10)
Benzo(ghi)perylene	ND (2.6)	ND (10)
Benzo(k)fluoranthene	ND (2.6)	ND (10)
Bis(2-chloroethoxy)methane	ND (2.6)	ND (10)
Bis(2-chloroethyl)ether	ND (2.6)	ND (10)
Bis(2-chloroisopropyl)ether	ND (2.6)	ND (10)
Bis(2-ethylhexyl)phthalate	ND (13.2)	ND (5)
4-Bromophenyl phenyl ether	ND (6.6)	ND (10)
Butyl benzyl phthalate	ND (2.6)	ND (10)
2-Chloronapthalene	ND (6.6)	ND (10)
4-Chlorophenyl phenyl ether	ND (2.6)	ND (10)
Chrysene	ND (2.6)	ND (10)
Dibenzo(a,h)anthracene	ND (2.6)	ND (10)
1,2-Dichlorobenzene	ND (2.6)	ND (5)
1,3-Dichlorobenzene	ND (2.6)	ND (5)
1,4-Dichlorobenzene	ND (2.6)	ND (5)
3,3-Dichlorobenzidine	NA	ND (20)
Diethyl phthalate	ND (6.6)	ND (10)
Dimethyl phthalate	ND (6.6)	ND (10)
Di-n-butyl phthalate	ND (6.6)	ND (10)
2,4-Dinitrotoluene	ND (2.6)	ND (20)
2,6-Dinitrotoluene	ND (2.6)	ND (10)
Di-n-octyl phthalate	ND (2.6)	ND (10)
1,2-Diphenylhydrazine	NA	ND (10)
Fluoranthene	ND (2.6)	ND (10)
Fluorene	ND (2.6)	ND (10)
Hexachlorobenzene	ND (2.6)	ND (10)
Hexachlorobutadiene	ND (2.6)	ND (10)
Hexachlorocyclopentadiene	ND (2.6)	ND (10)
Hexachloroethane	ND (6.6)	ND (10)
Indeno(1,2,3-cd)pyrene	ND (2.6)	ND (20)

Isophorone	ND (2.6)	ND (10)
Naphthalene	ND (2.6)	ND (10)
Nitrobenzene	ND (2.6)	ND (10)
N-nitrosodimethylamine	NA	ND (10)
N-nitrosodi-n-propylamine	ND (2.6)	ND (10)
N-nitrosodiphenylamine	ND (2.6)	ND (10)
Phenathrene	ND (2.6)	ND (10)
Pyrene	ND (2.6)	ND (10)
1,2,4-Trichlorobenzene	ND (2.6)	ND (10)

Table 3e. Effluent Characterization (Continued)

PARAMETER	**Ohio EPA**	**Form 2C**
Acid Compunds	**3/20/2012**	**Outfall 005**
2-Chlorophenol	ND (2.6)	ND (10)
2,4-Dichlorophenol	ND (2.6)	ND (10)
2,4-Dimethylphenol	ND (13.2)	ND (10)
4,6-Dinitro-o-cresol	NA	ND (50)
2,4-Dinitrophenol	ND (26.3)	ND (50)
2-Nitrophenol	ND (2.6)	ND (10)
4-Nitrophenol	ND (26.3)	ND (50)
p-Chloro-m-cresol	NA	ND (50)
Pentachlorophenol	ND (2.6)	ND (50)
Phenol	64.2	ND (10)
2,4,6-Trichlorophenol	ND (6.6)	ND (20)

Table 4. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Casting Solutions outfalls 0IS00000001, 0IS00000002, 0IS00000003, 0IS00000004, and 0IS00000005 (January 2008 - December 2012). All values are based on annual records unless otherwise indicated. a = weekly average. MGD = Million Gallons per Day; GPD = Gallons per Day; TUa = Acute Toxicity Units; $CBOD_5$ = 5-day carbonaceous biochemical oxygen demand; Phenolic 4AAP = Phenols with 4- aminoantipyrine

* For minimum pH, 5th percentile shown in place of 50th percentile;
** For dissolved oxygen, 5th percentile shown in place of 95th percentile;
*** Chlorine monitoring is only performed when chlorinated water is used in the industrial process

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	Cº	- - - - Monitor - - - -		1240	27	39	5-41
Total Precipitation	Annual	Inches	- - - - Monitor - - - -		12	0.44	1.55	0.11-1.92
Dry Days Preceding Precipitation Event	Annual	days	- - - - Monitor - - - -		12	3	15.2	3-19
pH	Annual	S.U.	Between 6.5 and 9.0		258	7.5	8.1	6.8-8.6
Total Suspended Solids	Annual	mg/L	- - - - Monitor - - - -		11	180	777	0-810
Oil and Grease	Annual	mg/L	- - - - Monitor - - - -		11	0	0	0-0
Copper	Annual	µg/L	- - - - Monitor - - - -		11	47	279	0-291
Zinc	Annual	µg/L	- - - - Monitor - - - -		11	400	2110	22-2250
Chlorine, Total Residual	Annual	mg/L	- - - - Monitor - - - -		--	--	--	--
Flow Rate	Annual	MGD	- - - - Monitor - - - -		1252	0.2	0.326	0.0326-0.39
Outfall 002								
Water Temperature	Annual	Cº	- - - - Monitor - - - -		1138	33	42	5-46
Total Precipitation	Annual	Inches	- - - - Monitor - - - -		12	0.44	1.55	0.11-1.92
Dry Days Preceding Precipitation Event	Annual	days	- - - - Monitor - - - -		12	3	15.2	3-19
pH	Annual	S.U.	Between 6.5 and 9.0		232	7.5	8.2	6.7-8.6
Copper	Annual	µg/L	- - - - Monitor - - - -		11	0	17.5	0-35
Chlorine, Total Residual	Annual	mg/L	- - - - Monitor - - - -		--	--	--	--
Flow Rate	Annual	MGD	- - - - Monitor - - - -		1156	0.406	0.466	0-0.466

Table 4. Effluent Characterization Using Self-Monitoring Data (Continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 003								
Flow Rate	Annual	GPD	- - - - Monitor - - - -		831	1100	2230	17-3310
Color, Severity	Annual	Units	- - - - Monitor - - - -		1249	0	0	0-0
Dissolved Oxygen	Annual	mg/L	Not Less than 5.0		258	8.69	9.88	6.7-10.6
pH	Annual	S.U.	Between 6.5 and 9.0		258	7.1	7.8	6.3-8.9
Total Suspended Solids	Annual	mg/L	30	45	62	9	27	0-44
Ammonia	Annual	mg/L	- - - - Monitor - - - -		60	0	4.39	0-26.5
Odor, Severity	Annual	Units	- - - - Monitor - - - -		1249	0	0	0-0
Turbidity, Severity	Annual	Units	- - - - Monitor - - - -		1249	0	0	0-0
Fecal Coliform	Annual	#/100 ml	1000	2000	36	3	532	0-9100
Flow Rate	Annual	MGD	- - - - Monitor - - - -		374	0.001	0.002	0.001-0.004
$CBOD_5$	Summer	mg/L	25	40	59	1	5.5	0-12
Outfall 004								
Water Temperature	Annual	Cº	- - - - Monitor - - - -		1216	33	45	0-48
pH	Annual	S.U.	Between 6.5 and 9.0		256	7.5	8.1	6.8-8.7
Chlorine, Total Residual	Annual	mg/L	- - - - Monitor - - - -		0	--	--	--
Flow Rate	Annual	MGD	- - - - Monitor - - - -		1242	0.079	0.079	0.079-0.079

Table 4. Effluent Characterization Using Self-Monitoring Data (Continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 005								
Water Temperature	Annual	C°	- - - - Monitor - - - -		1082	24	34	2-38
Total Precipitation	Annual	Inches	- - - - Monitor - - - -		1235	0	0.556	0-2.09
Total Suspended Solids	Annual	mg/L	17.1	54.2	219	4	16.1	0-33
Oil and Grease	Annual	mg/L	8.39	20	219	0	0	0-4
Free Cyanide	Annual	mg/L	- - - - Monitor - - - -		10	0	0	0-0
Cadmium	Annual	µg/L	- - - - Monitor - - - -		10	0	0	0-0
Copper	Annual	µg/L	--	57	219	0	27.1	0-57
Lead	Annual	µg/L	276	563	219	0	12	0-38
Nickel	Annual	µg/L	- - - - Monitor - - - -		10	0	51.1	0-70
Silver	Annual	µg/L	- - - - Monitor - - - -		10	0	0	0-0
Zinc	Annual	µg/L	393	450	219	11	58.1	0-151
Phenolic, 4-amino-antipyrine	Annual	µg/L	248	712	220	0	156	0-3720
Chlorine	Annual	mg/L	- - - - Monitor - - - -		--	--	--	--
Flow Rate	Annual	MGD	- - - - Monitor - - - -		1085	0.048	0.073	0.003-0.135
Mercury	Annual	ng/L	- - - - Monitor - - - -		14	16	52.5	4.49-95.7
pH Range Excursion, Maximum Duration	Annual	Minutes	--	60	751	0	2	0-130
Acute Toxicity, *Ceriodaphnia dubia*	Annual	TU_a	- - - - Monitor - - - -		14	0	0.3	0-0.3
pH, Maximum	Annual	S.U.	- - - - Monitor - - - -		1086	8.4	9.1	8-11.4
pH, Minimum	Annual	S.U.	- - - - Monitor - - - -		1086	7.9	8.1	1.3-8.6
pH Range Excursions, > 60 Minutes	Annual	Number/Day	--	0	751	0	0	0-1
pH Range Excursions, Monthly Total Duration	Annual	Minutes	--	446	41	2	72	0-250

Table 4. Effluent Characterization Using Self-Monitoring Data (Continued)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 008								
Total Precipitation	Annual	Inches	- - - - Monitor - - - -		11	0.46	1.59	0.11-1.92
Flow Rate	Annual	GPD	- - - - Monitor - - - -		130	644	2500	4-4210
Dry Days Preceding Precipitation Event	Annual	days	- - - - Monitor - - - -		11	3	15.5	3-19
Total Suspended Solids	Annual	mg/L	- - - - Monitor - - - -		10	6	10	0-10
Copper	Annual	µg/L	- - - - Monitor - - - -		10	0	14.3	0-17
Zinc	Annual	µg/L	- - - - Monitor - - - -		10	145	270	96-271
Flow Rate	Annual	MGD	- - - - Monitor - - - -		156	0.001	0.001	0.001-0.001
Outfall 010								
Total Precipitation	Annual	Inches	- - - - Monitor - - - -		12	0.44	1.55	0.11-1.92
Flow Rate	Annual	GPD	- - - - Monitor - - - -		331	1440	9280	110-18800
Dry Days Preceding Precipitation Event	Annual	days	- - - - Monitor - - - -		12	3	15.2	3-19
Total Suspended Solids	Annual	mg/L	- - - - Monitor - - - -		11	24	361	3-643
Copper	Annual	µg/L	- - - - Monitor - - - -		11	10	52	0-65
Zinc	Annual	µg/L	- - - - Monitor - - - -		11	95	200	36-237
Flow Rate	Annual	MGD	- - - - Monitor - - - -		156	0.001	0.001	0.001-0.001

Table 5. Effluent Data for the Casting Solutions: Outfall 005

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia-Summer	mg/L	1	1	0.941408	1.2896
Barium	µg/L	1	1	72.416	99.2
Chlorides	mg/L	1	1	367.0586	502.82
Copper	µg/L	220	96	19.81	29.02
Dissolved solids	mg/L	1	1	3104.836	4253.2
Iron	µg/L	1	1	1421.164	1946.8
Lead	µg/L	220	99	11.03	15.15
Magnesium	mg/L	1	1	72.416	99.2
Manganese	µg/L	1	1	117.676	161.2
Mercury	ng/L	14	14	51.55	91.68
Nickel	µg/L	11	4	86.87	119
Nitrate + Nitrite	mg/L	1	1	7.10582	9.734
Phenol	µg/L	221	43	206.55	215.79
Selenium	µg/L	1	1	23.5352	32.24
Strontium	µg/L	1	1	1036.454	1419.8
Zinc	µg/L	220	117	42.5	62.47

Table 6. Water Quality Criteria in the Study Area

		Outside Mixing Zone Criteria				Inside
		Average			Maximum	Mixing
		Human	Agri-	Aquatic	Aquatic	Zone
Parameter	Units	Health	culture	Life	Life	Maximum
Ammonia-Summer	mg/L	--	--	0.8	--	--
Ammonia-Winter	mg/L	--	--	3.3	--	--
Barium	µg/L	--	--	220	2000	4000
Chlorides	mg/L	--	--	--	--	--
Copper	µg/L	1300	500	18	29	57
Dissolved solids	mg/L	--	--	1500	--	--
Iron	µg/L	--	5000	--	--	--
Lead	µg/L	--	100	17	320	640
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Nickel	µg/L	4600	200	99	890	1800
Nitrate + Nitrite	mg/L	--	100	--	--	--
Phenol	µg/L	4600000	--	400	4700	9400
Selenium	µg/L	11000	50	5	--	--
Strontium	µg/L	--	--	21000	40000	81000
Zinc	µg/L	69000	25000	230	230	450

Table 7. Toxicity Testing at Casting Solutions			
Date	Percent Affected Upstream	Toxicity at Outfall 005 (TU_a)	Percent Affected Downstream
8/12/2009	0	ND	0
12/2/2009	0	0.2	0
3/3/2010	0	ND	0
6/2/2010	0	ND	0
8/4/2010	0	ND	0
12/1/2010	0	0.3	5
3/1/2011	0	ND	0
6/1/2011	0	ND	0
8/1/2011	0	ND	0
12/7/2011	0	ND	0
3/7/2012	0	0.3	0
6/6/2012	0	ND	0
8/1/2012	0	ND	0
12/5/2012	0	ND	0

*ND = Not Detected, TUa = Acute Toxicity Unit

Table 8. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	53.54	USGS Gage 03147500
7Q10	cfs	annual	63.84	USGS Gage 03147500
30Q10	cfs	summer	72.08	USGS Gage 03147500
		winter	154.45	USGS Gage 03147500
90Q10	cfs	annual	0	
Harmonic Mean	cfs	annual	248.15	USGS Gage 03147500
Mixing Assumption	%	average	25	
	%	maximum	25	
Hardness	mg/L	annual	213	Station R13S34, n=5, 2008 data
pH	S.U.	summer	8	
Temperature	C	summer	27.1	
Casting Solutions flow	cfs	annual	0.074256	PEQ average of flow rates 2008-2012

*cfs = Cubic Feet/second; USGS = United States Geological Survey; n = Number of Samples; PEQ = Projected Effluent Quality

Table 8. Instream Conditions and Discharger Flow (Continued)

Parameter	Units	Value	Basis
Background Water Quality			
Ammonia-Summer	mg/L	0.145	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Ammonia-Winter	mg/L	0	No representative data available.
Barium	µg/L	65.67	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Chlorides	mg/L	53.26	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Copper	µg/L	2.31	OEPA; 6/25/08-3/19/12; n=9; 3<MDL; Station R13S27; mean value
Dissolved solids	mg/L	336.44	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Iron	µg/L	1174.25	OEPA; 6/25/08-3/19/12; n=8; 0<MDL; Station R13S27; mean value
Lead	µg/L	1.275	OEPA; 6/25/08-3/19/12; n=8; 7<MDL; Station R13S27; mean value
Magnesium	mg/L	17.25	OEPA; 6/25/08-3/19/12; n=8; 0<MDL; Station R13S27; mean value
Manganese	µg/L	169.75	OEPA; 6/25/08-3/19/12; n=8; 0<MDL; Station R13S27; mean value
Mercury	ng/L	0	No representative data available.
Nickel	µg/L	3.1	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Nitrate + Nitrite	mg/L	0.874	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Phenol	µg/L	0	No representative data available.
Selenium	µg/L	0	OEPA; 6/25/08-3/19/12; n=9; 9<MDL; Station R13S27; all values below DL
Strontium	µg/L	382.11	OEPA; 6/25/08-3/19/12; n=9; 0<MDL; Station R13S27; mean value
Zinc	µg/L	9.89	OEPA; 6/25/08-3/19/12; n=9; 7<MDL; Station R13S27; mean value

*MDL = Method Detection Limit; OEPA = Ohio Environmental Protection Agency; DL = Detection Limit; n = Number of Samples

Table 9. Summary of Effluent Limits to Maintain Applicable WQ Criteria

		Outside Mixing Zone Criteria				Inside Mixing Zone
		Average			Maximum	
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Maximum
Ammonia-Summer	mg/L	--	--	0.8	--	--
Ammonia-Winter	mg/L	--	--	3.3	--	--
Barium	µg/L	--	--	33390	350672	4000
Chlorides	mg/L	--	--	--	--	--
Copper	µg/L	1085461	416297	3390	4840	57
Dissolved solids	mg/L	--	--	251586	--	--
Iron	µg/L	--	3201240	--	--	--
Lead	µg/L	--	82580	3397	57772	640
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Mercury	ng/L	12	10000	910	1700	3400
Nickel	µg/L	3845100	164701	20711	160758	1800
Nitrate + Nitrite	mg/L	--	82915	--	--	--
Phenol	µg/L	3847690121	--	86373	851898	9400
Selenium	µg/L	9200998	41823	1080	--	--
Strontium	µg/L	--	--	4452447	7181315	81000
Zinc	µg/L	57707089	20903097	47539	39906	450

Table 10. Parameter Assessment: Outfall 005

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

Chlorides	Magnesium	Manganese

Group 2: PEQ < 25 percent of WQS or all data below minimum detection limit.
WLA not required. No limit recommended; monitoring optional.

Nitrate + Nitrite	Strontium

Group 3: PEQ_{max} < 50 percent of maximum PEL and PEQ_{avg} < 50 percent of average PEL.
No limit recommended; monitoring optional.

Barium	Dissolved solids	Iron
Lead	Nickel	Phenol
Selenium	Zinc	

Group 4: PEQ_{max} >= 50 percent, but < 100 percent of the maximum PEL or
PEQ_{avg} >= 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Copper

Group 5: Maximum PEQ >= 100 percent of the maximum PEL or average PEQ >= 100 percent of the average PEL, or either the average or maximum PEQ is between 75 and 100 percent of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

			Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum
Mercury	ng/L		12	1700

Table 11. Final Effluent Limits and Monitoring Requirements for Outfalls 001 through 010

Casting Solutions Outfall 001

		Concentration		Loading (kg/day)		
Parameter	**Units**	**30 Day Average**	**Daily Maximum**	**30 Day Average**	**Daily Maximum**	**Basis[b]**
Water Temperature	C°	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		WQS, EP, PD
Total Precipitation	Inches	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Dry Days Preceding Precipitation Event	Number	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
pH	S.U.	- - - - - - - - -	Between 6.5 and 9.0	- - - - - - - - -		WQS
Total Suspended Solids	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Oil and Grease	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Copper	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Zinc	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Flow	MGD	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		M
Chlorine, Total Residual	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP

Casting Solutions Outfall 002

		Concentration		Loading (kg/day)		
Parameter	**Units**	**30 Day Average**	**Daily Maximum**	**30 Day Average**	**Daily Maximum**	**Basis[b]**
Water Temperature	C°	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		WQS, EP, PD
Total Precipitation	Inches	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Dry Days Preceding Precipitation Event	Number	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
pH	S.U.	- - - - - - - - -	Between 6.5 and 9.0	- - - - - - - - -		WQS
Copper	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		EP
Total Suspended Solids	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ
Zinc	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ
Flow	MGD	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		M
Chlorine, Total Residual	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP

Table 11. Final Effluent Limits and Monitoring Requirements for Outfalls 001 through 010 (Continued)

Casting Solutions Outfall 003

		Concentration		Loading (kg/day)[a]		
Parameter	**Units**	**30 Day Average**	**Daily Maximum**	**30 Day Average**	**Daily Maximum**	**Basis[b]**
Flow Rate	GPD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M
Dissolved Oxygen	mg/L	- - - - - - - - - - Not Less than 5.0 - - - - - - - - - -				WQS
pH	S.U.	- - - - - - - - - Between 6.5 and 9.0 - - - - - - - - -				WQS
Total Suspended Solids	mg/L	30	45	1.87	2.81	PD, EP
Ammonia	mg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M
Turbidity	Number	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M
E. Coli	#/100 mL	126	284[e]	--	--	WQS
$CBOD_5$[c]	mg/L	25	40	1.56	2.50	PD, EP

Casting Solutions Outfall 004

		Concentration		Loading (kg/day)		
Parameter	**Units**	**30 Day Average**	**Daily Maximum**	**30 Day Average**	**Daily Maximum**	**Basis[b]**
Water Temperature	C°	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				BPJ, EP
pH	S.U.	- - - - - - - - - Between 6.5 and 9.0 - - - - - - - - -				WQS
Flow	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				M
Chlorine	mg/L	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				BPJ, EP

Table 11. Final Effluent Limits and Monitoring Requirements for Outfalls 001 through 010 (Continued)

Casting Solutions Outfall 005

Parameter	Units	Concentration 30 Day Average	Concentration Daily Maximum	Loading (kg/day)[d] 30 Day Average	Loading (kg/day)[d] Daily Maximum	Basis[b]
Water Temperature	C°	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Total Precipitation	Inches	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Total Suspended Solids	mg/L	14.8	48	2.69	8.73	BAT
Oil and Grease	mg/L	8.39	20	1.46	1.95	BAT, EP
Free Cyanide	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		EP
Cadmium	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		EP
Copper	µg/L	--	57	0.0266	0.0483	BAT, RP
Lead	µg/L	238	485	0.0432	0.0881	BAT
Nickel	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Silver	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		EP
Zinc	µg/L	339	450	0.0616	0.163	BAT
Phenolic 4AAP[f]	µg/L	207	594	0.0376	0.108	BAT
Flow	MGD	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		M
Chlorine, Total Residual	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Mercury	ng/L	33	1700	0.0000032	0.00017	WLA
pH Range Excursion, Maximum Duration	Minutes	--	60	--	--	BPJ, WQS
Acute Toxicity - *Ceriodaphnia. dubia*	TU_a	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		WET
pH	S.U.	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, WQS
pH Range Excursion, Greater than 60 mins	#/day	--	0	--	--	BPJ, WQS
pH Range Excursion, Monthly Total Duration	Minutes	--	446	--	--	BPJ, WQS

Casting Solutions Outfall 091

Parameter	Units	Concentration 30 Day Average	Concentration Daily Maximum	Loading (kg/day) 30 Day Average	Loading (kg/day) Daily Maximum	Basis[b]
Dry Days Preceding Precipitation Event	Number	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ
Copper	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ
Zinc	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ

Table 11. Final Effluent Limits and Monitoring Requirements for Outfalls 001 through 010 (Continued)

Casting Solutions Outfall 008

		Concentration		Loading (kg/day)		
Parameter	**Units**	**30 Day Average**	**Daily Maximum**	**30 Day Average**	**Daily Maximum**	**Basis[b]**
Total Precipitation	Inches	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Flow	GPD	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		M
Dry Days Preceding Precipitation Event	Number	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Total Suspended Solids	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Copper	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Zinc	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP

Casting Solutions Outfall 010

		Concentration		Loading (kg/day)		
Parameter	**Units**	**30 Day Average**	**Daily Maximum**	**30 Day Average**	**Daily Maximum**	**Basis[b]**
Total Precipitation	Inches	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Flow	GPD	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		M, EP
Dry Days Preceding Precipitation Event	Number	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Total Suspended Solids	mg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Copper	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP
Zinc	µg/L	- - - - - - - - - - - - -	Monitor	- - - - - - - - - - - - -		BPJ, EP

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[a] Effluent loadings based on average design discharge flow of :

Outfall:	Flow Rate (MGD)
0IS00000003	0.0165

[b] Definitions: BAT = Best Available Technology
BEJ = Best Engineering Judgment;
BPJ = Best Professional Judgment
EP = Existing Permit;
M = BEJ of Permit Guidance 1: Monitoring Frequency Requirements for Sanitary Discharges;
PD = Plant Design Criteria;
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits [OAC 3745-33-07(A)];
VAR = mercury variance-based limits, OAC 3745-33-07(D)(10);

WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)] OR Reasonable potential for requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [OAC 3745-33-07(B)]
WLA = Wasteload Allocation procedures (OAC 3745-2);
WQS = Ohio Water Quality Standards (OAC 3745-1-07).

[c] $CBOD_5$ = 5-day carbonaceous biochemical oxygen demand

[d] With the exception of the daily maximum loading limit for oil & grease which is based on anti-backsliding, all loading limits are based upon FEG.

[e] This limit is based on a weekly geometric average.

[f] Phenolic 4AAP is Phenolic 4-amino-antipyrine

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines

Casting Solutions is subject to the Federal Effluent Guidelines (FEG) found in 40 CFR Parts 464.32 and 464.33, Metal Molding and Casting Point Source Category, Subpart C - Ferrous Casting Subcategory.

These guidelines have been used to determine appropriate permit limits for outfall 005. The specific operations at Casting Solutions subject to the FEG are as follows:

1. Casting Cleaning Operations
2. Casting Quench Operations
3. Dust Collection Scrubber Operations
4. Melting Furnace Scrubber Operations
5. Slag Quench Operations

The calculation of allowable loadings for copper, lead, zinc, oil & grease, and TSS is explained on the following pages in detail for each of these operations. (Loading calculations for total phenols is also included for the Dust Collection Scrubber Operations and Melting Furnace Scrubber Operations.)

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines (continued)

Casting Cleaning Operations

Casting Solutions has no actual casting cleaning process using water. However, approximately 92 percent of their total production is pressure tested using water. Therefore, BPJ is used as to apply the standards from the casting cleaning operations category.

Lbs./day cleaned = (production in lbs./day) x (percent of total production which is cleaned)
= 400,000 lbs./day x 92 percent
= 368,000 lbs./day

An example of the calculation of the daily maximum allowable loadings from these operations using copper is as follows:

Copper loading = (0.0129 lbs / 1,000,000 lbs of metal poured*) x (368,000 lbs./day cleaned)
= 0.0047472 lbs. / day

* For purposes of these calculations, the 'pounds of metal poured' is equivalent to production. Allowable loadings for copper, lead, zinc, oil & grease, and TSS are shown in the table below.

Current Casting Cleaning Operations				
Parameter	Daily Maximum (lb/day)		30 Day Average (lb/day)	
	BAT/BPT Effluent Limitation*	Allowable Loading	BAT/BPT Effluent Limitation*	Allowable Loading
Copper	0.0129	0.0047472	0.0071	0.0026128
Lead	0.0237	0.0087216	0.0116	0.0042688
Zinc	0.0437	0.0160816	0.0165	0.006072
Oil and Grease	1.34	0.49312	0.446	0.164128
TSS	1.7	0.6256	0.67	0.24656
pH	Within the range of 7.0 to 10.0 at all times			

* TSS = Total Suspended Solids; "BAT" means Best Available Technology economically achievable, and applies to copper, lead, and zinc. "BPT" means Best Practicable control Technology currently available, and applies to oil & grease, TSS, and pH.

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines (continued)

Casting Quench Operations

Currently, there is no discharge from these operations to the WWTP. Therefore, the allowable loading from casting quench operations for each of the following parameters is zero ('0').

Casting Quench Operations				
Parameter	Daily Maximum (lb/day)		30 Day Average (lb/day)	
	BAT/BPT Effluent Limitation*	Allowable Loading	BAT/BPT Effluent Limitation*	Allowable Loading
Copper	0.0138	0	0.0076	0
Lead	0.0252	0	0.0124	0
Zinc	0.0466	0	0.0176	0
Oil and Grease	1.43	0	0.476	0
TSS	1.81	0	0.713	0
pH	Within the range of 7.0 to 10.0 at all times			

* TSS = Total Suspended Solids; "BAT" means Best Available Technology economically achievable, and applies to copper, lead, and zinc. "BPT" means Best Practicable control Technology currently available, and applies to oil & grease, TSS, and pH.

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines (continued)

Dust Collection Scrubber Operations

Allowable loadings for Dust collection scrubber operations are based upon the following operations:

Baghouse	Scrubbed Cubic Feet/ Minute of Blower Capacity	Hrs / day of operation
Airset	72,000	10 hours/day
Monorail	40,000	16 hours/day
Ductile	8,000	8 hours/month
Grinder	13,000	24 hours/day
Rotoblast	13,000	24 hours/day
Schneible	54,000	8 hours/day
Roberts	58,000	8 hours/day
Cupola	45,000	8 hours/day
Unit 3 Large Collector	41,000	8 hours/month
Unit 3 Small Collector	7,000	8 hours/month

An example of the calculation of the daily maximum allowable loadings from these operations using copper is as follows:

Copper loading = [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (72,000 SCF / minute of blower capacity) x (480 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (40,000 SCF / minute of blower capacity) x (960 minutes / month) x (12 months / 365 days)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (8,000 SCF / minute of blower capacity) x (480 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (13,000 SCF / minute of blower capacity) x (480 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (13,000 SCF / minute of blower capacity) x (1440 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (54,000 SCF / minute of blower capacity) x (480 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (58,000 SCF / minute of blower capacity) x (480 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (45,000 SCF / minute of blower capacity) x (480 minutes / day)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (41,000 SCF / minute of blower capacity) x (960 minutes / month) x (12 months / 365 days)]
+ [(0.218 lbs / 1,000,000,000 SCF of air scrubbed) x (7,000 SCF / minute of blower capacity) x (960 minutes / month) x (12 months / 365 days)]

= 0.037968 lbs. / day

*SCF = scrubbed cubic feet

Allowable loadings for each parameter are shown in the table below.

Current Calculated Dust Collection Scrubber Operations				
Parameter	Daily Maximum (lb/day)		30 Day Average (lb/day)	
	BAT/BPT Effluent Limitation*	Allowable Loading	BAT/BPT Effluent Limitation*	Allowable Loading
Copper	0.218	0.037968	0.12	0.020900
Lead	0.398	0.069317	0.195	0.033962
Zinc	0.736	0.128185	0.278	0.048418
Total Phenols	0.646	0.112510	0.225	0.039187
Oil and Grease	22.5	3.918684	7.51	1.307970
TSS	28.5	4.963666	11.3	1.968050
pH	Within the range of 7.0 to 10.0 at all times			

* TSS = Total Suspended Solids; "BAT" means Best Available Technology economically achievable, and applies to copper, lead, and zinc. "BPT" means Best Practicable control Technology currently available, and applies to oil & grease, TSS, and pH.

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines (continued)

Melting Furnace (or Cupola) Scrubber Operations

Allowable loadings for the Cupola scrubber operations are based upon a rate of 31,000 scrubbed cubic feet of air per minute per 20 hours (1200 mins) of operation per day.

An example of the calculation of the daily maximum allowable loadings from these operations using copper is as follows:

Copper loading = (1.02 lbs / 1,000,000,000 SCF of air scrubbed) x (31,000 SCF / minute of blower capacity) x (1200 minutes / day)
= 0.037944 lbs. / day

Allowable loadings for copper, lead, zinc, total phenols, oil & grease, and TSS are shown in the table below.

Current Melting Furnace Scrubber Operations				
Parameter	Daily Maximum (lb/day)		30 Day Average (lb/day)	
	BAT/BPT Effluent Limitation*	Allowable Loading	BAT/BPT Effluent Limitation*	Allowable Loading
Copper	1.02	0.037944	0.561	0.0208692
Lead	1.86	0.069192	0.911	0.0338892
Zinc	3.44	0.127968	1.3	0.04836
Total Phenols	3.01	0.111972	1.05	0.03906
Oil and Grease	105	3.906	35	1.302
TSS	133	4.9476	52.6	1.95672
pH	Within the range of 7.0 to 10.0 at all times			

* TSS = Total Suspended Solids; "BAT" means Best Available Technology economically achievable, and applies to copper, lead, and zinc. "BPT" means Best Practicable control Technology currently available, and applies to oil & grease, TSS, and pH.

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines (continued)

Slag Quench Operations

An example of the calculation of the daily maximum allowable loadings from these operations using copper is as follows:

Copper loading = (0.0527 lbs / 1,000,000 lbs of metal poured*)
x (400,000 lbs. of metal poured/day)
= 0.02108 lbs. / day

* For purposes of these calculations, the 'pounds of metal poured' is equivalent to production. Allowable loadings for copper, lead, zinc, total phenols, oil & grease, and TSS are shown in the table below.

Slag Quench Operations				
Parameter	Daily Maximum (lb/day)		30 Day Average (lb/day)	
	BAT/BPT Effluent Limitation*	Allowable Loading	BAT/BPT Effluent Limitation*	Allowable Loading
Copper	0.0527	0.02108	0.0291	0.01164
Lead	0.0964	0.03856	0.0473	0.01892
Zinc	0.178	0.0712	0.0673	0.02692
Oil and Grease	5.46	2.184	1.82	0.728
TSS	6.91	2.764	2.73	1.092
pH	Within the range of 7.0 to 10.0 at all times			

* TSS = Total Suspended Solids; "BAT" means Best Available Technology economically achievable, and applies to copper, lead, and zinc. "BPT" means Best Practicable control Technology currently available, and applies to oil & grease, TSS, and pH.

Attachment A. Calculation of Loading Limits for Outfall 005 Using Federal Effluent Guidelines (continued)

Total Allowable Loadings for All Operations Used

Allowable Loadings for All Casting Solutions Operations Based on Federal Effluent Guidelines (40 CFR Parts 464.32 and 464.33) (in lbs. per day)						
Parameter	Casting Cleaning	Casting Quench	Dust Collection Scrubber	Melting Furnace Scrubber	Slag Quench	Totals
Copper						
Daily Maximum	0.0048	0.0000	0.0426	0.0379	0.0211	**0.1064**
30-day Average	0.0026	0.0000	0.0234	0.0209	0.0116	**0.0586**
Lead						
Daily Maximum	0.0088	0.0000	0.0777	0.0692	0.0386	**0.1943**
30-day Average	0.0043	0.0000	0.0381	0.0339	0.0189	**0.0952**
Zinc						
Daily Maximum	0.0163	0.0000	0.1437	0.1280	0.0712	**0.3592**
30-day Average	0.0062	0.0000	0.0543	0.0484	0.0269	**0.1357**
Total Phenols						
Daily Maximum	0.0000	0.0000	0.1262	0.1120	0.0000	**0.2381**
30-day Average	0.0000	0.0000	0.0439	0.0391	0.0000	**0.0830**
Oil and Grease						
Daily Maximum	0.4997	0.0000	4.3939	3.9060	2.1840	**10.9836**
30-day Average	0.1663	0.0000	1.4666	1.3020	0.7280	**3.6629**
Total Suspended Solids						
Daily Maximum	0.6339	0.0000	5.5656	4.9476	2.7640	**13.9111**
30-day Average	0.2498	0.0000	2.2067	1.9567	1.0920	**5.5053**

The above calculated loadings are lower than the previous loading limits. The reasoning for this is because different information was made available to OEPA where facility operations had changed or been miscalculated previously. Changes included percentage of total production pressure tested for water in casting cleaning operations and changes in operation took place in operations, decreasing dust collection scrubber operations calculations. In the dust collection scrubber operations calculations from the previous permit, an error was made calculating the ductile as 8hours/day rather than 8hrs/month and this has also been corrected.

Attachment B. Calculation of Additional Pollutant Loadings at Outfall 005 Not Subject to Federal Effluent Guidelines

Stormwater and boiler blowdown are also discharged at Casting Solutions' outfall 005. These discharges are not subject to the FEG; therefore, BPJ has been used to calculate pollutant loadings from these sources.

Stormwater Loadings

During precipitation events, Casting Solutions has stormwater runoff from the raw material storage area and the scrap pile storage area which discharges to the WWTP. Loadings for oil & grease and TSS from these areas have been included in previous NPDES permits, and have been based upon the following information:

I. total runoff surface area equals 19,300 sq. ft.;
II. calculate runoff based upon a one-year, 24-hour storm event of 2.2 inches of precipitation and an average of 827gal/day additional stormwater from facility roof top; and
III. calculate loadings based upon meeting final effluent limit concentration limits of 10 mg/L for oil & grease and 30 mg/L for TSS.

Total gallons of runoff = (19,300 sq.ft.) x (2.2 inches of rain / day) x (1 ft. / 12 inches)
x (7.48 gallons / cubic ft.) + 827 gallons / day
= 27,294 gallons / day

Assume that a rainfall less than 0.5 inches will not cause runoff to the WWTP. Gallons of runoff from a rainfall equal to 0.5 inches:

Gallons of runoff = (19,300 sq.ft.) x (0.5 inches of rain / day) x (1 ft. / 12 inches)
x (7.48 gallons / cubic ft.)
= 6015 gallons / day
Net gallons of runoff = 27,294 gallons - 6015 gallons
= 21,279 gallons / day

To determine the daily maximum allowable loadings for oil & grease (O&G) and TSS, use the following formulas:

Daily maximum loading for O&G = (10 mg/L) x (21,279 gal. / day) x (3.78541 liters / gal.)
x 1 kg / 1,000,000 mg) x (2.20462 lbs. / kg)
= 1.7758 lbs. / day

Daily maximum loading for TSS = (30 mg/L) x (21,279 gal. / day) x (3.78541 liters / gal.)
x 1 kg / 1,000,000 mg) x (2.20462 lbs. / kg)
x (2.204 lbs. / kg)
= 5.3274 lbs. / day

Attachment B. Calculation of Additional Pollutant Loadings at Outfall 005 Not Subject to Federal Effluent Guidelines (continued)

Stormwater Loadings (continued)

To determine average loadings, assume a total annual rainfall of 33 inches, and assume that 80 percent of the runoff goes through outfall 005. The following equations can then be used to calculate the average allowable loadings for oil & grease and TSS due to stormwater:

Net average gallons of runoff = (19,300 sq.ft.) x (33 inches of rainfall / year)
x (1 ft./ 12 inches) x (7.48 gal./ cubic ft.) x (0.8 factor)
= 317,601 gal. / year + 827 gallons / day
= 870 gal. / day + 827 gallons / day
= 1,697 gallons / day

30-day average loading for oil & grease = (10 mg/L) x (1,697 gal. / day) x (3.78541 liters / gal.)
x 1 kg / 1,000,000 mg) x (2.20462 lbs. / kg)
= 1.7758 lbs. / day
= 0.1416 lbs. / day

30-day average loading for TSS = (30 mg/L) x (1,697 gal. / day) x (3.78541 liters / gal.)
x 1 kg / 1,000,000 mg) x (2.20462 lbs. / kg)
x (2.204 lbs. / kg)
= 0.4249 lbs. / day

Boiler Blowdown Loadings

Casting Solutions' process wastewaters also receive boiler blowdown and allowable TSS loadings from boiler blowdown have been calculated in previous NPDES permits assuming a flow of 5 gallons per minute (or 7200 gallons/day), and an allowable TSS concentration of 10 mg/L. However, since the volume of boiler blowdown is now estimated to be only 3 to 5 gallons per week, a TSS loading has not been included for this source of wastewater.

Attachment C. Summation of Pollutant Loadings at Outfall 005 from Process and Non-Process Wastewaters

This attachment shows the summation of allowable pollutant loadings at outfall 005 for process wastewaters (i.e., those subject to FEG and non-process wastewaters (stormwater and boiler blowdown) based upon the analyses in Attachments A and B. The following table provides the total allowable loadings in pounds/day and kilograms/day, and also includes the allowable concentrations in micrograms/Liter.

Total Allowable Loadings and Concentrations Based Upon FEG, Stormwater, and Boiler Blowdown						
Parameter	Loadings (lbs/day)				Calculated Loadings (kg/day)	Concentration***
	FEG*	Storm Water	Boiler Blowdown	Totals		
Copper						
Daily Maximum	0.1064			0.1064	0.0483	**265.6[a]**
30-day Average	0.0586			0.0586	0.0266	**146.3[a]**
Lead						
Daily Maximum	0.1943			0.1943	0.0881	**485.1[a]**
30-day Average	0.0952			0.0952	0.0432	**237.7[a]**
Zinc						
Daily Maximum	0.3592			0.3592	0.1629	**896.7[a]**
30-day Average	0.1357			0.1357	0.0616	**338.8**
Total Phenols						
Daily Maximum	0.2381			0.2381	0.1080	**594.4**
30-day Average	0.0830			0.0830	0.0376	**207.2**
Oil and Grease						
Daily Maximum	10.9836	1.7758		12.7594	5.7875	**31.9[a]**
30-day Average	3.6629	0.1416		3.8045	1.7257	**9.50[a]**
Total Suspended Solids						
Daily Maximum	13.9111	5.3274		19.2385	8.7264	**48.0**
30-day Average	5.5053	0.4249		5.9302	2.6899	**14.8**

* Allowable loadings based upon applicable Federal Effluent Guidelines (FEG). See Attachment A.
** Concentrations have been "back" calculated from the allowable loadings, using a flow of 0.048MGD, the median flow rate reported from 2008 through 2012 in DMR data.
[a] These values are not used because they are larger than either previously-used numbers and would contribute to backsliding, or are larger than water quality based effluent limits.