National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for J.M. Smucker LLC – Cincinnati Crisco Plant

Public Notice No.: 13-12-016
Public Notice Date: December 17, 2013
Comment Period Ends: January 18, 2013

Ohio EPA Permit No.: 1IH00026*ED
Application No.: OH0134155

Name and Address of Applicant:
J.M. Smucker LLC
5204 Spring Grove Avenue
Cincinnati, Ohio 45217

Name and Address of Facility Where Discharge Occurs:
J.M. Smucker LLC – Cincinnati Crisco Plant
5204 Spring Grove Avenue
Cincinnati, Ohio 45217
Hamilton County

Receiving Water: Mill Creek

Subsequent Stream Network: 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 (Ohio Revised Code [ORC] 6111). 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.

In accordance with the antidegradation rule, OAC 3745-1-05, it has been determined that a lowering of water quality in Mill Creek is necessary. Provision (D)(1)(i) was applied to this application. This provision excludes the need for the submittal and subsequent review of technical alternatives and social and economic issues related to the degradation. Other rule provisions, however, including public participation and appropriate intergovernmental coordination were required and considered prior to reaching this decision.

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by the United States EPA (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

Most of the effluent limits and monitoring requirements proposed in this permit are the same as in the current permit.

Total nickel monitoring is proposed to be removed from monitoring at Outfall 004. A new, lower total residual chlorine limit is proposed at Outfall 004. In accordance with the facility antidegradation addendum, a higher maximum temperature is proposed at Outfall 004.

In Part II of the permit, special conditions are included that address storm water compliance and outfall signage.

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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 Sara Hise, (614) 644-4824, sara.hise@epa.ohio.gov.

Location of Discharge/Receiving Water Use Classification

The J.M. Smucker LLC – Cincinnati Crisco Plant (Smucker) discharges to Mill Creek at River Mile (RM) 6.45. Figure 1 shows the approximate location of the facility and Figure 2 shows the approximate location of the outfalls.

This segment of Mill Creek is described by Ohio EPA River Code: 23-001, County: Hamilton, Ecoregion: Interior Plateau. Mill Creek is designated for the following uses under Ohio's WQS (Ohio Administrative Code [OAC] 3745-1-30): modified warmwater Habitat (MWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Class B Primary Contact Recreation (PCR).

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 MWH 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 (PCR) 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

Smucker is primarily engaged in manufacturing the Crisco brand of vegetable shortening. Facility operations include processing fats and oils. The process operations are classified in the Standard Industrial Classification (SIC) category 2079, "Shortening, Table Oils, Margarine, and Other Edible Fats and Oils Not Elsewhere Classified." There are no federal effluent guidelines for the process wastewaters.

Description of Existing Discharge

Smucker's has four outfalls. Outfall 001 discharges only non-contact cooling water; those discharges are covered through the general non-contact cooling water permit (1GN00031*DG). Outfall 002 also discharges non-contact cooling water. Stormwater from the facility's South Yard can be discharged through outfall 003 following skimming, flotation, sorption, and neutralization. Currently this discharged to the Metropolitan Sewer District of Greater Cincinnati's (MSDGC) sewer system. Process wastewater is discharged through outfall 004 and is treated by the following processes:

- Skimming
- Flocculation
- Flotation
- Neutralization

- Microstraining
- Temperature reduction
- Anaerobic treatment
- Activated sludge
- Membrane filtration

Wastewater from outfall 004 is normally discharged to Mill Creek, but can be discharged to the MSDGC sewer system. The average design flow of the treatment plant was originally 1.44 million gallons per day (MGD), but that has been decreased to 1.152 MGD.

Sludge is treated by chemical conditioning and belt filter press. The sludge is either disposed of in a landfill or composted.

Table 1 presents a summary of NPDES permit application data.

Table 2 presents a summary of unaltered Discharge Monitoring Report (DMR) data. Data are presented for the period of July 2008 through June 2013, and current permit limits are provided for comparison.

Table 3 presents the average and maximum PEQ values.

Assessment of Impact on Receiving Waters

No assessments of Mill Creek have been conducted since the last permit renewal. Biological surveys in the Mill Creek basin were conducted in 1992, 1997, and 2002. The results from the 1992 survey showed that the mainstem was in non-attainment of water quality standard use designations at RM 8.7 and RM 13.3. The 1997 survey showed similar results for sample locations at RM 3.1 and RM 13.3. The 2002 survey showed that this portion of the river was in full attainment of the designated use, however, this assessment was based only on macroinvertebrate sampling.

The 1997 survey identified unknown toxicity, ammonia, organic enrichment/low dissolved oxygen, habitat alteration, oil and grease, taste and odor, pesticides, metals, and priority organics as causes of impairment for Mill Creek from RM 11.57 to the mouth. In addition, 1997 data showed that the median instream phosphorus concentration for this portion of the river was greater than the target instream concentration.

The causes and sources of impairment for Lower Mill Creek were described in the September 2004 *Mill Creek Watershed TMDLs*, which include nutrients, bacteria, organic enrichment, organic chemical pollutants, metals and habitat alterations. The TMDL focused only on nutrients (phosphorus and nitrogen).

Smucker was not discharging directly to Mill Creek when these assessments took place. The treatment system started to be utilized in 2012.

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 Smucker were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA - Discharge Monitoring Report (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)	July 2008 through June 2013
NPDES permit application Form 2C	October 2013

Outliers
The data were examined, and no values were removed from the evaluation to give a more reliable PEQ.

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 3.

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 7 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 5, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

A thermal WLA was conducted to ensure the proposed increase in temperature at outfall 004 would not be detrimental to water quality. The thermal loading was calculated using the following equation:

BTU/hr = (7Q10 * percent of stream flow of 003 * conversion factor of cfs to MGD * conversion factor of gallons to pounds * temperature difference in °F)/24

The thermal loading of outfall 004 at the current temperature and flow rate was compared to the expected thermal loading at the increased temperature and decreased flow rate.

	Temperature (°F)	*Flow (MGD)*	*Summer Max (BTU/day)*	*Winter Max (BTU/day)*
Current	89.6	1.44	110	417
Projected	96.8	1.152	43	350

The projected thermal loading of outfall 004 is lower than the current thermal loading.

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 6. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

Whole Effluent Toxicity WLA
Whole effluent toxicity (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 Smucker, the WLA values are 1.0 TU_a and 7.47 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (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/geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (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 WLA 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 6. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 3, 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 7.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 8 presents the final effluent limits and monitoring requirements proposed for the final outfalls and the basis for their recommendation.

Outfall 003
Discharges at this outfall are limited to stormwater only. Limits and monitoring requirements are proposed to continue for this outfall. The limits for pH are based on WQS and limits for oil and grease and total suspended solids (TSS) are based on Ohio's anti-degradation rule regarding requirements for de minimus discharges.

Outfall 004

Water Temperature
The limit for water temperature is proposed to be increased in accordance with the facility's antidegradation addendum.

Flow Rate, pH, and pH Excursions
Monitoring for pH and flow rate and limits for pH excursions are proposed to be continued.

Biochemical Oxygen Demand (5 day), TSS, and Ammonia
Limits for 5 day biochemical oxygen demand (BOD), TSS, and ammonia are all proposed to be continued. Limits are based on best available demonstrated control technology limits (BADCT) and water quality modeling conducted in 2006 demonstrating that these limits would be protective of instream WQS.

Phosphorus, Nitrate+Nitrate, and Total Kjeldahl Nitrogen
The Ohio EPA risk assessment (Table 7) places these parameters in groups 1 and 2. This placement, as well as the data in Tables 2 and 3, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality.

Limits for phosphorus are proposed to be continued based in the recommendations in the 2004 TMDL study. Monitoring for nitrate+nitrite and total Kjeldahl nitrogen (TKN) is proposed to be continued. The purpose of the monitoring is to assist in the implementation of the TMDL.

Nickel
The Ohio EPA risk assessment (Table 7) places total nickel in group 2. This placement, as well as the data in Tables 2 and 3, supports that this parameter does not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to be removed.

Chlorine, Total Residual
The Ohio EPA risk assessment (Table 7) places this parameter in group 5. This placement, as well as the data in Tables 2 and 3, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The maximum limit is proposed to be decreased.

Whole Effluent Toxicity Reasonable Potential

No whole effluent toxicity (WET) tests have been performed on the Smucker's effluent. Based on the provisions of OAC 3745-33-07(B), this places the facility in Category 4 with respect to WET. Biomonitoring is not recommended at this time.

Other Requirements

Storm Water Compliance
Smucker was issued an industrial stormwater general permit (1GR00599*EG) on August 23, 2012. A condition is included in Part II for renewing this permit.

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

Figure 1. Approximate Location of J. M. Smucker LLC - Cincinnati Crisco Plant

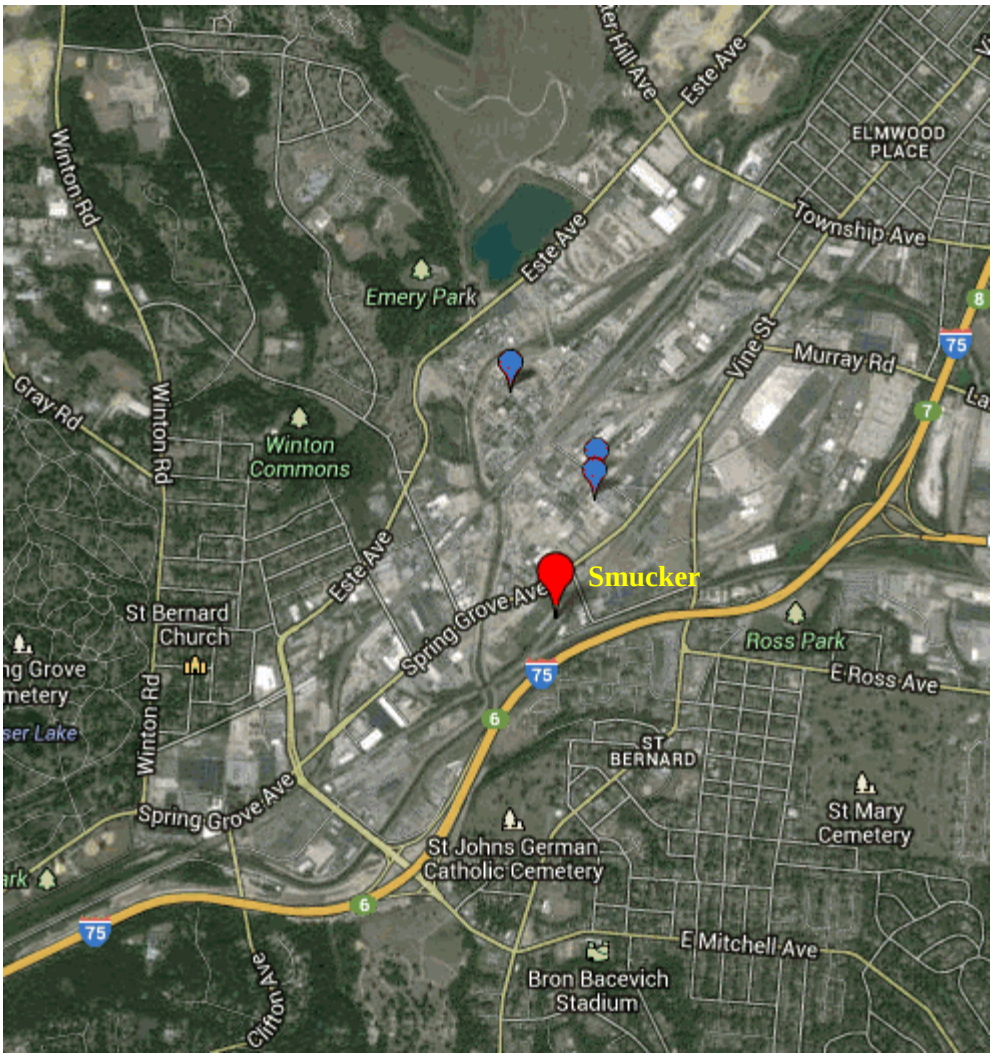
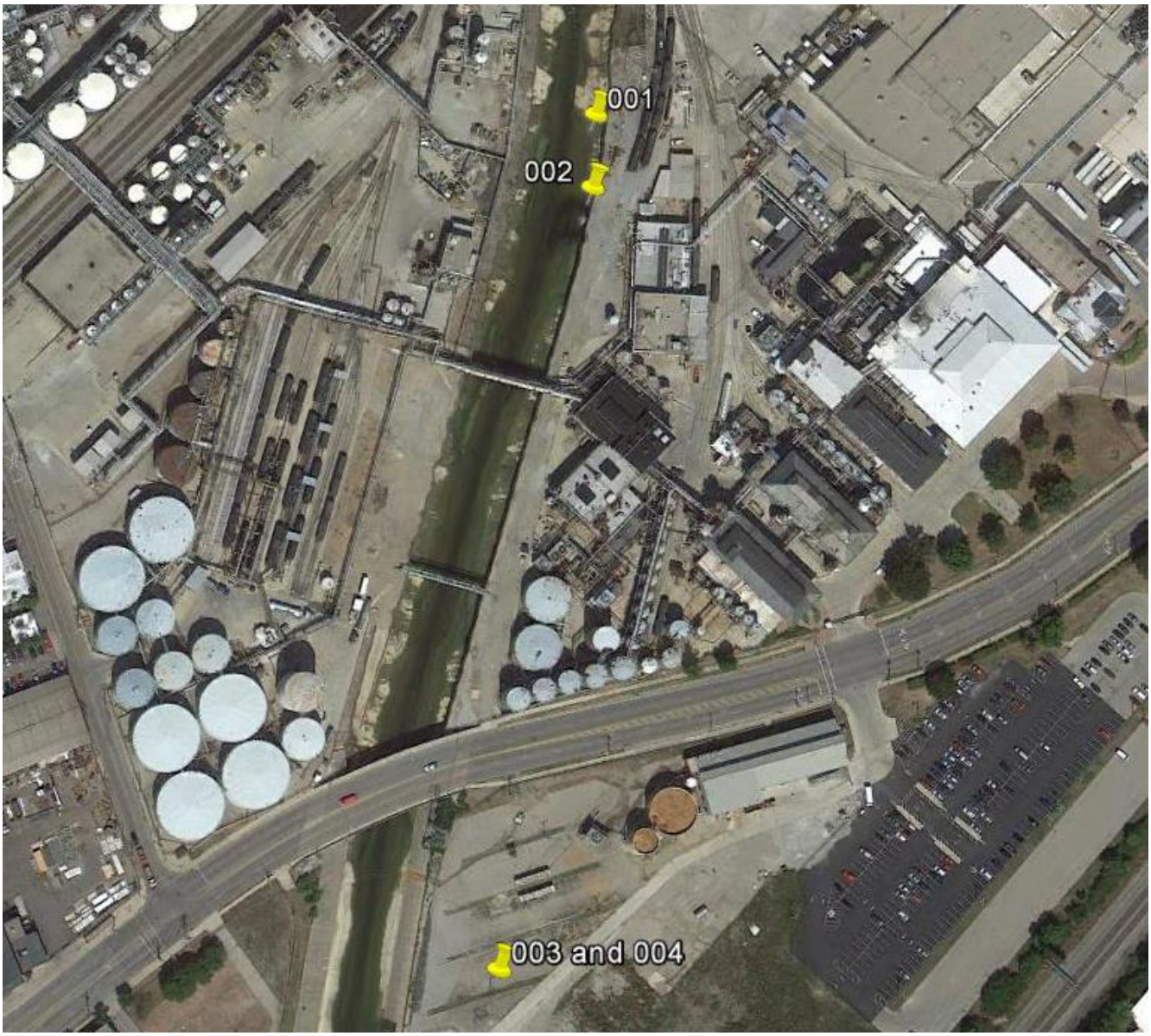


Figure 2. Approximate Location of Smucker Outfalls



Outfall 001 is covered under permit 1GN00031*DG

Table 1. Effluent Data from Permit Application Form 2C Data for Outfall 004

Parameter	Units		Max daily		30 day max		Long term avg		No. of Analyses
	Conc	Mass	Conc	Mass	Conc	Mass	Conc	Mass	
Biological Oxygen Demand	mg/L	lb/day	14.9	79.72	4.6	13.86	3.2	7.67	101
Chemical Oxygen Demand	mg/L	lb/day	< 37	< 197.96	-	-	-	-	1
Total Organic Carbon	mg/L	lb/day	6.4	34.24	-	-	-	-	1
Total Suspended Solids	mg/L	lb/day	< 21.0	< 112.4	< 5.4	< 16.4	< 5.2	< 12.5	102
Ammonia	mg/L	lb/day	< 10.6	< 56.71	< 2.31	< 6.96	< 0.53	< 1.27	102
Flow Rate	MGD	-	0.641		0.361		0.287		319
Temperature-Winter	°F	-	89.9		83.8		78.9		186
Temperature-Summer	°F	-	89.6		86.8		84.3		180
pH	S.U.	-	4.11 - 9.1		4.11 - 9.1		-	-	316
Bromide	mg/L	lb/day	< 0.5	< 2.68	-	-	-	-	1
Chlorine, Total Residual	mg/L	lb/day	< 0.06	< 0.32	< 0.05	< 0.18	< 0.05	< 0.12	6
Fluoride	mg/L	lb/day	< 1.0	< 5.35	-	-	-	-	1
Nitrate+Nitrite	mg/L	lb/day	< 0.1	< 0.54	-	-	-	-	1
Total Organic Nitrogen	mg/L	lb/day	< 3.0	< 16.05	-	-	-	-	1
Oil & Grease	mg/L	lb/day	6.5	34.8	< 3.9	< 11.7	< 3.1	< 7.5	102
Phosphorus	mg/L	lb/day	1.29	6.9	0.78	2.35	0.36	0.86	102
Sulfate	mg/L	lb/day	63	337.1	-	-	-	-	1
Sulfide	mg/L	lb/day	< 1.0	< 5.4	-	-	-	-	1
Sulfite	mg/L	lb/day	< 0.05	< 0.27	-	-	-	-	1
Surfactants	mg/L	lb/day	< 0.05	< 0.27	-	-	-	-	1
Aluminum	mg/L	lb/day	0.057	0.305	-	-	-	-	1
Barium	mg/L	lb/day	< 0.005	< 0.027	-	-	-	-	1
Boron	mg/L	lb/day	0.042	0.225	-	-	-	-	1
Cobalt	mg/L	lb/day	< 0.001	< 0.0054	-	-	-	-	1
Iron	mg/L	lb/day	2.2	11.77	-	-	-	-	1
Magnesium	mg/L	lb/day	< 15	< 80.253	-	-	-	-	1
Molybdenum	mg/L	lb/day	0.036	0.1926	-	-	-	-	1
Manganese	mg/L	lb/day	< 0.1	< 0.535	-	-	-	-	1
Tin	mg/L	lb/day	< 0.01	< 0.054	-	-	-	-	1
Titanium	mg/L	lb/day	< 0.01	< 0.054	-	-	-	-	1
Antimony	mg/L	lb/day	< 0.002	< 0.011	-	-	-	-	1
Arsenic	mg/L	lb/day	< 0.005	< 0.027	-	-	-	-	1
Beryllium	mg/L	lb/day	< 0.001	< 0.005	-	-	-	-	1
Cadmium	mg/L	lb/day	< 0.001	< 0.005	-	-	-	-	1
Chromium	mg/L	lb/day	< 0.002	< 0.0107	-	-	-	-	1
Copper	mg/L	lb/day	<	< 0.0294	-	-	-	-	1

Table 1. Effluent Data from Permit Application Form 2C Data for Outfall 004

Parameter	Units		Max daily		30 day max		Long term avg		No. of Analyses
	Conc	Mass	Conc	Mass	Conc	Mass	Conc	Mass	
			0.0055						
Lead	mg/L	lb/day	0.0022	0.0118	-	-	-	-	1
Mercury	ng/L	lb/day	< 0.05	< 0.000003	-	-	-	-	1
Nickel	mg/L	lb/day	0.0064	0.0342	0.0064	0.0194	0.0017	0.004	5
Selenium	mg/L	lb/day	< 0.005	< 0.027	-	-	-	-	1
Silver	mg/L	lb/day	< 0.001	< 0.005	-	-	-	-	1
Thallium	mg/L	lb/day	< 0.002	< 0.0107	-	-	-	-	1
Zinc	mg/L	lb/day	< 0.1	< 0.535	-	-	-	-	1
Cyanide	mg/L	lb/day	< 0.01	< 0.0535	-	-	-	-	1
Phenols	mg/L	lb/day	< 0.04	< 0.214	-	-	-	-	1
Dissolved Oxygen	mg/L	lb/day	8.9	47.6	8.2	24.7	8	19.2	278
Total Kjeldahl Nitrogen	mg/L	lb/day	15.4	82.39	5.33	16.06	1.57	3.75	96

Table 2. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 002								
Water Temperature	Annual	°C	--	--	1815	23	25.9	11.1-26.7
	Summer	°C	28	30	--	--	--	--
	Winter	°C	--	26	--	--	--	--
Flow Rate	Annual	MGD	Monitor		1817	2.45	3.35	0.019-4.18
pH Range Excursion, Maximum Duration	Annual	Minutes	--	60	1276	0	0	0-0
pH, Maximum	Annual	S.U.	Monitor		1815	7.21	7.74	6.61-9
pH, Minimum	Annual	S.U.	Monitor		1813	6.93	7.49	6.5-7.84
pH Range Excursions, > 60 Minutes	Annual	Number/Day	--	0	1275	0	0	0-0
pH Range Excursions, Monthly Total Duration	Annual	Minutes	--	446	42	0	0	0-0
Outfall 003								
Flow Rate	Annual	GPD	Monitor		--	--	--	--
pH	Annual	S.U.	6.5 - 9.0		--	--	--	--
Total Suspended Solids	Annual	mg/L	--	65	--	--	--	--
Oil & Grease	Annual	mg/L	--	10	--	--	--	--
Outfall 004								
Water Temperature	Annual	°C	--	32	367	27	31.4	17.2-32.2
Dissolved Oxygen	Summer	mg/L	5.0 Minimum		107	8	8.2	7.1-8.6
Dissolved Oxygen	Winter	mg/L	5.0 Minimum		219	8	8.4	7.1-8.9
Biochemical Oxygen Demand, 5 Day	Summer	mg/L	10	15	44	2.5	5.81	0-6.3

Table 2. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Biochemical Oxygen Demand, 5 Day	Winter	mg/L	10	15	73	2.6	6.06	0-14.9
Total Suspended Solids	Annual	mg/L	12	18	117	0	0	0-8
Oil and Grease	Annual	mg/L	--	10	119	0	0.3	0-6.5
Ammonia	Summer	mg/L	--	1.5	44	0	0.37	0-10.6
Ammonia	Winter	mg/L	--	1.5	73	0	1.72	0-4
Total Kjeldahl Nitrogen	Annual	mg/L	Monitor		108	0.735	6	0-15.4
Nitrite + Nitrate	Annual	mg/L	Monitor		107	0	0	0-2.33
Phosphorus	Annual	mg/L	--	1.0	118	0.275	0.825	0-2.91
Nickel, Total	Annual	µg/L	Monitor		5	0	5.15	0-6.43
Flow Rate	Annual	MGD	Monitor		367	0.266	0.536	0.0009-0.641
Chlorine, Total Residual	Annual	mg/L	--	0.05	5	0	0.0456	0-0.057
pH Range Excursion, Maximum Duration	Annual	Minutes	--	60	486	0	0.733	0-7.73
pH, Maximum	Annual	S.U.	Monitor		367	7.7	8.32	6.9-9.1
pH, Minimum	Annual	S.U.	Monitor		367	7.07	7.47	4.11-7.72
pH Range Excursions, > 60 Minutes	Annual	Number/Day	--	0	486	0	0	0-0
pH Range Excursions, Monthly Total Duration	Annual	Minutes	--	446	16	5.56	14	0-21.6

Table 3. Projected Effluent Quality Values for Outfall 004

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (summer)	mg/L	30	5	9.29	12.7
Ammonia (winter)	mg/L	45	2	0.883	1.21
Chlorine, Total Residual	mg/L	5	1	0.096	0.131
Nickel	µg/L	5	2	10.8	14.8
Nitrate + Nitrite	mg/L	107	4	1.53	2.10
Phosphorus	mg/L	118	115	0.544	0.893
Total Kjeldahl Nitrogen	mg/L	108	81	2.71	4.90

MDL = method detection limit
PEQ = projected effluent quality

Table 4. Water Quality in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (summer)	mg/L	--	--	1.2	--	--
Ammonia (winter)	mg/L	--	--	2.8	--	--
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Nickel	µg/L	4600	200	120	1100	2100
Nitrate + Nitrite	mg/L	--	100	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Total Kjeldahl Nitrogen	mg/L	--	--	--	--	--

Table 5. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	8.93	USGS Station 03259000
7Q10	cfs	annual	11.53	USGS Station 03259000
30Q10	cfs	summer	14.43	USGS Station 03259000
		winter	22.83	USGS Station 03259000
Harmonic Mean	cfs	annual	30.13	USGS Station 03259000
Mixing Assumption	%	average	100	
	%	maximum	100	
Hardness	mg/l	annual	190	BWQR; n=39; 75th percentile
pH	S.U.	summer	8.1	BWQR; n=48; 75th percentile
		winter	8.1	BWQR; n=48; 75th percentile
Temperature	°C	summer	24.5	BWQR; n=89; 75th percentile
		winter	7	BWQR; n=89; 75th percentile
J. M. Smuckers flow	cfs	annual	1.782	Requested new average design flow
Background Water Quality				
Ammonia (summer)	mg/L		0.06	Ohio EPA; 2002; n=6; 2<MDL; Ohio EPA Station Q01S13
Ammonia (winter)	mg/L		0	No representative data available.
Chlorine, Total Residual	mg/L		0	No representative data available.
Nickel	µg/L		0	Ohio EPA; 2002; n=6; 6<MDL; Ohio EPA Station Q01S13
Nitrate + Nitrite	mg/L		1.075	Ohio EPA; 2002; n=6; 0<MDL; Ohio EPA Station Q01S13
Phosphorus	mg/L		0.169	Ohio EPA; 2002; n=6; 0<MDL; Ohio EPA Station Q01S13
Total Kjeldahl Nitrogen	mg/L		0.608	Ohio EPA; 2002; n=6; 0<MDL; Ohio EPA Station Q01S13

BWQR = "Analysis of Unimpacted Stream Data for the State of Ohio," Ohio EPA, 1988.
MDL = method detection limit
Ohio EPA = Ohio Environmental Protection Agency
USGS = United States Geological Survey

Table 6. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

		Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (summer)	mg/L	--	--	--	--	--
Ammonia (winter)	mg/L	--	--	--	--	--
Chlorine, Total Residual	mg/L	--	--	0.082	0.11	0.038
Nickel	µg/L	82377	3582	896	6612	2100
Nitrate + Nitrite	mg/L	--	1773	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Total Kjeldahl Nitrogen	mg/L	--	--	--	--	--

Table 7. Parameter Assessment for Outfall 004

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

Phosphorus Total Kjeldahl Nitrogen

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

Nickel Nitrate + Nitrite

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

No parameters meet these criteria.

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.

No parameters meet these criteria.

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*	*Average*	*Maximum*
Chlorine, Total Residual	mg/L	--	0.038

PEL = preliminary effluent limit
PEQ = projected effluent quality
WLA = wasteload allocation
WQS = water quality standards

Table 8. Final Effluent Limits

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Outfall 003						
Flow Rate	GPD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
pH	S.U.	6.5 - 9.0		--	--	EP
Total Suspended Solids	mg/L	--	65	--	--	EP
Oil & Grease	mg/L	--	10	--	--	EP
Outfall 004						
Temperature						
Summer	℃	--	36	--	--	AD
Winter	℃	--	36	--	--	AD
Dissolved Oxygen	mg/L	5.0 Minimum		--	--	EP/WQS
Biochemical Oxygen Demand (5 day)	mg/L	10	15	43.7	65.5	BADCT
pH	S.U.	6.5 - 9.0		--	--	EP
Total Suspended Solids	mg/L	12	18	52.4	78.5	BADCT
Oil & Grease	mg/L	--	10	--	43.7	WQS
Ammonia	mg/L	--	1.5	--	6.55	EP
Total Kjeldahl Nitrogen	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Nitrate + Nitrite	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				EP
Phosphorus	mg/L	1.0	--	4.37	--	EP/TMDL
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Chlorine, Total Residual	mg/L	--	0.038	--	--	WLA
pH Range Excursions, >60 minutes	#/day	--	0	--	--	EP
pH Range Excursions, Monthly Total Duration	minutes	--	446	--	--	EP

[a] Effluent loadings based on average design discharge flow of 1.152 MGD.

[b] Definitions:
AD = Antidegradation (OAC Rule 3745-1-05)
BADCT = Best Available Demonstrated Control Technology
EP = Existing Permit
TMDL = Total Maximum Daily Load
WLA = Wasteload Allocation procedures (OAC 3745-2)
WQS = Ohio Water Quality Standards (OAC 3745-1)

[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.