

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 **North Ridgeville French Creek WWTP**

Public Notice No.: 10-05-072  
Public Notice Date: May 27, 2010  
Comment Period Ends: June 26, 2010

OEPA Permit No.: **3PD00043\*MD**  
Application No.: **OH044512**

Name and Address of Applicant:

**City of North Ridgeville  
7307 Avon Belden Road  
Sheffield, Ohio 44054**

Name and Address of Facility Where  
Discharge Occurs:

**French Creek WWTP  
2350 Abbe Road  
Sheffield, Ohio 44054  
Lorain County**

Receiving Water: **French Creek**

Subsequent  
Stream Network: **Black River to  
Lake Erie**

**Introduction**

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations, 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, 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 and Ohio Water Pollution Control Law (ORC 6111). Decisions to award variances to Water Quality Standards 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 Clean Water Act. Many of these have already been established by 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).

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Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations 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 wasteload allocation for a pollutant to a measure of the effluent quality. The measure of effluent quality is called PEQ - Projected Effluent Quality. 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**

The existing permit limits for the following parameters continue: CBOD5, total suspended solids, oil and grease, pH, and phosphorus.

Additional permit limits for the following parameters: free cyanide and lead are based upon the current wasteload allocation worksheet.

New Water Quality Standards have replaced fecal coliform with E. coli limits.

The monitoring requirements for the following parameters continue: flow, temperature, dissolved oxygen, TKN, nitrate + nitrite, nickel, silver, zinc, cadmium, chromium, copper, chromium<sup>+6</sup>, and Di-N-Butylphthalate.

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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 and Compliance Section  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

The OEPA 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 Daniel A. Kopec, (614) 644-1987, [daniel.kopec@epa.state.oh.us](mailto:daniel.kopec@epa.state.oh.us).

## **Location of Discharge/Receiving Water Use Classification**

The North Ridgeville French Creek WWTP discharges to French Creek at River Mile (RM) 2.6. The approximate location of the facility is shown in Figure 1.

French Creek flows into the Black River which flows into Lake Erie. French Creek has the following designated uses: under the Ohio Water Quality Standards (OAC 3745-1-27): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR) Class B. This section of French Creek is identified by the Ohio EPA River Code 02-002 and USEPA River Reach number 0411001-004. The Black River study area is shown in Figure 3.

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 water quality standards 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 Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not 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 agricultural and industrial water supply.

## **Facility Description**

The French Creek WWTP was constructed in 1975 as a tertiary treatment plant and the last major modification was in 2003. The facility has a design flow of 11.25 MGD. The French Creek WWTP receives sewage from the City of North Ridgeville, Avon, and the Village of Sheffield. Treatment processes at the plant include automatic screens, flow equalization, grit removal, conventional activated sludge, biological phosphorus removal, addition of ferric chloride, secondary clarification, tertiary treatment using rapid sand filters, ultraviolet disinfection, and post aeration. Sludge is stabilized by aerobic digestion and dried on sludge drying beds. The sludge is then land applied at agronomic rates under an approved sludge management plan.

The French Creek WWTP collection system is 100% separate sanitary sewer. The current average inflow and infiltration rate is estimated to be 400,000 gallons per day. There are satellite communities that

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discharge to the French Creek WWTP. To minimize inflow and infiltration a satellite sewer discharge control program (SSDCP) was developed.

The French Creek WWTP Pretreatment program was approved by the Ohio EPA on June 19, 1996. The city has three (3) metal finishers as well as other general industrial users.

### **Description of Existing Discharge**

Table 1 presents chemical specific data compiled from data reported in annual pretreatment reports by the North Ridgeville French Creek WWTP.

Table 2 presents a summary of acute toxicity test results on the North Ridgeville French Creek WWTP effluent.

Table 3 summarizes the chemical specific data for outfall 001 by presenting the average and maximum Projected Effluent Quality (PEQ) values.

Tables 4a-4f summarize the water quality criteria results for the Black River.

Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information through the submission of annual pretreatment program reports and/or from effluent testing conducted by the Agency.

### **Assessment of Impact on Receiving Waters**

For a biological assessment of the study area, please refer to the Technical Support Document, *Biological and Water Quality Study of the Black River Basin, 1998*(OEPA, December 1998). The results of that survey showed that the Black River from approx. RM 5.5 to the mouth was found to be in non-attainment of the WWH use designation. The following high magnitude causes were listed as the reason for the non-attainment status; unknown toxicity, priority organics, nutrients and organic enrichment/D.O. The following high magnitude sources for the impairment were listed; industrial and municipal point sources, combined sewer overflows and unknown sources. In addition, much of the study area is considered to be lacustrine influenced.

In August 2008, Ohio EPA completed a report entitled Total Maximum Daily Loads (TMDL) for the Black River Basin. A TMDL report is necessary when a waterbody is characterized as not meeting its goals or water quality use designation or characteristics. A TMDL report shall address chemical and biological impacts or characteristics of the waterbody, identify causes of non-attainment, impacts, recommend solutions, etc. The entire TMDL report is available at:

<http://www.epa.ohio.gov/dsw/tmdl/BlackRiverTMDL.aspx>

Point source pollution (discharged from pipes), runoff from urban areas and agricultural land, failing home sewage treatment and poor stream bank land management are degrading some stream segments. Among the most visible threats to the Black River is the conversion of farm, forest and stream bank acreage to suburban and commercial uses.

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### *Dissolved Metals Translators*

A dissolved metals translator (DMT) is the factor used to convert a dissolved metal aquatic life criterion to an effective total recoverable aquatic life criterion with which a total recoverable aquatic life allocation can be calculated as required in the NPDES permit process. Currently, a DMT is based on site- or area specific field data; each field data sample consists of a total recoverable measurement paired with a dissolved metal measurement. To account for the limited quantity of data, the DMT for each of these metals was determined as the lower end of the 95% confidence interval (1-tail) about the geometric mean of the total recoverable-to-dissolved ratios of the sample pairs. Each DMT is metal specific and is applied by multiplying the dissolved criteria by the DMT, resulting in total effective recoverable criteria which can be used in the wasteload allocation procedures.

In some cases, it is possible that the use of a DMT may result in instream concentrations of metals that may increase the risk of non-attainment of the aquatic life use designation. The application of the dissolved metal translators resulted in effective total recoverable criteria for copper, lead, and zinc that were higher than the total recoverable criteria listed in OAC 3745-1. In order to provide an adequate margin of safety for protection of aquatic life, the effective total recoverable criteria that resulted from the application of the DMTs for these parameters were adjusted to levels that are protective of applicable aquatic life use designation and biological criteria.

The DMTs used in the modeling for the lower Black River are based on sample data collected in 1997 and may no longer be representative of current instream conditions. Should North Ridgeville WWTP wish to continue using DMTs for future wasteload allocations (beyond the 2010 permit), a new DMT analysis or study must be completed prior to the next permit renewal and submitted with the renewal application. See paragraphs F and G in rule 3745-2-04 of the Ohio Administrative Code for requirements in developing a DMT study.

### *Whole Effluent Toxicity WLA*

Water quality standards 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). Wasteload allocations can then be calculated using TUs as if they were water quality criteria.

The wasteload allocation 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

The allowable effluent toxicity (AET) is a factor considered in evaluating whole effluent toxicity. The AET calculations are similar to those for aquatic life criteria (using the chronic toxicity unit ( $TU_c$ ) and 7Q10 for average and the acute toxicity unit ( $TU_a$ ) and 1Q10 for maximum). For North Ridgeville WWTP, the AET values are 0.30  $TU_a$  and 1.0  $TU_c$ .

The chronic toxicity unit ( $TU_c$ ) is defined as 100 divided by the  $IC_{25}$ :

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

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):

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

The acute toxicity unit (TU<sub>a</sub>) is defined as 100 divided by the LC<sub>50</sub> 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.

When the acute wasteload allocation is less than 1.0 TU<sub>a</sub>, it may be defined as:

| <u>Dilution Ratio</u><br><u>(downstream flow to discharger flow)</u> | <u>Allowable Effluent Toxicity</u><br><u>(percent effects in 100% effluent)</u> |
|--|---|
| up to 2 to 1   | 30  |
| greater than 2 to 1 but less than 2.7 to 1                           | 40  |
| 2.7 to 1 to 3.3 to 1   | 50  |

The acute wasteload allocation for French Creek is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.0 to 1.

$$\frac{\text{Downstream flow}}{\text{Discharger flow}} = \frac{\text{Upstream flow} + \text{Discharger flow}}{\text{Discharger flow}} = \frac{0.26 \text{ cfs} + 17.66}{17.40 \text{ cfs}} = \frac{17.66}{17.40} = 1.014 = 1.0$$

### **Reasonable Potential/ Effluent Limits/Hazard Management Decisions**

The preliminary effluent limits are the lowest average WLA (average PEL) and the maximum WLA (maximum PEL). To determine the reasonable potential of the discharger to exceed the WLA for each parameter, the facility's effluent quality is compared to the preliminary effluent limits. The average PEQ value (Table 3) is compared to the average PEL, and the maximum PEQ value is compared to the maximum PEL. Based on the calculated percentage of the respective average and maximum comparisons, the parameters are assigned to "groups", as 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 3PD00043 outfall 001 and the basis for their recommendation.

The limits proposed for dissolved oxygen, total suspended solids, ammonia-nitrogen, and 5-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>) are all based on plant design criteria. These limits are protective of water quality standards.

Limits proposed for oil and grease, pH, and E. coli are based on Water Quality Standards (OAC 3745-1-07). Phosphorus is limited based on provisions of OAC 3745-33-06(C).

The Ohio EPA risk assessment (Table 7) places free cyanide, lead, and mercury into group 5. This placement indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters PEQ is greater than 100 percent of the wasteload allocation. Pollutants that meet this requirement must have permit limits under OAC Rule 3745-33-07(A)(1).

Ohio EPA risk assessment (Table 7) places copper in group 4. The placement of copper as well as the data in Table 3 supports that this parameter does not have the reasonable potential to contribute to WQS

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exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC Rule 3745-33-07(A)(2).

Ohio EPA risk assessment (Table 7) places silver in group 3. The placement of silver as well as the data in Table 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 document that these pollutants continue to remain at low levels.

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**

#### *Sanitary Sewer Overflow Reporting*

Provisions for reporting sanitary sewer overflows (SSOs) are also proposed in this permit. These provisions include: the reporting of the system-wide number of SSO occurrences on monthly operating reports; telephone notification of Ohio EPA and the local health department, and 5-day follow up written reports for certain high risk SSOs; and preparation of an annual report that is submitted to Ohio EPA and made available to the public. Many of these provisions were already required under the “Noncompliance Notification”, “Records Retention”, and “Facility Operation and Quality Control” general conditions in Part III of Ohio NPDES permits.

#### *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 North Ridgeville French Creek WWTP to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001.

#### *Operator of Record*

In December 2006, Ohio Administrative Code rule revisions became effective which 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 represents language necessary to implement rule 3745-7-02 of the Ohio Administrative Code (OAC), and requires the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

#### *Storm Water Compliance*

North Ridgeville French Creek WWTP currently has granted coverage on December 18, 2006, under Industrial stormwater general permit, number 3GR01056\*DG.

#### *Outfall Signage*

Part II of the permit includes requirements for signs to be placed at each outfall to French Creek, providing information about the discharge. Signage at outfalls is required pursuant to Ohio Administrative Code 3745-33-08(A).

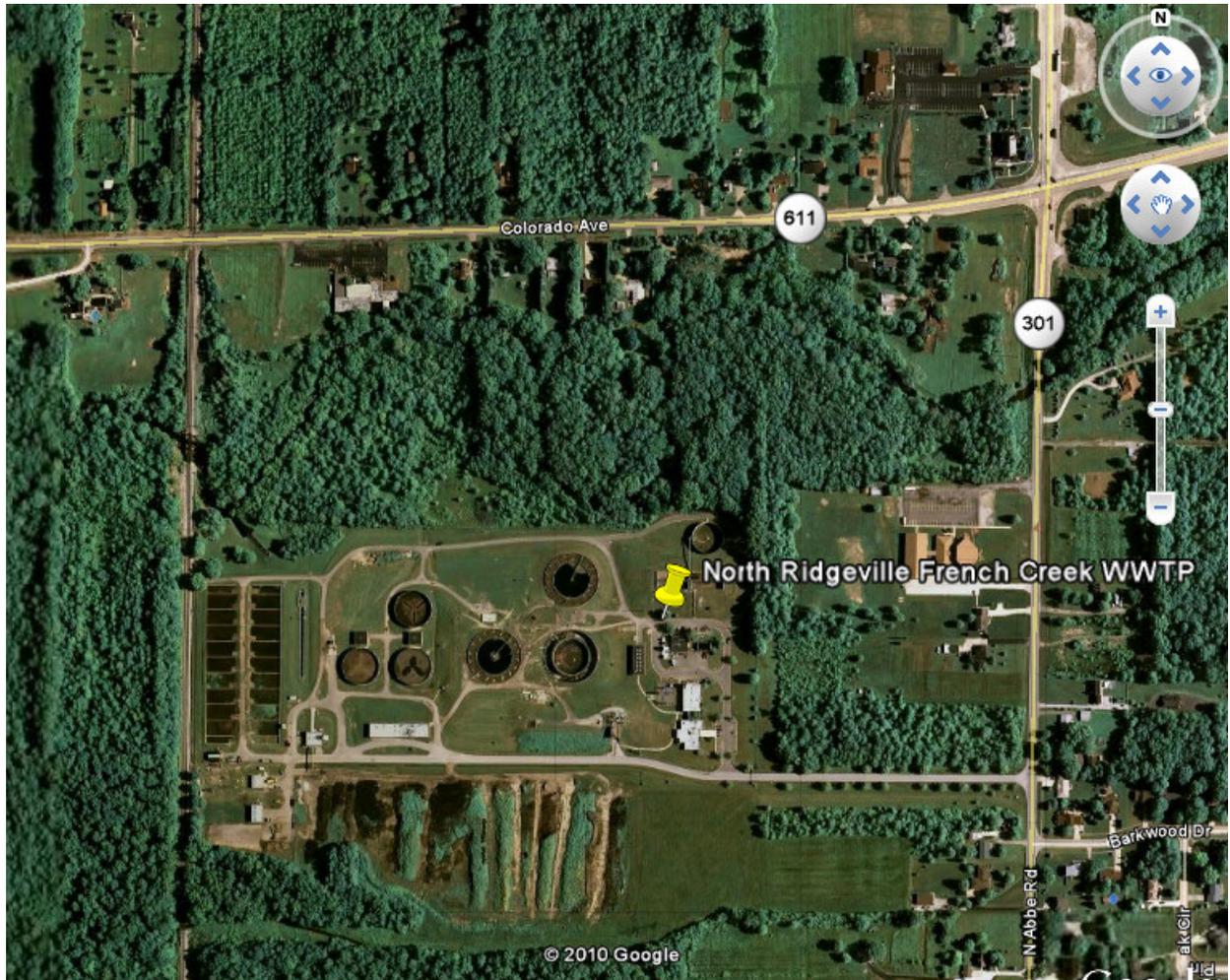


Figure 1. Approximate location of the North Ridgeville French Creek WWTP.

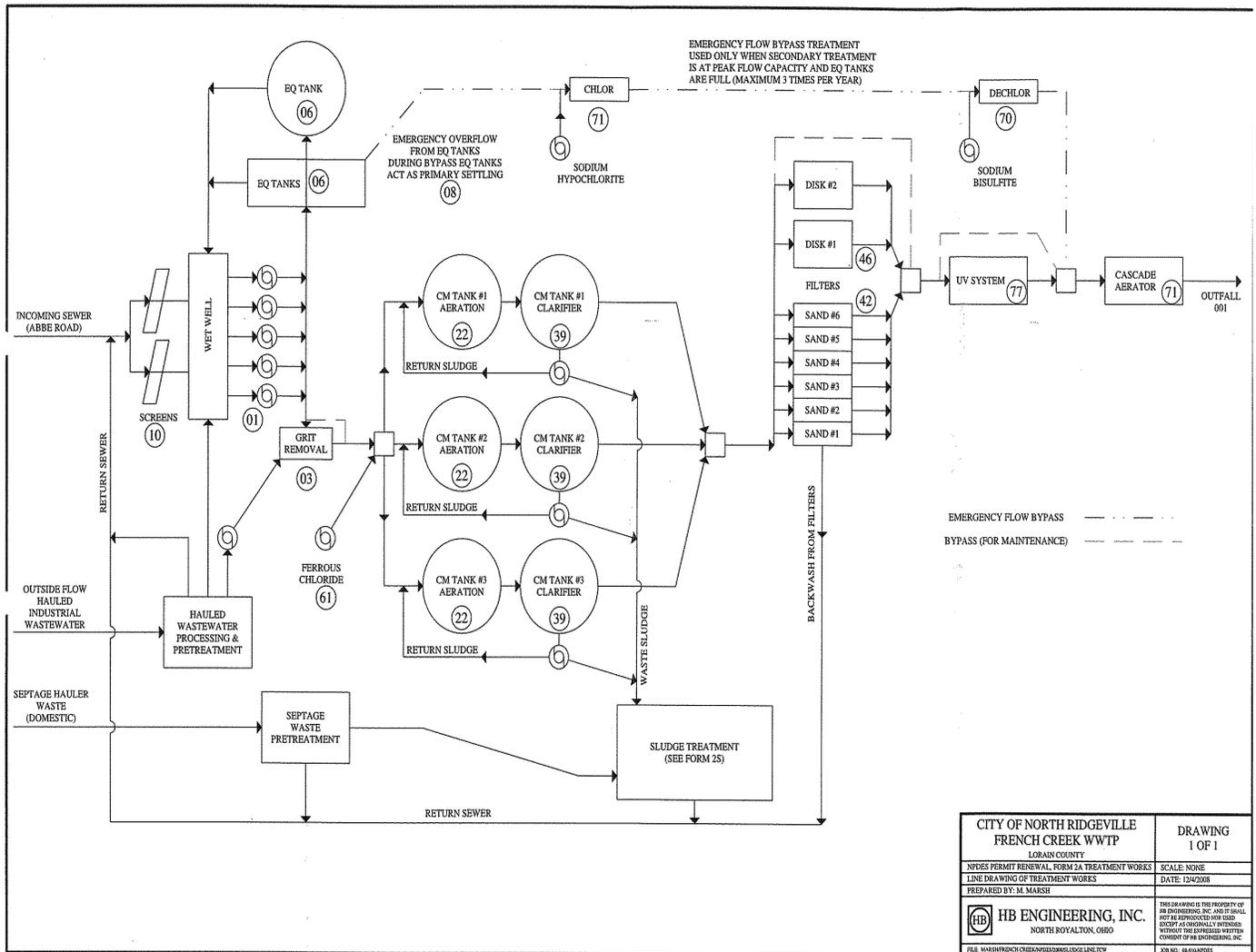


Figure 2. Diagram of Wastewater Treatment System

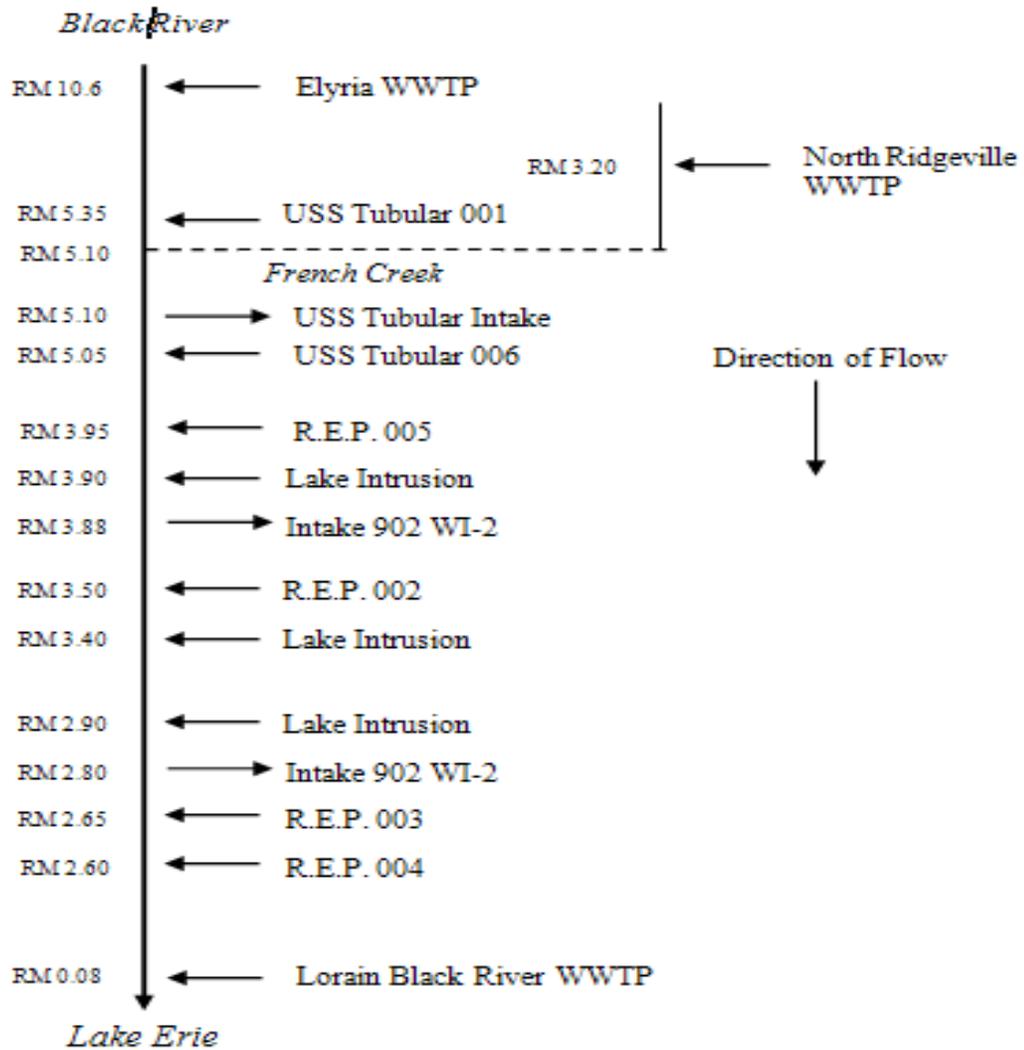


Figure 3. French Creek Study Area

Table 1. Effluent Characterization and Decision Criteria

Summary of analytical results for the North Ridgeville French Creek WWTP outfall 3PD0043001. All values are in mg/l unless otherwise indicated. PT = data from, pretreatment program reports; ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ<sub>avg</sub> = monthly averages; PEQ<sub>max</sub> = daily maximum analytical results.

| PARAMETER       | PT   | PT   | PT   | DECISION CRITERIA  |                    |
|-----------------|------|------|------|--------------------|--------------------|
|                 | 2006 | 2007 | 2008 | PEQ <sub>avg</sub> | PEQ <sub>max</sub> |
| Zinc (ug/L)     | 30.8 | 51.9 | 25.9 |                    |                    |
| Chromium (ug/L) | ND   | 14.3 | ND   |                    |                    |

Table 2. Summary of acute toxicity test results on the North Ridgeville French Creek WWTP effluent.

| Test Date(a) | <i>Ceriodaphnia dubia</i> 48 hours |                |                               |                 |                  |                 | <i>Fathead Minnows</i> 96 hour |                |                               |                 |                  |                 |
|--------------|------------------------------------|----------------|-------------------------------|-----------------|------------------|-----------------|--------------------------------|----------------|-------------------------------|-----------------|------------------|-----------------|
|              | UP <sup>b</sup>                    | C <sup>c</sup> | LC <sub>50</sub> <sup>d</sup> | %M <sup>g</sup> | TUa <sup>h</sup> | NF <sup>i</sup> | UP <sup>b</sup>                | C <sup>c</sup> | LC <sub>50</sub> <sup>d</sup> | %M <sup>g</sup> | TUa <sup>h</sup> | NF <sup>i</sup> |
| 10/27/08(e)  | 5                                  | 0              | >100                          | 00              | AA               | NT              | 3.3                            | 0              | >100                          | 00              | AA               | NT              |
|              |                                    |                |                               |                 |                  |                 |                                |                |                               |                 |                  |                 |

<sup>a</sup> O = EPA test; E = entity test

<sup>b</sup> UP = upstream control water

<sup>c</sup> C = laboratory water control

<sup>d</sup> LC<sub>50</sub> = median lethal concentration

<sup>e</sup> EC<sub>50</sub> = median effects concentration

<sup>f</sup> %A = percent adversely affected in 100% effluent

<sup>g</sup> %M = percent mortality in 100% effluent

<sup>h</sup> TUa = acute toxicity units

<sup>i</sup> NF = near field sample

NT = not tested

Table 3. Effluent Data for North Ridgeville French Creek and Projected Effluent Quality Values

| <b>Parameter</b>               | <b>Units</b> | <b>Number of Samples</b> | <b>Number &gt; MDL</b> | <b>PEQ Average</b> | <b>PEQ Maximum</b> |
|--------------------------------|--------------|--------------------------|------------------------|--------------------|--------------------|
| Ammonia - summer               | mg/L         | 425                      | 247                    | 0.795              | 1.346              |
| - winter                       | mg/L         | 300                      | 119                    | 2.897              | 3.969              |
| Nitrite + Nitrate              | mg/L         | 224                      | 224                    | 11.29              | 15.47              |
| Phosphorus                     | mg/L         | 1243                     | 1243                   | 0.478              | 0.890              |
| Cyanide, free                  | ug/L         | 45                       | 1.0                    | 8.03               | 11.0               |
| Nickel                         | ug/L         | 118                      | 56                     | 24.28              | 36.02              |
| Silver                         | ug/L         | 50                       | 2                      | 0.583              | 0.798              |
| Zinc                           | ug/L         | 119                      | 114                    | 45.01              | 57.64              |
| Cadmium                        | ug/L         | 49                       | 2.0                    | 0.550              | 0.753              |
| Lead                           | ug/L         | 118                      | 5.0                    | 24.29              | 33.28              |
| Chromium, total                | ug/L         | 114                      | 4.0                    | 8.935              | 12.24              |
| Copper                         | ug/L         | 120                      | 28                     | 10.21              | 12.82              |
| Chromium <sup>+6</sup> , diss. | ug/L         | 58                       | 0                      | --                 | --                 |
| Di-N-Butylphthalate            | ug/L         | 18                       | 0                      | --                 | --                 |
| Mercury                        | ug/L         | 49                       | 10                     | 0.0037             | 0.0050             |

Table 4a. Water Quality Criteria for the Black River & French Creek (except hardness-based)

| Parameter                      | Outside Mixing Zone Criteria |                           |              |                           |                                   | Inside Mixing Zone Maximum <sup>A</sup> |
|--------------------------------|------------------------------|---------------------------|--------------|---------------------------|-----------------------------------|---|
|                                | Units                        | Average                   |              |                           | Maximum Aquatic Life <sup>A</sup> |   |
|                                |                              | Human Health <sup>A</sup> | Agri-culture | Aquatic Life <sup>A</sup> |                                   |   |
| Aluminum                       | ug/L                         | 4500 <sup>B</sup>         | --           | --                        | --                                | --                                      |
| Antimony                       | ug/L                         | 780                       | --           | 190 <sup>B</sup>          | 900 <sup>B</sup>                  | 1800 <sup>B</sup>                       |
| Arsenic                        | ug/L                         | 580                       | 100          | 150                       | 340                               | 680                                     |
| Barium                         | ug/L                         | 160000                    | --           | 220 <sup>B</sup>          | 2000 <sup>B</sup>                 | 4000 <sup>B</sup>                       |
| Bis(2-ethylhexyl)phthalate     | ug/L                         | 32                        | --           | 8.4                       | 1100 <sup>B</sup>                 | 2100 <sup>B</sup>                       |
| Boron                          | ug/L                         | 200000                    | --           | 3900 <sup>B</sup>         | 33000 <sup>B</sup>                | 65000 <sup>B</sup>                      |
| Bromodichloromethane           | ug/L                         | 180                       | --           | 340 <sup>S,V</sup>        | 3100 <sup>S,V</sup>               | 6200 <sup>S,V</sup>                     |
| Bromoform                      | ug/L                         | 890                       | --           | 230 <sup>B</sup>          | 1100 <sup>B</sup>                 | 2200 <sup>B</sup>                       |
| Chlorine, total res.           | ug/L                         | --                        | --           | 11                        | 19                                | 38                                      |
| Chloroform                     | ug/L                         | 1700                      | --           | 140 <sup>B</sup>          | 1300 <sup>B</sup>                 | 2600 <sup>B</sup>                       |
| Chromium <sup>+6</sup> , diss. | ug/L                         | 14000                     | --           | 11                        | 16                                | 31                                      |
| Cobalt                         | ug/L                         | --                        | --           | 24 <sup>B</sup>           | 220 <sup>B</sup>                  | 440 <sup>B</sup>                        |
| Cyanide, free                  | ug/L                         | 48000                     | --           | 5.2                       | 22                                | 44                                      |
| Cyanide, total                 | ug/L                         | 48000                     | --           | --                        | --                                | --                                      |
| Dibromochloromethane           | ug/L                         | 150                       | --           | 320 <sup>S,V</sup>        | 2900 <sup>S,V</sup>               | 5800 <sup>S,V</sup>                     |
| Fluoride                       | ug/L                         | --                        | 2000         | --                        | --                                | --                                      |
| Iron                           | ug/L                         | --                        | 5000         | --                        | --                                | --                                      |
| Manganese                      | ug/L                         | 61000                     | --           | --                        | --                                | --                                      |
| Mercury <sup>C,W</sup>         | ug/L                         | 0.0031                    | 10           | 0.91                      | 1.7                               | 3.4                                     |
| Molybdenum                     | ug/L                         | 10000                     | --           | 20000 <sup>B</sup>        | 190000 <sup>B</sup>               | 370000 <sup>B</sup>                     |
| Naphthalene                    | ug/L                         | 1200                      | --           | 21 <sup>B</sup>           | 170 <sup>B</sup>                  | 340 <sup>B</sup>                        |
| Nitrate + Nitrite              | mg/L                         | --                        | 100          | --                        | --                                | --                                      |
| Phenol                         | ug/L                         | 2400 <sup>B</sup>         | --           | 400 <sup>B</sup>          | 4700                              | 9400                                    |
| Selenium                       | ug/L                         | 3100                      | 50           | 5.0                       | --                                | --                                      |
| Strontium                      | ug/L                         | 1400000                   | --           | 21000 <sup>B</sup>        | 40000                             | 81000                                   |
| Thallium                       | ug/L                         | --                        | --           | 17 <sup>B</sup>           | 79 <sup>B</sup>                   | 160 <sup>B</sup>                        |
| Toluene                        | ug/L                         | 51000                     | --           | 62 <sup>B</sup>           | 560 <sup>B</sup>                  | 1100 <sup>B</sup>                       |
| Total Dissolved Solids         | mg/L                         | --                        | --           | 1500                      | --                                | --                                      |
| 2,4,6 – Trichlorophenol        | ug/L                         | 190                       | --           | 4.9 <sup>B</sup>          | 39 <sup>B</sup>                   | 79 <sup>B</sup>                         |

A – Human Health and Aquatic Life criteria are Tier I unless otherwise indicated.

B – Tier II criterion

C – Bioaccumulative Chemical of Concern (BCC)

W – Wildlife Criteria apply = 0.0013 ug/L

S,V – Screening Value

Table 4b. Water Quality Criteria for the Black River downstream of intake 901 (hardness = 140 mg/L)

| Parameter       | Outside Mixing Zone Criteria |                           |              |                           |                                   | Inside Mixing Zone Maximum <sup>A</sup> |
|-----------------|------------------------------|---------------------------|--------------|---------------------------|-----------------------------------|---|
|                 | Units                        | Average                   |              |                           | Maximum Aquatic Life <sup>A</sup> |   |
|                 |                              | Human Health <sup>A</sup> | Agri-culture | Aquatic Life <sup>A</sup> |                                   |   |
| Cadmium         | ug/L                         | 730                       | 50           | 4.4 <sup>D</sup>          | 9.5 <sup>D</sup>                  | 19 <sup>D</sup>                         |
| Chromium, total | ug/L                         | 14000                     | 100          | 330 <sup>D</sup>          | 2500 <sup>D</sup>                 | 5000 <sup>D</sup>                       |
| Copper          | ug/L                         | 64000                     | 500          | 16 <sup>D</sup>           | 25 <sup>D</sup>                   | 50 <sup>D</sup>                         |
| Lead            | ug/L                         | --                        | 100          | 110 <sup>D</sup>          | 2100 <sup>D</sup>                 | 4200 <sup>D</sup>                       |
| Nickel          | ug/L                         | 43000                     | 200          | 83 <sup>D</sup>           | 750 <sup>D</sup>                  | 1500 <sup>D</sup>                       |
| Silver          | ug/L                         | 11000                     | --           | 1.3                       | 2.9                               | 5.7                                     |
| Zinc            | ug/L                         | 35000                     | 25000        | 430 <sup>D</sup>          | 420 <sup>D</sup>                  | 840 <sup>D</sup>                        |

A – Human Health and Aquatic Life criteria are Tier I unless otherwise indicated

D – Total effective criteria based on application of dissolved metal translators

Table 4c. Water Quality Criteria for the Black River from intake 902 to 901 (hardness = 193 mg/L)

| Parameter       | Outside Mixing Zone Criteria |                           |              |                           |                                   | Inside Mixing Zone Maximum <sup>A</sup> |
|-----------------|------------------------------|---------------------------|--------------|---------------------------|-----------------------------------|---|
|                 | Units                        | Average                   |              |                           | Maximum Aquatic Life <sup>A</sup> |   |
|                 |                              | Human Health <sup>A</sup> | Agri-culture | Aquatic Life <sup>A</sup> |                                   |   |
| Cadmium         | ug/L                         | 730                       | 50           | 4.0 <sup>D</sup>          | 9.5 <sup>D</sup>                  | 19 <sup>D</sup>                         |
| Chromium, total | ug/L                         | 14000                     | 100          | 210 <sup>D</sup>          | 1600 <sup>D</sup>                 | 3200 <sup>D</sup>                       |
| Copper          | ug/L                         | 64000                     | 500          | 19 <sup>D</sup>           | 30 <sup>D</sup>                   | 61 <sup>D</sup>                         |
| Lead            | ug/L                         | --                        | 100          | 73 <sup>D</sup>           | 1400 <sup>D</sup>                 | 2800 <sup>D</sup>                       |
| Nickel          | ug/L                         | 43000                     | 200          | 92 <sup>D</sup>           | 830 <sup>D</sup>                  | 1700 <sup>D</sup>                       |
| Silver          | ug/L                         | 11000                     | --           | 1.3                       | 5.0                               | 9.9                                     |
| Zinc            | ug/L                         | 35000                     | 25000        | 280 <sup>D</sup>          | 270 <sup>D</sup>                  | 550 <sup>D</sup>                        |

A – Human Health and Aquatic Life criteria are Tier I unless otherwise indicated

D – Total effective criteria based on application of dissolved metal translators

Table 4d. Water Quality Criteria for the Black River dst outfall 006 to intake 902 (hardness =233 mg/L)

| Parameter       | Outside Mixing Zone Criteria |                           |              |                                     |                                   | Inside Mixing Zone Maximum <sup>A</sup> |
|-----------------|------------------------------|---------------------------|--------------|-------------------------------------|-----------------------------------|---|
|                 | Units                        | Average                   |              |                                     | Maximum Aquatic Life <sup>A</sup> |   |
|                 |                              | Human Health <sup>A</sup> | Agri-culture | Aquatic Life <sup>A</sup>           |                                   |   |
| Cadmium         | ug/L                         | 730                       | 50           | 4.6 <sup>D</sup>                    | 12 <sup>D</sup>                   | 24 <sup>D</sup>                         |
| Chromium, total | ug/L                         | 14000                     | 100          | 250 <sup>D</sup>                    | 1900 <sup>D</sup>                 | 3800 <sup>D</sup>                       |
| Copper          | ug/L                         | 64000                     | 500          | 22 <sup>D</sup>                     | 36 <sup>D</sup>                   | 72 <sup>D</sup>                         |
| Lead            | ug/L                         | --                        | 100          | 93 <sup>D</sup> (22) <sup>C</sup>   | 1800 <sup>D</sup>                 | 3500 <sup>D</sup>                       |
| Nickel          | ug/L                         | 43000                     | 200          | 110 <sup>D</sup>                    | 970 <sup>D</sup>                  | 1900 <sup>D</sup>                       |
| Silver          | ug/L                         | 11000                     | --           | 1.3                                 | 6.8                               | 14                                      |
| Zinc            | ug/L                         | 35000                     | 25000        | 320 <sup>D</sup> (170) <sup>C</sup> | 320 <sup>D</sup>                  | 640 <sup>D</sup>                        |

A – Human Health and Aquatic Life criteria are Tier I unless otherwise indicated  
 C – The values in parentheses are biological threshold values and apply only to USS Tubular outfall 006  
 D – Total effective criteria based on application of dissolved metal translators

Table 4e. Water Quality Criteria for the Black River from Elyria to outfall 006 (hardness =233 mg/L)

| Parameter       | Outside Mixing Zone Criteria |                           |              |                           |                                   | Inside Mixing Zone Maximum <sup>A</sup> |
|-----------------|------------------------------|---------------------------|--------------|---------------------------|-----------------------------------|---|
|                 | Units                        | Average                   |              |                           | Maximum Aquatic Life <sup>A</sup> |   |
|                 |                              | Human Health <sup>A</sup> | Agri-culture | Aquatic Life <sup>A</sup> |                                   |   |
| Cadmium         | ug/L                         | 730                       | 50           | 4.7 <sup>D</sup>          | 12 <sup>D</sup>                   | 24 <sup>D</sup>                         |
| Chromium, total | ug/L                         | 14000                     | 100          | 280 <sup>D</sup>          | 2100 <sup>D</sup>                 | 4200 <sup>D</sup>                       |
| Copper          | ug/L                         | 64000                     | 500          | 20 <sup>D</sup>           | 32 <sup>D</sup>                   | 64 <sup>D</sup>                         |
| Lead            | ug/L                         | --                        | 100          | 22 <sup>C</sup>           | 810 <sup>D</sup>                  | 1600 <sup>D</sup>                       |
| Nickel          | ug/L                         | 43000                     | 200          | 110 <sup>D</sup>          | 980 <sup>D</sup>                  | 2000 <sup>D</sup>                       |
| Silver          | ug/L                         | 11000                     | --           | 1.3                       | 6.8                               | 14                                      |
| Zinc            | ug/L                         | 35000                     | 25000        | 250 <sup>D</sup>          | 250 <sup>D</sup>                  | 500 <sup>D</sup>                        |

A – Human Health and Aquatic Life criteria are Tier I unless otherwise indicated  
 C – Biological threshold value  
 D – Total effective criteria based on application of dissolved metal translators

Table 4f. Water Quality Criteria for French Creek (hardness =254 mg/L)

| Parameter       | Outside Mixing Zone Criteria |                           |              |                           |                                   | Inside Mixing Zone Maximum <sup>A</sup> |
|-----------------|------------------------------|---------------------------|--------------|---------------------------|-----------------------------------|---|
|                 | Units                        | Average                   |              |                           | Maximum Aquatic Life <sup>A</sup> |   |
|                 |                              | Human Health <sup>A</sup> | Agri-culture | Aquatic Life <sup>A</sup> |                                   |   |
| Cadmium         | ug/L                         | 730                       | 50           | 5.1                       | 13                                | 26                                      |
| Chromium, total | ug/L                         | 14000                     | 100          | 180                       | 3900                              | 7700                                    |
| Copper          | ug/L                         | 64000                     | 500          | 21 <sup>D</sup>           | 34 <sup>D</sup>                   | 69 <sup>D</sup>                         |
| Lead            | ug/L                         | --                        | 100          | 27 <sup>C</sup>           | 530 <sup>D</sup>                  | 1100 <sup>D</sup>                       |
| Nickel          | ug/L                         | 43000                     | 200          | 110                       | 1000                              | 2100                                    |
| Silver          | ug/L                         | 11000                     | --           | 1.3                       | 7.9                               | 16                                      |
| Zinc            | ug/L                         | 35000                     | 25000        | 260                       | 260                               | 530                                     |

A – Human Health and Aquatic Life criteria are Tier I unless otherwise indicated  
 C – Biological threshold value  
 D – Total effective criteria based on application of dissolved metal translators

Table 5a: Instream Conditions and Discharger Flow for Black River Mainstream

| Parameter                     | Units |        | Value | Basis                            |
|-------------------------------|-------|--------|-------|----------------------------------|
| Upstream Flow                 |       |        |       |                                  |
| 7Q10                          | cfs   | annual | 4.29  | USGS gage #04200500,1944-97 data |
| 1Q10                          | cfs   | annual | 2.90  | USGS gage #04200500,1944-97 data |
| 30Q10                         | cfs   | summer | 5.30  | USGS gage #04200500,1944-97 data |
|                               |       | winter | 19.0  | USGS gage #04200500,1944-97 data |
| 90Q10                         | cfs   | annual | 9.55  | USGS gage #04200500,1944-97 data |
| Harmonic Mean Flow            | cfs   | annual | 30.48 | USGS gage #04200500,1944-97 data |
| Lake Intrusion flows @ RM 3.9 |       |        |       |                                  |
| 7Q10                          | cfs   | annual | 2.77  | USS/Kobe                         |
| 1Q10                          | cfs   | annual | 3.11  | USS/Kobe                         |
| 90Q10                         | cfs   | annual | 1.90  | USS/Kobe                         |
| Harmonic Mean Flow            | cfs   | annual | 0.32  | USS/Kobe                         |
| Lake Intrusion flows @ RM 3.4 |       |        |       |                                  |
| 7Q10                          | cfs   | annual | 9.18  | USS/Kobe                         |
| 1Q10                          | cfs   | annual | 10.47 | USS/Kobe                         |
| 90Q10                         | cfs   | annual | 6.17  | USS/Kobe                         |
| Harmonic Mean Flow            | cfs   | annual | 0.89  | USS/Kobe                         |

Lake Intrusion flows @ RM 2.9

|                           |      |         |        |                                 |
|---------------------------|------|---------|--------|---------------------------------|
| 7Q10                      | cfs  | annual  | 116    | USS/Kobe                        |
| 1Q10                      | cfs  | annual  | 117.11 | USS/Kobe                        |
| 90Q10                     | cfs  | annual  | 110.29 | USS/Kobe                        |
| Harmonic Mean Flow        | cfs  | annual  | 86.41  | USS/Kobe                        |
| Mixing Assumption         | %    | average | 25     | Chronic criteria default        |
|                           | %    | maximum | 100    | Stream-to-discharge ratio       |
| Instream Hardness         | mg/L | annual  |        |                                 |
| downstream of intake 901  |      |         | 140    | STORET                          |
| from intake 902 to 901    |      |         | 193    | Calculated                      |
| from Elyria to intake 902 |      |         | 233    | STORET                          |
| Instream Temperature      | °C   | summer  | 23     | Lorain 801: 20 values 2005-2009 |
|                           | °C   | winter  | 2.4    | Lorain 801: 8 values 2005-2009  |
| Instream pH               | S.U. | summer  | 7.4    | Lorain 801: 20 values 2005-2009 |
|                           | S.U. | winter  | 7.6    | Lorain 801: 8 values 2005-2009  |

Background Water Quality for the Black River Mainstem

|                         |      |        |       |                                   |
|-------------------------|------|--------|-------|-----------------------------------|
| Aluminum                | ug/L | annual | 686   | STORET: 3 values, 0<MDL, 2001     |
| Ammonia - Summer        | mg/L | annual | 0.49  | Lorain 801: 20 values 2005-2009   |
| Ammonia - Winter        | mg/L | annual | 0.39  | Lorain 801: 8 values 2005-2009    |
| Arsenic                 | ug/L | annual | 3.4   | STORET: 10 values, 1<MDL, 1997-01 |
| Barium                  | ug/L | annual | 30.6  | STORET: 5 values, 2<MDL, 2001     |
| Bis (2-EHP)             | ug/L | annual | 0     | No representative data available  |
| Boron                   | ug/L | annual | 0     | No representative data available  |
| Bromoform               | ug/L | annual | 0     | No representative data available  |
| Cadmium                 | ug/L | annual | 0.415 | STORET: 10 values, 0<MDL, 1997-01 |
| Chlorine, total res.    | ug/L | annual | 0     | No representative data available  |
| Chromium total          | ug/L | annual | 15    | STORET: 10 values, 5<MDL, 1997-01 |
| Chromium +6 diss.       | ug/L | annual | 0     | No representative data available  |
| Cobalt                  | ug/L | annual | 0     | No representative data available  |
| Copper                  | ug/L | annual | 5     | STORET: 10 values, 2<MDL, 1997-01 |
| Cyanide, free           | ug/L | annual | 0     | No representative data available  |
| Fluoride                | ug/L | annual | 0     | No representative data available  |
| Iron                    | ug/L | annual | 752   | STORET: 8 values, 0<MDL, 1997-01  |
| Lead                    | ug/L | annual | 1     | STORET: 10 values, 3<MDL, 1997-01 |
| Mercury                 | ug/L | annual | 0     | No representative data available  |
| Molybdenum              | ug/L | annual | 0     | No representative data available  |
| Nickel                  | ug/L | annual | 20    | STORET: 9 values, 5<MDL, 1997-01  |
| Nitrate + Nitrite       | mg/L | annual | 8.35  | STORET: 54 values, 1<MDL, 1997-01 |
| Phenol                  | ug/L | annual | 0     | No representative data available  |
| Selenium                | ug/L | annual | 2.34  | STORET: 5 values, 2<MDL, 1997-01  |
| Silver                  | ug/L | annual | 0     | No representative data available  |
| 2,4,6 - Trichlorophenol | ug/L | annual | 0     | No representative data available  |

|                        |      |        |     |                                   |
|------------------------|------|--------|-----|-----------------------------------|
| Total Dissolved Solids | mg/L | annual | 546 | STORET: 54 values, 0<MDL, 1997-01 |
| Zinc                   | ug/L | annual | 7.5 | STORET: 10 values, 1<MDL, 1997-01 |

### Background Water Quality for Lake Intrusion Flow

Note: unlisted parameters are the same as background for Black River Mainstem

|                        |      |        |      |                            |
|------------------------|------|--------|------|----------------------------|
| Cadmium                | ug/L | annual | 0.25 | BWQR 1696 values, 1365<MDL |
| Chromium, total        | ug/L | annual | 15   | BWQR 1641 values, 1388<MDL |
| Copper                 | ug/L | annual | 5    | BWQR 2867 values, 1597<MDL |
| Iron                   | ug/L | annual | 650  | BWQR 3018 values, 15<MDL   |
| Lead                   | ug/L | annual | 2    | BWQR 2814 values, 1458<MDL |
| Nickel                 | ug/L | annual | 20   | BWQR 1259 values, 1105<MDL |
| Total Dissolved Solids | ug/L | annual | 382  | BWQR 3755 values, 0<MDL    |
| Zinc                   | ug/L | annual | 15   | BWQR 2284 values, 1117<MDL |

### Effluent Flows

|                    |          |              |     |
|--------------------|----------|--------------|-----|
| Elyria WWTP        | cfs(mgd) | 20.11(13)    | DSW |
| R.E.P. 002         | cfs(mgd) | 25.07(16.2)  | DSW |
| R.E.P. 003         | cfs(mgd) | 69.29(44.78) | DSW |
| R.E.P. 004         | cfs(mgd) | 63.13(40.8)  | DSW |
| R.E.P. 005         | cfs(mgd) | 13.43(6.68)  | DSW |
| USS Tubular 001    | cfs(mgd) | 0.002(0.001) | DSW |
| USS Tubular 006    | cfs(mgd) | 4.32(2.79)   | DSW |
| Lorain Black River | cfs(mgd) | 23.21(15)    | DSW |

### Dissolved Metal Translators for Black River downstream of intake 901

|                 |        |           |
|-----------------|--------|-----------|
| Cadmium         | 1.523  | n=7, 1997 |
| Chromium, total | 3.392  | n=7, 1997 |
| Copper          | 1.344  | n=7, 1997 |
| Lead            | 13.983 | n=7, 1997 |
| Nickel          | 1.201  | n=7, 1997 |
| Zinc            | 2.708  | n=7, 1997 |

### Dissolved Metal Translators for Black River downstream outfall 001 to intake 901

|                 |       |           |
|-----------------|-------|-----------|
| Cadmium         | 1.062 | n=7, 1997 |
| Chromium, total | 1.670 | n=7, 1997 |
| Copper          | 1.212 | n=7, 1997 |
| Lead            | 6.220 | n=7, 1997 |
| Nickel          | 1.012 | n=7, 1997 |
| Zinc            | 1.337 | n=7, 1997 |

### Dissolved Metal Translators for Black River from Elyria to outfall 001

|                 |       |           |
|-----------------|-------|-----------|
| Cadmium         | 1.074 | n=6, 1997 |
| Chromium, total | 1.861 | n=6, 1997 |
| Copper          | 1.080 | n=6, 1997 |
| Lead            | 2.854 | n=6, 1997 |
| Nickel          | 1.023 | n=6, 1997 |
| Zinc            | 1.039 | n=6, 1997 |

Table 5b: Instream Conditions and Discharger Flow for French Creek

| Parameter  | Units |          | Value       | Basis                            |
|--|-------|----------|-------------|----------------------------------|
| <b>Upstream Flow</b>   |       |          |             |                                  |
| 7Q10   | cfs   | annual   | 0.39        | USGS gage #04200500,1944-97 data |
| 1Q10   | cfs   | annual   | 0.26        | USGS gage #04200500,1944-97 data |
| 90Q10  | cfs   | annual   | 0.87        | USGS gage #04200500,1944-97 data |
| Harmonic Mean Flow   | cfs   | annual   | 2.78        | USGS gage #04200500,1944-97 data |
| <b>Mixing Assumption</b>   |       |          |             |                                  |
|  | %     | average  | 25          | Chronic criteria default         |
|  | %     | maximum  | 100         | Stream-to-discharge ratio        |
| <b>Instream Hardness</b>   |       |          |             |                                  |
|  | mg/L  | annual   | 254         | LEAPS 60 values, 0<MDL, 2005-09  |
| <b>Background Water Quality for French Creek</b>                                     |       |          |             |                                  |
| <i>note: unlisted parameters are the same as background for Black River Mainstem</i> |       |          |             |                                  |
| Aluminum   | ug/L  | annual   | 0           | STORET 3 values, 3<MDL, 2001     |
| Arsenic  | ug/L  | annual   | 2.0         | STORET 8 values, 1<MDL, 1997-01  |
| Cadmium  | ug/L  | annual   | 0           | STORET 8 values, 8<MDL, 1997-01  |
| Chromium, total  | ug/L  | annual   | 0           | STORET 8 values, 8<MDL, 1997-01  |
| Copper   | ug/L  | annual   | 2.6         | STORET 8 values, 3<MDL, 1997-01  |
| Iron   | ug/L  | annual   | 583         | STORET 6 values, 0<MDL, 1997-01  |
| Lead   | ug/L  | annual   | 0           | STORET 8 values, 8<MDL, 1997-01  |
| Nickel   | ug/L  | annual   | 0           | STORET 7 values, 7<MDL, 1997-01  |
| Nitrate + Nitrite  | mg/L  | annual   | 1.97        | STORET 18 values, 0<MDL, 2001    |
| Selenium   | ug/L  | annual   | 0           | STORET 3 values, 3<MDL, 2001     |
| Total Dissolved Solids   | mg/L  | annual   | 635         | STORET 18 values, 0<MDL, 2001    |
| Zinc   | ug/L  | annual   | 8.6         | STORET 8 values, 2<MDL, 1997-01  |
| <b>Effluent Flows</b>  |       |          |             |                                  |
| North Ridgeville WWTP  |       | cfs(mgd) | 17.4(11.25) | DSW                              |
| <b>Dissolved Metal Translators for French Creek</b>                                  |       |          |             |                                  |
| Copper   |       |          | 1.064       | n=6, 1997                        |
| Lead   |       |          | 1.675       | n=6, 1997                        |

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

| Parameter                                       | Units | Average            |                    |                 | Maximum Aquatic Life | Inside Mixing Zone Maximum |
|---|-------|--------------------|--------------------|-----------------|----------------------|----------------------------|
|   |       | Human Health       | Agri-culture       | Aquatic Life    |                      |                            |
| Arsenic <sup>R</sup>                            | ug/L  | 603                | 104                | 151             | 345                  | 680                        |
| Cadmium <sup>R</sup>                            | ug/L  | 759 <sup>A</sup>   | 52 <sup>A</sup>    | 4.7             | 13                   | 26                         |
| Chromium, total <sup>R</sup>                    | ug/L  | 14560 <sup>A</sup> | 104                | 181             | 1956                 | 7700                       |
| Chromium <sup>+6</sup> , dissolved <sup>R</sup> | ug/L  | 14560 <sup>A</sup> | --                 | 11              | 16                   | 31                         |
| Copper  | ug/L  | 66570 <sup>A</sup> | 520 <sup>A</sup>   | 20 <sup>D</sup> | 33 <sup>D</sup>      | 69 <sup>D</sup>            |
| Cyanide, free                                   | ug/L  | 49930 <sup>A</sup> | --                 | 5.2             | 22                   | 44                         |
| Lead  | ug/L  | --                 | 104                | 23 <sup>T</sup> | 538 <sup>D</sup>     | 1100 <sup>D</sup>          |
| Mercury <sup>BW</sup>                           | ug/L  | 0.003              | 10 <sup>A</sup>    | 0.91            | 1.7                  | 3.4                        |
| Molybdenum <sup>R</sup>                         | ug/L  | 10400              | --                 | 20120           | 192800               | 370000                     |
| Nickel <sup>R</sup>                             | ug/L  | 44730 <sup>A</sup> | 208                | 98              | 930                  | 2100                       |
| Selenium <sup>R</sup>                           | ug/L  | 3225               | 52                 | 5.0             | --                   | --                         |
| Silver  | ug/L  | 11440 <sup>A</sup> | --                 | 1.3             | 7.4                  | 16                         |
| Zinc <sup>R</sup>                               | ug/L  | 36410 <sup>A</sup> | 26010 <sup>A</sup> | 175             | 264                  | 530                        |

<sup>A</sup> Allocation must not exceed the Inside Mixing Zone Maximum

<sup>B</sup> Bioaccumulation Chemical of Concern (BCC) no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless the requirements for an exclusion are met listed in 3745-2-08 (L).

<sup>D</sup> WLA based on applicable dissolved metal translator

<sup>W</sup> Wildlife Criteria WLA=0.0015 ug/L

<sup>R</sup> Parameter would not require a WLA based on reasonable potential procedures; allocation requested for use in pretreatment program

<sup>T</sup> WLA based on biological Trigger Value.

Table 7. Parameter Assessment for North Ridgeville French Creek WWTP

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

*Phosphorus*

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

|                      |                              |                           |
|----------------------|------------------------------|---------------------------|
| <i>Arsenic - TR</i>  | <i>Cadmium - TR</i>          | <i>Chromium VI - Diss</i> |
| <i>Chromium - TR</i> | <i>Di-N-Butylphthalate</i>   | <i>Molybdenum</i>         |
| <i>Nickel - TR</i>   | <i>Nitrate-N + Nitrite-N</i> | <i>Selenium</i>           |
| <i>Zinc - TR</i>     |                              |                           |

Group 3: PEQ<sub>max</sub> < 50 percent of maximum PEL and PEQ<sub>avg</sub> < 50 percent of average PEL. No limit recommended; monitoring optional.

*Silver*

Group 4: PEQ<sub>max</sub> >= 50 percent, but < 100 percent of the maximum PEL or PEQ<sub>avg</sub> >= 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

*Copper – TR*

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

| <u>Parameter</u>     | <u>Units</u> | <u>Period</u> | <u>Recommended Effluent Limits</u> |                |
|----------------------|--------------|---------------|------------------------------------|----------------|
|                      |              |               | <u>Average</u>                     | <u>Maximum</u> |
| <i>Cyanide, free</i> | <i>ug/L</i>  | <i>annual</i> | <i>5.2</i>                         | <i>22</i>      |
| <i>Lead</i>          | <i>ug/L</i>  | <i>annual</i> | <i>23</i>                          | <i>538</i>     |
| <i>Mercury (BPO)</i> | <i>ug/L</i>  | <i>annual</i> | <i>0.0013</i>                      | <i>1.7</i>     |
| <i>Mercury (APO)</i> | <i>ug/L</i>  | <i>annual</i> | <i>0.0013</i>                      | <i>1.7</i>     |

Table 8. Final effluent limits and monitoring requirements for North Ridgeville French Creek WWTP outfall 3PD00043001 and the basis for their recommendation.

| Parameter              | Units       | Effluent Limits              |                            |                               |                            | Basis <sup>b</sup> |        |
|------------------------|-------------|------------------------------|----------------------------|-------------------------------|----------------------------|--------------------|--------|
|                        |             | Concentration                |                            | Loading (kg/day) <sup>a</sup> |                            |                    |        |
|                        |             | 30 Day Average               | Daily <sup>1</sup> Maximum | 30 Day Average                | Daily <sup>1</sup> Maximum |                    |        |
| Flow                   | MGD         | -----Monitor-----            |                            |                               |                            | M <sup>c</sup>     |        |
| Temperature            | °C          | -----Monitor-----            |                            |                               |                            | M <sup>c</sup>     |        |
| Dissolved Oxygen       | mg/L        | -----6.0 Minimum-----        |                            |                               |                            | PD, EP             |        |
| CBOD <sub>5</sub>      | mg/L        | 6.7                          | 10.0                       | 284                           | 426                        | PD, EP             |        |
| Suspended Solids       | mg/L        | 8.0                          | 12.0                       | 341                           | 511                        | PD, EP             |        |
| Ammonia-N              |             |                              |                            |                               |                            |                    |        |
|                        | (summer)    | mg/L                         | 1.0                        | 1.5                           | 42.6                       | 63.9               | PD, EP |
|                        | (winter)    | mg/L                         | 2.7                        | 4.0                           | 114                        | 170                | PD, EP |
| Oil & Grease           | mg/L        | Not to exceed 10 at any time |                            |                               |                            | WQS                |        |
| pH                     | S.U.        | -----6.5 to 9.0-----         |                            |                               |                            | WQS                |        |
| E. coli                |             |                              |                            |                               |                            |                    |        |
|                        | Summer Only | #/100mL                      | 161                        | 362                           | --                         | --                 | WQS    |
| TKN                    | mg/L        | -----Monitor-----            |                            |                               |                            | EP                 |        |
| Nitrite + Nitrate – TR | mg/L        | -----Monitor-----            |                            |                               |                            | EP                 |        |
| Chlorine, Residual     | mg/L        |                              |                            |                               |                            | WQS/BEJ            |        |
| Phosphorus             | mg/L        | 0.67                         | 1.0                        | 28.4                          | 42.6                       | EP                 |        |
| Cyanide, Free          | mg/l        | 0.0052                       | 0.022                      | 0.000001                      | 0.000001                   | WLA                |        |
| Lead – TR              | mg/l        | 0.023                        | 0.538                      | 0.000001                      | 0.000001                   | WLA                |        |
| Nickel - TR            | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Silver - TR            | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Zinc – TR              | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Cadmium – TR           | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Chromium – TR          | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Copper - TR            | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Chromium, Diss. Hex    | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Di-N-Butylphthalate    | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Selenium               | ug/l        | -----Monitor-----            |                            |                               |                            | RP, M <sup>c</sup> |        |
| Mercury                | ug/l        | 0.0013                       | 1.7                        | 0.0591                        | 77.3                       | WLA                |        |

<sup>a</sup> Effluent loadings based on average design discharge flow of 11.25 MGD.

<sup>b</sup> Definitions: BEJ = Best Engineering Judgment; EP = Existing Permit; M = Monitoring; PD = Plant Design Criteria; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A)); WLA = Wasteload Allocation procedures (OAC 3745-2); WQS = Ohio Water Quality Standards (OAC 3745-1).

<sup>c</sup> Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

<sup>d</sup> 7 day average limit.