

APPENDIX N – NPDES PERMIT NARRATIVES

Excerpts from Ohio EPA TSD – Point Source Loadings Part B.1

B.1 Point Source Pollutant Loadings

There are 51 active permitted point source discharges in the Big Darby Creek watershed.

Many (48) of the facilities are small wastewater treatment plants (WWTPs) serving small cities, villages, schools, businesses, and mobile home parks, and discharging from 2,000 to 100,000 gallons per day (gpd), which are generically called “package plants.” The term “package plant” is used to describe a wastewater treatment system consisting of a prefabricated steel or concrete tank that is divided into an aeration chamber and settling chamber. Most package plants are preceded by some type of pretreatment, which removes untreatable matter, including plastics, rags, rocks, wood, etc. Occasionally, flow equalization tanks are also included. The package treatment system is generally followed with effluent polishing and disinfection either by chlorination followed by dechlorination or ultraviolet light. Sometimes the plant will have a sludge holding tank.

The pretreatment devices in a package plant are generally one or two of the following: a trash trap, which is a tank that has an outlet opening that is smaller than the inlet and is in the lower 1/3 of the tank; a bar screen, which is a rack of bars in front of the package plant inlet usually spaced 1-2" apart; and/or a comminutor which grinds the trash into small pieces.

A flow equalization tank assists in providing the package plant with a steady flow, hopefully over an entire day since water use and subsequent wastewater generation varies within a day. A constant flow of sewage facilitates the effective breakdown of organic material in the sewage by providing the microbiological fauna providing the treatment a “steady state” of nutrients. Consistent flow yields improved effluent quality.

When working properly, the aeration chamber facilitates the breakdown of up to 90% of the organic material in the wastewater by injecting large volumes of air into the water. This provides the oxygen required to facilitate the aerobic breakdown of the wastes by the microfauna. Carbon-based oxygen demanding substances, as measured by cBOD testing, are broken down by the activity of bacteria and protozoans. If enough detention time is provided in the aeration tank, breakdown of nitrogenous wastes (i.e., ammonia) will also occur. As the waste is “eaten” by the different microfauna, the microfauna multiply.

The following chamber in the tank is the settling chamber, also termed a clarifier. Its function is to permit settling of the microfauna, also known as sludge, by gravity. Some of the settled organisms are then pumped back to the aeration chamber to resume consumption of the raw wastewater components. Clear water is decanted over the top of a barrier or weir and moves

onto the next stage of treatment, usually polishing and/or disinfection. If the system has been upgraded, a sludge holding tank will be present to store excess microfauna. When this tank fills, the “sludge” is dried or dewatered and taken to a land fill or directly removed to larger WWTP for digestion. Polishing treatment generally consists of sand filtration or a polishing pond. Both function to remove light weight “sludge” that did not settle in the clarifier. The treated wastewater then flows to a small disinfection tank. Disinfection, destruction of remaining microfauna in the wastewater, is generally achieved by chlorination by tablet or liquid bleach and followed at the outlet of the tank with dechlorination which is accomplished by tablets or liquid.. Occasionally, ultraviolet light will be used to provide disinfection; however, this is uncommon in package plants.

These “package plants” combine to account for approximately 4.5% of the wastewater flow, 9.4% of the cBOD₅ loading, 35.3% of the ammonia loading, and 6.8% of the suspended solids loading discharged to the Big Darby watershed. Many of these package plants are not properly maintained and operated, hence the disproportionate amounts of ammonia, cBOD₅, and suspended solids loadings documented as discharged from these facilities.

Flat Branch WWTP (RM 78.48)

The Flat Branch Wastewater Treatment Plant (WWTP) is located in Logan County along Township Road 157, in East Liberty, Ohio. Formerly known as Honda of America Transportation Research Area (TRC), the Flat Branch WWTP was constructed in 1979. The WWTP has not undergone any significant changes since construction.

Two separate divisions of Honda of America utilized the plant for treatment, Honda TRC and Honda of America Motorcycle Division Manufacturing Plant. The State of Ohio Department of Development assisted in the funding of the wastewater treatment plant as part of an economic development plan. The TRC Wastewater Treatment Plant was originally designed to provide sewers to Honda of America Motorcycle and later Honda’s Automobile Division, as well as local industrial interests associated with the Honda manufacturing process. Marysville WWTP treats the industrial process wastewater from all manufacturing divisions of the Honda industrial complex while sanitary wastewater was diverted to TRC.

In 1996, the Logan County Board of Commissioners assumed ownership from the State of Ohio and thus oversight of TRC. The wastewater treatment plant name was officially changed to the Flat Branch WWTP and was promoted as a regional wastewater management facility for southeastern Logan County. The proposal was to increase capacity in order to serve the unincorporated communities of East Liberty and Middleburg as well as new residential housing subdivisions. Sewer extensions to these communities and subdivisions have not occurred and alternative treatment options and discharge locations are being investigated for these communities.

The Flat Branch WWTP currently receives sanitary wastewater from: TRC; one private residence; NEX and Midwest Express - both warehousing facilities for Honda; TNT Logistic North American Incorporated; and Harding Machine, a machine shop. In addition to sanitary wastewater, Harding Machine sends floor cleaning waste to the Flat Branch WWTP for treatment a few times a year.

The Flat Branch WWTP treatment process consists of a lift station, pre-aeration, comminutor bar screen, a flow equalization basin, extended aeration, clarification, rotating biological contactor (RBC), two fixed media clarifiers, rapid sand filter, chlorination and post aeration. The aeration tanks, clarifier and sludge holding tanks are enclosed in a fiberglass building reducing the potential for odor nuisance. The bypass channel around the RBCs was reported as being inoperable due to mechanical dysfunctions. The collection system contains to lift stations and is reported as having zero overflow structures; however, inflow and infiltration into the collection system have been problematic for the treatment plant. Flat Branch WWTP design flow rate is 0.1 MGD (100,000 GPD) with an average annual daily flow rate for the past three years of 0.062 MGD.

Ohio EPA has documented operational problems and numerous serious violations of the NPDES permit for the Flat Branch WWTP over the last 6 years. Poor plant operations were documented through an inspection performed in 1998, documenting that sludge wasting had not occurred at the wastewater facility in 15 years. In order to insure proper operation and treatment efficiency, a WWTP must remove or “waste” sludge (microfauna) periodically. This is done by removing settled sludge from the treatment train and sending it off for disposal. Continual “recycling” of the sludge without wasting leads to poor treatment of the wastes due to the excessive age of the microfauna and a buildup of sludge in the plant, allowing the possibility that sludge might escape from the plant during high flow events. Sludge loss from the Flat Branch WWTP to the Big Darby Creek may be inferred due to documented problems with I/I noted above and violations of total suspended solids concentrations and loadings in the effluent.

Percentile flows have remained fairly constant over time except during the period from 1999 through 2001 when it exceeded or approached the design flow. Monthly operating reports submitted by the Flat Branch WWTP indicate that the wastewater treatment plant has not met NPDES permitted effluent concentration and loading limits or sampling frequency requirements during much of the last 6 years. Violations for various parameters occur regularly over a monthly reporting period. Permit violations for the period of January 2000 through December 2003 have been documented for total residual chlorine (39%), fecal coliform bacteria (14%), pH (14%), total suspended solids (12%), ammonia (11%), and 5-day carbonaceous biochemical oxygen demand (2%). Many of these permit violations were significant and are causing degradation instream.

The volume and scope of NPDES permit violations noted for this facility indicate a lack of consistent and proper treatment of wastewater delivered to the Flat Branch WWTP that has negatively affected the biological communities downstream of the discharge point. Monitoring by the WWTP upstream and downstream of the discharge shows little change in chemical water quality. The frequency and quantity of instream monitoring should be closely examined to determine possible correlations with effluent violations (e.g., was instream monitoring completed on days where there were effluent violations of one kind or another). There is also the possibility that upstream point or nonpoint sources have increased loadings since the operations and treatment at the plant have not improved over time. Certainly, significant degradation to the biological communities in the upper Big Darby Creek exists downstream of the Flat Branch WWTP.

Honda Water Treatment and Surface Water Ditches

Honda East Liberty Auto Plant Water Treatment Plant - (formerly TRC)-001 and 002 (RM 4.80, Flat Branch via Unnamed Tributary)

The East Liberty Auto Plant Water Treatment Plant (ELPWTP) is located at 11000 SR 347, East Liberty, Ohio in Logan County. Raw water is drawn from five wells, at a daily production rate of 1.2 MGD, followed by clarification, filtration, and disinfection. Wastewater from treatment is discharged through two outfalls, 001 and 002.

The treatment processes used at the water treatment plant are clarification (via polymers and hydrated lime), re-carbonation, sand filtration, chlorination and lime sedimentation. Honda East Liberty WTP utilizes conventional water treatment processes to treat groundwater and yield potable water for both personal and industrial usage. Influent groundwater is mixed with polymer and lime to raise pH, precipitate metals, and enhance settling.

Due to the high quality of the groundwater, soda ash is not required in the treatment process. The chemical mixing and sludge settling is accomplished using an upflow clarifier system. The facility discharges lagoon overflow through two outfalls that discharge to a 1000' long unnamed tributary (swale) of Flat Branch. The final outfall (outfall 001) conveys supernatant from the southwest lime sludge lagoon. Outfall 002 carries overflow from the northeast lime sludge lagoon. The swale is then picked up by a ten acre storm water retention basin that also receives runoff from the buildings downspouts and parking lot. The storm water retention basin then discharges from a single location to Flat Branch. The average daily discharge flow in 2000 was 12,300 gpd.

The clarifier and other process tanks are generally drained and cleaned out once per year with the wash water discharging to the lime sludge settling lagoon. Dewatered lime sludge is disposed of in accordance with an approved Sludge Management Plan (SMP). Sludge that accumulates in

the settling lagoon is applied to agricultural land located on Honda property which is farmed under a cooperative agreement with Honda.

A total of 2,860 acres of Honda-owned agricultural land is available to receive lime sludge which is applied at a maximum rate of six dry tons per acre. Isolation distances, topography, seasonal variations, and flood plains are considered when siting for land application of the sludge in order to minimize the potential for runoff into nearby waterways.

On numerous occasions in 2001, Ohio EPA field personnel noted a chalky white appearance to the unnamed tributary prior to discharge into Flat Branch. The whitish plume was also apparent in Flat Branch and Big Darby Creek. The origin of the chalky plume appeared to be one of the lime settling lagoons. As indicated by the field report, this particular event was not judged to be related to a storm event. Flow conditions were not documented during this sampling event. Honda is investigating the causes and sources of the gray-white material and corrective measures that might be taken to eliminate this problem prior to water reaching Flat Branch. A preliminary report indicated a drainage problem. Honda has significantly increased the amount of impervious surfaces on their property; the impacts associated with the increased rate of storm water run-off may be an issue. A final report detailing corrective measures outlines additional water quality monitoring proposed in Flat Branch. Re-vegetation of stream and ditch banks, further conservation methods on agricultural fields owned by Honda, and improvements to storm water controls including construction of erosion control BMPs were some of the measures proposed to deal with this documented problem.

Limited conduit flow data for both outfall 001 and 002 demonstrated unpredictable and irregular flows for both outfalls likely linked to industry process peak demand, lagoon capacity and storm events.

Honda - Benton Road Water Treatment Plant (RM 2.21, Flat Branch via Unnamed Tributary)

The Honda-Benton Road Water Treatment Plant (WTP) is located in Union County on Benton Road, north of Pottersburg and east of Middleburg between SR 33 and SR 739. The first wastewater discharge permit Ohio EPA issued for the Honda-Benton Road WTP was in 1988. The Honda-Benton Road WTP permit was recently reissued in July 2000 with limits for pH between 6.5 and 11.0 S.U. and total suspended solids (TSS) at 30 mg/l for a 30-day average and 45 mg/l for the daily maximum value. The Honda-Benton Road WTP utilizes lime-soda softening, sand filtration, and chlorination to produce between 0.60 and 1.70 MGD of potable water.

Wastewater discharges through two outfalls, 001 and 002, to the unnamed tributary. Honda-Benton Road's average daily discharge flow during 2000 was 12,300 gpd. Raw water drawn for treatment is supplied by five primary wells and two backup wells. Flow seems to fluctuate

monthly according to Monthly Operating Reports (MORs) and is likely due to precipitation and evaporation rates and production demand rates.

Dewatered lime sludge is usually disposed of on site in accordance with an approved Sludge Management Plan (SMP). Isolation distances, topography, seasonal variations, and flood plains are considered when siting for land application of the sludge in order to minimize the potential for runoff into nearby waterways.

Limited data available for conduit flow demonstrates an increasing trend in quantity with fairly consistent percentile variance. Total suspended solids (TSS) trends demonstrated no discernable pattern from 1994 to 2001. This pattern is likely tied to production and inflow rates, as well as sampling timing and technique, all of which have the potential to suspend solids of various concentrations.

North Lewisburg WWTP (RM 1.50, Spain Creek)

The Village of North Lewisburg WWTP is located in Champaign County at 9984 SR 245 in North Lewisburg. The village began treating wastewater in the early 1970s in response to population growth and to address public health concerns associated with failing on-site systems. A lagoon wastewater treatment process was constructed in 1970 utilizing two 0.10 MGD stabilization lagoons with a grit chamber, an inflow/outflow structure, and a final outfall headwall. This type of treatment system was unable to consistently comply with its NPDES permit limits resulting in degradation of Spain Creek. The village's population is currently estimated at 1,800 with the population projected to grow to 2,000 within five to ten years.

In 1989, the Village of North Lewisburg was referred to the State of Ohio Attorney General's Office for failure to comply with the July 1, 1988 directive to meet secondary wastewater treatment criteria. North Lewisburg was required to construct a treatment facility to negate further degradation of Spain Creek and to conform to the secondary treatment technology mandate. By 1990, North Lewisburg administrators received a federal construction grant for an overhaul of the WWTP. The abandonment of the stabilization lagoon system occurred in 1991 when the village completed its installation of the Sequencing Batch Reactor (SBR) Treatment System.

The North Lewisburg WWTP currently has a design capacity of 0.170 MGD. Full capacity is expected to be reached by the year 2010. In addition, the Village of North Lewisburg has a current agreement with the Village of Woodstock to accept wastewater flow of approximately 0.0267 MGD. The current wastewater treatment process includes a sewage grinder, grit removal system, lift station, a three cell equalization tank, SBR, four rapid sand filters, chlorination system, tablet dechlorination system, and post aeration followed by a final effluent flow meter. Sludge is handled via aerobic digesters and a sludge holding tank. Power failures at the

treatment facility are handled by an emergency power generator which can provide power for the entire plant.

The collection system is a gravity flow system of approximately 29,000 linear feet of 8" to 12" diameter pipe. The entire sanitary collection system consists of separate sewers, with all of the village sewerage. Inflow and infiltration are problematic in the collection system.

In 1996, an Ohio EPA inspection report of the North Lewisburg Treatment Plant and their effluent quality described the wastewater as dark green in color and noted the depletion of the supply of chlorine used for disinfection. During most of 1995 and a portion of 1996, Monthly Operating Reports (MORs) were not submitted to Ohio EPA, a violation of their discharge permit. Additional permit violations for North Lewisburg continued throughout the 1990s.

An inspection by Ohio EPA personnel in June of 2001 revealed solids and sludge on the streambed of Spain Creek, downstream from the final outfall (001). In addition, a significant quantity of foam was also documented downstream from the WWTP. Records indicate the Village of North Lewisburg has completed a Sludge Management Plan (SMP) and received approval in 2001 for land application on nearby cropland.

The village is also currently working with an environmental consultant on a plan to provide for treatment plant upgrades brought about by the inflow and infiltration problems, necessary repairs and general housekeeping practices. The wastewater treatment plant has been re-rated for a Class II Operator, requiring the present operator to pursue a Class II Operator Certification while North Lewisburg's consultant oversees operations of the wastewater plant.

Wastewater treatment improved prior to the expansion completed in 1991 for most wastewater constituents with the exception of ammonia-N, which remained variable throughout the years evaluated. Loads of cBOD₅ and TSS notably decreased after the 1989 referral to the Ohio Attorney General's Office. Prior to the requirement to meet secondary standards, peak flows, as represented by the 95th percentile, consistently exceeded design flow of 0.10 MGD.

Monitoring stations upstream and downstream of the WWTP outfall yielded similar ammonia values. Insufficient reporting of data for fecal coliform prevented an accurate evaluation of any differences over the same period.

Records indicate a total of 235 NPDES permit violations for the North Lewisburg WWTP from February 1999 through December of 2001. Permit limit violations decreased annually from 112 violations in 1999 to 52 violations in 2001. Most of the violations occurred in May and July of the respective years, suggesting seasonal influences. The most frequent parameters reported in violation listed in decreasing order of frequency were ammonia-N, TSS and cBOD₅.

The Village of North Lewisburg WWTP contributes approximately 1.6% of the total point source flow to the Darby watershed. The village also adds 20.2% of the cBOD₅ loading and 24.5% of the ammonia loading to the watershed. Loadings of suspended solids were negligible.

Reflections Subdivision (RM 8.00, Buck Run via Unnamed Tributary)

The Reflections Subdivision operates a wastewater treatment system which treats wastewater via a wetland. Wastewater is pumped to the wetland from submerged piping underneath the wetland. Once treatment is completed, wastewater is conveyed to two ponds, overflow from which intermittently discharges to an unnamed tributary to Buck Run. This system consistently meets NPDES permit limits. Inspections have revealed that adequate maintenance is provided.

Darby Creek Golf Course (RM 64.00, Big Darby Creek)

The Darby Creek Golf Course operates a 7,580 gpd capacity package WWTP. The WWTP consistently meets its permit limits. Inspections revealed marginal operation and maintenance practices.

Fairbanks School (RM 63.74, Big Darby Creek)

Fairbanks School operates an unpermitted, 15,000 gpd capacity package WWTP which operates year-round. The school houses the Union County Board of Education offices. Ohio EPA has received an NPDES permit application for this facility. The plant appears to be operated properly.

Ranco Corporation (RM 54.00, Big Darby Creek)

Ranco Corporation operates a 39,000 gpd design combined non-contact cooling water and package WWTP. Inspections revealed good operation and maintenance practices.

Discharge data shows a decrease in flow and loadings of pollutants to Big Darby Creek. This is primarily due to reduced levels of production at the company. Whole effluent toxicity testing in November 2001 and March 2002 confirmed acute toxicity of the effluent to the invertebrate *Ceriodaphnia dubia* at an LC50 of 44.1% (Ohio EPA Bioassay Report 02-2600-C), consistent with reports in 1992 and 1997. Toxicity was not apparent in the mixing zone.

St. Johns Evangelical Lutheran Church (RM 8.04, Robinson Run via Unnamed Tributary)

St. Johns Church operates a 3,500 gpd package WWTP that consistently meets NPDES permit limits. Inspections have revealed marginal operation and maintenance practices at this facility.

Darby Meadows (RM 0.42, Robinson Run via ditch)

Darby Meadows subdivision operates a 10,000 gpd capacity package WWTP which consistently meets NPDES permit limits. Inspections reveal marginal operation and maintenance practices.

Effluent chemistry suggests stable operation of the plant, although disinfection may be insufficient at times.

Tuffco Sand and Gravel (RM 52.40, Big Darby Creek)

This quarrying operation produces an intermittent overflow to the creek from solids settling ponds. Flow data shows a regular discharge of approximately 2.1 MGD. The system consistently meets NPDES permit limits. Inspections have revealed that maintenance is provided for this treatment system. This facility is one of the two largest contributors of wastewater flow to the Big Darby watershed. Tuffco Sand and Gravel contributes 18.4% of the flow and 15% of the loading of suspended solids to the watershed from known point sources.

Plain City WWTP (RM 52.05, Big Darby Creek)

The Village of Plain City owns and operates a 0.50 MGD capacity WWTP. The treatment train consists of two “race track” oxidation ditches, two clarifiers, a chlorine contact tank and post aeration. This facility has consistently met its NPDES permit limits for the last 5 years. However, numerous complaints had documented that the total suspended solids limits in the permit allowed for the degradation of Big Darby Creek downstream of the outfall due to the deposition of excess biosolids on the streambed. This violated Ohio WQS (OAC 3745-1-04) that apply to all surface waters in that they be “free from suspended solids or other substances that enter the waters as a result of human activity and that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life.”

Therefore, the NPDES permit was modified to reduce suspended solids reaching the creek. The mayor and village council of Plain City have since adjudicated this NPDES permit modification and the issue has gone to legal proceedings for resolution. In the meantime, the village Utilities Director and WWTP Superintendent have been investigating the addition of another oxidation ditch and rapid sand filtration to meet the new permit limits. Inspections revealed good operation and maintenance practices at this facility.

Historical loadings data from the WWTP show highly variable values for TSS and cBOD₅ when comparing median to 95th percentile values. Loadings for these parameters, however, are trending lower. Instream monitoring up and downstream of the outfall by the Village shows little impact from the WWTP for dissolved oxygen, cBOD₅, fecal coliform, or ammonia. Analysis for TSS was not part of the instream monitoring requirements until the 2002 permit renewal, so no comparisons can be made for this parameter.

The Village of Plain City WWTP contributes only 1.5% of the total wastewater flow to the Darby watershed. However, this plant adds over 5.3% of the cBOD₅, 20.8% of the ammonia, and over 5.3% of the suspended solids loadings to the watershed from known point sources.

Suburbans Mobile Home Park (RM 49.80, Big Darby Creek)

The Suburbans Mobile Home Park operates a 44,000 gpd package WWTP that complies with its NPDES permit limits about half the time. This is primarily due to excessive inflow and infiltration (I/I) causing loss of biosolids to the stream during rain events. Inspections have revealed good operation and maintenance practices at this WWTP. An I/I reduction program is in place and has helped reduce solids loss. The facility may also pursue flow equalization.

Dutch Kitchen (Ballenger-Jones Ditch via Unnamed Tributary at RM 0.70)

The Dutch Kitchen restaurant operates an 8,000 gpd capacity package WWTP that is usually in compliance with its NPDES permit. Inspection reports revealed marginal operation and maintenance practices.

Jonathan Alder High School (RM 2.55, Ballenger-Jones Ditch)

This school operates a 5000 gallon per day package wastewater treatment plant that is overloaded and no longer appears to operate. Inspections reveal a history of marginal operation and maintenance. A NPDES permit was issued September 18, 2003, and a new plant will be constructed to handle the Canaan Elementary School flow and the high school flows in the summer of 2004.

COJV School District, aka Tolles Technical School (RM 2.68, Powell Ditch)

This vocational education school operates a 20,000 gpd capacity package WWTP that consistently meets its permit limits. The majority of the inspections revealed adequate operation and maintenance. The discharge is continuous as the school is operated year-round.

Canaan Elementary (RM 2.25, Yutzy Ditch)

This school operates an unpermitted 3,000 gpd capacity package WWTP. The sampling performed to complete the NPDES permit application indicates that the WWTP does not provide adequate treatment. The WWTP fails to perform even secondary treatment. Inspection of the plant indicated that maintenance provided was inadequate with respect to replacing worn and faulty equipment. No discharge occurs during the summer months of June to September when school is out of session. This school flow will be redirected to the high school's new wastewater plant in the summer of 2004.

Wisslohican Sanitary Sewer District (RM 45.00, Big Darby Creek)

This sewer district operates a 4,400 gpd package WWTP that consistently meets its permit limits. Recent inspections have revealed good operation and maintenance practices at the WWTP. Monitoring of sites immediately up and downstream of the outfall reveal little to no impact on Big Darby Creek.

Canaan Community Mobile Home Park (RM 1.40, Fitzgerald Ditch)

This mobile home park operates a 35,000 gpd capacity package WWTP that is in compliance with its NPDES permit the majority of the time. Inspections revealed that the WWTP will require replacement within 5 years due to deteriorating tankage and piping.

Olen Corporation (Big Darby Creek RM 43.60)

This sand and gravel quarrying operation was a batch discharger, discharging only at night from settling ponds. The discharge was limited to surface water run-off, recycled process-generated wastewater and non-process generated wastewater. Calculated flows indicated discharges from 0 gallons to 100,000 gallons per day. Olen ceased operations in 2003, eliminating the point source discharge. They have sold their property to the Franklin County Metro Park system to be incorporated into the Prairie Oaks Metropark.

Battelle Memorial Institute (RM 40.55, Big Darby Creek)

This facility operates a 20,000 gpd capacity package WWTP that has a continuous discharge of treated sewage (outfall 001) along with an intermittent discharge of up to 13,000 gpd of non-contact cooling water (outfalls 002 and 003). This facility consistently complies with its NPDES permit requirements and limits. Inspection reports indicated good operation and maintenance practices. The intermittent cooling water discharge is located within 200 feet of the continuous WWTP discharge point on the Big Darby Creek. Median flow from the 001 discharge has averaged between 20,000 and 30,000 gpd over the last 5 years of record. Median loadings of ammonia, suspended solids, and cBOD₅ have shown slight decreases over the same time period. Median discharge from the 002 and 003 outfalls are approximately 2000 gpd and 5000 gpd, respectively.

Lake Darby Estates WWTP (RM 40.00, Big Darby Creek)

American Water, Inc. operates a 500,000 gpd (0.50 MGD) WWTP for this subdivision. The plant consists of extended aeration tanks (rectangular tanks), rectangular clarifiers, a chlorine contact tank, and rapid sand filters. This WWTP consistently meets its permit limits in spite of the fact that significant inflow and infiltration plague the collection system during wet weather. Inspections revealed good operation and maintenance practices. Median loadings of suspended solids and ammonia have been low over the last 10 years. Fecal coliform concentrations also showed some variability within that time frame, including some elevated values indicating some problems with inflow/infiltration and/or disinfection. Comparisons of instream conditions both up and downstream of the WWTP show no significant differences. Lake Darby Estates WWTP contributes just over 2.4% of the known point source wastewater flow to the Darby watershed. Loadings of cBOD₅, ammonia, and suspended solids are just over 5%, less than 1%, and 1.4%, respectively, of known point sources.

Greentree Mobile Home Park (RM 39.00, Big Darby Creek via ditch)

The Greentree Mobile Home Park operates a 16,000 gpd design package WWTP that consistently meets its NPDES permit limits. Inspections revealed marginal operation and maintenance practices.

Darby Dan Farms LLP (RM 36.70, Big Darby Creek)

Darby Dan Farms operates a 4,000 gpd capacity package WWTP which consistently violates its NPDES permit limits. The violations are caused by under-loading of the WWTP. Currently, the WWTP is undergoing modification to enable treatment of lower flows. Inspections revealed marginal operation and maintenance practices.

Mechanicsburg WWTP (RM 39.20, Little Darby Creek)

The Mechanicsburg WWTP is located in Champaign County at 18 N. Main Street in Mechanicsburg, Ohio. The facility was built in 1936, when wastewater treatment consisted solely of sand filters and chlorination, at a design flow of 0.16 MGD. Subsequent upgrades in 1971 and 1984 included the addition of aerated retention in treatment lagoons. A new Sequential Batch Reactor (SBR) treatment plant was constructed in 1990. The transition to a new treatment plant in 1990 included maintaining the original lagoon system for flow equalization during periods of peak flow. Land application of biosolids occurs at approved fields along State Route 4, approximately 0.3 mile east of the village. In 1980 the population served by the collection system was approximately 1,800. The service population is projected to be 2,780 by 2005.

The existing treatment train consists of a bar rack, comminutor with bar screen, SBR, chlorination and dechlorination with a SBR design capacity of 0.23 MGD and a hydraulic capacity of 0.72 MGD. Two lift stations are located at the intersection of Western Avenue and Railroad Street. The Railroad Street location was the original wastewater facility and the old bypass structure is currently sealed and inoperable. A private lift station serves the Tri County Jail. An additional connection of a two-inch force main was recently approved by Ohio EPA which will bring a church online in late 2002 adding an additional 300 gpd of sanitary sewage. Standby power is provided by portable generators for the treatment plant; however, incompatibility of the electrical connections at the lift stations leaves this area of the treatment system vulnerable to bypassing. A recent federal grant, matched by the Ohio Public Works Commission (OPWC), will provide funding for the Village of Mechanicsburg toward the construction of a new water storage tower. This tower will provide drinking water storage for the village and will be equipped with a generator providing backup power to the tower and to the wastewater lift stations in the event of a electrical power outage.

The 66 year old collection system consists of clay pipe with mortar joints. The collection system is totally separate from the storm water collection system with ninety-percent (90%) of the service area currently sewered. A USEPA grant in 1980 provided for an inflow and infiltration (I/I) evaluation of the collection system and treatment works. The investigation determined that

the collection system was failing and there was inefficient solids removal at the wastewater treatment facility. Basement flooding and facility related bypassing historically occurred during storm events of 1.5 to 2 inches of rain. Consultants hired by the village recommended a Sewer System Evaluation Survey to identify specific locations of I/I problem areas. Based on those results, a 1982 Facility Planning Survey (FPS) recommended a complete sewer system rehabilitation along with the construction of additional oxidation ditches and the utilization of the existing lagoons for storm flow equalization. In 1988, a Consent Agreement was reached with Ohio EPA in response to numerous violations of the discharge limitations and monitoring requirements of the Mechanicsburg discharge permit. The village agreed to eliminate discharges from overflows and bypasses from the sanitary sewer and to complete construction of the improvements to its WWTP by 1990. Indications are that bypass events continue to occur at manholes, influent pump stations, and at the treatment plant itself.

In 1994, the Village of Mechanicsburg filed for the Emergency Village Capital Improvement Special Account (EVCISA) for construction of the diversion station at the inlet works of the treatment plant whereby storm flow would be diverted to the lagoon at an estimated design of 0.23 mgd. In November of 1995 the village connected the equalization lagoons from the original plant to aid in equalizing flow in the influent chamber.

In July of 1998, Ohio EPA field personnel reported fish community impacts in Little Darby Creek downstream from the WWTPs discharge point. An Ohio EPA inspection in September of 2001 noted active discharge of raw sewage into Little Darby Creek at the Railroad Street lift station bypass. There is a limited amount of data on raw bypass quantities for this site; however, volumes of 450,000 gallons discharging to the Little Darby in July of 1992 and 100,000 gallons in June of 1995 are documented. Subsequent bypasses were reported in July of 1998 and October of 2000; however, these bypass events were not monitored so the total activity and associated quantities are unknown. This bypass location was permanently sealed on December 6, 2001. Field inspection sheets and observations by Ohio EPA water quality personnel also indicated a chronic loss of solids from the treatment plant as observed in the WWTP effluent and in Little Darby Creek downstream of the WWTP discharge pipe.

Annual peak flows consistently exceeded the design flow of 0.16 and 0.23 MGD throughout the period of record (since the 1970s) with peak flows approaching hydraulic design. Median percentile flows exceeded the original design of 0.16 MGD for the period of record and approached the increased design flow for the remainder of the record. This is indicative of the I/I problems that have plagued the collection system for many years. Loading percentile variance abruptly ended in 2001 when the majority of NPDES violations were reported, suggesting violations were correlated to operational controls as well as I/I influence.

Flow equalization completed in 1990 resulted in significant treatment improvements. Wastewater constituents (ammonia, suspended solids, cBOD₅) all declined notably following the inclusion of flow equalization, reacting inversely to flow behavior which graphically support

reported events of frequent bypassing and substantial I/I problems. A steadily increasing trend in median discharge rate with the absence of new sewer extensions, substantiates the existence and impact of the archaic collection system.

Upstream and downstream (801 and 901) monitoring of the final outfall (001) is conducted by the city and reported quarterly to Ohio EPA. The upstream monitoring station (801) is located at the State Route 29 bridge north of Rosedale Road. The downstream monitoring station (901) is located at the Wing Road bridge. A pipe structure located under the bridge at Wing Road is described by the city as a storm sewer and is not configured to receive any effluent or influent for bypassing purposes.

Monitoring at stations 801 and 901 demonstrated that downstream concentrations of ammonia-N were commensurate with upstream values throughout the period of record. Fecal coliform values upstream clearly exceeded downstream concentrations from 1981-1987. Thereafter, approximately ten years of data for upstream concentrations was unreported.

Fecal coliform violations accounted for nearly half of all NPDES violations documented from 1999 to 2002 with the majority of violations occurring in 2001. Between August of 1999 and January of 2002, a minimum of 47 NPDES permit violations were reported to Ohio EPA. All reported violations were typical constituents of treated domestic wastewater. The violations, in declining order of frequency, were: fecal coliform, TSS, pH, cBOD₅, ammonia-N and dissolved oxygen (D.O).

The Village of Mechanicsburg contributes approximately 1.4% of the total point source wastewater flow to the Darby watershed. Loadings of cBOD₅ and ammonia are 8.6% and 1.2% of the total respectively. Suspended solids comprised a negligible loading to the creek compared with other point sources.

Village of West Jefferson WWTP (RM 5.35, Little Darby Creek)

The Village of West Jefferson operates a 1.20 MGD WWTP which consists of two “race track” oxidation ditches followed by inter-channel clarifiers, a chlorine contact tank, and post aeration. Inspections of the WWTP revealed good operation and maintenance practices. However, the collection system for this facility is plagued by excessive inflow and infiltration causing excessive solids loss from the WWTP to the creek and loadings violations in the WWTP effluent during precipitation events. Historical flow data confirms the problems with I/I in the collection system. The Village has been informed by Ohio EPA that construction of an equalization basin and a preliminary treatment system designed to handle the I/I problem, will be required as part of any permit-to-install applications submitted by the Village of West Jefferson. The Village initiated a NPDES permit renewal that contained a 12 month compliance schedule to construct an equalization basin and additional clarifiers to eliminate the solids loss due to their I/I problems. By September of 2004, West Jefferson will have completed construction. The Village of West Jefferson WWTP contributes just over 4% of the known point source wastewater

flow to the Darby watershed along with over 21% of the cBOD₅, 11.8% of the suspended solids, and less than 1% of the ammonia loadings.

Triad Local School (RM ~ 7.00 Proctor Run [upstream of Brush Lake])

This WWTP is a typical package plant with a design capacity of 10,000 gpd. The discharge is to Proctor Run upstream of Brush Lake in the vicinity of RM 7.00. Brush Lake is located 6.6 river miles upstream of the Proctor Run confluence with Treacle Creek.

Monroe Elementary School (Spring Fork, unpermitted discharge)

The Jonathan Alder School District operates a 5000 gallon per day package wastewater treatment plant that is overloaded and inspections reveal that it does not appear to operate. Inspections reveal a history of marginal operation and maintenance. A NPDES permit was issued September 18, 2003, and a PTI was approved for the new plant. The wastewater treatment plant began operating in November 2003.

Green Meadows Mobile Home Park (RM 0.20, Spring Fork)

The Green Meadows Mobile Home Park operates an 81,000 gpd capacity package WWTP that meets its permit limits about half of the time. Inspections revealed marginal operation and maintenance practices. Effluent chemistry data indicated that there are 95th percentile loadings values of up to 2 kg/day of both cBOD₅ and TSS and fecal coliform median concentrations of nearly 1000 per 100 ml. These loadings are atypical of a facility this size and may be causing degradation to the stream. Ohio EPA personnel were not granted access to the stream by surrounding streamside landowners, so biological water quality data could not be obtained and the impact from this plant could not be evaluated.

Fisher Cast Steel (RM 14.00, Little Darby Creek via ditch)

Fisher Cast Steel operates a 1000 gpd intermittent discharge of non-contact cooling water. Recent inspections revealed good maintenance.

Jefferson Lodge Mobile Home Park (RM 9.00, Little Darby Creek)

This mobile home park operates a 40,000 gpd package WWTP that consistently meets NPDES permit limits. Inspections revealed marginal operation and maintenance practices.

Oakwood Acres Mobile Home Park (RM 8.00, Little Darby Creek via Unnamed Tributary)

This mobile home park owns a 10,000 gpd capacity package WWTP that consistently violates its NPDES permit. Inspections have revealed problems with operation and maintenance practices with portions of the WWTP structure falling into the tributary. Ohio EPA is negotiating with the Village of West Jefferson to connect the MHP to its collection system following upgrades to the West Jefferson WWTP to allow for the abandonment of the malfunctioning Oakwood Acres WWTP.

B&B Motel (RM 7.00, Ditch to Little Darby Creek)

This motel operates a package WWTP (2,200 gpd design) that consistently violates its NPDES permit requirements and limits. Half of the inspections performed at this facility have revealed poor operation and maintenance practices. The discharge point is to an ephemeral ditch along U.S. Route 40 which flows into Little Darby Creek.

Oak Hills Mobile Home Park (RM 29.29, Big Darby Creek)

This mobile home park owns a 69,000 gpd capacity package WWTP that consistently violates its NPDES permit. Inspections revealed poor operation and maintenance practices as well as a severe inflow and infiltration problems. This WWTP receives as much as 5 times the design capacity during a precipitation event. Compliance sampling performed during dry conditions in August 2002 revealed that the plant was meeting NPDES permit limits for effluent quality. Ohio EPA plans to modify this NPDES permit by 2005 to require the abandonment of this WWTP and connection of the repaired collection system to the new Darbydale WWTP.

Darbydale Elementary (RM 29.00, Storm sewer discharge to Big Darby Creek)

The Darbydale Elementary School manages a 7,500 gpd capacity package WWTP that operates only while school is in session (9 months out of the year). The WWTP meets its NPDES permit limits about 2/3 of the time it is in operation. Inspections reveal good operation and maintenance practices. The NPDES permit will be modified by the year 2005 to require the school to abandon the WWTP and connect to the new Darbydale WWTP.

Pleasant Acres Mobile Home Park (Big Darby Creek via Unnamed Tributary at RM 1.00)

This mobile home park operates a 39,000 gpd design package WWTP that complies with NPDES permit limits the majority of the time. Inspections have revealed marginal operation and maintenance practices. Compliance sampling performed during dry conditions in August 2002 revealed that the plant was meeting NPDES permit limits for effluent quality. The NPDES permit will be modified by 2005 to require abandonment of this facility and connection of the collection system to the new Darbydale WWTP.

Community Gardens Mobile Home Park (RM 1.00, Unnamed Tributary to Big Darby Creek)

This mobile home park operates a 30,000 gpd capacity package WWTP that regularly discharges approximately half this amount. Inspections revealed virtually no attention given to proper operation and maintenance, causing regular non-compliance with its NPDES permit.

Compliance sampling performed during dry conditions in August 2002 revealed that the plant was meeting NPDES permit limits for effluent quality. This entity will be connected to the proposed Darbydale WWTP by the year 2005. The new Darbydale plant will be built on the site of this WWTP and will discharge at the confluence of the unnamed tributaries which currently carry effluent from the Community Gardens MHP and the Pleasant Acres MHP.

Alton Campground Mobile Home Park (RM 0.50, Hamilton Ditch)

This campground operates a package WWTP (3,200 gpd design). This entity is typically in compliance with NPDES permit requirements and limits. Inspections have revealed proper operation and maintenance practices. The discharge flows to an ephemeral ditch along U.S. Route 40 that flows into Hamilton Ditch near the mouth.

Thornapple Country Club (RM 2.65, Clover Groff Ditch)

The Thornapple Country Club operates a 2,000 gpd capacity package WWTP that consistently meets NPDES permit limits. Inspections have revealed good operation and maintenance practices at this facility.

Cypress Wesleyan School (RM 1.30, Clover Groff Ditch)

Cypress Wesleyan School operates a 2,000 gpd capacity package WWTP. The WWTP often discharges approximately double this flow. Inspections indicated that virtually no maintenance is performed on the plant. The NPDES permit contains a compliance schedule which requires the school to connect to the City of Columbus sanitary sewer within 12 months and to abandon its WWTP.

Oakhurst Knolls (RM 5.80, Hellbranch Run)

Franklin County operates the 10,000 gpd capacity Oakhurst Knolls WWTP. The treatment train consists of an equalization tank split to an oxidation (orbal) ditch, two clarifiers, a rapid sand filter and a chlorine contact tank. The plant meets permit limits consistently during dry weather. Heavy precipitation (e.g., greater than 1 inch of rain) produces severe inflow and infiltration problems within the collection system. The WWTP can receive as much as 4 times the designed plant capacity during a precipitation event, causing a disruption to proper treatment. Flow and loadings information does not reveal much in the way of trends other than to confirm inspection results. Inspections have revealed good operation and maintenance practices at the WWTP.

Comparisons of up and downstream monitoring stations in Hellbranch Run reveal discharge of additional loadings of bacteria and ammonia to the stream from the WWTP. Instream dissolved oxygen concentrations seem unaffected by the discharge.

Pleasantview School (RM 1.14, Hellbranch Run)

This school operates a 20,000 gpd capacity package WWTP plant that complies with NPDES permit limits most of the time. This facility only discharges while school is in session, generally about 9 months out of the year. Inspections revealed marginal operation and maintenance practices. Loadings from this outfall are not significant.

Timberlake Subdivision (RM 0.50, Hellbranch Run)

Lakeland Utilities operates the Timberlake subdivision 50,000 gpd package WWTP. This WWTP violates NPDES permit limits during rain events due to inflow and infiltration problems in the collection system. At times, large “blankets” of biosolids were evident in Hellbranch Run downstream of the outfall during stream sampling events by Ohio EPA. Inspections have revealed a number of problems, including inadequate maintenance funds and faulty and broken equipment. Due to the long history and severity of the violations, the Director of Ohio EPA issued orders to force Timberlake Subdivision to abandon the WWTP and connect to the Darbydale WWTP via force main by 2005.

Dot-Mar Mobile Home Park (RM 23.77, Big Darby Creek via ditch)

The Dot-Mar Mobile Home Park operates a 4,000 gpd capacity package WWTP. The WWTP is typically out of compliance with assigned NPDES permit requirements and limits. Inspections show a history of operations and maintenance problems. The NPDES permit for this entity will be modified by to require abandonment of the WWTP and connection to the force main supplying ODRC-Pickaway Correctional Institute WWTP.

ODRC - Pickaway County Correctional Institute (RM 22.92, Big Darby Creek)

The State of Ohio operates this 2.34 MGD capacity WWTP (expanded from 1.40 MGD in 2003). The treatment train consists of two “race track” oxidation ditches (extended aeration), two final clarifiers, and a chlorine contact tank. The expansion will allow this WWTP to become a regional facility eventually servicing the unsewered Village of Derby and forcing the abandonment of the following facilities: Clark’s Lake Subdivision WWTP, Foxlair MHP WWTP, Vantage Point MHP WWTP, and Dot-Mar MHP WWTP following their connection to the expanded WWTP. This WWTP has future plans for expansion capped at 3.0 MGD due to antidegradation issues. Recent inspections revealed good operation and maintenance practices.

Beginning in 1988, ODRC-PCI WWTP began operating at or above its designed flow with regularity. In the last 10 years, loadings of cBOD₅, and TSS peaked in 1998 and have declined since. NPDES permit limits for total suspended solids were typically violated during precipitation events (e.g., more than 2 inches of rain). Ammonia removal has also become more reliable and less variable. Directors Final Findings and Orders were issued in March 2000, resulting in upgraded facilities which include a new sludge management plan and a contractor to haul the sludge, the addition of a new clarifier with a distribution splitter box, new aerators in the two oxidation ditches, a new flow meter and process improvements suggested by Ohio EPA. Upstream and downstream monitoring in Big Darby Creek indicated little recent impact to the stream from the WWTP. Previous instances of solids losses and poor treatment at this facility appear to have dissipated during the recent sampling. Whole effluent toxicity testing at the WWTP in October 2001 and May 2002 revealed no acute toxicity.

ODRC-PCI WWTP contributes 10.8% of the total, known point source wastewater flow to Big Darby Creek. Loadings of other pollutants are as follows: suspended solids 40.7%, cBOD₅ 14.1%, and 18.1% of the ammonia. With planned expansion of this facility and the elimination of several package plants and diversion of their sewage to PCI, loadings from the plant are expected to increase, but overall loadings to the watershed should decrease due to the elimination of package WWTPs with performance problems.

Foxlair Farms Mobile Home Park (RM 22.50, Big Darby Creek via ditch)

Foxlair Farms Mobile Home Park operates a 50,000 gpd design package WWTP that meets its NPDES permit limits about half of the time. Inspections indicated that marginal operation and maintenance has been performed. Compliance sampling performed during dry conditions in August 2002 revealed that the plant was not meeting NPDES permit limits for CBOD₅, ammonia, and suspended solids. The NPDES permit for this facility has been modified to require abandonment of this WWTP with connection of the collection system to the Pickaway County Board of Commissioners force main which supplies the ODRC Pickaway Correctional Institute WWTP.

Clark's Lake Subdivision (Big Darby Creek via Unnamed Tributary at RM 1.54 [aka Clarks Lake Tributary])

This subdivision operates a 100,000 gpd capacity, three lagoon, wastewater treatment system that consistently violates its NPDES permit limits. All of the inspections revealed poor operation and maintenance as well as excessive inflow and infiltration from the collection system. The sewage from this subdivision will be pumped to an expanded Ohio Department of Rehabilitation and Corrections (ODRC) Pickaway Correctional Institute wastewater treatment plant and the existing lagoons will be abandoned. Currently, this WWTP contributes just 0.9% of the known point source wastewater flow, under 1% of the ammonia loadings, over 16% of the cBOD₅, and 19.1% of the suspended solids loadings to the watershed.