Final
GeoMorph® Site Characterization Report

Tittabawassee River and Floodplain Soils
Midland, Michigan

Volume II of VI

Evaluation of Constituents of Interest
Supplemental Information

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VOLUME II

EVALUATION OF CONSTITUENTS OF INTEREST

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EXHIBIT II – 1

INDUSTRIAL HISTORY AND TIMELINE

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1. INDUSTRIAL HISTORY

The Midland Plant began operations in 1897 as The Dow Chemical Company. Expansion in production operations during the past century resulted in growth of the Midland Plant from 25 to approximately 1,900 acres. The majority of the Midland Plant is located on the east side of the Tittabawassee River and south of the City of Midland. Some of the current waste management (tertiary treatment ponds) operations are located on the southwest side of the river. The following subsections summarize the historical operations and waste management practices of the Midland Plant. Tables 1 and 2 at the end of this Exhibit present listings of chemicals produced during the various stages of Midland Plant operations.

A timeline summarizing historical operations at the Midland Plant, chemicals produced, waste management practices, and the development of environmental laws and regulations over time is provided in Exhibit II-1B.

A. Overview of Plant Manufacturing Operations

Initially, the Midland Plant operations involved extracting brine from groundwater pumped from production wells ranging in depth from 1,300 to 5,000 feet below ground surface. Over the time of its operation, the Midland Plant has produced over 1,000 different inorganic and organic chemicals. These chemicals include the manufacture of 24 chlorophenolic compounds since the 1930s (Agin et al., 1984).

A.1 Early History of Dow Chemical

In the 1800s, bromine was an important chemical used in patent medicines, as a disinfectant, and in early photographic films. In 1878, the first successful brinewell was drilled in Midland, with Midland becoming a "center for bromine production [with] no fewer than 14 producers" over the next decade. Slab wood from lumber mills was used as cheap fuel to evaporate local brines to produce salt. "Bitterns" from the salt evaporators were "chemically oxidized to release the bromine." In 1890, Herbert Henry Dow, along with partner John H. Osborne, formed the Midland Chemical Company to extract bromine from cold brine using a novel electrolytic bromine recovery system. Early products included iron bromide, potassium bromide, and bromine purifier (Brandt, 1997; Dow, 1938; Dow, 1926; Leddy, 1989; Levenstein, 1998; Haynes, 1954a).

In 1893, an early experimental attempt to construct and operate a chlorine cell in Midland resulted in an explosion due to a build-up and mixing of hydrogen and chlorine gases. The Midland Chemical Company decided against further expansion in chlorine, and H.H. Dow left the company, moving to Navarre, Ohio, to continue his experiments with electrolytic chlorine cells. He joined with James Pardee and several other backers to form the Dow Process Company in Navarre. By 1896, Dow had completed development on the chlorine cell and had

established a manufacturing process for the production of bleach or "chloride of lime" (calcium hypochlorite). He closed the Ohio plant and returned to Midland, Michigan. He built a small electrolytic chlorine cell room and bleaching powder plant, leasing land from the Midland Chemical Company and purchasing their debrominated brine for the process. This original bleach plant was made of tar, wood, iron, glass, and concrete (Brandt, 1997; Dow, 1926; Haynes, 1954a; Karpiuk, 1984).

By 1897, the "new" Dow Process Company in Midland had been reorganized as The Dow Chemical Company and began the manufacture of bleaching powder using waste brine from bromine production operations. The chlorine plant consisted of nine electrolytic chlorine production cells fabricated of inexpensive, readily available materials including culled arc-light carbon rod for anodes, tar-coated pine and hemlock for wooden vessels, and a slaked lime absorber to form the calcium hypochlorite bleaching powder. Dow inserted wooden troughs around each bank of carbon rods to "trap" the chlorine. This was the basis for calling these early cells, the "Trap Cells," which Dow patented in 1899. A multitude of such Trap Cells and absorbers were arrayed in large wooden buildings (40 feet wide by 368 feet long). These early chlorine cells did not make caustic soda.

Dow's Trap Cells were unique in that they were bipolar and generated an autogenous membrane of metal hydroxides. The alkalinity in the brine itself deposited around the graphitic carbon cathode, causing a gelatinous precipitate of iron, magnesium, and calcium hydroxides to form on the surface of the cathode. This metal hydroxide layer acted as a diaphragm to prevent the hydrogen and chlorine from mixing, which caused explosions. In 1899, Dow found that carbon electrodes could be treated by soaking in molten paraffin (135°F melting point) to plug pores and minimize diffusion of hydrogen, thereby preventing explosions.

In the bipolar Trap Cell, the metal hydroxide sludge and slough from chemical attack of the graphitic carbon electrodes filled the cells within a week and required a shut-down for cleaning. The cells were designed with a knock-out plug in the bottom, so the solids could be washed out and the cells restored to service. Chlorine was conducted from the cells in wooden pipes (bored-out pine logs lined with coal tar pitch), cooled with water, and then passed over scrap zinc to dry it sufficiently to make good bleaching powder through reaction with lime. The corrosive conditions were harsh on such primitive construction materials. Historical anecdotal information indicates that the tarred wooden boards holding the carbon electrodes became "spongy" with exposure to the "corrosive chemicals" in the cells, and that replacing them

"during the down-time" improved cell efficiency (Karpiuk, 1984). Such maintenance also included renewing the coal tar coating of the wooden vessels and replacing spent graphite electrodes, which was done approximately every two years. Eventually there were 16 cell buildings with two million graphitic carbon electrode rods in service in 26,000 Trap Cells (Haynes, 1954a; Karpiuk, 1984; Leddy, 1989). Graphitic carbon electrodes were so important to the chlorine production process that by 1913 Dow had begun manufacturing these components in Midland. This production continued until the mid to late 1970's, when dimensionally stable, rare metal-coated electrodes replaced graphitic carbon in electrolysis processes.

The first commercial sales of bleaching powder began in 1898. During this early time period, Dow also began production of sulfur chloride, various bromides, mining salts, Epsom salts, and magnesium carbonate, maximizing the economic return from the rich mineral resources available in the brine (Levenstein, 1998).

In 1902, the Midland Chemical Company merged into The Dow Chemical Company. That same year, H.H. Dow organized a new Midland Chemical Company, differentiated from the original by being called Midland Chemical Company II, for the commercial synthesis of chloroform from carbon tetrachloride, using sulfur chloride from Dow's chlorine cell operation. Chloroform and carbon tetrachloride were first commercially available in 1903. The production building, known as 3-B and located on land leased from The Dow Chemical Company, continued to produce chloroform until 1942. Midland Chemical Company II was combined with The Dow Chemical Company in 1914 (Brandt, 1997; Dow, 1939; Haynes, 1954a; Karpiuk, 1984). Between 1904 and 1905, Dow began the manufacture of benzoic acid by treating toluene with chlorine and then converting the resultant benzyl chloride into benzoic acid. This represented Dow's first venture into benzene ring chemistry (Haynes, 1954a).

By 1908, Dow manufactured two principal products, bromides and bleaching powder, and other small-volume products based on bromine and chlorine extraction, including mining salts, chemical insecticides and food preservatives, sulfur chloride, benzyl chloride and benzoic acid, carbon tetrachloride, and chloroform. In 1908, H.H. Dow formed the Midland Manufacturing Company in equal partnership with the Fostoria Glass Company and the Libbey Glass Company to develop an electrolytic caustic potash cell to make chlorine and potassium hydroxide. This process produced minor amounts of potash. In 1910 Dow Chemical had its first sales of lime sulfur (calcium sulfide) and lead arsenate sprays. In 1911, both glass companies dropped out of

the Midland Manufacturing Company (Brandt, 1997; Campbell and Hatton, 1951; Haynes, 1954a; Karpiuk, 1984; Levenstein, 1998).

In 1911, Dow scientists improved brine processing by developing a more sophisticated and efficient cell design. In the new plant, after removal of the bromine the brine flowed into a vacuum evaporator where steam heat and low pressure efficiently and rapidly boiled the brine and removed water. With evaporation, sodium chloride first precipitated and was removed. The liquid then passed into a second evaporator where magnesium chloride precipitated from the solution. The remaining viscous liquid was then transferred to a third evaporator, which removed the rest of the water, producing solid calcium chloride. In the spirit of economical extraction of benefits from the brine, Dow again increased the number of viable products obtained from the brine. Prior to this process improvement, only bromine and chlorine were recovered; the rest of the components of the brine being considered waste materials rather than raw materials for other chemical products (Haynes, 1954a; Karpiuk, 1984).

In 1913, Dow scientists further refined the chlorine electrolytic cell so that it could produce two usable products at the same time: chlorine and caustic soda (sodium hydroxide). They used the salt from the first stage vacuum evaporator and re-dissolved it in water as a feedstock. These new vertical-filter-press cells were also bipolar, but incorporated an asbestos diaphragm to more effectively separate the anolyte from the catholyte, rather than rely on autogenous generation of a metal hydroxide layer solely for that purpose. The result was purer chlorine and caustic soda product streams. The new cells were constructed of more durable materials, including concrete in place of tar-coated wood, and impregnated graphite instead of culled arc-light carbon electrodes of earlier designs. Dow "had elected to use 75 cells in a filter press series." Dow's new "bipolar cells," utilizing steel as the cathode and impregnated graphite as the anode, achieved "electrical continuity internally, with external connections to the rectifier circuit being made only at the anode and cathode terminals of a series which contains a multiplicity of cells" (Karpiuk, 1984).

By 1914, Dow had abandoned the original Trap Cells in favor of the newer bipolar, filter press-style "D.G." and "Ward" (M-21) cells. Also in 1914, H.H. Dow announced the company would quit the manufacture of bleaching powder. He told associates the "real future of the Company lay in the use of its chlorine for products other than bleaching powder, especially chlorinated hydrocarbons." Dow produced its last bleach powder in July 1915. Demand was shifting from bleaching powder to chlorine, prompted by chlorine's effectiveness in stemming typhoid

outbreaks by: direct injection into domestic water supplies; the blockade of German dyestuffs and organic intermediates; the liquefaction of chlorine and its transport in cylinders and tank cars; and, the introduction of liquid chlorine into the manufacture of pulp and paper after World War I (Haynes, 1945a; Haynes, 1945b; Haynes, 1949; Leddy, 1989; Karpiuk, 1984).

In 1916, Dow began magnesium metal production in Midland using electrowinning from molten magnesium chloride. By 1918, Dow was manufacturing alloys of magnesium metal for use in airplane parts, portable tools, high speed machinery, vacuum cleaners, and truck, trailer and bus parts. In 1922, Dow formally established the "DOWMETAL" trade mark for these magnesium metal alloys. By 1927, Dow was the sole domestic producer of magnesium metal and by 1929 was producing over 840,000 pounds annually. By 1942, Dow was responsible for producing 91 percent of all magnesium produced in the United States. In 1943-1944, Dow built an extrusion plant and rolling mill for magnesium at Midland, and a magnesium foundry in Bay City. During the years immediately before and during WWII (1939-1945), DOWMETAL™ became one of Dow's largest products by tonnage measure. In 1945, at the end of WWII, Dow shut down the magnesium ingot production operation in Midland, and consolidated all magnesium metal production to the Freeport, Texas plant (Dow, 1939; Dow, 1966b; Gross, 1949; Haynes, 1945a; Haynes, 1945b; Pretzer, Undated).

A.2 Manufacturing After Bleach

During World War I (1914-1918), in response to the British Navy's blockade of German exports and subsequent increased domestic demand, Dow began the manufacture of phenol using a benzene-sulfonation process. Dow manufactured 40 tons per day for use in producing trinitrophenol for artillery shells. Dow's dramatic increase in phenol production was in response to the United States increase in demand (Whitehead, 1968). Other wartime-introduced products included dichloroethylsulfide (for mustard agent), monochlorobenzene (for explosives), and hexachloroethane (for smoke screens). In 1918, the United States Army operated a plant manufacturing mustard agent based on chlorine at the Midland Plant. The United States manufactured up to 10,000 pounds per day of mustard agent (Brandt, 1997).

During this same period Dow also began to produce acetic anhydride, ethylene glycol, ethylene chlorohydrin and its acetate, dichloroacetic acid, aspirin and other salicylates, calcium chloride, monochlorobenzene, hexachloroethane, sodium acetate, trichloroethylene, trinitrophenol, and tetrachloroethylene. Also in response to wartime demand, Dow began commercial production of synthetic brominated indigo (400 pounds/day by 1917) and its intermediates, aniline and

chloroacetic acid. Military needs for incendiary flares prompted the production of magnesium metal (3000 pounds/day by 1917), produced by electrolysis of magnesium chloride. Dow continued production of inorganic bromide- and chloride-based products, including caustic soda (50 tons/day by 1916), chlorine (45 tons/day by 1916), bromine, Epsom salts, magnesium products, and insecticides (Bennett, 1926; Brandt, 1997; Dow, 1939; Haynes, 1945a; Haynes, 1945b; Leddy, 1989).

In 1918, Dow perfected a new synthetic process for production of phenol using chlorobenzene. This process used high pressure in a continuous system and yielded *o*- and *p*-xenols (phenylphenols). Shortly thereafter, Dow began production and marketing of Paradow™ (p-dichlorobenzene) (Haynes, 1945a; Haynes, 1945b).

Table 3.4 provides a list of products manufactured at Dow Chemical circa 1926-1928. During the 1920s Dow resumed production of its peacetime products and introduced several new products, including synthetic amino acids, phenylethyl alcohol, vinyl chloride, carbonic acid, ethylene dibromide, ethylene dichloride, propylene dichloride, synthetic oil of wintergreen (methyl salicylate), coumarin, synthetic ammonia, trichloroethane, and trichloroacetic acid. A larger plant was built in 1921 for production of acetylsalicylic acid (aspirin). By 1927, annual commercial production of phenol manufacture exceeded 8 million pounds, owing to an improved heat exchange system developed by Dow chemists W.H. Hale and E.C. Britton. In 1929, a new method for preparation of aniline from chlorobenzene and aqua ammonia led to the development of Dowtherm™ heat transfer fluids (at that time, a mixture of diphenyl and diphenyloxide) (Dow, 1939; Haynes, 1945a; Haynes, 1945b; Dow, 1928; Midland Sun, 1926).

During the early 1930s, Dow began marketing a hydrochloric acid treatment method to revive old wells (Dowell™), and developed ethyl cellulose, Dow's first plastic, which was used extensively during World War II for telephone headsets, dust goggles, airplane parts, etc. During this time, Dow also began production of vinylidene chloride and 1,1,1-trichloroethane. In the mid-1930s, the Midland Plant began producing various chlorinated phenols, both directly for sale and for use as intermediates in the production of other chemicals. These chemicals were used primarily as fungicides, bactericides, or herbicides (Dowicides™). Dow scientists also invented the Dow styrene monomer process during this time, which consisted of passing ethylbenzene vapors through superheated steam to bring about partial dehydrogenation of ethylbenzene using special low inventory stills. Commercial production of polystyrene (Styron™) followed in 1938. Also during this time period, the Thiokol Company arranged for

Dow to begin production of Thiokol synthetic rubber at the Midland Plant and, by 1938, Dow had moved into large-scale production, producing over 2 million pounds annually. By 1939, Dow was producing 100 tons of Epsom salts per day and over 41 million pounds of aniline per year. By this time, Dow scientists had also worked out the polymerization and fabrication techniques for a copolymer of vinyl chloride and vinylidene chloride (Saran™). During this period, Dow experienced steady growth, becoming the single largest domestic producer of chlorine, the majority of which was used in the manufacture of various Dow products (Agin et al., 1984; Brandt, 1997; Dow, 1928; Dow, 2006a; Haynes, 1948; Karpiuk, 1984; Whitehead, 1968). Brine electrolysis continued to be an important source of chlorine for Dow, and in 1939 Dow migrated from M-21 cells to the M-25 "Pocket Cell" design when the patent for the more economical Hooker "S" cell expired. Like the M-21 before it, the M-25 was a bipolar, multi-plate filter press design capable of producing both chlorine and caustic soda. It was constructed of durable materials including concrete bodies, impregnated graphitic carbon plate electrodes, and an asbestos diaphragm to separate the anolyte from the catholyte. This M-25 design was utilized for the electyrolysis of brine to produce chlorine and other materials in Midland until Dow ceased such production in the 1980's.

As Dow entered the 1940s, over 500 products were being manufactured at the Midland Plant, which by then covered 525 acres. Dow added 2,4-D herbicide to its product line and built a larger production facility. Dowex™ ion exchange resins were developed and used for purification of water, liquid food, and other materials. In an attempt to make a flexible, low loss dielectric for early radar applications, Dow scientists tried to copolymerize styrene with isobutylene. Rather than copolymerizing, the isobutylene vaporized within the styrene polymer, forming a rigid cellular product that paved the way for Styrofoam™.

During World War II, additional plant facilities were made available for Thiokol production. Several new products were introduced, many in response to wartime needs. In addition, Dow operated the Midland Chemical Warfare Service (CWS) Plant for the production of CC-2 from February 1943 to April 1944 (Brandt, 1997). CC-2, also known as impregnite, was used during World War II for the impregnation of clothing for protection against vesicant agents such as mustard agent and lewisite. The plant plans were based on a DuPont pilot plant. By April 1944, the military forces had sufficient stockpiles of impregnite and the plant was placed on standby. It never operated again (Brandt, 1997).

In 1947, a new pentachlorophenol plant was built. By the end of the decade, over half the American domestic production of phenol was produced at the Midland Plant (Brandt, 1997; Haynes, 1954b). Table 2 provides a listing of new products introduced during the 1940s.

During the 1950s the Midland Plant expanded its manufacturing capacity of existing products and added several new products including acrylic acid, acrylamide, ethanolamines, phenolics, herbicides, soil fumigants, polyacrylamide and other plastics, and styrene/butadiene latexes. By the end of the 1950s, chemicals accounted for 53 percent and plastics accounted for 35 percent of Dow sales (Brandt, 1997; Dow, 1947; Karpiuk, 1984). See Table 2 for a listing of new products introduced during the 1950s.

In the 1960s, the Midland Plant continued to expand both its production capacity and the number and range of products being manufactured, while ceasing to produce other products. Many of the new products introduced during the 1960s would be produced through the mid-1970s, with a few of these products continuing in production into the 1980s and beyond. In 1964, Dow improved the 2,4,5-T production process to increase efficiency and reduce waste. During the late 1960s, Dow built a new trichlorophenol plant and a new chlor-alkali plant and expanded existing plant operations for ethylbenzene, styrene, bromine, bisphenol A, and polystyrene (Dow, 1960; Dow, 1966a; Dow, 1970). Table 2 provides a listing of products introduced during the 1960s.

In the 1970s, Dow commenced full-scale production of the chlorpyrifos insecticides Dursban™ (household market) and Lorsban™ (agricultural market). Dow also introduced 2-chloro-*N*-isopropylacetanilide (Propachlor™). During the early to mid-1970s, the chlorine/caustic facilities were modernized. Also, a new 2,4-D herbicide plant was built that provided recycling of much of the process water and by-products, and the existing chlorinated benzene production facilities were replaced and expanded to more efficiently produce monochlorobenzene, *o*- and *p*-dichlorobenzene, trichlorobenzene, and tetrachlorobenzene. During the mid- to late 1970s, Midland stopped production of 1,2-dibromo-3-chloropropane (Fumazone™), *o*,*o*-dimethyl-*o*-(2,4,5-trichlorophenyl) phosphorothioate (Ronnel™), and 2,4,5-T (Dow, 1966a; Dow, 1970).

In the 1980s and 1990s, on-site production began to decrease both in terms of capacity and range of products. The Midland Plant pentachlorophenol manufacturing facility was closed in October 1980. Also during this time, the decision was made to shut down the chlorine/caustic soda production facilities and, by the mid-1980s, the Midland Plant exited the brine business.

At this time, Dow doubled its household product lines producing Saran Wrap™, Handi-Wrap™, and Scrubbing Bubbles cleaner. Dow also introduced Seldane™, a non-sedating antihistamine, and Drytech™, the active absorbent in disposable diapers. In 1998, Dow exited the magnesium business corporation-wide (Brandt, 1997; Dow, 1973; Dow, 1975; Dow, 1977; Dow, 2006a; Amendola, 1986).

Currently, the Midland Plant consists of approximately 30 production plants and a core centralized Research & Development campus that serves Dow's global operations. The Midland Plant has been and remains a major research and development center for Dow. The research and development conducted at present is a mixture of pure research up to and including the construction of pilot plants to test manufacturing processes prior to construction of manufacturing facilities at Dow's various global locations.

B. Overview of Plant Waste Management Practices

Waste management practices have evolved with the changing production and regulatory environment. Waste management practices at the Midland Plant have included on-site and off-site treatment and disposal of various waste products (MDEQ, 2003b). In the very early history of the Midland Plant, wastes were discharged directly to the Tittabawassee River and, sometime later, wastes were stored and treated in ponds. Other wastes were disposed of on-site either on land or by burning (Agin, et al., 1984). Over time, improvements in waste management practices included the installation and operation of a modern wastewater treatment plant as well as the use of incinerators instead of open burning. Improvements in the wastewater treatment plant and subsequent incorporation of pollution controls into both the operations of and emissions from the incinerators have reduced or eliminated releases and emissions from the Midland Plant.

Historic waste burning and waste incineration appear to be the primary source of elevated furans and dioxins found in surface soil in the Midland Study Area, as reported in "Point Sources and Environmental Levels of 2,3,7,8-TCDD (2,3,7,8–tetrachlorodibenzo-*p*-dioxin) on the Midland Plant Site of The Dow Chemical Company of Midland, Michigan, November 5, 1984" (Agin et al., 1984). This study conducted by Dow was "a comprehensive search for all critical point sources of 2,3,7,8-TCDD to the air, soil, and water in the Midland area." The results of the study were submitted to federal, state, and local governmental agencies. The 1984 Agin Study contains details about historic manufacturing processes and waste management practices, focusing on 2,3,7,8-TCDD. Prior to the construction of wastewater storage ponds in the 1920s, wastes from manufacturing processes were discharged directly to the Tittabawassee River.

B.1. Historical Aqueous Waste Management

Beginning in the 1920s, aqueous waste was managed using a network of collection ditches, pipelines, and pumps that delivered waste to a series of storage ponds. Outlet structures controlled releases to the Tittabawassee River during high river flow periods. Approximately 30,472 barrels per day of waste brines were placed in a series of storage ponds. Two additional ponds were constructed during the 1930s, resulting in over two years of waste brine storage capacity at then present waste brine pumping rates. Sludges were stored in a 64-acre pond designed to collect and thicken suspended matter. Organic system wastes, defined by odor, were also stored in ponds designed for long retention periods. Acid wastes were stored in a 109-acre pond system during cold months; during warmer months discharges to the River were controlled based on temperature and stream condition. Clear water wastes from condenser and cooling waters were continuously discharged. Discharges were periodically monitored for sodium chloride concentration and phenol content (MSCC, 1937). Leaching from waste impoundments located near the river impacted the groundwater, which may have subsequently migrated to the river.

In the 1930s, a secondary wastewater treatment plant (trickling filter) was built and operated to treat phenolic wastes. As Dow increased production to meet the government's demands, Dow's efforts to upgrade its treatment plant were delayed due to denials of materials by the United States War Production Board (Bay City Times, 1947). However, in 1945, the wastewater treatment plant (WWTP) was upgraded to include preliminary treatment in trickling filters followed by activated sludge treatment and final clarification (Velz, 1958). The wastewater treatment processes have undergone several upgrades over the years, including the construction of tertiary treatment ponds (referred to as "T-ponds") in 1974. In 1985, mixed media sand filters were constructed to remove particulates from the tertiary effluent prior to discharge to the river. Operation of the T-ponds has been regulated by Dow's NPDES permit since 1988. Historically, the WWTP received flows from the process areas and sanitary wastewaters. During the 1970s and 1980s, additional flow contributions were directed to the WWTP, specifically waste scrubber water from the rotary kiln incinerator and tar burner, sludge dewatering system discharges, cooling tower blow down, other non-contact cooling water, water softener backwash, tank car washings, surface water runoff, and leachate from the Salzburg Landfill.

Dow Chemical has discharged wastewater into the Tittabawassee River since the early years of its operations, and continues to discharge wastewater treated through their on-site wastewater

treatment plant and an NPDES permitted outfall. Over time, the Midland Plant reduced the number of outfalls to a primary process wastewater outfall, with one emergency back up outfall and several storm water outfalls. A workplan prepared for Dow by URS Corporation provides a detailed investigation of historic wastewater outfalls at the Midland Plant, incorporated herein by reference (MDNR, 1972; URS, 2008).

By 1984, through efforts to recover and reclaim process wastewaters, the wastewater effluent discharge flow to the River had dropped from 35.4 million gallons per day (MGD) to 20 MGD. Continued efforts throughout the 1980s and 1990s resulted in construction of several process waste recovery and reclamation facilities and subsequent reduction of influent pollutant loads at the facility-wide WWTP.

During the early 1980s, Dow discontinued the use of deep disposal wells for discharge of phenolic wastes. These wells discharged into the Sylvania formation and the Dundee formation. Historic deep well disposal activities are presently being investigated as part of the On-Site Corrective Action Program.

In the late 1970s, construction began on a 2.5 mile-long Revetment Groundwater Interceptor System (RGIS). The T-Pond RGIS system was added in 1992. The RGIS flanks most of the plant site on both sides of the river. From 1990 to the present, upgrades and replacement work have continued to take place on the RGIS. A new horizontal interceptor pipe system was constructed in 2002 along a portion of South Saginaw Road. The estimated length of all the perforated pipe horizontal interceptor systems total is approximately 7 miles (Agin, et al., 1984).

B.2 Uncontrolled Aqueous Release Management

The Tittabawassee River has a long history of significant flood events, with records dating back to the late 1800s. During the early years of the Dow facility, flood control in the River was especially troublesome, many times resulting in inundation of the plant site and waste treatment facilities. Particularly severe storm events have caused flooding of the entire Midland region, including the Dow facility. These heavy floods usually occurred during the spring and resulted in discharges to the Tittabawassee River of stored brines and untreated or partially treated process wastewaters. Releases to the River as a result of flooding included overflows from the brine storage and tertiary treatment ponds (MDEQ SWQD, 1970-2000; MWRC, 1960; Midland Daily News, 1950).

As in any manufacturing operation of this size, accidental spills of process materials and infrequent excursions of isolated parameters above the WWTP NPDES discharge permit levels occurred at the Midland Plant. Beginning in the early 1970s, Dow recorded reportable spills and excursion events and reported them to the MDEQ, Surface Water Quality Division. While some of the reported spills resulted in releases to the Tittabawassee River, many were contained, controlled, and/or treated through the on-site WWTP and did not result in a direct release to the River. Reported NPDES excursions have been promptly addressed (MDEQ SWQD, 1970-2000).

B.3 Historic Air Emissions Management

Process Emissions

Historically, waste process gases were vented to the atmosphere. Dow chemists and engineers have always viewed waste materials as process inefficiencies. As a result, efforts have been focused on recovering wastes for reclamation and reuse (Agin, et al., 1984; Haynes, 1945a; Haynes, 1945b; Haynes, 1948; Haynes, 1949; Haynes, 1954a: Haynes 1954b). Beginning in the late 1960s, Dow more aggressively pursued reduction in emissions from its process vents through process changes or elimination, implementation of material recovery and reuse, and installation of air pollution control technologies (Agin, et al., 1984; Dow, 2006a).

Due to the high demand for electrical power, Dow has historically supplied its own power needs using on-site power generation plants. As of 1984, the on-site 60 megawatt electrical, two million pound per hour steam cogeneration plant (Plant Powerhouse) burned 2000 tons of coal per day. Exhaust gases were directed through an economizer prior to stack exhaust to the atmosphere. The powerhouse was retrofitted with baghouse filters in October 1982 to remove 99 percent of the flyash previously discharged to the environment (Agin, et al., 1984).

Airborne Deposition and Fugitive Dust Emissions

Exhaust constituents from process vents, power generation, and thermal destruction processes may have deposited onto plant soils. During dry periods, desiccated Midland Plant soils may have resulted in fugitive dust emissions. Samples of Midland Plant soils at the plant fence line have shown higher levels of chlorinated dioxins than soils located in distant City of Midland residential soils. Current information indicates that concentrations in Midland Plant soils (average is less than 1 ppb) decrease radially from inside the plant outward, suggesting a windborne mechanism. The Midland Plant soils with the highest concentrations of dioxins were located near historic chlorophenolic production areas, the waste incinerator, and ash handling

facilities (see discussion on combustion of solid wastes below.) Two small areas directly associated with the long-term manufacture or handling of chlorophenolic production compounds (477 Building and the area by 11th and J Street) demonstrated the highest levels of chlorinated dioxins. These areas occupy less than 0.5 percent of the total land surface of the Midland plant site. Concentrations in these areas were localized and dropped off dramatically within a few hundred feet, suggesting that fugitive dust transport was not a major occurrence in these areas (Agin, et al., 1984). During 2006, an area of elevated 2,3,7,8-TCDD was identified adjacent to the butadiene tank farm. This area is presently being investigated as part of the on-site corrective action program.

Early Combustion of Liquid Waste Tars

As early as 1930 the Dow Midland facility disposed of organic liquid tars by incineration. Two basic types of incineration were used: liquid tar burners using several different configurations and rotary kiln solid waste trash incineration. Improvements in burn efficiency and environmental controls have been consistently made since this time. In 2003, Dow completed upgrades to several of its thermal destruction devices to meet USEPA Maximum Achievable Control Technology (MACT) standards for industrial incineration devices (Agin, et al, 1984; Dow, 2006a).

In the mid 1930's two tar burners were installed northwest of the present Midland Plant waste incinerator. Liquid tars were burned inside vertical brick lined towers with combustion exhaust gases and particulates vented directly to the atmosphere. Fuel oil was also used to assist in start up and maintenance of the burner flame (Agin, et al., 1984).

In 1951, a new vertical tar burner replaced these two units. Within the new 15-foot diameter by 50-foot tall brick-lined tower, four tangential feed nozzles dispersed process wastes, blended with supplemental fuel oil, for incineration. Combustion exhaust gases and particulates were vented directly to the atmosphere. This unit was removed from service in 1974 and demolished in the late 1970s (Agin, et al., 1984).

In 1957, the 707 Building tar burner was constructed just east of the present Dow Midland plant waste incinerator. This unit provided air exhaust scrubbing equipment to reduce hydrogen chloride emissions when burning chlorinated tars. Depending on the materials undergoing incineration, the vent emissions could be diverted directly to a 125 foot stack or to a water

quench chamber prior to venting to the atmosphere. This unit was removed from service in 1975 (Agin, et al., 1984).

High temperature (approximately 1,000 ^{o}C, or higher) combustion of organic liquid tars began in 1968 with construction of the 830 Building tar burner. This unit operated at a temperature of 900-1,000 ^{o}C with a tar feed rate of 10 gallons per minute (gpm). Combustion exhaust gases and particulates (30,000 cubic feet per minute (cfm)) were directed through a water quench system, venturi scrubber, and demister before stack discharge. In 1975, chlorinated waste tars were directed to the afterburner of the rotary kiln incinerator (discussed below). In 1981, this unit was placed in standby mode to be used only for tar inventory control. The unit has not operated since December 1982 (Agin, et al., 1984).

Three natural gas augmented incinerators for destruction of process halogenated by-product streams were in operation by 1984. The 1058 Building burner was designed to destroy waste chlorinated aromatic materials and recover usable hydrogen chloride. The 564 Building burner was designed to destroy waste chlorinated monomers. The 1009 Building burner was designed to burn a variety of halogenated waste solvents and by-products.

Combustion of Solid Wastes

Prior to 1948, solid wastes were either landfilled on the Midland Plant site or stockpiled for open air burning. In 1948, a rotary kiln incinerator was placed in service to burn rubbish, waste solids, packs, and liquid tars. Solids were manually shoveled into the feed chute and various liquids were sprayed into the front of the kiln. Combustion exhaust gases and particulates were vented directly to the atmosphere (Agin, et al., 1984).

In 1958, this original rotary kiln was replaced with a new dual rotary kiln system (703 Building Kiln No. 1 and Kiln No. 2) to burn paper and wood trash, solid chemical waste, chemically contaminated waste equipment, and a variety of liquid wastes. From 1958 to 1975, only Kiln No. 1 was used. This unit provided increased capacity and improved burner control. The operating temperatures in the rotary kiln ranged between 500-900^{o}C with a 30-45 minute bulk solid residence time. Combustion exhaust gases and particulates were directed through a water-spray quench system before discharge to the atmosphere. In 1970, to reduce stack particulate emissions, a secondary combustion unit afterburner (using natural gas for supplemental fuel) was installed between the kiln and the quench chamber. In 1975, the Kiln No. 2 was placed into service and Kiln No. 1 was shut down. The Kiln No. 2 system included a rotary kiln, an

improved afterburner and air pollution control system consisting of a water quench system, venturi scrubber, and demister. Beginning in 1978, in response to research studies indicating that a higher temperature was needed to minimize formation of chlorinated dibenzo-p-dioxins and to assure their efficient destruction, natural gas was added to the afterburner to increase the temperature control point to approximately 1000^{o}C. In 1981, the addition of a wet electrostatic precipitator to the Kiln No. 2 system resulted in further reduction of particulate emissions to the atmosphere. By 1984, further improvements, including process computer control, resulted in the afterburner operating temperatures between 1000-1100^{o}C with a residence time of a few seconds. Liquid wastes and tars were atomized either directly into the kiln or directed to the afterburner, with higher BTU liquid feeds and dichlorophenol distillation wastes directed to the afterburner and higher ash-containing feed directed to the kiln. Mass flow measurements of 2,3,7,8-TCDD levels in the incinerator system in 1984 showed that the incinerator ash captured about one-half of the 2,3,7,8-TCDD. The other half was 95 percent captured by the exhaust scrubber equipment (Agin, et al., 1984).

Historically, wet kiln ash was lifted from the ash trough by conveyor belt to dump trucks for transport to on-site landfill disposal. From 1979 to 1982, after closure of the on-site landfills and before completion of the Salzburg Landfill, kiln ashes were stockpiled in an open area south of 11th Street and west of the waste incinerator. The pile was sprayed regularly with an aqueous dust suppressant to minimize desiccation and fugitive emissions of particulates. In 1982, a building was constructed around the ash transfer operation to totally enclose the conveyor and truck loading operation. Ash handling methods were also implemented to prevent drying and dusting of kiln ash at all stages of loading, transport, and landfilling (Agin, et al., 1984).

Prior to 1985, liquid waste being fed to the secondary combustion chamber burner was atomized through the use of an air fan. The type of burner nozzle was changed to employ the use of steam atomization, which was more efficient, thereby lowering the amount of 2,3,7,8-TCDD that was formed. To lessen the amount of particulates, several improvements were added to the 703 incinerator in the 1987-1988 time frame. The venturi scrubber was modified to employ a variable throat, which created a greater pressure drop. A series of high efficiency water nozzles were added to the entrance into the quench tower. This greatly improved the efficiency of the venturi scrubber (Dow, 2006b).

In 1988, the secondary combustion chamber of the 703 incinerator was reconfigured. A high efficiency vortex burner was installed just after the rotary kiln. This installation increased the

secondary combustion zone residence time significantly and employed a highly efficient burner. These changes allowed Dow to demonstrate within the year that this burner was capable of 99.99 to 99.999 percent efficiencies (Dow, 2006b).

In 1990, another rotary kiln incinerator, 830, replaced the existing 830 tar burner. This unit had a sixty foot long rotary kiln with two 30 million BTU per hour (BTU/hr) burners, and a large secondary combustion chamber with over two seconds residence time. This chamber was fitted with two 30 million BTU/hr vortex burners. From the combustion chamber, gases flowed through the following units: a rapid quench chamber, an hydrochloric acidl absorber, a variable throat venturi scrubber, a demister, an initial fan, four ionizing wet scrubbers, a second fan, and then to the stack. This unit was permitted at 99.999 percent efficiency (Dow, 2006b).

Planning for the new, state-of-the-art 32 Building rotary kiln began in the late 1990s. This new kiln was built to insure that Dow could meet the forthcoming MACT standards. The kiln was designed to burn both solid and liquid wastes. The kiln, which had two 35 million BTU/hr burners, was outfitted with carbon seals on both ends to greatly minimize the possible occurrence of fugitive emissions. Where older kilns often had less than 0.25 inch of water vacuum on the combustion chamber, the new kiln was designed to run at greater than 1 inch of water vacuum (Dow, 2006b).

Exhaust gases from the new rotary kiln pass into a large circular secondary combustion chamber having a 3.5 second retention time where three 30 million BTU/hr burners fire tangentially into the chamber. After the secondary combustion chamber, the gasses pass into a NO_x reduction system then into a rapid quench designed to minimize dioxin formation. From the quench chamber, the flue gases pass into a packed condenser tower which removes most of the hydrochloric acid that is formed in the combustion process. The condenser tower also aids with the pre-treatment of particulates prior to entering the high energy venturi scrubber. After the venturi, which removes the bulk of particulates in the gas stream, the flue gases pass into a packed tower chlorine scrubber. Sodium hydroxide is used to react with any remaining residual chlorine in the gas stream. After the chlorine scrubber, the gases are pulled through the first induced draft fan. From the fan, the gases pass through nine ionizing wet scrubber (IWS) units, which remove the last of the fine particulates from the gas stream. From the IWS's, the gases pass through a second induced draft fan and then up a 200 foot stack. At the stack, oxygen, carbon monoxide, SO_x and NO_x are continuously monitored (Dow, 2006b).

After starting up the 32 Building kiln in 2003, the 703 Building and 830 Building incinerators were closed under RCRA requirements. Whereas the older units were permitted to process 85 million BTU/hr and 60 million BTU/hr, the new 32 Building kiln was licensed to operate at 130 million BTU/hr. This reduction in capacity was possible because Dow had implemented new technologies to recycle wastes as useful raw materials (Dow, 2006b).

By 2003, Dow had completed upgrades to its thermal destruction devices to meet USEPA MACT standard for industrial incineration devices. Between 2003 and 2006, Dow implemented new technology to further improve the performance of their thermal destruction devices. Since 1995, Dow has reduced dioxin emissions to the air by over 95 percent (Dow, 2006a).

Table 1. Products Circa 1926-1928

The Dow Chemical Company

acetic acid
acetic anhydride
acetylene tetrabromide
acetylsalicylic acid
ammonium bromide
ammonium salicylate
aniline hydrochloride
aniline oil
anthralic acid
barium bromate
Bordo mixtures
bromoform
cadmium bromate
calcium arsenate
calcium bromide
calcium chloride
camphor monobrominated
carbolic acid
carbon bisulfide
carbon tetrachloride
caustic soda
chloracetyl chloride
chlorine
chloroform
Ciba dyes (7 colors)
cinchophen
coumarin
dichloromethane
dichloroacetic acid
diethylaniline
dimethylaniline
diphenyloxide
DOWMETAL™
Epsom salt (magnesium sulfate)
ethyl chloride
ethyl monochloracetate
ethylene bromide
ethylene chlorbromide
ethylene chlorhydrin
ferric chloride
ferrous chloride
hexachloroethane
hydrobromic acid
lead arsenate
lime sulfur
lithium bromide
lithium salicylate
magnesium arsenate
magnesium bromate
magnesium bromide
magnesium chloride
magnesium oxychloride
magnesium salicylate
methyl anthranilate
methyl bromide
methyl salicylate
methylene chloride
Midland Vat Blue dyes (3 types)
mining salts
monobromobenzene
monochloroacetic acid
monochlorobenzene
nicotine sulfate
orthocresotinic acid
orthodichlorobenzene
orthophenylphenol
paradibromobenzene
paradichlorobenzene
paraphenetidin
paraphenylphenol
pentachloroethane
phenol
phenol salicylate
phenyl acetate
phenyl ethyl alcohol
potassium bromate
potassium bromide
propylene chloride
purified bromine
salicylaldehyde
sodium bromate
sodium bromide
sodium chloride
sodium salicylate
sodium sulfide
strontium bromide
strontium salicylate
sulfur chloride
sulfur monochloride
synthetic indigo
tetrachloroethane
tetrachloroethylene
tribromophenol
trichloroacetic acid

Source: Midland Sun (1926) and Dow (1928)

Table 2. New Product Introductions during the 1940s, 1950s, and 1960s

The Dow Chemical Company

Decade	*Product*	*Production Years (where available)*	*Source*
1940s	1,1-dichloroethane	1945-1980	A
	1,2,4,5-tetrachlorobenzene	1945-1980	A
	2,4,6-trichlorophenol		
	2-(2,4-dichlorophenoxy)acetic acid (2-4-D; Dowspray™ 66; Esteron™ 44; Esteron™ 99; Esteron™ Brush Killer)	1945-1983	A
	2-chloropropionic acid	1949-1984	A
	4-chloro-2-phenyl-phenol (Dowicide™ 32)	1948-1972	A
	acrylonitrile		A
	alpha-methylstyrene		A
	antipyrene		A
	bromoform	1944-1983	A
	demethylaminobenzene		A
	dicyclopentadiene		A
	diethylbenzene	1946-?	A
	diisopropanolamine	1944-2000	A
	dinitro-o-sec-butylphenol (Dinoseb™, Premerge™, DN289™)		A
	methylchloroacetate	1947-2000	A
	propylene glycol		A
	sodium trichloroacetate	1948-1977	A
	toluene		A
	xylidene		A
	2,4,5-T (Esteron™ 245)	1950-?	A
1950s	4-chloro-2-cyclopentyl-phenol (Dowicide™ 9)	1965-1982	A
	1,2-dibromo-3-chloropropane (Fumazone™)	1957-1975	A
	1-methoxy-2-propanol (Dowanol™ PM)	1958-1990	A
	2-(2,4,5-trichlorphenoxy) ethyl 2,2-dichlorpropanoate (Erbon™)	1954-1979	A
	2,2-dichloroproprionic acid (Dalapon™)	1954-?	A
	2-chloro-1-morpholin-4-yl-ethanone (Morpholine™)	1950-?	A
	2-ethoxyethanol (Dowanol™ EE)	1957-1988	A
	2-methoxyethanol (Dowanol™ EM)	1957-1988	A
	acrylamide	1954-1971	A
	acrylic acid		
	bromobenzene	1950-1970	A
	bromomethylbenzene	1952-1976	A
	dimethoxy-sulfanylidene-(2,4,5- trichlor-phenoxy-phosphorane (Ectoral™, Trolene™, Ronnel™, Korlan™, Nankor™, Viozene™)	1957-1977	A
	Kuron™ herbicide containing 2,4,5-trichlorophenoxypropionic acid (also known as Silvex™)	1953-1980	A
	monoisopropanolamine	1953-2000	A
	o,o-dimethyl-o-(2,4,5-trichlorophenyl) phosphorothioate (Dowpon™, Ronnel™, Ruelene™)	1951-?	A

Table 2 - *Continued.* New Product Introductions during the 1940s, 1950s, and 1960s

The Dow Chemical Company

Decade	*Product*	*Production Years (where available)*	*Source*
	o-chlorophenol	1950-1965	A
	parachlorophenol		B
	p-dibromobenzene	1950-1968	A
	polyacrylamide (Separan™),	1950s-?	A
	SE-651	1958-1980	A
	styrene/butadiene latex	1950s-?	A
	Styrofoam™ brand plastic foam		B
	tetrachlorobenzene		B
	tetraethylene pentamine	1951-1966	A
	tetrasodium 2-[2-bis-(carboxylatomethyl)amon]ethyl-(carboxylatomethyl)amino]acetate (Versene™)	Pilot plant; 1951	A
	trichlorophenol		B
	Vidden™ (a mixture of dichloroprpenes and dichloropropanes)	1959-1983	A
1960s	(17-acetyl-6-chloro-3-hydroxy-10,10-dimethyl-1,2,3,8,9,11,12,14,15,16-decahydrocydopenta[a]phenanthren-17-yl)acetate (Verton™)	1962-1979	A
	(4-dimethylamino-3,5-dimethyl-phenyl methylaminoformate (Zectran™)	Pilot scale; 1961-1975	A
	2,3,5-trichloro-1H-pyridin-4-one (Daxtron™)	1965-1968	A
	2,4,5-T and 2,4-D mixture	1962-1970	A
	2-butoxyethanol (Dowanol™ EB)	1960-1988	A
	2-phenoxyethanol (Dowanol™ EP and Dowanol™ EPH)	1960-1967	A
	chlorpyrifos o,o-diethyl o-(2,4,6-trichlor-2-pyridyl)l (Dursban™)	Pilot scale;1965	A
	decabromodiphenyl oxide	1969-1986	A
	dimethylamine salt of 2-methyl-chlorophenoxyacetic acid	1963-1975	A
	Dowicil™ TBS	1962-1971	A
	l-isobutoxy-2-propanol (Dowanol™ PIB)	1962-1981	A
	methylene bromide	1960-1978	A
	o-2,4-dichlorophenyl-o-methyl isopropylphosphoramidothioate (Zytron™)	1960-?	A
	o-sec-butylphenol	1964-1979	A
	pentachloropyridine	1966-?	A
	pentachlorphenol (glazed, prilled form)	1965-?	A
	t-butylsalol	1966-1970	A
	tert-butyl-salol (TBS, Tausol™)	1963-1965	A
	tricyclohexylstannane hydrate	1967-1979	A
	triisopropanolamine	1966-2000	A
	Zetabon™ (coils of metal coated with ethylene copolymer plastic)	1965-?	A

Sources: (A) Birch, A. (2006); (B) ATS (2006)

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EXHIBIT II – 1B

Timeline

Dow Chemical - Midland Industrial Anthropology Timeline 1850-Present

1850 1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000

Production Processes

- Extraction & Processing of Brine
- Bromine blowing
- Chlorine Electrolysis using Graphite Electrodes
- "TRAP" Cell (Chlorine)
- "DG" and M-21 Cells (Chlorine/Caustic Soda)
- M-25 Cell (Chlorine/Caustic Soda)
- Modernize Facility
- Use of membrane cell in brine electrolysis
- Graphitic Carbon Electrode Production
- Magnesium Metal Production
- Acid Cracking to Produce Ethyl Chloride, Sulfuryl Chloride
- Sulfonation Process to make Pheno
- Hydrolysis of Chlorobenzene
- Manufacturing Benzoic Acid from Toluene & Chlorine
- Chlorination of Hydrocarbons
- Glycols, Glycolamines, Ethers
- Styrene Monomer Production from Ethylbenzene & Steam
- Chlorinated Phenol Production
- Ion-exchange Resins
- Co-polymerization of Isobutylene & Styrene (Styrofoam)
- Chlorophenoxy Acetic Acids
- Acrylamide from sulfuric acid batch process

Intermediate Products

- Acetic Anhydride Monochlorobenzene Chloroacetic Acid
- Synthetic Brominated Indigo Process
- Phenylphenols
- Aniline Production (from ammonia & chlorobenzene)
- Butadiene
- Styrene/Butadiene latex
- Vinylidene Chloride Polymerization (Saran)
- Flake Pentachlorophenol
- Polystyrene
- 1,2-dibromo-3-chloropropane
- Acrylic Acid, Acrylamide, Polyacrylamides
- Phenylphosphate Insecticides
- Brominated Biphenyls
- Chlorinated Benzene

Final Products

- Bromides, Epsom salts
- Bleaching Powder
- Chloroform, Carbon Tetrachloride
- Calcium Sulfide & Lead Arsenates
- Synthetic Indigo
- Chlorine
- Dowicides (chlorophenol-based pesticides)
- Aspirin
- TCE, PCE
- Dowmetal (magnesium alloy)
- Paradow (p-dichlorobenzene)
- DowTherm (diphenyl and diphenyloxide)
- 1,1,1-TCA
- Ethocel (ethylcellulose - Dow's 1st plastic
- Styron (polystyrene)
- Synthetic Rubber
- Styrofoam
- 2,4-D Herbicide
- Estron (2,4,5-T brush killer)
- 2,4,5-T and Ester of 2,4-D
- 2,4,5-TP (Kuron or Silvex)
- Ronnel (insecticide)
- Dowpon & Dalapon Herbicide (2,2,-dichloropropionic acid
- Fumazone (1,2-dibromo-3-chloropropane)
- Dowanol Fluids
- Zytron (DMPA herbicide)
- Agent orange herbicide
- Dowacil
- Dursban (chlorpyrifos insecticide)
- Lorsban (chlorpyrifos insecticide)
- Propachlor (2-chloro-*N*-isopropylacetanilide)

Waste Management

- Wastes discharged directly to the Tittabawassee River
- Aqueous waste was managed using pond systems and discharged to TR during high flow period
- Wastewater treatment plant to treat phenolic waster
- General site wastewater treatment plant (WWTP) constructed within Midland Plan
- WWTP upgrade with T-ponds
- Steam strippers to reduce organic loading in WWTF
- WWTP tertiary effluent sand filters
- WWTP Carbon Upgrade
- RGIS System
- RGIS Upgrades
- Tar burners used to incinerate liquid organic tars
- Rotary kiln incineration of rubbish, waste solids, packs, liquid tars
- After-burner added to rotary kiln for combustion of chlorinated waste tars
- Ash landfilled
- Stockpiled
- 1925 Landfill
- Poseyville Landfill
- Salzburg Road Landfill
- Deep chemical disposal wells

Anthropogenic Influences in Tittabawassee Watershed

- Agricultural Development
- Tittabawase Boom Company Operations and Logging Era
- Dow Dam
- Fire
- Fire
- Evacuation of Green Point Channel
- Wolverine Power Company Hydroelectric Dams

Federal/ Environmental Statutes

- 1899 - Rivers & Harbors Act
- 1929 WRC Act 245
- 1948 Water Pollution Control Act
- 1972 Federal Water Polution Control Act
- 1956 WPCA Amendments
- 1963 Clean Air Act
- 1970 Clean Air Act
- 1990 Clean Air Act
- 1965 Water Quality Act
- 1965 Solid Waste Disposal Act
- 1969 NEPA
- 1970 WQI Act
- 1974 Safe Drinking Water Act
- 1976 RCRA
- 1984 RCRA HSWA Amendments (LDRs)
- 1976 TSCA
- 1980 CERCLA
- 1986 SARA
- 1986 EPCRA

ANN ARBOR TECHNICAL SERVICES, INC.

Revision 04/30/09

EXHIBIT II – 2

PCOI TECH MEMO

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TECHNICAL MEMORANDUM

To: Mr. Allan Taylor, MDEQ Waste and Hazardous Materials Division

From: Philip B. Simon, ATS
Peter M. Simon, ATS

Date: December 1, 2006

RE: PCOI/COI/TAL Evaluation – Target Analyte List Development
Tittabawassee River & Upper Saginaw River, Michigan
Midland Soils Investigation, Michigan

The Tittabawassee River Sampling and Analysis Plan (SAP, rev. 070706, section 5.1.1) identifies the seventeen federally regulated chlorinated dioxin and furan congeners as the primary Constituents of Interest (COI) for the ***GeoMorph***™ site characterization project. That section of the SAP also discusses the need to identify and develop data for other, secondary COI based on substances used or produced at the Dow Chemical Company Midland Plant (Midland Plant). This memorandum describes the process utilized to identify those secondary COI and develop Target Analyte Lists (TALs) to address them in the Tittabawassee River, Upper Saginaw River and Midland Soils site characterization projects.

Dow Master PCOI List

On June 1, 2006, Mr. Ben Baker of The Dow Chemical Company (Dow) submitted a document concerning this issue entitled *"Target Analyte List Development – Tittabawassee River and Floodplain."* This document contained a discussion draft Target Analyte List (TAL), and presented the methodology used to select the substances for this TAL from a master list of the chemicals used and produced at the Midland Plant over its 100+ years of operation as a chemical manufacturing facility. On June 23, 2006, ATS submitted on behalf of Dow electronic and paper copies of the chemical database assembled by Dow staff to generate the June 1, 2006 submittal. This database contains 802 line items and we are referring to it as the Dow "Master List."

Consultants in Chemistry & Environmental Science
290 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734/995-0995 Fax 734/995-3731

PCOI/COI/TAL Evaluation Process

Subsequent to that submittal, ATS and MDEQ worked collaboratively to develop a process to systematically evaluate each of the 802 references on the Master List, plus additional COI coming from other sources. The objective of this effort was to select substances that should be included on the final TALs for the Tittabawassee River, Upper Saginaw River and Midland Soils site characterizations. The process is detailed in the flow chart given in Attachment 1. Key definitions used in this process, and in RIWP and QAPP documents relating to these site characterizations are given in Attachment 2.

As shown in the process flow chart, this work initially involved crosschecking product compositions, chemical names, CAS numbers, and eliminating overlapping or redundant references. Identified information problems within the database were categorized as follows:

- "Redundant entries"
- "Multi-compound references"
- "CAS number reassigned"
- "Salt references"
- "Composition Uncertain"
- "ID Conflict" (CAS # versus chemical name)

A case narrative was prepared to address each reference falling into each of these categories. The first four case narrative categories ("Redundant entries," "Multi-compound references," "CAS number reassigned," and "Salt references") were resolved by ATS. The resolution for each line item is detailed in the corresponding case narrative, organized by Dow reference number in the Master List (see Attachment 3). The remaining two categories ("Composition Uncertain" and "ID Conflict") were referred back to Dow for resolution by the staff that entered the information (Attachment 4). The information problems for all but approximately 30 of these references have been resolved as of this writing. In some instances, resolution of case narrative items resulted in addition of substances to the database. A case narrative was created to keep track of such database additions (Attachment 5).

Polymers

Some of the materials referenced in the Master List were polymers, or polymer-based products. Because of the limited bioavailability of polymeric materials, and the general lack of environmental analytical methods for such macromolecules, ATS and MDEQ agreed to segregate those referenced, polymeric materials having an average molecular weight greater than 5,000 Daltons into the following case narrative for separate consideration:

- "Polymers (MW >5000)"

This case narrative category was referred to Dow for affirmation that the materials were, indeed, polymers of that size (see Attachment 4). Polymers with average molecular weight of less than 5,000 Daltons were included in the analytical methods evaluation. Larger polymers were excluded from methods evaluation at this time.

Site-Specific Monitoring "Positives"

To assure that contaminants showing up in biomonitoring of the Tittabawassee and Saginaw Rivers were appropriately considered in the site characterizations, ATS and MDEQ agreed to add all such biomonitoring "positives" to the COI database if they were not already present. Fish studies conducted in 1998 and 2002 were the primary source of this information, however other biomonitoring studies available at the time of this writing were also reviewed. The aggregate of these biomonitoring "positives" results in eight compounds being added to the database, as recorded in the following case narrative (Attachment 5):

- "Biomonitoring Positives - Database Additions"

In addition, to assure appropriate consideration of substances that may have been released to the Tittabawassee River through groundwater-related migration pathways prior to the installation of the Revetment Groundwater Intercept System (RGIS), monitoring data from the RGIS system were reviewed and all monitoring "positives" were identified. Any RGIS system monitoring "positive" substance not already in the database was added and recorded in the following case narrative:

- "RGIS System Positives – Database Additions"

Review of RGIS system monitoring data resulted in the addition of nine compounds to the database (Attachment 5).

Midland Soils PCOI/COI

The Midland Soils site characterization has a somewhat different set of COI to consider, focusing primarily on the air-release history of the Midland Plant. To address this, Dow staff assembled a list of PCOI anticipated from historical and current air-discharge sources including tar burners, waste incinerators, and others. This PCOI list included polynuclear aromatic hydrocarbons, chlorobenzenes, chlorophenols, chlorinated dioxins and furans, polychlorinated biphenyls, and all the substances reported by the facility under the United States Environmental Protection Agency (USEPA) SARA III

TRI reporting program. In addition, Dow staff included a list of approximately 200 compounds and TICs reported by USEPA as "Products of Incomplete Combustion (PICs)" from research regarding incineration disposal of halogenated chemical wastes. In total, this Midland Soils PCOI list contains references to 407 substances (Attachment 6).

The Midland Soils PCOI list was error-checked and reviewed to determine which substances were common with the Tittabawassee River/Saginaw River COI database. Those substances not already in the database were added, and recorded in the following case narrative:

- "Midland Soils COI – Database Additions"

This resulted in approximately 200 additional references in the COI database, approximately half of which are TICs from the USEPA PICs list (Attachment 5). Integrating the Midland Soils COIs into a common database with the Tittabawassee River/Saginaw River COIs allows the Dow Master List and derived COI database to be used for all three site characterizations, facilitating analytical method selection, development of TALs, and standardization of data quality objectives in project QAPPs.

COI Database

As shown on the process flow chart, the error-checked and edited Master List serves as the core database for COI evaluation and TAL development. The source lineage for all references in this database has been retained for audit purposes. It is anticipated that the COI database will be periodically updated to reflect new information developed during the site characterizations, and that it will be useful in future phases of work, including ecologic and human health risk analysis, and evaluation of corrective action alternatives. The current version of the database, in spreadsheet form as of this writing, is available on-line in the ***eProject***™ workspaces for the Tittabawassee River, Saginaw River and Midland Soils projects.

Analytical Methods Evaluation

One of the purposes of the COI database is to serve as the basis for evaluating which substances have available analytical methods and can be included in monitoring for site impact. To facilitate the analytical methods evaluation task, all the substances in the COI database were classified according to their elemental composition and chemical functionality, using the following groupings:

- Organochlorine compounds
- Organobromine compounds

- Other organohalogen compounds
- Organophophorus compounds
- Phenols, aromatic alcohols and aldehydes
- Organic acids, and corresponding salts
- Amines and other organic bases, and corresponding salts
- Polynuclear Aromatic Hydrocarbons, and derivatives
- Aliphatic and aromatic hydrocarbons, alcohols, ethers, carbonyl compounds, and other heteromolecules
- Organometallic compounds
- Metals and other inorganic compounds

Each substance was coded in the COI database so that the queries could be made to review classes of chemicals with analytical chemistry commonality—that is, they could be addressed with the same analytical method. In many cases, substances fell into multiple chemical classes (e.g. pentachlorophenol is both an organochlorine compound, and a phenolic compound; chloroacetic acid is both an organochlorine compound and an organic acid; tryptophan is both an organic acid and an organic base).

To determine the availability of analytical methods, current versions of all U.S. Environmental Protection Agency SW-846 RCRA methods were considered in the analytical methods evaluation process. Each substance was evaluated separately to determine whether it was a standard target analyte in each RCRA analytical method suitable for that COI group, or whether it could be included either as an extended target analyte or as a site-specific tentatively identified compound (TIC) within the conditions of the method. At the same time, each substance was also coded to indicate whether USEPA has designated it for RCRA Appendix IX profiling.

Substances that are standard target analytes in USEPA RCRA methods were coded in the database with the letter “T”. In those cases where USEPA has indicated that method conditions can be extended to include a particular substance, or if, based on structure/activity considerations, there is a possibility the substance could be included as a target analyte the substance was coded with the designation “?”. In a number of circumstances USEPA has designated a substance as a target analyte in one method (e.g. tetrachlorophenol [25167-83-3] in USEPA 8041), but not in another similar method applicable to that chemical class (e.g. USEPA 8270). If USEPA has designated the substance for RCRA Appendix IX profiling, the substance was coded with an “X” under the Appendix IX heading. For certain substances, no suitable USEPA analytical methods exist. These COIs were coded with an “X” under the “No EPA Method” heading.

Evaluation of Site Positives/Designation of Extended Target Analytes

Once standard target compounds were identified in the COI database, the lists of “Biomonitoring Positives” and “RGIS System Monitoring Positives” were reviewed to

assure that all such compounds were included as fully calibrated, target analytes in one or more analytical methods. In those cases where these site positive substances were not standard USEPA target analytes, they were coded in the database with the designation "E" under the appropriate analytical method headings so that they would be included as extended target analytes in the TALs.

Tentatively Identified Compounds

All analytical methods referenced in the TALs specify mass spectrometric detection, primarily because of the selectivity this technique brings and its potential for post-acquisition data analysis. Ion current chromatograms of multi-compound analytical methods utilizing mass spectrometric detection (e.g. USEPA 8260 and 8270) often contain useful qualitative and quantitative information for substances beyond the fully-calibrated target analytes. Qualitative and quantitative information about the substances responsible for "non-target peaks" in such chromatograms can be included in the laboratory data reports if the peaks are handled using the procedure for Tentatively Identified Compounds (TICs), as specified in USEPA Methods 8260B and 8270C (section 7.6.2 in both methods). Post-acquisition data analysis for TICs can be optimized for site-specific COIs by identifying those compounds to the analyst as site-specific TICs in the TALs.

ATS and MDEQ have agreed upon a specification for treatment of TIC information, and incorporating TIC data into project data reports (Attachment 7). This specification will be employed for all Appendix IX and other secondary COI sample analyses, allowing post-acquisition data analysis for TICs in all samples analyzed with secondary COI methods. TICs that show up analytically in analysis for secondary COI will be considered further for reclassification as extended target analytes in subsequent phases of site work. Such consideration will take into account additional factors including environmental persistence, toxicity, and availability of reference materials for analytical calibration, among others.

Environmental Filters/ Designation of Site-Specific TICs

To determine which non-target COI substances warrant classification as site-specific TICs, ATS and MDEQ agreed to use certain environmentally relevant physical and chemical properties to assess the likelihood of these substances occurring as sediment or soil contaminants. These properties included:

- Hydrolytic instability/reactivity (unstable in contact with water, or having a very short hydrolytic half-life)
- Volatility (currently defined empirically by USEPA 8260 retention time; threshold for concern: retention time greater than bromoform)

- Aqueous solubility (threshold for concern: 1.0 g/L or less, at 20 degrees C)
- Octanol-water partition coefficient (threshold for concern: KOW approximately 3.0, or greater)

Except in continuing-source circumstances (e.g. near-plant sampling locations), substances with substantial hydrolytic reactivity and/or volatility were considered unlikely prospects as sediment and soil contaminants, given atmospheric or water-borne release pathways. Conversely, substances with hydrolytic stability, low volatility, low aqueous solubility and/or elevated octanol-water partition coefficient, were considered likely to occur in sediment or soil contaminant deposition zones.

ATS and MDEQ staff researched these physical and chemical properties for all COI coded "No USEPA Methods" in the COI database. The data were reviewed collaboratively, and non-target COI substances considered potentially useful as indicators of sediment or soil contamination, based on the properties and thresholds given above, were classified as site-specific TICs. Site-specific TICs are listed in a special section of each method TAL.

Method-Specific Target Analyte Lists

TALs were prepared for each analytical method by extracting the database based on the coding system described above. Versions of these TALs current as of this writing are given in Attachment 8. These TALs have been incorporated into the current revision of the Quality Assurance Project Plans (QAPPs). As with the COI database and QAPP documents, it is anticipated that the TALs will change as the investigations proceed. Substances may be added, deleted and/or reclassified, based on study findings. Revisions of the TALs will be reflected in formal updates to the applicable QAPP.

ATTACHMENT 1

PCOI/COI/TAL Process Flow Chart

PCOI/COI/TAL Process Flowchart

Tittabawassee River and Saginaw River Project
Midland Soils Project

Dow Master List (PCOI)

Error Check & Correct

Resolve By ATS or Dow

Case Narratives
- Redundant Entries
- Multi-Compound References
- CAS Number Reassigned
- Salts
- Biomonitoring Positives – Database Additions
- RGIS System Positives – Database Additions
- Midland Soils COI – Database Additions
- Other Database Additions

Resolve By Dow

Case Narratives
- Composition Uncertain
- Identification Conflict
- Polymers

Resolved

Add To COI Database

COI Database

Resolved

Add To COI Database

Resolved?

- Polymers (MW>5000)
- Composition Uncertain (unresolved)

Excluded References

Sort By Chemical Class

Analytical Methods Evaluation

Possible USEPA Methods

Extended Target Analytes & TICs

No USEPA Methods

- No Available Methods

Excluded References

Standard Methods & Target Analytes

- USEPA Appendix IX
- USEPA 8260 (Volatile Organics)
- USEPA 8270 (Semi-Volatile Organics)
- USEPA 1613B (Dioxins & Furans)
- METHOD 1613-TRP/RT (Dioxins & Furans)
- USEPA 1668A (Polychlorinated Biphenyls)
- USEPA 8041 (Phenols)
- USEPA 8081 (Chlorinated Pesticides)
- USEPA 8082 (Polychlorinated Biphenyls)
- USEPA 8121 (Chlorinated Hydrocarbons)
- USEPA 8141 (Organophosphorus Compounds)
- USEPA 8151 (Chlorinated Herbicides)
- USEPA 6010/6020 (Metals)
- USEPA 7471 (Mercury)
- Other USEPA Methods

Evaluate For Reported Site Positives
- Biomonitoring Studies
- RGIS System Monitoring

All Site Positives Included as Target Analytes

(Add As Extended Target Analyte if Necessary)

Evaluate Environmental Filters
- Volatility (8260 RRT > $CHBr_3$)
- Aqueous Solubility (<1 g/L)
- KOW (>3.0)

Trigger One or More Filters?

Handle As Site-Specific TIC

Pass All Filters

QAPP Target Analyte Tables
- Standard Target Analytes
- Extended Target Analytes
- Site-Specific TIC's
- Other TIC's

Excluded COI

Excluded References

PCOI/COI/TAL Technical Memo

ANN ARBOR TECHNICAL SERVICES, INC.

Rev. 11/29/2006

ATTACHMENT 2

Definitions

Definitions:

PCOI: Potential Constituents of Interest

The PCOI for this project consist of those substances on the master list of chemicals submitted by The Dow Chemical Company to MDEQ on June 1, 2006, plus those substances found in biomonitoring of the Tittabawassee and Saginaw Rivers, and routine monitoring of the RGIS system. It is recognized that not all substances on the Dow master list will have significance as environmental contaminants, nor that the substances found in biomonitoring of the two rivers are necessarily related to Dow operations in Midland.

COI: Constituents of Interest

The lists of COI for this project are derived from the PCOI, and reflect those substances that are likely to have been released to the environment during the approximately 110 year period of interest for the study. Because of the large number of PCOI, the COI lists have been organized by chemical class to facilitate evaluation of physical/chemical properties and selection of analytical methods, and therefore may or may not be included on the TALs.

TAL: Target Analyte List

The Target Analyte Lists are compilations of those substances (elements or chemicals) that will be analyzed in samples from the study. TALs are method specific, and are integral components of the project QAPP and method SOPs. Together, SOPs and TALs constitute the work instructions for laboratories generating analytical data for site characterization. Because of the large number of COI and project samples, not all samples will be analyzed for all TALs.

The TAL for a specific method may contain compounds in three categories: (1) Standard Target Analytes, which are those substances for which the method was originally developed and validated; (2) Extended Target Analytes, which are specific substances of interest for which the method has been performance tested, validated, and calibrated using the same criteria as for Standard Target Analytes; and, (3) Site-Specific TICs, which are specific substances of interest for which the method is likely to useful for detection and semi-quantitation.

TIC: Tentatively Identified Compounds & Site-Specific TICs

The ion current chromatograms of multi-compound analytical methods based upon GC/MS or LC/MS (e.g. USEPA 8260 and 8270) can contain information beyond the fully-calibrated target analytes. Qualitative and quantitative information about the substances responsible for non-target peaks in such chromatograms can be included in the laboratory data reports if the peaks are handled using the procedure for Tentatively Identified Compounds (TIC) as described in USEPA Methods 8260B and 8270C (section 7.6.2 in both methods). Post-run data analysis for TICs can be optimized for site-specific COIs by identifying those compounds to the analyst as Site-Specific TICs in the TALs.

ATTACHMENT 3

Case Narratives – Resolved By ATS
Revision Date: November 27, 2006

- "Redundant entries"
- "Multi-compound references"
- "CAS number reassigned"
- "Salt references"

CASE NARRATIVE - Redundant Entries

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
433	67-72-1	Hexachloroethane	redundant entry. See Dow # 428 [67-72-1]
293	71-55-6	Chlorothene	redundant entry. See Dow # 16 [71-55-6], formerly [74552-83-3]
512	71-55-6	Methyl Chloroform	redundant entry. See Dow # 16 [71-55-6], formerly [74552-83-3]
499	74-83-9	Bromomethane	redundant entry. See Dow # 498 [74-83-9]
545	74-83-9	N/A	redundant entry. See Dow # 498 [74-83-9]
500	74-87-3	Methyl Chloride	redundant entry. See Dow # 287 [74-87-3]
284	74-97-5	Chlorobromomethane	redundant entry. See Dow # 233 [74-97-5]; formerly [83847-49-8]
515	74-97-5	Methylene Chlorobromide	redundant entry. See Dow # 233 [74-97-5]; formerly [83847-49-8]
388	75-00-3	Ethyl Chloride	redundant entry. See Dow # 285 [75-00-3]
514	75-09-2	Methylene Chloride	redundant entry. See Dow #325 [75-09-2]
161	79-06-1	Acrylamide	redundant entry. See Dow # 160 [79-06-1]
606	79-06-1	Acrlamide (Paper Filler)	DOW RESOLVED. Redundant entry See Dow #160.
157	79-34-5	Acetylene tetrachloride	redundant entry. See Dow # 17 [79-34-5]
756	79-34-5	1,1,2,2-Tetrachloroethane	redundant entry. See Dow # 17 [79-34-5]
226	80-05-7	Bisphenol-A	redundant entry. See Dow # 128 [80-05-7]
353	88-85-7	Dinitro-o-sec-butylphenol	redundant entry. See Dow # 351 [88-85-7]
357	92-52-4	Diphenyl	redundant entry. See Dow # 221 [92-52-4]
608	92-69-3	[1,1'-Biphenyl]-4-ol	redundant entry. See Dow # 682 [92-69-3]
81	93-76-5	2,4,5-Trichlorophenoxyacetic acid	redundant entry. See Dow # 65 [93-76-5]
346	93-76-5	Dimethylamine salts of 2,4-D abd 2,4,5-TP	redundant entry. See Dow # 65 [93-76-5]
68	94-75-7	2-(2,4-Dichlorophenoxy)acetic acid	redundant entry. See Dow # 67 [94-75-7]
84	94-75-7	2-(2,4-Dichlorophenoxy)acetic acid	redundant entry. See Dow # 67 [94-75-7]
86	94-75-7	2-(2,4-Dichlorophenoxy)acetic acid	redundant entry. See Dow # 67 [94-75-7]
589	95-50-1	ortho-Chlorobenzene	redundant entry. See Dow # 47 [95-50-1]
602	95-50-1	ortho-dichlorobenzene	redundant entry. See Dow # 47 [95-50-1]
590	95-57-8	ortho-chlorophenol	redundant entry. See Dow # 102 [95-57-8]
520	96-34-4	Monochloromethyl acetate	redundant entry. See Dow # 501 [96-34-4]
454	98-82-8	Isopropylbenzene	redundant entry. See Dow # 453 [98-82-8]
393	100-41-4	Ethylbenzene	redundant entry. See Dow # 386 [100-41-4]
59	100-42-5	100-42-5	DOW RESOLVED; redundant entry see Dow # 730 [100-42-5]
524	100-42-5	Monomeric Styrene	redundant entry. See Dow # 730 [100-42-5]
729	100-42-5	Styrene	DOW AFFIRMED. polymer (MW>5000) and redundant see Dow #730.
362	101-84-8	Diphenylaniline (Diphenyl oxide)	multi-compound listing for Diphenylaniline and Diphenyl oxide; AND redundant entry. See Dow # 358 [101-84-8]
370	101-84-8	DPO (5,5-diphenyloxazolidine-2,4-dione)	DOW RESOLVED.redundant entry see Dow #358 [101-84-8].

CASE NARRATIVE - Redundant Entries

736	101-84-8	Substituted phenyl ether	redundant entry. See Dow # 358 [101-84-8]
629	104-38-1	Phenolic polyglycols	DOW RESOLVED and redundant. See Dow #628.
607	106-48-9	4-chlorophenol (Para Chlo Phenol)	DOW RESOLVED and redundant. See Dow #614
401	106-93-4	1,2-Dibromoethane	redundant entry.See Dow # 46 [106-93-4]; formerly [8003-07-4]
402	106-93-4	1,2-Dibromoethane	redundant entry.See Dow # 46 [106-93-4]; formerly [8003-07-4]
403	106-93-4	Ethylene Dibromide	redundant entry.See Dow # 46 [106-93-4]; formerly [8003-07-4]
398	107-06-2	Ethylene chloride	redundant entry. See Dow # 48 [107-06-2, formerly [52399-93-6]
324	111-44-4	Dichloroethyl ether	redundant entry. See Dow # 224 [111-44-4]
407	122-99-6	Ethylene Glycol Phenyl Ether	former [56257-90-0] has been replaced with [122-99-6] for Ethylene Glycol Phenyl Ether; See Dow # 114
624	127-18-4	Perc (Perchloroethylene)	redundant entry. See Dow # 18 [127-18-4]
757	127-18-4	Tetrachloroethylene	redundant entry. See Dow # 18 [127-18-4]
568	317-83-9	2-Cyclohexyl-4,6-dinitrophenol dicyclohexylamine salt	redundant entry. See Dow # 11 [317-83-9]
130	534-52-1	2-Methyl-4,6-dinitrophenol	redundant entry. See Dow # 111 [534-52-1]
374	1321-74-0	DVB (Divinylbenzene)	redundant entry. See Dow # 367 [1321-74-0]
101	1918-16-7		redundant entry. See Dow # 684 [1918-16-7]
77	1970-40-7	2,3,5-trichloro-1H-pyridin-4-one	redundant entry see Dow # 76 [1970-40-7]
329	2921-88-2	O,O-Diethyl O-(3,5,6-trichloro-2-pyridinyl) ester phosphorothioic acid	redundant entry. See Dow # 294 [2921-88-2], formerly [39475-55-3]
406	3775-85-7	Ethylene glycol	redundant; see Dow #405
271	5017-45-8	chlorbenzol	redundant entry; See Dow #282 [108-90-7]
698	6027-02-7	Quinoline	redundant entry see Dow #436 [6027-02-7]
470	7439-95-4	Magnesium	redundant entry; see Dow #469 [7439-95-4]
472	7439-95-4	Magnesium alloy metal	redundant entry; see Dow #469 [7439-95-4]
479	7439-95-4	Magnesium metal	redundant entry. See Dow #469 [7439-95-4]
480	7439-95-4	Magnesium metal sticks	redundant entry; see Dow #469 [7439-95-4]
646	7439-95-4	Pistons and castings(Magnesium)	redundant entry; see Dow #469 [7439-95-4]
526	7647-01-0	Muriatic acid	redundant entry. See Dow # 424 [7647-01-0]
187	7664-41-7	Anhydrous Ammonia	redundant entry. See Dow #181 [7664-41-7]
53	8022-76-2	1,3-dichloroprop-1-ene	reduntant entry See Dow # 52 [8022-76-2]
54	8022-76-2	1,3-dichloropropene	reduntant entry See Dow # 52 [8022-76-2]
368	8071-51-0	2-methyl-4,6-dinitrophenol	DOW RESOLVED [8071-51-0] and [534-52-1]for chemical name 2-methyl-4,6-dinitrophenol; REDUNDANT see Dow #111 [534-52-1]
289	25167-80-0	2-Chlorophenol	DOW RESOLVED conflicting [25167-80-0] and [95-57-8] for chlorophenol; REDUNDANT; see Dow #590.
365	34590-94-8	Dipropylene glycol methyl ether	redundant entry. See Dow # 364 [34590-94-8]
519	50717-45-8	Monochlorobenzene	DOW RESOLVED [5017-45-8] and [108-90-7]for monochlorobenzene; REDUNDANT see Dow # 282 [108-90-7]
63	58769-19-0	1-methoxypropan-2-ol	redundant entry. See Dow # 62 [58769-19-0]
666	63625-56-9	Propylene glycol	DOW RESOLVED and redundant. See Dow #685

CASE NARRATIVE - Redundant Entries

689	63625-56-9	Propylene glycol	DOW RESOLVED and redundant entry. See Dow # 685 [57-55-6]; formerly [63625-56-9]
690	63625-56-9	Propylene Glycol	redundant entry. See Dow # 685 [57-55-6]; formerly [63625-56-9]
733	79637-11-9	Styrene P-100	redundant entry. See Dow # 729 [79637-11-9]
255	N/A	Carbon disulfide	redundant entry. See Dow # 254 [75-15-0]
471	N/A	Magnesium alloy	redundant entry; see Dow #469 [7439-95-4]
482	N/A	Magnesium ribbon anode	redundant entry; see Dow #469 [7439-95-4]
517	N/A	Mixture of Ethylene oxide and propylene oxide	DOW RESOLVED and redundant entry. See Dow #516
738	N/A	Sulphur	redundant entry. See Dow # 739 [81032-32-8]
382			redundant entry. See Dow # 381 [9004-57-3]
383			redundant entry. See Dow # 381 [9004-57-3]
659		Polychlorinated diphenyl ethers	DOW RESOLVED and redundant entry. See Dow# 274
660		Polychlorinated diphenyl sulfides	DOW RESOLVED and redundant entry. See Dow# 275
662		Polycyclic Aromatic Compounds	DOW RESOLVED and redundant entry. See Dow# 278
776			redundant entry. See Dow # 16 [71-55-6]
781			redundant entry. See Dow # 771 [1918-02-1]
793			redundant entry. See Dow # 22 [75-35-4]
795			redundant entry. See Dow # 467 [1330-20-7]

CASE NARRATIVE - Multi-Compound Listings

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
362	101-84-8	Diphenylaniline (Diphenyl oxide)	multi-compound listing for Diphenylaniline and Diphenyl oxide; AND redundant entry. See Dow # 358 [101-84-8]
168	102-71-6	Alkanolamines	DOW RESOLVED. Multi compound listing. Individual components are Dow #208 triethanolamine [102-71-6] and monoethanolamine [9007-33-4] Added to Master List
637	8004-13-5	Phenylbenzene	multi-compound listing. Indivudual components Dow #357 Biphenyl [92-52-4] and Dow #358 Diphenyl ether [101-84-8] are included.
85	50884-30-5	2,4-Dichlorophenol/2,4-Dichlorophenol potassium salt	multi-compound listing [120-83-2] for 2,4-Dichlorophenol added to master list
20	62587-63-7	1,1'-Biphenyl,phenoxy-, mixt. with 1,1'-oxybis[benzene]	multi-compound listing. Individual components are Dow #358 Diphenyl ether [101-84-8] and 1,1-Biphenyl, phenoxy [28984-89-6] added to Master List, are included.
252	97794-26-8	Caprylic/Capric Triglyceride - DDS 223	DOW RESOLVED.multi compound listing. Individual components are decanoic acid [334-48-5], octanoic acid [124-07-2], propane-1,2,3-triol [no CAS] all Added to Master List.
55	N/A		multi-compound listing. Individual compounds Dow #54 [8022-76-2] 1,3-dichloropropene, Dow #49 [78-87-5] 1,2-dichloropropane, 2,3-dichloropropene and 3,3-dichloropropene are added to Master List.
142	N/A	4-tert-butyl catechol + n-butyl bromide	DOW RESOLVED multi compound listing. Individual components are Dow #752 [98-29-3] 4-t-butyl catechol and [109-65-9] n-butyl bromide Added to Master List.
155	N/A	Acetylene Bromide	DOW RESOLVED. Dow #156 [79-27-6] for 1,1,2,2-Tetrabromoethane or [540-49-8] for 1,2-dibromoethene Added to Master List.
167	N/A	Acrylonitrile + Vinylidene Chloride	DOW RESOLVED. Multi-compound listing individual components are Dow # 165 [63908-52-1] acrylonitrile and Dow # 22 [75-35-4] 1,1-dichloroethene.
310	N/A	D.N. Sulphur Dust No. 10	RESOLVED. Multi compound listing. Individual components are Dow #350 [131-89-5] and Dow #739 [7704-34-9].

CASE NARRATIVE - Multi-Compound Listings

369	N/A	Dowanol EB, Triethanolamine, Dowfax 2A1, Neutronyx-600 (Dowfax 9N9), Deodorized kerosene and Versene	DOW RESOLVED. Multi compound listing. Individual components are [12626-49-2] and [26571-11-9] Added to Master List, Dow # 97 [52663-57-7] and Dow # 208 [102-71-6], and [60-00-4] Added to Master List.
427	N/A	Heptane + Ethyl Ether + Carbon dioxide	DOW RESOLVED, multi-compound listing individual components are [142-82-5] heptane, [7578-39-4] ethyl ether, [124-38-9] carbon dioxide all Added to Master List.
456	N/A	Jojoba Ester - High Internal Phase (Myristic Acid, Palmetic Acid, Oleic Acid, Eicosenic Acid, Erucic Acid, Nervonic Acid, Eicosenol, Docosenol, Tetracosenol)	DOW RESOLVED. Multi-compound listing individual components are [544-63-8] myristic acid, [66321-94-6] palmitic acid, [112-80-1] oleic acid, [506-30-9] eicosenic acid, [112-86-7] eruc+AG808ic acid, [506-37-6] nervonic acid, [629-96-9] eiconsenol, [506-51-4] tetracosenol, [30303-65-2]docosenal, all Added to Master List.
516	N/A	Mixture of Ethylene oxide and propylene oxide	DOW RESOLVED. Multi-compound listing individual components are [99932-75-9] Added to Master List ethylene oxide and Dow # 693 [75-56-9] propylene oxide.
534	N/A	Aromatic Eutectic Blend	DOW RESOLVED. Multi-compound listing individual components are Dow # 358 [101-84-8] diphenyl ether and Dow # 221 [92-52-4] diphenyl.
535	N/A	Aromatics	DOW RESOLVED. Multi compound listing individual components are Dow # 209 [71-43-2] benzene, Dow # 770 [108-88-3] toluene, Dow # 386 [100-41-4] ethylbenzene, Dow # 467 [1330-20-7] xylenes.
560	N/A	Sylvenol	DOW RESOLVED. multi-compound listing individual components are [28231-03-0] Cedrenol Added to Master List, Dow #18 [127-18-4] Tetrachloroethene, [8041-89-2] Retrol Added to Master List
627	N/A	Phenol Sulphonates	DOW RESOLVED. Multi-compound listing individual components are salts [825-90-1] parahydroxybenzene sulfonic acid and [127-82-2] zinc phenyl sulphonate. See Dow #705 (sodium) and Dow #797 (zinc).
229			Multi-compound listing. Individual compounds Dow #245 Calcium Chloride [7440-70-2], Dow #672 Potassium Chloride [7440-09-7], Dow #469 Magnesium Chloride [7439-95-4], Dow #705 Sodium Chloride [12258-98-9], Dow #230 Bromine [7726-95-6], Dow #443 Iodine [7553-56-2] are included.
258			multi-compound listing. Individual components Dow #258 Carbon tetrachloride [56-23-5], Dow #48 1,2 Dichloroethane [107-06-2]. No [CAS#] for 1,2-Dibromomethane added to Conflict ID Category

CASE NARRATIVE - Multi-Compound Listings

259			multi-compound listing. Individual components Dow #258 Carbon tetrachloride [56-23-5], Dow #404 Ethylene dichloride [52399-93-6], Dow #401 Ethylene Dibromide [106-93-4] are included.
260			multi-compound listing. Individual components Dow #258 carbon tetrachloride [56-23-5], Dow #255 Carbon Disulfide [75-15-0], Dow #498 Methyl bromide [74-83-9] are included.
302			multi-compound listing. Individual compounds Dow #301 copper [7440-50-8], Dow #204 arsenic [7440-38-2] are included.
543		Dow Mill and Bin Spray	DOW RESOLVED. multi-compound listing individual components are Dow # 417[58-89-9] gamma-BHC, [57157-84-3] Atlox 1045A Added to Mater List, Dow # 451 [78-59-1]Isophoreone, Dow # 467 [1330-20-7] xylene.
544		Dow Oven Cleaner	DOW RESOLVED. Multi-compound listing individual componests are Dow #325 [75-09-2] methylene chloride, [no CAS#] paraffin, Dow # 770[108-88-3] toluene, Dow # [9968-59-2] methocel, Dow # 491 [67-56-1] methanol, [35365-94-7] triethyl ammonium phosphate and [9007-33-4] monethanolamine Added to Master List.
566		Naptha solvent + Toluene + Dowanol EB - ethylene glycol + mono-n-butyl ether	DOW RESOLVED. multi-compound lisiting individual components are [no CAS #] Naptha solvent, Dow #770 [108-88-3]Toluene, [111-76-2] Dowanol EB added to Master List.
572			multi-element listing. Individual components Dow #571 nickel [8049-31-8], Dow #245 calcium [7440-70-2], Dow # 295 chromium [7440-47-3] are included.
594		Octyl Methoxycinnamate + Octyl Salicylate + Oxybenzone ("Sunscreens")	DOW RESOLVED. Multi-compound listing individual components are Dow #593 [5466-77-3} octyl methoxycinnamate , [118-60-5] octyl salicylalte Added to Master List, [131-57-7] oxybenzone Added to Master List.
631		Phenoxy herbicides	DOW RESOLVED. General reference to Dow #67 [94-75-7] 2,4-D, Dow # 66[93-72-1] 2,4,5-TP, Dow # 65 [93-76-5] 2,4-T.
648		Plasticizers (Phthalates)	DOW RESOLVED. General reference to Dow #225 [117-81-7 bis(2-ethylhexyl) phthalate, Dow # 355[117-84-0]di-n-octyl phthalate, Dow # 342 [131-11-3] dimethyl phthalalte.
662		Polycyclic Aromatic Compounds	DOW RESOLVED and redundant entry. See Dow# 278
783		Phosphoric acid, isodecyl diphenylester, mixt. with triphenyl phosphate	RESOLVED. Multi-compound listing individual components are[115-86-6] triphenylphospahte and [29761-21-5] isodecyldiphenylphosphate ester both Added to Master List.

CASE NARRATIVE - CAS # CHANGES

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
415	50-00-0	Formaldehyde	former [8013-13-6] has been replaced with [50-00-0] for Formaldehyde
206	50-78-2	2-(Acetyloxy) benzoic acid	former [98201-60-6] has been replaced with [50-78-2] for Aspirin (2-Acetyloxy benzoic acid)
104	51-05-8	Benzoic acid, 4-amino-, 2-(diethylamino)ethyl ester, monohydrochloride	former [8023-03-8] has been replaced with [51-05-8] for 2-diethylaminoethyl 4-aminobenzoate
758	56-23-5	Tetrachloromethane	[8068-85-7] not in registry; [56-23-5]may be correct for Tetrachloromethane
420	56-40-6	Glycine	former [87867-94-5] has been replaced with [56-40-6] for Glycine
419	56-81-5	Glycerine	former [8013-25-0] has been replaced with [56-81-5] for glycerine
685	57-55-6	Propane-1,2-diol	former [63625-56-9] has been replaced with [57-55-6] for propane-1,2-diol
636	63-91-2	L-Phenylalanine	former [3617-44-5] has been replaced with [63-91-2] for L-phenylalanine
763	64-02-8	Glycine, N,N'-1,2-ethanediylbis[N-(carboxymethyl)-, tetrasodium salt	former [8013-51-2] hasa been replaced with [64-02-8] for Glycine, N,N'-1,2-ethanediylbis(N-carboxymethyl)-tetrasodium salt
150	64-19-7	Acetic acid	former [77671-22-8] has been replaced with [64-19-7] for acetic acid
217	65-85-0	Benzoic acid	former [8013-63-6] has been replaced with [65-85-0] for benzoic acid
286	67-66-3	Chloroform	former [8013-54-5] has been replaced with [67-66-3] for chloroform
439	69-72-7	Hydroxybenzoic acid	DOW RESOLVED. [69-72-7] for hydroxybenzoic acid
434	70-30-4	2,2'-Methylenebis[3,4,6-trichloro]phenol	former [8054-98-6] has been replaced with [70-30-4] for hexachlorophene
293	71-55-6	Chlorothene	redundant entry. See Dow # 16 [71-55-6], formerly [74552-83-3]
512	71-55-6	Methyl Chloroform	redundant entry. See Dow # 16 [71-55-6], formerly [74552-83-3]
96	72-18-4	(S)-2-Amino-3-methyl-butanoic acid	former [7004-03-7] has been replaced with [72-18-4] for 2-amino-3-methyl-butanoic acidglycerine
785	73-22-3	L-Tryptophan	former [80206-30-0] has been replaced with [73-22-3] for L-Tryptophan
203	74-79-3	Arginine	former[7004-12-8] has been replaced with [50-78-2] for arginine
395	74-85-1	Ethylene	former [87701-65-3] has been replaced with [74-85-1] for ethene
408	75-21-8	Ethylene Oxide	former [99932-75-9] has been replaced with [75-21-8] for ethylene oxide

CASE NARRATIVE - CAS # CHANGES

686	79-09-4	Propionic acid	conflict [69806-86-6]not in registry; [79-09-4] for Propionic acid may be correct
391	79-11-8	Chloracetic acid, ethyl ester	DOW RESOLVED. Former [763-69-9] replaced with [79-11-8] and name changed.
555	79-11-8	chloroacetic acid, ethyl ester (Lonex)	DOW RESOLVED and redundant entry. See Dow #521
766	80-68-2	Threonine	conflict [632-20-2]not in registry; [80-68-2] for Threonine may be correct
559	87-84-3	Pentabromochlorocyclohexane (SE-651)	DOW RESOLVED. [79-11-8] for pentabromochlorocyclohexane
603	89-72-5	2-(1-Methylpropyl)phenol	former [96346-15-5] has been replaced with [89-72-5] for o-sec-butylphenol
630	92-84-2	10H-Phenothiazine	conflict [117-89-5]not in registry; [92-84-2] for Phenothiazine may be correct
524	100-42-5	Monomeric Styrene	former [79637-11-9] replaced with [100-42-5]. Redundant entry See Dow # 730 [100-42-5]
730	100-42-5	Styrene	former [79637-11-9] replaced with [100-42-5] for Styrene
729	100-42-5	Styrene	DOW AFFIRMED. polymer (MW>5000) and redundant see Dow #730. Former [79637-11-9] replaced with [100-42-5] for styrene.
584	100-75-4	N-Nitrosopiperidine	former [68374-62-9] has ben replaced with [100-75-4] for N-nitrosopiperdine
363	102-06-7	Diphenylguanidine	former [55556-10-0] has been replaced with [102-06-7] for diphenylguanidine
709	106-25-2	(z)-3,7-dimethyl-2,6-octadiene-1 ol (Secondary sesquiterpene alcohol or Nearasol)	DOW AFFIRMED. [106-25-2] for Secondary sesquiterpene alcohol
614	106-48-9	4-Chlorophenol	conflict; [1193-00-6]not in registry; [106-48-9] may be correct for 4-Chlorophenol
377	106-89-8	Chloromethyloxirane	former [13403-37-7] has been replaced with [106-89-8] for epichlorohydrin
396	106-93-4	Ethylene bromide	former [8003-07-4] replaced with [106-93-4] for Ethylene bromide
50	106-99-0	1,3-Butadiene	former [130983-70-9] replaced with [106-99-0] for 1,3-Butadiene
238	106-99-0	1,3-Butadiene	DOW RESOLVED [106-99-0] for 1,3-Butadiene
404	107-06-2	Ethylene dichloride	former [52399-93-6] replaced with [107-06-2] for Ethylene dichloride
397	107-07-3	2-Chloroethanol	former [1867-09-0] has been replaces with [107-07-3] for 2-chloroethanol
165	107-13-1	Acrylonitrile	former [63908-52-1] has been replaced with [107-13-1] for Acrylonitrile
691	107-98-2	Propylene Glycol Methyl Ether	DOW RESOLVED. former [89024-56-6] for Propylene glycol methyl ether has been replaced with [107-98-2]
626	108-95-2	Phenol	former [8002-07-1] has been replaced with [108-95-2] for phenol
116	109-06-8	2-Methylpyridine	former [82005-07-0] has been replaced with [109-06-8] for 2-methylpyridine
570	110-54-3	N-Hexane	former [8031-34-3] has been replaced with [110-54-3] for N-Hexane
644	110-85-0	Piperazine	former [81546-15-8] replaced with [110-85-0] for Piperazine

CASE NARRATIVE - CAS # CHANGES

336	110-97-4	1,1'-Iminobis-2-propanol	former [1335-54-2] has been replaced with [110-97-4] for 1,1'-Iminobis-2-propanol
328	111-42-2	2,2'-Iminobisethanol	former [8033-73-6] has been replaced with [111-42-2] for Diethanolamine
333	111-46-6	Diethylene Glycol	former [4669-26-5] has been replaced with [111-46-6] for Diethylene Glycol
779	112-27-6	Triethylene glycol	former [676-18-6] has been replaced with [112-27-6] for Triethylene glycol
334	112-34-5	Diethylene glycol butyl ether	former [210818-08-9] has been replaced with [112-34-5] for Diethylene glycol butyl ether
687	115-07-1	Propylene	former [676-63-1] has been replaced with [115-07-1] for Propylene
198	118-92-3	2-Aminobenzoic acid	former [80206-34-4] has been replaced with [118-92-3] for 2-Aminobenzoic acid
509	119-36-8	Methyl salicylate (Oil of wintergreen)	former [8024-54-2] has been replaced with [119-36-8] for Methyl salicylate
356	120-07-0	Diethoxy Aniline (Dioxy Diethyl Aniline)	DOW RESOLVED. [120-07-0] for diethoxy aniline.
455	120-58-1	Isosafrole	former [191281-03-5] has been replaced with [120-58-1] for Isosafrole
263	120-80-9	1,2-Benzenediol	former [37349-32-9] has been replaced with [120-80-9] for Catechol
787	121-33-5	Vanillin	former [8014-42-4] has been replaced with [121-33-5] for Vanillin
114	122-99-6	2-phenoxyethanol	former [56257-90-0] has been replaced with [122-99-6] for 2-phenoxyphenol
407	122-99-6	Ethylene Glycol Phenyl Ether	former [56257-90-0] has been replaced with [122-99-6] for Ethylene Glycol Phenyl Ether; See Dow # 114
438	123-31-9	Hydroquinone	former [8027-02-9] has been replaced with [23-31-9] for Hydroquinone
696	129-00-0	Pyrene	former [76165-23-6] has been replaced with [129-00-0] for pyrene
64	134-32-7	1-Naphthalenamine	former [25168-10-9] not in registry; [134-32[7] may be correct
678	140-92-1	Potassium Isopropyl Xanthate	former [41256-16-0] replaced with [140-92-1] for Potassium Isopropyl Xanthate
239	141-32-2	Butyl acrylate	former [220713-31-5] has been replaced with [141-32-2] for Butyl acrylate
380	141-43-5	2-Aminoethanol	former [9007-33-4] has been replaced with [141-43-5] for Ethanolamine
645	142-64-3	Dihydrochloride piperazine	former [8049-00-1] has been replaced with [142-64-3] for Piperazine dihydrochloride
268	107-04-0	1-bromo-2-chloroethane (Chlor Ethylene Bromide)	DOW RESOLVED. [107-04-0] for 1-bromo-2-chloroethane (chlor ethylene bromide).
802	299-85-4	o-(2,4-dichlorophenyl + o-methylisopropyl phosphoramidothioate) (Zytron)	DOW RESOLVED. [299-85-4] for Zytron+o-(2,4-dichlorophenyl + o-methyl isopropylphosphoromidothioate)
532	309-00-2	Aldrin - 1,2,3,4,10,10-Xexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta.,5.alpha.,8.alpha.,8a.beta.)-1,4:5,8-dimethanonaphthalene	former [6851-31-6] for Aldrin has been replaced with [309-00-2]

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449	465-73-6	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-(1R,4S,4aS,5R,8S,8aR)-rel-1,4:5,8-dimethanonaphthalene	conflicting [370-14-9] not in registry;[463-73-6] may be correct for Isodrin.
527	505-60-2	1,1'-Thiobis[2-chloro]ethane	former [69020-37-7] has been replaced with [505-60-2] for Mustard gas
103	598-78-7	2-Chloropropionic acid	former [62138-52-7] has been replaced with [598-78-7] for 2-Chloropropionic acid
753	630-25-1	Tetrachlordibromoethane	DOW RESOLVED. [630-25-1] for Tetrachlordibromoethane
549	1031-07-8	6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide-6,9-methano-2,4,3-benzodioxathiepin	former [87695-43-0] replaced with [1031-07-8] for endosulfan sulfate
796	1300-73-8	Xylidene with mixed isomers	DOW RESOLVED. [1300-73-8] for Xylidene with mixed isomers.
367	1321-74-0	Divinylbenzene	former[61804-50-0] hes been replaced with [1321-74-0] for divinylbenzene
292	1331-28-8	2-Chloroethenylbenzene	former [8063-96-5] has been replaced with [1331-28-8] for Chlorostyrene (2-Chloroethylbenzene)
747	1406-05-9	Synthetic Penicillin Medium	DOW RESOLVED. [1406-05-9] for Synthetic Penicillin Medium
69	2008-39-1	Acetic acid, (2,4-dichlorophenoxy)-, compd. with N-methylmethanamine	former [64296-19-1] has been replaced with [2008-39-1] for 2-(2,4-dichlorophenoxy)acetic acid; N-methylmethanamine
556	2385-85-5	1,1a,2,2,3,3a,4,5,5,5a,5b,6-Dodecachlorooctahydro-1,3,4-metheno-1H-cyclobuta[cd]pentalene	former [56449-78-6] replaced with [2385-85-5] for Mirex
673	2720-73-2	Potassium Amyl Xanthate	DOW RESOLVED. [2720-73-2] for Potassium Amyl Xanthate
329	2921-88-2	O,O-Diethyl O-(3,5,6-trichloro-2-pyridinyl) ester phosphorothioic acid	redundant entry. See Dow # 294 [2921-88-2], formerly [39475-55-3]
754	3228-99-7	1,3-dichloro-2,2-bis(chloromethyl)propane (Tetrachloride)	DOW RESOLVED. [3228-99-7] for tetrachloride
745	3775-85-7	Super Coolant Anti-freeze (Ethylene glycol)	DOW RESOLVED. [3775-85-7] for Super Coolant anti-freeze (Ethylene glycol)
643	3819-00-9	Piperacetazine	DOW RESOLVED. [3819-00-9] for piperacetazine
523	6168-72-5	2-Amino-1-propanol	former [78-91-1] has been replaced with [6168-72-5] for Monoisopropanolamine
571	7440-02-0	Nickel	former [8049-31-8] has been replaced with [7440-02-0] for nickel
715	7440-23-5	Sodium	former [12258-98-9] not in registry; [7440-23-5] may be correct for sodium
764	7440-28-0	Thallium	former [82870-81-3] hasa been replaced with [7440-28-0] for thallium
742	7446-09-5	Sulfur dioxide	former [89125-89-3] replaced with [7446-09-5] Sulphur Dioxide
623	7607-99-0	Pentasol Xanthate	DOW RESOLVED. [7607-99-0] for Pentasol Xanathate
181	7664-41-7	Ammonia	former [8007-57-6] has been replaced with [7664-41-7] for ammonia
574	7697-37-2	Nitric acid	former [78989-43-2] has been replacec with [7697-37-2] for nitric acid
739	7704-34-9	Sulfur	former [81032-32-8] replaced with [7704-34-9] for Sulfur

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422	7782-42-5	Graphite electrodes	former [87934-03-0] has been replaced with [7782-42-5] for graphite electrodes
710	7782-49-2	Selenium	former [95788-45-7] has bben replaced with [7782-49-2] for selenium
772	8001-35-2	Toxaphene	former [8022-04-6] has been replaced with [8001-35-2] for toxaphene
163	9003-04-7	2-Propenoic acid, homopolymer, sodium salt	DOW AFFIRMED. polymer (MW>5000) AND former [95077-68-2] has been replaced with [9003-04-7] for Acrylic acid + Sodium Acylate (2-Propenoic acid, homopolymer, sodium salt)
595	9082-06-8	Polyacrylamide (Oil Emulsion)	DOW RESOLVED. [9082-06-8] for polyacylamide
641	10025-87-3	Phosphoric trichloride	former [39380-77-3] has been replaced with [10025-87-3] for Phosphorus oxychloride (Phosphoric trichloride)
437	10035-10-6	Hydrobromic acid	former [62140-56-1] has been replaced with [10035-10-6] for hydrobromic acid
741	10545-99-0	Sulphur Dichloride	former [39461-36-4] replaced with [10545-99-0] Sulphur Dichloride
318	13552-09-5	DHC (2-aminooctadecane-1,3-diol)	DOW RESOLVED. Former [764-22-7] replaced with [13552-09-5].
313	13654-09-6	Decabromobiphenyl	former [39282-95-6] has been replaced with [13654-09-6] for Decabromobiphenyl
347	14484-64-1	Tris(dimethylcarbamodithioato-.kappa.S,.kappa.S')-, (OC-6-11) iron	former [64070-92-4] has been replaced with [14484-64-1] for Dimethylaminomethannedithioate;iron(+3) cation
546	24556-65-8	3,4,5-tribromosalicylanide	DOW RESOLVED. [24556-65-8] for 3,4,5-tribromosalicylanide
722	25155-30-0	Sodium dodecylbenzene sulfonate	DOW RESOLVED. [25155-30-0] for sodium dodecylbenzene sulfonate
664	25322-68-3	Polyethylene glycol	DOW RESOLVED. [25322-68-3] for polyethylene glycol
784	25498-49-1	Tripropylene Glycol Methyl Ether	former [30373-82-1] has been replaced with [25498-49-1] for Tripropylene Glycol Methyl Ether
548	33213-65-9	6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3.alpha.,5a.alpha.,6.beta.,9.beta.,9a.alpha.)-6,9-methano-2,4,3-benzodioxathiepin	former [891-86-1] for Endosulfan II replaced with [33213-65-9]
562	35884-77-6	Xylyl bromide (Y-11)	DOW RESOLVED. [35884-77-6] for Xylyl bromide
773	49690-94-0	Tribromophenyl ether	DOW RESOLVED. [49690-94-0] for tribromodiphenylether
412	55860-53-2	Flotation agent (Isobutyl ethyl thionocarbamate)	DOW RESOLVED. [55860-53-2] for isobutyl ethyl thionocarbamate.
692	57018-52-7	Propylene Glycol n-Butyl Ether (Dowanol)	DOW RESOLVED. [57018-52-7] for Propylene glycol n-Butyl ether
231	62140-56-1	Hydrobromic acid (Bromine Acid)	DOW RESOLVED. [62140-56-1] for hydrobromic acid.
765	63148-67-4	Polysulfide rubber compounds (Thiokol)	DOW RESOLVED. [63148-67-4] for Thiokol
375	63908-52-1	Emulsion - Finishing (primary component - acrylonitrile)	DOW RESOLVED. [63908-52-1] for acrylonitrile, primary compnent
423	69806-40-2	Haloxyfop-methyl	former [86510-80-7] for Haloxyfop-methyl replaced with [69806-40-2]
335	89698-92-0	Toluene diisocyanate	DOW RESOLVED. [89698-92-0] for toluene diisocyanate

CASE NARRATIVE - CAS # CHANGES

665	96956-24-0	Polyethleneimine	DOW RESOLVED. [96956-24-0] for polyethleneimine
596	104053-06-7	Oligonucleotide (Nucleotide - RNA or DNA)	DOW RESOLVED. [104053-06-7] for Nucleotide
317	166524-65-8	DFEP (2-ethoxy-4,6-difluropyrimidine)	DOW RESOLVED. [166524-65-8] for 2-ethoxy-4,6-difluropyrimidine (DFEP)
627	N/A	Phenol Sulphonates	DOW RESOLVED. Multi-compound listing individual components are salts [825-90-1] parahydroxybenzene sulfonic acid and [127-82-2] zinc phenyl sulphonate. See Dow #705 (sodium) and Dow #797 (zinc).
594		Octyl Methoxycinnamate + Octyl Salicylate + Oxybenzone ("Sunscreens")	DOW RESOLVED. Multi-compound listing individual components are Dow #593 [5466-77-3} octyl methoxycinnamate , [118-60-5] octyl salicylalte Added to Master List, [131-57-7] oxybenzone Added to Master List.
648		Plasticizers (Phthalates)	DOW RESOLVED. General reference to Dow #225 [117-81-7 bis(2-ethylhexyl) phthalate, Dow # 355[117-84-0]di-n-octyl phthalate, Dow # 342 [131-11-3] dimethyl phthalalte.
783		Phosphoric acid, isodecyl diphenylester, mixt. with triphenyl phosphate	DOW RESOLVED. Multi-compound listing individual components are[115-86-6] triphenylphospahte and [29761-21-5] isodecyldiphenylphosphate ester both Added to Master List.

CASE NARRATIVE - Salts

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
726	650-51-1	Trichlorosodium salt acetic acid	salt; see Dow #705 (sodium) [12258-98-9]
786	1314-62-1	Vanadium oxide	salt; [7440-62-2] Vanadium Added
743	7487-88-9	Sulphuric acid, magnesium salt	DOW RESOLVED; salt see Dow# 469 (magnesium) [7439-95-4]
744	7681-38-1	Sulphuric Acid, sodium salt	DOW RESOLVED; salt see Dow# 705 (sodium) [12258-98-9]
719	7789-38-0	Bromic acid, sodium salt	salt; see Dow #705 (sodium) [12258-98-9]
675	7790-93-4	Chloric acid	salt; see Dow #672 (potassium) [7440-09-7]
798	16485-55-5	Zincate(3-), pentachlorotriammonium	salt; see Dow #797 (zinc) [7440-66-6]
483	18917-89-0	Bis[2-(hydroxy.kappa.O)benzoato-.kapp.O]-,(T-4)r	salt; see Dow #469 (magnesium) [7439-95-4]
627	N/A	Phenol Sulphonates	DOW RESOLVED. Multi-compound listing individual components are salts [825-90-1] parahydroxybenzene sulfonic acid and [127-82-2] zinc phenyl sulphonate. See Dow #705 (sodium) and Dow #797 (zinc).
178			salt; see Dow #176 (aluminum) [7429-90-5]
179			salt; see Dow #176 (aluminum) [7429-90-5]
182			salt; see Dow #181 (ammonia) [8007-57-6]
183			salt; see Dow #181 (ammonia) [8007-57-6]
184			salt; see Dow #181 (aluminum) [80007-57-6]
185			salt; see (benzoic acid) [69-72-7] Added to Master List.
186			salt; see Dow #181 (ammonia) [8007-57-6]
188			salt; see Dow #469 (magnesium) [7439-95-4]
189			salt; see Dow #705, #150 (sodium, acetic acid) [12258-98-9],[64-19-7 former 77671-22-8]
205			salt; see Dow #204, #301 (arsenic, copper) [7440-38-2], [7440-50-8]
246			salt; see Dow #245 (calcium) [7440-70-2]
247			salt; see Dow #245,(calcium) [7440-70-2] and benzoic acid [65-85-0] Added to Master List.
248			salt; see Dow #245 (calcium) [7440-70-2]
249			salt; see Dow #245 (calcium) [7440-70-2]
250			salt; see Dow #245 (calcium) [7440-70-2]
251			salt; see Dow #245 (calcium) [7440-70-2]
264			salt; see Dow #705 (sodium) [12258-98-9]
267			salt; see Dow #245 (calcium) [7440-70-2]
371			salt; see Dow 204, #457 (arsenic, lead) [7440-38-2, 7439-92-1]
372			salt; see Dow #245 (calcium) [7440-70-2]
411			salt; see Dow #445 (iron) [7439-89-6]
416			salt; see Dow #764 (thallium) [82870-81-3]
458			salt; see Dow #204, #457 (arsenic, lead) [7440-38-2, 7439-92-1]
459			salt; see Dow #457 (lead) [7439-92-1]
460			salt; see Dow #457 (lead) [7439-92-1]
461			salt; see Dow #457 (lead) [7439-92-1]
462			salt; see Dow #245 (calcium) [7440-70-2]
463			salt; see Dow #245 (calcium) [7440-70-2]
464			salt; see Dow #245 (calcium) [7440-70-2]
468			salt; see Dow #469 (magnesium) [7439-95-4]

CASE NARRATIVE - Salts

473			salt; see Dow #469 (magnesium) [7439-95-4]
474			salt; see Dow #469 (magnesium) [7439-95-4]
475			salt; see Dow #469 (magnesium) [7439-95-4]
476			salt; see Dow #469 (magnesium) [7439-95-4]
477			salt; see Dow #469 (magnesium) [7439-95-4]
478			salt; see Dow #469 (magnesium) [7439-95-4]
481			salt; see Dow #469 (magnesium) [7439-95-4]
484			salt; see Dow #469 (magnesium) [7439-95-4]
487			salt; see Dow #486 (manganese) [7439-96-5]
538		Zinc salt of 2,4,5 -trichlorophenol (Dow 9-B)	DOW RESOLVED. salt; see Dow #8[95-95-4] 2,4,5-trichlorophenol
573		Nitrate Compounds	DOW RESOLVED. Salt see Dow #
671			salt; see Dow #672 (potassium) [7440-09-7]
674			salt; see Dow #672 (potassium) [7440-09-7]
702			salt; see Dow #181 (ammonia) [8007-57-6]
704			salt; see Dow #705 (sodium) [12258-98-9], benzoic acid [69-72-7] Added to Master List.
705			salt; see Dow #705 (sodium) [12258-98-9]
714			salt; see Dow #245 (calcium) [7440-70-2]
716			salt; see Dow #705, #150 (sodium, acetic acid) [12258-98-9], [64-19-7 former 77671-22-8]
717			salt; see Dow #204, #705 (arsenic, sodium) [7440-38-2, 12258-98-9]
718			salt; see Dow #705 (sodium) [12258-98-9], benzoic acid 69-72-7] Added to Master List.
720			salt; see Dow #705 (sodium) [12258-98-9]
721			salt; see Dow #705 (sodium) [12258-98-9]
724			salt; see Dow #705 (sodium) [12258-98-9]
725			salt; see Dow #705 (sodium) [12258-98-9]
768			salt; see (titanium) [7440-32-6] Added to Master List.
769			salt; see (titanium) [7440-32-6] Added to Master List.
799			salt; see Dow #797 (zinc) [7440-66-6]
800			salt; see Dow #797 (zinc) [7440-66-6]
801			salt; see Dow #797, #295 (zinc, chromium) [7440-66-6, 7440-47-3]

ATTACHMENT 4

Case Narratives – Resolved or Affirmed by Dow
Revision Date: November 27, 2006

- "Composition Uncertain"
- "ID Conflicts" (between CAS and chemical name)
- "Polymers" (MW > 5000 Daltons)

CASE NARRATIVE - Composition Uncertain

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
237	N/A	Bromozones	DOW AFFIRMED. composition uncertain for chemical name Bromozones (very old product)
242	N/A	By-products of brominated biphenyl ethers	DOW AFFIRMED. composition uncertain for chemical name By-products of brominated diphenyl ethers
253	N/A	Carbamoyl Sarcosine (CMS) or 2-(carbomyl-methyl-ami	DOW AFFIRMED. no [CAS] for chemical name Carbamoyl Sarcosine or 2-(carbonyl-methyl-amino)acetic acid
265	N/A	Cedambrette	DOW AFFIRMED. composition uncertain for chemical name Cedambrette (very old product)
297	N/A	Ciba blue (brominated indigo)	DOW AFFIRMED. composition uncertain for chemical name Ciba blue
312	N/A	DBR (N-[4-(5-dimethylaminonaphthalen-1-yl)sulfonylaminobutyl]adamantane-1-carboxamide)	DOW AFFIRMED. composition uncertain for chemical name DBR (N-[4-(5-dimethylaminoaphthalenyl)sulfonylaminobutyl]adamante-1-c
373	N/A	DTRP - 1,2,3,4-tetrahydro-(1-phenylethyl)napthalene)	DOW AFFIRMED. composition uncertain (no CAS #) for chemical name DTRP - 1,2,3,4-tetrahydro-(1-phenylethyl)napthalene)
410	N/A	F Reagant, Potassium Furfuryl Xanthate	DOW AFFIRMED. composition uncertain for chemical name F Reagent, Potassium Furfuryl Xanthate
418	N/A	Ginger root, Boric Acid, Soluble Oil	DOW AFFIRMED. composition uncertain for chemical name Ginger root, boric acid, soluble oil
243			DOW AFFIRMED. composition uncertain for chemical name By-products of phenol process
274			DOW AFFIRMED. composition uncertain for chemical name Chlorinated Diphenyloxide
275			DOW AFFIRMED. composition uncertain for chemical name Chlorinated Diphenylsulfide
276			DOW AFFIRMED. composition uncertain for chemical name Chlorinated Heterocycles like chlorinated carbazoles, acridin, polychlorinated dibenzophenes
277			DOW AFFIRMED. composition uncertain for chemical name Chlorinated Indene
278			DOW AFFIRMED. composition uncertain for chemical name Chlorinated PAH's (3-5 rings)
279			DOW AFFIRMED. composition uncertain for chemical name Chlorinated Phenols, cresols
553		N/A	DOW AFFIRMED. composition uncertain for chemical name Gardanthrol
561		N/A	DOW AFFIRMED. composition uncertain for chemical name Sylviola
609		Paraffins + Bentonite + Pale Linsee Fatty Acid + Ammonia + Water	DOW AFFIRMED. composition uncertain for chemical name Paraffins +Bentonite + Pale Linsee fatty acid + ammonia + water
658			DOW RESOLVED. General reference to Dow # 655, Dow #533, Dow #657, Dow #651, Dow #652, Dow #654, Dow# 656, Dow #653.

CASE NARRATIVE - Composition Uncertain

661			DOW AFFIRMED. composition uncertain for chemical name Polychlorinated naphthalenes
737		Sulphonated base oil	DOW AFFIRMED. composition uncertain for chemical name Sulphonated base oil
749		t-butylsalol	DOW AFFIRMED. composition uncertain for chemical name t-butylsalol
755		Tetrachlorodinuthane	DOW AFFIRMED. Composition uncertain for Tetrachlorodiuthane.
788		Velvetine	DOW AFFIRMED.composition uncertain for chemical name Velvetine

CASE NARRATIVE - ID Conflict

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
758	56-23-5	Tetrachloromethane	[8068-85-7] not in registry; [56-23-5]may be correct for Tetrachloromethane
686	79-09-4	Propionic acid	conflict [69806-86-6]not in registry; [79-09-4] for Propionic acid may be correct
766	80-68-2	Threonine	conflict [632-20-2]not in registry; [80-68-2] for Threonine may be correct
630	92-84-2	10H-Phenothiazine	conflict [117-89-5]not in registry; [92-84-2] for Phenothiazine may be correct
614	106-48-9	4-Chlorophenol	conflict; [1193-00-6]not in registry; [106-48-9] may be correct for 4-Chlorophenol
292	1331-28-8	2-Chloroethenylbenzene	former [8063-96-5] has been replaced with [1331-28-8] for Chlorostyrene (2-Chloroethylbenzene)
715	7440-23-5	Sodium	former [12258-98-9] not in registry; [7440-23-5] may be correct for sodium
135	N/A	4-chloro-2-nitrophenylphenylether; "Nitrophene"	conflict; no [CAS #] for chemical name 4-chloro-2-nitrophenylphenylether
208	N/A	B-chloro-B'-(2,4,6-trichlorophenoxy)-diethyl ether	DOW RESOLVED no [CAS #] for chemical name B-chloro-B'-(2,4,6-trichlorophenoxy)-diethyl ether. Experiemental chemical, not produced.
316	N/A	DFBA (2-[1-[3,5-diflurorphenyl)methoxy]-6-imino-purin-9-yl]-5-hydroxymethyl)oxolane-3,4-diol)	conflict; no [CAS #] for chemical name DFBA (2-[1-[3,5-diflurorphenyl)methoxy]-6-imino-purin-9-yl]-5-hydroxymethyl)oxolane-3,4-diol)
679	N/A	PPH((1-amino-2-phenyl-ethyl)phosphinic acid)	conflict; no [CAS #] for chemical name PPH((1-amino-2-phenyl-ethyl)phosphinic acid)
258			multi-compound listing. Individual components Dow #258 Carbon tetrachloride [56-23-5], Dow #48 1,2 Dichloroethane [107-06-2]. No [CAS#] for 1,2-Dibromomethane added to Conflict ID Category

CASE NARRATIVE - Polymers

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
446	100-42-5	IRPS (Ignition-resistant polystyrene)	DOW AFFIRMED. polymer (MW>5000)
729	100-42-5	Styrene	DOW AFFIRMED. polymer (MW>5000) and redundant see Dow #730.
163	9003-04-7	2-Propenoic acid, homopolymer, sodium salt	DOW AFFIRMED. polymer (MW>5000) AND former [95077-68-2] has been replaced with [9003-04-7] for Acrylic acid + Sodium Acylate (2-Propenoic acid, homopolymer, sodium salt)
378	28064-14-4	Epoxy resin (epichlorohydrin + phenol-formaldehyde novolac)	DOW AFFIRMED. polymer (MW>5000)
23	N/A	1,1'-isopropylidene bis (p-phenyleneoxy) di-2-pr+C32opanol or 2,2-bis(p-(2-hydroxypropxy))-phenyl propane	DOW AFFIRMED. polymer (MW>5000)
376	N/A	Emulsion - HGABS	DOW AFFIRMED. polymer (MW>5000)
409	N/A	Ethylene/propylene/diene monomer (EPDM)	DOW AFFIRMED. polymer (MW>5000)
444	N/A	Ion exchange resins	DOW AFFIRMED. polymer (MW>5000)
780	N/A	Triethylene Glycol -main ingredient + Methyl Ether + 4,4'-(1-Methylethylidene)bisphenol + 2,2',2''-Nitrilotrisethanol + 1-Amino-2-propanol + Voranol CP-3322	DOW RESOLVED. Multi-compound listing individual componenets are [112-35-6] Triethylene glycol Methyl Ether, [25068-38-6] 4,4' (1-Methyltheylidene)bisphenol, [24794-58-9] 2,2,2'-Nitrilotrisethanol, [78-96-6] Amino-2-propanol, [no CAS] Voranol CP-3322, all Added to Master List.
124			DOW AFFIRMED. polymer (MW>5000)
164			DOW AFFIRMED. polymer (MW>5000)
166			DOW AFFIRMED. polymer (MW>5000)
177			DOW AFFIRMED. polymer (MW>5000)
180			DOW AFFIRMED. polymer (MW>5000)
192			DOW AFFIRMED. polymer (MW>5000)
193			DOW AFFIRMED. polymer (MW>5000)
194			DOW AFFIRMED. polymer (MW>5000)
195			DOW AFFIRMED. polymer (MW>5000)
196			DOW AFFIRMED. polymer (MW>5000)
201			DOW AFFIRMED. polymer (MW>5000)
262			DOW AFFIRMED. polymer (MW>5000)
266			DOW AFFIRMED. polymer (MW uncertain; very old product)
343			DOW AFFIRMED. polymer (MW>5000)
381			DOW AFFIRMED. polymer (MW>5000)
384			DOW AFFIRMED. polymer (MW>5000)
394			DOW AFFIRMED. polymer (MW>5000)
466			DOW AFFIRMED. polymer (MW>5000)
494			DOW AFFIRMED. polymer (MW>5000)
511			DOW AFFIRMED. polymer (MW>5000)
539		N/A	DOW AFFIRMED. polymer (MW>5000)

CASE NARRATIVE - Polymers

540		N/A	DOW AFFIRMED. polymer (MW>5000)
541		N/A	DOW AFFIRMED. polymer (MW>5000)
542		N/A	DOW AFFIRMED. polymer (MW>5000)
552			DOW AFFIRMED. polymer (MW>5000)
569			DOW AFFIRMED. polymer (MW>5000)
647		Plastic	DOW AFFIRMED. polymer (MW>5000)
663			DOW AFFIRMED. polymer (MW>5000)
667			DOW AFFIRMED. polymer (MW>5000)
668			DOW AFFIRMED. polymer (MW>5000)
669			DOW AFFIRMED. polymer (MW>5000)
670			DOW AFFIRMED. polymer (MW>5000)
683			DOW AFFIRMED. polymer (MW>5000)
695			DOW AFFIRMED. polymer (MW>5000)
706			DOW AFFIRMED. polymer (MW>5000)
707			DOW AFFIRMED. polymer (MW>5000)
711		Silicon compounds	DOW AFFIRMED. polymer (MW>5000)
712		Silicon compounds	DOW AFFIRMED. polymer (MW>5000)
727			DOW AFFIRMED. polymer (MW>5000)
731		Styrene + Acrylonitrile	DOW AFFIRMED. polymer (MW>5000)
732			DOW AFFIRMED. polymer (MW>5000)
734			DOW AFFIRMED. polymer (MW>5000)
735			DOW AFFIRMED. polymer (MW>5000)
782			DOW AFFIRMED. polymer (MW>5000)

ATTACHMENT 5

Case Narrative – Database Additions
Revision Date: November 27, 2006

- "Case Narrative Additions"
- "Biomonitoring Positives"
- "RGIS System Positives"
- "Midland Soils COI"

CASE NARRATIVE - Database Additions

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
Added	60-00-4	Versene (sodium EDTA)	See Dow #369; [60-00-4] for Versene
Added	69-72-7	Benzoic acid, 2-hydroxy	salt, See Dow #185 and #704 Added to Master List.
Added	75-69-4	trichlorofluoromethane	Appendix IX.
Added	78-88-6	2,3-Dichloropropene	[78-88-6] 2,3-Dichloropropene
Added	78-96-6	Amino-2-propanol	See Dow #780; [78-96-6] for amino-2-propanol
Added	107-12-0	propionitrile	Appendix IX. RGIS.
Added	108-05-4	vinyl acetate	Appendix IX.
Added	109-65-9	n-butyl bromide	See Dow #142; [109-65-9] n-butyl bromide
Added	110-57-6	trans-1,4-dichloro-2-butene	Appendix IX. RGIS.
Added	111-76-2	2-butoxy ethanol	See Dow #566; [111-76-2] for 2-butoxy ethanol
Added	112-35-6	Triethylene glycol methyl ether	See Dow #780; [112-35-6] for triethylenen glycol methyl ether
Added	112-80-1	Oleic acid	See Dow #456; [112-80-1] for Oleic acid
Added	112-86-7	Erusic acid	See Dow #456; [112-86-7] for Erusic acid
Added	115-86-6	Triphenylphospahte	See Dow #783; [115-86-6] for triphenylphospahte
Added	118-60-5	Octyl Salicylate	See Dow # 594; [118-60-5] for octyl salicylate
Added	119-93-7	3,3[min]dimethylbenzidine	Appendix IX.
Added	120-83-2	2,4-Dichlorophenol	RGIS. [120-83-2] 2,4-Dichlorophenol
Added	124-07-2	Octanoic acid	See Dow #252; [124-07-2] for octanoic acid.
Added	124-38-9	Carbon dioxide	See Dow #427; [124-38-9] for carbon dioxide
Added	131-57-7	Oxybenzone	See Dow # 594; [131-57-7] for oxybenzone
Added	142-82-5	Heptane	See Dow #427; [142-82-5] for heptane
Added	156-59-2	cis-1,2-Dichloroethene	RGIS. [156-59-2] cis-1,2-Dichloroethene
Added	156-60-5	trans-1,2-dichloroethene	Appendix IX. RGIS.
Added	334-48-5	Decanoic acid	See Dow #252; [334-48-5] for decanoic acid.
Added	506-30-9	Eicosinic acid	See Dow #456; [506-30-9] for Eicosinic acid
Added	506-37-6	Nervonic acid	See Dow #456; [506-37-6] for Nervonic acid
Added	506-51-4	Tetraconsenol	See Dow #456; [506-51-4] for Tetraconsinol
Added	540-49-8	1,2-Dibromoethene	See Dow #155; [540-49-8] for 1,2-Dibromoethene
Added	544-63-8	Myristic acid	See Dow #456; [544-63-8] for Myristic acid
Added	563-57-5	3,3-Dichloropropene	[563-57-5] 3,3-Dichloropropene
Added	629-96-9	Eicosenol	See Dow #456; [629-96-9] for Eiconsenol
Added	2432-11-3	2,6-Diphenyl Phenol	RGIS.
Added	5103-73-1	Cis Nonachlor - 1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-(1.alpha.,2.alpha.,3.alpha.,3a.alpha., 4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene	[5103-73-1] Cis Nonachlor
Added	7440-32-6	Titanium	[7440-32-6] Titanium
Added	7440-62-2	Vanadium	RGIS. [7440-62-2] Vanadium

CASE NARRATIVE - Database Additions

Added	7578-39-4	Ethyl ether	See Dow #427; [7578-39-4] for ethyl ether
Added	7783-06-4	Sulfide	RGIS.
Added	8041-89-2	Retrol	See Dow #560; [8041-89-2] for Retrol
Added	8063-96-5	Chlorostyrene	[8063-96-5] Chlorostyrene
Added	9007-33-4	Monoethanolamine	See Dow #208; [9007-33-4] monethanolamine
Added	10061-02-6	trans-1,3-Dichloropropene	[10061-02-6] trans-1,3-Dichloropropene
Added	12626-49-2	Dowfax 2A1	See Dow #369; [12626-49-2] for Dowfax 2A1
Added	18496-25-8	sulfide	Appendix IX.
Added	23950-58-5	pronnamide	Appendix IX.
Added	24794-58-9	2,2',2''-nitrilotrisethanol	See Dow #780; [112-35-6] for triethylenen glycol methyl ether
Added	25068-38-6	4,4'-(1-Methylethylidene)bisphenol	See Dow #780; [25068-38-6] for 4,4'-(1-Methyiethylidene bisphenol
Added	26571-11-9	Dowfax 9N9	See Dow #369; [26571-11-9] for Dowfax 9N9
Added	27178-34-3	Tertbutyl Phenol	RGIS.
Added	27304-13-8	2,3,4,5,6,6a,7,7-Octachloro-1a,1b,5,5a,6,6a-hexahydro-, (1a.alpha.,1b.beta.,2.alpha.,5.alpha.,5a.beta.,6.beta.,6a.alpha.)- 2,5-methano-2H-indeno[1,2-b]oxirene	[27304-13-8] Oxychlordane
Added	28231-03-0	Cedrenol	See Dow #560; [28231-03-0] for Cedrenol
Added	28984-89-6	1,1'-Biphenyl, phenoxy-	multi-compound listing. See Dow #20 [62587-63-7] Added to Master List.
Added	29082-74-4	Octachlorostyyrene - Pentachloro(trichloroethenyl)benzene	[29082-74-4] Octachlorostyrene
Added	29761-21-5	Isodecyldiphenylphospahte ester	See Dow #783; [29761-21-5] for isodecyldiphenylphosphate ester
Added	30303-65-2	Docosenal	See Dow #456; [30303-65-2] for Docosenol+AG574
Added	35365-94-7	triethylammonium phosphate	See Dow #544; [35365-94-7] for triethylammonium phosphate
Added	39765-80-5	1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-, (1.alpha.,2.beta.,3.alpha.,3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene	[39765-80-5] trans Nonachlor
Added	57157-84-3	Isophorone	See Dow #543; [57157-84-3] for Atlox 1045A
Added	61255-81-0	Heptachlorostyrene	[61255-81-0] Heptachlorostyrene
Added	66321-94-6	Palmitic acid	See Dow #456; [66321-94-6] for Palmitic acid
Added	67774-32-7	PBB	[67774-32-7] PBB
Added	83484-75-7	Pentachlorostyrene	[83484-75-7] Pentachlorostyrene
Added	90301-92-1	Hexachlorostyrene	[90301-92-1] Hexachlorostyrene
Added	99932-75-9	Ethylene oxide	See Dow #516; [99932-75-9] for ethylene oxide
185			salt; see (benzoic acid) [69-72-7] Added to Master List.

CASE NARRATIVE - Database Additions

544		Dow Oven Cleaner	DOW RESOLVED. Multi-compound listing individual componests are Dow #325 [75-09-2] methylene chloride, [no CAS#] paraffin, Dow # 770[108-88-3] toluene, Dow # [9968-59-2] methocel, Dow # 491 [67-56-1] methanol, [35365-94-7] triethyl ammonium phosphate and [9007-33-4] monethanolamine Added to Master List.
566		Naptha solvent + Toluene + Dowanol EB - ethylene glycol + mono-n-butyl ether	DOW RESOLVED. multi-compound lisiting individual components are [no CAS #] Naptha solvent, Dow #770 [108-88-3]Toluene, [111-76-2] Dowanol EB added to Master List.
704			salt; see Dow #705 (sodium) [12258-98-9], benzoic acid [69-72-7] Added to Master List.
Added		Propane-1,2,3-triol	See Dow #252; [no CAS] for propane-1,2,3-triol.

CASE NARRATIVE - Biomonitoring Positives/Database Additions

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
Added	5103-73-1	Cis Nonachlor - 1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-(1.alpha.,2.alpha.,3.alpha.,3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene	[5103-73-1] Cis Nonachlor
Added	27304-13-8	2,3,4,5,6,6a,7,7-Octachloro-1a,1b,5,5a,6,6a-hexahydro-,(1a.alpha.,1b.beta.,2.alpha.,5.alpha.,5a.beta.,6.beta.,6a.alpha.)- 2,5-methano-2H-indeno[1,2-b]oxirene	[27304-13-8] Oxychlordane
Added	29082-74-4	Octachlorostyyrene - Pentachloro(trichloroethenyl)benzene	[29082-74-4] Octachlorostyrene
Added	39765-80-5	1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-,(1.alpha.,2.beta.,3.alpha.,3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene	[39765-80-5] trans Nonachlor
Added	61255-81-0	Heptachlorostyrene	[61255-81-0] Heptachlorostyrene
Added	67774-32-7	PBB	[67774-32-7] PBB
Added	83484-75-7	Pentachlorostyrene	[83484-75-7] Pentachlorostyrene
Added	90301-92-1	Hexachlorostyrene	[90301-92-1] Hexachlorostyrene

CASE NARRATIVE - RGIS System Positives/Database Additions

Dow ID	CAS Number	Chemical Name	Case Narrative Comments
Added	107-12-0	propionitrile	Appendix IX. RGIS.
Added	110-57-6	trans-1,4-dichloro-2-butene	Appendix IX. RGIS.
Added	120-83-2	2,4-Dichlorophenol	RGIS. [120-83-2] 2,4-Dichlorophenol
Added	156-59-2	cis-1,2-Dichloroethene	RGIS. [156-59-2] cis-1,2-Dichloroethene
Added	156-60-5	trans-1,2-dichloroethene	Appendix IX. RGIS.
Added	2432-11-3	2,6-Diphenyl Phenol	RGIS.
Added	7440-62-2	Vanadium	RGIS. [7440-62-2] Vanadium
Added	7783-06-4	Sulfide	RGIS.
Added	27178-34-3	Tertbutyl Phenol	RGIS.

CASE NARRATIVE - Midland Soils COI/Database Additions

Dow ID	CAS Number	Chemical Name	Case Narrative Comments

ATTACHMENT 6

Midland Soils PCOI List
November 22, 2006

Midland Soils PCOI List From DOW (11/22/06)

CAS # (sortable)	Chemical Name	In COI/TAL Database? (Y/N)
50000	Formaldehyde	Y
50328	Benzo(a)pyrene	Y
51285	2,4-Dinitrophenol	N
51796	Ethyl carbamate (Urethane)	N
53703	Dibenzo(a,h)anthracene	Y
53963	2-Acetylaminofluorene	Y
56235	Carbon tetrachloride	Y
56382	Parathion	Y
56495	3-Methylcholanthrene	Y
56553	Benzo(a)anthracene	Y
57147	1,1-Dimethyl hydrazine	N
57578	beta-Propiolactone	N
57749	Chlordane	Y
57976	7,12-Dimethylbenz(a)anthracene	Y
58899	Lindane (all isomers)	Y
59892	N-Nitrosomorpholine	Y
60117	Dimethyl aminoazobenzene	Y
60344	Methyl hydrazine	N
60355	Acetamide	Y
62533	Aniline	Y
62737	Dichlorvos	N
62759	N-Nitrosodimethylamine	Y
63252	Carbaryl	N
64675	Diethyl sulfate	N
67561	Methanol	N
67641	Acetone	Y
67663	Chloroform	Y
67721	Hexachloroethane	Y
68122	Dimethyl formamide	Y
71363	Butyl alcohol	Y
71432	Benzene (including benzene from gasoline)	Y
71556	Methyl chloroform (1,1,1-Trichloroethane)	Y
71556	1,1,1-Trichloroethane	Y-REDUNDANT
72435	Methoxychlor	Y
74839	Bromomethane	Y
74839	Methyl bromide (Bromomethane)	Y-REDUNDANT
74873	Chloromethane	Y
74873	Methyl chloride (Chloromethane)	Y-REDUNDANT
74884	Methyl iodide (Iodomethane)	Y
74953	Dibromomethane	Y
74964	bromoethane	Y
74975	Bromodichloromethane	Y
75003	Chloroethane	Y
75003	Ethyl chloride (Chloroethane)	Y-REDUNDANT
75014	Vinyl chloride	Y
75058	Acetonitrile	Y
75070	Acetaldehyde	Y
75092	Methylene chloride (Dichloromethane)	Y
75150	Carbon disulfide	Y
75218	Ethylene oxide	Y
75252	Bromoform	Y
75343	1,1-Dichloroethane	Y
75343	Ethylidene dichloride (1,1-Dichloroethane)	Y-REDUNDANT
75354	1,1-Dichloroethene	Y
75354	Vinylidene chloride (1,1-Dichloroethylene)	Y-REDUNDANT
75445	Phosgene	Y
75558	1,2-Propylenimine (2-Methyl aziridine)	N
75569	Propylene oxide	Y
75627	Bromotrichloromethane	N
75718	Dichlorodifluoromethane	N
76448	Heptachlor	Y
77474	Hexachlorocyclopentadiene	Y
77781	Dimethyl sulfate	N
78591	Isophorone	Y
78875	1,2-Dichloropropane	Y
78875	Propylene dichloride (1,2-Dichloropropane)	Y-REDUNDANT
78933	2-Butanone	Y
78933	Methyl ethyl ketone (2-Butanone)(See Modification)	Y-REDUNDANT
79005	1,1,2-Trichloroethane	Y
79016	Trichloroethylene	Y
79061	Acrylamide	Y
79107	Acrylic acid	Y
79118	Chloroacetic acid	Y
79287	Tetrabromoethene	N
79345	1,1,2,2-Tetrachloroethane	Y
79447	Dimethyl carbamoyl chloride	N
79469	2-Nitropropane	N
80057	4,4'-Isopropylidenediphenol	Y

Midland Soils PCOI List From DOW (continued)

80626	Methyl methacrylate	Y
82688	Pentachloronitrobenzene (Quintobenzene)	Y
83329	Acenaphthene	Y
84641	Anthracenedione	N
84662	Diethyl phthalate	Y
84742	Dibutylphthalate	Y
85018	Phenanthrene	Y
85449	Phthalic anhydride	N
85687	Benzyl butyl phthalate	Y
86737	Fluorene	Y
87616	1,2,3-Trichlorobenzene	Y
87650	3,4-dichlorophenol	Y
87683	Hexachlorobutadiene	Y
87865	Pentachlorophenol	Y
88062	3,4,5-trichlorophenol	Y
88755	2-Nitrophenol	Y
90040	o-Anisidine	N
90437	2-phenylphenol	Y
90471	Xanthenone	N
91203	Naphthalene	Y
91225	Quinoline	N
91576	2-Methylnaphthalene	Y
91587	2-Chloronaphthalene	Y
91941	3,3-Dichlorobenzidene	Y
92524	Biphenyl	Y
92671	4-Aminobiphenyl	Y
92875	Benzidine	N
92933	4-Nitrobiphenyl	N
93583	Benzoic acid, methyl ester	N
94757	2,4-D, salts and esters	Y
95363	1,2,4-Trimethylbenzene	Y
95476	o-Xylenes	N
95487	o-Cresol	Y
95501	1,2-Dichlorobenzene	Y
95534	o-Toluidine	Y
95578	2-chlorophenol	Y
95578	3-chlorophenol	Y-REDUNDANT
95772	3,5-dichlorophenol	N
95807	2,4-Toluene diamine	N
95943	1,2,4,5-tetrachlorobenzene	Y
95954	2,4,6-trichlorophenol	Y
96093	Styrene oxide	N
96128	1,2-Dibromo-3-chloropropane	Y
96333	Methyl acrylate	Y
96457	Ethylene thiourea	N
98077	Benzotrichloride	N
98828	Cumene	Y
98862	Acetophenone	Y
98953	Nitrobenzene	Y
100027	4-Nitrophenol	Y
100414	Ethyl benzene	Y
100425	Styrene	Y
100447	Benzyl chloride	N
100470	Benzonitrile	N
101144	4,4-Methylene bis(2-chloroaniline)	N
101688	Methylene diphenyl diisocyanate (MDI)	N
101779	4,4¬-Methylenedianiline	N
105602	Caprolactam(See Modification)	N
106423	p-Xylenes	N
106445	p-Cresol	Y
106467	1,4-Dichlorobenzene(p)	Y
106489	2,3-dichlorophenol	Y
106503	p-Phenylenediamine	Y
106514	Quinone	N
106650	Butanedioic acid, dimethyl ester	N
106887	1,2-Epoxybutane	N
106898	Epichlorohydrin (l-Chloro-2,3-epoxypropane)	Y
106934	Ethylene dibromide (Dibromoethane)	Y
106990	1,3-Butadiene	Y
107028	Acrolein	Y
107051	Allyl chloride	Y
107062	1,2-Dichlorothane	Y
107062	Ethylene dichloride (1,2-Dichloroethane)	Y-REDUNDANT
107119	Allylamine	Y
107131	Acrylonitrile	N
107186	Allyl Alcohol	Y
107211	Ethylene glycol	N
107302	Chloromethyl methyl ether	Y
107506	Tetradecamethylcycloheptasiloxane	N

Midland Soils PCOI List From DOW (continued)

108054	Vinyl acetate	Y
108101	Methyl isobutyl ketone (Hexone)	Y
108101	4-Methyl-2-pentanone	Y-REDUNDANT
108316	Maleic anhydride	N
108383	m-Xylenes	N
108394	m-Cresol	Y
108430	4-chlorophenol	N
108703	1,3,5-Trichlorobenzene	N
108850	Bromocyclohexane	N
108861	Bromobenzene	Y
108872	Methylcyclohexane	N
108883	Toluene	Y
108907	Chlorobenzene	Y
108952	Phenol	Y
110527	Benzaldehyde	N
110543	Hexane	Y
110576	trans-1,4-Dichloro-2-butene	Y
111422	Diethanolamine	Y
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)	Y
111659	Octane	N
111842	Nonane	N
114261	Propoxur (Baygon)	N
115117	Methyl propene	N
117817	Bis(2-ethylhexyl)phthalate (DEHP)	Y
117840	Di-N-Octyl phthalate	Y
118741	Hexachlorobenzene	Y
119904	3,3-Dimethoxybenzidine	N
119937	3,3'-Dimethyl benzidine	Y
120127	Anthracene	Y
120809	Catechol	Y
120821	1,2,4-Trichlorobenzene	Y
120832	2,5-dichlorophenol	Y
121142	2,4-Dinitrotoluene	Y
121448	Triethylamine	N
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	N
122667	1,2-Diphenylhydrazine	N
123319	Hydroquinone	Y
123386	Propionaldehyde	N
123911	1,4-Dioxane (1,4-Diethyleneoxide)	Y
124185	Decane	N
124481	Dibromochloromethane	Y
126998	Chloroprene	Y
127184	tetrachloroethene	Y
127184	Tetrachloroethylene (Perchloroethylene)	Y-REDUNDANT
129000	Pyrene	Y
131113	Dimethyl phthalate	Y
132649	Dibenzofuran	Y
132649	Dibenzofurans	Y-REDUNDANT
133062	Captan	N
133904	Chloramben	N
140885	Ethyl acrylate	Y
151564	Ethylene imine (Aziridine)	N
156627	Calcium cyanamide	N
189559	Benzo(r,s,t)pentaphene	N
189640	Dibenzo(a,h)pyrene	N
191242	Benzo (g,h,i) perylene	Y
191300	Dibenzo(a,l)pyrene	N
192654	Dibenzo(a,e)pyrene	N
192972	Benzo(e)pyrene	N
193395	Indeno(1,2,3-cd)pyrene	Y
194592	7H-Dibenzo(c,g)carbazole	N
205823	Benzo(j)fluoranthene	N
205992	Benzo(b)fluoranthene	Y
206440	Benzo(j,k)fluorene(fluoranthene)	Y
206440	Fluoranthene	Y-REDUNDANT
207089	Benzo(k)fluoranthene	Y
218019	Benzo(a)phenanthrene (chrysene)	Y
218019	Chrysene	Y-REDUNDANT
224420	Dibenz(a,j)acridine	N
226368	Dibenz(a,h)acridine	N
302012	Hydrazine	N
334883	Diazomethane	N
460128	Butadiyne	N
463581	Carbonyl sulfide	N
506592	Dimethylamine	Y
510156	Chlorobenzilate	Y
532274	2-Chloroacetophenone	N
534521	4,6-Dinitro-o-cresol, and salts	Y
540841	2,2,4-Trimethylpentane	N

Midland Soils PCOI List From DOW (continued)

	540976	Dodecamethylcyclohexasiloxane	N
	541026	Decamethylcyclopentasiloxane	N
	541731	1,3-Dichlorobenzene	Y
	542881	Bis(chloromethyl)ether	N
	558134	tetrabromomethane	Y
	576249	2,4-dichlorophenol	N
	584849	2,4-Toluene diisocyanate	N
	591355	2,3,4-trichlorophenol	N
	593602	Bromoethene	Y
	593602	Vinyl bromide	Y-REDUNDANT
	593635	Chloroethyne	N
	593788	2,6-dichlorophenol	N
	594150	tribromochloromethane	N
	594183	dibromodichloromethane	N
	598163	Tribromoethene	N
	608935	Pentachlorobenzene	Y
	609198	2,3,4,5-tetrachlorophenol	N
	624839	Methyl isocyanate	N
	627930	Hexanedioic acid, dimethyl ester	N
	630206	1,1,1,2-Tetrachloroethane	Y
	634662	1,2,3,4-tetrachlorobenzene	Y
	634902	1,2,3,5-tetrachlorobenzene	Y
	676631	Propene	N
	676631	Propylene	N-REDUNDANT
	680319	Hexamethylphosphoramide	N
	684935	N-Nitroso-N-methylurea	N
	822060	Hexamethylene-1,6-diisocyanate	N
	872504	N-methyl-2-pyrrolidone	Y
	933754	2,4,5-trichlorophenol	N
	933788	2,3,6-trichlorophenol	N
	935955	2,3,5,6-tetrachlorophenol	N
	992983	Formic acid	N
	1120214	Undecane	N
	1120714	1,3-Propane sultone	N
	1319773	Cresols/Cresylic acid (isomers and mixture)	N
	1330207	Xylenes (isomers and mixture)	Y
	1332214	Asbestos	N
	1336363	Polychlorinated biphenyls (Aroclors)	N
	1582098	Trifluralin	N
	1634044	Methyl tert butyl ether	N
	1735177	Cyclohexane	N
	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	Y
	3547044	DDE	N
	3697243	5-Methylchrysene	N
	4901513	2,3,4,6-tetrachlorophenol	N
	5385751	Dibenzo(a,e)fluoranthene	N
	5522430	1-Nitropyrene	N
	6012971	Tetrachlorothiophene	N
	7550450	Titanium tetrachloride	N
	7572294	Dichloroethyne	N
	7647010	Hydrochloric acid	Y
	7664393	Hydrogen fluoride (Hydrofluoric acid)	N
	7664417	Ammonia	Y
	7723140	Phosphorus	N
	7726956	Bromine	Y
	7782505	Chlorine	Y
	7783064	Hydrogen sulfide(See Modification)	N
	7803512	Phosphine	N
	8001352	Toxaphene (chlorinated camphene)	Y
	8003074	1,2-Dibromoethane	N
	8031332	Heptane	N
	8031354	Pentane	N
	10061015	cis-1,3-Dichloropropene	Y
	10061026	trans-1,3-Dichloropropene	Y
	15950660	2,3,5-trichlorophenol	N
	30498669	Dimethylheptane	N
	52663577	Butoxyethanol	Y
	77392713	Perylene	N
	83847498	bromochloromethane	N
	87701653	Ethylene	N
	145538745	Decabromodiphenyl oxide	N
	220713315	Butyl acrylate	N
isomer uncertain		Bromochlorobenzene	
isomer uncertain		bromodichloroethane	
isomer uncertain		Bromodichlorophenol	
isomer uncertain		Chlorobutane	
isomer uncertain		Chlorooctane	
isomer uncertain		Chloropyridine	
26249-12-7		Dibromobenzene	

Midland Soils PCOI List From DOW (continued)

isomer uncertain	dibromochloroethane
isomer uncertain	Dimethylphenanthrene
isomer uncertain	Ethylhexanoic acid
isomer uncertain	Ethylhexanol
isomer uncertain	Hexene
isomer uncertain	Methylheptane
isomer uncertain	Methyphenanthrene
isomer uncertain	Methylphenol
isomer uncertain	Pentachlorobutadiene
isomer uncertain	Pentene
isomer uncertain	tribromochloroethane
271-89-6	Benzofuran
isomer uncertain	Benzopyranone
isomer uncertain	Bromoanthracene
isomer uncertain	Bromobenzonitrile
isomer uncertain	Bromochlorocyclohexanol
107-04-0	Bromochloroethane
isomer uncertain	Bromochloroethene
isomer uncertain	Bromochloroethyne
isomer uncertain	Bromochloropropyne
16536-57-5	Bromocyclohexanol
isomer uncertain	Bromodichlorobenzene
isomer uncertain	Bromodichloroethene
isomer uncertain	Bromodichloropropyne
isomer uncertain	Bromodimethylbenzene
isomer uncertain	Bromoethyne
	Bromoheptane
629-04-9	1-bromoheptane
1974-04-5	2-bromoheptane
1974-05-6	3-bromoheptane
998-93-6	4-bromoheptane
isomer uncertain	Bromomethoxycyclohexane
	Bromomethylbenzene
95-46-5	o-bromomethylbenzene
106-38-7	p-bromomethylbenzene
591-17-3	m-bromomethylbenzene
100-39-0	benzylbromide
isomer uncertain	Bromomethylpropane
27497-51-4	Bromonaphthalene
106-95-6	Bromopropene (3-bromo-1-propene)
106-96-7	Bromopropyne (3-bromo-1-propyne)
107103-78-6	Bromotrichlorobenzene (1-bromo-2,3,4-trichlorobenzene)
127099-33-6	bromotrichloroethane (2-bromo-1,1,1-trichloroethane)
isomer uncertain	Bromotrichloroethene
74-84-0	C2 Alkanes (Ethane)
87701-65-3	C2 Alkenes (Ethene)
74-86-2	C2 Alkynes (Acetylene)
75-01-4	chloroethene (vinyl chloride)
isomer uncertain	Chlorothiophene
631-64-1 (acid)	Dibromoacetic acid, methyl ester
isomer uncertain	Dibromochloroethene
60956-24-3	Dibromochlorobenzene (1,2-dibromo-4-chlorobenzene)
4526-56-1	Dibromochlorophenol (2,4-dibromo-6-chlorophenol)
isomer uncertain	Dibromocyclohexane
683-68-1	dibromodichloroethane (1,2-dibromo-1,2-dichloroethane)
isomer uncertain	Dibromodichloroethene
25429-23-6	Dibromoethene
624-61-3	dibromoethyne
	Dibromopropane
78-75-1	1,2-dibromopropane
109-64-8	1,3-dibromopropane
594-16-1	2,2-dibromopropane
isomer uncertain	Dibromothiophene
540-59-0	1,2-Dichloroethene (either isomer)
isomer uncertain	Dichloronaphthyridine
isomer uncertain	Diisocyanates
Redundant (Dow ID 351 or 352)	2,4-Dinitro-o-sec-butylphenol (DINOSEB)
142-62-1	Hexanoic acid
85-44-9	Isobenzofuran-1,3-dione
26914-18-1	Methylanthracene
78-78-4	Methyl butane (2-methyl)
isomer uncertain	Methyldecane
6975-98-0	2-methyldecane
2847-72-5	4-methyldecane
27137-41-3	Methylfuran
isomer uncertain	Methylpentenal
12679-43-5	Naphthalenedione
1600-37-9	Pentachloropropene
isomer uncertain	Phenalenone

Midland Soils PCOI List From DOW (continued)

isomer uncertain	Phenoxybiphenyl
	tetrabromoethane
25167-20-8	1,1,1,2-tetrabromoethane
79-27-6	1,1,2,2-tetrabromoethane
	Tribromobutane
632-05-3	1,2,3-tribromobutane
3675-68-1	1,1,2-tribromobutane
3675-69-2	1,2,2-tribromobutane
62127-47-3	2,2,3-tribromobutane
78-74-0	tribromoethane (1,1,2-tribromoethane)
NO CAS Number	Tribromochloroethene
118-79-6	Tribromophenol
55335-06-3 (acid)	Triclopyr triethylammonium salt
25323-89-1	trichloroethane
71-55-6	1,1,1-trichloroethane
79-00-5	1,1,2-trichloroethane
79-01-6	Trichloroethene
isomer uncertain	Trimethylhexane
87-62-7	2,6-xylidene

ATTACHMENT 7

Tentatively Identified Compounds – Specification

Specification:

Treatment of Site-Specific Constituents of Interest, Standard Target Analytes, Extended Target Analytes, and Tentatively Identified Compounds
Tittabawassee River and Upper Saginaw River Project
Midland Soils Project

Purpose: The ion current chromatograms of multi-compound analytical methods based upon GC/MS or LC/MS (e.g. USEPA 8260 and 8270) can contain information beyond the fully calibrated target analytes. Qualitative and quantitative information about the substances responsible for non-target peaks in such chromatograms can be included in the laboratory data reports if the peaks are handled using the procedure for Tentatively Identified Compounds as described in USEPA Methods 8260B and 8270C (section 7.6.2 in both methods).

Specifications for Handling Unknown Peaks as TICs: The specifications for handling TICs in Method 8260 are given in sections 8.10 and 9.5 of the ATS SOP for this method, and in method 8270 are given in sections 8.11 and 9.7 of that SOP (ATS QAPP, July 2006). To summarize, compounds detected will be identified and quantified as TICs if they have peak areas equal to or greater than 10 percent of the nearest (retention time) internal standard. All such peaks will be reported in a special section of the laboratory data report for each sample.

For non-target peaks meeting the 10 percent threshold, the mass spectrum will be compared to referenced spectra in the current NIST library, using a computer search routine. If the spectral match has a fit of 80 percent or better, the substance name representing the best fit will be reported as the tentative identity of the compound. If the spectral fit is less 80 percent, the peak will be reported as "Unknown RRT x.xxx", where x.xxx is the relative retention time in minutes. In either case, an estimated concentration will be calculated by comparing the peak area to that of the internal standard, using a response factor of 1.00. The estimated concentration will be shown on the laboratory data report.

ATTACHMENT 8

Target Analytes Lists
Revision Date: November 10, 2006

- USEPA Appendix IX
- USEPA 8260 (Volatile Organics)
- USEPA 8270 (Semi-Volatile Organics)
- USEPA 1613-B (Chlorinated Dioxins & Furans)
- Method 1613-TRP/RT (Chlorinated Dioxins & Furans)
- USEPA 1668-A (Polychlorinated Biphenyls)
- USEPA 8041 (Phenols)
- USEPA 8081 (Chlorinated Pesticides)
- USEPA 8082 (Polychlorinated Biphenyls)
- USEPA 8121 (Chlorinated Hydrocarbons)
- USEPA 8141 (Organophosphorus Compounds)
- USEPA 8151 (Chlorinated Herbicides)
- USEPA 6010/6020 (Metals)
- USEPA 7471 (Mercury)
- Other USEPA Methods

Target Analyte List: USEPA 8260
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8260B (SW-846, rev. Dec. 1996)
Test Procedure: Methanol extraction; Purge & Trap, GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
Tetrachloromethane	56-23-5	257	0.05
Diethyl ether	60-2-97	NA	0.2
Acetone	67-64-1	152	1
Chloroform	67-66-3	286	0.05
Benzene	71-43-2	209	0.05
1,1,1-Trichloroethane	71-55-6	16	0.05
Methyl Bromide	74-83-9	498	0.2
Chloromethane	74-87-3	287	0.25
Iodomethane	74-88-4	504	0.1
Dibromomethane	74-95-3	513	0.25
Bromochloromethane	74-97-5	233	0.1
Chloroethane	75-00-3	285	0.25
Chloroethene	75-01-4	790	0.04
Dichloromethane	75-09-2	325	0.1
Carbon Disulfide	75-15-0	254	0.25
Tribromomethane	75-25-2	236	0.1
Bromodichloromethane	75-27-4	234	0.1
1,1-Dichloroethane	75-34-3	21	0.05
1,1-Dichloroethene	75-35-4	22	0.05
t-Butanol	75-65-0	NA	2.5
Trichlorofluoromethane	75-69-4	NA	0.1
Dichlorodifluoromethane	75-71-8	323	0.25
1,2-Dichloropropane	78-87-5	49	0.05
Methyl ethyl ketone	78-93-3	503	0.75
1,1,2-Trichloroethane	79-00-5	19	0.05
Trichlorethene	79-01-6	774	0.05
1,1,2,2-Tetrachloroethane	79-34-5	17	0.05
2-Chlorotoluene	95-49-8	NA	0.05
1,2,4-Trimethylbenzene	95-63-6	44	0.1
1,2-Dibromo-3-chloropropane	96-12-8	45	0.25
1,2,3-Trichloropropane	96-18-4	41	0.1
tert-Butylbenzene	98-06-6	NA	0.05
Isopropylbenzene	98-82-8	453	0.25
4-Isopropyltoluene	99-87-6	NA	0.1
Ethylbenzene	100-41-4	386	0.05
Styrene	100-42-5	730	0.05
Propylbenzene	103-65-1	NA	0.1
n-Butylbenzene	104-51-8	NA	0.05
4-Chlorotoluene	106-43-4	NA	0.05
1,2-Dibromoethane	106-93-4	46	0.05
1,2-Dichloroethane	107-06-2	48	0.05
Acrylonitrile	107-13-1	165	0.1
Vinyl Acetate	108-05-4	NA	5
4-Methyl-2-pentanone	108-10-1	140	2.5
Diisopropyl ether	108-20-3	NA	0.25
1,3,5-Trimethylbenzene	108-67-8	NA	0.1
Bromobenzene	108-86-1	232	0.1
Toluene	108-88-3	770	0.1
Chlorobenzene	108-90-7	282	0.05

Target Analyte List: USEPA 8260
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8260B (SW-846, rev. Dec. 1996)
Test Procedure: Methanol extraction; Purge & Trap, GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes (continued)			
Tetrahydrofuran	109-99-9	NA	1
t-1,4-Dichloro-2-butene	110-57-6	NA	0.05
Cyclohexane	110-82-7	308	0.25
Dibromochloromethane	124-48-1	321	0.1
Tetrachloroethene	127-18-4	18	0.05
sec-Butylbenzene	135-98-8	NA	0.05
1,3-Dichloropropane	142-28-9	NA	0.05
cis-1,2-Dichloroethene	156-59-2	Added	0.05
trans-1,2-Dichloroethene	156-60-5	NA	0.05
1,2,3-Trimethylbenzene	526-73-8	NA	0.1
1,1-Dichloropropene	563-58-6	NA	0.05
2-Hexanone	591-78-6	108	2.5
2,2-Dichloropropane	594-20-7	NA	0.05
1,1,1,2-Tetrachloroethane	630-20-6	15	0.1
Ethyl tert-butyl ether	637-92-3	NA	0.25
t-Amyl methyl ether	994-05-8	NA	0.25
Xylenes	1330-20-7	467	0.15
Methyl tert-butyl ether	1634-04-4	NA	0.25
cis-1,3-Dichloro-1-propene	10061-01-5	299	0.05
trans-1,3-Dichloropropene	10061-02-6	Added	0.05
Extended Target Analytes			
None			

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8260
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8260B (SW-846, rev. Dec. 1996)
Test Procedure: Methanol extraction; Purge & Trap, GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (handled as TICs if found)			
N-butyl alcohol	71-36-3	567	
Bromoethane	74-96-4	387	
Acetonitrile	75-05-8	153	
Ethylene Oxide	75-21-8	408	
Carbonic dichloride	75-44-5	640	
Propylene oxide	75-56-9	693	
Pentachloroethane	76-01-7	619	
2,2-Dichloro-1,1-difluoro-1-methoxyethane	76-38-0	496	
Isobutylalcohol	78-83-1	447	
2,3-Dichloropropene	78-88-6	Added	
2-Chloroacetylchloride	79-04-9	269	
Methyl methacrylate	80-62-6	505	
Diethylaniline	91-66-7	331	
2-Methylbenzenamine	95-53-4	604	
Acetic acid, chloro-, methyl ester	96-34-4	501	
Ethyl methacrylate	97-63-2	389	
4-(1,1-Dimethylethyl)cyclohexanone	98-53-3	10	
Benzene, (1-methylethenyl)-	98-83-9	175	
Nitrobenzene	98-95-3	575	
(2-Bromoethyl)benzene	103-63-9	235	
Chloromethyloxirane	106-89-8	377	
1,3-Butadiene	106-99-0	50	
Acrolein	107-02-8	159	
1-Bromo-2-chloroethane	107-04-0	399	
3-Chloro-1-propene	107-05-1	170	
2-Chloroethanol	107-07-3	397	
1,4-Dioxane	123-91-1	57	
Methylacrylonitrile	126-98-7	510	
2-Chlorobuta-1,3-diene	126-99-8	291	
Butyl acrylate	141-32-2	239	
2,2,2-Trichloroethane-1,1-diol	302-17-0	270	
1,1'-Thiobis[2-chloro]ethane	505-60-2	527	
Tetrabromomethane	558-13-4	256	
1,2-Dichloro-1-propene	563-54-2	688	
3,3-Dichloropropene	563-57-5	Added	
Bromoethene	593-60-2	789	
Divinylbenzene	1321-74-0	367	
Isocyclocitral-S	1335-66-6	448	
1-(Chloromethyl)-4-ethenylbezene	1592-20-7	792	
Chloromethanone	2602-42-8	261	
1,3-dichloroprop-1-ene	8022-76-2	52	
Chlorostyrene	8063-96-5	Added	
Vinyl toluene	25013-15-4	791	
Diethylbenzene	25340-17-4	332	
Cyclotene	79299-96-0	309	

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
Benzo[a]pyrene	50-32-8	213	0.33
2,4-Dinitrophenol	51-28-5	88	0.8
Dibenz[a,h]anthracene	53-70-3	319	0.33
Benz[a]anthracene	56-55-3	212	0.33
4-Chloro-3-methyl-phenol	59-50-7	613	0.33
Benzenamine	62-53-3	191	0.8
N-Methyl-N-nitrosomethanamine	62-75-9	578	0.33
Hexachloroethane	67-72-1	428	0.3
1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene	77-47-4	432	0.33
Isophorone	78-59-1	451	0.33
1,2-Dihydroacenaphthylene	83-32-9	146	0.33
Diethyl phthalate	84-66-2	330	0.33
Di-n-butyl phthalate	84-74-2	349	0.33
Phenanthrene	85-01-8	625	0.33
Butyl benzyl phthlate	85-68-7	240	0.33
N-Nitroso-N-phenybenzenamine	86-30-6	580	0.33
9H-Carbazole	86-73-7	414	0.33
Carbazole	86-74-8	NA	0.33
1,1,2,3,4,4-Hexachloro-1,3-butadiene	87-68-3	430	0.33
Pentachlorophenol	87-86-5	621	0.8
2,4,6-Trichlorophenol	88-06-2	82	0.33
2-Nitrobenzenamine	88-74-4	597	0.8
2-Nitrophenol	88-75-5	598	0.33
Naphthalene	91-20-3	565	0.33
2-Methylnaphthalene	91-57-6	112	0.33
2-Chloronaphthalene	91-58-7	100	0.33
3,3'-Dichlorobenzidine	91-94-1	117	2
Benzidine	92-87-5	NA	1
2-Methylphenol	95-48-7	591	0.33
1,2-Dichlorobenzene	95-50-1	47	0.33
2-Chlorophenol	95-57-8	102	0.33
2,4,5-Trichlorophenol	95-95-4	80	0.33
Nitrobenzene	98-95-3	NA	0.33
3-Nitroaniline	99-09-2	518	0.8
4-Nitrobenzenamine	100-01-6	649	0.8
4-Nitrophenol	100-02-7	650	0.8
Benzyl alcohol	100-51-6	218	3.3
1-Bromo-4-phenoxybenzene	101-55-3	133	0.33
Azobenzene	103-33-3	NA	0.2
2,4-Dimethylphenol	105-67-9	87	0.33
4-Methylphenol	106-44-5	615	0.33
1,4-Dichlorobenzene	106-46-7	56	0.33
3-Methylphenol	108-39-4	488	0.33
Bis(2-chloro-1-methylethyl)ether	108-60-1	222	0.33
Phenol	108-95-2	626	0.33

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes (continued)			
Pyridine	110-86-1	697	0.33
Bis(2-chloroethyl) ether	111-44-4	224	0.1
Bis(2-chloroethoxy)methane	111-91-1	223	0.33
Bis(2-ethylhexyl) phthlate	117-81-7	225	0.33
Di-n-octyl phthalate	117-84-0	355	0.33
Hexachlorobenzene	118-74-1	429	0.33
Anthracene	120-12-7	197	0.33
1,2,4-Trichlorobenzene	120-82-1	43	0.33
2,4-Dichlorophenol	120-83-2	Add	0.33
2,4-Dinitrotoluene	121-14-2	89	0.33
Pyrene	129-00-0	696	0.33
Dimethyl phthalate	131-11-3	342	0.33
Dibenzofuran	132-64-9	320	0.33
Benzo[ghi]perylene	191-24-2	215	0.33
Indeno[1,2,3-cd]pyrene	193-39-5	440	0.33
Benz[e]acephenanthrylene	205-99-2	214	0.33
Fluoranthene	206-44-0	413	0.33
Benzo[k]fluoranthene	207-08-9	216	0.33
Acenaphthylene	208-96-8	145	0.33
Chrysene	218-01-9	296	0.33
2-Methyl-4,6-dinitrophenol	534-52-1	111	0.8
1,3-Dichlorobenzene	541-73-1	51	0.33
2,6-Dinitrotoluene	606-20-2	93	0.33
N-Nitroso-N-propyl-1-propanamine	621-64-7	581	0.33
4-Chlorophenyl phenyl ether	7005-72-3	137	0.33
Extended Target Analytes			
1-Chloro-2-[2,2-dichloro-1-(4-chlorophenyl)ethenyl]benzene (o,p'-DDD)	53-19-0	60	TBD
1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-(1.alpha.,2.alpha.,3.alpha.,3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene (cis Nonachlor)	5103-73-1	Added	TBD
2,3,4,5,6,6a,7,7-Octachloro-1a,1b,5,5a,6,6a-hexahydro-, (1a.alpha.,1b.beta.,2.alpha.,5.alpha.,5a.beta.,6.beta.,6a.alpha.)- 2,5-methano-2H-indeno[1,2-b]oxirene (Oxychlordane)	27304-13-8	Added	TBD
Pentachloro(trichloroethenyl)benzene (Octachlorostyrene)	29082-74-4	Added	TBD
Heptachlorostyrene	61255-81-0	Added	TBD
Polybrominated biphenyls (PBB)	67774-32-7	Added	TBD
Pentachlorostyrene	83484-75-7	Added	TBD
Hexachlorostyrene	90301-92-1	Added	TBD

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (handled as TICs if found)			
2-(Acetyloxy) benzoic acid	50-78-2	206	
O-[4-[(Dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester phosphorothioic acid	52-85-7	139	
N-9H-Fluoren-2-yl-acetamide	53-96-3	95	
N-Ethyl-N-nitrosoethanamine	55-18-5	577	
O,O-Diethyl O-(4-nitrophenyl) ester phosphorothioic acid	56-38-2	611	
1,2-Dihydro-3-methylbenz[j]aceanthrylene	56-49-5	123	
1,1',1''-Phosphinylidynetris[2-methyl]aziridine	57-39-6	762	
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene	57-74-9	272	
7,12-Dimethylbenz[a]anthracene	57-97-6	144	
1,2,3,4,5,6-Hexachloro-,(1.alpha.,2.alpha.,3.beta.,4.alpha.,5.alpha.,6.beta)-cyclohexane	58-89-9	417	
2,3,4,6-Tetrachlorophenol	58-90-2	74	
N-Nitrosomorpholine	59-89-2	583	
N,N-Dimethyl-4-(phenylazo)- benzenamine	60-11-7	605	
Benzeneethanol	60-12-8	632	
O,O-Dimethyl S-[2-(methylamino)-2-oxoethyl] ester phosphorodithioic acid	60-51-5	338	
3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-(1aR,2R,2aS,3S,6R,6aR,7S,7aS)-rel-2,7:3,6-Dimethanonaphth[2,3-b]oxirene	60-57-1	327	
N-(4-ethoxyphenyl)ethanamide	62-44-2	529	
Ethyl methanesulfonate	62-50-0	390	
Benzoic acid	65-85-0	217	
Benzoic acid, 2-hydroxy	69-72-7	Added	
2,2'-Methylenebis[3,4,6-trichloro]phenol	70-30-4	434	
3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-(1aR,2R,2aR,3R,6S,6aS,7S,7aS)-rel-2,7:3,6-dimethanonaphth[2,3-b]oxirene	72-20-8	550	
1,1'-(2,2,2-Trichloroethylidene)bis[4-methoxy-benzene]	72-43-5	495	
1,1'-(2,2-Dichloroethylidene)bis[4-chlorobenzene]	72-54-8	125	
1,1'-(Dichloroethenylidene)bis[4-chlorobenzene]	72-55-9	126	
1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-Methano-1H-indene	76-44-8	425	
Dicyclopentadiene	77-73-6	326	
Tetraethyllead	78-00-2	761	
Acrylamide	79-06-1	160	
1,1,2,2-Tetrabromoethane	79-27-6	156	
4,4'-(1-Methylethylidene)bisphenol	80-05-7	128	
1-Chloro-4-(4-chlorophenyl)sulfonyloxy-benzene	80-33-1	211	
Pentachloronitrobenzene	82-68-8	620	
3-Methylsalicylic acid	83-40-9	601	
1-Naphthaleneacetic acid	86-87-3	172	
3,5-Dibromo-N-(4-bromophenyl)-2-hydroxybenzamide	87-10-5	748	

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (continued) (handled as TICs if found)			
1,2,3-Trichlorobenzene	87-61-6	40	
2,6-Dimethylbenzenamine	87-62-7	94	
2,6-Dichlorophenol	87-65-0	92	
1,2,3,4,5-Pentabromo-6-chloro-cyclohexane	87-84-3	24	
2-(1-Methylpropyl)-4,6-dinitrophenol	88-85-7	351	
3H-Pyrazol-3-one, 2,4-dihydro-5-methyl-2-phenyl-	89-25-8	634	
2-(1-Methylpropyl)phenol	89-72-5	603	
Salicylaldehyde	90-02-8	703	
[1,1'-Biphenyl]-2-ol	90-43-7	599	
2-Naphthalenamine	91-59-8	113	
N,N-Dimethyl-N'-2-pyridinyl-N'-(2-ethienylmethyl)-1,2-ethanediamine	91-80-5	492	
2-Chloro-4-phenyl-phenol/3-Chloro[1,1'-biphenyl]-4-ol	92-04-6	99	
Biphenyl	92-52-4	221	
[1,1'-Biphenyl]-4-amine	92-67-1	131	
[1,1'-Bicyclohexyl]-4-one	92-68-2	138	
P-Phenylphenol	92-69-3	682	
Benzenemethanol, .alpha.-methyl-, acetate	93-92-5	508	
Safrole	94-59-7	701	
2-Methylbenzenamine	95-53-4	604	
1,2,4,5-Tetrachlorobenzene	95-94-3	42	
1-Chloro-2,4-dinitrobenzene	97-00-7	352	
Tertiary butyl catechol	98-29-3	752	
4-(1,1-Dimethylethyl)phenol	98-55-4	694	
Acetophenone	98-86-2	154	
Sym-Trinitrobenzene	99-35-4	746	
2-Methyl-5-nitroaniline	99-55-8	143	
m-Dinitrobenzene	99-65-0	489	
1-(4-Chlorophenyl)-ethanone	99-91-2	557	
Phenylhydrazine	100-63-0	633	
N-Nitrosopiperidine	100-75-4	584	
Diphenyl methane	101-81-5	359	
Diphenyl ether	101-84-8	358	
Acetic acid, 2-phenylethyl ester/2-Phenyl ester acetic acid	103-45-7	638	
(2-Bromoethyl)benzene	103-63-9	235	
1,4-Dibromobenzene	106-37-6	616	
4-Chloro-benzenamine	106-47-8	612	
1,4-Benzenediamine	106-50-3	681	
2-Methylpyridine	109-06-8	116	
1,1'-Iminobis-2-propanol	110-97-4	336	
Benzoic acid, 2-hydroxy-, phenyl ester	118-55-8	635	
3-hydroxy-2-methyl-pyran-4-one	118-71-8	122	
2-Aminobenzoic acid	118-92-3	198	
Methyl salicylate (Oil of wintergreen)	119-36-8	509	
4-Chloro-2-(phenylmethyl)-phenol	120-32-1	588	

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (continued) (handled as TICs if found)			
Isosafrole	120-58-1	455	
Indole	120-72-9	442	
1,2-Benzenediol	120-80-9	263	
Vanillin	121-33-5	787	
2-Chloro-4-nitro-benzenamine	121-87-9	600	
.alpha.alpha.-Dimethylbenzeneethanamine	122-09-8	173	
N-Phenylbenzenamine	122-39-4	360	
2-phenoxyethanol	122-99-6	114	
p-Hydroxybenzaldehyde	123-08-0	642	
Hydroquinone	123-31-9	438	
O,O,O-Triethyl ester phosphorothioic acid	126-68-1	587	
1,4-Naphthalenedione	130-15-4	58	
[1,1'-Biphenyl]-2-ol sodium salt	132-27-4	115	
1-Naphthalenamine	134-32-7	64	
Aramite	140-57-8	202	
Dihydrochloride piperazine	142-64-3	645	
1,1a,3,3a,4,5,5,5a,5b,6-Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[cd]pentalen-2-one	143-50-0	273	
2-methyl-3,5-dinitro-benzamide	148-01-6	110	
4-Ethoxybenzenamine	156-43-4	610	
O,O-Diethyl O-pyrazinyl ester phosphorothioic acid	297-97-2	586	
O,O-Dimethyl O-(4-nitrophenyl) ester phosphorothioic acid	298-00-0	507	
O,O-Diethyl S-[(ethylthio)methyl] ester phosphorodithioic acid	298-02-2	639	
O,O-Diethyl S-[2-(ethylthio)ethyl]ester phosphorodithioic acid	298-04-4	366	
O-(2,4-Dichlorophenyl) O-methylisopropylphosphoramidothioate	299-85-4	563	
methyl-2-chloro-4-(1,1-dimethylethyl)phenyl methyl ester phosphoramidic acid	299-86-5	564	
Aldrin - 1,2,3,4,10,10-Xexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta.,5.alpha.,8.alpha.,8a.beta.)-1,4:5,8-dimethanonaphthalene	309-00-2	532	
4-(Dimethylamino)-3,5-dimethyl-, methylcarbamate phenol	315-18-4	9	
1,2,3,4,5,6-hexachloro-, (1.alpha.,2.alpha.,3.beta.,4.alpha.,5.beta.,6.beta.)Cyclohexane	319-84-6	174	
1,2,3,4,5,6-Hexachloro-, (1.alpha.,2.alpha.,3.beta.,4.alpha.,5.beta.,6.beta.)-cyclohexane	319-85-7	220	
1,2,3,4,5,6-Hexachlorocyclohexane	319-86-8	315	
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-(1R,4S,4aS,5R,8S,8aR)-rel-1,4:5,8-dimethanonaphthalene	465-73-6	449	
Ethyl 2,2-bis(4-chlorophenyl)-2-hydroxy-acetate	510-15-6	283	
Tetrabromomethane	558-13-4	256	
10-Chloro-5,10-dihydrophenarsazine	578-94-9	361	
4-Chloro-2-phenyl-phenol	607-12-5	136	
Pentachlorobenzene	608-93-5	618	
1,2,3,4-Tetrachlorobenzene	634-66-2	32	
1,2,3,5-Tetrachlorobenzene	634-90-2	33	

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (continued) (handled as TICs if found)			
N-Methyl-2-pyrrolidone	872-50-4	576	
N-Butyl-N-nitroso-1-butanamine	924-16-3	579	
N-Nitrosopyrrolidine	930-55-2	585	
6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3.alpha.,5a.beta.,6.alpha.,9.alpha.,9a.beta.)-6,9-methano-2,4,3-benzodioxathiepin	959-98-8	547	
2,3,4,5,6,7,7-Heptachloro-1a,1b,5,5a,6,6a-hexahydro-,(1aR,1bS,2R,5S,5aR,6S,6aR)-rel-2,5-Methano-2H-indeno[1,2-b]oxirene	1024-57-3	426	
6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide-6,9-methano-2,4,3-benzodioxathiepin	1031-07-8	549	
4-Bromobenzocyclobutene (BrBCB)	1073-39-8	132	
1,1'-Oxybis[2,3,4,5,6-pentabromobenzene	1163-19-5	314	
Isocyclocitral-S	1335-66-6	448	
4-(Chloroacetyl)-morpholine	1440-61-5	525	
Tertbutylstyrene	1746-23-2	750	
N,N'-Dimethyl-, phenyl ester phosphorodiamidic acid	1754-58-1	530	
Pentachloromethoxybenzene	1825-21-4	617	
1,1,2,3,3,3-Hexachloro-1-propene	1888-71-7	435	
2,6-Difluorobenzonitrile	1897-52-5	91	
(2,4-Dichlorophenoxy)-2-butoxyethyl ester acetic acid	1929-73-3	83	
2,3,5-Trichloro-1H-pyridin-4-one	1970-40-7	76	
Pentachloropyridine	2176-62-7	622	
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	2303-16-4	14	
1,1a,2,2,3,3a,4,5,5,5a,5b,6-Dodecachlorooctahydro-1,3,4-metheno-1H-cyclobuta[cd]pentalene	2385-85-5	556	
1-Naphthaleneacetic acid, methyl ester	2876-78-0	502	
2,2-Bis(bromomethyl)-1,3-propanediol	3296-90-0	322	
Tetraethyl dithiopyrophosphate	3689-24-5	760	
Octyl methoxycinnamate	5466-77-3	593	
2,6-Difluorobenzenamine	5509-65-9	90	
1,3-Benzenediol, disodium salt	6025-45-2	210	
2,2',2''-Nitrilotris-sulfate (salt) ethanol	7376-31-0	778	
2,2a,3,3,4,7-Hexachlorodecahydro-(1.alpha.,2.beta.,2a.beta.,4.beta.,4a.beta.,5.beta.,6a.beta.,6b.beta.,7R*)-1,2,4-methenocyclopenta[cd]pentalene-5-carboxaldehyde	7421-93-4	551	
3,3'-Dimethylbenzidine	7563-59-9	118	
Toxaphene	8001-35-2	772	
Chlorostyrene	8063-96-5	Added	
2,2-Dibromo-2-cyanoacetamide	10222-01-2	311	
N-Methyl-N-nitrosoethanamine	10595-95-6	582	
Aroclor 1260	11096-82-5	655	
Aroclor 1254	11097-69-1	533	
Aroclor 1268	11100-14-4	657	

Target Analyte List: USEPA 8270
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8270C (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (continued) (handled as TICs if found)			
Aroclor 1221	11104-28-2	651	
Aroclor 1232	11141-16-5	652	
Aroclor 1248	12672-29-6	654	
4-Chloro-2-cyclopentylphenol	13347-42-7	134	
Decabromobiphenyl	13654-09-6	313	
Tetrachlorophenol	25167-83-3	759	
Dinitrophenol	25550-58-7	354	
Hexachlorocyclohexane	27154-44-5	431	
1,1'-Biphenyl, ar,ar,ar,ar,ar',ar',ar',ar'-octabromo-	27858-07-7	592	
1,1'-Biphenyl, phenoxy-	28984-89-6	Added	
Octachlorostyyrene - Pentachloro(trichloroethenyl)benzene	29082-74-4	Added	
1-(3-Chlorophenyl)ethanone	29731-15-5	281	
6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3.alpha.,5a.alpha.,6.beta.,9.beta.,9a.alpha.)-6,9-methano-2,4,3-benzodioxathiepin	33213-65-9	548	
Aroclor 1262	37324-23-5	656	
(4-[4-(hydroxy-diphenyl-methyl)-1-piperidyl]-1-(4-tert-butylphenyl)-butan-1-ol	50679-08-8	8	
Tert-butylstyrene	50976-19-7	751	
Aroclor 1242	53469-21-9	653	
Benzenamine, N,N-dimethyl-, sulfate (1:1)	58888-49-6	348	
Heptachlorostyrene	61255-81-0	Added	
PBB	67774-32-7	Added	
3,5-Dichloro-2,6-dimethyl-1H-pyridin-4-one	68821-99-8	304	
Pentachlorostyrene	83484-75-7	Added	
Dimethyl 2,3,5,6-tetrachlorobenzene-1,4-dicarboxylate	87209-56-1	341	
2-ethoxyethyl 2-[4-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]oxyphenoxy]propanoate	87237-48-7	107	
Hexachlorostyrene	90301-92-1	Added	
2-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)- benzenesulfonamide	219714-96-2	558	

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 1613-B
Chemical Method References and Reporting Limits
TR & USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 1613B (40 CFR 136, as amended)
Test Procedure: Solvent extraction, HR/LR GC/MS or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	79	1.0 ng/kg TEQ
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	26	1.0 ng/kg TEQ
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	37	1.0 ng/kg TEQ
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	28	1.0 ng/kg TEQ
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	25	1.0 ng/kg TEQ
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	31	1.0 ng/kg TEQ
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	39	1.0 ng/kg TEQ
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	78	1.0 ng/kg TEQ
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	29	1.0 ng/kg TEQ
1,2,3,4,8,9-Hexachlorodibenzofuran	55684-94-1	30	1.0 ng/kg TEQ
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	75	1.0 ng/kg TEQ
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	38	1.0 ng/kg TEQ
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	34	1.0 ng/kg TEQ
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	35	1.0 ng/kg TEQ
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	27	1.0 ng/kg TEQ
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	73	1.0 ng/kg TEQ
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	36	1.0 ng/kg TEQ
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
None			

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8041
Chemical Methods, References, and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8041 (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; derivatization; GC/FID, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
2,4-Dinitrophenol	51-28-5	88	0.8
2,3,4,6-Tetrachlorophenol	58-90-2	74	0.8
4-Chloro-3-methyl-phenol	59-50-7	613	0.28
2,6-Dichlorophenol	87-65-0	92	0.33
Pentachlorophenol	87-86-5	621	0.8
2,4,6-Trichlorophenol	88-06-2	82	0.33
2-Nitrophenol	88-75-5	598	0.33
2-(1-Methylpropyl)-4,6-dinitrophenol	88-85-7	351	0.2
2-Methylphenol	95-48-7	591	0.33
2-Chlorophenol	95-57-8	102	0.33
2,4,5-Trichlorophenol	95-95-4	80	0.33
4-Nitrophenol	100-02-7	650	0.8
2,4-Dimethylphenol	105-67-9	87	0.33
4-Methylphenol	106-44-5	615	0.33
3-Methylphenol	108-39-4	488	0.33
Phenol	108-95-2	626	0.33
2,4-Dichlorophenol	120-83-2	Added	0.33
2-Methyl-4,6-dinitrophenol	534-52-1	111	0.8
Tetrachlorophenol	25167-83-3	759	TBD
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
2,2'-Methylenebis[3,4,6-trichloro]phenol	70-30-4	434	
4,4'-(1-Methylethylidene)bisphenol	80-05-7	128	
2-(1-Methylpropyl)phenol	89-72-5	603	
2-Chloro-4-phenyl-phenol/3-Chloro[1,1'-biphenyl]-4-ol	92-04-6	99	
4-(1,1-Dimethylethyl)phenol	98-55-4	694	
4-Chloro-2-(phenylmethyl)-phenol	120-32-1	588	
O-(2,4-Dichlorophenyl) O-methylisopropylphosphoramidothioate	299-85-4	563	
2-Cyclohexyl-4,6-dinitrophenol dicyclohexylamine salt	317-83-9	11	
4-Chloro-2-phenyl-phenol	607-12-5	136	
4-Chloro-2-cyclopentylphenol	13347-42-7	134	
Dinitrophenol	25550-58-7	354	

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8081
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8081A (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/ECD, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	50-29-3	127	0.02
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene	57-74-9	272	0.025
1,2,3,4,5,6-Hexachloro-,(1.alpha.,2.alpha.,3.beta.,4.alpha.,5.alpha.,6.beta)-cyclohexane	58-89-9	417	0.02
3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-(1aR,2R,2aS,3S,6R,6aR,7S,7aS)-rel-2,7:3,6-Dimethanonaphth[2,3-b]oxirene	60-57-1	327	0.02
3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-(1aR,2R,2aR,3R,6S,6aS,7S,7aS)-rel-2,7:3,6-dimethanonaphth[2,3-b]oxirene	72-20-8	550	0.02
1,1'-(2,2,2-Trichloroethylidene)bis[4-methoxy-benzene]	72-43-5	495	0.02
1,1'-(2,2-Dichloroethylidene)bis[4-chlorobenzene]	72-54-8	125	0.02
1,1'-(Dichloroethenylidene)bis[4-chlorobenzene]	72-55-9	126	0.02
1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-Methano-1H-indene	76-44-8	425	0.02
1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene	77-47-4	432	0.02
Pentachloronitrobenzene	82-68-8	620	0.02
1,2-Dibromo-3-chloropropane	96-12-8	45	0.01
Hexachlorobenzene	118-74-1	429	0.02
Aldrin - 1,2,3,4,10,10-Xexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta.,5.alpha.,8.alpha.,8a.beta.)-1,4:5,8-dimethanonaphthalene	309-00-2	532	0.02
1,2,3,4,5,6-hexachloro-,(1.alpha.,2.alpha.,3.beta.,4.alpha.,5.beta.,6.beta.)Cyclohexane	319-84-6	174	0.02
1,2,3,4,5,6-Hexachloro-,(1.alpha.,2.alpha.,3.beta.,4.alpha.,5.beta.,6.beta.)-cyclohexane	319-85-7	220	0.02
1,2,3,4,5,6-Hexachlorocyclohexane	319-86-8	315	0.02
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-(1R,4S,4aS,5R,8S,8aR)-rel-1,4:5,8-dimethanonaphthalene	465-73-6	449	0.02
Ethyl 2,2-bis(4-chlorophenyl)-2-hydroxy-acetate	510-15-6	283	
6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide,(3.alpha.,5a.beta.,6.alpha.,9.alpha.,9a.beta.)-6,9-methano-2,4,3-benzodioxathiepin	959-98-8	547	0.02
2,3,4,5,6,7,7-Heptachloro-1a,1b,5,5a,6,6a-hexahydro-,(1aR,1bS,2R,5S,5aR,6S,6aR)-rel-2,5-Methano-2H-indeno[1,2-b]oxirene	1024-57-3	426	0.02
6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide-6,9-methano-2,4,3-benzodioxathiepin	1031-07-8	549	0.02
2-Chloro-N-(1-methylethyl)-N-phenyl- acetamide	1918-16-7	684	
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	2303-16-4	14	0.02
1,1a,2,2,3,3a,4,5,5,5a,5b,6-Dodecachlorooctahydro-1,3,4-metheno-1H-cyclobuta[cd]pentalene	2385-85-5	556	0.05

Target Analyte List: USEPA 8081
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8081A (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/ECD, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes (continued)			
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-(1R,2S,3aS,4S,7R,7aS)-rel-4,7-methano-1H-indene	5103-71-9	158	0.02
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-(1R,2R,3aS,4S,7R,7aS)-rel-4,7-methano-1H-indene	5103-74-2	554	0.02
2,2a,3,3,4,7-Hexachlorodecahydro-(1.alpha.,2.beta.,2a.beta.,4.beta.,4a.beta.,5.beta.,6a.beta.,6b.beta.,7R*)-1,2,4-methenocyclopenta[cd]pentalene-5-carboxaldehyde	7421-93-4	551	0.02
Toxaphene	8001-35-2	772	0.17
6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3.alpha.,5a.alpha.,6.beta.,9.beta.,9a.alpha.)-6,9-methano-2,4,3-benzodioxathiepin	33213-65-9	548	0.02
1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-, (1.alpha.,2.beta.,3.alpha.,3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene	39765-80-5	Added	0.02
Extended Target Analytes			
1-Chloro-2-[2,2-dichloro-1-(4-chlorophenyl)ethenyl]benzene (o,p'-DDD)	53-19-0	60	TBD
1,2,3,4,5,6,7,8,8-Nonachloro-2,3,3a,4,7,7a-hexahydro-(1.alpha.,2.alpha.,3.alpha.,3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methano-1H-indene (cis Nonachlor)	5103-73-1	Added	TBD
2,3,4,5,6,6a,7,7-Octachloro-1a,1b,5,5a,6,6a-hexahydro-, (1a.alpha.,1b.beta.,2.alpha.,5.alpha.,5a.beta.,6.beta.,6a.alpha.)- 2,5-methano-2H-indeno[1,2-b]oxirene (Oxychlordane)	27304-13-8	Added	TBD
Pentachloro(trichloroethenyl)benzene (Octachlorostyrene)	29082-74-4	Added	TBD
Heptachlorostyrene	61255-81-0	Added	TBD
Polybrominated biphenyls (PBB)	67774-32-7	Added	TBD
Pentachlorostyrene	83484-75-7	Added	TBD
Hexachlorostyrene	90301-92-1	Added	TBD

Target Analyte List: USEPA 8081
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8081A (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/ECD, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Other Site-Specific COI (handled as TICs if found)			
Hexachloroethane	67-72-1	428	
3,5-Dibromo-N-(4-bromophenyl)-2-hydroxybenzamide	87-10-5	748	
1,2,3-Trichlorobenzene	87-61-6	40	
1,2,3,4,5-Pentabromo-6-chloro-cyclohexane	87-84-3	24	
1,2-Dichlorobenzene	95-50-1	47	
1,2,4,5-Tetrachlorobenzene	95-94-3	42	
1-Chloro-2,4-dinitrobenzene	97-00-7	352	
1-(4-Chlorophenyl)-ethanone	99-91-2	557	
1,4-Dichlorobenzene	106-46-7	56	
Bis(2-chloro-1-methylethyl)ether	108-60-1	222	
Bis(2-chloroethyl) ether	111-44-4	224	
Bis(2-chloroethoxy)methane	111-91-1	223	
1,3-Dichlorobenzene	541-73-1	51	
Pentachlorobenzene	608-93-5	618	
1,2,3,4-Tetrachlorobenzene	634-66-2	32	
1,2,3,5-Tetrachlorobenzene	634-90-2	33	
1,1'-Oxybis[2,3,4,5,6-pentabromobenzene	1163-19-5	314	
Pentachloromethoxybenzene	1825-21-4	617	
1,1,2,3,3,3-Hexachloro-1-propene	1888-71-7	435	
2,2-Bis(bromomethyl)-1,3-propanediol	3296-90-0	322	
4-Chlorophenyl phenyl ether	7005-72-3	137	
2,2-Dibromo-2-cyanoacetamide	10222-01-2	311	
Decabromobiphenyl	13654-09-6	313	
Hexachlorocyclohexane	27154-44-5	431	
1,1'-Biphenyl, ar,ar,ar,ar,ar',ar',ar',ar'-octabromo-	27858-07-7	592	
1-(3-Chlorophenyl)ethanone	29731-15-5	281	
2-ethoxyethyl 2-[4-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]oxyphenoxy]propanoate	87237-48-7	107	
2-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)- benzenesulfonamide	219714-96-2	558	

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8082
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8082 (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/ECD, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
Aroclor 1260	11096-82-5	655	0.01
Aroclor 1254	11097-69-1	533	0.01
Aroclor 1268	11100-14-4	657	0.01
Aroclor 1221	11104-28-2	651	0.02
Aroclor 1232	11141-16-5	652	0.01
Aroclor 1248	12672-29-6	654	0.01
Aroclor 1262	37324-23-5	656	0.01
Aroclor 1242	53469-21-9	653	0.01
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
None			

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8121
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8121 (SW-846, rev. Sep. 1994)
Test Procedure: Solvent extraction; GC/ECD, GC/MS, GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
1-Chloro-2-[2,2-dichloro-1-(4-chlorophenyl)ethenyl]benzene (o,p'-DDD)	53-19-0	60	TBD
1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene	77-47-4	432	TBD
Pentachloronitrobenzene	82-68-8	620	TBD
Hexachlorobenzene	118-74-1	429	TBD
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
None			

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8141
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8141 (SW-846, rev. Sep. 1994)
Test Procedure: Solvent extraction; GC/N-P, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
O-[4-[(Dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester phosphorothioic acid	52-85-7	139	TBD
O,O-Diethyl O-(4-nitrophenyl) ester phosphorothioic acid	56-38-2	611	0.05
O,O-Dimethyl S-[2-(methylamino)-2-oxoethyl] ester phosphorodithioic acid	60-51-5	338	0.2
O,O-Diethyl O-pyrazinyl ester phosphorothioic acid	297-97-2	586	
O,O-Dimethyl O-(4-nitrophenyl) ester phosphorothioic acid	298-00-0	507	0.04
O,O-Diethyl S-[(ethylthio)methyl] ester phosphorodithioic acid	298-02-2	639	0.02
O,O-Diethyl S-[2-(ethylthio)ethyl]ester phosphorodithioic acid	298-04-4	366	0.05
Phosphorothioic acid, O,O-dimethyl O-(2,4,5-trichlorophenyl) ester (Ronnel)	299-84-3	339	0.05
O,O-Diethyl O-(3,5,6-trichloro-2-pyridinyl) ester phosphorothioic acid (Chlorpyrifos)	2921-88-2	294	0.05
O,O-Dimethyl O-(3,5,6-trichloro-2-pyridinyl) ester phosphorothioic acid	5598-13-0	340	TBD
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
O-(2,4-Dichlorophenyl) O-methylisopropylphosphoramidothioate	299-85-4	563	
methyl-2-chloro-4-(1,1-dimethylethyl)phenyl methyl ester phosphoramidic acid	299-86-5	564	
N,N'-Dimethyl-, phenyl ester phosphorodiamidic acid	1754-58-1	530	
Tetraethyl dithiopyrophosphate	3689-24-5	760	

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 8151
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 8151A (SW-846, rev. Dec. 1996)
Test Procedure: Solvent extraction; GC/ECD, GC/MS, or GC/MS/MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
2,2-Dichloropropanoic acid	75-99-0	72	0.5
Pentachlorophenol	87-86-5	621	0.01
2-(1-Methylpropyl)-4,6-dinitrophenol	88-85-7	351	0.2
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	93-72-1	66	0.3
2,4,5-Trichlorophenoxyacetic acid (2,4-T)	93-76-5	65	0.5
2-methyl-4-chlorophenoxyacetic acid (MCPA)	94-74-6	345	0.3
2-(2,4-Dichlorophenoxy)acetic acid (2,4-D)	94-75-7	67	0.2
4-Amino-3,5,6-trichloro-2-pyridinecarboxylic acid	1918-02-1	771	0.5
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
2,2-Dichloro-2-(2,4,5-trichlorophenoxy)ethyl ester propanoic acid	136-25-4	379	
2-Chloropropionic acid	598-78-7	103	
(2,4-Dichlorophenoxy)-2-butoxymethylethyl ester acetic acid	1320-18-9	121	
(2,4-Dichlorophenoxy)-2-butoxyethyl ester acetic acid	1929-73-3	83	
Acetic acid, (2,4-dichlorophenoxy)-, compd. with N-methylmethanamine	2008-39-1	69	
2-(3,5,6-Trichloropyridin-2-yl)oxyacetic acid	55335-06-3	70	
Haloxyfop-methyl	69806-40-2	423	

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 6010/6020
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 6010B/6020A (SW-846, rev. Dec. 1996)
Test Procedure: Acid Digestion; ICP-OES/ICP-MS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
Aluminum	7429-90-5	176	0.02
Iron	7439-89-6	445	0.02
Lead	7439-92-1	457	0.02
Lithium	7439-93-2	465	0.02
Magnesium	7439-95-4	469	0.02
Manganese	7439-96-5	486	0.02
Nickel	7440-02-0	571	0.02
Potassium	7440-09-7	672	0.02
Silver	7440-22-4	713	0.02
Sodium	7440-23-5	715	0.02
Strontium	7440-24-6	728	0.02
Thallium	7440-28-0	764	0.02
Tin	7440-31-5	767	0.02
Titanium	7440-32-6	Added	0.02
Antimony	7440-36-0	199	0.02
Arsenic	7440-38-2	204	0.02
Barium	7440-39-3	207	0.02
Beryllium	7440-41-7	219	0.02
Boron	7440-42-8	228	0.02
Cadmium	7440-43-9	244	0.02
Chromium	7440-47-3	295	0.02
Cobalt	7440-48-4	300	0.02
Copper	7440-50-8	301	0.02
Vanadium	7440-62-2	Added	0.02
Zinc	7440-66-6	797	0.02
Calcium	7440-70-2	245	0.02
Selenium	7782-49-2	710	0.02
Extended Target Analytes			
Gold	7440-57-5	421	TBD
Other Site-Specific COI (handled as TICs if found)			
None			

Notes:
TBD = To Be Determined

Target Analyte List: USEPA 7471
Chemical Method References and Reporting Limits
TR and USR GeoMorph Site Characterization QAPP
Midland Soils Site Characterization QAPP

Test Reference: USEPA 7471A (SW-846, rev. Dec. 1996)
Test Procedure: Acid Digestion; CVASS detection

Parameter	CAS No.	Dow ID	Reporting Limits (mg/kg)
Standard Target Analytes			
Mercury	7439-97-6	490	0.05
Extended Target Analytes			
None			
Other Site-Specific COI (handled as TICs if found)			
None			

Notes:
TBD = To Be Determined

EXHIBIT II – 3

SECONDARY COI

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1. DEFINITION OF PRIMARY AND SECONDARY CONSTITUENTS OF INTEREST (COI)

The Tittabawassee River Sampling and Analysis Plans (SAPs) and Quality Assurance Project Plans (QAPPs) specify the 17 chlorinated dibenzofurans and dibenzodioxins used to calculate TEQ as the Primary Constituents of Interest (COI) in the Tittabawassee River investigation (ATS, 2006a, b; ATS, 2007a, b). These compounds are known to be environmentally persistent, and have relatively low threshold concentrations for environmental concern. However, because of the long and complex history of the Midland Plant as a manufacturer of chemicals, and the likelihood of other potential contributors of chemicals to the Tittabawassee River watershed, other potential constituents of interest (PCOI) are being evaluated as part of the site characterization. The SAP and QAPP documents identify these additional substances as site-specific, Secondary COI.

A. PCOI/COI Evaluation Process

Evaluation of Secondary COI for the Tittabawassee River investigation was a large and complex task, given the chemical manufacturing history of the 100+ year old Dow Midland Plant. This evaluation was undertaken in a collaborative effort between Dow, MDEQ, USEPA and ATS in the summer and fall of 2006. The end products of this effort included a chemical database of more than 1,000 substances used and/or produced over the history of the Midland Plant, along with important physical properties, chemical properties and analytical method references. This database was used to generate a series of method-based Target Analyte Lists (TALs) which identified the site-specific Secondary COI for Tittabawassee River samples, and assigned these Secondary COI to the USEPA methods that would be used to measure them. The PCOI evaluation process was documented in a Technical Memorandum issued by ATS on December 1, 2006, and included as Attachment G in the Tittabawassee River Remedial Investigation Work Plan (RIWP) issued on that same day (ATS, 2006c, d).

B. Secondary COI Sample Selection Criteria

B.1 Sediment Deposition Zones

The *GeoMorph*® investigation of the Tittabawassee River is based upon a site model that incorporates the environmental chemistry of specific contaminants with their fate and transport, based on the hydrology and morphology of the river. In this way, the distribution of contaminants associated with river sediments can be mapped along with the erosion and deposition zones of the river. This is equally true for fine-grained sediments as well as medium/coarse grained sediments.

Because of the unique nature of the graphitic carbon source material for dioxin and furan Primary COI, these contaminants occur in all sediment size fractions. Geochemistry fractionation studies have confirmed they can occur in fine grained, silt and clay-sized material,

as well as in larger material the size of medium and coarse-grained sands (Dow, 2007). Accordingly, they are useful indicators of impact in all sediments of the Tittabawassee River. Based on these Primary COI, impacted deposition zones within the Upper and Middle Tittabawassee River include the following morphologic units:

- in-channel deposits
- levees
- ridge and swale complexes
- wetlands
- near-channel over-bank areas (e.g. immediately downstream from eroding, contaminated levee)
- tributaries

Samples for characterization of Secondary COI are selected from deposits accreted over the past 150 years within each of these morphologic units and along the entire length of the river.

Secondary COI samples are selected to be inclusive of deposited sediments spanning the entire range of dioxin/furan impact, and the entire range of particle size fractions up to small cobble.

B.2 Other Factors

In addition to sediment deposition zones, the following criteria are also used to select samples for Secondary COI:

- atypical dioxin/furan congener patterns;
- proximity to historic outfalls;
- evidence during coring or logging of visual, olfactory or other characteristics suggestive
- of impact.

Atypical congener patterns can include elevated TCDD/PCDD content, indicative of residues from trichlorophenol processes, and/or elevated HxCDF content, indicative of residues from pentachlorophenol processes. An analysis of the location of historic outfalls was made in reparing the RIWP, and sampling transects have been located to provide information on residual impact, if any exists. In certain samples, visual or other physical clues suggest the possibility of impact.

C. 2006 Secondary COI Using USEPA Appendix IX

While the 2006 field activities were underway and the PCOI evaluation process was being finalized, MDEQ and Dow agreed to gather some information on Secondary COI using the current USEPA Appendix IX list of target analytes and analytical methods. For this, a set of 24 samples from 22 in-channel and over-bank locations were selected from the 2006 UTR sample set. The specific locations and sample intervals are identified in the tables at the end of this exhibit. Included were a number of samples from the following locations selected to provide information about sediment composition at transects adjacent to known historic outfalls:

- RD-55+00-IC-C
- RD-55+00-IC-SW2
- RD-55+05-IC-NE
- RG-117+00-IC-C
- RG-130+50-IC-C
- RG-130+50-IC-SW
- RG-130+50-NE10
- RG-130+50-NE30
- RH-161+50-T-NE50
- RH-161+50-T-NE265
- RH-162+00-IC-C

The results of this analysis were presented in the February 1, 2007 Site Characterization Report (ATS, 2007c). Of the 221 target analytes, a total of 94 substances were detected in these samples.

D. 2006 through 2008 Secondary COI Sampling Locations

The following section presents summary information on SCOI samples collected and analyzed within the are upstream of Midland (i.e., Reference Area) and the Tittabawassee River Study Area and includes: 1) a summary table with the final SCOI Target Analyte List (TAL); 2) SCOI sample location summary table organized by Region and depositional setting; 3) SCOI sample location figure; and 4) documentation summary of the SCOI sample location criteria based on the rationale described above in Section IA and B (PCOI/COI Evaluation Process and SCOI Sample Selection Criteria).

Secondary COI Target Compound List
Tittabawassee River Site Cinvestigation

Analyte	Functional Group	Analytical Group	CAS	Units	Lab MDL	PQL
Polybrominated biphenyls	Brominated Compounds	Extended Target Analytes	(67774-32-7)	mg/kg	0.036	0.04
2,3,4,6-Tetrachlorophenol	Chlorinated Phenols	Standard Target Analytes	(58-90-2)	mg/kg	0.008	0.02
2,4,5-Trichlorophenol	Chlorinated Phenols	Standard Target Analytes	(95-95-4)	mg/kg	0.056	0.19
2,4,6-Trichlorophenol	Chlorinated Phenols	Standard Target Analytes	(88-06-2)	mg/kg	0.060	0.20
2,4-Dichlorophenol	Chlorinated Phenols	Standard Target Analytes	(120-83-2)	mg/kg	0.067	0.22
2,4-Dimethylphenol	Chlorinated Phenols	Standard Target Analytes	(105-67-9)	mg/kg	0.082	0.27
2,6-Dichlorophenol	Chlorinated Phenols	Standard Target Analytes	(87-65-0)	mg/kg	0.023	0.08
2-Chlorophenol	Chlorinated Phenols	Standard Target Analytes	(95-57-8)	mg/kg	0.097	0.32
4-Chloro-3-methyl-phenol	Chlorinated Phenols	Standard Target Analytes	(59-50-7)	mg/kg	0.064	0.21
Pentachlorophenol	Chlorinated Phenols	Standard Target Analytes	(87-86-5)	mg/kg	0.054	0.05
1,2,3,4-Tetrachlorobenzene	Chlorobenzenes	Extended Target Analytes	(634-66-2)	mg/kg	0.010	0.02
1,2,3-Trichlorobenzene	Chlorobenzenes	Standard Target	87-61-6	mg/kg	0.012	0.04
1,2,3-Trichlorobenzene	Chlorobenzenes	Extended Target Analytes	(87-61-6)	mg/kg	0.008	0.02
1,2,4,5-Tetrachlorobenzene	Chlorobenzenes	Extended Target Analytes	(95-94-3)	mg/kg	0.005	0.02
1,2,4-Trichlorobenzene	Chlorobenzenes	Standard Target	120-82-1	mg/kg	0.014	0.05
1,2,4-Trichlorobenzene	Chlorobenzenes	Standard Target Analytes	(120-82-1)	mg/kg	0.054	0.18
1,2-Dichlorobenzene	Chlorobenzenes	Standard Target	95-50-1	mg/kg	0.014	0.05
1,2-Dichlorobenzene	Chlorobenzenes	Standard Target Analytes	(95-50-1)	mg/kg	0.042	0.08
1,3-Dichlorobenzene	Chlorobenzenes	Standard Target	541-73-1	mg/kg	0.011	0.04
1,3-Dichlorobenzene	Chlorobenzenes	Standard Target Analytes	(541-73-1)	mg/kg	0.050	0.10
1,4-Dichlorobenzene	Chlorobenzenes	Standard Target	106-46-7	mg/kg	0.011	0.04
1,4-Dichlorobenzene	Chlorobenzenes	Standard Target Analytes	(106-46-7)	mg/kg	0.042	0.08
Chlorobenzene	Chlorobenzenes	Standard Target	108-90-7	mg/kg	0.003	0.01
Hexachlorobenzene	Chlorobenzenes	Standard Target Analytes	(118-74-1)	mg/kg	0.008	0.02
Pentachlorobenzene	Chlorobenzenes	Extended Target Analytes	(608-93-5)	mg/kg	0.007	0.02
Pentachloronitrobenzene	Chlorobenzenes	Standard Target Analytes	(82-68-8)	mg/kg	0.009	0.02
(E)-α,β-2,3,4,5,6-Heptachlorostyrene	Chlorostyrenes	Extended Target Analytes	(29086-38-2)	mg/kg		0.03
(E)-β-2,3,4,5,6-Hexachlorostyrene	Chlorostyrenes	Extended Target Analytes	(90301-92-1)	mg/kg		0.03
(Z)-α,β-2,3,4,5,6-Heptachlorostyrene	Chlorostyrenes	Extended Target Analytes	(29086-39-3)	mg/kg		0.03
(Z)-β-2,3,4,5,6-Hexachlorostyrene	Chlorostyrenes	Extended Target Analytes	(90301-93-2)	mg/kg		0.03
2,3,4,5,6-Pentachlorostyrene	Chlorostyrenes	Extended Target Analytes	(14992-81-5)	mg/kg		0.03
Octachlorostyrene	Chlorostyrenes	Extended Target Analytes	(29082-74-4)	mg/kg	0.008	0.02
α-2,3,4,5,6-Hexachlorostyrene	Chlorostyrenes	Extended Target Analytes	(68705-15-7)	mg/kg		0.03
β,β-2,3,4,5,6-Heptachlorostyrene	Chlorostyrenes	Extended Target Analytes	(29082-75-5)	mg/kg		0.03
1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF	Dioxins & Furans			ng/kg		
1,2,3,7,8-PeCDF	Dioxins & Furans			ng/kg		
2,3,4,7,8-PeCDF	Dioxins & Furans			ng/kg		
2,3,7,8-TCDD	Dioxins & Furans			ng/kg		
2,3,7,8-TCDF	Dioxins & Furans			ng/kg		
AICC	Dioxins & Furans			ng/kg		
ETEQ	Dioxins & Furans			ppt		
Chlorpyrifos	Organophosphorus Compounds	Extended Target Analytes	(2921-88-2)	mg/kg	0.022	0.04
Dimethoate	Organophosphorus Compounds	Extended Target Analytes	(60-51-5)	mg/kg	0.018	0.04
Disulfoton	Organophosphorus Compounds	Extended Target Analytes	(298-04-4)	mg/kg	0.017	0.03
Endosulfan sulfate	Organophosphorus Compounds	Extended Target Analytes	(1031-07-8)	mg/kg	0.005	0.02
Ethyl parathion	Organophosphorus Compounds	Extended Target Analytes	(56-38-2)	mg/kg	0.015	0.05
Famphur	Organophosphorus Compounds	Extended Target Analytes	(52-85-7)	mg/kg	0.022	0.04
Methyl chlorpyrifos	Organophosphorus Compounds	Extended Target Analytes	(5598-13-0)	mg/kg	0.020	0.04
Methyl parathion	Organophosphorus Compounds	Extended Target Analytes	(298-00-0)	mg/kg	0.015	0.03
Phorate	Organophosphorus Compounds	Extended Target Analytes	(298-02-2)	mg/kg	0.009	0.02
Ronnel	Organophosphorus Compounds	Extended Target Analytes	(299-84-3)	mg/kg	0.018	0.04
Thionazin	Organophosphorus Compounds	Extended Target Analytes	(297-97-2)	mg/kg	0.017	0.03
4,4-DDD	Other Chlorinated Hydrocarbons	Extended Target Analytes	(72-54-8)	mg/kg	0.009	0.02
4,4-DDE	Other Chlorinated Hydrocarbons	Extended Target Analytes	(72-55-9)	mg/kg	0.009	0.02
4,4-DDT	Other Chlorinated Hydrocarbons	Extended Target Analytes	(50-29-3)	mg/kg	0.008	0.02
Aldrin	Other Chlorinated Hydrocarbons	Extended Target Analytes	(309-00-2)	mg/kg	0.006	0.02
cis-Chlordane	Other Chlorinated Hydrocarbons	Extended Target Analytes	(5103-71-9)	mg/kg	0.008	0.02
cis-Nonachlor	Other Chlorinated Hydrocarbons	Extended Target Analytes	(5103-73-1)	mg/kg	0.009	0.02
Dieldrin	Other Chlorinated Hydrocarbons	Extended Target Analytes	(60-57-1)	mg/kg	0.010	0.02
Endosulfan I	Other Chlorinated Hydrocarbons	Extended Target Analytes	(959-98-8)	mg/kg	0.009	0.02
Endosulfan II	Other Chlorinated Hydrocarbons	Extended Target Analytes	(33213-65-9)	mg/kg	0.008	0.02
Endrin	Other Chlorinated Hydrocarbons	Extended Target Analytes	(72-20-8)	mg/kg	0.008	0.02
Endrin aldehyde	Other Chlorinated Hydrocarbons	Extended Target Analytes	(7421-93-4)	mg/kg	0.010	0.02

Secondary COI Target Compound List
Tittabawassee River Site Cinvestigation

Analyte	Functional Group	Analytical Group	CAS	Units	Lab MDL	PQL
Heptachlor	Other Chlorinated Hydrocarbons	Extended Target Analytes	(76-44-8)	mg/kg	0.007	0.01
Heptachlor epoxide	Other Chlorinated Hydrocarbons	Extended Target Analytes	(1024-57-3)	mg/kg	0.008	0.02
Hexachloro-1,3-butadiene	Other Chlorinated Hydrocarbons	Standard Target Analytes	(87-68-3)	mg/kg	0.059	0.20
Hexachloro-1,3-cyclopentadiene	Other Chlorinated Hydrocarbons	Standard Target Analytes	(77-47-4)	mg/kg	0.007	0.01
Hexachloroethane	Other Chlorinated Hydrocarbons	Standard Target Analytes	(67-72-1)	mg/kg	0.062	0.21
Isodrin	Other Chlorinated Hydrocarbons	Extended Target Analytes	(465-73-6)	mg/kg	0.009	0.02
Isophorone	Other Chlorinated Hydrocarbons	Standard Target Analytes	(78-59-1)	mg/kg	0.055	0.18
Lindane	Other Chlorinated Hydrocarbons	Extended Target Analytes	(58-89-9)	mg/kg	0.010	0.02
Methoxychlor	Other Chlorinated Hydrocarbons	Extended Target Analytes	(72-43-5)	mg/kg	0.009	0.02
Mirex	Other Chlorinated Hydrocarbons	Extended Target Analytes	(2385-85-5)	mg/kg	0.009	0.03
o,p'-DDD	Other Chlorinated Hydrocarbons	Extended Target Analytes	(53-19-0)	mg/kg	0.009	0.02
Oxychlordane	Other Chlorinated Hydrocarbons	Extended Target Analytes	(27304-13-8)	mg/kg	0.006	0.02
Propachlor	Other Chlorinated Hydrocarbons	Extended Target Analytes	(1918-16-7)	mg/kg	0.006	0.02
Toxaphene	Other Chlorinated Hydrocarbons	Extended Target Analytes	(8001-35-2)	mg/kg	0.166	0.17
trans-Chlordane	Other Chlorinated Hydrocarbons	Extended Target Analytes	(5103-74-2)	mg/kg	0.007	0.01
trans-Nonachlor	Other Chlorinated Hydrocarbons	Extended Target Analytes	(39765-80-5)	mg/kg	0.009	0.02
α-BHC	Other Chlorinated Hydrocarbons	Extended Target Analytes	(319-84-6)	mg/kg	0.007	0.01
β-BHC	Other Chlorinated Hydrocarbons	Extended Target Analytes	(319-85-7)	mg/kg	0.008	0.02
δ-BHC	Other Chlorinated Hydrocarbons	Extended Target Analytes	(319-86-8)	mg/kg	0.008	0.02
2,4-Dinitrotoluene	Other Extractable Organics	Standard Target Analytes	(121-14-2)	mg/kg	0.048	0.16
2,6-Dinitrotoluene	Other Extractable Organics	Standard Target Analytes	(606-20-2)	mg/kg	0.064	0.21
2-Nitroaniline	Other Extractable Organics	Standard Target Analytes	(88-74-4)	mg/kg	0.051	0.20
3,3'-Dichlorobenzidine	Other Extractable Organics	Standard Target Analytes	(91-94-1)	mg/kg	0.484	1.60
3-Nitroaniline	Other Extractable Organics	Standard Target Analytes	(99-09-2)	mg/kg	0.103	0.34
4-Bromophenyl phenyl ether	Other Extractable Organics	Standard Target Analytes	(101-55-3)	mg/kg	0.094	0.31
4-Chlorophenyl phenyl ether	Other Extractable Organics	Standard Target Analytes	(7005-72-3)	mg/kg	0.088	0.29
4-Nitroaniline	Other Extractable Organics	Standard Target Analytes	(100-01-6)	mg/kg	0.180	0.60
Aniline	Other Extractable Organics	Standard Target Analytes	(62-53-3)	mg/kg	0.090	0.30
Azobenzene	Other Extractable Organics	Standard Target Analytes	(103-33-3)	mg/kg	0.060	0.20
Benzidine	Other Extractable Organics	Standard Target Analytes	(92-87-5)	mg/kg	0.230	0.77
Benzyl alcohol	Other Extractable Organics	Standard Target Analytes	(100-51-6)	mg/kg	0.306	1.00
Bis(2-chloroethoxy) methane	Other Extractable Organics	Standard Target Analytes	(111-91-1)	mg/kg	0.062	0.21
Bis(2-chloroethyl) ether	Other Extractable Organics	Standard Target Analytes	(111-44-4)	mg/kg	0.043	0.09
Bis(2-chloroisopropyl) ether	Other Extractable Organics	Standard Target Analytes	(108-60-1)	mg/kg	0.075	0.25
Bisphenol-A	Other Extractable Organics	Extended Target Analytes	(80-05-7)	mg/kg	0.044	0.13
Chlorobenzilate	Other Extractable Organics	Extended Target Analytes	(510-15-6)	mg/kg	0.005	0.02
Diallate	Other Extractable Organics	Extended Target Analytes	(2303-16-4)	mg/kg	0.007	0.01
Nitrobenzene	Other Extractable Organics	Standard Target Analytes	(98-95-3)	mg/kg	0.068	0.23
N-Nitrosodimethylamine	Other Extractable Organics	Standard Target Analytes	(62-75-9)	mg/kg	0.057	0.19
N-Nitrosodiphenylamine	Other Extractable Organics	Standard Target Analytes	(86-30-6)	mg/kg	0.056	0.19
N-Nitroso-N-propyl-1-propanamine	Other Extractable Organics	Standard Target Analytes	(621-64-7)	mg/kg	0.061	0.20
Pyridine	Other Extractable Organics	Standard Target Analytes	(110-86-1)	mg/kg	0.072	0.24
2-(1-Methylpropyl)-4,6-dinitrophenol	Other Phenols	Standard Target Analytes	(88-85-7)	mg/kg	0.055	0.18
2,4-Dinitrophenol	Other Phenols	Standard Target Analytes	(51-28-5)	mg/kg	0.199	0.66
2-Methyl-4,6-dinitrophenol	Other Phenols	Standard Target Analytes	(534-52-1)	mg/kg	0.170	0.57
2-Methylphenol	Other Phenols	Standard Target Analytes	(95-48-7)	mg/kg	0.062	0.21
2-Nitrophenol	Other Phenols	Standard Target Analytes	(88-75-5)	mg/kg	0.088	0.29
3-Methylphenol	Other Phenols	Standard Target Analytes	(108-39-4)	mg/kg	0.072	0.24
4-Methylphenol	Other Phenols	Standard Target Analytes	(106-44-5)	mg/kg	0.062	0.21
4-Nitrophenol	Other Phenols	Standard Target Analytes	(100-02-7)	mg/kg	0.124	0.41
Phenol	Other Phenols	Standard Target Analytes	(108-95-2)	mg/kg	0.066	0.22
Bis(2-ethylhexyl) phthalate	Phthalates	Standard Target Analytes	(117-81-7)	mg/kg	0.094	0.31
Butyl benzyl phthalate	Phthalates	Standard Target Analytes	(85-68-7)	mg/kg	0.089	0.30
Diethyl phthalate	Phthalates	Standard Target Analytes	(84-66-2)	mg/kg	0.112	0.23
Dimethyl phthalate	Phthalates	Standard Target Analytes	(131-11-3)	mg/kg	0.047	0.16
Di-n-butyl phthalate	Phthalates	Standard Target Analytes	(84-74-2)	mg/kg	0.114	0.23
Di-n-octyl phthalate	Phthalates	Standard Target Analytes	(117-84-0)	mg/kg	0.091	0.30
2-Chloronaphthalene	PNA	Standard Target Analytes	(91-58-7)	mg/kg	0.073	0.24
2-Methylnaphthalene	PNA	Standard Target Analytes	(91-57-6)	mg/kg	0.080	0.27
2-Methylnaphthalene	PNA	Standard Target Analytes	91-57-6	mg/kg	0.019	0.06
Acenaphthene	PNA	Standard Target Analytes	(83-32-9)	mg/kg	0.026	0.09
Acenaphthylene	PNA	Standard Target Analytes	(208-96-8)	mg/kg	0.063	0.21
Anthracene	PNA	Standard Target Analytes	(120-12-7)	mg/kg	0.096	0.32

Secondary COI Target Compound List
Tittabawassee River Site Cinvestigation

Analyte	Functional Group	Analytical Group	CAS	Units	Lab MDL	PQL
Benzo[a]anthracene	PNA	Standard Target Analytes	(56-55-3)	mg/kg	0.057	0.19
Benzo[a]pyrene	PNA	Standard Target Analytes	(50-32-8)	mg/kg	0.057	0.19
Benzo[b]fluoranthene	PNA	Standard Target Analytes	(205-99-2)	mg/kg	0.077	0.26
Benzo[ghi]perylene	PNA	Standard Target Analytes	(191-24-2)	mg/kg	0.065	0.22
Benzo[k]fluoranthene	PNA	Standard Target Analytes	(207-08-9)	mg/kg	0.104	0.21
Carbazole	PNA	Standard Target Analytes	(86-74-8)	mg/kg	0.010	0.03
Chrysene	PNA	Standard Target Analytes	(218-01-9)	mg/kg	0.056	0.19
Dibenzo[a,h]anthracene	PNA	Standard Target Analytes	(53-70-3)	mg/kg	0.096	0.32
Dibenzofuran	PNA	Standard Target Analytes	(132-64-9)	mg/kg	0.051	0.17
Fluoranthene	PNA	Standard Target Analytes	(206-44-0)	mg/kg	0.058	0.19
Fluorene	PNA	Standard Target Analytes	(86-73-7)	mg/kg	0.063	0.21
Indeno[1,2,3-cd]pyrene	PNA	Standard Target Analytes	(193-39-5)	mg/kg	0.056	0.19
Naphthalene	PNA	Standard Target Analytes	(91-20-3)	mg/kg	0.094	0.31
Naphthalene	PNA	Standard Target Analytes	91-20-3	mg/kg	0.016	0.05
Phenanthrene	PNA	Standard Target Analytes	(85-01-8)	mg/kg	0.099	0.33
Pyrene	PNA	Standard Target Analytes	(129-00-0)	mg/kg	0.052	0.17
Aluminum	SecCOI Metals	Metals	(7429-90-5)	mg/kg	0.437	0.87
Antimony	SecCOI Metals	Metals	(7440-36-0)	mg/kg	0.046	0.15
Arsenic	SecCOI Metals	Metals	(7440-38-2)	mg/kg	0.009	0.03
Barium	SecCOI Metals	Metals	(7440-39-3)	mg/kg	0.102	0.34
Beryllium	SecCOI Metals	Metals	(7440-41-7)	mg/kg	0.082	0.27
Boron	SecCOI Metals	Metals	(7440-42-8)	mg/kg	0.247	0.82
Cadmium	SecCOI Metals	Metals	(7440-43-9)	mg/kg	0.089	0.18
Calcium	SecCOI Metals	Metals	(7440-70-2)	mg/kg	0.494	1.6
Chromium	SecCOI Metals	Metals	(7440-47-3)	mg/kg	0.098	0.33
Cobalt	SecCOI Metals	Metals	(7440-48-4)	mg/kg	0.076	0.25
Copper	SecCOI Metals	Metals	(7440-50-8)	mg/kg	0.086	0.29
Gold	SecCOI Metals	Metals	(7440-57-5)	mg/kg	0.101	0.34
Iron	SecCOI Metals	Metals	(7439-89-6)	mg/kg	0.418	1.4
Lead	SecCOI Metals	Metals	(7439-92-1)	mg/kg	0.118	0.39
Lithium	SecCOI Metals	Metals	(7439-93-2)	mg/kg	0.076	0.25
Magnesium	SecCOI Metals	Metals	(7439-95-4)	mg/kg	0.998	3.3
Manganese	SecCOI Metals	Metals	(7439-96-5)	mg/kg	0.428	0.86
Mercury	SecCOI Metals	Metals	(7439-97-6)	mg/kg	0.0075	0.05
Nickel	SecCOI Metals	Metals	(7440-02-0)	mg/kg	0.106	0.35
Potassium	SecCOI Metals	Metals	(7440-09-7)	mg/kg	0.399	0.78
Selenium	SecCOI Metals	Metals	(7782-49-2)	mg/kg	0.024	0.08
Silver	SecCOI Metals	Metals	(7440-22-4)	mg/kg	0.043	0.09
Sodium	SecCOI Metals	Metals	(7440-23-5)	mg/kg	2.10	7.0
Strontium	SecCOI Metals	Metals	(7440-24-6)	mg/kg	0.076	0.25
Thallium	SecCOI Metals	Metals	(7440-28-0)	mg/kg	0.196	0.39
Tin	SecCOI Metals	Metals	(7440-31-5)	mg/kg	0.228	0.76
Titanium	SecCOI Metals	Metals	(7440-32-6)	mg/kg	0.309	0.62
Vanadium	SecCOI Metals	Metals	(7440-62-2)	mg/kg	0.074	0.25
Zinc	SecCOI Metals	Metals	(7440-66-6)	mg/kg	0.060	0.20
1,1,1,2-Tetrachloroethane	Volatile Organic Compounds	Standard Target	630-20-6	mg/kg	0.005	0.01
1,1,1-Trichloroethane	Volatile Organic Compounds	Standard Target	71-55-6	mg/kg	0.007	0.02
1,1,2,2-Tetrachloroethane	Volatile Organic Compounds	Standard Target	79-34-5	mg/kg	0.011	0.04
1,1,2-Trichloroethane	Volatile Organic Compounds	Standard Target	79-00-5	mg/kg	0.007	0.02
1,1-Dichloroethane	Volatile Organic Compounds	Standard Target	75-34-3	mg/kg	0.009	0.03
1,1-Dichloroethene	Volatile Organic Compounds	Standard Target	75-35-4	mg/kg	0.009	0.03
1,1-Dichloropropene	Volatile Organic Compounds	Standard Target	563-58-6	mg/kg	0.006	0.02
1,2,3-Trichloropropane	Volatile Organic Compounds	Standard Target	96-18-4	mg/kg	0.007	0.02
1,2,3-Trimethylbenzene	Volatile Organic Compounds	Standard Target	526-73-8	mg/kg	0.003	0.01
1,2,4-Trimethylbenzene	Volatile Organic Compounds	Standard Target	95-63-6	mg/kg	0.003	0.01
1,2-Dibromo-3-chloropropane	Volatile Organic Compounds	Standard Target	96-12-8	mg/kg	0.021	0.02
1,2-Dibromoethane	Volatile Organic Compounds	Standard Target	106-93-4	mg/kg	0.005	0.02
1,2-Dichloroethane	Volatile Organic Compounds	Standard Target	107-06-2	mg/kg	0.008	0.02
1,2-Dichloropropane	Volatile Organic Compounds	Standard Target	78-87-5	mg/kg	0.01	0.03
1,3,5-Trimethylbenzene	Volatile Organic Compounds	Standard Target	108-67-8	mg/kg	0.003	0.01
2,2-Dichloropropane	Volatile Organic Compounds	Standard Target	594-20-7	mg/kg	0.017	0.04
2-Butanone (MEK)	Volatile Organic Compounds	Standard Target	78-93-3	mg/kg	0.075	0.25
2-Chlorotoluene	Volatile Organic Compounds	Standard Target	95-49-8	mg/kg	0.011	0.04

Secondary COI Target Compound List
Tittabawassee River Site Cinvestigation

Analyte	Functional Group	Analytical Group	CAS	Units	Lab MDL	PQL
2-Hexanone	Volatile Organic Compounds	Standard Target	591-78-6	mg/kg	0.066	0.22
4-Chlorotoluene	Volatile Organic Compounds	Standard Target	106-43-4	mg/kg	0.003	0.01
4-Isopropyltoluene	Volatile Organic Compounds	Standard Target	99-87-6	mg/kg	0.006	0.02
4-Methyl-2-pentanone (MIBK)	Volatile Organic Compounds	Standard Target	108-10-1	mg/kg	0.043	0.14
Acetone	Volatile Organic Compounds	Standard Target	67-64-1	mg/kg	0.09	0.3
Acrylonitrile	Volatile Organic Compounds	Standard Target	107-13-1	mg/kg	0.007	0.02
Benzene	Volatile Organic Compounds	Standard Target	71-43-2	mg/kg	0.006	0.02
Bromobenzene	Volatile Organic Compounds	Standard Target	108-86-1	mg/kg	0.012	0.04
Bromochloromethane	Volatile Organic Compounds	Standard Target	74-97-5	mg/kg	0.006	0.02
Bromodichloromethane	Volatile Organic Compounds	Standard Target	75-27-4	mg/kg	0.007	0.02
Bromoform	Volatile Organic Compounds	Standard Target	75-25-2	mg/kg	0.006	0.02
Bromomethane	Volatile Organic Compounds	Standard Target	74-83-9	mg/kg	0.006	0.02
Carbon Disulfide	Volatile Organic Compounds	Standard Target	75-15-0	mg/kg	0.03	0.1
Carbon Tetrachloride	Volatile Organic Compounds	Standard Target	56-23-5	mg/kg	0.011	0.04
Chloroethane	Volatile Organic Compounds	Standard Target	75-00-3	mg/kg	0.009	0.03
Chloroform	Volatile Organic Compounds	Standard Target	67-66-3	mg/kg	0.008	0.03
Chloromethane	Volatile Organic Compounds	Standard Target	74-87-3	mg/kg	0.005	0.02
cis-1,2-Dichloroethene	Volatile Organic Compounds	Standard Target	156-59-2	mg/kg	0.01	0.03
cis-1,3-Dichloropropene	Volatile Organic Compounds	Standard Target	10061-01-5	mg/kg	0.007	0.02
Cyclohexane	Volatile Organic Compounds	Standard Target	110-82-7	mg/kg	0.014	0.05
Dibromochloromethane	Volatile Organic Compounds	Standard Target	124-48-1	mg/kg	0.008	0.03
Dibromomethane	Volatile Organic Compounds	Standard Target	74-95-3	mg/kg	0.006	0.02
Dichlorodifluoromethane	Volatile Organic Compounds	Standard Target	75-71-8	mg/kg	0.006	0.02
Ethyl Ether	Volatile Organic Compounds	Standard Target	60-29-7	mg/kg	0.015	0.05
Ethyl tert-Butyl Ether	Volatile Organic Compounds	Standard Target	637-92-3	mg/kg	0.003	0.01
Ethylbenzene	Volatile Organic Compounds	Standard Target	100-41-4	mg/kg	0.002	0.01
Iodomethane	Volatile Organic Compounds	Standard Target	74-88-4	mg/kg	0.006	0.02
Isopropyl Ether	Volatile Organic Compounds	Standard Target	108-20-3	mg/kg	0.005	0.02
Isopropylbenzene	Volatile Organic Compounds	Standard Target	98-82-8	mg/kg	0.007	0.02
Methyl tert-Butyl Ether	Volatile Organic Compounds	Standard Target	1634-04-4	mg/kg	0.006	0.02
Methylene Chloride	Volatile Organic Compounds	Standard Target	75-09-2	mg/kg	0.009	0.03
n-Butylbenzene	Volatile Organic Compounds	Standard Target	104-51-8	mg/kg	0.006	0.02
n-Propylbenzene	Volatile Organic Compounds	Standard Target	103-65-1	mg/kg	0.009	0.03
sec-Butylbenzene	Volatile Organic Compounds	Standard Target	135-98-8	mg/kg	0.003	0.01
Styrene	Volatile Organic Compounds	Standard Target	100-42-5	mg/kg	0.005	0.02
t-Butanol	Volatile Organic Compounds	Standard Target	75-65-0	mg/kg	0.076	0.25
tert-Amyl Methyl Ether	Volatile Organic Compounds	Standard Target	994-05-8	mg/kg	0.004	0.01
tert-Butylbenzene	Volatile Organic Compounds	Standard Target	98-06-6	mg/kg	0.01	0.03
Tetrachloroethene	Volatile Organic Compounds	Standard Target	127-18-4	mg/kg	0.012	0.04
Tetrahydrofuran	Volatile Organic Compounds	Standard Target	109-99-9	mg/kg	0.17	0.57
Toluene	Volatile Organic Compounds	Standard Target	108-88-3	mg/kg	0.004	0.01
trans-1,2-Dichloroethene	Volatile Organic Compounds	Standard Target	156-60-5	mg/kg	0.005	0.02
trans-1,3-Dichloropropene	Volatile Organic Compounds	Standard Target	10061-02-6	mg/kg	0.009	0.03
trans-1,4-Dichloro-2-butene	Volatile Organic Compounds	Standard Target	110-57-6	mg/kg	0.009	0.03
Trichloroethene	Volatile Organic Compounds	Standard Target	79-01-6	mg/kg	0.004	0.01
Trichlorofluoromethane	Volatile Organic Compounds	Standard Target	75-69-4	mg/kg	0.004	0.01
Vinyl Chloride	Volatile Organic Compounds	Standard Target	75-01-4	mg/kg	0.003	0.01
Xylene, Meta+Para	Volatile Organic Compounds	Standard Target	136777-61-2	mg/kg	0.013	0.04
Xylene, Ortho	Volatile Organic Compounds	Standard Target	95-47-6	mg/kg	0.008	0.03
Moisture content (ATS)				% (w/w)		
Moisture Content (D/F Lab)				% (w/w)		

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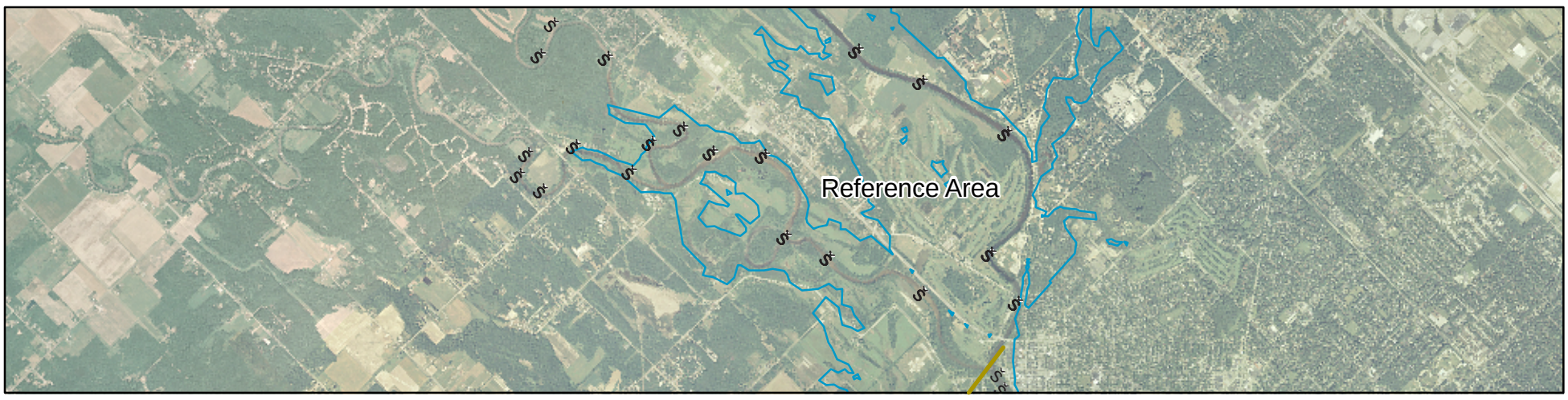
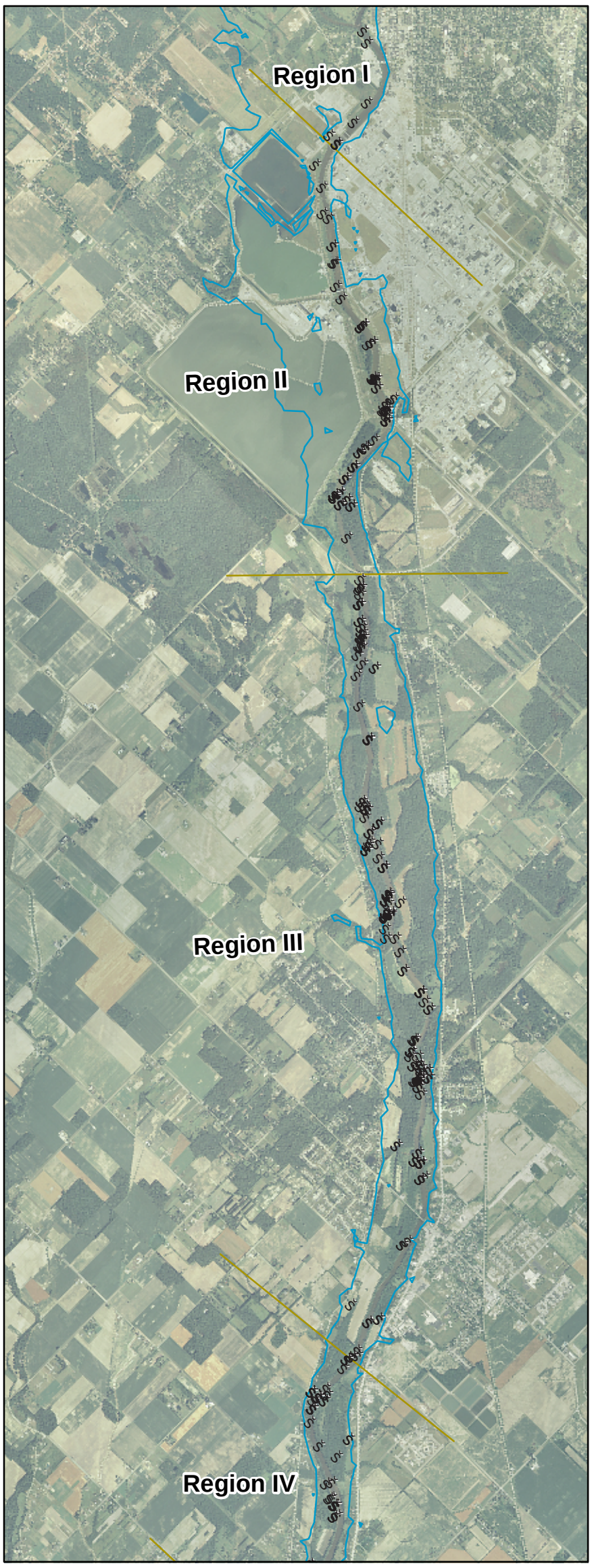
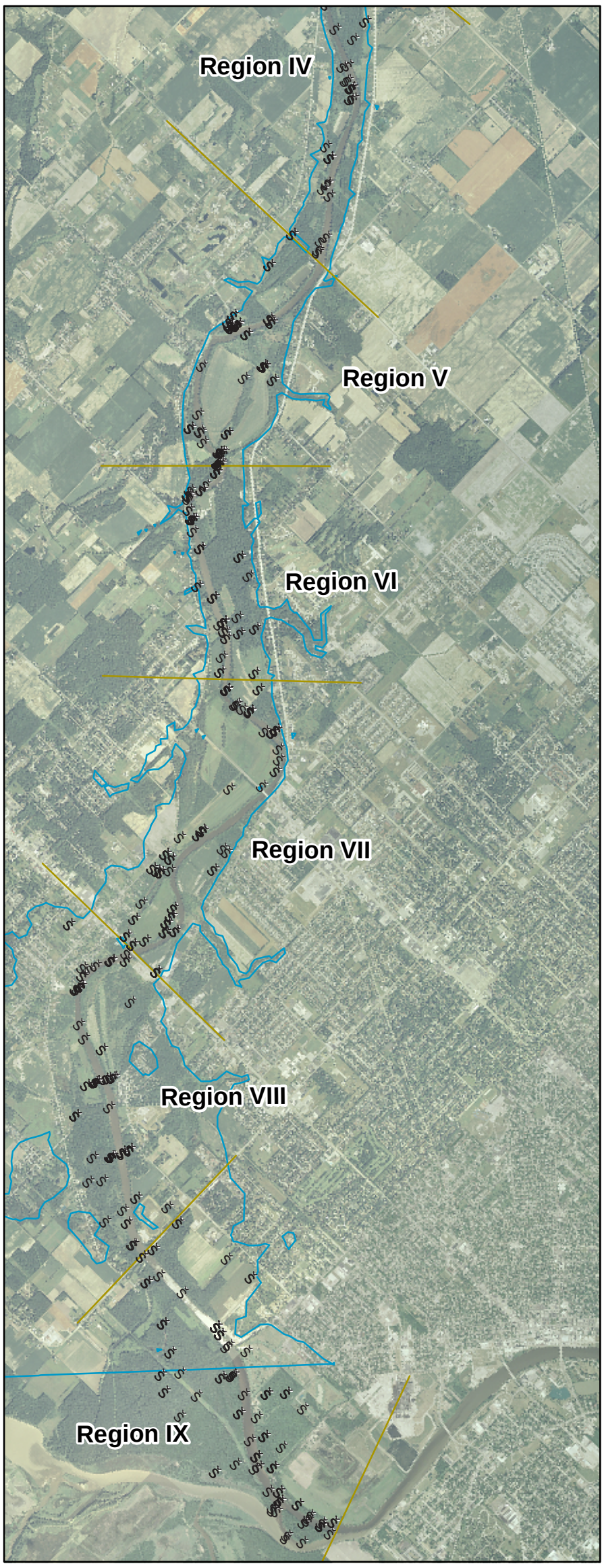
Secondary COI Sample Location Summary
Tittabawassee River Site Investigation
Midland, Michigan

	Deposition Zones									
	In-channel		Levee Complex		Wetland Complex		Other Overbank Areas		Tributaries	
Reach	Locations	Samples	Locations	Samples	Locations	Samples	Locations	Samples	Locations	Samples
Reference Area										
Chippewa River	10	42								
Pine River	5	15								
Tittabawassee River	5	29								
Reach A	2	2								
Reach B	21	29								
Reach C	2	5								
Reach D	31	113								
Reach E	6	14					1	1		
Reach F	13	28								
Reach G	9	12	1	3			1	3		
Reach H	8	19							2	2
Reach I	10	31								
Reach J	2	14								
Reach K	2	15	2	5	1	3	2	7		
Reach L	9	17	3	15						
Reach M	5	5	1	1			2	3		
Reach N			1	1						
Reach O	5	5	2	1	1	4				
Reach P	2	4	1	1	1	6	2	5		
Reach Q	7	23	4	12	1	3	4	10		
Reach R	22	96	1	1						
Reach S	7	14			1	2	3	11		
Reach T	5	10	2	16	1	1	5	16		
Reach U	1	2							1	2
Reach V	2	4	2	10						
Reach W	2	3								
Reach X									2	3
Reach Y	2	3	1	1	1	1				
Reach Z	2	4	2	8			3	10		
Reach AA	4	4	1	6	1	1	1	2	1	1
Reach BB	3	6	3	5						
Reach CC	3	3	2	10	1	1				
Reach DD	4	4			1	3				
Reach EE							1	3		
Reach FF	2	3	7	45	3	10	3	11	2	9
Reach GG			1	1			1	1		
Reach HH	2	2	1	1			1	5		
Reach II	12	25	6	34	2	6	3	7		
Reach JJ	2	2	3	21	1	3	3	4		
Reach KK	3	4	2	4	2	4	1	2		
Reach LL	2	2	4	15			1	8	1	2
Reach MM	5	10	1	1			2	4		
Reach NN	1	1	2	6	1	1	4	5		
Reach OO	1	1			1	2	4	8		
Reach PP	3	5	1	8	2	9	5	17	1	1
Reach QQ	4	5					3	4		
Reach RR	5	5	2	16			1	1		
Reach SS	2	2	3	21	2	3	3	5	1	3
Reach TT	1	1	4	16	3	7	3	7		
Reach UU	4	4			1	1	2	3		
Reach VV	3	4			1	5	4	7		
Reach WW	5	18	1	4	7	16	4	7		
Reach XX	5	6	1	6	3	5	6	13		
Reach YY	16	21					2	4		
Subtotal	289	696	68	295	39	97	81	194	11	23

Locations (total)	488
Samples (total)	1305







Sec. COI Sampling Locations
Tittabawassee River Site Investigation
Midland, Michigan

0 0.3 0.6 1.2 Miles

FEMA Q3 Floodplain

ANN ARBOR TECHNICAL SERVICES, INC.

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Michigan Laboratory ID: 9604
Wisconsin Laboratory ID: 998321720

Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
CR-1131+50-C1	CR-1131+50-C1	0.0	0.5	1	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	20.4	<5	<4	<4	<4	<4	<21	<10	In-Channel
CR-1131+50-C1	CR-1131+50-C1	0.5	1.0	1	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	10.2	<4	<4	<4	<4	<5	<21	<10	In-Channel
CR-1131+50-C1	CR-1131+50-C1	1.0	2.0	2	2.5Y 4/1 dark gray loamy sand, <15% subangular gravel, wet, massive, friable, non-plastic	SM	8.6	<7	<4	<5	<5	<10	<31	<10	In-Channel
CR-1131+50-C1	CR-1131+50-C1	1.0	2.0	2	2.5Y 4/1 dark gray loamy sand, <15% subangular gravel, wet, massive, friable, non-plastic	SM	9.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
CR-1172+00-C1	CR-1172+00-C1	0.0	0.5	1	2.5Y 5/4 light olive brown sand, wet, single grain, loose, non-plastic	SP	3.6	<9	<4	<6	<5	<12	<36	<10	In-Channel
CR-1172+00-C1	CR-1172+00-C1	0.5	1.0	1	2.5Y 5/4 light olive brown sand, wet, single grain, loose, non-plastic	SP	4	<4	<4	<4	<4	<5	<21	<10	In-Channel
CR-1172+00-C1	CR-1172+00-C1	1.0	1.4	1	2.5Y 5/4 light olive brown sand, wet, single grain, loose, non-plastic	SP	8	<5	<4	<4	<4	<9	<26	<10	In-Channel
CR-1172+00-C1	CR-1172+00-C1	1.4	2.0	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	13.1	<4	<4	<4	<4	<6	<22	<10	In-Channel
CR-1196+00-C1	CR-1196+00-C1	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	10	<5	<4	<4	<4	<6	<23	<10	In-Channel
CR-1196+00-C1	CR-1196+00-C1	0.5	1.0	1	2.5Y 5/3 light olive brown and 2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic	SP	11.9	<6	<4	<4	<4	<8	<26	<10	In-Channel
CR-120+50-C1	CR-120+50-C1	0.0	0.5	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	3.7	<5	<4	<4	<4	<6	<23	<10	In-Channel
CR-120+50-C1	CR-120+50-C1	0.5	1.0	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	7.5	<4	<4	<4	<4	<5	<21	<10	In-Channel
CR-120+50-C1	CR-120+50-C1	1.0	1.4	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	15	<4	<4	<4	<4	<8	<24	<10	In-Channel
CR-120+50-C1	CR-120+50-C1	1.4	2.5	2	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	12.5	<5	<4	<4	<4	<9	<26	<10	In-Channel
CR-120+50-C1	CR-120+50-C1	2.5	3.0	3	2.5Y 5/2 grayish brown sandy loam, <15% subangular gravel, wet, subangular blocky, weak, very firm, non-plastic	SM	8.9	<4	<4	<4	<4	<7	<23	<10	In-Channel
CR-2403+00-C1	CR-2403+00-C1	0.0	0.5	1	2.5Y 5/4 light olive brown sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	8	<6	<4	<4	<4	<7	<25	<10	In-Channel
CR-2403+00-C1	CR-2403+00-C1	0.5	1.0	1	2.5Y 5/4 light olive brown sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.9	<4	<4	<4	<4	<6	<22	<10	In-Channel
CR-2403+00-C1	CR-2403+00-C1	1.0	2.0	2	2.5Y 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	9.8	<4	<4	<4	<4	<7	<23	<10	In-Channel
CR-2403+00-C1	CR-2403+00-C1	1.0	2.0	2	2.5Y 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	9.8	<6	<4	<4	<4	<7	<25	<10	In-Channel
CR-263+50-C1	CR-263+50-C1	0.0	0.5	1	2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, common medium roots, shell fragments	SP	25.9	<5	4	<4	<4	<6	<23	<10	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
CR-263+50-C1	CR-263+50-C1	0.5	1.0	1	2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, common medium roots, shell fragments	SP	30.4	<6	12	5	5	<8	<26	<10	In-Channel
CR-263+50-C1	CR-263+50-C1	1.0	1.5	1	2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, common medium roots, shell fragments	SP	19.3	<6	<4	<5	<4	<10	<29	<10	In-Channel
CR-263+50-C1	CR-263+50-C1	1.5	2.5	1	2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	18.3	<4	<4	<4	<4	<8	<24	<10	In-Channel
CR-263+50-C1	CR-263+50-C1	2.5	3.0	2	2.5Y 3/1 very dark gray sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	11.5	<6	<4	<4	<4	<10	<28	<10	In-Channel
CR-263+50-C1	CR-263+50-C1	2.5	3.0	2	2.5Y 3/1 very dark gray sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	7.7	<4	<4	<4	<4	<7	<23	<10	In-Channel
CR-42+00-C1	CR-42+00-C1	0.0	0.5	1	2.5Y 5/4 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	10.8	<4	<4	<4	<4	<6	<22	<10	In-Channel
CR-42+00-C1	CR-42+00-C1	0.5	1.0	2	2.5Y 5/4 light olive brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	10.3	<5	<4	<4	<4	<4	<21	<10	In-Channel
CR-42+00-C1	CR-42+00-C1	1.0	2.7	3	2.5Y 3/1 very dark gray and 2.5Y 4/4 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	15.9	<4	<4	<4	<4	<6	<22	<10	In-Channel
CR-42+00-C1	CR-42+00-C1	2.7	3.5	4	2.5Y 4/1 dark gray sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	10.5	<5	<4	<4	<4	<9	<26	<10	In-Channel
CR-559+50-C1	CR-559+50-C1	0.0	0.5	1	2.5Y 4/1 dark gray and 2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic	SP	15.3	<6	<4	<4	<4	<6	<24	<10	In-Channel
CR-559+50-C1	CR-559+50-C1	0.5	1.0	1	2.5Y 4/1 dark gray and 2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic	SP	16.4	<7	<4	<4	<4	<7	<26	<10	In-Channel
CR-559+50-C1	CR-559+50-C1	0.5	1.0	1	2.5Y 4/1 dark gray and 2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic	SP	14.8	<8	<4	<6	<4	<12	<34	<10	In-Channel
CR-559+50-C1	CR-559+50-C1	1.0	1.5	1	2.5Y 4/1 dark gray and 2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	17.6	<10	<4	<7	<7	<4	<32	<10	In-Channel
CR-559+50-C1	CR-559+50-C1	1.5	2.0	2	2.5Y 4/2 dark grayish brown sandy clay loam, <15% subrounded gravel, wet, massive, firm, moderately plastic	SC	9.3	<6	<4	<4	<4	<10	<28	<10	In-Channel
CR-68+00-C1	CR-68+00-C1	0.0	0.5	1	2.5Y 5/3 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11	<5	<4	<4	<4	<10	<27	<10	In-Channel
CR-68+00-C1	CR-68+00-C1	0.5	1.0	1	2.5Y 5/3 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	7	<5	<4	<4	<4	<7	<24	<10	In-Channel
CR-68+00-C1	CR-68+00-C1	1.0	1.7	1	2.5Y 5/3 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	8.1	<4	<4	<4	<4	<7	<23	<10	In-Channel
CR-68+00-C1	CR-68+00-C1	1.7	2.7	2	2.5Y 4/1 dark gray and 2.5Y 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	13.1	<5	<4	<4	<4	<9	<26	<10	In-Channel
CR-68+00-C1	CR-68+00-C1	2.7	3.7	2	2.5Y 4/1 dark gray and 2.5Y 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	13.5	<7	<4	<5	<4	<11	<31	<10	In-Channel

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
CR-68+00-C1	CR-68+00-C1	3.7	4.0	3	2.5Y 5/2 grayish brown sandy loam, <15% subangular gravel, wet, subangular blocky, weak, very firm, non-plastic	SM	10.5	<4	<4	<4	<4	<10	<26	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	0.0	0.5	1	2.5Y 6/4 light yellowish brown fine sand, wet, single grain, loose, non-plastic, plant fragments	SP	4.3	<8	<4	<5	<4	<10	<31	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	0.5	1.0	1	2.5Y 6/4 light yellowish brown fine sand, wet, single grain, loose, non-plastic, plant fragments	SP	6.6	<4	<4	<4	<4	<6	<22	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	0.5	1.0	1	2.5Y 6/4 light yellowish brown fine sand, wet, single grain, loose, non-plastic, plant fragments	SP	6.4	<4	<4	<4	<4	<6	<22	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	1.0	1.6	1	2.5Y 6/4 light yellowish brown fine sand, wet, single grain, loose, non-plastic	SP	12.9	<5	<4	<4	<4	<8	<25	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	1.6	2.3	2	5Y 4/1 dark gray fine sand, wet, single grain, loose, non-plastic	SP	15.6	<4	<4	<4	<4	4	<20	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	2.3	3.7	3	5Y 3/1 very dark gray coarse sand, > or =90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	13.9	<5	<4	<4	<4	<6	<23	<10	In-Channel
CR-94+00-C1	CR-94+00-C1	3.7	5.0	4	2.5Y 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	10.5	<5	<4	<4	<4	<8	<25	<10	In-Channel
PR-10+50-C1	PR-10+50-C1	0.0	0.5	1	5Y 3/2 dark olive gray and 10YR 2/1 black sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	15.8	<5	<4	<4	<4	<6	<23	<10	In-Channel
PR-10+50-C1	PR-10+50-C1	0.5	1.0	2	5Y 3/2 dark olive gray coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	10.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-10+50-C1	PR-10+50-C1	1.0	1.3	2	5Y 3/2 dark olive gray coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	13.9	<13	<4	<8	<7	<16	<48	<10	In-Channel
PR-10+50-C1	PR-10+50-C1	1.3	3.0	3	10YR 4/2 dark grayish brown sandy loam, <15% subangular gravel, wet, massive, friable, slightly plastic	SM	9.6	<5	<4	<4	<4	<7	<24	<10	In-Channel
PR-33+50-C1	PR-33+50-C1	0.0	0.5	1	2.5Y 5/2 grayish brown sandy loam, <15% subangular gravel, wet, subangular blocky, weak, very firm, non-plastic	SM	9.6	<6	<4	<4	<4	<8	<26	<10	In-Channel
PR-33+50-C1	PR-33+50-C1	0.5	0.7	1	2.5Y 5/2 grayish brown sandy loam, <15% subangular gravel, wet, subangular blocky, weak, very firm, non-plastic	SM	9	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-50+50-C1	PR-50+50-C1	0.0	0.5	1	2.5Y 5/4 light olive brown coarse sand, wet, single grain, loose, non-plastic, shell fragments	SP	7.4	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-50+50-C1	PR-50+50-C1	0.5	1.0	1	2.5Y 5/4 light olive brown coarse sand, wet, single grain, loose, non-plastic, shell fragments	SP	11.6	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-50+50-C1	PR-50+50-C1	1.0	2.0	2	2.5Y 3/2 very dark grayish brown coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	10.6	<4	<4	<4	<4	<6	<22	<10	In-Channel
PR-61+00-C1	PR-61+00-C1	0.0	0.5	1	2.5Y 4/3 olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	17.4	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-61+00-C1	PR-61+00-C1	0.5	1.0	1	2.5Y 4/3 olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11.4	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-61+00-C1	PR-61+00-C1	1.0	1.5	2	2.5Y 5/2 grayish brown sandy loam, <15% subangular gravel, wet, subangular blocky, weak, very firm, non-plastic	SM	9.2	<4	<4	<4	<4	<6	<22	<10	In-Channel
PR-69+00-C1	PR-69+00-C1	0.0	0.5	1	2.5Y 4/3 olive brown and 2.5Y 3/2 very dark grayish brown coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic	GW	12.8	<4	<4	<4	<4	<4	<20	<10	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
PR-69+00-C1	PR-69+00-C1	0.5	1.0	2	10YR 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	9.1	<4	<4	<4	<4	<4	<20	<10	In-Channel
PR-69+00-C1	PR-69+00-C1	1.0	2.0	2	10YR 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	10.8	<5	<4	<4	<4	<5	<22	<10	In-Channel
PR-69+00-C1	PR-69+00-C1	1.0	2.0	2	10YR 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	10.4	<5	<4	<4	<4	<4	<21	<10	In-Channel
TR-123+50-C1	TR-123+50-C1	0.0	0.5	1	2.5Y 4/4 olive brown coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, plant fragments, wood material (black)	SW	12.3	<5	<4	<4	<4	<5	<22	<10	In-Channel
TR-123+50-C1	TR-123+50-C1	0.5	1.0	2	5Y 3/1 very dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SW	20.2	<5	<4	<4	<4	<5	<22	<10	In-Channel
TR-123+50-C1	TR-123+50-C1	1.0	3.0	2	5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	14.1	<6	<4	<4	<4	<4	<22	<10	In-Channel
TR-123+50-C1	TR-123+50-C1	1.0	3.0	2	5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	17.1	<5	<4	<4	<4	<5	<22	<10	In-Channel
TR-123+50-C1	TR-123+50-C1	3.0	3.3	3	5Y 3/1 very dark gray coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic	SW	3.6	<8	<4	<4	<4	<7	<27	<10	In-Channel
TR-123+50-C1	TR-123+50-C1	3.3	4.6	4	5Y 4/1 dark gray sandy clay loam, <15% subrounded gravel, wet, massive, firm, moderately plastic	SC	10.9	<8	<4	<4	<4	<6	<26	<10	In-Channel
TR-147+00-C1	TR-147+00-C1	0.0	0.5	1	2.5Y 4/4 olive brown sand, wet, single grain, loose, non-plastic	SP	10.9	<6	<4	<4	<4	<7	<25	<10	In-Channel
TR-147+00-C1	TR-147+00-C1	0.5	1.0	2	5Y 2.5/2 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic	SW	13.5	<4	<4	<4	<4	<4	<20	<10	In-Channel
TR-147+00-C1	TR-147+00-C1	1.0	1.7	3	2.5Y 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic	SW	10.8	<6	<4	<4	<4	<4	<22	<10	In-Channel
TR-147+00-C1	TR-147+00-C1	1.7	4.0	4	10YR 2/1 black , wet, wood material (black), shell fragments		30.1	<5	<4	<4	<4	<5	<22	<10	In-Channel
TR-147+00-C1	TR-147+00-C1	4.0	4.3	5	5Y 3/1 very dark gray coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic	GW	14.3	<5	<4	<4	<4	<4	<21	<10	In-Channel
TR-147+00-C1	TR-147+00-C1	4.3	5.3	6	2.5Y 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, slightly plastic	SC	9.3	<5	<4	<4	<4	<5	<22	<10	In-Channel
TR-30+00-C1	TR-30+00-C1	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	16.1	<4	<4	<4	<4	<4	<20	<10	In-Channel
TR-30+00-C1	TR-30+00-C1	0.5	1.0	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	15.8	<4	<4	<4	<4	5	<20	<10	In-Channel
TR-30+00-C1	TR-30+00-C1	1.0	3.2	2	2.5Y 5/3 light olive brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	21.2	<6	<4	<4	<4	<6	<24	<10	In-Channel
TR-30+00-C1	TR-30+00-C1	3.2	3.7	3	2.5Y 2.5/1 black coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic	GW	12.9	<6	<4	<4	<4	<4	<22	<10	In-Channel
TR-30+00-C1	TR-30+00-C1	3.7	4.5	4	2.5Y 5/2 grayish brown clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	CL	11.7	<5	<4	<4	<4	<5	<22	<10	In-Channel
TR-49+00-C1	TR-49+00-C1	0.0	0.5	1	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, plant fragments	SW	5.5	<6	<4	<4	<4	<7	<25	<10	In-Channel

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TR-49+00-C1	TR-49+00-C1	0.5	1.0	1	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	3.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
TR-49+00-C1	TR-49+00-C1	1.0	2.1	1	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	6.6	<5	<4	<4	<4	<4	<21	<10	In-Channel
TR-49+00-C1	TR-49+00-C1	1.0	2.1	1	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	7	<4	<4	<4	<4	<4	<20	<10	In-Channel
TR-49+00-C1	TR-49+00-C1	2.1	4.1	2	2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	16.9	<5	<4	<4	<4	4	<21	<10	In-Channel
TR-49+00-C1	TR-49+00-C1	4.1	6.2	3	2.5Y 5/2 grayish brown and 10YR 2/1 black sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	25.6	<6	<4	<4	<4	<6	<24	<10	In-Channel
TR-49+00-C1	TR-49+00-C1	6.2	7.8	4	2.5Y 5/2 grayish brown and 2.5Y 4/2 dark grayish brown sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	9.7	<6	<4	<4	<4	<7	<25	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	20.5	<7	<4	<4	<4	<7	<26	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	0.5	1.0	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	18.4	<4	<4	<4	<4	<4	<20	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	1.0	1.7	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	15.1	<14	<4	<8	<6	<15	<47	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	1.7	4.0	2	2.5Y 3/2 very dark grayish brown silt loam, wet, subangular blocky, weak, friable, non-plastic, shell fragments, plant fragments, wood material	ML	35	<7	<4	<4	<4	<7	<26	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	4.0	5.5	3	2.5Y 5/4 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	13.4	<7	<4	<4	<4	<6	<25	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	5.5	6.6	3	2.5Y 5/4 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11	<9	<4	<5	<4	<7	<29	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	6.6	8.0	4	2.5Y 5/2 grayish brown clay loam, <15% subangular gravel, wet, massive, very firm, moderately plastic	CL	12.4	<11	<4	<6	<6	<10	<37	<10	In-Channel
TR-87+00-C1	TR-87+00-C1	6.6	8.0	4	2.5Y 5/2 grayish brown clay loam, <15% subangular gravel, wet, massive, very firm, moderately plastic	CL	13.3	<5	<4	<4	<4	<6	<23	<10	In-Channel
RB-23+00-C1	RB-23+00-IC29	0.0	0.5	1	2.5Y 2.5/1 black and 2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SP	21	<4	38	21	18	18	95	15	In-Channel
RB-23+00-C1	RB-23+00-IC29	0.0	0.5	1	2.5Y 2.5/1 black and 2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SP	24.2	<4	32	17	14	14	77	13	In-Channel
RB-23+00-C1	RB-23+00-IC29	0.5	1.0	2	2.5Y 4/2 dark grayish brown sandy loam, <15% subrounded gravel, wet, single grain, friable, slightly plastic, wood material, shell fragments	SM	20.3	<5	<4	<4	<4	<6	<23	<10	In-Channel
RB-23+50-C1	RB-23+50-IC95	0.0	0.5	1	2.5Y 4/1 dark gray sandy clay loam, <15% subrounded gravel, wet, massive, very firm, slightly plastic	SC	9.6	<4	<4	<4	<4	<4	<20	<10	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RB-24+00-C1	RB-24+00-IC35	0.0	0.5	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic, shell fragments	CH	11	180	95000	21000	39000	24000	180000	27000	In-Channel
RB-24+00-C1	RB-24+00-IC35	0.0	0.5	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic, shell fragments	CH	9.6	<74	3500	2800	1700	5000	13000	1600	Atypical
RB-24+00-C2	RB-24+00-IC173	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14.9	<4	<4	<4	<4	<4	<20	<10	In-Channel
RB-24+00-C2	RB-24+00-IC173	0.5	1.0	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RB-24+00-C2	RB-24+00-IC173	2.3	4.0	2	2.5Y 4/2 dark grayish brown fine sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	25.1	<6	<4	<4	<4	<4	<22	<10	In-Channel
RB-24+00-C2	RB-24+00-IC173	4.0	4.5	3	2.5Y 3/2 very dark grayish brown fine sand, wet, single grain, loose, non-plastic, wood material (black), wood material	SP	22.1	<5	9	9	5	19	43	<10	In-Channel
RB-24+50-C1	RB-24+50-IC23	0.0	4.1	1	2.5Y 4/1 dark gray sandy clay loam, <15% subangular gravel, wet, subangular blocky, strong, firm, moderately plastic	SC	15	<4	4300	6100	3200	12000	26000	3100	Atypical
RB-24+50-C1	RB-24+50-IC23	0.0	4.1	1	2.5Y 4/1 dark gray sandy clay loam, <15% subangular gravel, wet, subangular blocky, strong, firm, moderately plastic	SC	14.4	<4	4200	3300	1800	7000	16000	2000	Atypical
RB-24+50-C2	RB-24+50-IC48	0.0	0.2	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	9.6	<9	<4	<7	<7	<4	<31	<10	In-Channel
RB-24+50-C2	RB-24+50-IC48	0.0	0.2	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	9.8	<9	<4	<4	<4	6	<25	<10	In-Channel
RB-24+50-C3	RB-24+50-IC84	0.0	0.4	1	10YR 2/1 black sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, plant fragments	SW	18.4	<130	8000	7100	3500	17000	35000	4200	Atypical
RB-24+50-C3	RB-24+50-IC84	0.4	1.0	2	2.5Y 4/1 dark gray sandy clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	SC	14.8	<98	9200	7600	3800	19000	40000	4600	Atypical
RB-25+00-C1	RB-25+00-IC13	0.0	3.3	1	2.5Y 3/1 very dark gray sandy loam, 15<35% subrounded gravel, wet, structureless, loose, slightly plastic, wood material	SM	44.6	5	5200	4800	2400	17000	30000	3400	Atypical
RB-25+00-C1	RB-25+00-IC13	0.0	3.3	1	2.5Y 3/1 very dark gray sandy loam, 15<35% subrounded gravel, wet, structureless, loose, slightly plastic, wood material	SM	15.7	4	21000	14000	7600	47000	90000	10000	Atypical
RB-25+00-C2	RB-25+00-IC41	0.0	0.2	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	11.9	<7	840	490	270	1100	2700	320	Atypical
RB-25+25-C1	RB-25+25-IC124	0.0	0.5	1	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, non-plastic, shell fragments	SW	16.4	<4	<4	<4	<4	<6	<22	<10	In-Channel
RB-25+25-C1	RB-25+25-IC124	0.5	1.0	1	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, non-plastic, shell fragments	SW	7.6	<4	<4	<4	<4	<4	<20	<10	In-Channel
RB-25+50-C1	RB-25+50-IC5	0.0	5.4	1	2.5Y 3/2 very dark grayish brown sandy loam, 15<35% subrounded gravel, wet, structureless, loose, non-plastic, wood material (black)	SM	39.2	25	57000	71000	30000	330000	490000	55000	Atypical
RB-25+50-C1	RB-25+50-IC5	5.4	7.0	2	2.5Y 3/2 very dark grayish brown clay loam, <15% subangular gravel, wet, massive, firm, moderately plastic	CL	10.2	<7	650	800	350	4100	5900	670	Atypical

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RB-25+50-C2	RB-25+50-IC40	0.0	0.2	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic, shell fragments	CH	11	<8	<4	<6	<6	<11	<35	<10	In-Channel
RB-27+00-C1	RB-27+00-IC8	0.0	3.3	1	2.5Y 4/2 dark grayish brown and 2.5Y 4/1 dark gray loam, <15% subrounded gravel, wet, subangular blocky, weak, firm, moderately plastic	ML/CL	17.2	<4	970	530	230	1300	3100	350	Atypical
RB-27+00-C2	RB-27+00-IC35	0.0	0.3	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic, shell fragments	CH	10.5	<6	33	40	18	170	250	32	In-Channel
RB-28+00-C1	RB-28+00-IC11	0.0	0.4	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	10.4	<4	260	440	210	2300	3200	370	Atypical
RB-28+00-C2	RB-28+00-IC38	0.0	0.2	1	2.5Y 4/1 dark gray clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	8.6	<8	<4	<6	<6	<4	<28	<10	In-Channel
RB-29+50-C1	RB-29+50-IC8	0.0	0.3	1	2.5Y 2.5/1 black loamy sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, plant fragments	SW	17.9	6	1700	2200	740	7800	12000	1400	Atypical
RB-29+50-C1	RB-29+50-IC8	0.3	2.1	2	2.5Y 4/2 dark grayish brown and 2.5Y 5/2 grayish brown sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	17.2	<14	99	96	39	360	600	74	Atypical
RB-29+50-C2	RB-29+50-IC37	0.0	0.2	1	2.5Y 4/1 dark gray clay loam, <15% subangular gravel, wet, massive, very firm, very plastic	CL	10.3	<10	<4	<4	<7	7	<29	<10	In-Channel
RB-29+50-C3	RB-29+50-IC64	0.0	0.5	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CL	10.1	<5	7	7	<4	18	33	<10	In-Channel
RB-30+00-C1	RB-30+00-IC55	0.0	0.3	1	2.5Y 4/1 dark gray sandy clay, <15% subangular gravel, wet, massive, very firm, very plastic	CL	9.1	<4	31	40	17	150	240	29	In-Channel
RB-30+50-IC-NE	RB-30+50-IC-NE	0.0	0.3	1	10YR 4/2 dark grayish brown sand, wet, single grain, moist, loose, non-plastic, few fine roots	SP	14.5	<4	<4	<4	<4	<4	<20	<10	In-Channel
RB-30+50-IC-NE	RB-30+50-IC-NE	0.3	1.1	2	10YR 4/2 dark grayish brown sand, <15% subangular gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.8	<4	<5	<5	<6	<15	<35	<10	In-Channel
RB-30+50-IC-SW	RB-30+50-IC-SW	0.0	0.2	1	5Y 3/1 very dark gray loamy very fine sand, wet, single grain, moist, loose, non-plastic, very few very fine roots	SM	41.6	<4	6	<6	<7	7	<25	<10	In-Channel
RB-30+50-IC-SW	RB-30+50-IC-SW	1.6	2.5	6	10YR 3/1 very dark gray loamy very fine sand, wet, single grain, moist, loose, non-plastic, common fine roots	SM	23.2	5	27	15	23	50	120	27	In-Channel
RB-30+50-IC-SW	RB-30+50-IC-SW	3.6	4.0	9	5Y 2.5/1 black and 2.5Y 3/1 very dark gray silt loam, wet, friable, slightly plastic, very few very fine roots	ML	45.3	11	42	38	36	69	200	49	In-Channel
RC-40+50-C1	RC-40+50-IC252	0.0	0.5	1	2.5Y 3/2 very dark grayish brown loamy sand, wet, single grain, loose, non-plastic, plant fragments	SP	25.3	<8	<4	<5	<6	<9	<32	<10	In-Channel
RC-40+50-C1	RC-40+50-IC252	0.5	1.0	2	2.5Y 4/1 dark gray and 2.5Y 5/2 grayish brown sandy loam, wet, angular blocky, weak, very friable, slightly plastic, plant fragments	SM	28.5	<6	<4	<4	<4	<8	<26	<10	In-Channel
RC-40+50-C1	RC-40+50-IC252	1.7	3.6	4	2.5Y 3/2 very dark grayish brown silt loam, wet, subangular blocky, moderate, friable, slightly plastic, plant fragments	ML	27.3	<8	<4	<5	<5	<8	<30	<10	In-Channel
RC-40+50-C1	RC-40+50-IC252	5.5	7.0	9	2.5Y 4/2 dark grayish brown coarse sand, 60<90% subangular gravel, wet, single grain, loose, non-plastic	GW	6.8	<5	<4	<4	<4	<7	<24	<10	In-Channel
RD-53+00-C4	RD-53+00-IC349	0.0	0.5	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	54.7	<73	<19	<40	<45	<85	<262	(<53)	Atypical
RD-53+00-C4	RD-53+00-IC349	0.0	0.5	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	54.5	<47	14	<24	<25	14	<104	33	In-Channel
RD-53+00-C4	RD-53+00-IC349	0.5	1.0	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	47.9	<40	<11	13	<22	31	<81	30	In-Channel

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RD-53+00-C4	RD-53+00-IC349	8.0	9.5	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	43.6	45	300	220	160	990	1700	300	Atypical
RD-53+00-C4	RD-53+00-IC349	9.5	10.0	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	45.7	<32	49	17	32	72	170	42	In-Channel
RD-54+75-C4	RD-54+75-IC339	0.0	0.5	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	59.9	<58	19	<30	<32	20	<128	42	In-Channel
RD-54+75-C4	RD-54+75-IC339	0.5	1.0	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	58.9	<57	15	<30	<31	22	<126	40	In-Channel
RD-54+75-C4	RD-54+75-IC339	4.0	8.0	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	48.1	22	62	56	50	300	490	110	Atypical
RD-54+75-C4	RD-54+75-IC339	9.5	10.0	1	5Y 2.5/2 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	43.9	49	120	62	66	280	570	170	Atypical
RE-61+50-C2	RE-61+50-IC68	0.0	0.4	1	2.5Y 4/2 dark grayish brown sand, 35<60% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	4.4	<4	22	8	5	12	47	<10	In-Channel
RE-61+50-C2	RE-61+50-IC68	1.1	3.0	4	10YR 2/1 black , <15% subangular gravel, wet, wood material (black), shell fragments		30.6	<5	<4	<4	<4	<8	<25	<10	In-Channel
RE-61+50-C4	RE-61+50-IC221	0.0	0.5	1	2.5Y 2/1 black sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic	SW	14.9	<4	9	<4	<4	10	<20	<10	In-Channel
RE-61+50-C4	RE-61+50-IC221	0.5	2.0	2	2.5Y 4/1 dark gray and 2.5Y 4/2 dark grayish brown very fine sand, wet, massive, friable, non-plastic	SP	14.7	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-64+50-C3	RE-64+50-IC192	0.0	0.8	1	2.5Y 2/1 black sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	16.6	<4	13	11	6	51	80	11	In-Channel
RE-64+50-C3	RE-64+50-IC192	0.8	2.0	2	2.5Y 4/1 dark gray clay, wet, massive, very firm, very plastic	CH	17.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-65+50-C1	RE-65+50-IC23	0.0	0.5	1	2.5Y 4/3 olive brown and 2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	8.4	<4	110	55	48	78	290	40	In-Channel
RE-65+50-C1	RE-65+50-IC23	0.0	0.5	1	2.5Y 4/3 olive brown and 2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	8.4	<4	110	68	55	84	320	44	In-Channel
RE-65+50-C1	RE-65+50-IC23	0.9	1.9	2	10YR 2/1 black sand, wet, single grain, loose, non-plastic, black particles (glossy), wood material (black), plant fragments	SP	27.1	<4	6	<4	<4	<4	<20	<10	In-Channel
RE-65+50-C1	RE-65+50-IC23	3.5	4.0	3	2.5Y 3/1 very dark gray coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-66+05-SW65	RE-66+05-SW65	1.1	2.5		dry	SW	9.42	850	2700	2100	7100	52000	65000	10000	Atypical
RE-67+50-C1	RE-67+50-IC30	0.0	0.5	1	2.5Y 4/2 dark grayish brown coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	15.2	5	640	360	320	750	2100	280	Atypical
RE-67+50-C1	RE-67+50-IC30	0.0	0.5	1	2.5Y 4/2 dark grayish brown coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	13.4	7	790	640	700	2200	4400	600	Atypical
RE-67+50-C1	RE-67+50-IC30	2.8	3.2	3	2.5Y 3/1 very dark gray sand, wet, single grain, loose, non-plastic	SP	16.6	<48	300	220	140	550	1200	170	Atypical
RE-67+50-C1	RE-67+50-IC30	5.8	6.3	5	2.5Y 3/1 very dark gray sand, <15% subangular gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	13.6	<7	350	140	140	250	890	120	Atypical
RE-70+50-C1	RE-70+50-IC22	0.0	0.5	1	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SP	5	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-70+50-C1	RE-70+50-IC22	2.0	2.8	2	2.5Y 3/1 very dark gray , wet, wood material		37.8	<6	510	140	140	120	900	120	In-Channel

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RE-70+50-C1	RE-70+50-IC22	2.8	3.3	3	2.5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11.5	<4	10	4	4	4	22	<10	In-Channel
RE-70+50-C2	RE-70+50-IC175	0.0	0.5	1	2.5Y 4/1 dark gray clay, <15% subangular gravel, wet, massive, very firm, very plastic	CH	16.8	<4	<4	<4	<4	<5	<21	<10	In-Channel
RE-71+75-C1	RE-71+75-IC29	0.0	0.5	1	2.5Y 5/2 grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	3.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-71+75-C1	RE-71+75-IC29	0.5	2.7	1	2.5Y 5/2 grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	5.5	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-71+75-C1	RE-71+75-IC29	2.7	4.0	2	2.5Y 4/2 dark grayish brown sand, 15<35% angular gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.6	<4	15	6	5	8	34	<10	In-Channel
RE-73+00-C1	RE-73+00-IC32	0.0	1.6	1	2.5Y 5/3 light olive brown and 2.5Y 4/4 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	3.87	<4	4	<4	<4	5	<20	<10	In-Channel
RE-73+00-C1	RE-73+00-IC32	2.8	3.5	3	2.5Y 4/1 dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	17.5	<4	48	23	43	67	180	30	In-Channel
RE-73+00-C1	RE-73+00-IC32	5.6	6.3	5	2.5Y 4/3 olive brown sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	7.34	<4	21	15	13	37	86	13	In-Channel
RE-74+00-IC-C	RE-74+00-IC-C	0.0	0.6	1	10YR 4/3 brown sand, 15<35% gravel, wet, single grain, moist, loose, non-plastic, few coarse roots	SW	7.1	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-74+00-IC-C	RE-74+00-IC-C	1.1	1.5	3	10YR 4/2 dark grayish brown loamy fine sand, <15% gravel, wet, single grain, moist, loose, non-plastic	SW	17.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-80+00-IC-NE	RE-80+00-IC-NE	0.0	0.5	1	10YR 4/2 dark grayish brown sand, <15% gravel, wet, single grain, moist, loose, non-plastic	SP	8.46	<4	<4	<4	<4	<4	<20	<10	In-Channel
RE-80+00-IC-NE	RE-80+00-IC-NE	0.9	1.3	3	10YR 4/1 dark gray sand, <15% gravel, wet, single grain, moist, loose, non-plastic	SW	15.5	<4	5	<4	<4	<4	<20	<10	In-Channel
RF-103+50-C1	RF-103+50-IC45	1.6	1.9	2	2.5Y 4/2 dark grayish brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	19.7	22	87000	37000	29000	26000	180000	23000	In-Channel
RF-103+50-C2	RF-103+50-IC120	1.2	1.8	2	2.5Y 5/3 light olive brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	4.2	53	25000	5400	6800	3500	41000	5700	In-Channel
RF-107+25-C1	RF-107+25-IC223	0.0	0.5	1	2.5Y 4/3 olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	15.8	<13	8	5	<10	6	<35	10	In-Channel
RF-107+25-C1	RF-107+25-IC223	0.0	0.5	1	2.5Y 4/3 olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	12.1	<19	45	23	13	22	100	22	In-Channel
RF-107+25-C1	RF-107+25-IC223	1.6	2.8	3	2.5Y 2.5/1 black and 2.5Y 3/1 very dark gray coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic	GW	8.1	<9	<4	<6	<6	<14	<39	<10	In-Channel
RF-107+25-C1	RF-107+25-IC223	3.9	4.4	4	2.5Y 3/1 very dark gray and 10YR 2/1 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14.5	<4	<4	<4	<4	<6	<22	<10	In-Channel
RF-107+25-C1	RF-107+25-IC223	3.9	4.4	4	2.5Y 3/1 very dark gray and 10YR 2/1 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11.2	<7	<4	<5	<5	<11	<32	<10	In-Channel
RF-109+00-C1	RF-109+00-IC231	0.0	0.5	1	2.5Y 4/2 dark grayish brown and 2.5Y 2.5/1 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.9	<6	<4	<4	<4	<9	<27	<10	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RF-109+00-C1	RF-109+00-IC231	0.5	1.0	1	2.5Y 4/2 dark grayish brown and 2.5Y 2.5/1 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11.3	<8	<4	<6	<6	<12	<36	<10	In-Channel
RF-109+00-C1	RF-109+00-IC231	2.3	2.8	1	2.5Y 4/2 dark grayish brown and 2.5Y 2.5/1 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	9	<6	<4	<5	<5	<10	<30	<10	In-Channel
RF-112+50-C3	RF-112+50-IC170	1.9	2.3	2	10YR 2/1 black , wet, wood material (black)		0	<15	560	450	410	4300	5800	700	Atypical
RF-114+00-C1	RF-114+00-IC49	0.0	0.5	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	4	<4	<4	<4	<4	7	<20	<10	In-Channel
RF-114+00-C1	RF-114+00-IC49	2.1	2.9	2	2.5Y 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.9	<4	13	5	4	13	35	<10	In-Channel
RF-114+00-C1	RF-114+00-IC49	5.5	6.0	5	2.5Y 3/2 very dark grayish brown coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	13.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-82+50-C1	RF-82+50-IC31	0.0	0.3	1	2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic	SP	15	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-82+50-C1	RF-82+50-IC31	1.7	2.0	2	2.5Y 3/1 very dark gray and 10YR 2/1 black sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic	SW	7.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-82+50-C1	RF-82+50-IC31	4.5	4.8	3	2.5Y 3/1 very dark gray and 2.5Y 4/3 olive brown sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic	SW	8.9	<4	4	<4	5	9	<20	<10	In-Channel
RF-83+50-C1	RF-83+50-IC213	0.0	0.5	1	2.5Y 3/2 very dark grayish brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic	SW	15	<4	56	32	26	42	160	23	In-Channel
RF-83+50-C1	RF-83+50-IC213	2.0	2.9	3	2.5Y 3/2 very dark grayish brown sandy clay loam, 15<35% rounded gravel, wet, massive, friable, slightly plastic, wood material	SC	17.9	<17	8	6	<11	11	<40	13	In-Channel
RF-83+50-C1	RF-83+50-IC213	3.9	4.4	4	2.5Y 3/2 very dark grayish brown sand, 35<60% rounded gravel, wet, single grain, loose, non-plastic	SW	15.4	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-84+00-C1	RF-84+00-IC42	0.0	1.2	1	2.5Y 6/3 light yellowish brown and 2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic	SP	4.28	<4	5	<4	<4	<4	<20	<10	In-Channel
RF-84+00-C1	RF-84+00-IC42	0.0	1.2	1	2.5Y 6/3 light yellowish brown and 2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic	SP	4.28	<4	5	<4	<4	4	<20	<10	In-Channel
RF-84+00-C1	RF-84+00-IC42	1.2	2.2	2	2.5Y 3/1 very dark gray coarse sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	6.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-84+00-C4	RF-84+00-IC218	0.0	0.7	1	2.5Y 4/1 dark gray loamy sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	14.9	13	190	79	150	630	1100	170	Atypical
RF-86+00-IC-C	RF-86+00-IC-C	0.1	0.5	2	10YR 4/2 dark grayish brown fine sand, wet, single grain, non-plastic	SP	11.3	<4	7	<4	<4	8	<20	<10	In-Channel
RF-86+00-IC-C	RF-86+00-IC-C	0.7	1.0	3	10YR 2/1 black fine sand, wet, single grain, non-plastic	SW	8.14	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-90+50-IC-C	RF-90+50-IC-C	0.0	0.8	1	10YR 4/2 dark grayish brown sand, 15<35% gravel, wet, single grain, moist, loose, non-plastic	SW	7.9	<4	7	<4	<4	5	<20	<10	In-Channel
RF-90+50-IC-C	RF-90+50-IC-C	0.8	1.3	2	10YR 3/1 very dark gray silt loam, <15% gravel, wet, granular, moist, friable, slightly plastic	ML	27.9	<4	<5	<7	<7	<15	<38	<10	In-Channel
RF-93+50-C1	RF-93+50-IC57	0.0	0.5	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	2.4	<150	50	<99	<110	<200	<557	120	Atypical

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RF-93+50-C1	RF-93+50-IC57	0.0	0.5	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	2.1	<10	16	6	5	7	33	10	In-Channel
RF-93+50-C1	RF-93+50-IC57	6.5	8.5	5	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	5.7	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-93+50-C1	RF-93+50-IC57	6.5	8.5	5	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	5.6	<5	<4	<4	<4	<10	<27	<10	In-Channel
RF-93+50-C1	RF-93+50-IC57	19.0	19.5	8	2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic	SP	12.8	<4	<4	<4	<4	<8	<24	<10	In-Channel
RF-93+50-C1	RF-93+50-IC57	19.0	19.5	8	2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic	SP	12.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
RF-93+50-C2	RF-93+50-IC248	0.0	0.5	1	2.5Y 4/3 olive brown coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic	GW	5.6	<6	7	4	<4	8	<22	<10	In-Channel
RF-93+50-C2	RF-93+50-IC248	2.2	3.4	3	2.5Y 4/2 dark grayish brown loamy coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	12.2	<4	<4	<4	<4	<5	<21	<10	In-Channel
RF-93+50-C2	RF-93+50-IC248	6.7	7.2	6	2.5Y 4/2 dark grayish brown coarse sand, 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	8.3	<4	<4	<4	<4	<5	<21	<10	In-Channel
RF-97+00-C1	RF-97+00-IC53	0.0	1.2	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SW	4.5	<4	<4	<4	<4	<6	<22	<10	In-Channel
RF-97+00-C1	RF-97+00-IC53	1.2	3.0	2	2.5Y 4/1 dark gray sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	11.9	<4	170	82	160	540	940	140	Atypical
RG-115+50-C1	RG-115+50-IC57	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	5.5	<10	<4	<7	<6	<14	<41	<10	In-Channel
RG-115+50-C1	RG-115+50-IC57	9.9	11.3	4	2.5Y 4/2 dark grayish brown sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.4	<7	<4	<5	<5	<11	<32	<10	In-Channel
RG-115+50-C1	RG-115+50-IC57	17.0	17.5	6	2.5Y 4/2 dark grayish brown fine sand, wet, single grain, loose, non-plastic	SP	12.9	<5	<4	<4	<4	<7	<24	<10	In-Channel
RG-115+50-C1	RG-115+50-IC57	17.0	17.5	6	2.5Y 4/2 dark grayish brown fine sand, wet, single grain, loose, non-plastic	SP	12.5	<5	<4	<4	<4	<6	<23	<10	In-Channel
RG-117+00-IC-NE	RG-117+00-IC-NE	0.0	0.6	1	10YR 5/2 grayish brown fine sand, <15% gravel, wet, single grain, moist, loose, non-plastic	SP	3.14	<4	<4	<4	<4	<4	<20	<10	In-Channel
RG-117+00-IC-NE	RG-117+00-IC-NE	2.1	2.4	4	10YR 4/2 dark grayish brown and N 2/0 black loamy fine sand, wet, single grain, moist, loose, non-plastic	SM	11.1	10	72	49	54	310	490	83	Atypical
RG-118+00-C1	RG-118+00-IC55	0.0	1.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	53.4	<9	26	15	12	15	68	13	In-Channel
RG-118+00-C1	RG-118+00-IC55	2.9	4.5	2	2.5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SP	12.7	<4	57	22	20	68	170	23	In-Channel
RG-118+00-C1	RG-118+00-IC55	7.5	9.0	4	2.5Y 3/2 very dark grayish brown sandy loam, <15% subrounded gravel, wet, massive, very firm, slightly plastic	SM	11.2	<4	31	<10	9	<15	40	<10	In-Channel
RG-128+25-C1	RG-128+25-IC106	0.0	0.5	1	2.5Y 5/2 grayish brown fine sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SP	12.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
RG-128+25-C2	RG-128+25-IC193	0.0	0.5	1	2.5Y 4/1 dark gray loamy sand, 15<35% subrounded gravel, wet, single grain, structureless, loose, non-plastic	SW	16.5	<4	14	6	5	<6	24	<10	In-Channel

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RG-128+25-C2	RG-128+25-IC193	0.0	0.5	1	2.5Y 4/1 dark gray loamy sand, 15<35% subrounded gravel, wet, single grain, structureless, loose, non-plastic	SW	14.7	<4	19	7	7	5	39	<10	In-Channel
RG-129+00-C1	RG-129+00-IC149	0.0	0.5	1	2.5Y 4/1 dark gray sandy clay loam, <15% subangular gravel, wet, massive, structureless, very firm, moderately plastic	SC	9.6	<4	<4	<4	<4	<6	<22	<10	In-Channel
RG-130+50-IC-NE	RG-130+50-IC-NE	0.0	0.5	1	10YR 4/3 brown loamy fine sand, wet, single grain, moist, loose, non-plastic	SP	15.9	<4	4	<4	<4	5	<20	<10	In-Channel
RG-130+50-IC-NE	RG-130+50-IC-NE	0.9	1.2	3	10YR 3/1 very dark gray sand, 15<35% gravel, wet, single grain, moist, loose, non-plastic	SW	11.4	<4	160	54	57	34	300	44	In-Channel
RG-130+50-NE10	RG-130+50-NE10	1.7	2.8	2AC2	10YR 3/2 very dark grayish brown loamy very fine sand, dry, single grain, dry, loose, non-plastic, very few very fine roots	SP	5.77	5	660	310	240	290	1500	210	Disturbed - Natural Levee (Post-Industrial Levee)
RG-130+50-NE10	RG-130+50-NE10	6.0	7.7	2C6	10YR 6/3 pale brown very fine sand, dry, single grain, dry, loose, non-plastic	SP	1.97	24	61	22	46	210	360	99	Atypical
RG-130+50-NE10	RG-130+50-NE10	7.7	8.8	2C6	10YR 6/3 pale brown very fine sand, dry, single grain, dry, loose, non-plastic	SP	3.72	21	110	49	73	250	500	110	Atypical
RG-130+50-NE30	RG-130+50-NE30	1.6	2.8	AC	10YR 3/2 very dark grayish brown loamy very fine sand, dry, single grain, dry, loose, non-plastic, very few very fine roots	SP	4.59	<4	140	65	53	98	360	48	Disturbed - Low Surface
RG-130+50-NE30	RG-130+50-NE30	2.8	4.1	2C2	10YR 5/2 grayish brown very fine sand, dry, single grain, dry, loose, non-plastic	SP	1.32	<4	30	13	13	55	110	16	Disturbed - Low Surface
RG-130+50-NE30	RG-130+50-NE30	7.9	8.8	2C6	10YR 4/3 brown loamy very fine sand, dry, single grain, dry, loose, non-plastic, few medium roots	SP	19.6	1600	960	490	1800	4900	9700	4800	Atypical
RG-138+00-C1	RG-138+00-IC115	0.0	2.0	1	10YR 5/3 brown sand, wet, single grain, loose, non-plastic	SP	4	<4	17	10	7	9	44	<10	In-Channel
RG-138+00-C1	RG-138+00-IC115	4.0	6.5	2	10YR 4/1 dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	15.3	<4	3000	130	1900	2100	7100	1200	In-Channel
RG-138+00-C3	RG-138+00-IC275	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, very few fine roots, wood material (black), shell fragments	SW	37.8	<15	330	200	170	170	870	130	In-Channel
RG-140+00-IC-NE	RG-140+00-IC-NE	1.0	1.9	2	10YR 4/1 dark gray sand, wet, single grain, moist, loose, non-plastic	SP	16.9	9	61	26	68	250	410	76	Atypical
RG-140+00-IC-NE	RG-140+00-IC-NE	1.0	1.9	2	10YR 4/1 dark gray sand, wet, single grain, moist, loose, non-plastic	SP	18.1	7	54	34	59	170	330	61	Atypical
RH-143+75-C1	RH-143+75-IC25	0.0	0.5	1	2.5Y 4/1 dark gray fine sandy loam, <15% subangular gravel, wet, angular blocky, weak, very firm, slightly plastic	SC	8.2	<4	<4	<4	<4	<5	<21	<10	In-Channel
RH-144+75-C1	RH-144+75-IC50	0.0	0.5	1	2.5Y 3/1 very dark gray sand, 35<60% subrounded gravel, wet, single grain, structureless, loose, non-plastic	SW	9.2	<4	27	6	8	6	46	<10	In-Channel
RH-151+00-C1	RH-151+00-IC144	6.8	7.6	6	10YR 3/1 very dark gray coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.8	<4	1300	51	150	890	2400	290	Atypical
RH-151+50-C1	RH-151+50-IC33	0.0	1.0	1	10YR 4/2 dark grayish brown loamy sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, few coarse roots, wood material (black), black particles (glossy)	SW	9.23	4	8500	3900	3000	3000	18000	2400	In-Channel
RH-151+50-C1	RH-151+50-IC33	1.0	2.2	2	10YR 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, black particles (glossy), shell fragments	SW	5.94	4	58	14	62	110	250	48	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RH-151+50-C1	RH-151+50-IC33	2.2	2.8	3	10YR 4/1 dark gray coarse sand, wet, single grain, loose, non-plastic, shell fragments	SP	7.67	<4	140	100	75	120	440	59	In-Channel
RH-151+50-C1	RH-151+50-IC33	2.8	3.3	4	10YR 3/1 very dark gray fine sandy loam, <15% subrounded gravel, wet, massive, friable, slightly plastic, wood material	SM	21.7	<4	9	<4	8	10	27	<10	In-Channel
RH-151+50-C1	RH-151+50-IC33	3.3	5.5	5	10YR 5/2 grayish brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, black particles (glossy), shell fragments	SW	11.9	<4	<4	<4	<4	<4	<20	<10	In-Channel
RH-151+50-C1	RH-151+50-IC33	5.5	6.2	6	10YR 5/1 gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, black particles (glossy), shell fragments	SP	4.96	<4	<4	<4	<4	<4	<20	<10	In-Channel
RH-151+50-C1	RH-151+50-IC33	6.2	7.4	7	10YR 5/1 gray loamy sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, black particles (glossy), shell fragments	SW	3.55	<4	<4	<4	<4	<4	<20	<10	In-Channel
RH-151+50-C1	RH-151+50-IC33	7.4	8.5	8	10YR 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	9.35	<4	<4	<4	<4	<4	<20	<10	In-Channel
RH-151+50-C1	RH-151+50-IC33	8.5	9.4	9	10YR 3/1 very dark gray , > or =90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	6.58	110	7300	260	4500	5700	18000	3200	In-Channel
RH-151+50-C1	RH-151+50-IC33	9.4	10.0	10	10YR 4/1 dark gray clay loam, <15% subangular cobble, wet, angular blocky, strong, very firm, very plastic	CL	8.37	<4	14	<4	8	11	32	<10	In-Channel
RH-151+50-C2	RH-151+50-IC92	0.0	0.8	1	10YR 5/3 brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, very few medium roots, shell fragments, wood material (black)	SP	3.38	<4	<4	<5	<4	<4	<21	<10	In-Channel
RH-151+50-C2	RH-151+50-IC92	3.7	5.5	5	10YR 4/1 dark gray loamy sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SW	8.44	<4	32	<7	7	30	69	11	In-Channel
RH-151+50-C2	RH-151+50-IC92	6.1	6.5	7	N 2/0 black , wet, wood material (black)		29.5	27	2800	710	850	960	5300	780	In-Channel
RH-151+50-C2	RH-151+50-IC92	8.3	9.5	11	N 2/0 black coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	12.2	<4	380	68	220	290	960	150	In-Channel
RH-151+50-C2	RH-151+50-IC92	8.3	9.5	11	N 2/0 black coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	9.57	<4	430	15	250	290	980	160	In-Channel
RH-151+50-C3	RH-151+50-IC152	0.0	0.6	1	2.5Y 4/4 olive brown and 2.5Y 3/2 very dark grayish brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	8.3	12	58000	26000	25000	17000	120000	17000	In-Channel
RH-151+50-C3	RH-151+50-IC152	0.6	1.1	2	2.5Y 3/2 very dark grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	9.8	<4	17	5	5	6	33	<10	In-Channel
RH-155+00-C1	RH-155+00-IC36	0.0	1.8	1	2.5Y 5/3 light olive brown sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, few very fine roots, wood material (black), black particles (glossy)	SP	4.6	<17	250	60	62	56	430	65	In-Channel
RH-155+00-C1	RH-155+00-IC36	5.6	7.2	3	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, black particles (glossy), wood material (black)	SP	10.7	6	170	140	99	270	690	98	Atypical
RH-155+00-C1	RH-155+00-IC36	12.8	12.9	7	2.5Y 4/1 dark gray sandy loam, <15% subrounded gravel, wet, massive, very firm, slightly plastic	SM	8.68	<4	<4	<4	<4	<4	<20	<10	In-Channel
RH-155+00-C2	RH-155+00-IC94	2.2	3.8	4	2.5Y 3/1 very dark gray and 10YR 2/1 black fine sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments, plant fragments	SP	24.7	89	590	210	280	920	2100	460	Atypical
RH-155+00-C2	RH-155+00-IC94	4.2	4.7	6	2.5Y 2.5/1 black , wet, wood material (black)		53.7	570	5800	3400	3700	8200	22000	4100	Atypical
RH-158+00-IC-NE	RH-158+00-IC-NE	0.0	0.7	1	10YR 5/3 brown coarse sand, wet, single grain, loose, non-plastic, few medium roots	SW	3.2	<4	23	14	14	42	93	14	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RH-158+00-IC-NE	RH-158+00-IC-NE	2.0	2.5	4	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic	SP	18.3	8	93	43	79	360	580	95	Atypical
RH-162+00-IC-C	RH-162+00-IC-C	0.0	1.2	1	10YR 5/2 grayish brown fine sand, <15% gravel, wet, single grain, moist, loose, non-plastic, very few coarse roots	SP	4.1	<4	23	4	6	23	56	<10	In-Channel
RH-162+50-C1	RH-162+50-IC46	0.0	0.4	1	2.5Y 4/3 olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	14.2	<4	24	16	18	35	93	15	In-Channel
RH-162+50-C1	RH-162+50-IC46	2.5	4.4	4	2.5Y 3/1 very dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, plant fragments, black particles (glossy)	SP	16.9	6	220	80	89	260	650	98	Atypical
RI-164+50-C1	RI-164+50-IC81	0.0	0.9	1	2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	15.5	<4	17	8	10	16	51	<10	In-Channel
RI-164+50-C1	RI-164+50-IC81	0.9	1.6	2	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, shell fragments	SW	16.2	<4	10	4	6	9	29	<10	In-Channel
RI-164+50-C1	RI-164+50-IC81	1.6	2.4	3	10YR 2/1 black and 2.5Y 3/1 very dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SW	39.5	2300	5600	3400	4100	22000	37000	9500	Atypical
RI-164+50-C1	RI-164+50-IC81	2.4	4.0	4	10YR 2/1 black , wet, wood material (black)		60.6	180	2000	970	940	2900	7000	1300	Atypical
RI-164+50-C1	RI-164+50-IC81	4.0	5.6	5	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	4.56	8	39	14	15	48	120	33	In-Channel
RI-164+50-C1	RI-164+50-IC81	5.6	6.7	6	2.5Y 3/1 very dark gray silt loam, <15% rounded gravel, wet, massive, firm, slightly plastic, wood material, wood material (black)	ML	32.1	24	130	70	89	200	510	120	Atypical
RI-164+50-C1	RI-164+50-IC81	6.7	7.5	7	2.5Y 4/2 dark grayish brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
RI-164+50-C1	RI-164+50-IC81	7.5	9.5	8	2.5Y 4/1 dark gray clay, <15% subangular gravel, wet, massive, extremely firm, very plastic	CH	9.23	<4	<4	<4	<4	<4	<20	<10	In-Channel
RI-164+50-C2	RI-164+50-IC111	0.0	1.8	1	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	14.3	<4	11	4	5	8	28	<10	In-Channel
RI-164+50-C2	RI-164+50-IC111	0.0	1.8	1	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	13.3	<4	29	8	10	9	55	10	In-Channel
RI-164+50-C2	RI-164+50-IC111	4.0	6.1	5	10YR 5/2 grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic	SW	4.18	6	220	140	120	180	670	100	In-Channel
RI-164+50-C2	RI-164+50-IC111	4.0	6.1	5	10YR 5/2 grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic	SW	3.26	<4	100	20	28	61	210	30	In-Channel
RI-164+50-C2	RI-164+50-IC111	8.8	10.0	10	2.5Y 6/2 light brownish gray coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic	SW	7.77	<4	<4	<4	<4	<4	<20	<10	In-Channel
RI-164+50-C3	RI-164+50-IC149	0.0	2.0	1	10YR 5/2 grayish brown sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	4.3	<4	38	29	21	170	260	33	In-Channel
RI-164+50-C3	RI-164+50-IC149	0.0	2.0	1	10YR 5/2 grayish brown sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	4.8	26	50	18	29	120	240	85	Atypical
RI-164+50-C3	RI-164+50-IC149	2.0	3.5	1	10YR 5/2 grayish brown sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	6.84	<4	13	5	4	34	57	<10	In-Channel
RI-164+50-C3	RI-164+50-IC149	3.5	4.0	2	N 3/0 very dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	39.4	150	700	190	270	910	2200	600	Atypical
RI-164+50-C4	RI-164+50-IC223	0.0	1.4	1	2.5Y 5/2 grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black), wood material	SP	5.7	<4	92	49	31	44	220	29	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RI-164+50-C4	RI-164+50-IC223	0.0	1.4	1	2.5Y 5/2 grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black), wood material	SP	4	12	11	5	5	8	41	30	In-Channel
RI-165+00-C1	RI-165+00-IC119	1.3	2.3	2	10YR 3/1 very dark gray and N 2.5/0 black loamy sand, wet, single grain, loose, non-plastic, few fine roots, shell fragments	SW	18	220	180	57	180	510	1100	630	Atypical
RI-166+50-C1	RI-166+50-IC110	0.0	0.8	1	2.5Y 4/2 dark grayish brown and 2.5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	15.5	95	110	66	94	260	620	280	Atypical
RI-168+00-C2	RI-168+00-IC103	0.0	1.5	1	2.5Y 6/2 light brownish gray sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	3.8	<4	8	<4	5	12	25	<10	In-Channel
RI-168+00-C2	RI-168+00-IC103	1.5	3.0	1	2.5Y 6/2 light brownish gray sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	7.9	10	38	8	51	450	560	94	Atypical
RI-168+00-C2	RI-168+00-IC103	3.0	4.0	2	2.5Y 4/2 dark grayish brown sand, <15% angular gravel, wet, single grain, loose, non-plastic	SW	12.6	9	220	99	120	890	1300	180	Atypical
RI-168+00-C2	RI-168+00-IC103	4.0	5.4	3	2.5Y 5/2 grayish brown sand, <15% angular gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	13.5	11	160	34	75	210	490	90	Atypical
RI-168+00-C2	RI-168+00-IC103	5.4	6.7	3	2.5Y 5/2 grayish brown sand, <15% angular gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	13.2	12	68	26	25	82	210	51	Atypical
RI-168+00-C2	RI-168+00-IC103	6.7	7.8	4	2.5Y 3/1 very dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	36.4	<4	10	<4	<4	<4	<20	<10	In-Channel
RI-168+00-C2	RI-168+00-IC103	7.8	8.5	5	2.5Y 4/2 dark grayish brown sandy clay loam, <15% angular gravel, wet, massive, firm, slightly plastic	SC	9.66	<4	<4	<4	<4	<6	<22	<10	In-Channel
RI-175+00-C3	RI-175+00-IC161	0.9	1.3	3	10YR 3/2 very dark grayish brown loamy sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy), wood material (black)	SW	14.7	27	19	7	8	24	85	68	Atypical
RI-181+50-C3	RI-181+50-IC148	0.0	1.6	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, wood material (black), black particles (glossy)	SP	5.9	<4	10	5	4	7	26	<10	In-Channel
RI-181+50-C3	RI-181+50-IC148	1.6	3.2	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, black particles (glossy)	SP	3.6	<4	9	<4	4	5	<20	<10	In-Channel
RI-181+50-C3	RI-181+50-IC148	3.2	3.7	2	2.5Y 5/2 grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments, black particles (glossy)	SW	9.8	<4	38	10	21	27	95	16	In-Channel
RI-181+50-C3	RI-181+50-IC148	3.2	3.7	2	2.5Y 5/2 grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments, black particles (glossy)	SW	7.1	<4	100	17	39	40	200	31	In-Channel
RI-181+50-C3	RI-181+50-IC148	3.7	5.0	3	N 2.5/0 black sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.1	<4	<4	<4	<4	<4	<20	<10	In-Channel
RI-181+50-C3	RI-181+50-IC148	5.0	6.5	4	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	5.09	<4	<4	<4	<4	<4	<20	<10	In-Channel
RI-181+50-C3	RI-181+50-IC148	5.0	6.5	4	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	5.09	<4	<4	<4	<4	<4	<20	<10	In-Channel
RI-181+50-C4	RI-181+50-IC224	1.7	2.4	2	2.5Y 4/1 dark gray silt loam, wet, massive, very friable, slightly plastic, wood material (black)	ML	29.1	54	3200	1300	1300	1100	6900	1100	In-Channel

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RI-184+00-IC-SW	RI-184+00-IC-SW	2.3	2.7	3	10YR 2/1 black loamy very fine sand, wet, single grain, moist, loose, non-plastic, few medium roots	SM	24.3	41	5200	4300	2700	3700	16000	2100	In-Channel
RI-184+00-IC-SW	RI-184+00-IC-SW	2.7	2.9	4	2.5Y 3/1 very dark gray silt loam, wet, subangular blocky, moist, friable, slightly plastic	ML	31.6	80	3900	1500	1300	1400	8200	1200	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	0.0	1.1	1	10YR 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SW	5.09	7	550	210	140	260	1200	160	Atypical
RJ-189+50-C1	RJ-189+50-IC35	0.0	1.1	1	10YR 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SW	5.09	26	<8	91	85	140	340	100	Atypical
RJ-189+50-C1	RJ-189+50-IC35	1.1	1.6	2	10YR 3/1 very dark gray loamy sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	35.6	140	410000	180000	140000	130000	860000	110000	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	1.6	2.4	3	10YR 4/1 dark gray coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy), wood material (black)	SW	19.5	200	470000	270000	170000	200000	1100000	140000	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	2.4	3.0	4	N 2/0 black , wet, wood material (black), shell fragments		44.7	<6	28	<14	<16	<17	<57	10	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	3.0	4.0	5	10YR 3/1 very dark gray , 60<90% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	GW	12.1	<4	27	14	9	10	60	10	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	4.0	4.5	6	10YR 3/1 very dark gray loamy sand, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SW	15.6	<4	1400	470	410	320	2600	340	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	4.5	5.9	7	10YR 4/2 dark grayish brown coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	7.53	<4	340	100	73	70	590	75	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	5.9	8.0	8	10YR 4/1 dark gray coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14.1	<4	8	5	<4	4	<20	<10	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	5.9	8.0	8	10YR 4/1 dark gray coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	11.9	<4	8	5	4	<4	<20	<10	In-Channel
RJ-189+50-C1	RJ-189+50-IC35	8.0	10.0	9	10YR 4/1 dark gray sandy clay loam, <15% subangular gravel, wet, angular blocky, moderate, very firm, very plastic	SC	9.13	<4	28	<10	<6	8	36	<10	In-Channel
RJ-195+00-C1	RJ-195+00-IC37	0.0	1.0	1	10YR 4/1 dark gray and 10YR 4/3 brown coarse sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	8.88	<4	5500	2700	2000	2200	12000	1600	In-Channel
RJ-195+00-C1	RJ-195+00-IC37	0.0	1.0	1	10YR 4/1 dark gray and 10YR 4/3 brown coarse sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	10.2	8	38000	21000	15000	15000	89000	11000	In-Channel
RJ-195+00-C1	RJ-195+00-IC37	1.0	3.2	2	10YR 2/1 black , wet, wood material (black)		61	<4	59	24	18	<20	100	16	In-Channel
RJ-195+00-C1	RJ-195+00-IC37	3.2	5.0	3	10YR 3/2 very dark grayish brown and 10YR 4/3 brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	12.6	14	110000	30000	28000	19000	180000	24000	In-Channel
RJ-195+00-C1	RJ-195+00-IC37	5.0	6.7	3	10YR 3/2 very dark grayish brown and 10YR 4/3 brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	10.3	<4	7	<4	<4	<4	<20	<10	In-Channel
RJ-195+00-C1	RJ-195+00-IC37	6.7	8.0	4	10YR 5/1 gray silt loam, wet, massive, very firm, slightly plastic	ML	9.45	<4	<4	<4	<4	<4	<20	<10	In-Channel
RJ-195+00-IC37	RJ-195+00-IC37	0.0	1.0				33.1	<56	36000	22000	16000	14000	88000	12000	

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RK-201+00-NE25	RK-201+00-NE25	0.0	0.7	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, moist, friable, slightly plastic, common fine roots	SM	14.4	56	4300	1800	1600	2100	9700	1400	Intermediate Surface
RK-201+00-NE25	RK-201+00-NE25	2.2	3.3	C1	10YR 4/3 brown and 10YR 3/3 dark brown sand, moist, single grain, moist, loose, non-plastic, few fine roots	SP	8.11	49	330000	100000	110000	78000	620000	84000	Intermediate Surface
RK-201+00-NE25	RK-201+00-NE25	3.3	4.4	C2	10YR 5/4 yellowish brown fine sand, dry, single grain, dry, loose, non-plastic	SP	5.05	39	160000	62000	55000	42000	320000	42000	Intermediate Surface
RK-201+00-NE25	RK-201+00-NE25	5.9	6.6	C3	10YR 4/6 dark yellowish brown fine sand, dry, single grain, dry, loose, non-plastic	SP	6.21	<4	87	17	24	12	140	21	Intermediate Surface
RK-202+75-C1	RK-202+75-IC128	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	3.3	<5	5	<4	<4	4	<21	<10	In-Channel
RK-202+75-C1	RK-202+75-IC128	0.5	1.0	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	3.2	<4	<4	<4	<4	<4	<20	<10	In-Channel
RK-202+75-C1	RK-202+75-IC128	1.0	2.4	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	8	<5	160	190	130	160	640	86	In-Channel
RK-202+75-C1	RK-202+75-IC128	2.4	4.0	2	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, plant fragments, wood material (black)	SP	16.9	<4	6	<4	<4	8	<20	<10	In-Channel
RK-202+75-C1	RK-202+75-IC128	4.0	6.0	2	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, plant fragments, wood material (black)	SP	13.9	<5	24	11	10	14	59	10	In-Channel
RK-202+75-C1	RK-202+75-IC128	6.0	8.0	3	2.5Y 2.5/1 black , wood material (black)		58.9	<10	<4	6	<6	<15	<39	<10	In-Channel
RK-202+75-C1	RK-202+75-IC128	8.0	8.7	3	2.5Y 2.5/1 black , wood material (black)		64	<9	<4	<6	<6	<13	<38	<10	In-Channel
RK-202+75-C1	RK-202+75-IC128	8.0	8.7	3	2.5Y 2.5/1 black , wood material (black)		63.7	<9	<4	<7	<6	<15	<41	<10	In-Channel
RK-202+75-C1	RK-202+75-IC128	8.7	10.2	4	2.5Y 3/1 very dark gray sand, <15% subangular gravel, wet, single grain, loose, non-plastic, shell fragments	SW	12.5	<4	<4	<4	<4	<4	<20	<10	In-Channel
RK-203+50-NE420	RK-203+50-NE420	0.0	0.2	A	10YR 2/1 black fine sandy loam, moist, granular, moist, friable, slightly plastic, many very fine roots	SM	23.8	62	50000	29000	21000	28000	130000	17000	High Surface
RK-203+50-NE420	RK-203+50-NE420	0.2	1.9	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, moist, very friable, slightly plastic	SM	13.7	19	32000	13000	10000	9900	64000	8400	High Surface
RK-203+50-NE420	RK-203+50-NE420	3.4	5.0	2C2	10YR 4/2 dark grayish brown and 10YR 4/4 dark yellowish brown sand, wet, single grain, moist, loose, non-plastic, very few medium roots	SP	14.8	<4	290	120	100	77	580	80	High Surface
RK-203+75-C1	RK-203+75-IC118	0.0	0.5	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material	SP	3.4	<4	10	5	6	10	31	<10	In-Channel
RK-203+75-C1	RK-203+75-IC118	0.5	1.0	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material	SP	4.2	<4	6	<4	<4	5	<20	<10	In-Channel
RK-203+75-C1	RK-203+75-IC118	1.0	2.4	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	6.6	<4	6	<4	<4	13	<20	<10	In-Channel
RK-203+75-C1	RK-203+75-IC118	2.4	4.0	2	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	17.3	<4	27	6	8	7	49	<10	In-Channel
RK-203+75-C1	RK-203+75-IC118	4.0	4.9	3	2.5Y 4/3 olive brown and 2.5Y 2.5/1 black sand, wet, single grain, loose, non-plastic, shell fragments, plant fragments	SP	15.8	<4	7	6	4	11	28	<10	In-Channel
RK-203+75-C1	RK-203+75-IC118	4.9	6.2	4	2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	12.6	<4	6	<4	<4	7	<20	<10	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RK-203+75-C1	RK-203+75-IC118	6.2	7.9	5	2.5Y 2.5/1 black , wet, wood material (black)		59.9	<11	<4	<8	<8	12	<35	<10	In-Channel
RK-206+00-NE50	RK-206+00-NE50	0.0	0.5	A	10YR 2/1 black fine sandy loam, moist, granular, moderate, moist, very friable, non-plastic, common very fine roots	SM	21.4	76	12000	4300	3000	4800	24000	3200	Historic Natural Levee (Pre-Industrial Levee)
RK-206+00-NE50	RK-206+00-NE50	0.0	0.5	A	10YR 2/1 black fine sandy loam, moist, granular, moderate, moist, very friable, non-plastic, common very fine roots	SM	20.1	71	13000	4600	3400	5000	26000	3400	Historic Natural Levee (Pre-Industrial Levee)
RK-206+00-NE50	RK-206+00-NE50	0.5	1.6	AC	2.5Y 3/3 dark olive brown fine sand, moist, single grain, moist, loose, non-plastic, very few very fine roots	SP	7.86	<4	2100	790	670	770	4300	560	Historic Natural Levee (Pre-Industrial Levee)
RK-206+00-NE50	RK-206+00-NE50	2.2	2.7	2Ab	10YR 3/2 very dark grayish brown loamy fine sand, moist, granular, weak, moist, friable, non-plastic	SP	11.4	<6	150	64	64	77	360	52	Historic Natural Levee (Pre-Industrial Levee)
RK-206+00-NE50	RK-206+00-NE50	2.7	3.2	2Bsb	10YR 3/4 dark yellowish brown fine sand, moist, subangular blocky, weak, moist, very friable, non-plastic	SP	8.72	<4	8	4	<4	4	<20	<10	Historic Natural Levee (Pre-Industrial Levee)
RK-206+00-NE515	RK-206+00-NE515	0.0	1.1	A	10YR 3/2 very dark grayish brown silt loam, wet, granular, moderate, moist, friable, slightly plastic, many fine roots	ML/CL	44.4	57	5700	2400	2100	3000	13000	1800	Geomorphic Wetland
RK-206+00-NE515	RK-206+00-NE515	1.1	1.8	C1	10YR 4/2 dark grayish brown silt loam, few 10YR 4/4 dark yellowish brown mottle, wet, granular, weak, moist, friable, slightly plastic, common very fine roots	ML/CL	29.2	5	840	240	220	150	1500	200	Geomorphic Wetland
RK-206+00-NE515	RK-206+00-NE515	1.8	3.3	C2	10YR 5/1 gray clay loam, few 10YR 5/6 yellowish brown mottle, wet, subangular blocky, weak, moist, firm, moderately plastic	CL	30.2	<4	240	96	79	95	510	68	Geomorphic Wetland
RK-219+50-NE30	RK-219+50-NE30	4.2	5.1	C3	10YR 4/3 brown loamy fine sand, dry, subangular blocky, weak, dry, soft, non-plastic	SM	5.41	<4	4000	1700	1400	3200	10000	1300	Atypical
RL-236+25-C2	RL-236+25-IC107	2.4	2.9	2	10YR 2/1 black , wet, wood material (black)		28.1	<4	520	80	83	1100	1800	210	Atypical
RL-239+50-C1	RL-239+50-IC152	0.0	1.5	1	10YR 5/1 gray coarse sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	5	6	210	75	110	420	820	120	Atypical
RL-239+50-C1	RL-239+50-IC152	1.5	3.0	1	10YR 5/1 gray coarse sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	12.6	67	320000	220000	150000	150000	830000	110000	In-Channel
RL-239+50-C1	RL-239+50-IC152	3.0	4.0	2	10YR 2/1 black , wet, wood material (black)		49	5	21000	7800	7400	6200	42000	5700	In-Channel
RL-239+50-C1	RL-239+50-IC152	4.0	6.0	3	10YR 5/1 gray and 10YR 2/1 black coarse sand, wet, single grain, loose, non-plastic, wood material (black)	SW	12.3	<4	110	42	36	32	220	31	In-Channel
RL-239+50-C1	RL-239+50-IC152	6.0	7.0	4	10YR 5/1 gray coarse sand, wet, single grain, loose, non-plastic	SP	12.5	<4	250	130	98	93	570	76	In-Channel
RL-239+50-C1	RL-239+50-IC152	7.0	7.5	5	10YR 6/1 gray clay loam, wet, massive, structureless, firm, moderately plastic	CL	18.3	<4	5	<4	<4	<4	<20	<10	In-Channel
RL-240+00-C3	RL-240+00-IC217	0.0	1.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, structureless, loose, non-plastic, very few fine roots, wood material (black), shell fragments	SW	10.4	<4	78	34	35	53	200	29	In-Channel
RL-240+00-C3	RL-240+00-IC217	0.0	1.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, structureless, loose, non-plastic, very few fine roots, wood material (black), shell fragments	SW	12.8	<17	89	32	34	310	460	65	Atypical
RL-242+00-C4	RL-242+00-IC222	1.0	1.7	1	2.5Y 5/2 grayish brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	13.5	4	70	70	37	180	360	50	In-Channel
RL-246+00-SW20	RL-246+00-SW20	5.0	6.0	C1	10YR 4/2 dark grayish brown and 10YR 5/3 brown fine sand, dry, dry, loose, non-plastic	SP	7.45	22	110000	72000	44000	55000	280000	35000	Natural Levee (Post-Industrial Levee)

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RL-246+05-SW20	RL-246+05-SW20	0.0	0.6	A5	10YR 3/1 very dark gray and 10YR 5/3 brown sandy loam, dry, dry, slightly hard, slightly plastic, very few roots	SP	11.5	8	1600	380	450	340	2800	390	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	0.6	1.0	Bw	10YR 4/2 dark grayish brown loamy sand, dry, dry, loose, non-plastic		10.5	120	1900	940	900	1200	5000	930	Atypical
RL-246+05-SW20	RL-246+05-SW20	0.6	1.0	Bw	10YR 4/2 dark grayish brown loamy sand, dry, dry, loose, non-plastic		11	100	1600	670	740	1100	4200	790	Atypical
RL-246+05-SW20	RL-246+05-SW20	5.0	6.0	C	10YR 4/2 dark grayish brown and 10YR 5/3 brown fine sand, dry, dry, loose, non-plastic		8.3	80	110000	41000	51000	33000	240000	34000	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	6.0	7.5	C2	10YR 5/3 brown and 10YR 4/2 dark grayish brown loamy very fine sand, common mottle, moist, moist, loose, non-plastic	SP	8.7	27	50000	20000	22000	17000	110000	15000	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	7.5	8.5	C3	10YR 5/3 brown and 10YR 4/2 dark grayish brown fine sand, common 7.5YR 5/8 strong brown mottle, moist, single grain, moist, loose, non-plastic	SP-SM	15.7	130	49000	14000	30000	13000	110000	18000	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	8.5	9.5	C4	10YR 5/3 brown and 2.5Y 4/1 dark gray sand, moist, single grain, moist, loose, non-plastic	SP	29.7	7	4300	1700	1600	1100	8600	1200	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	9.5	10.5	C5	2.5Y 4/1 dark gray and 2.5Y 4/3 olive brown sand, single grain, loose, non-plastic	SW	21.3	<4	580	250	230	180	1200	170	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	10.5	11.8	C6	2.5Y 4/1 dark gray fine sandy loam, wet, subangular blocky, moist, friable, non-plastic	SM	35.7	<4	140	68	60	49	320	45	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	11.8	12.9	C7	2.5Y 4/1 dark gray silty clay loam, wet, massive, moist, firm, moderately plastic	ML/CL	26.9	<4	9	5	4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	12.9	13.5	C8	2.5Y 4/2 dark grayish brown sand, wet, single grain, moist, loose, non-plastic	SP	39.8	<4	33	18	17	14	82	14	Natural Levee (Post-Industrial Levee)
RL-246+05-SW20	RL-246+05-SW20	13.5	15.0	C9	2.5Y 4/1 dark gray fine sandy loam, wet, structureless, moist, friable, moderately plastic	SM	35.2	<4	6	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RL-252+05-SW5	RL-252+05-SW5	3.0	4.5	Cg1	N 3/0 very dark gray sand, wet, moist, loose, non-plastic		35	650	710	460	480	1100	3400	1800	Atypical
RL-252+05-SW5	RL-252+05-SW5	4.5	6.0	Cg2	5Y 3/1 very dark gray sand, wet, single grain, moist, loose, non-plastic	SP	19.2	19	1700	1100	860	860	4500	640	Bankfull Bench
RL-252+05-SW5	RL-252+05-SW5	6.0	7.4	Cg2	5Y 3/1 very dark gray sand, wet, single grain, moist, loose, non-plastic	SP	16.7	<4	870	300	370	520	2100	290	Bankfull Bench
RL-255+00-C1	RL-255+00-IC214	0.0	1.5	1	2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	18	<4	450	170	160	170	950	130	In-Channel
RL-255+00-C1	RL-255+00-IC214	0.0	1.5	1	2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	15.8	<4	900	150	530	740	2300	360	In-Channel
RL-255+00-C1	RL-255+00-IC214	9.3	10.1	4	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SW	11.5	<4	190	80	65	56	390	53	In-Channel
RL-256+50-C1	RL-256+50-IC229	0.0	2.0	1	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SP	11.8	15	24000	17000	13000	11000	65000	8700	In-Channel

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RL-256+50-C1	RL-256+50-IC229	0.0	2.0	1	2.5Y 6/3 light yellowish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SP	13.8	5	2500	2400	1600	2000	8500	1100	In-Channel
RL-256+50-C1	RL-256+50-IC229	2.0	4.0	2	2.5Y 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	14.2	15	36000	13000	12000	8500	70000	9300	In-Channel
RL-256+50-C1	RL-256+50-IC229	4.0	6.0	3	2.5Y 4/1 dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14	<4	7	4	<4	<4	<20	<10	In-Channel
RL-256+50-C1	RL-256+50-IC229	4.0	6.0	3	2.5Y 4/1 dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	14	<4	7	5	<4	4	<20	<10	In-Channel
RL-258+50-IC-SW	RL-258+50-IC-SW	1.9	2.4	4	10YR 4/1 dark gray loamy fine sand, wet, single grain, moist, loose, non-plastic, few medium roots	SM	15.6	20	54000	43000	36000	30000	160000	23000	In-Channel
RM-262+00-C2	RM-262+00-IC205	5.2	7.2	4	2.5Y 4/1 dark gray fine sand, wet, single grain, loose, non-plastic	SP	17.7	4	18000	14000	7900	9600	49000	6100	In-Channel
RM-262+00-IC-C	RM-262+00-IC-C	0.7	1.2	2	10YR 4/2 dark grayish brown coarse sand, moist, single grain, moist, loose, non-plastic	SP	6.8	20	27000	12000	12000	9100	60000	8300	In-Channel
RM-265+50-C2	RM-265+50-IC209	3.7	4.0	5	7.5YR 4/4 brown , wet		57.8	12	<6	<21	<19	<33	<83	32	In-Channel
RM-268+00-NE20	RM-268+00-NE20	1.6	3.5	C2	2.5Y 4/3 olive brown fine sand, moist, single grain, moist, loose, non-plastic, many coarse roots	SW	3.59	240	3800	1500	1400	1600	8500	1600	Atypical
RM-268+00-NE570	RM-268+00-NE570	0.0	0.7	A	10YR 3/2 very dark grayish brown loamy fine sand, dry, granular, dry, slightly hard, slightly plastic, many fine roots	SW	22.1	9	2100	630	610	570	3900	540	High Surface
RM-268+00-NE570	RM-268+00-NE570	0.7	2.0	Bs	10YR 5/6 yellowish brown loamy sand, moist, single grain, moist, loose, non-plastic, few fine roots	SW	26	<4	87	31	26	40	180	26	High Surface
RM-273+00-C2	RM-273+00-IC88	0.0	0.5	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SP	10.2	<14	140	93	67	100	400	60	In-Channel
RM-273+00-C2	RM-273+00-IC88	0.0	0.5	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SP	10.2	<16	120	66	56	120	360	56	Atypical
RM-273+00-C2	RM-273+00-IC88	0.0	0.5	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SP	11.6	8	210	750	150	720	1800	190	Atypical
RM-273+00-C2	RM-273+00-IC88	0.0	0.5	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SP	11.6	93	74000	36000	31000	24000	170000	23000	In-Channel
RM-284+00-NE20	RM-284+00-NE20	3.2	5.4	C4	10YR 6/3 pale brown fine sand, moist, single grain, moist, loose, non-plastic	SP	2.4	60	82000	31000	30000	24000	170000	23000	Natural Levee (Post-Industrial Levee)
RN-297+00-NE25	RN-297+00-NE25	0.0	0.8	A	10YR 3/2 very dark grayish brown loamy sand, moist, single grain, moist, very friable, non-plastic, common fine roots	SW	7	8	2400	1200	1100	1200	5800	810	Natural Levee (Post-Industrial Levee)
RN-297+00-NE25	RN-297+00-NE25	0.0	0.8	A	10YR 3/2 very dark grayish brown loamy sand, moist, single grain, moist, very friable, non-plastic, common fine roots	SW	6	6	2100	620	700	590	4000	560	Natural Levee (Post-Industrial Levee)
RN-297+00-NE25	RN-297+00-NE25	4.3	5.3	C1	10YR 3/3 dark brown sand, moist, single grain, moist, very friable, non-plastic	SP	5.9	12	63000	26000	22000	21000	130000	17000	Natural Levee (Post-Industrial Levee)
RN-297+05-NE25	RN-297+05-NE25	8.1	9.2	C2	10YR 5/3 brown fine sand, dry, single grain, dry, loose, non-plastic	SP	5.2	20	16000	4100	5300	3300	28000	4000	Natural Levee (Post-Industrial Levee)
RN-297+05-NE25	RN-297+05-NE25	9.2	11.5	C2	10YR 4/2 dark grayish brown and 10YR 5/4 yellowish brown loam, common 10YR 5/6 yellowish brown and 7.5YR 4/6 strong brown mottle, moist, structureless, moist, friable, slightly plastic, very few medium roots	ML/CL	18.8	5	3000	780	880	540	5200	710	Natural Levee (Post-Industrial Levee)

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RN-297+05-NE25	RN-297+05-NE25	9.2	11.5	C2	10YR 4/2 dark grayish brown and 10YR 5/4 yellowish brown loam, common 10YR 5/6 yellowish brown and 7.5YR 4/6 strong brown mottle, moist, structureless, moist, friable, slightly plastic, very few medium roots	ML/CL	17.5	<4	2200	630	690	400	4000	540	Natural Levee (Post-Industrial Levee)
RN-297+05-NE25	RN-297+05-NE25	11.5	13.3	Cg	10YR 4/1 dark gray and 10YR 2/1 black sand, moist, structureless, moist, loose, non-plastic	SW	35	<4	5	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RN-297+05-NE25	RN-297+05-NE25	11.5	13.3	Cg	10YR 4/1 dark gray and 10YR 2/1 black sand, moist, structureless, moist, loose, non-plastic	SW	30.8	<4	<4	<4	<4	<8	<24	<10	Natural Levee (Post-Industrial Levee)
RO-322+50-IC-C	RO-322+50-IC-C	0.5	1.1	2	10YR 2/1 black , moist, non-plastic, many medium roots		44.2	44	280000	160000	130000	100000	660000	88000	In-Channel
RO-322+50-IC-C	RO-322+50-IC-C	0.5	1.1	2	10YR 2/1 black , moist, non-plastic, many medium roots		44.2	15	100000	33000	30000	18000	180000	24000	In-Channel
RO-322+50-IC-C	RO-322+50-IC-C	0.5	1.1	2	10YR 2/1 black , moist, non-plastic, many medium roots		44.2	74	380000	140000	140000	83000	740000	100000	In-Channel
RO-323+00-IC-SW75	RO-323+00-IC-SW75	0.6	0.9	2	wet, structureless		34.5	13	11000	6900	6000	4900	29000	4000	In-Channel
RO-325+50-NE10	RO-325+50-NE10	0.0	0.3	A	10YR 3/1 very dark gray fine sand, moist, single grain, moist, loose, non-plastic, common very fine roots	SP	6.4	29	11000	5500	9200	4100	29000	4900	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	0.3	0.8	A/C	10YR 4/3 brown fine sand, moist, single grain, moist, loose, non-plastic, few very fine roots	SP	4.3	5	11000	5700	6300	4700	27000	3900	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	0.8	2.5	C1	10YR 4/4 dark yellowish brown very fine sand, moist, single grain, moist, loose, non-plastic	SP	6.2	<4	590	260	270	210	1300	190	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	2.5	3.0	C2	10YR 4/2 dark grayish brown very fine sand, moist, single grain, moist, loose, non-plastic	SP	3.8	<4	57	12	17	9	95	15	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	3.0	3.7	C3	10YR 4/3 brown very fine sand, moist, single grain, moist, loose, non-plastic	SP	3.5	<4	1000	550	520	510	2600	360	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	3.7	4.3	C4	10YR 3/3 dark brown very fine sand, moist, single grain, moist, loose, non-plastic	SP	5.9	<4	7	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	4.3	5.8	C5	10YR 4/3 brown loamy very fine sand, moist, single grain, moist, loose, non-plastic	SP	5.2	<4	49	23	23	20	110	18	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	5.8	6.7	C6	10YR 3/4 dark yellowish brown loamy very fine sand, moist, subangular blocky, moist, very friable, slightly plastic	SC	4.58	<4	360	150	140	160	800	110	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	6.7	7.6	C7	10YR 4/4 dark yellowish brown loamy very fine sand, moist, subangular blocky, moist, friable, slightly plastic	SC	8.3	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RO-325+50-NE10	RO-325+50-NE10	7.6	8.7	C8	10YR 4/4 dark yellowish brown loamy very fine sand, moist, subangular blocky, moist, very friable, slightly plastic	SC	7.9	<4	41	16	16	20	92	15	Natural Levee (Post-Industrial Levee)
RO-325+50-NE45	RO-325+50-NE45	0.0	0.3	A	10YR 3/1 very dark gray fine sandy loam, moist, granular, moist, friable, slightly plastic, very few fine roots	SC	9.5	17	35000	29000	20000	12000	96000	13000	Historic Natural Levee (Pre-Industrial Levee)
RO-327+50-IC-C	RO-327+50-IC-C	0.4	1.0	2	10YR 2/1 black , moist, many medium roots		44	8	30000	5400	7400	3300	46000	6300	In-Channel

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RO-333+00-NE300	RO-333+00-NE300	0.0	0.2	A	10YR 3/2 very dark grayish brown silt loam, moist, granular, moist, friable, moderately plastic, few very fine roots	ML	23.7	80	4000	1600	1300	2100	9000	1300	Geomorphic Wetland
RO-333+00-NE300	RO-333+00-NE300	0.2	0.6	A/C	10YR 4/2 dark grayish brown silty clay loam, common mottle, moist, subangular blocky, moist, firm, moderately plastic, few medium roots	CL	19.3	13	7000	2900	2400	3000	15000	2000	Geomorphic Wetland
RO-333+00-NE300	RO-333+00-NE300	0.6	1.8	C1	10YR 5/2 grayish brown silty clay loam, common 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moist, firm, moderately plastic	CL	18.2	<4	190	65	58	64	380	51	Geomorphic Wetland
RO-333+00-NE300	RO-333+00-NE300	1.8	3.3	C2	10YR 5/2 grayish brown silty clay loam, many 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moist, firm, moderately plastic	CL	17.9	<4	4	<4	<4	<4	<20	<10	Geomorphic Wetland
RP-337+00-S1	RP-337+00-SW41	1.0	2.3	C1	10YR 4/4 dark yellowish brown sandy loam, dry, subangular blocky, weak, slightly hard, slightly plastic, few fine roots, shell fragments	SM	6.9	<4	2400	1700	1500	1300	6800	950	High Surface
RP-337+00-S1	RP-337+00-SW41	1.0	2.3	C1	10YR 4/4 dark yellowish brown sandy loam, dry, subangular blocky, weak, slightly hard, slightly plastic, few fine roots, shell fragments	SM	6.1	<4	2900	1400	1500	1100	6900	980	High Surface
RP-338+00-S2	RP-338+00-SW119	0.3	1.0	AC	10YR 4/2 dark grayish brown silty clay loam, moist, subangular blocky, moderate, friable, slightly plastic, few fine roots	ML	23.2	17	8300	5300	5300	5500	24000	3500	Low Surface
RP-338+00-S2	RP-338+00-SW119	1.0	3.3	C1	10YR 4/3 brown silty clay loam, moist, subangular blocky, moderate, friable, slightly plastic	ML	20	<4	2100	440	450	290	3300	430	Low Surface
RP-338+00-S2	RP-338+00-SW119	3.3	4.4	C2	10YR 4/3 brown silty clay loam, few fine 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moderate, friable, slightly plastic	ML	17.7	<4	680	150	130	120	1100	140	Low Surface
RP-338+00-S2	RP-338+00-SW119	4.4	5.5	C2	10YR 4/3 brown silty clay loam, few fine 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moderate, friable, slightly plastic	ML	19.3	<4	12	4	<4	<4	<20	<10	Low Surface
RP-339+00-N1	RP-339+00-NE19	5.5	6.6	C	10YR 5/2 grayish brown sand, dry, single grain, loose, non-plastic	SP	3.74	<4	17000	2900	3700	1600	25000	3400	Natural Levee (Industrial Age Levee)
RP-339+00-N1	RP-339+00-NE19	5.5	6.6	C	10YR 5/2 grayish brown sand, dry, single grain, loose, non-plastic	SP	3.91	<4	3100	740	790	520	5200	690	Natural Levee (Industrial Age Levee)
RP-339+50-S3	RP-339+50-SW222	0.0	1.0	C1	10YR 4/2 dark grayish brown clay loam, moist, subangular blocky, weak, friable, moderately plastic, few medium roots	CL	34	34	6600	3600	3400	3100	17000	2400	Geomorphic Wetland
RP-339+50-S3	RP-339+50-SW222	1.0	1.6	C1	10YR 4/2 dark grayish brown clay loam, moist, subangular blocky, weak, friable, moderately plastic, few medium roots	CL	30.8	49	10000	3900	4000	3000	21000	3000	Geomorphic Wetland
RP-339+50-S3	RP-339+50-SW222	1.0	1.6	C1	10YR 4/2 dark grayish brown clay loam, moist, subangular blocky, weak, friable, moderately plastic, few medium roots	CL	31.1	68	7100	2900	3300	2700	16000	2400	Geomorphic Wetland
RP-339+50-S3	RP-339+50-SW222	1.6	3.0	C2	10YR 4/2 dark grayish brown clay loam, common medium 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, moderately plastic, few fine roots, shell fragments	CL	27.9	4	2700	1100	1200	1000	6000	830	Geomorphic Wetland
RP-339+50-S3	RP-339+50-SW222	3.0	4.7	C2	10YR 4/2 dark grayish brown clay loam, common medium 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, moderately plastic, few fine roots, shell fragments	CL	26.7	<4	260	110	110	92	570	80	Geomorphic Wetland

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RP-339+50-S3	RP-339+50-SW222	4.7	5.8	C3	10YR 4/2 dark grayish brown silt loam, common medium 7.5YR 4/6 strong brown mottle, wet, massive, friable, moderately plastic, few fine roots	ML	31.1	8	930	470	440	440	2300	330	Geomorphic Wetland
RP-339+50-S3	RP-339+50-SW222	5.8	8.0	C4	10YR 4/1 dark gray silt loam, moist, massive, friable, moderately plastic, shell fragments	ML	31	<4	44	24	18	19	100	16	Geomorphic Wetland
RP-344+00-C2	RP-344+00-IC128	1.5	3.0	1	10YR 5/3 brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SP	3.3	21	120	19	87	650	900	160	Atypical
RP-348+00-C1	RP-348+00-IC48	0.0	1.4	1	10YR 4/3 brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	29.8	<4	8200	6200	4400	6300	25000	3300	In-Channel
RP-348+00-C1	RP-348+00-IC48	1.4	2.6	2	10YR 4/1 dark gray and 10YR 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	12.6	<4	5	4	<4	<7	<23	<10	In-Channel
RP-348+00-C1	RP-348+00-IC48	2.6	3.3	3	10YR 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SP	12.2	<4	<4	<4	<4	<5	<21	<10	In-Channel
RQ-358+00-C3	RQ-358+00-IC235	2.2	4.0	3	10YR 2/1 black , wet, wood material (black)		77.5	45	230000	63000	58000	37000	380000	50000	In-Channel
RQ-358+50-C2	RQ-358+50-IC193	0.3	1.5	2	10YR 2/1 black , wet, wood material (black)		62.1	17	93000	48000	37000	33000	210000	28000	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	0.0	1.4	1	2.5Y 4/2 dark grayish brown coarse sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	24.4	<9	22000	9900	7700	6200	46000	6000	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	1.4	1.9	2	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, shell fragments	SP	16	<4	920	280	250	230	1700	220	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	1.9	2.7	3	10YR 2/1 black , wet, wood material (black)		61.9	31	62000	21000	21000	15000	120000	16000	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	2.7	3.5	4	2.5Y 3/1 very dark gray coarse sand, > or =90% rounded gravel, wet, single grain, loose, non-plastic, wood material (black)	GW	20.9	<4	1200	290	260	160	1900	240	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	3.5	4.6	5	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	16.7	<4	<4	<4	<4	<4	<20	<10	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	4.6	6.0	6	2.5Y 4/1 dark gray loamy sand, <15% rounded gravel, wet, massive, friable, non-plastic, wood material (black), shell fragments	SP	22.9	<4	<4	<4	<4	<4	<20	<10	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	6.0	6.9	6	2.5Y 4/1 dark gray loamy sand, <15% rounded gravel, wet, massive, friable, non-plastic, wood material (black), shell fragments	SP	42	<4	42	21	13	13	88	13	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	6.9	7.5	7	2.5Y 4/2 dark grayish brown coarse sand, <15% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	12.9	<4	<4	<4	<4	<4	<20	<10	In-Channel
RQ-359+00-C3	RQ-359+00-IC190	7.5	8.2	8	2.5Y 5/1 gray coarse sand, 35<60% rounded gravel, wet, single grain, loose, non-plastic	SW	12.9	<4	<4	<4	<4	<4	<20	<10	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	0.0	2.0	1	10YR 5/1 gray very fine sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	8.82	<4	11000	3800	3300	2300	20000	2700	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	0.0	2.0	1	10YR 5/1 gray very fine sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	8.82	<4	2400	1100	740	770	5100	640	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	2.0	3.0	1	10YR 5/1 gray very fine sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	5.05	<4	480	95	71	61	700	88	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	2.0	3.0	1	10YR 5/1 gray very fine sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	5.05	<4	250	57	56	50	420	56	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	3.0	4.8	2	10YR 2/1 black , wet, wood material (black)		55.9	37	120000	65000	41000	46000	270000	34000	In-Channel

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Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RQ-359+00-C4	RQ-359+00-IC226	4.8	5.0	3	2.5Y 4/1 dark gray coarse sand, wet, single grain, loose, non-plastic, shell fragments	SW	18.8	<4	520	160	140	140	950	120	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	5.0	7.0	4	2.5Y 5/3 light olive brown coarse sand, 35<60% rounded gravel, wet, single grain, loose, non-plastic	SW	3.55	<4	56	16	15	11	99	15	In-Channel
RQ-359+00-C4	RQ-359+00-IC226	7.0	7.7	4	2.5Y 5/3 light olive brown coarse sand, 35<60% rounded gravel, wet, single grain, loose, non-plastic	SW	3.53	<4	<4	<4	<4	<4	<20	<10	In-Channel
RQ-361+00-N6	RQ-361+00-NE284	3.8	4.8	2Ab	10YR 3/1 very dark gray clay loam, moist, subangular blocky, strong, firm, moderately plastic	CL	17.9	<12	60	30	28	26	140	26	Intermediate Surface
RQ-361+00-S2	RQ-361+00-SW26	0.0	1.1	A	10YR 2/2 very dark brown sandy loam, moist, granular, weak, friable, slightly plastic, common fine roots	SM	11.3	34	1300	520	500	840	3100	490	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	1.1	2.0	C1	10YR 3/2 very dark grayish brown loamy sand, moist, single grain, loose, non-plastic, very few very fine roots	SW	8.9	71	1100	470	450	1200	3300	570	Atypical
RQ-361+00-S2	RQ-361+00-SW26	2.0	3.0	2Ab	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, friable, slightly plastic, few fine roots	SM	9.95	33	5300	1800	1900	2900	12000	1700	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	3.0	5.1	2C2	10YR 4/3 brown loamy sand, moist, single grain, loose, non-plastic	SW	4.32	<4	12000	6500	4900	5400	29000	3800	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	5.1	7.2	2C2	10YR 4/3 brown loamy sand, moist, single grain, loose, non-plastic	SW	3.18	10	47000	16000	15000	12000	91000	12000	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	5.1	7.2	2C2	10YR 4/3 brown loamy sand, moist, single grain, loose, non-plastic	SW	3.97	11	60000	22000	19000	16000	120000	16000	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	7.2	9.1	2C3	10YR 4/2 dark grayish brown sandy loam, few medium 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	SM	10.2	10	47000	23000	18000	18000	110000	14000	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	7.2	9.1	2C3	10YR 4/2 dark grayish brown sandy loam, few medium 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	SM	10.2	12	54000	29000	23000	23000	130000	17000	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	9.1	10.0	2C4	10YR 6/3 pale brown fine sand, moist, single grain, loose, non-plastic	SP	2.5	<4	14000	5200	4800	3600	28000	3700	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	10.0	11.1	2C5	10YR 6/3 pale brown and 10YR 2/1 black fine sand, moist, single grain, loose, non-plastic, wood material (black)	SP	28.9	<4	39	13	11	8	70	11	Natural Levee (Industrial Age Levee)
RQ-361+00-S2	RQ-361+00-SW26	11.1	13.6	2C6	10YR 4/1 dark gray and 10YR 2/1 black sandy loam, moist, massive, friable, slightly plastic, wood material (black)	SM	32.5	<4	31	12	11	9	62	11	Natural Levee (Industrial Age Levee)
RQ-362+00-C3	RQ-362+00-IC183	0.0	2.0	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SP	15.8	4	2800	390	530	250	4000	530	In-Channel
RQ-365+50-C1	RQ-365+50-IC72	0.0	0.4	1	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, black particles (glossy), wood material (black)	SP	5.01	<4	1400	210	140	140	1800	220	In-Channel
RQ-365+50-C1	RQ-365+50-IC72	0.4	1.7	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	25.8	<4	50	11	13	12	86	14	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RQ-365+50-C1	RQ-365+50-IC72	1.7	2.8	3	2.5Y 4/2 dark grayish brown coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	10.2	36	65	19	28	42	190	100	Atypical
RQ-365+50-C1	RQ-365+50-IC72	2.8	3.1	4	2.5Y 3/2 very dark grayish brown coarse sand, wet, single grain, loose, non-plastic, wood material (black)	SP	33.5	18	50000	22000	20000	15000	110000	14000	In-Channel
RQ-366+00-C1	RQ-366+00-IC71	1.6	3.2	2	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, structureless, loose, non-plastic, wood material (black), shell fragments	SW	13.8	<4	50	20	47	7400	7500	840	Atypical
RQ-366+00-S1	RQ-366+00-SW47	1.0	2.5	C2	10YR 6/3 pale brown and 10YR 4/3 brown loamy sand, dry, subangular blocky, weak, slightly hard, non-plastic, very few fine roots	SP	6.9	90	1100	410	540	920	3000	610	Atypical
RQ-366+00-S1	RQ-366+00-SW47	2.5	4.5	C2	10YR 6/3 pale brown and 10YR 4/3 brown loamy sand, dry, subangular blocky, weak, slightly hard, non-plastic, very few fine roots	SP	5.6	48	1500	610	820	1400	4300	710	Atypical
RQ-366+00-S1	RQ-366+00-SW47	2.5	4.5	C2	10YR 6/3 pale brown and 10YR 4/3 brown loamy sand, dry, subangular blocky, weak, slightly hard, non-plastic, very few fine roots	SP	5.9	52	3400	1300	1800	5500	12000	1700	Atypical
RQ-366+00-S1	RQ-366+00-SW47	4.5	6.5	C2	10YR 6/3 pale brown and 10YR 4/3 brown loamy sand, dry, subangular blocky, weak, slightly hard, non-plastic, very few fine roots	SP	8.1	21	8400	3000	3200	6000	21000	2800	Atypical
RQ-366+00-S1	RQ-366+00-SW47	6.5	8.0	C3	10YR 4/1 dark gray and 10YR 5/3 brown sand, few medium 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, wood material (black)	SP	19	<4	2100	1800	1400	1900	7200	960	Low Surface
RQ-367+00-S2	RQ-367+00-SW17	10.8	11.4	C7	10YR 6/2 light brownish gray sand, common coarse 5YR 3/4 dark reddish brown mottle, moist, single grain, loose, non-plastic	SP	5.84	10	41000	8700	11000	4500	65000	8800	Natural Levee (Industrial Age Levee)
RQ-367+00-S5	RQ-367+00-SW77	1.0	1.5	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, slightly plastic, very few fine roots	ML	20	91	1500	590	860	1600	4700	850	Atypical
RQ-367+00-S5	RQ-367+00-SW77	1.5	3.2	C1	10YR 4/3 brown and 10YR 6/3 pale brown loamy sand, moist, subangular blocky, weak, very friable, non-plastic, very few fine roots	SP	7.9	<4	7200	2800	2800	2800	16000	2100	Low Surface
RQ-367+00-S5	RQ-367+00-SW77	1.5	3.2	C1	10YR 4/3 brown and 10YR 6/3 pale brown loamy sand, moist, subangular blocky, weak, very friable, non-plastic, very few fine roots	SP	7.7	<4	7300	2900	3000	2800	16000	2200	Low Surface
RQ-367+00-S5	RQ-367+00-SW77	3.2	4.9	C1	10YR 4/3 brown and 10YR 6/3 pale brown loamy sand, moist, subangular blocky, weak, very friable, non-plastic, very few fine roots	SP	12.2	14	65000	27000	27000	23000	140000	20000	Low Surface
RQ-367+00-S5	RQ-367+00-SW77	7.1	8.0	Cg	2.5Y 4/1 dark gray loamy sand, wet, massive, friable, non-plastic, wood material (black)	SP	34	<4	4300	1600	1300	970	8200	1100	Low Surface
RQ-367+50-S1	RQ-367+50-SW55	1.0	2.5	C2	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, very few fine roots	ML/CL	25.1	150	1500	590	850	1400	4400	930	Atypical
RQ-367+50-S1	RQ-367+50-SW55	2.5	3.7	C3	2.5Y 3/2 very dark grayish brown silt loam, common fine 10YR 3/6 dark yellowish brown mottle, wet, massive, friable, slightly plastic, very few fine roots	ML	35.9	36	2900	1200	1400	2600	8200	1200	Atypical
RQ-367+50-S1	RQ-367+50-SW55	3.7	5.1	Cg1	5Y 5/1 gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	14.7	<4	2400	2000	1500	1900	7700	1000	Geomorphic Wetland
RQ-371+50-S2	RQ-371+50-SW20	2.9	3.7	C2	10YR 3/2 very dark grayish brown sandy clay loam, moist, subangular blocky, moderate, firm, moderately plastic, very few very fine roots	SC	18.8	93	640	390	510	1500	3100	620	Atypical

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RQ-374+00-S1	RQ-374+00-SW28	1.4	2.3	C1	10YR 6/3 pale brown sand, dry, single grain, loose, non-plastic, few medium roots	SP	2.5	<15	51000	20000	21000	16000	110000	15000	Historic Natural Levee (Pre-Industrial Age Levee)
RQ-374+00-S1	RQ-374+00-SW28	1.4	2.3	C1	10YR 6/3 pale brown sand, dry, single grain, loose, non-plastic, few medium roots	SP	2.3	<15	49000	19000	19000	15000	100000	14000	Historic Natural Levee (Pre-Industrial Age Levee)
RQ-376+00-N2	RQ-376+00-NE51	1.0	3.0	C1	10YR 3/3 dark brown loam, moist, subangular blocky, weak, friable, slightly plastic, few medium roots	SM	13.8	26	32000	16000	16000	13000	78000	11000	Intermediate Surface
RR-381+50-N1	RR-381+50-NE22	0.0	2.1	A	10YR 3/2 very dark grayish brown loam, moist, granular, weak, very friable, slightly plastic, common fine roots	ML/CL	18.6	160	1300	750	650	1600	4500	910	Atypical
RR-388+00-C3	RR-388+00-IC210	2.1	4.0	2	10YR 2/1 black , wet, wood material (black)		40.8	18	96000	31000	28000	25000	180000	24000	In-Channel
RR-388+00-C3	RR-388+00-IC210	8.7	9.2	5	10YR 2/1 black , wet, wood material (black)		81.3	<11	100	40	43	31	210	35	In-Channel
RR-398+50-C2	RR-398+50-IC151	0.0	1.6	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	2.7	<4	24	5	9	10	47	<10	In-Channel
RR-398+50-C2	RR-398+50-IC151	1.6	2.4	2	2.5Y 4/2 dark grayish brown coarse sand, <15% subangular gravel, wet, single grain, loose, non-plastic, black particles (glossy)	SW	4.2	<4	57	17	24	31	130	20	In-Channel
RR-398+50-C2	RR-398+50-IC151	2.4	3.0	3	2.5Y 3/1 very dark gray and 2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	11.5	<4	190	44	48	35	320	44	In-Channel
RR-398+50-C2	RR-398+50-IC151	3.0	3.6	4	10YR 2/1 black , wet, shell fragments, wood material (black)		30.5	18	69000	33000	34000	19000	150000	22000	In-Channel
RR-398+50-C2	RR-398+50-IC151	3.0	3.6	4	10YR 2/1 black , wet, shell fragments, wood material (black)		40.1	13	46000	27000	26000	18000	120000	16000	In-Channel
RR-398+50-C2	RR-398+50-IC151	3.6	5.0	5	2.5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.4	<4	61	18	15	18	110	17	In-Channel
RR-398+50-C2	RR-398+50-IC151	5.0	7.2	6	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	2.6	<4	<4	<4	<4	<5	<21	<10	In-Channel
RR-398+50-C2	RR-398+50-IC151	7.2	8.5	7	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SW	6.3	<4	<4	<4	<4	<4	<20	<10	In-Channel
RR-398+50-C2	RR-398+50-IC151	10.0	11.5	9	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SW	3	<4	120	45	52	30	250	37	In-Channel
RS-402+50-C2	RS-402+50-IC104	2.7	4.0	2	2.5Y 4/2 dark grayish brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	16	5	4400	500	830	320	6000	820	In-Channel
RS-406+00-N3	RS-406+00-NE76	0.0	0.6	A	10YR 3/2 very dark grayish brown clay loam, moist, granular, moderate, friable, moderately plastic, few fine roots	CL	12.5	25	6200	2800	2800	2700	14000	2000	Geomorphic Wetland
RS-406+00-N3	RS-406+00-NE76	0.6	1.5	C1	10YR 4/2 dark grayish brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic, few fine roots	CL	13.3	<4	110	780	810	600	2300	370	Geomorphic Wetland
RS-417+50-C2	RS-417+50-IC119	1.6	3.6	2	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	15.5	<18	110000	55000	48000	43000	250000	34000	In-Channel
RS-418+00-C1	RS-418+00-IC133	2.2	4.4	3	10YR 2/1 black , wet, wood material (black)		44	39	240000	130000	92000	74000	540000	69000	In-Channel

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RS-418+00-C1	RS-418+00-IC133	4.4	5.8	4	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, structureless, loose, non-plastic, wood material (black)	SW	18.6	21	110000	64000	45000	42000	260000	34000	In-Channel
RS-418+00-C3	RS-418+00-IC184	4.0	4.8	2	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	18.3	8	40000	19000	17000	13000	89000	12000	In-Channel
RS-422+00-C2	RS-422+00-IC80	0.0	0.9	1	10YR 4/3 brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy), wood material (black)	SP	4.7	6	27000	20000	14000	12000	73000	9600	In-Channel
RS-422+00-C2	RS-422+00-IC80	0.9	1.2	2	10YR 2/1 black , wet, wood material (black)		48.1	<5	1000	140	170	81	1400	180	In-Channel
RS-422+00-C2	RS-422+00-IC80	1.2	2.2	3	10YR 4/2 dark grayish brown fine sand, wet, single grain, loose, non-plastic	SP	10	<4	31	8	9	7	56	10	In-Channel
RS-422+00-C2	RS-422+00-IC80	2.2	4.3	4	10YR 4/1 dark gray fine sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	14.6	<4	58	23	17	15	110	17	In-Channel
RS-422+00-C2	RS-422+00-IC80	2.2	4.3	4	10YR 4/1 dark gray fine sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	20.9	<5	130	29	32	<8	190	29	In-Channel
RS-422+00-C2	RS-422+00-IC80	4.3	5.1	5	10YR 4/2 dark grayish brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	7.7	4	8500	5900	4100	3900	22000	2900	In-Channel
RS-422+00-C2	RS-422+00-IC80	5.1	8.0	6	10YR 4/1 dark gray loamy sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SM	27.1	<4	16000	7000	6000	4400	33000	4500	In-Channel
RS-424+00-C2	RS-424+00-IC134	3.0	3.3	2	10YR 2/1 black , wet, wood material (black), shell fragments		65.9	16	35000	5200	6000	2600	49000	6300	In-Channel
RS-424+00-N3	RS-424+00-NE150	1.0	1.7	A	10YR 3/1 very dark gray loam, moist, granular, weak, friable, slightly plastic, common fine roots	ML	21.5	110	1800	820	950	1300	5000	920	Atypical
RS-427+50-N3	RS-427+50-NE104	0.0	1.0	A	10YR 2/1 black loam, moist, granular, weak, very friable, slightly plastic, few fine roots	ML/CL	27.4	57	4700	1700	1500	2000	10000	1400	Intermediate Surface
RS-427+50-N3	RS-427+50-NE104	1.0	1.6	A	10YR 2/1 black loam, moist, granular, weak, very friable, slightly plastic, few fine roots	ML/CL	18.6	83	2300	1100	940	1700	6200	980	Atypical
RS-427+50-N3	RS-427+50-NE104	1.6	2.7	C1	2.5Y 3/3 dark olive brown and 10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, very friable, slightly plastic, few fine roots	SM	12.4	7	11000	6700	4000	5800	28000	3400	Intermediate Surface
RS-427+50-N3	RS-427+50-NE104	2.7	4.0	C2	10YR 6/3 pale brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	5.26	8	30000	11000	11000	6700	58000	7900	Intermediate Surface
RS-427+50-N3	RS-427+50-NE104	4.0	6.0	C2	10YR 6/3 pale brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	11.8	11	50000	22000	17000	16000	110000	14000	Intermediate Surface
RS-427+50-N3	RS-427+50-NE104	6.0	8.0	C2	10YR 6/3 pale brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	8.3	12	46000	19000	16000	14000	95000	13000	Intermediate Surface
RS-427+50-N3	RS-427+50-NE104	8.0	9.6	C3	2.5Y 6/3 light yellowish brown sand, few medium 10YR 4/6 dark yellowish brown mottle, wet, single grain, loose, non-plastic, wood material (black)	SP	9.6	<4	92	23	21	16	150	22	Intermediate Surface
RS-427+50-N3	RS-427+50-NE104	9.6	10.1	C4	10YR 4/1 dark gray sandy loam, wet, massive, friable, slightly plastic, wood material (black)	SM	53.5	<4	9	<4	<5	<4	<21	<10	Intermediate Surface
RS-428+00-C2	RS-428+00-IC98	5.0	5.7	2	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	17.4	6	36000	15000	13000	11000	75000	9900	In-Channel
RS-428+00-C2	RS-428+00-IC98	5.7	7.1	3	2.5Y 4/1 dark gray sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	15.6	<4	11000	3200	3000	1800	19000	2400	In-Channel

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RS-428+50-N2	RS-428+50-NE157	0.0	0.6	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML	23.7	97	73000	62000	33000	49000	220000	26000	Low Surface
RS-428+50-N2	RS-428+50-NE157	0.6	1.0	C	10YR 4/2 dark grayish brown loamy sand, moist, granular, weak, very friable, slightly plastic, few fine roots	SM	15	28	6600	2700	2400	2900	15000	2000	Low Surface
RT-429+50-N3	RT-429+50-NE377	0.0	0.5	A	10YR 3/1 very dark gray loam, moist, granular, weak, friable, slightly plastic, common fine roots	ML	22.4	240	520	230	230	300	1500	690	Atypical
RT-429+50-N3	RT-429+50-NE377	0.5	1.0	Bw	10YR 3/3 dark brown sandy loam, wet, subangular blocky, moderate, friable, non-plastic, very few very fine roots	SM	14.7	130	420	190	170	210	1100	410	Atypical
RT-429+50-N4	RT-429+50-NE163	0.0	0.4	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic	ML	28.5	280	1300	670	590	1200	4000	1100	Atypical
RT-429+50-N4	RT-429+50-NE163	0.4	1.0	C	10YR 4/2 dark grayish brown loamy sand, moist, subangular blocky, weak, friable, non-plastic	SP	14.8	27	4700	1800	1600	2100	10000	1400	Low Surface
RT-433+00-N1	RT-433+00-NE15	0.0	0.8	C1	10YR 3/3 dark brown loamy sand, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	13.6	6	630	260	240	320	1500	210	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	0.8	2.2	C2	10YR 3/3 dark brown loamy sand, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	9.4	53	1500	980	820	1100	4400	700	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	2.2	3.9	C2	10YR 3/3 dark brown loamy sand, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	9	36	2000	3000	1600	2500	9200	1200	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	2.2	3.9	C2	10YR 3/3 dark brown loamy sand, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	9	<22	1400	2500	1100	1700	6600	790	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	3.9	5.5	C3	10YR 3/1 very dark gray loamy sand, moist, subangular blocky, weak, friable, slightly plastic	SM	8.2	<4	5900	10000	3600	4800	24000	2700	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	5.5	6.4	C3	10YR 3/1 very dark gray loamy sand, moist, subangular blocky, weak, friable, slightly plastic	SM	11.8	<4	2000	1900	1600	6300	12000	1500	Atypical
RT-433+00-N1	RT-433+00-NE15	6.4	7.4	2C4	10YR 3/4 dark yellowish brown loam, dry, subangular blocky, weak, soft, slightly plastic	ML	15.3	12	3400	1400	1400	3900	10000	1300	Atypical
RT-433+00-N1	RT-433+00-NE15	7.4	8.1	3C5	10YR 5/3 brown and 10YR 5/4 yellowish brown sand, dry, single grain, loose, non-plastic	SP	5.87	<4	1200	690	510	1000	3400	440	Atypical
RT-433+00-N1	RT-433+00-NE15	8.1	9.3	3C6	10YR 5/3 brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	24.7	<4	10000	4800	4200	3600	23000	3100	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	8.1	9.3	3C6	10YR 5/3 brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	18.4	<4	2000	1100	790	850	4700	610	Natural Levee (Industrial Age Levee)
RT-433+00-N1	RT-433+00-NE15	9.3	9.9	3C7	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic	SP	15	<4	79	18	14	15	130	18	Natural Levee (Industrial Age Levee)
RT-433+00-N10	RT-433+00-NE82	0.0	1.0	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, common medium roots, shell fragments	ML	37.5	45	660	480	350	590	2100	370	Atypical
RT-433+00-N10	RT-433+00-NE82	1.0	2.5	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, few medium roots, shell fragments	ML	23.3	140	1700	600	860	2100	5400	1000	Atypical
RT-433+00-N10	RT-433+00-NE82	2.5	4.5	C2	10YR 5/3 brown sand, few medium 10YR 5/8 yellowish brown mottle, moist, single grain, loose, non-plastic, few medium roots, shell fragments	SP	11.5	10	1700	550	830	2200	5300	740	Atypical

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RT-433+00-N10	RT-433+00-NE82	2.5	4.5	C2	10YR 5/3 brown sand, few medium 10YR 5/8 yellowish brown mottle, moist, single grain, loose, non-plastic, few medium roots, shell fragments	SP	10.3	12	8900	5100	4600	6100	25000	3300	Low Surface
RT-433+00-N10	RT-433+00-NE82	4.5	6.3	C2	10YR 5/3 brown sand, few medium 10YR 5/8 yellowish brown mottle, moist, single grain, loose, non-plastic, few medium roots, shell fragments, wood material (black)	SP	9.6	<4	3700	2000	1900	2000	9500	1300	Low Surface
RT-433+00-N2	RT-433+00-NE84	0.0	0.7	A	10YR 3/2 very dark grayish brown silt loam, moist, granular, moderate, friable, slightly plastic, very few fine roots	ML	28.9	20	700	460	350	460	2000	300	Low Surface
RT-433+00-N2	RT-433+00-NE84	0.7	2.1	Bt	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, slightly plastic, very few fine roots	ML	25.7	210	900	1500	700	1200	4500	980	Atypical
RT-433+00-N2	RT-433+00-NE84	2.1	3.0	2C1	10YR 4/2 dark grayish brown and 10YR 5/2 grayish brown loamy sand, moist, single grain, loose, non-plastic, very few fine roots	SW	16.5	<12	2100	6300	3800	7200	19000	2500	Atypical
RT-433+00-N2	RT-433+00-NE84	3.0	3.6	3C2	10YR 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, slightly plastic	ML	23.7	120	4300	3000	1600	3100	12000	1700	Atypical
RT-433+00-N2	RT-433+00-NE84	3.6	4.6	4C3	10YR 5/1 gray and 10YR 6/2 light brownish gray sandy loam, few medium mottle, moist, single grain, loose, non-plastic	SM	12.9	<9	1400	870	670	1100	4000	530	Low Surface
RT-433+00-N2	RT-433+00-NE84	4.6	5.4	4C4	10YR 4/1 dark gray sandy loam, few medium 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, wood material (black)	SM	21.4	<10	4400	2300	1900	1900	10000	1400	Low Surface
RT-433+00-N2	RT-433+00-NE84	5.4	6.6	5C5	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	15.9	<4	430	91	70	58	640	81	Low Surface
RT-433+00-N5	RT-433+00-NE346	0.0	0.4	A	10YR 3/2 very dark grayish brown clay loam, moist, granular, moderate, friable, moderately plastic, few fine roots	CL	21.2	11	71	40	36	110	260	57	Atypical
RT-433+00-N6	RT-433+00-NE376	0.0	0.8	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, common fine roots, wood material	ML	33	45	140	75	75	170	510	160	Atypical
RT-433+00-N9	RT-433+00-NE12	0.0	1.0	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML	17.1	6	1000	370	360	330	2100	290	Natural Levee (Industrial Age Levee)
RT-433+00-N9	RT-433+00-NE12	1.0	2.4	C1	10YR 4/3 brown sandy loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, common fine roots	SM	9.3	130	1100	440	540	840	3100	690	Atypical
RT-433+00-N9	RT-433+00-NE12	2.4	2.8	C2	10YR 3/2 very dark grayish brown loam, dry, granular, moderate, slightly hard, slightly plastic	ML	12.6	160	1300	500	680	1400	4000	890	Atypical
RT-433+00-N9	RT-433+00-NE12	2.8	4.8	C3	10YR 4/4 dark yellowish brown loamy sand, dry, subangular blocky, weak, soft, non-plastic, very few very fine roots	SP	7.9	39	2300	770	1100	1900	6000	920	Atypical
RT-433+00-N9	RT-433+00-NE12	4.8	6.8	C3	10YR 4/4 dark yellowish brown loamy sand, dry, subangular blocky, weak, soft, non-plastic, very few very fine roots	SP	11.6	29	2500	1600	1700	5600	11000	1600	Atypical
RT-433+00-N9	RT-433+00-NE12	9.0	10.6	C5	10YR 6/3 pale brown sand, few medium 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, wood material (black), shell fragments	SP	22.6	8	4500	1700	1500	3800	12000	1500	Atypical
RT-433+00-N9	RT-433+00-NE12	10.6	12.0	C6	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	14.8	<4	16000	3000	3200	1900	24000	3100	Natural Levee (Industrial Age Levee)

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RT-434+00-C1	RT-434+00-IC53	0.0	1.5	1	2.5Y 5/3 light olive brown and 2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic	SP	7.1	<4	43	11	12	15	80	13	In-Channel
RT-434+00-C1	RT-434+00-IC53	1.5	2.7	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	14	5	26000	6200	7000	3400	42000	5700	In-Channel
RT-434+00-C1	RT-434+00-IC53	1.5	2.7	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	16.9	<4	13000	4800	4800	2700	26000	3500	In-Channel
RT-434+00-C1	RT-434+00-IC53	2.7	4.0	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	31.6	<19	69000	44000	33000	31000	180000	23000	In-Channel
RT-434+00-C1	RT-434+00-IC53	4.0	5.4	3	2.5Y 4/1 dark gray sand, <15% subangular gravel, wet, single grain, loose, non-plastic	SP	16.7	<4	360	120	140	85	690	99	In-Channel
RT-434+00-C1	RT-434+00-IC53	5.4	6.0	4	2.5Y 4/1 dark gray sandy loam, wet, massive, friable, slightly plastic, wood material	SM	24.7	<5	14	<5	<5	<10	<29	<10	In-Channel
RT-434+00-C2	RT-434+00-IC126	2.9	5.0	2	10YR 2/1 black , wet, wood material (black)		50.8	<16	1100	270	270	140	1700	240	In-Channel
RT-434+00-C2	RT-434+00-IC126	2.9	5.0	2	10YR 2/1 black , wet, wood material (black)		45.9	<18	890	200	210	120	1400	200	In-Channel
RT-434+00-C3	RT-434+00-IC192	0.0	0.5	1	2.5Y 4/3 olive brown coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	5.8	<68	600	430	220	420	1700	240	Atypical
RT-436+00-C2	RT-436+00-IC144	0.0	1.6	1	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SP	8.2	<5	31	10	11	11	63	11	In-Channel
RT-436+00-C2	RT-436+00-IC144	0.0	1.6	1	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic	SP	7.1	22	19000	8900	8400	5700	42000	5900	In-Channel
RT-436+00-C2	RT-436+00-IC144	5.5	6.0	5	2.5Y 3/1 very dark gray and 2.5Y 2.5/1 black sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SW	40.1	<9	1800	1300	930	1100	5200	680	In-Channel
RT-439+50-C2	RT-439+50-IC94	5.0	5.3	2	10YR 2/1 black coarse sand, wet, single grain, loose, non-plastic, shell fragments, black particles (glossy)	SW	32.2	180	64000	35000	25000	27000	150000	20000	In-Channel
RU-458+50-S1	RU-458+50-SW579	0.0	0.7	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, slightly plastic, few fine roots	ML	33.4	14	650	350	370	430	1800	290	Disturbed - Tributary
RU-458+50-S1	RU-458+50-SW579	0.7	1.0	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, moderately plastic, very few medium roots	ML/CL	24.5	12	660	310	340	380	1700	260	Disturbed - Tributary
RU-462+00-C1	RU-462+00-IC32	0.0	1.4	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic	SP	7.6	21	14000	2800	3500	1400	22000	3000	In-Channel
RU-462+00-C1	RU-462+00-IC32	0.0	1.4	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic	SP	8.8	<4	43	9	11	9	73	12	In-Channel
RU-462+00-C1	RU-462+00-IC32	0.0	1.4	1	10YR 4/3 brown sand, wet, single grain, loose, non-plastic	SP	8.8	<4	33	10	11	9	63	11	In-Channel
RU-462+00-C1	RU-462+00-IC32	1.4	2.7	2	10YR 2/1 black , wet, wood material (black)		63.3	<9	7	<7	<6	<16	<42	<10	In-Channel
RV-465+50-C3	RV-465+50-IC216	0.0	2.0	1	10YR 5/1 gray silt loam, wet, massive, friable, slightly plastic, shell fragments	ML	21.1	<5	<5	<5	<5	<9	<29	<10	In-Channel
RV-465+50-C3	RV-465+50-IC216	2.0	2.7	2	10YR 4/3 brown sand, 15<35% subrounded cobble, wet, single grain, loose, non-plastic	SP	12.3	<4	<4	<4	<4	<8	<24	<10	In-Channel
RV-465+50-C3	RV-465+50-IC216	2.7	3.9	3	2.5Y 5/2 grayish brown silt loam, wet, massive, firm, slightly plastic	ML	17.5	<4	<4	<4	<4	<6	<22	<10	In-Channel
RV-466+00-N1	RV-466+00-NE9	0.0	1.0	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, slightly plastic, many medium roots	ML/CL	18.7	13	890	580	440	700	2600	370	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	1.0	3.0	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, few fine roots	ML/CL	12.6	96	2600	1700	1100	1900	7300	1100	Atypical

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RV-466+00-N1	RV-466+00-NE9	3.0	4.0	C2	10YR 3/2 very dark grayish brown sandy loam, dry, subangular blocky, weak, slightly hard, slightly plastic, few fine roots	SM	9.54	41	6100	3400	2600	5000	17000	2300	Atypical
RV-466+00-N1	RV-466+00-NE9	4.0	5.0	C3	10YR 4/2 dark grayish brown loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, very few fine roots	ML/CL	9.44	5	17000	8800	6600	7400	39000	5100	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	5.0	7.0	C4	10YR 4/3 brown loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, very few fine roots	ML/CL	15	10	42000	22000	17000	18000	99000	13000	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	5.0	7.0	C4	10YR 4/3 brown loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, very few fine roots	ML/CL	15.4	12	50000	26000	21000	21000	120000	15000	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	7.0	9.2	C5	10YR 7/2 light gray sand, common medium 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, wood material, wood material (black)	SP	14.7	<4	1800	610	530	410	3300	440	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	9.2	11.0	2Cg1	2.5Y 5/1 gray fine sand, wet, single grain, loose, non-plastic, wood material (black), wood material	SP	20.1	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	11.0	12.2	2Cg1	2.5Y 5/1 gray fine sand, wet, single grain, loose, non-plastic, wood material (black), wood material	SP	37.8	<4	12	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RV-466+00-N1	RV-466+00-NE9	12.2	13.4	2Cg1	2.5Y 5/1 gray fine sand, wet, single grain, loose, non-plastic, wood material (black), wood material	SP	17	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RV-471+50-N1	RV-471+50-NE19	2.4	3.1	BC	2.5Y 5/3 light olive brown loam, dry, subangular blocky, weak, slightly hard, slightly plastic, very few very fine roots	ML/CL	6.49	8	33000	16000	14000	13000	75000	10000	Natural Levee (Industrial Age Levee)
RV-472+00-C2	RV-472+00-IC148	5.0	5.4	6	10YR 2/1 black , wet, wood material (black)		43.1	<12	<5	<8	<9	<18	<52	<10	In-Channel
RW-497+00-C2	RW-497+00-IC127	5.0	6.5	5	2.5Y 4/1 dark gray silt loam, <15% subrounded gravel, wet, massive, friable, slightly plastic, few fine roots, shell fragments	ML	29.7	<19	<6	<11	<11	<22	<69	<13	In-Channel
RW-499+00-C3	RW-499+00-IC233	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	3.9	<4	43	44	20	250	350	42	In-Channel
RW-499+00-C3	RW-499+00-IC233	0.5	1.0	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	4.7	<4	34	13	12	57	120	17	In-Channel
RX-528+00-N4	RX-528+00-NE317	1.1	2.0	2C2	2.5Y 4/1 dark gray sandy clay loam, moist, subangular blocky, moderate, friable, moderately plastic	SC	22	<4	88	39	36	41	200	29	Tributary
RX-528+00-N4	RX-528+00-NE317	2.0	3.3	3Cg	2.5Y 4/1 dark gray silty clay loam, wet, subangular blocky, moderate, friable, moderately plastic	ML	30.4	20	1400	630	490	780	3300	470	Tributary
RX-528+00-S4	RX-528+00-SW578	0.0	0.9	C1	10YR 4/3 brown sand, dry, single grain, loose, non-plastic	SW	12.8	<13	41	23	20	23	110	21	Tributary
RY-531+00-N1	RY-531+00-NE15	4.0	5.5	C3	2.5Y 4/3 olive brown fine sand, common fine 10YR 5/6 yellowish brown mottle, dry, single grain, loose, non-plastic, very few very fine roots	SP	7.4	12	56000	23000	19000	19000	120000	15000	Natural Levee (Industrial Age Levee)
RY-543+00-C1	RY-543+00-IC28	12.5	12.9	8	2.5Y 3/2 very dark grayish brown silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	46.6	<23	<8	<17	<17	<31	<96	<17	In-Channel
RY-545+00-N2	RY-545+00-NE78	0.0	1.0	A	10YR 3/2 very dark grayish brown silt loam, moist, granular, moderate, friable, slightly plastic	ML	20.7	520	910	630	630	1200	3900	1600	Atypical
RY-545+50-C2	RY-545+50-IC92	0.0	0.5	1	10YR 5/2 grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	4.77	6	1200	300	250	230	2000	260	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RY-545+50-C2	RY-545+50-IC92	0.5	1.0	1	10YR 5/2 grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	4.34	<4	130	25	23	440	620	73	Atypical
RY-545+50-C2	RY-545+50-IC92	0.5	1.0	1	10YR 5/2 grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	4.34	<4	49	9	9	330	390	47	In-Channel
RZ-547+50-C3	RZ-547+50-IC204	0.5	1.0	2	10YR 2/1 black , wet, wood material (black)		52	<19	83000	31000	22000	24000	160000	20000	In-Channel
RZ-547+50-C3	RZ-547+50-IC204	1.0	1.2	2	10YR 2/1 black , wet, wood material (black)		79.1	21	350	41	35	41	490	100	Atypical
RZ-547+50-C3	RZ-547+50-IC204	11.7	12.3	7	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	21.3	<20	<6	<13	<13	<35	<87	<15	In-Channel
RZ-551+00-C1	RZ-551+00-IC16	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, wood material (black)	SW	7.63	<4	410	28	40	19	490	63	In-Channel
RZ-561+00-N1	RZ-561+00-NE8	0.0	1.0	C1	10YR 3/2 very dark grayish brown and 10YR 5/2 grayish brown loamy sand, moist, single grain, loose, non-plastic, few fine roots	SW	5.78	19	18000	12000	7900	9500	47000	6000	Natural Levee (Industrial Age Levee)
RZ-562+50-N2	RZ-562+50-NE209	0.0	0.4	A	10YR 3/2 very dark grayish brown loamy sand, moist, granular, moderate, friable, non-plastic	SP	14.9	9	2800	1100	980	2000	6900	910	Atypical
RZ-562+50-N2	RZ-562+50-NE209	0.4	1.0	C	10YR 4/3 brown sand, moist, single grain, loose, non-plastic	SP	5.26	6	16000	8300	6400	6100	36000	4800	Disturbed - Intermediate Surface
RZ-562+50-N2	RZ-562+50-NE209	0.4	1.0	C	10YR 4/3 brown sand, moist, single grain, loose, non-plastic	SP	5.26	13	40000	19000	16000	14000	89000	12000	Disturbed - Intermediate Surface
RZ-564+50-N4	RZ-564+50-NE291	0.0	0.6	C1	10YR 2/2 very dark brown loamy sand, moist, granular, weak, friable, non-plastic	SP	18.4	<4	360	150	150	150	790	110	Disturbed - Low Surface
RZ-564+50-N4	RZ-564+50-NE291	0.8	1.0	C2	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic	SP	11.5	50	45000	11000	15000	9500	81000	11000	Disturbed - Low Surface
RZ-565+50-N1	RZ-565+50-NE18	0.0	1.0	C1	10YR 5/3 brown sand, dry, single grain, loose, non-plastic, very few fine roots	SP	3.6	4	1200	490	480	430	2600	360	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	1.0	1.7	C1	10YR 5/3 brown sand, dry, single grain, loose, non-plastic, very few fine roots	SP	4.4	56	3800	1500	1500	1100	7900	1200	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	1.7	3.7	C2	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic, very few fine roots	SP	4.5	630	130000	67000	57000	42000	300000	41000	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	3.7	5.7	C3	10YR 7/2 light gray and 10YR 4/3 brown sand, dry, single grain, loose, non-plastic	SP	2.1	40	63000	20000	20000	14000	120000	16000	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	5.7	7.7	C3	10YR 7/2 light gray and 10YR 4/3 brown sand, dry, single grain, loose, non-plastic	SP	1.37	23	92000	40000	33000	26000	190000	25000	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	5.7	7.7	C3	10YR 7/2 light gray and 10YR 4/3 brown sand, dry, single grain, loose, non-plastic	SP	1.12	16	70000	27000	24000	20000	140000	19000	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	7.7	9.4	C3	10YR 7/2 light gray and 10YR 4/3 brown sand, dry, single grain, loose, non-plastic	SP	3.05	13	48000	24000	18000	17000	110000	14000	Natural Levee (Industrial Age Levee)
RZ-565+50-N1	RZ-565+50-NE18	9.4	9.9	C4	10YR 4/3 brown sandy loam, dry, subangular blocky, weak, soft, slightly plastic, very few very fine roots	SM	7.04	<4	14000	7500	5500	5600	32000	4200	Natural Levee (Industrial Age Levee)
RZ-565+50-S1	RZ-565+50-SW10	0.0	1.0	C1	10YR 4/3 brown loam, dry, granular, moderate, slightly hard, slightly plastic, few very fine roots	ML/CL	18.2	140	1100	430	400	1300	3400	720	Atypical
RZ-565+50-S1	RZ-565+50-SW10	1.0	2.8	C1	10YR 4/3 brown loam, dry, granular, moderate, slightly hard, slightly plastic, few very fine roots	ML/CL	14.2	98	1600	1000	1200	4100	8000	1300	Atypical

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RZ-565+50-S1	RZ-565+50-SW10	2.8	4.1	C2	10YR 4/2 dark grayish brown and 10YR 5/3 brown loam, few fine 10YR 4/6 dark yellowish brown mottle, dry, subangular blocky, moderate, soft, slightly plastic, few very fine roots	ML/CL	16	33	2300	1200	1100	4800	9400	1200	Atypical
RZ-565+50-S1	RZ-565+50-SW10	4.1	6.1	C3	10YR 4/2 dark grayish brown and 10YR 6/2 light brownish gray loam, common medium 10YR 4/6 dark yellowish brown mottle, dry, subangular blocky, weak, soft, slightly plastic	ML/CL	16.4	4	13000	5900	5000	5500	30000	3900	Low Surface
RZ-565+50-S1	RZ-565+50-SW10	4.1	6.1	C3	10YR 4/2 dark grayish brown and 10YR 6/2 light brownish gray loam, common medium 10YR 4/6 dark yellowish brown mottle, dry, subangular blocky, weak, soft, slightly plastic	ML/CL	16.4	6	24000	14000	12000	11000	61000	8300	Low Surface
RZ-565+50-S1	RZ-565+50-SW10	6.1	7.4	Cg	N 3/0 very dark gray loam, moist, massive, friable, slightly plastic, wood material (black)	ML/CL	31.3	<4	410	250	170	220	1000	140	Low Surface
RZ-565+50-S1	RZ-565+50-SW10	7.4	8.8	Cg	N 3/0 very dark gray loam, moist, massive, friable, slightly plastic, wood material (black)	ML/CL	36.6	<4	23	<10	11	18	52	11	Low Surface
RAA-567+50-C1	RAA-567+50-IC67	2.2	2.8	2	10YR 2/1 black , wet, wood material (black)		18.2	11	39000	24000	20000	16000	99000	14000	In-Channel
RAA-571+50-N2	RAA-571+50-NE15	0.0	1.0	C1	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic	SP	6.76	6	10000	4400	3700	2900	21000	2800	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	1.0	3.0	C1	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic	SP	6.21	52	5400	2400	2100	2200	12000	1700	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	1.0	3.0	C1	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic	SP	6.65	51	2100	880	790	1200	5000	760	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	3.0	5.0	C1	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic	SP	3.77	30	65000	25000	19000	18000	130000	16000	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	3.0	5.0	C1	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic	SP	3.28	34	77000	23000	18000	16000	130000	17000	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	5.0	6.7	C1	10YR 4/2 dark grayish brown sand, dry, single grain, loose, non-plastic	SP	2.1	20	63000	18000	19000	16000	120000	16000	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	6.7	8.7	C2	10YR 4/3 brown loamy sand, dry, subangular blocky, weak, slightly hard, non-plastic	SP	3.82	6	28000	9100	7800	6300	51000	6700	Natural Levee (Industrial Age Levee)
RAA-571+50-N2	RAA-571+50-NE15	8.7	9.9	C2	10YR 4/3 brown loamy sand, common fine 10YR 4/6 dark yellowish brown mottle, dry, subangular blocky, weak, slightly hard, non-plastic	SP	6.75	4	16000	11000	7300	8300	42000	5400	Natural Levee (Industrial Age Levee)
RAA-576+50-C2	RAA-576+50-IC62	13.0	13.9	4	10YR 4/2 dark grayish brown clay, wet, massive, very firm, very plastic	CH	17.2	<16	<18	<10	<8	<12	<64	<12	In-Channel
RAA-586+50-N12	RAA-586+50-NE1222	0.0	1.0	C1	10YR 4/2 dark grayish brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic	ML/CL	14.6	<4	19	8	15	19	62	12	High Surface
RAA-586+50-N12	RAA-586+50-NE1222	1.5	2.0	Ab	10YR 3/1 very dark gray loam, moist, subangular blocky, moderate, friable, slightly plastic	ML/CL	17.8	<4	11	4	<4	4	<20	<10	High Surface
RAA-586+50-N3	RAA-586+50-NE76	2.6	3.3	C3	10YR 6/4 light yellowish brown sandy loam, moist, subangular blocky, weak, very friable, slightly plastic, very few fine roots	SM	5.08	24	210	62	63	83	440	110	Atypical

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RAA-594+50-N7	RAA-594+50-NE539	1.0	2.5	C	2.5Y 4/2 dark grayish brown silt loam, few medium 2.5Y 5/6 light olive brown mottle, wet, subangular blocky, weak, firm, slightly plastic	ML	36.8	91	250	54	50	42	490	250	Atypical
RAA-601+00-C2	RAA-601+00-IC79	13.1	13.5	5	2.5Y 3/1 very dark gray silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	50.4	<29	<10	<21	<22	<40	<122	<22	In-Channel
RAA-601+00-C4	RAA-601+00-IC281	0.5	1.0	2	10YR 2/1 black coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	12.2	<4	86	9	8	5	110	15	In-Channel
RBB-607+00-S2	RBB-607+00-SW12	6.7	8.0	C4	10YR 6/3 pale brown coarse sand, moist, single grain, loose, non-plastic	SW	11.8	310	5800	2000	1900	1400	11000	2200	Atypical
RBB-607+00-S3	RBB-607+00-SW78	3.0	3.3	4Cg2	2.5Y 3/1 very dark gray sandy loam, <15% angular gravel, wet, massive, friable, slightly plastic, shell fragments	SM	14.4	<16	6	<12	<12	<4	<48	12	Bankfull Bench
RBB-610+00-C3	RBB-610+00-IC175	0.0	0.5	1	2.5Y 5/2 grayish brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic	SP	5.1	6	170	43	49	140	410	66	Atypical
RBB-610+00-C3	RBB-610+00-IC175	2.0	2.4	2	10YR 2/1 black , wet, wood material (black)		57.1	38	220000	100000	76000	58000	460000	59000	In-Channel
RBB-610+00-C3	RBB-610+00-IC175	6.0	7.2	5	2.5Y 5/2 grayish brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	4	<4	46	17	13	10	86	13	In-Channel
RBB-610+00-C4	RBB-610+00-IC225	0.5	1.0	1	2.5Y 5/3 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	4.3	<4	95	21	36	390	540	68	Atypical
RBB-610+00-C4	RBB-610+00-IC225	2.0	2.5	3	10YR 2/1 black , wet, wood material (black)		17.4	<4	5600	3000	2300	1800	13000	1600	In-Channel
RBB-614+00-C2	RBB-614+00-IC176	0.0	0.5	1	2.5Y 5/2 grayish brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	3.5	12	100	1500	120	1000	2700	240	Atypical
RBB-614+50-S1	RBB-614+50-SW4	1.0	2.1	C2	2.5Y 6/3 light yellowish brown coarse sand, <15% subangular gravel, moist, single grain, loose, non-plastic, wood material (black)	SW	25.4	8	690	140	160	100	1100	160	Bankfull Bench
RBB-614+50-S1	RBB-614+50-SW4	2.1	3.2	C2	2.5Y 6/3 light yellowish brown coarse sand, <15% subangular gravel, moist, single grain, loose, non-plastic, wood material (black)	SW	29.2	10	340	140	140	130	760	120	Bankfull Bench
RBB-614+50-S1	RBB-614+50-SW4	2.1	3.2	C2	2.5Y 6/3 light yellowish brown coarse sand, <15% subangular gravel, moist, single grain, loose, non-plastic, wood material (black)	SW	30.9	11	230	80	110	100	530	99	Atypical
RBB-614+50-S1	RBB-614+50-SW4	3.2	4.4	Cg	2.5Y 3/1 very dark gray coarse sand, <15% subangular gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	35.6	21	14000	5600	5500	3700	29000	4000	Bankfull Bench
RCC-635+50-S6	RCC-635+50-SW300	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown clay, common fine 7.5YR 3/4 dark brown mottle, moist, angular blocky, moderate, very firm, very plastic, plant fragments	CH	33.7	35	100	54	69	190	450	130	Atypical
RCC-639+00-S1	RCC-639+00-SW9	0.0	1.0	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, common medium roots	ML	12.9	21	2400	1300	1100	1300	6200	860	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	1.0	1.6	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, common medium roots	ML	10.4	94	1900	960	930	1300	5100	890	Atypical
RCC-639+00-S1	RCC-639+00-SW9	1.6	3.6	C1	10YR 3/3 dark brown loam, dry, subangular blocky, weak, soft, slightly plastic, common medium roots	ML	8.8	65	4600	2400	2100	3400	13000	1800	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	3.6	4.6	C1	10YR 3/3 dark brown loam, dry, subangular blocky, weak, soft, slightly plastic, common medium roots	ML	10.2	5	23000	13000	11000	11000	58000	7800	Natural Levee (Industrial Age Levee)

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RCC-639+00-S1	RCC-639+00-SW9	4.6	5.8	C2	10YR 4/3 brown sandy loam, dry, subangular blocky, weak, soft, slightly plastic, few medium roots	SM	6.8	7	30000	15000	13000	14000	72000	9700	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	5.8	6.6	C3	10YR 4/4 dark yellowish brown fine sand, common medium 10YR 6/8 brownish yellow mottle, dry, single grain, loose, non-plastic, few medium roots	SP	5.6	<4	330	110	110	85	630	87	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	5.8	6.6	C3	10YR 4/4 dark yellowish brown fine sand, common medium 10YR 6/8 brownish yellow mottle, dry, single grain, loose, non-plastic, few medium roots	SP	7.2	<4	840	280	290	170	1600	220	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	6.6	8.2	C4	10YR 4/4 dark yellowish brown sandy clay loam, few medium mottle, dry, subangular blocky, weak, soft, slightly plastic, few medium roots	SM	9.1	<4	28	13	14	15	71	12	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	8.2	10.0	C5	10YR 3/1 very dark gray loamy sand, wet, subangular blocky, weak, friable, non-plastic, shell fragments, wood material (black)	SP	34.1	<4	7	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RCC-639+00-S1	RCC-639+00-SW9	10.0	12.0	C5	10YR 3/1 very dark gray loamy sand, wet, subangular blocky, weak, friable, non-plastic, shell fragments, wood material (black)	SP	23.1	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)

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RCC-648+00-C1	RCC-648+00-IC174	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material	SP	3.89	<4	82	16	17	13	130	19	In-Channel
RCC-648+50-C3	RCC-648+50-IC174	5.0	5.2	4	10YR 2/1 black , wet, wood material (black)		60.1	50	160000	53000	47000	35000	300000	39000	In-Channel
RCC-650+50-S1	RCC-650+50-SW44	1.0	1.4	A	10YR 2/1 black loamy sand, dry, subangular blocky, weak, soft, slightly plastic, common fine roots	SP	12.6	18	44000	19000	15000	12000	90000	12000	Historic Natural Levee (Pre-Industrial Age Levee)
RCC-652+50-C1	RCC-652+50-IC40	1.0	2.5	1	2.5Y 5/3 light olive brown and 2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	26.1	<17	91000	28000	28000	20000	170000	22000	In-Channel
RDD-668+00-C1	RDD-668+00-IC58	0.5	1.0	2	10YR 2/1 black , wet, wood material (black)		24.3	<4	1800	200	310	96	2400	320	In-Channel
RDD-670+00-C2	RDD-670+00-IC205	0.0	0.5	1	2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	37.5	37	120000	39000	41000	21000	220000	30000	In-Channel
RDD-673+50-C3	RDD-673+50-IC251	0.5	1.0	2	2.5Y 4/2 dark grayish brown sand, <15% subangular gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	36.3	47	130000	130000	79000	79000	420000	54000	In-Channel
RDD-674+00-S14	RDD-674+00-SW970	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, moderately plastic, common very fine roots	CL	24.5	15	2300	1300	1100	1400	6100	860	Disturbed - Geomorphic Wetland
RDD-674+00-S14	RDD-674+00-SW970	1.0	1.7	C1	2.5Y 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, moderately plastic, common very fine roots	CL	19.6	<4	6800	3700	3100	3000	17000	2200	Disturbed - Geomorphic Wetland
RDD-674+00-S14	RDD-674+00-SW970	1.7	3.0	C2	2.5Y 5/3 light olive brown loam, common medium 10YR 5/4 yellowish brown mottle, moist, subangular blocky, moderate, friable, moderately plastic, few very fine roots	ML/CL	15.5	<5	760	380	330	310	1800	240	Disturbed - Geomorphic Wetland
RDD-674+50-C1	RDD-674+50-IC257	5.1	5.7	5	10YR 2/1 black , wet, wood material (black), shell fragments		33.6	<21	6	12	12	20	50	18	In-Channel
REE-694+00-S9	REE-694+00-SW1402	0.0	0.5	A	10YR 3/1 very dark gray loam, dry, granular, moderate, soft, slightly plastic, many fine roots	ML	19.8	9	540	320	260	360	1500	220	Disturbed - Intermediate Surface
REE-694+00-S9	REE-694+00-SW1402	0.5	1.0	C1	10YR 4/2 dark grayish brown loam, dry, subangular blocky, strong, hard, slightly plastic	ML	16	<4	290	170	160	160	770	110	Disturbed - Intermediate Surface
REE-694+00-S9	REE-694+00-SW1402	1.0	1.9	C1	10YR 4/2 dark grayish brown loam, dry, subangular blocky, strong, hard, slightly plastic	ML	14.4	<18	16	10	10	12	47	16	Disturbed - Intermediate Surface
RFF-707+00-C2	RFF-707+00-IC157	0.5	1.0	1	2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	13.6	28	220000	46000	56000	24000	350000	47000	In-Channel
RFF-707+00-C2	RFF-707+00-IC157	2.5	2.7	4	2.5Y 2.5/1 black , wet, wood material (black)		50.8	63	34000	14000	13000	10000	72000	9800	In-Channel
RFF-707+00-C2	RFF-707+00-IC157	2.5	2.7	4	2.5Y 2.5/1 black , wet, wood material (black)		49.7	41	27000	11000	9700	7500	54000	7400	In-Channel
RFF-707+00-C4	RFF-707+00-IC94	0.5	1.0	2	10YR 2/1 black , <15% subrounded gravel, wet, wood material (black), shell fragments		16.4	<4	650	240	240	200	1300	180	In-Channel
RFF-707+00-C4	RFF-707+00-IC94	0.5	1.0	2	10YR 2/1 black , <15% subrounded gravel, wet, wood material (black), shell fragments		23.1	10	34000	21000	17000	15000	87000	12000	In-Channel
RFF-707+00-N2	RFF-707+00-NE42	0.0	0.3	C1	10YR 5/2 grayish brown sand, moist, single grain, loose, non-plastic	SP	4.7	<4	450	200	200	190	1000	150	High Surface
RFF-707+00-N2	RFF-707+00-NE42	0.3	0.8	Ab	10YR 2/2 very dark brown loamy sand, moist, granular, weak, friable, non-plastic	SP	8.4	16	9500	3900	3900	3200	21000	2800	High Surface
RFF-707+00-N2	RFF-707+00-NE42	0.8	1.0	C2	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic	SP	5.8	5	8100	3200	3200	2300	17000	2300	High Surface

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RFF-717+00-N5	RFF-717+00-NE102	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, very friable, slightly plastic, very few very fine roots	SP	19.7	17	310	270	130	230	960	150	Atypical
RFF-717+00-N5	RFF-717+00-NE102	1.0	1.4	C1	2.5Y 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, very friable, slightly plastic, very few very fine roots	SP	16.1	51	740	660	360	630	2400	400	Atypical
RFF-717+00-N5	RFF-717+00-NE102	1.4	3.6	C2	2.5Y 5/2 grayish brown and 2.5Y 3/2 very dark grayish brown sand, few fine 10YR 4/6 dark yellowish brown mottle, <15% subangular gravel, moist, single grain, loose, non-plastic, few very fine roots, shell fragments	SW	7.9	21	4600	3200	2300	3700	14000	1800	Tributary
RFF-717+00-N5	RFF-717+00-NE102	3.6	4.9	C3	2.5Y 6/2 light brownish gray sand, <15% subangular gravel, dry, single grain, loose, non-plastic, very few medium roots, shell fragments, wood material	SW	7.3	<26	130000	69000	55000	48000	300000	40000	Tributary
RFF-717+00-N5	RFF-717+00-NE102	3.6	4.9	C3	2.5Y 6/2 light brownish gray sand, <15% subangular gravel, dry, single grain, loose, non-plastic, very few medium roots, shell fragments, wood material	SW	12.2	<21	4300	1000	1300	850	7400	1000	Tributary
RFF-717+00-N5	RFF-717+00-NE102	4.9	5.7	C4	10YR 2/1 black , dry, wood material		50.5	<15	8600	1800	1800	920	13000	1700	Tributary
RFF-717+00-N5	RFF-717+00-NE102	5.7	6.0	C5	2.5Y 6/3 light yellowish brown sand, <15% subangular gravel, dry, single grain, loose, non-plastic, shell fragments	SW	2.9	<6	680	280	220	180	1400	180	Tributary
RFF-719+00-N10	RFF-719+00-NE2081	0.0	1.0	C1	2.5Y 3/1 very dark gray loam, few fine 10YR 4/4 dark yellowish brown mottle, wet, subangular blocky, moderate, friable, moderately plastic, few very fine roots	ML/CL	42.7	22	1000	500	500	720	2800	420	Geomorphic Wetland
RFF-719+00-N10	RFF-719+00-NE2081	1.0	3.0	C1	2.5Y 3/1 very dark gray loam, few fine 10YR 4/4 dark yellowish brown mottle, wet, subangular blocky, moderate, friable, moderately plastic, few very fine roots	ML/CL	41.9	8	5400	1700	1400	950	9500	1200	Geomorphic Wetland
RFF-719+00-N13	RFF-719+00-NE1496	0.0	1.0	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic	SM	16.9	66	17000	7100	6200	5000	35000	4800	Low Surface
RFF-719+00-N13	RFF-719+00-NE1496	1.0	1.5	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic	SM	17.7	85	8100	3400	3000	3100	18000	2500	Low Surface
RFF-719+00-N13	RFF-719+00-NE1496	1.5	3.5	C2	10YR 6/2 light brownish gray sand, moist, single grain, loose, non-plastic, wood material (black)	SP	15.6	6	29000	9900	9200	6300	54000	7200	Low Surface
RFF-719+00-N13	RFF-719+00-NE1496	3.5	5.5	C2	10YR 6/2 light brownish gray sand, moist, single grain, loose, non-plastic, wood material (black)	SP	15	8	39000	13000	13000	8300	74000	10000	Low Surface
RFF-719+00-N13	RFF-719+00-NE1496	5.5	6.0	C2	10YR 6/2 light brownish gray sand, moist, single grain, loose, non-plastic, wood material (black)	SP	19.4	5	21000	4600	5000	2700	33000	4400	Low Surface
RFF-719+00-N14	RFF-719+00-NE1430	0.0	1.0	C1	10YR 4/2 dark grayish brown loamy sand, moist, subangular blocky, weak, friable, non-plastic, few fine roots	SP	15.1	18	16000	5900	5500	4300	32000	4300	Geomorphic Wetland
RFF-719+00-N14	RFF-719+00-NE1430	1.0	2.5	C1	10YR 4/2 dark grayish brown loamy sand, moist, subangular blocky, weak, friable, non-plastic, few fine roots	SP	14.7	33	21000	8000	7500	6300	43000	5800	Geomorphic Wetland
RFF-719+00-N14	RFF-719+00-NE1430	2.5	3.5	C2	10YR 2/1 black , moist, wood material (black)		54.1	16	100000	32000	32000	19000	180000	25000	Geomorphic Wetland
RFF-719+00-N14	RFF-719+00-NE1430	3.5	5.3	C3	2.5Y 3/1 very dark gray sandy loam, moist, massive, friable, non-plastic, wood material (black)	SM	25.5	6	29000	11000	9100	7000	56000	7300	Geomorphic Wetland
RFF-719+00-N8	RFF-719+00-NE1424	0.0	0.4	C1	10YR 3/3 dark brown loam, moist, granular, weak, friable, slightly plastic, common fine roots	SM	20	21	15000	6000	5700	4600	31000	4300	Geomorphic Wetland
RFF-719+00-N8	RFF-719+00-NE1424	0.4	1.0	C2	10YR 3/4 dark yellowish brown loamy sand, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SP	7.48	34	11000	3900	3300	3100	21000	2800	Geomorphic Wetland

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RFF-719+00-N8	RFF-719+00-NE1424	1.0	2.1	C3	10YR 3/2 very dark grayish brown sandy loam, few fine 7.5YR 3/4 dark brown mottle, moist, subangular blocky, moderate, firm, slightly plastic, few fine roots	SM	15.1	37	10000	4400	3400	3900	22000	2900	Geomorphic Wetland
RFF-719+00-N8	RFF-719+00-NE1424	2.1	3.3	C4	10YR 5/3 brown sand, dry, single grain, loose, non-plastic, wood material (black)	SP	26.2	7	33000	11000	9100	7100	60000	7800	Geomorphic Wetland
RFF-719+00-S1	RFF-719+00-SW33	0.0	1.0	C1	10YR 3/2 very dark grayish brown loamy fine sand, moist, subangular blocky, weak, very friable, non-plastic, very few very fine roots	SP	13.1	7	2100	1000	830	800	4800	640	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	1.0	1.6	C1	10YR 3/2 very dark grayish brown loamy fine sand, moist, subangular blocky, weak, very friable, non-plastic, very few very fine roots	SP	15.5	7	3700	2600	1700	2000	10000	1300	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	1.6	3.1	C2	10YR 5/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SP	5.74	9	5100	2000	1600	1500	10000	1300	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	3.1	5.1	C2	10YR 5/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SP	3.6	10	650	290	240	330	1500	220	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	3.1	5.1	C2	10YR 5/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SP	4.35	11	3500	1500	1300	1100	7400	1000	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	5.1	7.1	C2	10YR 5/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SP	6.63	28	7200	2500	2100	1500	13000	1800	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	7.1	8.9	C3	2.5Y 5/2 grayish brown and 2.5Y 3/1 very dark gray fine sand, few medium 10YR 5/6 yellowish brown mottle, moist, single grain, loose, non-plastic	SP	20.4	300	6300	4300	3100	4300	18000	3000	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	8.9	9.9	Cg1	N 3/0 very dark gray fine sand, wet, single grain, loose, non-plastic, wood material (black)	SP	32.4	130	3600	1200	1300	1700	7900	1300	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	9.9	12.1	Cg2	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material	SP	26.8	<4	230	130	95	110	560	75	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	0.0	1.0	C1	10YR 3/4 dark yellowish brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML	14.5	16	2900	1100	1100	990	6100	870	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	1.0	2.2	C1	10YR 3/4 dark yellowish brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML	11.9	49	17000	7200	7400	6400	38000	5300	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	2.2	4.0	C2	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, dry, single grain, loose, non-plastic, few fine roots	SP	6.1	67	78000	34000	26000	22000	160000	21000	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	4.0	6.0	C2	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, dry, single grain, loose, non-plastic, few fine roots	SP	4.1	110	110000	44000	39000	31000	220000	30000	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	6.0	8.0	C3	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, few medium 10YR 5/8 yellowish brown mottle, dry, single grain, loose, non-plastic, few fine roots	SP	4.4	12	47000	25000	20000	17000	110000	15000	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	5.1	7.1	C2	10YR 5/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SP	8	25	1000	390	500	890	2800	440	Atypical
RFF-719+00-S1	RFF-719+00-SW33	7.1	8.9	C3	2.5Y 5/2 grayish brown and 2.5Y 3/1 very dark gray fine sand, few medium 10YR 5/6 yellowish brown mottle, moist, single grain, loose, non-plastic	SP	20.4	300	6300	4300	3100	4300	18000	3000	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	8.9	9.9	Cg1	N 3/0 very dark gray fine sand, wet, single grain, loose, non-plastic, wood material (black)	SP	32.4	130	3600	1200	1300	1700	7900	1300	Natural Levee (Industrial Age Levee)
RFF-719+00-S1	RFF-719+00-SW33	9.9	12.1	Cg2	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material	SP	26.8	<4	230	130	95	110	560	75	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	0.0	1.0	C1	10YR 3/4 dark yellowish brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML	14.5	16	2900	1100	1100	990	6100	870	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	1.0	2.2	C1	10YR 3/4 dark yellowish brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML	11.9	49	17000	7200	7400	6400	38000	5300	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	2.2	4.0	C2	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, dry, single grain, loose, non-plastic, few fine roots	SP	6.1	67	78000	34000	26000	22000	160000	21000	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	4.0	6.0	C2	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, dry, single grain, loose, non-plastic, few fine roots	SP	4.1	110	110000	44000	39000	31000	220000	30000	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	6.0	8.0	C3	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, few medium 10YR 5/8 yellowish brown mottle, dry, single grain, loose, non-plastic, few fine roots	SP	4.4	12	47000	25000	20000	17000	110000	15000	Natural Levee (Industrial Age Levee)

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RFF-719+00-S2	RFF-719+00-SW70	8.0	9.1	C3	10YR 4/4 dark yellowish brown and 10YR 5/4 yellowish brown sand, few medium 10YR 5/8 yellowish brown mottle, dry, single grain, loose, non-plastic, few fine roots	SP	4.3	<4	1100	280	330	160	1900	260	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	9.1	10.2	C4	10YR 5/6 yellowish brown sand, moist, single grain, loose, non-plastic, wood material	SP	24.7	<5	32	12	9	8	61	10	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	10.2	12.0	C5	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	13.5	<4	10	4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	12.0	13.0	C6	10YR 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	8.74	<4	91	36	29	24	180	25	Natural Levee (Industrial Age Levee)
RFF-719+00-S2	RFF-719+00-SW70	13.0	14.0	C6	10YR 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	13.7	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RFF-719+00-S4	RFF-719+00-SW441	0.0	1.0	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, moderately plastic, common fine roots, plant fragments	ML	27.1	61	500	260	240	400	1500	320	Atypical
RFF-719+00-S4	RFF-719+00-SW441	1.0	2.0	C2	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, moderately plastic, few fine roots, plant fragments, shell fragments	ML	20.6	30	630	350	310	710	2000	330	Atypical
RFF-719+00-S4	RFF-719+00-SW441	2.0	3.3	C3	10YR 5/4 yellowish brown sandy loam, common medium 10YR 5/8 yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, few fine roots, plant fragments	SM	12.7	<4	290	150	110	180	720	95	Tributary
RFF-719+00-S7	RFF-719+00-SW51	1.0	2.0	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, moderate, friable, slightly plastic, common fine roots	SM	13.4	8	1500	450	460	370	2800	390	Natural Levee (Industrial Age Levee)
RFF-719+00-S7	RFF-719+00-SW51	2.0	4.0	C2	10YR 4/3 brown sandy loam, moist, subangular blocky, moderate, very friable, slightly plastic, common fine roots	SM	9.2	19	4300	1300	1500	1000	8100	1200	Natural Levee (Industrial Age Levee)
RFF-719+00-S7	RFF-719+00-SW51	2.0	4.0	C2	10YR 4/3 brown sandy loam, moist, subangular blocky, moderate, very friable, slightly plastic, common fine roots	SM	8.6	10	4100	1500	1600	1300	8400	1200	Natural Levee (Industrial Age Levee)
RFF-719+00-S7	RFF-719+00-SW51	4.0	5.1	C3	10YR 3/3 dark brown loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, few medium roots	ML/CL	13	580	1800	930	1200	1700	6200	2100	Atypical
RFF-719+00-S7	RFF-719+00-SW51	5.1	6.2	C3	10YR 3/3 dark brown loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, few medium roots	ML/CL	11.6	290	3400	2400	2000	3200	11000	2100	Atypical
RFF-719+50-S1	RFF-719+50-SW13	1.0	1.5	C1	2.5Y 4/4 olive brown sand, moist, single grain, loose, non-plastic, very few fine roots	SP	13.9	<4	930	340	320	250	1800	250	Bankfull Bench
RFF-719+50-S1	RFF-719+50-SW13	1.5	2.0	C2	2.5Y 6/4 light yellowish brown sand, moist, single grain, loose, non-plastic, few medium roots, plant fragments	SP	18.1	<4	5400	2500	2200	1700	12000	1600	Bankfull Bench
RFF-719+50-S1	RFF-719+50-SW13	2.0	3.1	2C3	10YR 3/1 very dark gray and 2.5Y 4/4 olive brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML	28.2	<5	2100	960	1100	790	4900	710	Bankfull Bench
RFF-719+50-S1	RFF-719+50-SW13	3.1	3.9	3C4	2.5Y 5/3 light olive brown sand, few fine 10YR 3/6 dark yellowish brown mottle, wet, single grain, loose, non-plastic	SP	22	<6	4600	1500	1500	1100	8600	1200	Bankfull Bench

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RFF-719+50-S1	RFF-719+50-SW13	3.1	3.9	3C4	2.5Y 5/3 light olive brown sand, few fine 10YR 3/6 dark yellowish brown mottle, wet, single grain, loose, non-plastic	SP	20.9	<5	4700	2900	2100	1700	11000	1500	Bankfull Bench
RFF-719+50-S1	RFF-719+50-SW13	5.9	8.0	3C6	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black), wood material, shell fragments	SP	17.4	6	65	21	23	89	200	39	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	0.0	1.0	C1	2.5Y 5/3 light olive brown sand, moist, single grain, loose, non-plastic, common fine roots, plant fragments	SP	6.25	5	14000	5200	4300	2600	26000	3400	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	1.0	2.3	C2	2.5Y 3/3 dark olive brown loamy sand, moist, single grain, loose, non-plastic, few fine roots	SP	12.3	<4	1500	820	780	670	3700	520	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	2.3	3.6	C3	2.5Y 6/3 light yellowish brown sand, moist, single grain, loose, non-plastic, few fine roots, plant fragments	SP	4.3	<4	4400	1700	1600	1300	9000	1200	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	2.3	3.6	C3	2.5Y 6/3 light yellowish brown sand, moist, single grain, loose, non-plastic, few fine roots, plant fragments	SP	6.8	6	2400	990	930	730	5100	700	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	2.3	3.6	C3	2.5Y 6/3 light yellowish brown sand, moist, single grain, loose, non-plastic, few fine roots, plant fragments	SP	4.7	<4	2800	1900	1300	2600	8500	1100	Atypical
RFF-721+50-S1	RFF-721+50-SW9	3.6	4.9	C3	2.5Y 6/3 light yellowish brown sand, moist, single grain, loose, non-plastic, few fine roots, plant fragments	SP	4.7	14	8800	2800	3300	2000	17000	2400	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	4.9	6.2	C3	2.5Y 6/3 light yellowish brown sand, moist, single grain, loose, non-plastic, few fine roots, plant fragments	SP	5.2	10	830	310	260	270	1700	240	Bankfull Bench
RFF-721+50-S1	RFF-721+50-SW9	6.2	8.0	C4	2.5Y 5/3 light olive brown sand, few medium 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, very few fine roots, wood material (black), shell fragments	SP	11.3	11	2500	380	530	210	3600	500	Bankfull Bench
RFF-721+50-S3	RFF-721+50-SW131	0.0	1.0	A	10YR 2/2 very dark brown sandy loam, moist, granular, moderate, friable, slightly plastic, common fine roots	SM	23.4	8	2500	850	950	660	4900	700	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	1.0	1.2	A	10YR 2/2 very dark brown sandy loam, moist, granular, moderate, friable, slightly plastic, common fine roots	SM	19.2	10	3100	1200	1300	980	6600	930	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	1.2	1.6	AC	10YR 3/2 very dark grayish brown and 10YR 5/3 brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	SM	15.7	10	3900	1900	1800	1500	9100	1300	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	1.6	3.1	C1	10YR 6/3 pale brown and 10YR 4/2 dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few fine roots	SP	8.3	20	2800	850	940	670	5200	760	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	1.6	3.1	C1	10YR 6/3 pale brown and 10YR 4/2 dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few fine roots	SP	8	27	4000	870	1100	670	6700	980	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	3.1	4.4	C2	10YR 3/2 very dark grayish brown and 10YR 4/3 brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, common fine roots	SM	25.3	100	2900	1200	1300	1200	6600	1100	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	4.4	6.2	C3	10YR 4/2 dark grayish brown and 10YR 3/1 very dark gray loamy sand, moist, single grain, loose, non-plastic, plant fragments	SW	27.3	280	4800	2000	2000	2300	11000	2100	Atypical

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RFF-721+50-S3	RFF-721+50-SW131	6.2	7.7	C4	10YR 4/1 dark gray loamy sand, wet, single grain, loose, non-plastic	SW	28.5	7	21000	9300	7300	5900	44000	5700	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	7.7	9.2	C5	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic, shell fragments	SP	7.47	<4	30	9	7	<4	46	<10	Natural Levee (Industrial Age Levee)
RFF-721+50-S3	RFF-721+50-SW131	9.2	10.6	C5	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic, shell fragments	SP	12	<4	20	5	6	<4	32	<10	Natural Levee (Industrial Age Levee)
RFF-721+50-S4	RFF-721+50-SW174	1.0	1.9	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	14.2	140	10000	4100	4200	4200	23000	3400	Natural Levee (Industrial Age Levee)
RFF-721+50-S4	RFF-721+50-SW174	1.9	4.0	C2	10YR 4/3 brown sand, dry, single grain, loose, non-plastic, few fine roots	SP	6	15	72000	29000	28000	21000	150000	21000	Natural Levee (Industrial Age Levee)
RFF-721+50-S4	RFF-721+50-SW174	4.0	6.0	C2	10YR 4/3 brown sand, dry, single grain, loose, non-plastic, few fine roots	SP	21.8	18	61000	26000	24000	18000	130000	18000	Natural Levee (Industrial Age Levee)
RFF-721+50-S5	RFF-721+50-SW273	0.0	1.0	A	10YR 2/2 very dark brown silty clay loam, moist, granular, moderate, friable, moderately plastic, very few very fine roots	ML/CL	28.1	150	2700	1300	1400	1600	7200	1300	Atypical
RFF-721+50-S5	RFF-721+50-SW273	1.0	1.5	A	10YR 2/2 very dark brown silty clay loam, moist, granular, moderate, friable, moderately plastic, very few very fine roots	ML/CL	22	76	15000	7200	7200	6600	36000	5100	Low Surface
RFF-721+50-S5	RFF-721+50-SW273	1.5	2.5	Bt	10YR 4/3 brown clay loam, moist, subangular blocky, moderate, firm, moderately plastic	CL	17.3	7	31000	16000	15000	12000	74000	10000	Low Surface
RGG-727+00-N5	RGG-727+00-NE1698	2.9	3.3	Oe	10YR 3/1 very dark gray , moist	PT	55	5	1500	700	520	630	3400	440	Geomorphic Wetland
RGG-741+00-N1	RGG-741+00-NE26	9.5	11.2	C5	2.5Y 6/3 light yellowish brown and 2.5Y 4/3 olive brown fine sand, few medium 10YR 5/6 yellowish brown mottle, dry, single grain, loose, non-plastic, very few fine roots	SP	6	<4	57	12	11	7	87	13	Natural Levee (Industrial Age Levee)
RGG-741+00-N1	RGG-741+00-NE26	9.5	11.2	C5	2.5Y 6/3 light yellowish brown and 2.5Y 4/3 olive brown fine sand, few medium 10YR 5/6 yellowish brown mottle, dry, single grain, loose, non-plastic, very few fine roots	SP	6	<4	290	31	51	15	390	54	Natural Levee (Industrial Age Levee)
RHH-761+00-N5	RHH-761+00-NE24	3.2	5.1	C3	2.5Y 4/3 olive brown and 2.5Y 5/2 grayish brown sand, few fine 10YR 5/6 yellowish brown mottle, dry, single grain, loose, non-plastic, very few very fine roots	SP	6.7	10	53000	21000	18000	17000	110000	14000	Natural Levee (Industrial Age Levee)
RHH-766+00-S3	RHH-766+00-SW149	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, moderately plastic	ML/CL	25.4	99	1600	880	860	1200	4700	840	Atypical
RHH-766+00-S3	RHH-766+00-SW149	1.0	2.1	C1	2.5Y 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, moderately plastic	ML/CL	20.2	36	7100	2900	3100	3700	17000	2400	Low Surface
RHH-766+00-S3	RHH-766+00-SW149	2.4	3.7	3C2	2.5Y 4/3 olive brown loam, common fine 7.5YR 4/4 brown mottle, moist, subangular blocky, moderate, friable, moderately plastic, very few very fine roots	ML/CL	13.4	7	31000	13000	10000	11000	65000	8500	Low Surface
RHH-766+00-S3	RHH-766+00-SW149	3.7	5.0	3C2	2.5Y 4/3 olive brown loam, common fine 7.5YR 4/4 brown mottle, moist, subangular blocky, moderate, friable, moderately plastic, very few very fine roots	ML/CL	17.5	8	47000	18000	15000	13000	93000	12000	Low Surface
RHH-766+00-S3	RHH-766+00-SW149	5.0	5.5	4C3	2.5Y 6/3 light yellowish brown fine sand, few medium 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, wood material (black)	SP	15.8	<4	940	160	190	55	1300	180	Low Surface
RHH-767+50-C1	RHH-767+50-IC38	1.0	2.5	3	10YR 2/1 black , wet, wood material (black)		32.4	7	45000	15000	14000	9800	84000	11000	In-Channel

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RHH-768+00-C1	RHH-768+00-IC26	0.0	0.5	1	2.5Y 4/2 dark grayish brown fine sand, wet, single grain, loose, non-plastic, wood material (black)	SP	15.1	<4	67	21	25	800	910	110	Atypical
RII-772+00-C2	RII-772+00-IC114	2.0	3.0	2	10YR 2/1 black , <15% subrounded gravel, wet, wood material (black), shell fragments		20.5	6	45000	18000	16000	11000	90000	12000	In-Channel
RII-772+50-N6	RII-772+50-NE797	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown loam, common fine 7.5YR 3/4 dark brown mottle, moist, subangular blocky, weak, friable, moderately plastic, common very fine roots	ML/CL	32.4	23	2000	1100	860	1000	5000	700	Intermediate Surface
RII-772+50-N6	RII-772+50-NE797	1.0	2.6	C1	2.5Y 3/2 very dark grayish brown loam, common fine 7.5YR 3/4 dark brown mottle, moist, subangular blocky, weak, friable, moderately plastic, common very fine roots	ML/CL	31.6	120	2400	1600	1000	1300	6400	1100	Atypical
RII-772+50-N6	RII-772+50-NE797	2.6	3.0	C2	10YR 2/1 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	37.1	17	2600	1400	1000	1100	6100	820	Intermediate Surface
RII-772+50-N6	RII-772+50-NE797	2.6	3.0	C2	10YR 2/1 black silt loam, wet, massive, friable, slightly plastic, plant fragments	ML	36.3	18	2400	1100	1000	1000	5500	780	Intermediate Surface
RII-779+25-N1	RII-779+25-NE27	6.4	8.7	C4	10YR 6/2 light brownish gray and 2.5Y 4/2 dark grayish brown sand, common coarse 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, very few medium roots	SP	13.2	<18	41000	15000	13000	9700	79000	10000	Natural Levee (Industrial Age Levee)
RII-779+25-N1	RII-779+25-NE27	8.7	10.2	C5	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	18.5	<20	100000	39000	37000	24000	200000	27000	Natural Levee (Industrial Age Levee)
RII-779+25-N1	RII-779+25-NE27	10.2	11.7	C5	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	20.3	<17	50000	24000	20000	15000	110000	15000	Natural Levee (Industrial Age Levee)
RII-779+25-N1	RII-779+25-NE27	11.7	13.4	C5	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	21.2	29	140000	51000	44000	32000	260000	35000	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	0.0	1.0	C1	10YR 4/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, common very fine roots	SP	7.17	6	2200	780	670	610	4200	570	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	1.0	2.4	C1	10YR 4/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, common very fine roots	SP	6.58	66	4700	1600	1700	1600	9700	1500	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	1.0	2.4	C1	10YR 4/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, common very fine roots	SP	5.92	66	1400	830	630	1200	4100	670	Atypical
RII-779+50-N1	RII-779+50-NE20	2.4	3.8	C1	10YR 4/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, common very fine roots	SP	6.11	32	10000	6500	3600	7400	28000	3400	Atypical
RII-779+50-N1	RII-779+50-NE20	3.8	5.3	C1	10YR 4/3 brown and 10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, common very fine roots	SP	5.03	6	27000	13000	9500	9500	60000	7600	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	5.3	6.5	C2	2.5Y 6/2 light brownish gray and 2.5Y 4/2 dark grayish brown fine sand, common coarse 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, very few medium roots	SP	7.32	8	29000	13000	11000	12000	66000	8700	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	6.5	7.8	C2	2.5Y 6/2 light brownish gray and 2.5Y 4/2 dark grayish brown fine sand, common coarse 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, very few medium roots	SP	11.6	5	21000	9200	7100	7300	45000	5800	Natural Levee (Industrial Age Levee)

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RII-779+50-N1	RII-779+50-NE20	6.5	7.8	C2	2.5Y 6/2 light brownish gray and 2.5Y 4/2 dark grayish brown fine sand, common coarse 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, very few medium roots	SP	10.3	7	33000	12000	11000	8900	65000	8500	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	6.5	7.8	C2	2.5Y 6/2 light brownish gray and 2.5Y 4/2 dark grayish brown fine sand, common coarse 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, very few medium roots	SP	11.6	7	29000	13000	11000	9600	63000	8300	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	7.8	9.6	C3	2.5Y 6/2 light brownish gray fine sand, moist, single grain, loose, non-plastic	SP	6.72	10	43000	25000	17000	19000	100000	13000	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	9.6	11.2	C4	2.5Y 4/1 dark gray and 2.5Y 3/1 very dark gray fine sand, wet, single grain, loose, non-plastic, wood material (black)	SP	21.1	22	83000	24000	25000	14000	150000	20000	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	11.2	12.9	C4	2.5Y 4/1 dark gray and 2.5Y 3/1 very dark gray fine sand, wet, single grain, loose, non-plastic, wood material (black)	SP	21.9	26	100000	52000	46000	30000	230000	32000	Natural Levee (Industrial Age Levee)
RII-779+50-N1	RII-779+50-NE20	12.9	14.4	C5	10YR 2/1 black , wet, wood material (black)		41.7	<4	130	39	39	22	220	32	Natural Levee (Industrial Age Levee)
RII-779+50-N11	RII-779+50-NE158	0.0	1.0	A	10YR 3/1 very dark gray silt loam, moist, granular, moderate, friable, slightly plastic, few fine roots	ML	22.1	160	2100	920	910	1100	5200	1000	Atypical
RII-779+50-N2	RII-779+50-NE108	0.0	0.6	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML	28.5	13	1400	650	620	570	3300	480	Geomorphic Wetland
RII-779+50-N2	RII-779+50-NE108	0.6	1.0	Bt	10YR 3/3 dark brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic, few fine roots	CL	20.4	170	4600	2200	2200	2400	11000	1900	Geomorphic Wetland
RII-779+50-N2	RII-779+50-NE108	1.0	2.8	C1	10YR 3/3 dark brown loam, moist, subangular blocky, weak, friable, moderately plastic, few fine roots	ML	21.1	50	30000	14000	11000	12000	67000	8900	Geomorphic Wetland
RII-779+50-N2	RII-779+50-NE108	2.8	4.0	C2	10YR 3/4 dark yellowish brown loam, few medium 10YR 5/8 yellowish brown mottle, moist, subangular blocky, weak, friable, moderately plastic, few fine roots	ML	21.7	<4	14000	5900	5200	4400	29000	3900	Geomorphic Wetland
RII-779+50-N2	RII-779+50-NE108	4.0	5.5	C3	10YR 4/2 dark grayish brown sandy loam, wet, subangular blocky, weak, friable, slightly plastic, few fine roots, plant fragments	SM	33.2	<4	310	140	110	110	670	90	Geomorphic Wetland
RII-779+50-N9	RII-779+50-NE115	1.0	1.3	Bt	10YR 3/3 dark brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic, few fine roots	CL	20.4	320	6600	2800	2700	2700	15000	2700	Atypical
RII-779+50-N9	RII-779+50-NE115	1.0	1.3	Bt	10YR 3/3 dark brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic, few fine roots	CL	22.4	310	5200	2300	2100	2300	12000	2300	Atypical
RII-782+00-C2	RII-782+00-IC132	0.0	0.5	1	2.5Y 5/3 light olive brown coarse sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	10.3	6	3300	870	890	580	5600	760	In-Channel
RII-782+00-C2	RII-782+00-IC132	1.0	1.9	2	10YR 5/4 yellowish brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	17.8	10	45000	23000	20000	18000	110000	14000	In-Channel
RII-782+00-C2	RII-782+00-IC132	1.9	4.0	3	2.5Y 5/1 gray sand, wet, single grain, loose, non-plastic, wood material (black)	SP	29.2	<4	870	310	290	210	1700	230	In-Channel
RII-782+00-C3	RII-782+00-IC188	1.8	2.2	2	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	25.1	<4	1800	500	510	320	3100	420	In-Channel
RII-782+00-C3	RII-782+00-IC188	2.2	2.5	3	2.5Y 2.5/1 black silt loam, wet, massive, friable, slightly plastic	ML	56	1700	6600	2400	8300	32000	51000	11000	Atypical

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RII-782+00-C3	RII-782+00-IC188	3.3	5.0	6	2.5Y 3/1 very dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	25.8	<18	14000	5600	4600	4000	29000	3700	In-Channel
RII-782+50-S2	RII-782+50-SW33	0.0	0.7	C1	10YR 4/3 brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	7.1	<4	530	210	220	180	1100	160	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	0.0	0.7	C1	10YR 4/3 brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	6.9	<4	520	300	240	370	1400	190	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	0.7	1.0	C2	10YR 4/2 dark grayish brown loamy sand, dry, subangular blocky, weak, soft, non-plastic	SM	6.2	<4	2300	980	950	660	4900	680	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	1.0	2.2	C2	10YR 4/2 dark grayish brown loamy sand, dry, subangular blocky, weak, soft, non-plastic	SM	5.1	7	3200	1800	1500	1300	7800	1100	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	2.2	2.7	C3	10YR 4/3 brown sand, dry, single grain, loose, non-plastic	SP	3	37	3400	550	770	450	5200	770	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	2.7	4.4	C4	10YR 4/2 dark grayish brown loamy sand, dry, subangular blocky, weak, soft, non-plastic, shell fragments	SM	4.5	41	2200	1100	990	1100	5300	810	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	4.4	5.3	C4	10YR 4/2 dark grayish brown loamy sand, dry, subangular blocky, weak, soft, non-plastic, shell fragments	SM	5.4	38	710	390	550	940	2600	460	Atypical
RII-782+50-S2	RII-782+50-SW33	5.3	6.5	C5	10YR 4/3 brown sand, few fine 10YR 5/6 yellowish brown mottle, dry, single grain, loose, non-plastic, shell fragments, plant fragments	SP	5.54	22	2200	720	790	1300	5000	720	Bankfull Bench
RII-782+50-S2	RII-782+50-SW33	6.5	7.2	C6	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	24.2	26	2100	1100	990	3300	7400	1000	Atypical
RII-782+50-S2	RII-782+50-SW33	7.2	7.7	C7	10YR 5/6 yellowish brown and 10YR 4/3 brown sand, moist, single grain, loose, non-plastic, shell fragments	SP	19.2	<4	65	17	17	28	130	19	Bankfull Bench
RII-783+00-C1	RII-783+00-IC135	0.0	0.5	1	2.5Y 5/2 grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black), plant fragments	SW	9.2	9	28000	21000	19000	19000	86000	12000	In-Channel
RII-783+00-C2	RII-783+00-IC194	4.9	6.0	5	10YR 2/1 black and 2.5Y 3/2 very dark grayish brown , wet, wood material (black), wood material		76	22	51000	30000	22000	19000	120000	16000	In-Channel
RII-787+00-C3	RII-787+00-IC140	0.5	1.0	1	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, plant fragments	SP	32.9	4	890	250	240	170	1600	210	In-Channel
RII-787+00-C3	RII-787+00-IC140	2.2	3.1	3	2.5Y 4/1 dark gray loam, wet, massive, friable, slightly plastic, plant fragments	ML	46.6	190	4700	1200	1400	1700	9200	1600	Atypical
RII-787+00-C3	RII-787+00-IC140	3.1	3.5	4	2.5Y 4/2 dark grayish brown fine sand, wet, single grain, loose, non-plastic, wood material (black)	SP	27.1	53	23000	13000	9700	12000	57000	7500	In-Channel
RII-787+00-C3	RII-787+00-IC140	3.5	4.1	5	2.5Y 2.5/1 black sandy loam, wet, massive, friable, slightly plastic, plant fragments	SM	47.4	560	1100	320	780	1500	4300	1800	Atypical
RII-787+00-C3	RII-787+00-IC140	4.1	5.0	6	2.5Y 3/2 very dark grayish brown silt loam, wet, massive, friable, slightly plastic, wood material (black), plant fragments	ML	42.6	530	1900	760	1000	2300	6500	2000	Atypical
RII-787+00-C3	RII-787+00-IC140	5.0	7.0	7	2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	3.74	8	150	45	43	60	310	57	Atypical
RII-787+00-C3	RII-787+00-IC140	5.0	7.0	7	2.5Y 5/2 grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	4.1	7	300	93	70	100	570	85	In-Channel
RII-787+00-C3	RII-787+00-IC140	7.0	7.4	8	2.5Y 2.5/1 black silt loam, wet, massive, friable, slightly plastic, very few very fine roots	ML	50.1	3700	1600	770	1200	4800	12000	9400	Atypical
RII-787+00-C3	RII-787+00-IC140	7.4	8.8	9	2.5Y 2.5/1 black , wet, wood material (black)		33.9	7	<4	<4	<4	15	23	19	In-Channel
RII-793+00-C2	RII-793+00-IC117	6.0	8.0	3	2.5Y 4/2 dark grayish brown , wet, wood material		85.2	<10	<8	35	26	25	86	18	In-Channel
RII-796+00-N1	RII-796+00-NE33	0.0	1.0	A	10YR 2/1 black loamy sand, moist, granular, weak, friable, non-plastic, many fine roots	SP	12.9	7	2500	1200	1300	1100	6100	880	High Surface

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RII-796+00-N1	RII-796+00-NE33	1.0	1.4	A	10YR 2/1 black loamy sand, moist, granular, weak, friable, non-plastic, many fine roots	SP	10.4	9	8600	4400	3900	3600	21000	2800	High Surface
RII-796+00-N1	RII-796+00-NE33	1.4	2.3	C1	10YR 4/2 dark grayish brown loamy sand, moist, single grain, loose, non-plastic	SP	6	<4	8900	3800	3700	3300	20000	2700	High Surface
RII-799+00-C3	RII-799+00-IC219	3.2	4.0	3	10YR 2/1 black , wet, wood material (saw dust), wood material (black)		35.8	<4	1200	67	120	39	1400	180	In-Channel
RII-801+00-C1	RII-801+00-IC45	2.0	3.5	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	36.2	18	52000	31000	24000	21000	130000	17000	In-Channel
RII-801+00-C2	RII-801+00-IC147	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material, wood material (black)	SP	6	<4	130	33	27	32	220	30	In-Channel
RII-801+00-C2	RII-801+00-IC147	3.0	5.0	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	14.4	1300	81	22	22	20	1400	2800	Atypical
RII-801+00-C2	RII-801+00-IC147	7.9	9.3	2	2.5Y 2.5/1 black , wet, wood material (black)		40.7	<4	370	230	170	170	940	130	In-Channel
RII-801+00-C4	RII-801+00-IC92	0.0	0.5	1	2.5Y 4/3 olive brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	21.3	9	54000	26000	22000	15000	120000	16000	In-Channel
RII-802+00-C1	RII-802+00-IC41	0.0	0.5	1	10YR 2/1 black , <15% subrounded gravel, wet, wood material (black), shell fragments		27.7	<6	1200	320	330	250	2100	290	In-Channel
RII-802+00-C1	RII-802+00-IC41	0.0	0.5	1	10YR 2/1 black , <15% subrounded gravel, wet, wood material (black), shell fragments		29.5	10	31000	14000	15000	11000	72000	10000	In-Channel
RII-806+00-N1	RII-806+00-NE20	3.0	5.0	C1	10YR 5/2 grayish brown sand, moist, single grain, loose, non-plastic	SP	3.46	21	91000	35000	26000	22000	170000	22000	Natural Levee (Industrial Age Levee)
RII-806+00-N1	RII-806+00-NE20	5.0	7.0	C1	10YR 5/2 grayish brown sand, moist, single grain, loose, non-plastic	SP	4.26	12	64000	27000	20000	20000	130000	17000	Natural Levee (Industrial Age Levee)
RII-811+00-N1	RII-811+00-NE16	0.0	1.0	C1	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic	SP	9.19	<4	3800	860	770	580	6000	770	Natural Levee (Industrial Age Levee)
RII-811+00-N1	RII-811+00-NE16	1.0	3.0	C1	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic	SP	6.76	14	710	420	380	630	2100	310	Natural Levee (Industrial Age Levee)
RII-811+00-N1	RII-811+00-NE16	3.0	4.0	C1	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic	SP	9.8	160	4600	2100	1700	2800	11000	1800	Natural Levee (Industrial Age Levee)
RII-811+00-N1	RII-811+00-NE16	4.0	5.6	C1	10YR 4/2 dark grayish brown sand, moist, single grain, loose, non-plastic	SP	8.79	23	10000	4300	3500	5100	23000	3000	Natural Levee (Industrial Age Levee)
RII-811+00-N1	RII-811+00-NE16	9.8	11.8	C4	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic	SP	17.6	<4	2400	1200	730	860	5200	640	Natural Levee (Industrial Age Levee)
RII-811+00-N1	RII-811+00-NE16	9.8	11.8	C4	10YR 4/1 dark gray sand, wet, single grain, loose, non-plastic	SP	17.6	<4	1600	420	440	370	2800	370	Natural Levee (Industrial Age Levee)
RII-811+00-N2	RII-811+00-NE103	0.0	1.0	A	10YR 3/2 very dark grayish brown loam, dry, granular, strong, slightly hard, slightly plastic, few very fine roots	ML/CL	22.3	65	8200	4000	3000	3800	19000	2600	Historic Natural Levee (Pre-Industrial Age Levee)

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Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RII-811+00-N2	RII-811+00-NE103	1.0	1.1	A	10YR 3/2 very dark grayish brown loam, dry, granular, strong, slightly hard, slightly plastic, few very fine roots	ML/CL	17.1	41	19000	8800	7000	7400	42000	5600	Historic Natural Levee (Pre-Industrial Age Levee)
RII-811+00-N2	RII-811+00-NE103	1.1	2.2	C1	10YR 4/3 brown loam, dry, granular, moderate, slightly hard, slightly plastic, very few very fine roots	ML/CL	14.8	<4	3800	1900	1400	1400	8400	1100	Historic Natural Levee (Pre-Industrial Age Levee)
RII-811+00-N2	RII-811+00-NE103	2.2	3.3	2C2	10YR 5/3 brown and 10YR 6/3 pale brown loamy fine sand, common fine 10YR 5/6 yellowish brown mottle, dry, subangular blocky, weak, soft, non-plastic, very few very fine roots	SP	8.15	<4	540	250	180	190	1200	150	Historic Natural Levee (Pre-Industrial Age Levee)
RJJ-815+50-C1	RJJ-815+50-IC58	1.0	2.2	2	2.5Y 5/2 grayish brown and 2.5Y 3/2 very dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SP	16.9	<4	34	15	13	260	320	39	In-Channel
RJJ-822+00-N1	RJJ-822+00-NE7	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown sand, moist, single grain, loose, non-plastic, very few very fine roots	SP	7.1	10	44000	22000	22000	18000	110000	15000	Natural Levee (Industrial Age Levee)
RJJ-822+00-N1	RJJ-822+00-NE7	1.0	1.7	C1	2.5Y 3/2 very dark grayish brown sand, moist, single grain, loose, non-plastic, very few very fine roots	SP	6.5	10	4000	1600	1800	1200	8700	1200	Natural Levee (Industrial Age Levee)
RJJ-822+00-N1	RJJ-822+00-NE7	1.7	3.7	C2	2.5Y 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, friable, non-plastic	SP	10.7	100	4000	2000	2100	2600	11000	1700	Natural Levee (Industrial Age Levee)
RJJ-822+00-N1	RJJ-822+00-NE7	3.7	5.0	C2	2.5Y 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, friable, non-plastic	SP	11.2	68	16000	5600	6800	8200	37000	5200	Natural Levee (Industrial Age Levee)
RJJ-822+00-N1	RJJ-822+00-NE7	5.0	5.9	C2	2.5Y 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, friable, non-plastic	SP	12.4	15	75000	30000	29000	27000	160000	22000	Natural Levee (Industrial Age Levee)
RJJ-829+00-N8	RJJ-829+00-NE1349	0.0	1.0	C1	10YR 3/2 very dark grayish brown clay loam, few medium 7.5YR 4/6 strong brown mottle, moist, subangular blocky, moderate, friable, moderately plastic, common medium roots, shell fragments	CL	25.3	26	1600	710	640	780	3700	550	Geomorphic Wetland
RJJ-829+00-N8	RJJ-829+00-NE1349	1.0	2.2	C1	10YR 3/2 very dark grayish brown clay loam, few medium 7.5YR 4/6 strong brown mottle, moist, subangular blocky, moderate, friable, moderately plastic, common medium roots, shell fragments	CL	26.3	<4	450	220	200	210	1100	150	Geomorphic Wetland
RJJ-829+00-N8	RJJ-829+00-NE1349	2.2	3.3	C2	10YR 5/2 grayish brown clay loam, few medium 7.5YR 4/6 strong brown mottle, moist, massive, friable, moderately plastic, shell fragments	CL	34.9	<13	68	26	35	27	160	29	Geomorphic Wetland
RJJ-836+00-N11	RJJ-836+00-NE1509	0.0	0.4	C1	10YR 3/4 dark yellowish brown fine sand, moist, single grain, loose, non-plastic	SP	3.11	<4	15	<6	19	44	77	15	High Surface
RJJ-836+00-S6	RJJ-836+00-SW151	0.0	0.4	A	10YR 2/2 very dark brown loam, moist, granular, moderate, friable, slightly plastic, few fine roots	ML	23.1	21	1200	670	560	830	3300	470	Upland
RJJ-836+00-S6	RJJ-836+00-SW151	0.4	1.0	C	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, moderate, friable, non-plastic	SM	13.9	6	1800	920	740	820	4300	580	Upland
RJJ-842+00-N1	RJJ-842+00-NE4	0.0	1.0	C1	10YR 2/2 very dark brown fine sandy loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, common very fine roots	SM	9.36	21	2100	860	750	800	4500	640	Natural Levee (Industrial Age Levee)
RJJ-842+00-N1	RJJ-842+00-NE4	1.0	1.8	C1	10YR 2/2 very dark brown fine sandy loam, dry, subangular blocky, moderate, slightly hard, slightly plastic, common very fine roots	SM	10.5	65	2400	1200	940	1200	5800	890	Natural Levee (Industrial Age Levee)

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RJJ-842+00-N1	RJJ-842+00-NE4	1.8	3.6	C2	2.5Y 3/3 dark olive brown and 2.5Y 5/3 light olive brown loamy fine sand, dry, subangular blocky, weak, soft, non-plastic, few very fine roots	SP	8.97	100	7100	3400	3000	4700	18000	2600	Natural Levee (Industrial Age Levee)
RJJ-842+00-N1	RJJ-842+00-NE4	3.6	5.8	C3	2.5Y 4/3 olive brown fine sandy loam, dry, subangular blocky, moderate, slightly hard, non-plastic, few very fine roots	SM	12.1	7	9500	4300	3300	5000	22000	2900	Natural Levee (Industrial Age Levee)
RJJ-842+00-N1	RJJ-842+00-NE4	5.8	7.0	C4	2.5Y 3/2 very dark grayish brown and 2.5Y 5/3 light olive brown fine sandy loam, few medium 10YR 4/6 dark yellowish brown mottle, dry, subangular blocky, weak, soft, non-plastic, very few fine roots	SM	9.49	16	81000	36000	27000	26000	170000	22000	Natural Levee (Industrial Age Levee)
RJJ-842+00-N1	RJJ-842+00-NE4	5.8	7.0	C4	2.5Y 3/2 very dark grayish brown and 2.5Y 5/3 light olive brown fine sandy loam, few medium 10YR 4/6 dark yellowish brown mottle, dry, subangular blocky, weak, soft, non-plastic, very few fine roots	SM	9.49	14	60000	27000	21000	21000	130000	17000	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	0.0	1.0	C1	2.5Y 3/3 dark olive brown fine sandy loam, dry, subangular blocky, moderate, soft, slightly plastic, few very fine roots	SM	10.5	17	3300	1400	940	1100	6700	870	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	1.0	2.1	C1	2.5Y 3/3 dark olive brown fine sandy loam, dry, subangular blocky, moderate, soft, slightly plastic, few very fine roots	SM	9.33	100	8400	2500	2000	1400	14000	2000	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	2.1	3.1	C2	2.5Y 5/3 light olive brown and 2.5Y 6/3 light yellowish brown fine sand, dry, single grain, loose, non-plastic	SP	6.79	160	5700	2600	1800	2600	13000	1900	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	3.1	4.0	C3	2.5Y 4/3 olive brown fine sandy loam, dry, subangular blocky, weak, soft, slightly plastic, very few very fine roots	SM	10.9	100	4200	2000	1600	3900	12000	1700	Atypical
RJJ-851+50-N1	RJJ-851+50-NE20	4.0	5.5	C4	2.5Y 4/2 dark grayish brown loamy fine sand, dry, subangular blocky, weak, soft, non-plastic, few fine roots	SP	11.5	130	15000	5400	4300	10000	35000	4700	Atypical
RJJ-851+50-N1	RJJ-851+50-NE20	5.5	7.0	C5	2.5Y 4/3 olive brown loam, dry, subangular blocky, moderate, slightly hard, slightly plastic	ML/CL	15	13	15000	6500	4800	6700	33000	4200	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	7.0	8.3	C6	2.5Y 4/2 dark grayish brown and 2.5Y 6/3 light yellowish brown loam, common fine 10YR 5/6 yellowish brown mottle, dry, subangular blocky, moderate, slightly hard, slightly plastic	ML/CL	10.2	10	41000	20000	16000	15000	92000	12000	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	7.0	8.3	C6	2.5Y 4/2 dark grayish brown and 2.5Y 6/3 light yellowish brown loam, common fine 10YR 5/6 yellowish brown mottle, dry, subangular blocky, moderate, slightly hard, slightly plastic	ML/CL	10.2	16	44000	18000	16000	14000	93000	12000	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	8.3	9.6	C6	2.5Y 4/2 dark grayish brown and 2.5Y 6/3 light yellowish brown loam, common fine 10YR 5/6 yellowish brown mottle, dry, subangular blocky, moderate, slightly hard, slightly plastic, wood material (black)	ML/CL	12.8	<4	960	320	290	250	1800	240	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	9.6	10.3	2C7	2.5Y 4/1 dark gray silt loam, moist, massive, firm, slightly plastic, wood material (black), plant fragments	ML	28.4	<4	5	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	10.3	11.5	2C8	10YR 2/1 black , moist, wood material, wood material (black)		40.4	<4	6	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RJJ-851+50-N1	RJJ-851+50-NE20	11.5	12.7	3C9	2.5Y 4/1 dark gray and 2.5Y 5/1 gray sand, wet, single grain, loose, non-plastic	SP	7.51	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RJJ-851+50-N1	RJJ-851+50-NE20	11.5	12.7	3C9	2.5Y 4/1 dark gray and 2.5Y 5/1 gray sand, wet, single grain, loose, non-plastic	SP	8.2	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Industrial Age Levee)
RJJ-851+50-N10	RJJ-851+50-NE578	0.0	1.0	A	10YR 3/2 very dark grayish brown clay loam, moist, granular, moderate, friable, moderately plastic	CL	30.4	1500	3900	2100	1800	2500	12000	4700	Atypical
RJJ-852+50-C2	RJJ-852+50-IC171	0.5	1.0	1	2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic, shell fragments	SW	20.8	13	790	380	370	510	2100	310	In-Channel
RJJ-852+50-C2	RJJ-852+50-IC171	0.5	1.0	1	2.5Y 4/3 olive brown sand, wet, single grain, loose, non-plastic, shell fragments	SW	18	110	650	400	350	690	2200	520	Atypical
RKK-855+00-C1	RKK-855+00-IC62	1.7	2.4	2	10YR 2/1 black , wet, wood material (black)		28	<13	60000	19000	17000	13000	110000	14000	In-Channel
RKK-855+50-C1	RKK-855+50-IC68	1.5	2.8	3	10YR 2/1 black , wet, wood material (black)		43.1	15	92000	33000	28000	26000	180000	23000	In-Channel
RKK-857+50-C1	RKK-857+50-IC62	1.0	2.0	1	2.5Y 4/3 olive brown and 2.5Y 4/1 dark gray sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black)	SP	18.5	<4	1200	530	430	400	2500	330	In-Channel
RKK-857+50-C1	RKK-857+50-IC62	4.0	6.0	2	2.5Y 4/1 dark gray silt loam, wet, subangular blocky, weak, friable, slightly plastic, shell fragments, plant fragments, wood material (black)	ML	33	<12	13	6	8	8	35	12	In-Channel
RKK-857+50-N3	RKK-857+50-NE446	0.0	1.0	A	10YR 3/2 very dark grayish brown loam, moist, granular, strong, friable, moderately plastic	ML	27.3	53	6500	3200	2700	2900	15000	2100	Low Surface
RKK-857+50-N3	RKK-857+50-NE446	0.0	1.0	A	10YR 3/2 very dark grayish brown loam, moist, granular, strong, friable, moderately plastic	ML	28.3	110	3800	1900	1800	2200	9800	1500	Low Surface
RKK-857+50-N3	RKK-857+50-NE446	1.0	3.0	C	10YR 4/2 dark grayish brown clay loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, massive, friable, moderately plastic	CL	26.2	7	1300	340	330	220	2200	300	Low Surface
RKK-857+50-N8	RKK-857+50-NE1084	0.0	1.0	C	2.5Y 3/2 very dark grayish brown clay loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, massive, friable, moderately plastic	CL	38.9	23	600	120	220	250	1200	220	Atypical
RKK-857+50-N8	RKK-857+50-NE1084	1.0	1.6	C	2.5Y 3/2 very dark grayish brown clay loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, massive, friable, moderately plastic	CL	44.1	<9	410	190	180	180	950	130	Geomorphic Wetland
RKK-864+50-S1	RKK-864+50-SW23	7.0	8.0	C4	2.5Y 6/2 light brownish gray sand, dry, single grain, loose, non-plastic, wood material (black)	SP	3.1	5	18000	2800	4200	1800	27000	3600	Natural Levee (Industrial Age Levee)
RKK-870+50-N7	RKK-870+50-NE1021	0.0	1.0	C1	2.5Y 3/2 very dark grayish brown loam, wet, subangular blocky, moderate, friable, slightly plastic, few fine roots, plant fragments	ML	35.7	66	1500	860	710	790	4000	670	Geomorphic Wetland
RKK-870+50-N7	RKK-870+50-NE1021	1.0	1.8	C1	2.5Y 3/2 very dark grayish brown loam, wet, subangular blocky, moderate, friable, slightly plastic, few fine roots, plant fragments	ML	30.2	21	2300	1200	1100	1100	5700	830	Geomorphic Wetland
RKK-870+50-S1	RKK-870+50-SW17	0.0	1.0	C1	10YR 3/1 very dark gray loamy sand, dry, single grain, loose, non-plastic, many fine roots	SP	9.42	9	11000	3700	3000	2700	20000	2600	Natural Levee (Industrial Age Levee)
RKK-870+50-S1	RKK-870+50-SW17	1.0	2.3	C1	10YR 3/1 very dark gray loamy sand, dry, single grain, loose, non-plastic, many fine roots	SP	5.25	25	24000	11000	7900	7500	51000	6500	Natural Levee (Industrial Age Levee)
RKK-870+50-S1	RKK-870+50-SW17	2.3	3.7	C2	2.5Y 5/3 light olive brown fine sand, dry, single grain, loose, non-plastic	SP	4.01	17	57000	20000	16000	14000	110000	14000	Natural Levee (Industrial Age Levee)

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RLL-878+00-N2	RLL-878+00-NE75	0.0	1.0	A	10YR 3/2 very dark grayish brown and 10YR 4/2 dark grayish brown loamy sand, moist, granular, strong, very friable, slightly plastic, many very fine roots	SP	34.8	26	2100	950	860	920	4900	710	Natural Levee (Industrial Age Levee)
RLL-878+00-N2	RLL-878+00-NE75	0.0	1.0	A	10YR 3/2 very dark grayish brown and 10YR 4/2 dark grayish brown loamy sand, moist, granular, strong, very friable, slightly plastic, many very fine roots	SP	35.1	22	3900	1200	1200	1000	7300	1000	Natural Levee (Industrial Age Levee)
RLL-878+00-N2	RLL-878+00-NE75	1.0	1.4	A	10YR 3/2 very dark grayish brown and 10YR 4/2 dark grayish brown loamy sand, moist, granular, strong, very friable, slightly plastic, many very fine roots	SP	32.1	340	2800	1200	1200	2100	7600	1700	Atypical
RLL-878+00-N2	RLL-878+00-NE75	1.4	2.3	C1	2.5Y 3/2 very dark grayish brown sandy loam, few fine 10YR 4/4 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic	SM	39.5	21	21000	9400	7900	8600	47000	6200	Natural Levee (Industrial Age Levee)
RLL-878+00-N2	RLL-878+00-NE75	2.3	3.5	C2	10YR 2/1 black sand, wet, single grain, loose, non-plastic, wood material (black)	SP	34.4	7	39000	16000	13000	12000	80000	11000	Natural Levee (Industrial Age Levee)
RLL-878+00-N3	RLL-878+00-NE106	0.0	1.0	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, few very fine roots	ML/CL	32.6	200	3600	1100	1400	1800	8100	1500	Atypical
RLL-878+00-N3	RLL-878+00-NE106	1.0	1.7	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, few very fine roots	ML/CL	24.1	110	7500	2600	3000	4700	18000	2700	Natural Levee (Industrial Age Levee)
RLL-878+00-N3	RLL-878+00-NE106	1.7	3.7	C1	2.5Y 4/3 olive brown sandy loam, common fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	SM	11.5	8	37000	14000	13000	12000	76000	10000	Natural Levee (Industrial Age Levee)
RLL-878+00-N3	RLL-878+00-NE106	3.7	4.9	C2	2.5Y 4/2 dark grayish brown sandy loam, common fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few fine roots	SM	24.4	18	110000	48000	40000	43000	240000	32000	Natural Levee (Industrial Age Levee)
RLL-878+00-N3	RLL-878+00-NE106	4.9	6.1	C2	2.5Y 4/2 dark grayish brown sandy loam, common fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few fine roots, plant fragments	SM	29.7	19	99000	36000	33000	30000	200000	26000	Natural Levee (Industrial Age Levee)
RLL-878+00-N3	RLL-878+00-NE106	6.1	6.6	C3	10YR 2/1 black , moist, wood material		57.9	<6	27000	8400	8200	7000	50000	6700	Natural Levee (Industrial Age Levee)
RLL-885+50-N1	RLL-885+50-NE13	5.5	7.0	C4	2.5Y 4/1 dark gray and 10YR 2/1 black sand, wet, single grain, loose, non-plastic	SP	34.2	26	3100	1600	1900	6600	13000	1800	Atypical
RLL-885+50-N2	RLL-885+50-NE72	0.0	1.0	A	10YR 2/1 black silt loam, moist, granular, moderate, friable, slightly plastic, very few fine roots	ML	16.4	41	15000	7600	6000	6900	35000	4700	Historic Natural Levee (Pre-Industrial Age Levee)
RLL-885+50-N2	RLL-885+50-NE72	1.0	1.4	A	10YR 2/1 black silt loam, moist, granular, moderate, friable, slightly plastic, very few fine roots	ML	14.7	23	24000	12000	10000	11000	57000	7600	Historic Natural Levee (Pre-Industrial Age Levee)
RLL-885+50-N2	RLL-885+50-NE72	1.4	1.9	Bw	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic	SM	12.9	9	27000	11000	9400	8600	56000	7400	Historic Natural Levee (Pre-Industrial Age Levee)

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RLL-885+50-N2	RLL-885+50-NE72	1.9	3.0	C1	7.5YR 3/2 dark brown silt loam, moist, subangular blocky, weak, friable, slightly plastic, few very fine roots	ML	14.1	<4	920	510	390	400	2200	290	Historic Natural Levee (Pre-Industrial Age Levee)
RLL-885+50-N7	RLL-885+50-NE909	0.0	1.0	C1	10YR 3/2 very dark grayish brown and 10YR 2/1 black silt loam, wet, subangular blocky, weak, friable, slightly plastic, common fine roots	ML	51.2	40	530	300	280	370	1500	290	Atypical
RLL-885+50-N7	RLL-885+50-NE909	1.0	1.5	C1	10YR 3/2 very dark grayish brown and 10YR 2/1 black silt loam, wet, subangular blocky, weak, friable, slightly plastic, common fine roots	ML	46.8	64	740	360	350	520	2000	410	Atypical
RLL-889+00-C1	RLL-889+00-IC29	1.0	1.7	2	10YR 3/2 very dark grayish brown silt, wet, massive, friable, slightly plastic, plant fragments	ML	37.6	240	4200	880	1200	1000	7600	1500	Atypical
RLL-892+00-C1	RLL-892+00-IC19	0.0	0.5	1	2.5Y 4/2 dark grayish brown silt, <15% subrounded gravel, wet, massive, friable, slightly plastic, shell fragments, plant fragments	ML	29.9	<5	39	11	10	<7	60	10	In-Channel
RLL-892+00-N2	RLL-892+00-NE32	0.0	0.7	A	2.5Y 2.5/1 black loam, moist, granular, strong, friable, slightly plastic, few fine roots	ML	21.3	110	7300	3100	3000	4900	18000	2700	Low Surface
RLL-892+00-N2	RLL-892+00-NE32	0.7	1.0	AC	2.5Y 4/2 dark grayish brown sandy loam, moist, granular, moderate, friable, slightly plastic	SM	17.2	42	13000	4500	4500	8700	30000	4100	Atypical
RLL-892+00-N2	RLL-892+00-NE32	1.0	1.7	AC	2.5Y 4/2 dark grayish brown sandy loam, moist, granular, moderate, friable, slightly plastic	SM	15	8	32000	12000	12000	12000	68000	9100	Low Surface
RLL-892+00-N2	RLL-892+00-NE32	1.7	3.7	C1	10YR 4/3 brown loamy sand, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, non-plastic	SP	10	18	85000	44000	44000	39000	210000	30000	Low Surface
RLL-892+00-N2	RLL-892+00-NE32	3.7	5.0	C1	10YR 4/3 brown loamy sand, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, non-plastic	SP	19.5	7	9300	3700	3500	2700	19000	2600	Low Surface
RLL-892+00-N2	RLL-892+00-NE32	5.0	6.1	C2	2.5Y 3/1 very dark gray sandy loam, common fine 10YR 4/6 dark yellowish brown mottle, moist, massive, friable, non-plastic, wood material (black)	SM	31.7	<4	1300	520	520	340	2700	370	Low Surface
RLL-892+00-N2	RLL-892+00-NE32	6.1	7.8	C3	2.5Y 2.5/1 black silt loam, moist, massive, friable, slightly plastic, wood material (black)	ML	38.7	<4	50	25	18	19	110	17	Low Surface
RLL-892+00-N2	RLL-892+00-NE32	7.8	8.0	2C4	2.5Y 3/1 very dark gray sand, moist, single grain, loose, non-plastic	SP	26	<4	6	<4	<4	<4	<20	<10	Low Surface
RMM-900+50-C4	RMM-900+50-IC336	5.0	5.8	6	2.5Y 4/2 dark grayish brown , wet, wood material		77.9	<17	20	11	10	10	51	16	In-Channel
RMM-903+00-N1	RMM-903+00-NE20	0.0	1.0	C	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, moderately plastic	ML	21.4	79	2200	840	800	960	4800	810	Low Surface
RMM-903+50-C1	RMM-903+50-IC5	0.0	1.0	C1	2.5Y 5/3 light olive brown fine sand, moist, single grain, loose, non-plastic, few very fine roots, shell fragments, plant fragments, wood material	SP	3.16	<4	4800	3100	2400	2500	13000	1700	Island
RMM-903+50-C1	RMM-903+50-IC5	1.0	1.3	C1	2.5Y 5/3 light olive brown fine sand, moist, single grain, loose, non-plastic, few very fine roots, shell fragments, plant fragments, wood material	SP	3.23	6	16000	7100	5400	4600	33000	4300	Island
RMM-903+50-C1	RMM-903+50-IC5	1.3	3.0	C2	10YR 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SP	4.92	37	12000	4600	3700	4000	24000	3200	Island
RMM-903+50-C1	RMM-903+50-IC5	3.0	4.8	C3	2.5Y 3/2 very dark grayish brown and 2.5Y 5/4 light olive brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots, plant fragments	SP	2.41	7	19000	8400	6800	6300	41000	5400	Island
RMM-903+50-C1	RMM-903+50-IC5	3.0	4.8	C3	2.5Y 3/2 very dark grayish brown and 2.5Y 5/4 light olive brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots, plant fragments	SP	2.48	8	26000	14000	10000	10000	60000	7800	Island

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RMM-903+50-C1	RMM-903+50-IC5	4.8	6.6	C3	2.5Y 3/2 very dark grayish brown and 2.5Y 5/4 light olive brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots, plant fragments	SP	2.67	15	67000	33000	26000	24000	150000	20000	Island
RMM-903+50-C1	RMM-903+50-IC5	4.8	6.6	C3	2.5Y 3/2 very dark grayish brown and 2.5Y 5/4 light olive brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots, plant fragments	SP	2.5	14	51000	26000	19000	17000	110000	15000	Island
RMM-903+50-N2	RMM-903+50-NE17	0.0	0.4	A	10YR 3/1 very dark gray and 10YR 3/1 very dark gray loam, moist, granular, strong, friable, slightly plastic, many very fine roots	ML/CL	19.4	110	3300	1200	1100	1300	7000	1100	Low Surface
RMM-903+50-N2	RMM-903+50-NE17	0.4	1.0	AC	10YR 3/2 very dark grayish brown fine sandy loam, moist, granular, weak, very friable, slightly plastic, very few very fine roots	SM	15	40	1900	810	770	1100	4600	700	Low Surface
RMM-903+50-N2	RMM-903+50-NE17	1.0	2.0	AC	10YR 3/2 very dark grayish brown fine sandy loam, moist, granular, weak, very friable, slightly plastic, very few very fine roots	SM	15.3	18	9900	4600	3600	4000	22000	2900	Low Surface
RMM-909+50-C2	RMM-909+50-IC118	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	28.6	<4	3100	250	340	140	3800	480	In-Channel
RMM-913+50-C2	RMM-913+50-IC104	0.0	0.5	1	2.5Y 6/3 light yellowish brown sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	10.1	11	54000	24000	19000	15000	110000	15000	In-Channel
RMM-913+50-C2	RMM-913+50-IC104	0.0	0.5	1	2.5Y 6/3 light yellowish brown sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	9.3	6	260	55	59	45	430	67	In-Channel
RMM-918+50-C2	RMM-918+50-IC91	0.0	0.5	1	2.5Y 5/3 light olive brown and 2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SW	9.3	<4	68	23	18	17	130	18	In-Channel
RMM-918+50-C2	RMM-918+50-IC91	0.0	0.5	1	2.5Y 5/3 light olive brown and 2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments	SW	8.8	<4	33	12	11	20	76	12	In-Channel
RMM-918+50-C2	RMM-918+50-IC91	1.0	2.1	1	2.5Y 5/3 light olive brown and 2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	17.8	<4	210	58	70	1300	1700	200	Atypical
RMM-926+00-S1	RMM-926+00-SW13	4.2	5.8	C3	10YR 4/1 dark gray sandy loam, common fine 10YR 3/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic	SM	17.8	420	7500	3800	2900	3500	18000	3200	Atypical
RNN-935+00-S4	RNN-935+00-SW722	1.0	2.2	C2	10YR 3/1 very dark gray and 10YR 4/2 dark grayish brown clay loam, many fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	CL	22.1	<4	280	83	64	52	480	62	Geomorphic Wetland
RNN-953+50-N3	RNN-953+50-NE674	0.0	0.5	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, slightly plastic, common medium roots	ML/CL	30.2	39	1800	1100	920	1200	5000	750	Low Surface
RNN-953+50-N3	RNN-953+50-NE674	0.0	0.5	A	10YR 3/1 very dark gray loam, moist, granular, moderate, friable, slightly plastic, common medium roots	ML/CL	28.6	42	1700	1100	910	1200	5000	750	Low Surface
RNN-953+50-N4	RNN-953+50-NE872	0.0	0.5	A	2.5Y 3/2 very dark grayish brown loam, dry, granular, moderate, soft, slightly plastic, common fine roots	ML/CL	21.8	<4	230	110	83	110	530	70	Intermediate Surface
RNN-954+50-S1	RNN-954+50-SW7	0.5	1.0	C1	10YR 4/3 brown sand, moist, single grain, loose, non-plastic, few medium roots	SP	7.3	100	13000	3800	4300	3500	25000	3600	Natural Levee (Post-Industrial Levee)

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RNN-954+50-S1	RNN-954+50-SW7	1.0	2.5	C1	10YR 4/3 brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	8.2	55	21000	9500	8900	8200	47000	6500	Natural Levee (Post-Industrial Levee)
RNN-954+50-S1	RNN-954+50-SW7	2.5	4.1	C1	10YR 4/3 brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	9	17	51000	22000	21000	15000	110000	15000	Natural Levee (Post-Industrial Levee)
RNN-954+50-S1	RNN-954+50-SW7	2.5	4.1	C1	10YR 4/3 brown sand, moist, single grain, loose, non-plastic, few fine roots	SP	7.9	15	42000	20000	19000	14000	95000	13000	Natural Levee (Post-Industrial Levee)
RNN-954+50-S1	RNN-954+50-SW7	4.1	6.1	C2	10YR 3/3 dark brown sandy loam, moist, subangular blocky, moderate, friable, slightly plastic, very few fine roots	SM	12.4	11	40000	20000	18000	16000	94000	13000	Natural Levee (Post-Industrial Levee)
RNN-954+50-S1	RNN-954+50-SW7	4.1	6.1	C2	10YR 3/3 dark brown sandy loam, moist, subangular blocky, moderate, friable, slightly plastic, very few fine roots	SM	13.3	13	47000	21000	18000	17000	100000	14000	Natural Levee (Post-Industrial Levee)
RNN-954+50-S2	RNN-954+50-SW74	0.0	0.5	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, very friable, slightly plastic, very few fine roots	SM	13.3	<4	1000	450	350	400	2200	290	Historic Natural Levee (Pre-Industrial Levee)
RNN-954+50-S2	RNN-954+50-SW74	0.5	1.0	C1	10YR 3/4 dark yellowish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic, very few fine roots	SM	11.7	<4	440	190	160	180	960	130	Historic Natural Levee (Pre-Industrial Levee)
RNN-957+00-C4	RNN-957+00-IC263	1.0	1.7	2	2.5Y 5/1 gray fine sand, wet, single grain, loose, non-plastic, shell fragments	SP	20.8	31	600	200	190	220	1200	230	Atypical
RNN-962+50-N4	RNN-962+50-NE1173	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, strong, friable, moderately plastic, few very fine roots	ML/CL	27.5	12	990	410	380	470	2300	330	Low Surface
RNN-962+50-N4	RNN-962+50-NE1173	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, strong, friable, moderately plastic, few very fine roots	ML/CL	26.7	12	790	380	320	410	1900	280	Low Surface
RNN-962+50-N4	RNN-962+50-NE1173	0.5	1.0	C1	2.5Y 4/2 dark grayish brown clay loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, firm, moderately plastic, shell fragments	CL	21.8	<4	930	350	270	310	1900	240	Low Surface
RNN-962+50-S4	RNN-962+50-SW277	0.5	1.0	Bw	10YR 3/4 dark yellowish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, very few very fine roots	ML/CL	13.1	9	120	82	75	98	380	72	Atypical
ROO-971+00-S1	ROO-971+00-SW51	0.5	1.0	AC	10YR 4/2 dark grayish brown fine sandy loam, moist, subangular blocky, weak, very friable, slightly plastic, very few very fine roots	SM	9.54	44	24000	7000	5700	6100	43000	5500	Low Surface
ROO-971+00-S1	ROO-971+00-SW51	1.0	1.6	AC	10YR 4/2 dark grayish brown fine sandy loam, moist, subangular blocky, weak, very friable, slightly plastic, very few very fine roots	SM	11.4	<7	21000	8200	6000	5800	41000	5200	Low Surface
ROO-971+00-S3	ROO-971+00-SW315	1.0	2.9	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, moderate, friable, slightly plastic, few fine roots	SM	21.6	160	2500	1800	1400	1700	7600	1300	Atypical
ROO-971+00-S3	ROO-971+00-SW315	2.9	3.3	C2	10YR 3/2 very dark grayish brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic, very few very coarse roots	CL	36.2	28	2000	1800	1300	2700	7800	1100	Atypical
ROO-974+50-C2	ROO-974+50-IC128	1.8	4.0	2	2.5Y 5/2 grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	10.3	5	24000	5700	6100	3100	39000	5200	In-Channel
ROO-976+00-S3	ROO-976+00-SW238	0.5	1.0	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, moderate, friable, slightly plastic, common fine roots	SM	16.2	110	9400	4400	4700	5800	24000	3600	Low Surface

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
ROO-976+00-S3	ROO-976+00-SW238	1.0	2.8	C1	10YR 4/2 dark grayish brown and 10YR 6/3 pale brown loamy sand, moist, subangular blocky, weak, very friable, non-plastic, very few very fine roots	SP	11	29	27000	11000	10000	9400	58000	7800	Low Surface
ROO-976+00-S3	ROO-976+00-SW238	2.8	4.0	C2	10YR 4/2 dark grayish brown sandy loam, common fine 10YR 3/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic	SM	14.4	5	15000	8500	7700	6700	37000	5200	Low Surface
ROO-976+00-S3	ROO-976+00-SW238	2.8	4.0	C2	10YR 4/2 dark grayish brown sandy loam, common fine 10YR 3/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic	SM	15.6	<4	13000	7700	6400	5700	32000	4400	Low Surface
ROO-976+00-S4	ROO-976+00-SW385	2.1	3.3	C2	10YR 2/1 black silt loam, wet, massive, very friable, slightly plastic	ML	35.9	730	1800	2000	1200	2600	8300	2500	Atypical
ROO-976+00-S4	ROO-976+00-SW385	3.3	4.4	C2	10YR 2/1 black silt loam, wet, massive, very friable, slightly plastic	ML	41.8	450	4800	1800	2300	2500	12000	2600	Atypical
ROO-976+00-S6	ROO-976+00-SW581	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, weak, very friable, slightly plastic, very few very fine roots	ML/CL	18	<33	<40	<33	<34	<57	<197	<29	Intermediate Surface
RPP-1000+00-C2	RPP-1000+00-IC130	4.3	5.5	4	2.5Y 3/1 very dark gray silt loam, wet, massive, friable, slightly plastic, shell fragments, plant fragments	ML	35.3	<11	6	4	5	6	<27	<10	In-Channel
RPP-1000+00-C3	RPP-1000+00-IC178	0.5	1.0	1	2.5Y 3/2 very dark grayish brown fine sand, wet, single grain, loose, non-plastic, wood material	SP	31	16	2200	650	1200	2700	6800	990	Atypical
RPP-1001+50-S4	RPP-1001+50-SW1377	3.0	3.3	C3	10YR 2/1 black loam, moist, subangular blocky, weak, friable, slightly plastic	ML	61.9	<25	<25	<25	<25	<45	<145	<21	Tributary
RPP-1008+00-S2	RPP-1008+00-SW44	1.0	2.1	C1	2.5Y 3/2 very dark grayish brown silt loam, moist, subangular blocky, moderate, friable, slightly plastic	ML	37.1	310	4500	1400	1200	1500	9000	1800	Atypical
RPP-1008+00-S2	RPP-1008+00-SW44	2.1	3.9	C2	2.5Y 2.5/1 black silt loam, moist, massive, friable, slightly plastic	ML	43.5	360	2500	700	660	670	4800	1400	Atypical
RPP-1008+00-S4	RPP-1008+00-SW947	0.0	0.5	C1	2.5Y 3/2 very dark grayish brown silt loam, moist, subangular blocky, weak, friable, slightly plastic	ML	15.4	70	1100	350	260	320	2100	410	Atypical
RPP-1008+00-S4	RPP-1008+00-SW947	0.5	1.0	C1	2.5Y 3/2 very dark grayish brown silt loam, moist, subangular blocky, weak, friable, slightly plastic	ML	16.6	12	540	170	150	170	1000	160	Low Surface
RPP-1013+50-N4	RPP-1013+50-NE1046	0.0	0.5	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic		13.6	<4	44	12	15	29	100	16	Upland
RPP-1013+50-N4	RPP-1013+50-NE1046	0.5	1.0	C2	10YR 4/2 dark grayish brown sand, 15<35% rounded gravel, moist, single grain, loose, non-plastic		7.53	<4	31	10	11	10	62	11	Upland
RPP-1013+50-N4	RPP-1013+50-NE1046	1.0	1.7	C2	10YR 4/2 dark grayish brown sand, 15<35% rounded gravel, moist, single grain, loose, non-plastic		10	<4	97	32	30	29	190	27	Upland
RPP-1013+50-N4	RPP-1013+50-NE1046	1.7	3.3	C3	10YR 3/2 very dark grayish brown sandy clay loam, moist, subangular blocky, moderate, firm, slightly plastic		11.7	<4	4100	850	860	590	6400	830	Upland
RPP-1013+50-S1	RPP-1013+50-SW51	0.0	0.5	A	10YR 3/1 very dark gray very fine sandy loam, dry, granular, weak, soft, slightly plastic	SM	12.5	<44	1600	730	670	550	3500	500	Low Surface
RPP-1013+50-S1	RPP-1013+50-SW51	0.0	0.5	A	10YR 3/1 very dark gray very fine sandy loam, dry, granular, weak, soft, slightly plastic	SM	12.6	8	1100	510	470	400	2500	360	Low Surface
RPP-1013+50-S1	RPP-1013+50-SW51	1.8	3.2	C1	10YR 3/2 very dark grayish brown very fine sandy loam, dry, subangular blocky, weak, soft, slightly plastic, very few fine roots	SM	8.3	120	5600	2100	2300	1800	12000	1900	Low Surface
RPP-1013+50-S1	RPP-1013+50-SW51	5.2	6.2	C3	10YR 3/1 very dark gray very fine sandy loam, common medium 7.5YR 3/3 dark brown mottle, dry, subangular blocky, weak, soft, slightly plastic, few fine roots	SM	25.2	180	2900	980	1100	1100	6300	1200	Atypical
RPP-1013+50-S1	RPP-1013+50-SW51	6.2	6.7	C4	10YR 3/1 very dark gray silt loam, few fine 7.5YR 3/4 dark brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	ML	29.4	120	2500	1800	2000	3100	9500	1600	Low Surface

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RPP-1013+50-S1	RPP-1013+50-SW51	6.2	6.7	C4	10YR 3/1 very dark gray silt loam, few fine 7.5YR 3/4 dark brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few very fine roots	ML	28.4	70	1500	550	1100	1700	4900	890	Low Surface
RPP-1013+50-S4	RPP-1013+50-SW458	0.0	0.5	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, firm, slightly plastic		11.2	<11	330	140	130	120	730	100	Intermediate Surface
RPP-1013+50-S4	RPP-1013+50-SW458	0.5	1.0	C2	10YR 4/3 brown sandy loam, <15% subangular gravel, moist, subangular blocky, weak, firm, slightly plastic		9.7	15	150	52	44	39	300	70	Atypical
RPP-1013+50-S4	RPP-1013+50-SW458	1.0	1.5	C2	10YR 4/3 brown sandy loam, <15% subangular gravel, moist, subangular blocky, weak, firm, slightly plastic		6.3	<130	150	42	43	31	270	110	Intermediate Surface
RPP-989+50-C4	RPP-989+50-IC284	0.0	0.5	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, wood material (black)	SP	5.6	<4	50	8	10	16	84	13	In-Channel
RPP-989+50-C4	RPP-989+50-IC284	3.0	3.7	3	10YR 2/1 black , wet, wood material (black)		12.5	10	3700	1700	1400	1100	8000	1100	In-Channel
RPP-989+50-C4	RPP-989+50-IC284	5.8	8.0	4	2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	13.5	4	460	200	240	160	1100	160	In-Channel
RPP-993+00-S3	RPP-993+00-SW19	0.0	0.5	C1	10YR 3/3 dark brown fine sand, moist, single grain, loose, non-plastic, very few very fine roots	SP	9.8	4	1600	430	430	420	2900	380	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	0.5	1.0	C1	10YR 3/3 dark brown fine sand, moist, single grain, loose, non-plastic, very few very fine roots	SP	6.3	10	2400	510	570	520	4000	550	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	1.0	1.6	C1	10YR 3/3 dark brown fine sand, moist, single grain, loose, non-plastic, very few very fine roots	SP	4.9	44	2000	880	840	1000	4700	730	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	1.6	3.1	C2	2.5Y 6/3 light yellowish brown and 10YR 3/3 dark brown fine sand, moist, single grain, loose, non-plastic	SP	6.6	14	5800	2300	2200	2500	13000	1800	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	3.1	4.7	C2	2.5Y 6/3 light yellowish brown and 10YR 3/3 dark brown fine sand, moist, single grain, loose, non-plastic	SP	5.6	5	14000	6800	5500	5600	32000	4200	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	4.7	6.2	C3	2.5Y 6/3 light yellowish brown and 2.5Y 4/3 olive brown fine sand, few fine 10YR 4/6 dark yellowish brown mottle, dry, single grain, loose, non-plastic, very few very fine roots, wood material (black)	SP	11.4	8	41000	15000	13000	11000	81000	11000	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	6.2	7.3	C4	2.5Y 6/3 light yellowish brown and 2.5Y 4/2 dark grayish brown loamy fine sand, common fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, very friable, non-plastic, very few very fine roots	SM	12.4	<4	3800	1900	1700	1300	8600	1200	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	7.3	9.4	C5	2.5Y 4/1 dark gray loamy fine sand, common fine 10YR 3/4 dark yellowish brown mottle, moist, subangular blocky, weak, very friable, non-plastic, wood material (black)	SM	22.4	<4	14000	4200	3900	2800	24000	3200	Natural Levee (Post-Industrial Levee)
RPP-993+00-S3	RPP-993+00-SW19	7.3	9.4	C5	2.5Y 4/1 dark gray loamy fine sand, common fine 10YR 3/4 dark yellowish brown mottle, moist, subangular blocky, weak, very friable, non-plastic, wood material (black)	SM	21.6	<4	2500	1400	1100	1500	6500	850	Natural Levee (Post-Industrial Levee)
RPP-996+50-S3	RPP-996+50-SW139	0.0	0.5	C1	10YR 4/2 dark grayish brown loam, common fine 10YR 4/4 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, plant fragments	ML	33.5	14	7300	2600	2300	1900	14000	1900	Geomorphic Wetland
RPP-996+50-S3	RPP-996+50-SW139	0.5	1.0	C2	10YR 2/1 black and 10YR 4/2 dark grayish brown sandy loam, wet, massive, friable, slightly plastic	SM	30	41	7100	2500	2100	1800	14000	1800	Geomorphic Wetland

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RPP-996+50-S3	RPP-996+50-SW139	1.0	2.0	C2	10YR 2/1 black and 10YR 4/2 dark grayish brown sandy loam, wet, massive, friable, slightly plastic	SM	32.7	45	7400	2900	2300	1800	14000	2000	Geomorphic Wetland
RPP-996+50-S3	RPP-996+50-SW139	2.0	2.2	C3	2.5Y 3/1 very dark gray sandy loam, wet, massive, friable, slightly plastic	SM	20.2	<4	1100	530	420	410	2400	320	Geomorphic Wetland
RPP-996+50-S3	RPP-996+50-SW139	2.2	3.0	C4	10YR 2/1 black sand, wet, single grain, loose, non-plastic	SW	17.5	6	750	300	260	270	1600	220	Geomorphic Wetland
RPP-996+50-S3	RPP-996+50-SW139	3.0	3.3	C5	2.5Y 3/2 very dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	7.61	<4	25	11	9	12	56	<10	Geomorphic Wetland
RPP-996+50-S3	RPP-996+50-SW139	3.3	3.7	2C6	2.5Y 2.5/1 black and 2.5Y 3/1 very dark gray silt loam, wet, massive, friable, slightly plastic	ML	27.8	40	5900	2100	2200	1600	12000	1700	Geomorphic Wetland
RPP-997+00-N1	RPP-997+00-NE51	0.0	0.5	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, friable, non-plastic	SM	18.4	8	4100	1600	1200	1100	8000	1000	Low Surface
RPP-997+00-N1	RPP-997+00-NE51	0.5	1.0	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, friable, non-plastic	SM	16.3	12	1600	600	500	550	3300	450	Low Surface
RPP-997+00-N1	RPP-997+00-NE51	1.0	1.5	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, friable, non-plastic	SM	18.5	7	6000	1700	1500	1300	10000	1300	Low Surface
RPP-997+00-N1	RPP-997+00-NE51	1.5	2.8	Bw1	10YR 3/3 dark brown silt loam, moist, subangular blocky, weak, friable, slightly plastic	ML	18.5	<4	240	85	70	77	470	63	Low Surface
RPP-997+00-N1	RPP-997+00-NE51	1.5	2.8	Bw1	10YR 3/3 dark brown silt loam, moist, subangular blocky, weak, friable, slightly plastic	ML	18.5	<4	320	110	80	90	590	77	Low Surface
RQQ-1017+00-C2	RQQ-1017+00-IC113	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	21.5	<4	2100	1300	900	950	5200	680	In-Channel
RQQ-1017+00-C2	RQQ-1017+00-IC113	0.0	0.5	1	2.5Y 4/2 dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	18.6	<4	670	310	350	4500	5800	690	Atypical
RQQ-1019+00-N3	RQQ-1019+00-NE144	0.0	0.5	C1	10YR 5/2 grayish brown and 10YR 5/3 brown clay, 15<35% angular gravel, moist, massive, very firm, very plastic, few fine roots		17.8	29	80	<28	<24	31	140	81	Atypical
RQQ-1019+00-N3	RQQ-1019+00-NE144	0.5	1.0	C1	10YR 5/2 grayish brown and 10YR 5/3 brown clay, 15<35% angular gravel, moist, massive, very firm, very plastic, few fine roots		12.8	23	120	41	35	39	250	80	Atypical
RQQ-1023+00-C1	RQQ-1023+00-IC44	0.5	1.0	2	10YR 2/1 black , <15% subrounded gravel, wet, wood material (black), shell fragments		35.5	81	49000	17000	18000	9700	94000	13000	In-Channel
RQQ-1023+50-C1	RQQ-1023+50-IC43	0.0	0.5	1	2.5Y 3/2 very dark grayish brown coarse sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	26.5	7	31000	25000	17000	19000	91000	12000	In-Channel
RQQ-1023+50-C1	RQQ-1023+50-IC43	0.5	1.0	2	10YR 2/1 black , wet, wood material (black)		27.4	77	410	110	200	350	1100	320	Atypical
RQQ-1023+50-C1	RQQ-1023+50-IC43	0.5	1.0	2	10YR 2/1 black , wet, wood material (black)		25.6	72	2300	270	490	460	3600	630	Atypical
RQQ-1025+50-N5	RQQ-1025+50-NE1750	0.0	0.5	C	2.5Y 3/2 very dark grayish brown clay loam, few fine 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moderate, firm, moderately plastic, few medium roots	CL	28.3	27	970	460	430	560	2500	390	Low Surface
RQQ-1025+50-N5	RQQ-1025+50-NE1750	0.0	0.5	C	2.5Y 3/2 very dark grayish brown clay loam, few fine 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moderate, firm, moderately plastic, few medium roots	CL	28.3	24	1000	510	450	620	2600	400	Low Surface
RQQ-1027+50-S4	RQQ-1027+50-SW1620	0.0	0.5	A	10YR 2/2 very dark brown fine sandy loam, moist, granular, weak, very friable, slightly plastic, common fine roots	SM	18.9	<19	150	56	48	48	300	49	Upland

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RQQ-1027+50-S4	RQQ-1027+50-SW1620	0.0	0.5	A	10YR 2/2 very dark brown fine sandy loam, moist, granular, weak, very friable, slightly plastic, common fine roots	SM	22	<45	140	58	52	<74	250	63	Upland
RQQ-1030+00-C1	RQQ-1030+00-IC47	0.5	1.0	2	2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	3.7	<4	110	28	60	200	400	57	Atypical
RRR-1032+50-C2	RRR-1032+50-IC96	0.5	1.0	1	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	13.9	<4	71	32	21	34	160	22	In-Channel
RRR-1032+50-C2	RRR-1032+50-IC96	0.5	1.0	1	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	15.2	<4	320	34	200	300	850	140	In-Channel
RRR-1034+00-S1	RRR-1034+00-SW41	0.0	1.0	A	10YR 3/1 very dark gray loam, moist, granular, weak, friable, slightly plastic, few very fine roots	ML/CL	19.6	42	1000	470	460	790	2800	460	Atypical
RRR-1036+00-C2	RRR-1036+00-IC107	0.5	1.0	1	2.5Y 3/2 very dark grayish brown sand, 15<35% rounded gravel, wet, single grain, loose, non-plastic	SW	12.9	<4	480	64	85	34	670	89	In-Channel
RRR-1040+50-N1	RRR-1040+50-NE21	0.0	0.5	C1	10YR 6/3 pale brown fine sand, moist, single grain, loose, non-plastic, few fine roots, shell fragments	SP	2.3	<4	<4	<4	<4	<7	<23	<10	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	0.5	1.0	C1	10YR 6/3 pale brown fine sand, moist, single grain, loose, non-plastic, few fine roots, shell fragments	SP	3.2	<4	10	<4	<4	<6	<22	<10	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	1.0	2.2	C2	10YR 4/2 dark grayish brown fine sand, dry, single grain, loose, non-plastic, few fine roots, shell fragments	SP	4.9	45	14000	4400	4800	3600	27000	3800	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	2.2	3.4	C3	10YR 6/2 light brownish gray fine sand, dry, single grain, loose, non-plastic, very few very fine roots, shell fragments	SP	3.1	59	25000	15000	13000	12000	65000	8800	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	3.4	5.6	C4	10YR 6/3 pale brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots, shell fragments	SP	3	<57	42000	15000	15000	11000	82000	11000	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	3.4	5.6	C4	10YR 6/3 pale brown fine sand, dry, single grain, loose, non-plastic, very few very fine roots, shell fragments	SP	3.2	<33	34000	12000	13000	10000	69000	9400	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	5.6	7.4	C5	10YR 6/3 pale brown and 10YR 4/3 brown fine sand, few medium 10YR 3/6 dark yellowish brown mottle, dry, single grain, loose, non-plastic, few fine roots	SP	5.9	<46	15000	4600	5000	3700	28000	3900	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	7.4	8.2	C6	10YR 4/2 dark grayish brown and 10YR 6/3 pale brown fine sand, common fine 10YR 3/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, few fine roots, wood material	SP	16.3	<4	<4	<4	<4	<6	<22	<10	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N1	RRR-1040+50-NE21	10.2	11.7	3C9	2.5Y 3/2 very dark grayish brown fine sand, wet, single grain, loose, non-plastic, shell fragments, wood material, wood material (black)	SP	19.5	<4	28	9	8	8	52	<10	Natural Levee (Post-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	0.0	0.5	A	10YR 3/1 very dark gray sandy loam, dry, granular, weak, soft, slightly plastic, very few fine roots	SC	9.6	<26	4400	2000	2000	1900	10000	1400	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	0.5	1.0	C1	10YR 3/2 very dark grayish brown loamy fine sand, dry, single grain, loose, non-plastic	SM	9.1	11	6800	2900	2700	2500	15000	2000	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	1.0	1.4	C1	10YR 3/2 very dark grayish brown loamy fine sand, dry, single grain, loose, non-plastic	SM	7.5	<32	2000	910	890	880	4600	660	Historic Natural Levee (Pre-Industrial Levee)

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RRR-1040+50-N2	RRR-1040+50-NE63	1.4	2.2	C2	7.5YR 4/3 brown loamy fine sand, dry, single grain, loose, non-plastic	SW	5.2	5	1500	610	580	590	3300	450	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	2.2	3.1	Ab	10YR 2/1 black loamy fine sand, dry, granular, weak, soft, non-plastic, few very fine roots	SM	6.9	10	17000	6900	6300	5300	36000	4800	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	3.1	4.6	C3	7.5YR 4/3 brown loamy very fine sand, dry, single grain, loose, non-plastic	SM	8.9	<4	1700	710	650	580	3700	500	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	3.1	4.6	C3	7.5YR 4/3 brown loamy very fine sand, dry, single grain, loose, non-plastic	SM	9.2	<4	2200	890	810	710	4600	620	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	3.1	4.6	C3	7.5YR 4/3 brown loamy very fine sand, dry, single grain, loose, non-plastic	SM	9.8	<4	2100	840	780	690	4400	590	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	4.6	6.2	C3	7.5YR 4/3 brown loamy very fine sand, dry, single grain, loose, non-plastic	SM	7.5	<4	1100	360	350	250	2000	280	Historic Natural Levee (Pre-Industrial Levee)
RRR-1040+50-N2	RRR-1040+50-NE63	6.2	6.6	C4	10YR 4/3 brown very fine sand, dry, single grain, loose, non-plastic, shell fragments	SP	5.2	<4	4	<4	<4	<4	<20	<10	Historic Natural Levee (Pre-Industrial Levee)
RRR-1041+50-C1	RRR-1041+50-IC26	0.0	0.5	1	2.5Y 6/4 light yellowish brown fine sand, wet, single grain, loose, non-plastic, shell fragments	SP	5.65	<4	45	10	11	12	78	12	In-Channel
RRR-1041+50-C1	RRR-1041+50-IC26	0.0	0.5	1	2.5Y 6/4 light yellowish brown fine sand, wet, single grain, loose, non-plastic, shell fragments	SP	5.65	19	880	130	210	140	1400	230	In-Channel
RRR-1041+50-C2	RRR-1041+50-IC99	0.5	1.0	1	2.5Y 3/2 very dark grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	20.2	<4	210	59	60	54	380	53	In-Channel
RRR-1041+50-C2	RRR-1041+50-IC99	0.5	1.0	1	2.5Y 3/2 very dark grayish brown sand, <15% rounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	23.6	9	48000	17000	16000	12000	93000	13000	In-Channel
RRR-1042+00-C1	RRR-1042+00-IC88	0.0	0.5	1	2.5Y 5/3 light olive brown sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SW	5	9	300	150	280	750	1500	230	Atypical
RSS-1055+00-C1	RSS-1055+00-IC27	1.0	1.3	1	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic	SP	11.6	<4	21	7	65	390	490	70	Atypical
RSS-1061+00-C1	RSS-1061+00-IC38	1.0	2.1	1	2.5Y 4/2 dark grayish brown and 2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, shell fragments	SP	18.4	<4	110	13	25	18	160	25	In-Channel
RSS-1061+00-C1	RSS-1061+00-IC38	1.0	2.1	1	2.5Y 4/2 dark grayish brown and 2.5Y 4/1 dark gray sand, wet, single grain, loose, non-plastic, shell fragments	SP	18.5	<4	36	52	39	870	1000	120	Atypical
RSS-1067+50-N4	RSS-1067+50-NE370	0.0	0.5	C1	10YR 4/2 dark grayish brown loam, moist, subangular blocky, strong, firm, slightly plastic		27.2	19	1800	810	710	820	4100	590	Geomorphic Wetland
RSS-1067+50-N4	RSS-1067+50-NE370	0.5	1.0	C1	10YR 4/2 dark grayish brown loam, moist, subangular blocky, strong, firm, slightly plastic		20.8	<4	650	310	260	280	1500	200	Geomorphic Wetland
RSS-1078+50-N1	RSS-1078+50-NE10	0.0	1.0	A	10YR 3/1 very dark gray loam, moist, granular, weak, friable, moderately plastic, common medium roots	ML	24.3	19	2500	1300	940	1000	5700	770	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-N1	RSS-1078+50-NE10	1.0	2.1	Bt	10YR 4/4 dark yellowish brown clay loam, moist, subangular blocky, weak, friable, moderately plastic, common medium roots	ML/CL	13.1	<4	430	200	160	170	960	130	Historic Natural Levee (Pre-Industrial Levee)

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RSS-1078+50-N1	RSS-1078+50-NE10	1.0	2.1	Bt	10YR 4/4 dark yellowish brown clay loam, moist, subangular blocky, weak, friable, moderately plastic, common medium roots	ML/CL	13.1	<4	300	150	110	120	680	88	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-N1	RSS-1078+50-NE10	2.1	4.0	C1	10YR 4/4 dark yellowish brown clay loam, dry, subangular blocky, weak, slightly hard, moderately plastic, common medium roots, shell fragments	ML/CL	12.7	<4	150	98	64	78	390	51	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-N2	RSS-1078+50-NE115	0.0	0.5	A	10YR 3/2 very dark grayish brown clay loam, moist, granular, moderate, friable, moderately plastic, common fine roots	ML/CL	28.6	65	1000	460	390	500	2400	450	Atypical
RSS-1078+50-N2	RSS-1078+50-NE115	0.5	1.0	A/C	10YR 3/3 dark brown clay loam, moist, subangular blocky, moderate, friable, moderately plastic, common fine roots	ML/CL	23.3	<4	1100	430	370	340	2200	300	Low Surface
RSS-1078+50-N3	RSS-1078+50-NE280	0.0	1.0	C1	10YR 3/2 very dark grayish brown loam, moist, massive, friable, slightly plastic	ML	58.6	10	780	210	280	350	1600	240	Tributary
RSS-1078+50-N3	RSS-1078+50-NE280	1.0	3.0	C2	10Y 3/1 dark greenish gray silt loam, wet, massive, friable, non-plastic	ML	44.1	450	1500	560	560	1200	4300	1500	Atypical
RSS-1078+50-N3	RSS-1078+50-NE280	3.0	4.4	C2	10Y 3/1 dark greenish gray silt loam, wet, massive, friable, non-plastic	ML	40.8	230	1500	620	650	1100	4100	1000	Atypical
RSS-1078+50-N4	RSS-1078+50-NE355	3.0	4.2	C1	10YR 3/2 very dark grayish brown and 10YR 4/2 dark grayish brown loam, moist, subangular blocky, weak, firm, slightly plastic	ML	14	12	130	67	57	100	370	74	Atypical
RSS-1078+50-S1	RSS-1078+50-SW22	0.0	0.5	A	10YR 2/2 very dark brown very fine sandy loam, dry, granular, weak, soft, slightly plastic, common fine roots	SM	13.4	6	1200	370	390	350	2400	330	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	0.0	0.5	A	10YR 2/2 very dark brown very fine sandy loam, dry, granular, weak, soft, slightly plastic, common fine roots	SM	13.3	5	2300	1600	1100	1500	6400	820	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	0.5	1.0	AC	10YR 4/2 dark grayish brown loamy very fine sand, dry, subangular blocky, weak, soft, non-plastic, very few fine roots	SW	11	6	1600	640	570	540	3400	460	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	1.0	1.2	AC	10YR 4/2 dark grayish brown loamy very fine sand, dry, subangular blocky, weak, soft, non-plastic, very few fine roots	SW	6.6	10	2700	870	840	680	5100	700	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	1.2	2.0	C1	10YR 5/3 brown fine sand, moist, single grain, loose, non-plastic, very few very fine roots	SP	4.1	7	800	310	280	260	1700	230	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	2.0	2.7	C2	10YR 3/2 very dark grayish brown loamy very fine sand, dry, subangular blocky, weak, soft, non-plastic, very few very fine roots	SM	9.6	76	3700	1500	1300	1400	8000	1200	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	2.7	4.0	Ab	10YR 3/2 very dark grayish brown very fine sandy loam, dry, granular, weak, soft, slightly plastic, very few medium roots	SM	13.8	140	4500	1900	1800	2900	11000	1700	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	4.0	5.8	C3	10YR 5/2 grayish brown and 10YR 4/3 brown loamy very fine sand, dry, single grain, loose, non-plastic	SW	9.7	17	31000	14000	13000	10000	68000	9200	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	5.8	6.3	C4	10YR 3/1 very dark gray very fine sandy loam, dry, subangular blocky, weak, soft, slightly plastic	SM	15.3	<5	2900	1500	1300	2600	8300	1100	Atypical
RSS-1078+50-S1	RSS-1078+50-SW22	6.3	6.8	2C5	10YR 2/1 black , moist, wood material (black)		32.6	25	140000	47000	43000	25000	250000	34000	Natural Levee (Post-Industrial Levee)

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RSS-1078+50-S1	RSS-1078+50-SW22	6.8	7.1	3C6	10YR 4/1 dark gray very fine sandy loam, common medium 7.5YR 3/4 dark brown mottle, dry, subangular blocky, moderate, slightly hard, slightly plastic, very few very fine roots, shell fragments	SM	22.7	14	3100	1300	1700	3500	9600	1400	Atypical
RSS-1078+50-S1	RSS-1078+50-SW22	7.1	7.6	3C7	10YR 4/4 dark yellowish brown coarse sand, dry, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	7.85	<4	1600	530	420	290	2800	360	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	7.6	7.9	4C8	10YR 4/2 dark grayish brown silt loam, moist, subangular blocky, moderate, friable, slightly plastic, very few fine roots, shell fragments, wood material (black)	ML	26.3	<4	2500	1300	870	2000	6600	820	Atypical
RSS-1078+50-S1	RSS-1078+50-SW22	7.9	9.3	5C9	10YR 4/4 dark yellowish brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	16.1	<4	330	89	86	79	590	79	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S1	RSS-1078+50-SW22	9.3	10.6	5C10	10YR 2/1 black coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	11.2	<4	410	94	91	57	650	87	Natural Levee (Post-Industrial Levee)
RSS-1078+50-S17	RSS-1078+50-SW5076	0.0	0.5	A	10YR 2/1 black loamy very fine sand, moist, granular, weak, friable, non-plastic, many very fine roots	SP	12.1	<4	<4	<4	<4	<5	<21	<10	Geomorphic Wetland
RSS-1078+50-S2	RSS-1078+50-SW92	0.0	0.5	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	12	11	3500	1600	1400	1300	7800	1100	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-S2	RSS-1078+50-SW92	0.5	1.0	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	10.3	14	3300	1900	1600	1800	8600	1200	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-S2	RSS-1078+50-SW92	1.0	4.0	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	9.6	13	9700	2500	2600	1800	17000	2200	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-S2	RSS-1078+50-SW92	4.0	5.5	C2	10YR 4/2 dark grayish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic	SM	12.1	<4	4	<4	<4	<5	<21	<10	Historic Natural Levee (Pre-Industrial Levee)
RSS-1078+50-S3	RSS-1078+50-SW419	0.0	0.5	A	10YR 2/1 black silt loam, dry, granular, moderate, slightly hard, slightly plastic, common fine roots	ML	18.2	21	420	190	190	240	1100	190	Atypical
RSS-1078+50-S3	RSS-1078+50-SW419	0.5	1.0	A	10YR 2/1 black silt loam, dry, granular, moderate, slightly hard, slightly plastic, common fine roots	ML	17.8	43	400	190	180	250	1100	230	Atypical
RTT-1089+00-C2	RTT-1089+00-IC154	1.0	3.0	1	2.5Y 3/2 very dark grayish brown sand, wet, single grain, loose, non-plastic	SP	20.9	<4	160	41	41	33	280	38	In-Channel
RTT-1089+00-C2	RTT-1089+00-IC154	1.0	3.0	1	2.5Y 3/2 very dark grayish brown sand, wet, single grain, loose, non-plastic	SP	20.6	<4	13000	2100	2500	1200	18000	2400	In-Channel
RTT-1092+00-S1	RTT-1092+00-SW1124	0.0	0.5	AC	2.5Y 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, moderately plastic	ML	40	62	720	320	330	450	1900	380	Atypical
RTT-1092+00-S1	RTT-1092+00-SW1124	0.0	0.5	AC	2.5Y 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, moderately plastic	ML	38.9	61	790	370	360	470	2000	400	Atypical
RTT-1092+00-S1	RTT-1092+00-SW1124	0.5	1.0	AC	2.5Y 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, moderately plastic	ML	36.7	20	420	220	200	250	1100	190	Atypical
RTT-1092+00-S1	RTT-1092+00-SW1124	1.0	2.5	AC	2.5Y 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, moderately plastic	ML	28.8	<9	45	23	22	<23	89	19	Low Surface
RTT-1092+00-S1	RTT-1092+00-SW1124	1.0	2.5	AC	2.5Y 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, moderately plastic	ML	29.7	<6	64	17	18	17	120	19	Low Surface
RTT-1092+00-S1	RTT-1092+00-SW1124	2.5	3.0	C1	2.5Y 6/3 light yellowish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic	SM	29.5	<4	10	4	4	<6	<22	<10	Low Surface
RTT-1092+00-S1	RTT-1092+00-SW1124	3.0	3.3	Ab	2.5Y 3/1 very dark gray silt loam, moist, subangular blocky, weak, friable, moderately plastic	ML	33	<4	680	330	270	270	1600	210	Low Surface

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Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RTT-1107+50-N1	RTT-1107+50-NE22	0.0	1.0	A	10YR 3/2 very dark grayish brown fine sand, moist, granular, weak, very friable, non-plastic, few fine roots	SP	11.6	<15	11000	3100	2800	2100	19000	2500	Natural Levee (Post-Industrial Levee)
RTT-1107+50-N1	RTT-1107+50-NE22	1.0	2.5	C1	2.5Y 5/3 light olive brown fine sand, moist, single grain, loose, non-plastic, very few fine roots	SP	4.12	18	49000	16000	15000	12000	91000	12000	Natural Levee (Post-Industrial Levee)
RTT-1107+50-N1	RTT-1107+50-NE22	1.0	2.5	C1	2.5Y 5/3 light olive brown fine sand, moist, single grain, loose, non-plastic, very few fine roots	SP	4.12	<15	62000	16000	15000	11000	100000	14000	Natural Levee (Post-Industrial Levee)
RTT-1107+50-N1	RTT-1107+50-NE22	2.5	4.1	C2	10YR 4/3 brown sandy loam, moist, subangular blocky, moderate, friable, slightly plastic, very few fine roots	SM	10.9	<4	1900	910	720	730	4300	560	Natural Levee (Post-Industrial Levee)
RTT-1107+50-N1	RTT-1107+50-NE22	4.1	5.8	C2	10YR 4/3 brown sandy loam, moist, subangular blocky, moderate, friable, slightly plastic, very few fine roots	SM	7.62	<4	<4	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RTT-1107+50-N3	RTT-1107+50-NE308	0.0	0.5	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, few fine roots, shell fragments	ML	35	45	4600	1500	1500	1400	8900	1300	Geomorphic Wetland
RTT-1107+50-N3	RTT-1107+50-NE308	0.5	1.0	Bt1	2.5Y 3/2 very dark grayish brown clay loam, common fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, strong, firm, moderately plastic	CL	21.8	18	8200	2900	2500	2400	16000	2100	Geomorphic Wetland
RTT-1107+50-N3	RTT-1107+50-NE308	1.0	2.8	Bt1	2.5Y 3/2 very dark grayish brown clay loam, common fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, strong, firm, moderately plastic	CL	19	<4	3300	1500	1100	1200	7100	910	Geomorphic Wetland
RTT-1107+50-N3	RTT-1107+50-NE308	2.8	3.9	Bt2	2.5Y 4/1 dark gray clay loam, common medium 10YR 3/6 dark yellowish brown mottle, moist, subangular blocky, strong, firm, moderately plastic, shell fragments	CL	22.2	<4	410	96	110	57	670	93	Geomorphic Wetland
RTT-1107+50-N3	RTT-1107+50-NE308	5.2	5.8	2Ab	10YR 4/1 dark gray clay loam, moist, subangular blocky, moderate, firm, moderately plastic	CL	12.8	<4	740	340	270	270	1600	210	Geomorphic Wetland
RTT-1107+50-S2	RTT-1107+50-SW46	0.0	0.5	C1	10YR 3/3 dark brown loamy sand, moist, subangular blocky, weak, friable, non-plastic, few fine roots	SP	13.6	9	3300	870	1000	640	5800	820	Bankfull Bench
RTT-1107+50-S2	RTT-1107+50-SW46	0.5	1.0	C1	10YR 3/3 dark brown loamy sand, moist, subangular blocky, weak, friable, non-plastic, few fine roots	SP	12.8	11	2100	1300	960	1100	5500	740	Bankfull Bench
RTT-1107+50-S2	RTT-1107+50-SW46	1.0	2.3	C2	10YR 3/3 dark brown sandy loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, non-plastic, few fine roots	SM	15.7	200	5000	1600	1800	1800	10000	1800	Atypical
RTT-1107+50-S2	RTT-1107+50-SW46	2.3	4.3	C3	10YR 3/2 very dark grayish brown loam, few fine 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, slightly plastic, few fine roots, wood material (black)	ML	21.3	41	3100	1500	1800	3100	9500	1400	Atypical
RTT-1107+50-S2	RTT-1107+50-SW46	4.3	6.0	C3	10YR 3/2 very dark grayish brown loam, few fine 7.5YR 4/6 strong brown mottle, wet, subangular blocky, weak, friable, slightly plastic, few fine roots, wood material (black), shell fragments	ML	19.2	<4	3800	1800	1500	2300	9300	1200	Bankfull Bench
RTT-1107+50-S2	RTT-1107+50-SW46	6.0	6.6	C4	10YR 4/1 dark gray silt loam, wet, massive, weak, friable, slightly plastic, wood material (black)	ML	34	<4	57	29	24	20	130	20	Bankfull Bench
RTT-1107+50-S3	RTT-1107+50-SW99	0.0	0.5	A	10YR 2/2 very dark brown loam, moist, granular, weak, friable, slightly plastic	ML	25.3	10	2600	1600	1400	1400	6900	950	Historic Natural Levee (Pre-Industrial Levee)
RTT-1107+50-S3	RTT-1107+50-SW99	0.5	1.0	A	10YR 2/2 very dark brown loam, moist, granular, weak, friable, slightly plastic	ML	16.9	<4	1600	1100	850	850	4400	590	Historic Natural Levee (Pre-Industrial Levee)

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Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RTT-1107+50-S3	RTT-1107+50-SW99	1.0	2.6	A	10YR 2/2 very dark brown loam, moist, granular, weak, friable, slightly plastic	ML	14.6	<4	110	57	55	54	280	41	Historic Natural Levee (Pre-Industrial Levee)
RTT-1107+50-S3	RTT-1107+50-SW99	2.6	4.4	C1	10YR 4/4 dark yellowish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic	SM	15.5	<4	13	8	7	9	38	<10	Historic Natural Levee (Pre-Industrial Levee)
RTT-1107+50-S4	RTT-1107+50-SW775	0.0	0.5	C	10YR 3/1 very dark gray silty clay loam, moist, subangular blocky, moderate, firm, moderately plastic		25.3	15	400	170	160	190	930	150	Low Surface
RTT-1108+00-N1	RTT-1108+00-NE24	0.0	0.4	C1	10YR 2/2 very dark brown fine sand, dry, single grain, structureless, loose, non-plastic, few very fine roots	SP	5.81	7	8600	3400	3000	2800	18000	2400	Natural Levee (Post-Industrial Levee)
RTT-1108+00-N1	RTT-1108+00-NE24	0.4	1.0	C2	10YR 4/2 dark grayish brown and 10YR 3/3 dark brown fine sand, dry, single grain, structureless, loose, non-plastic, very few very fine roots	SP	3.57	4	13000	4400	3900	3300	24000	3200	Natural Levee (Post-Industrial Levee)
RTT-1108+00-N3	RTT-1108+00-NE321	0.0	0.7	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, very few very fine roots	ML/CL	38.1	32	5400	2700	2100	2200	13000	1700	Geomorphic Wetland
RTT-1115+50-S7	RTT-1115+50-SW568	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML	27.8	9	150	89	79	110	440	77	Atypical
RTT-1115+50-S8	RTT-1115+50-SW1100	0.0	0.5	A	10YR 2/2 very dark brown loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML	30.2	57	750	410	380	540	2100	410	Atypical
RUU-1124+50-N4	RUU-1124+50-NE316	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, few fine roots	ML	15	10	19000	9000	7600	6500	42000	5700	Low Surface
RUU-1124+50-N4	RUU-1124+50-NE316	0.5	1.0	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, weak, friable, slightly plastic, very few fine roots	ML/CL	12.6	8	23000	8900	7900	6100	45000	6100	Low Surface
RUU-1128+50-C3	RUU-1128+50-IC234	0.0	0.5	1	2.5Y 3/1 very dark gray sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black), plant fragments	SP	28	10	21000	5900	6500	3500	37000	5000	In-Channel
RUU-1131+00-N3	RUU-1131+00-NE1446	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, weak, friable, slightly plastic, many fine roots	ML	20.2	<4	340	240	190	230	990	130	Geomorphic Wetland
RUU-1131+00-S7	RUU-1131+00-SW588	0.0	0.5	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, few very fine roots	SM	26.3	27	290	170	150	250	880	170	Atypical
RUU-1133+50-C2	RUU-1133+50-IC188	0.0	0.5	1	2.5Y 3/1 very dark gray and 2.5Y 4/2 dark grayish brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	20.4	15	100000	64000	51000	43000	260000	35000	In-Channel
RUU-1133+50-C2	RUU-1133+50-IC188	1.0	2.1	1	2.5Y 3/1 very dark gray and 2.5Y 4/2 dark grayish brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	14.2	<4	30	11	8	6	55	<10	In-Channel
RUU-1133+50-C2	RUU-1133+50-IC188	1.0	2.1	1	2.5Y 3/1 very dark gray and 2.5Y 4/2 dark grayish brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	12.6	10	43000	21000	18000	13000	95000	13000	In-Channel
RUU-1141+50-C4	RUU-1141+50-IC259	0.0	0.5	1	2.5Y 3/2 very dark grayish brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	29.2	20	240	49	74	110	500	110	Atypical
RUU-1141+50-C5	RUU-1141+50-IC317	0.0	0.5	1	2.5Y 3/2 very dark grayish brown coarse sand, 15<35% subrounded gravel, wet, single grain, loose, non-plastic	SW	35.4	7	44000	20000	16000	15000	95000	12000	In-Channel

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RVV-1147+50-C3	RVV-1147+50-IC267	0.5	1.0	1	2.5Y 2.5/1 black loamy fine sand, wet, single grain, loose, non-plastic, few coarse roots	SW	16	12	140	43	46	81	320	67	Atypical
RVV-1147+50-C3	RVV-1147+50-IC267	0.5	1.0	1	2.5Y 2.5/1 black loamy fine sand, wet, single grain, loose, non-plastic, few coarse roots	SW	16	5	68	22	23	35	150	31	In-Channel
RVV-1147+50-C3	RVV-1147+50-IC267	3.7	5.3	4	2.5Y 3/1 very dark gray and 2.5Y 4/3 olive brown silt loam, wet, subangular blocky, moderate, friable, slightly plastic, shell fragments	ML	43.2	<8	500	41	67	22	630	85	In-Channel
RVV-1149+00-N4	RVV-1149+00-NE248	0.0	0.5	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML/CL	31.1	15	1000	590	480	690	2800	400	Low Surface
RVV-1149+00-N4	RVV-1149+00-NE248	0.5	1.0	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML/CL	23.4	5	650	370	300	390	1700	240	Low Surface
RVV-1149+00-N8	RVV-1149+00-NE1629	0.0	0.5	A	10YR 2/2 very dark brown loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML/CL	36.8	21	1000	500	430	530	2500	370	Low Surface
RVV-1149+00-N8	RVV-1149+00-NE1629	0.0	0.5	A	10YR 2/2 very dark brown loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML/CL	36.5	18	930	450	390	510	2300	340	Low Surface
RVV-1149+00-N8	RVV-1149+00-NE1629	0.5	1.0	A	10YR 2/2 very dark brown loam, moist, granular, moderate, friable, moderately plastic, few fine roots	ML/CL	38.9	16	680	300	260	340	1600	240	Low Surface
RVV-1155+00-S5	RVV-1155+00-SW468	0.0	0.5	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, common medium roots	ML	28.2	30	1400	570	580	680	3200	500	Low Surface
RVV-1155+00-S5	RVV-1155+00-SW468	0.5	1.0	C1	10YR 3/2 very dark grayish brown loam, moist, subangular blocky, moderate, friable, slightly plastic, common medium roots	ML	23.9	31	1300	570	650	860	3400	540	Low Surface
RVV-1157+00-C3	RVV-1157+00-IC276	0.0	0.5	1	5Y 3/1 very dark gray coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SW	19.1	4	6900	1100	1600	600	10000	1400	In-Channel
RVV-1167+50-C1	RVV-1167+50-IC33	0.0	0.5	1	5Y 3/2 dark olive gray sand, wet, single grain, loose, non-plastic, shell fragments	SP	30.9	4	4800	1200	1400	810	8200	1100	In-Channel
RVV-1171+50-N8	RVV-1171+50-NE2072	0.0	0.5	C1	2.5Y 3/2 very dark grayish brown clay loam, moist, subangular blocky, weak, friable, moderately plastic	ML	17.4	<4	4	<4	<4	<4	<20	<10	Intermediate Surface
RVV-1171+50-S5	RVV-1171+50-SW1085	0.0	0.5	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, many fine roots	ML	49.9	18	2100	1100	960	1100	5300	750	Geomorphic Wetland
RVV-1171+50-S5	RVV-1171+50-SW1085	0.5	1.0	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, many fine roots	ML	42.2	8	1600	790	680	820	3900	530	Geomorphic Wetland
RVV-1171+50-S5	RVV-1171+50-SW1085	1.0	1.8	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, many fine roots	ML	41.4	<4	510	240	200	210	1200	160	Geomorphic Wetland
RVV-1171+50-S5	RVV-1171+50-SW1085	1.8	2.2	C1	2.5Y 3/1 very dark gray loam, few fine 10YR 4/4 dark yellowish brown mottle, wet, massive, friable, moderately plastic	ML	28.3	<4	330	120	120	90	660	91	Geomorphic Wetland
RVV-1171+50-S5	RVV-1171+50-SW1085	2.2	3.2	C2	2.5Y 2.5/1 black sandy loam, wet, subangular blocky, weak, friable, slightly plastic	SM	31.8	<4	70	37	30	35	170	25	Geomorphic Wetland
RWW-1182+50-N5	RWW-1182+50-NE2152	0.0	0.5	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML/CL	15.9	<4	<4	<4	<4	<4	<20	<10	High Surface
RWW-1182+50-N5	RWW-1182+50-NE2152	0.5	1.0	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML/CL	15.8	<4	<4	<4	<4	<4	<20	<10	High Surface
RWW-1182+50-S6	RWW-1182+50-SW1614	0.0	0.5	A	10YR 2/1 black loam, moist, granular, weak, friable, slightly plastic, common medium roots	ML	35.4	7	1200	580	460	550	2800	380	Geomorphic Wetland

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RWW-1182+50-S6	RWW-1182+50-SW1614	0.5	1.0	C1	10YR 3/2 very dark grayish brown sandy loam, moist, subangular blocky, weak, friable, non-plastic, few fine roots, plant fragments	SM	23.9	<4	38	16	13	16	84	13	Geomorphic Wetland
RWW-1186+00-C4	RWW-1186+00-IC143	0.0	0.5	A	10YR 2/1 black very fine sandy loam, dry, granular, weak, soft, slightly plastic, many fine roots	SM	11.1	12	7400	3900	3400	3200	18000	2400	Island
RWW-1186+00-C4	RWW-1186+00-IC143	0.5	1.0	A	10YR 2/1 black very fine sandy loam, dry, granular, weak, soft, slightly plastic, many fine roots	SM	10.1	58	8000	3700	3600	3400	19000	2700	Island
RWW-1186+00-C4	RWW-1186+00-IC143	1.0	1.6	A	10YR 2/1 black very fine sandy loam, dry, granular, weak, soft, slightly plastic, many fine roots	SM	9.5	52	8300	4900	6200	6000	26000	3900	Island
RWW-1186+00-C4	RWW-1186+00-IC143	1.6	3.8	C1	10YR 4/2 dark grayish brown and 10YR 3/2 very dark grayish brown loamy very fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SW	4.8	79	60000	16000	21000	13000	110000	16000	Island
RWW-1186+00-C4	RWW-1186+00-IC143	1.6	3.8	C1	10YR 4/2 dark grayish brown and 10YR 3/2 very dark grayish brown loamy very fine sand, dry, single grain, loose, non-plastic, very few very fine roots	SW	4.1	47	36000	16000	16000	12000	80000	11000	Island
RWW-1186+00-C4	RWW-1186+00-IC143	3.8	5.1	C2	10YR 6/3 pale brown and 10YR 3/2 very dark grayish brown very fine sand, few fine 10YR 5/8 yellowish brown mottle, dry, single grain, loose, non-plastic, very few very fine roots	SP	3.8	<4	33000	15000	14000	10000	73000	9900	Island
RWW-1186+00-C4	RWW-1186+00-IC143	5.1	6.2	C3	10YR 5/3 brown and 10YR 3/2 very dark grayish brown very fine sand, common fine 10YR 5/8 yellowish brown mottle, dry, single grain, loose, non-plastic, common very fine roots	SP	14.3	47	53000	23000	23000	19000	120000	16000	Island
RWW-1186+00-C4	RWW-1186+00-IC143	6.2	7.2	C4	10YR 4/1 dark gray and 10YR 5/3 brown loamy fine sand, dry, single grain, loose, non-plastic, few very fine roots, wood material (black)	SW	18.2	30	30000	7100	9100	5900	53000	7300	Island
RWW-1186+00-C4	RWW-1186+00-IC143	7.2	8.5	C5	10YR 5/1 gray loamy sand, few medium 10YR 4/6 dark yellowish brown mottle, moist, single grain, loose, non-plastic, shell fragments	SW	10.5	<4	2000	560	620	270	3400	470	Island
RWW-1188+50-C4	RWW-1188+50-IC155	0.0	0.5	C1	2.5Y 5/3 light olive brown and 2.5Y 3/2 very dark grayish brown fine sand, dry, single grain, loose, non-plastic, many fine roots	SP	10.7	4	1900	720	750	600	3900	550	Island
RWW-1188+50-C4	RWW-1188+50-IC155	0.5	1.0	C2	2.5Y 3/2 very dark grayish brown fine sandy loam, dry, subangular blocky, weak, slightly hard, slightly plastic, few medium roots, wood material (black)	SM	18.1	48	2600	1300	1300	1400	6700	1000	Island
RWW-1188+50-C4	RWW-1188+50-IC155	1.0	2.0	C2	2.5Y 3/2 very dark grayish brown fine sandy loam, dry, subangular blocky, weak, slightly hard, slightly plastic, few medium roots	SM	15.2	66	3100	2200	2200	3000	10000	1600	Island
RWW-1188+50-C4	RWW-1188+50-IC155	2.0	3.6	C3	2.5Y 6/4 light yellowish brown fine sand, few fine 10YR 4/6 dark yellowish brown mottle, dry, single grain, loose, non-plastic, very few coarse roots	SP	7	11	13000	7700	6100	5200	32000	4400	Island
RWW-1188+50-C4	RWW-1188+50-IC155	2.0	3.6	C3	2.5Y 6/4 light yellowish brown fine sand, few fine 10YR 4/6 dark yellowish brown mottle, dry, single grain, loose, non-plastic, very few coarse roots	SP	7.5	23	21000	9600	9000	6900	47000	6400	Island
RWW-1188+50-C4	RWW-1188+50-IC155	3.6	4.8	C4	2.5Y 5/3 light olive brown and 2.5Y 4/2 dark grayish brown sand, common fine 10YR 5/6 yellowish brown mottle, moist, single grain, loose, non-plastic, wood material (black)	SP	25.9	180	96000	24000	29000	21000	170000	24000	Island
RWW-1188+50-C4	RWW-1188+50-IC155	4.8	5.9	C5	2.5Y 4/3 olive brown sand, common medium 10YR 4/6 dark yellowish brown mottle, wet, single grain, loose, non-plastic	SW	15.2	<4	4100	2100	1800	1300	9300	1200	Island
RWW-1188+50-C4	RWW-1188+50-IC155	5.9	6.6	C6	5Y 2.5/1 black sand, wet, single grain, loose, non-plastic, wood material (black)	SP	18.9	18	24000	7700	7400	4400	43000	5800	Island

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Tittabawassee River Site Investigation
Midland, Michigan

Preliminary Location Identification	Final Location Identification	Depth Interval (ft. bgs)		Soil/Sediment Horizon	Physical Description	USCS	Moisture Content (%)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	1,2,3,4,7,8 + 1,2,3,6,7,8-HxCDF (ng/kg)	Aggregate Indicator Congener Concentration (ng/kg)	ETEQ (ppt)	Criteria/ Deposition Zone
RWW-1194+00-C2	RWW-1194+00-IC118	2.5	4.3	2	2.5Y 4/2 dark grayish brown and 10R 4/6 red very fine sandy loam, wet, subangular blocky, strong, friable, slightly plastic, wood material (black)	SM	33.8	<5	1400	390	390	240	2400	320	In-Channel
RWW-1194+00-C3	RWW-1194+00-IC234	4.0	5.0	1	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	14.6	<4	6600	1800	2000	1200	12000	1600	In-Channel
RWW-1199+00-N2	RWW-1199+00-NE360	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, weak, friable, slightly plastic, common fine roots	ML	19.8	<4	820	360	310	320	1800	240	Low Surface
RWW-1199+00-S8	RWW-1199+00-SW1895	0.0	0.5	A	10YR 2/1 black fine sandy loam, moist, granular, moderate, friable, slightly plastic, few very fine roots, plant fragments	SM	28.9	<4	360	180	140	190	880	120	Low Surface
RWW-1206+00-S1	RWW-1206+00-SW27	0.0	0.5	A	10YR 3/2 very dark grayish brown fine sandy loam, moist, granular, weak, friable, slightly plastic, common fine roots	SM	14.9	24	5900	2200	2000	2100	12000	1600	Natural Levee (Post-Industrial Levee)
RWW-1206+00-S1	RWW-1206+00-SW27	0.5	1.0	A	10YR 3/2 very dark grayish brown fine sandy loam, moist, granular, weak, friable, slightly plastic, very few fine roots	SM	8.64	33	3800	1900	1400	2100	9300	1300	Natural Levee (Post-Industrial Levee)
RWW-1206+00-S1	RWW-1206+00-SW27	1.0	2.2	C1	10YR 3/2 very dark grayish brown and 10YR 4/6 dark yellowish brown sand, moist, single grain, loose, non-plastic, shell fragments	SW	5.4	<4	3600	1500	1200	1100	7500	980	Natural Levee (Post-Industrial Levee)
RWW-1206+00-S1	RWW-1206+00-SW27	1.0	2.2	C1	10YR 3/2 very dark grayish brown and 10YR 4/6 dark yellowish brown sand, moist, single grain, loose, non-plastic, shell fragments	SW	6.16	<4	4400	1700	1500	1200	8900	1200	Natural Levee (Post-Industrial Levee)
RWW-1206+00-S1	RWW-1206+00-SW27	5.4	6.6	2C2	10YR 4/2 dark grayish brown loam, common fine 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML/CL	21.8	<4	5	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RWW-1206+00-S1	RWW-1206+00-SW27	5.4	6.6	2C2	10YR 4/2 dark grayish brown loam, common fine 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	ML/CL	21.8	<4	5	<4	<4	<4	<20	<10	Natural Levee (Post-Industrial Levee)
RWW-1206+00-S13	RWW-1206+00-SW2780	0.0	0.5	A	2.5Y 2.5/1 black silt loam, moist, granular, weak, very friable, slightly plastic, common fine roots, plant fragments	ML	42.3	<4	210	110	95	130	540	74	Geomorphic Wetland
RWW-1206+00-S13	RWW-1206+00-SW2780	0.5	1.0	C	2.5Y 3/2 very dark grayish brown sandy loam, few medium 10YR 3/4 dark yellowish brown mottle, moist, subangular blocky, weak, very friable, slightly plastic, very few fine roots, plant fragments	SM	30.8	<4	290	160	130	150	730	99	Geomorphic Wetland
RWW-1206+00-S2	RWW-1206+00-SW93	0.0	0.5	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, common fine roots	ML/CL	30.9	110	5800	2400	2100	2700	13000	1900	Geomorphic Wetland
RWW-1206+00-S2	RWW-1206+00-SW93	0.0	0.5	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, common fine roots	ML/CL	31.7	78	9000	2800	2600	2800	17000	2400	Geomorphic Wetland
RWW-1206+00-S2	RWW-1206+00-SW93	0.5	1.0	A	2.5Y 3/2 very dark grayish brown loam, moist, granular, moderate, friable, moderately plastic, common fine roots	ML/CL	27.5	32	9600	4300	3400	4400	22000	2900	Geomorphic Wetland
RWW-1206+00-S2	RWW-1206+00-SW93	1.0	2.2	C1	2.5Y 4/2 dark grayish brown loam, few medium 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, moderately plastic	ML/CL	29.2	<4	2100	930	730	680	4400	570	Geomorphic Wetland
RWW-1206+00-S6	RWW-1206+00-SW497	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, moderate, friable, slightly plastic, few fine roots, shell fragments	ML/CL	26.9	14	2800	1300	1100	1400	6500	890	Geomorphic Wetland

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RWW-1206+00-S6	RWW-1206+00-SW497	0.5	1.0	C1	10YR 4/2 dark grayish brown clay loam, few fine 10YR 4/4 dark yellowish brown mottle, moist, subangular blocky, weak, friable, moderately plastic, very few fine roots, shell fragments	CL	21.5	<4	1200	530	440	490	2600	350	Geomorphic Wetland
RWW-1206+00-S6	RWW-1206+00-SW497	2.9	4.0	C2	10YR 4/2 dark grayish brown sandy loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, very few fine roots, shell fragments	SM	18.3	<4	45	20	15	19	99	15	Geomorphic Wetland
RWW-1213+50-C2	RWW-1213+50-IC109	0.5	1.0	1	2.5Y 4/3 olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	14.7	<4	3100	450	630	210	4400	590	In-Channel
RWW-1214+00-N2	RWW-1214+00-NE762	0.0	0.5	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, common fine roots, plant fragments	ML/CL	30.6	5	920	460	390	470	2200	310	Low Surface
RWW-1214+00-N2	RWW-1214+00-NE762	0.5	1.0	A	10YR 2/1 black loam, moist, granular, moderate, friable, slightly plastic, common fine roots, plant fragments	ML/CL	20.8	<4	270	130	100	110	620	82	Low Surface
RWW-1214+00-N2	RWW-1214+00-NE762	1.0	2.1	C1	2.5Y 4/2 dark grayish brown sandy clay loam, few fine 2.5Y 4/4 olive brown mottle, moist, subangular blocky, weak, firm, moderately plastic, very few fine roots, shell fragments	SC	17.3	<4	110	40	33	45	230	32	Low Surface
RWW-1214+00-N4	RWW-1214+00-NE1498	0.0	0.5	A	10YR 2/1 black sandy loam, moist, granular, moderate, very friable, slightly plastic, common fine roots	SM	31.8	7	880	460	350	450	2100	290	Geomorphic Wetland
RWW-1214+00-N4	RWW-1214+00-NE1498	0.0	0.5	A	10YR 2/1 black sandy loam, moist, granular, moderate, very friable, slightly plastic, common fine roots	SM	31.8	8	840	410	340	430	2000	280	Geomorphic Wetland
RWW-1214+00-N4	RWW-1214+00-NE1498	0.5	1.0	AC	2.5Y 3/2 very dark grayish brown sandy clay, moist, angular blocky, weak, very firm, very plastic	CH	19.2	<4	280	120	99	110	600	81	Geomorphic Wetland
RWW-1214+00-N4	RWW-1214+00-NE1498	1.0	1.8	AC	2.5Y 3/2 very dark grayish brown sandy clay, moist, angular blocky, weak, very firm, very plastic, shell fragments	CH	21.4	<4	70	23	19	33	150	21	Geomorphic Wetland
RWW-1214+00-S13	RWW-1214+00-SW2749	0.0	0.5	A	10YR 3/2 very dark grayish brown loam, moist, granular, weak, friable, slightly plastic, common fine roots	ML	37.6	<4	220	110	83	110	520	69	Geomorphic Wetland
RWW-1214+00-S13	RWW-1214+00-SW2749	0.5	1.0	C1	10YR 4/2 dark grayish brown sandy loam, few fine 10YR 3/4 dark yellowish brown mottle, moist, subangular blocky, weak, friable, slightly plastic, few fine roots	SM	24.4	<4	140	67	53	64	320	44	Geomorphic Wetland
RWW-1214+00-S9	RWW-1214+00-SW1513	0.0	0.5	A	10YR 2/1 black very fine sandy loam, moist, granular, weak, friable, slightly plastic, few very fine roots	SM	13.6	<4	320	170	140	180	800	110	Geomorphic Wetland
RXX-1220+50-C3	RXX-1220+50-IC334	0.0	0.5	1	2.5Y 3/1 very dark gray and 2.5Y 4/2 dark grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material (black), shell fragments, plant fragments	SP	24.9	16	150	73	62	120	420	87	Atypical
RXX-1222+00-N3	RXX-1222+00-NE310	0.0	0.5	A	10YR 2/1 black loam, moist, granular, weak, friable, slightly plastic, common very fine roots	ML/CL	25.7	7	2200	920	810	850	4800	650	Low Surface
RXX-1222+00-N8	RXX-1222+00-NE2101	0.0	0.5	A	10YR 2/1 black loamy sand, <15% angular gravel, moist, single grain, loose, non-plastic		14	4	36	8	19	23	91	23	Intermediate Surface

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RXX-1222+00-N8	RXX-1222+00-NE2101	0.0	0.5	A	10YR 2/1 black loamy sand, <15% angular gravel, moist, single grain, loose, non-plastic		15.9	4	30	6	15	18	73	19	Intermediate Surface
RXX-1222+00-N8	RXX-1222+00-NE2101	0.0	0.5	A	10YR 2/1 black loamy sand, <15% angular gravel, moist, single grain, loose, non-plastic		11.6	<4	28	7	18	17	70	13	Intermediate Surface
RXX-1222+00-S11	RXX-1222+00-SW2236	0.0	0.5	A	10YR 3/1 very dark gray sandy loam, moist, granular, weak, friable, slightly plastic, common fine roots	SM	40.1	<4	340	180	150	160	840	110	Geomorphic Wetland
RXX-1230+00-N4	RXX-1230+00-NE471	0.0	0.5	A	10YR 2/1 black loam, moist, granular, weak, friable, slightly plastic, common medium roots	ML	32.7	19	2100	1000	800	1000	4900	680	Geomorphic Wetland
RXX-1230+00-N4	RXX-1230+00-NE471	0.0	0.5	A	10YR 2/1 black loam, moist, granular, weak, friable, slightly plastic, common medium roots	ML	30.3	19	2100	970	770	1000	4900	670	Geomorphic Wetland
RXX-1230+00-N4	RXX-1230+00-NE471	0.0	0.5	A	10YR 2/1 black loam, moist, granular, weak, friable, slightly plastic, common medium roots	ML	32.7	21	2200	1100	900	1200	5400	750	Geomorphic Wetland
RXX-1230+00-N4	RXX-1230+00-NE471	0.5	1.0	C1	10YR 3/2 very dark grayish brown clay loam, few fine 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, moderately plastic, few fine roots	ML/CL	24.6	<4	2500	1200	900	850	5400	700	Geomorphic Wetland
RXX-1230+00-N4	RXX-1230+00-NE471	1.0	3.3	C1	10YR 3/2 very dark grayish brown clay loam, few fine 7.5YR 4/6 strong brown mottle, moist, subangular blocky, weak, friable, moderately plastic, few fine roots	ML/CL	19.1	<4	140	61	47	45	290	40	Geomorphic Wetland
RXX-1231+00-C2	RXX-1231+00-IC92	3.5	5.3	4	2.5Y 2.5/1 black coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	9.92	<4	630	260	190	140	1200	160	In-Channel
RXX-1231+00-C2	RXX-1231+00-IC92	3.5	5.3	4	2.5Y 2.5/1 black coarse sand, 35<60% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	9.92	<4	420	130	120	88	760	100	In-Channel
RXX-1238+00-N1	RXX-1238+00-NE14	0.0	0.5	C1	10YR 3/2 very dark grayish brown loamy sand, wet, subangular blocky, weak, friable, non-plastic, few fine roots	SP	19.2	63	6100	2900	2400	2900	14000	2000	Natural Levee (Post-Industrial Levee)
RXX-1238+00-N1	RXX-1238+00-NE14	0.5	1.0	C1	10YR 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, non-plastic, few fine roots	SP	14.5	55	9000	3900	3100	4000	20000	2700	Natural Levee (Post-Industrial Levee)
RXX-1238+00-N1	RXX-1238+00-NE14	1.0	1.5	C1	10YR 3/2 very dark grayish brown loamy sand, moist, subangular blocky, weak, non-plastic, few fine roots	SP	18.8	30	17000	6700	5600	6300	35000	4700	Natural Levee (Post-Industrial Levee)
RXX-1238+00-N1	RXX-1238+00-NE14	1.5	2.7	C2	10YR 3/3 dark brown loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, moderate, slightly plastic, few fine roots	ML	18.1	6	24000	9000	7600	7200	48000	6200	Natural Levee (Post-Industrial Levee)
RXX-1238+00-N1	RXX-1238+00-NE14	2.7	4.2	C2	10YR 3/3 dark brown loam, few fine 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, moderate, slightly plastic, few fine roots	ML	21.7	<4	130	37	32	27	230	31	Natural Levee (Post-Industrial Levee)
RXX-1238+00-N1	RXX-1238+00-NE14	4.2	5.5	C3	10YR 5/3 brown and 10YR 5/2 grayish brown sand, moist, single grain, loose, non-plastic, shell fragments	SP	18.7	<4	9	5	<4	4	<20	<10	Natural Levee (Post-Industrial Levee)
RXX-1238+00-N6	RXX-1238+00-NE1043	0.0	0.5	A	10YR 2/1 black loamy sand, moist, granular, weak, friable, non-plastic, many very fine roots	SP	18.7	5	150	74	63	170	470	71	Atypical
RXX-1238+00-S3	RXX-1238+00-SW451	0.0	0.5	A	10YR 2/1 black silt loam, moist, granular, weak, friable, slightly plastic, common fine roots	ML	29.3	9	1100	490	380	620	2600	350	Geomorphic Wetland
RXX-1238+00-S5	RXX-1238+00-SW1309	0.0	0.5	A	2.5Y 2.5/1 black silt loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML	29.2	<4	240	95	78	100	520	69	Low Surface
RXX-1238+00-S5	RXX-1238+00-SW1309	0.0	0.5	A	2.5Y 2.5/1 black silt loam, moist, granular, moderate, friable, slightly plastic, common fine roots	ML	31.4	<4	190	70	59	89	400	54	Low Surface
RXX-1242+00-C2	RXX-1242+00-IC108	1.0	2.9	1	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	3.75	5	13000	1700	2200	780	17000	2300	In-Channel

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Secondary COI Sample List
Tittabawassee River Site Investigation
Midland, Michigan

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RXX-1242+00-C2	RXX-1242+00-IC108	1.0	2.9	1	2.5Y 5/4 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	4.09	<4	64	11	11	7	93	14	In-Channel
RXX-1242+00-C2	RXX-1242+00-IC108	2.9	3.5	2	2.5Y 3/1 very dark gray , wet, wood material (black)		47.8	30	130000	45000	41000	33000	250000	33000	In-Channel
RXX-1242+00-C4	RXX-1242+00-IC260	0.0	0.5	1	2.5Y 4/3 olive brown coarse sand, wet, single grain, loose, non-plastic, wood material (black), shell fragments	SP	14.3	21	150000	51000	52000	30000	290000	39000	In-Channel
RXX-1244+50-N4	RXX-1244+50-NE382	0.0	0.5	C1	2.5Y 3/2 very dark grayish brown loamy sand, <15% very angular gravel, moist, single grain, loose, non-plastic, very few very fine roots		21.6	4	1500	710	540	760	3500	460	Low Surface
RXX-1244+50-N4	RXX-1244+50-NE382	0.5	1.0	C1	2.5Y 3/2 very dark grayish brown loamy sand, <15% very angular gravel, moist, single grain, loose, non-plastic, very few very fine roots		14.8	<4	1800	460	520	400	3200	430	Low Surface
RXX-1244+50-N4	RXX-1244+50-NE382	1.0	1.3	C1	2.5Y 3/2 very dark grayish brown loamy sand, <15% very angular gravel, moist, single grain, loose, non-plastic, very few very fine roots		14	5	450	150	140	160	910	130	Low Surface
RXX-1244+50-N4	RXX-1244+50-NE382	1.3	2.6	2C2	2.5Y 3/2 very dark grayish brown loam, few fine 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moderate, friable, slightly plastic, plant fragments	ML/CL	19	19	1000	430	370	450	2300	340	Low Surface
RXX-1244+50-N4	RXX-1244+50-NE382	2.6	3.9	2C2	2.5Y 3/2 very dark grayish brown loam, few fine 10YR 5/6 yellowish brown mottle, moist, subangular blocky, moderate, friable, slightly plastic, plant fragments	ML/CL	19	12	530	240	190	290	1300	190	Low Surface
RXX-1252+00-C2	RXX-1252+00-IC251	0.0	0.5	1	2.5Y 4/3 olive brown coarse sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SP	17.9	<4	140	71	78	1900	2200	260	Atypical
RXX-1254+50-N1	RXX-1254+50-NE39	0.0	1.0	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, friable, slightly plastic, few fine roots	SM	17.1	29	20000	9600	7500	7600	44000	5900	Low Surface
RXX-1254+50-N1	RXX-1254+50-NE39	1.0	1.4	A	10YR 3/2 very dark grayish brown sandy loam, moist, granular, weak, friable, slightly plastic, few fine roots	SM	14	<9	23000	9400	7200	6700	46000	6000	Low Surface
RXX-1254+50-N1	RXX-1254+50-NE39	1.4	2.3	Bw	10YR 3/4 dark yellowish brown loam, moist, subangular blocky, moderate, friable, slightly plastic	ML/CL	17.6	<5	8000	2700	2500	1800	15000	2000	Low Surface
RXX-1254+50-N1	RXX-1254+50-NE39	2.3	4.2	C1	10YR 4/4 dark yellowish brown sandy loam, moist, subangular blocky, weak, friable, slightly plastic, very few fine roots	SM	13.6	<4	750	330	230	250	1600	200	Low Surface
RYY-1257+50-C2	RYY-1257+50-IC198	2.2	3.0	3	10YR 2/1 black , wet, wood material (black), shell fragments		33.2	19	8000	2800	2500	2000	15000	2100	In-Channel
RYY-1257+50-C2	RYY-1257+50-IC198	3.0	5.0	3	10YR 2/1 black , wet, wood material (black), shell fragments		49.9	140	38000	17000	17000	15000	87000	12000	In-Channel
RYY-1257+50-C2	RYY-1257+50-IC198	6.5	7.3	5	10YR 2/1 black , wood material (black)		48.5	14	29000	6200	7700	3700	47000	6400	In-Channel
RYY-1257+50-C2	RYY-1257+50-IC198	6.5	7.3	5	10YR 2/1 black , wood material (black)		51	8	8700	2500	2500	1800	15000	2100	In-Channel
RYY-1257+50-C2	RYY-1257+50-IC198	9.1	11.3	7	5Y 3/1 very dark gray silt loam, wet, subangular blocky, weak, friable, slightly plastic, shell fragments, plant fragments	ML	32.2	<4	9	5	6	<4	<20	<10	In-Channel
RYY-1257+50-C3	RYY-1257+50-IC301	5.6	7.0	3	10YR 2/2 very dark brown and 2.5Y 2.5/1 black silt loam, wet, subangular blocky, weak, friable, slightly plastic, plant fragments	ML	55.1	810	4300	3300	8400	33000	49000	8700	Atypical
RYY-1257+50-C5	RYY-1257+50-IC553	1.6	2.4	2	2.5Y 4/1 dark gray silty clay loam, wet, massive, friable, slightly plastic, shell fragments, wood material (black)	ML	32.7	51	8700	2100	2600	5100	19000	2600	Atypical
RYY-1260+00-C1	RYY-1260+00-IC621	2.0	2.2	2	2.5Y 3/1 very dark gray silt loam, wet, massive, friable, non-plastic, shell fragments, plant fragments	ML	45.3	99	6800	3200	4000	7200	21000	3200	Atypical
RYY-1260+00-C3	RYY-1260+00-IC544	2.7	3.1	2	2.5Y 3/1 very dark gray sand, wet, single grain, loose, non-plastic, shell fragments	SW	18.5	5	660	300	480	1100	2500	370	Atypical

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Midland, Michigan

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RYY-1264+00-N1	RYY-1264+00-NE120	0.0	1.0	A	10YR 2/1 black loam, moist, granular, moderate, friable, moderately plastic	ML	34.5	18	5100	2300	2100	2400	12000	1600	Low Surface
RYY-1264+00-N1	RYY-1264+00-NE120	1.0	2.2	Bw	10YR 4/3 brown loam, common medium 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, moderately plastic	ML	23.5	<6	600	190	200	160	1100	160	Low Surface
RYY-1264+00-N1	RYY-1264+00-NE120	2.2	4.3	Bw	10YR 4/3 brown loam, common medium 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, moderately plastic	ML	22.8	<6	68	32	30	41	170	26	Low Surface
RYY-1264+00-N1	RYY-1264+00-NE120	2.2	4.3	Bw	10YR 4/3 brown loam, common medium 10YR 4/6 dark yellowish brown mottle, moist, subangular blocky, weak, friable, moderately plastic	ML	22.6	<6	49	29	22	30	130	20	Low Surface
RYY-1267+00-C4	RYY-1267+00-IC1198	0.0	0.5	1	10YR 2/1 black , wet, wood material (black)		33.9	8	21000	15000	10000	9700	56000	7300	In-Channel
RYY-1267+00-C5	RYY-1267+00-IC1089	0.0	0.5	1	2.5Y 4/2 dark grayish brown sandy loam, <15% subrounded gravel, wet, massive, friable, non-plastic, plant fragments	SM	27	26	950	260	240	270	1700	280	In-Channel
RYY-1269+00-C1	RYY-1269+00-IC383	1.5	2.8	C3	10YR 4/3 brown clay loam, few fine 7.5YR 3/4 dark brown mottle, dry, angular blocky, moderate, moderately hard, moderately plastic, very few very fine roots	CL	21.6	<4	240	120	95	91	550	74	Low Surface
RYY-1270+50-C1	RYY-1270+50-IC27	1.4	1.7	2	10YR 2/1 black , wet, wood material (black)		43.1	12	44000	9300	10000	3900	68000	9000	In-Channel
RYY-1270+50-C2	RYY-1270+50-IC134	4.9	6.5	3	2.5Y 4/2 dark grayish brown and 2.5Y 3/2 very dark grayish brown silty clay loam, wet, massive, friable, slightly plastic, plant fragments, shell fragments	ML	41.5	<29	<9	<21	<22	<45	<126	<22	In-Channel
RYY-1270+50-C3	RYY-1270+50-IC240	1.0	2.2	1	2.5Y 5/3 light olive brown and 2.5Y 5/2 grayish brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, shell fragments	SW	3.91	<4	13000	4700	4300	2900	25000	3300	In-Channel
RYY-1271+00-C4	RYY-1271+00-IC1090	0.5	1.0	2	5Y 3/1 very dark gray silt loam, wet, massive, friable, slightly plastic	ML	25.4	27	2900	1300	1000	1100	6300	880	In-Channel
RYY-1276+00-C3	RYY-1276+00-IC174	0.5	1.0	1	2.5Y 5/3 light olive brown sand, <15% subrounded gravel, wet, single grain, loose, non-plastic, wood material, shell fragments	SP	7.3	35	73000	39000	30000	23000	160000	22000	In-Channel
RYY-1276+00-C4	RYY-1276+00-IC269	3.4	3.7	3	5Y 2.5/1 black fine sand, wet, single grain, loose, non-plastic	SP	20.2	<6	84	32	38	41	190	31	In-Channel
RYY-1276+00-C5	RYY-1276+00-IC318	0.0	0.5	1	2.5Y 5/4 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	6	<4	76	20	23	17	130	20	In-Channel
RYY-1276+00-C5	RYY-1276+00-IC318	0.0	0.5	1	2.5Y 5/4 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	9.6	<4	61	12	10	8	90	13	In-Channel
RYY-1276+00-C5	RYY-1276+00-IC318	2.7	4.5	2	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	25.2	8	2800	830	940	600	5100	730	In-Channel
RYY-1276+00-C5	RYY-1276+00-IC318	8.5	10.3	3	2.5Y 5/2 grayish brown and 2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	17.7	<4	1100	380	380	250	2100	280	In-Channel
RYY-1278+50-C4	RYY-1278+50-IC491	2.0	4.0	3	2.5Y 4/2 dark grayish brown sandy loam, wet, subangular blocky, weak, friable, slightly plastic, shell fragments, plant fragments, wood material (black)	SM	30.5	8	43000	19000	17000	12000	91000	12000	In-Channel
RYY-1280+00-C1	RYY-1280+00-IC49	1.0	1.6	2	2.5Y 3/2 very dark grayish brown silt loam, wet, subangular blocky, weak, friable, non-plastic	ML	28.8	40	4700	2000	2000	1500	10000	1500	In-Channel

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RYY-1276+00-C5	RYY-1276+00-IC318	2.7	4.5	2	2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	25.2	8	2800	830	940	600	5100	730	In-Channel
RYY-1276+00-C5	RYY-1276+00-IC318	8.5	10.3	3	2.5Y 5/2 grayish brown and 2.5Y 5/3 light olive brown sand, wet, single grain, loose, non-plastic, shell fragments, wood material (black)	SP	17.7	<4	1100	380	380	250	2100	280	In-Channel
RYY-1278+50-C4	RYY-1278+50-IC491	2.0	4.0	3	2.5Y 4/2 dark grayish brown sandy loam, wet, subangular blocky, weak, friable, slightly plastic, shell fragments, plant fragments, wood material (black)	SM	30.5	8	43000	19000	17000	12000	91000	12000	In-Channel
RYY-1280+00-C1	RYY-1280+00-IC49	1.0	1.6	2	2.5Y 3/2 very dark grayish brown silt loam, wet, subangular blocky, weak, friable, non-plastic	ML	28.8	40	4700	2000	2000	1500	10000	1500	In-Channel

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EXHIBIT II – 4

GEOCHEMISTRY ANALYSIS

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GEOCHEMISTRY ANALYSIS

A. BACKGROUND

The 2006 UTR site characterization confirmed previous findings of elevated furan and dioxin concentrations in medium and coarse grained soils and sediments, quite atypical for hydrophobic organic compounds. (ATS, 2007) Further, the congener pattern of these residues was unique in that it was predominated by chlorinated furans. This is distinctly different from congener patterns characteristic of chlorophenol products and processes. Evaluation of the congener pattern, and analysis of the release history for the Midland plant, revealed these residues are most likely to have originated from direct chlorination of dibenzofuran in the coal tar binder of graphic carbon electrodes used in chlorine electrolytic cells.

B. PROTOCOL DEVELOPMENT

Because the significance of this is important in the fate and transport-based *GeoMorph®* site characterization, a geochemistry fractionation protocol was developed in 2006 to provide empirical evidence. The protocol utilizes a combination of dry sieving and wet sieving/Stokes Law settling to obtain discrete particle size cuts. Each fraction is then characterized for:

- moisture content;
- particle size distribution;
- total organic carbon content;
- "black carbon" content;
- furan/dioxin concentration.

The protocol incorporates manual procedures that are labor and time intensive, therefore the number of samples that can be processed at a given time is limited.

C. FRACTION ANALYSIS

Thirteen sediment/soil samples from the 2006 UTR sample set were selected collaboratively with MDEQ for the initial set of analyses. The results, contained in a report issued to MDEQ and USEPA on March 30, 2007, confirmed the presence of elevated furans and dioxins in all particle size fractions, including medium coarse grained materials (Dow, 2007). Further, the report concluded that subsample variability can be expected to increase as the furan/dioxin concentration increases. This unusual circumstance results from the presence of heterogeneously distributed particles of source material containing the furans/dioxins.

The results from this fractionation work are summarized in Table 1. One of the samples in this group, RL-246+00-SW20 (5.0-6.0), taken from an industrial-age levee, contained relatively high concentrations of approximately 20,000 ppt ETEQ in the clay and silt fractions, and an unusually high concentration of 150,000 ppt ETEQ in the sand fraction. Two sand fractions, 53-2,000 µm (very fine to very coarse) and 250-2,000 µm (medium to very coarse), were further fractionated based on density using a cesium chloride solution. The objective was to separate siliceous material, having a density of approximately 1.7, from carbonaceous materials having substantially lower densities. In this density separation, carbonaecous material such as coal tar impregnated graphitic carbon, having a density of approximately 1.15, would be expected to separate with the light fraction.

Table 1

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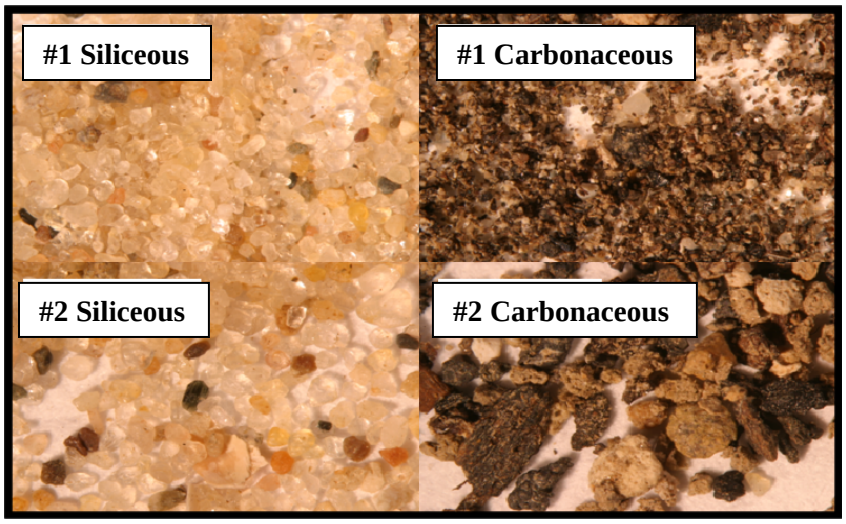
GEOCHEMISTRY FRACTION ANALYSIS

Location	Depth Interval (ft bgs)	Geomorphic Unit	Clay Fraction Analysis (<5 um)		Silt Fraction Analysis (5-53 um)		Sand Fraction Analysis (53-2000 um)	
			ETEQ (ppt)	Fraction of Total % (w/w)	ETEQ (ppt)	Fraction of Total % (w/w)	ETEQ (ppt)	Fraction of Total % (w/w)
2006 UTR Samples								
RG-130+50-NE30	7.2-7.9	Low surface	-	<1.0*	6,700	2.1	96	94.3
"	7.9-8.8	"	-	<1.0*	4,000	3.8	2,100	93.9
RL-246+00-SW20	3.0-4.0	Natural levee	1,700	8.7	1,200	15.5	210	74.0
"	4.0-5.0	"	3,200	10.8	2,200	21.1	570	63.2
"	5.0-6.0	"	21,000	5.1	14,000	11.3	150,000	80.5
"	6.0-7.5	"	22,000	10.2	16,000	16.1	4,200	68.4
"	7.5-8.5	"	16,000	9.1	12,000	14.0	1,500	72.7
RL-246+00-SW85	0.0-0.6	High surface	7,200	4.0	4,100	9.4	670	84.2
"	0.6-1.5	"	5,000	4.5	3,100	6.6	640	86.3
"	1.5-2.5	"	305	3.8	230	6.4	0	89.4
RL-246+00-SW265	0.0-0.8	Geomorphic wetland	870	19.6	660	44.4	1,500	31.5
"	0.8-1.1	"	1,400	23.1	1,100	41.2	1,400	28.0
"	1.1-3.1	"	77	31.9	68	39.1	49	22.3
2007 UTR Samples								
RD-55+10-IC-NE	composite	Waste deposit	-	<1.0*	29,100	52.0	11,400	52.4
RL-258+50-IC135	2.0-3.5	In-channel deposit	-	<1.0*	-	<1.0*	468	97.3
RL-258+50-IC196	1.5-4.0	In-channel deposit	-	<1.0*	11,300	5.3	4,060	94.9
RM-262+00-IC126	0.5-2.3	In-channel deposit	-	<1.0*	-	<1.0*	1.0	98.7
RO-321+50-IC155	1.7-4.0	In-channel deposit	-	<1.0*	128	1.5	8.2	97.5
RO-334+00-IC113	1.6-4.0	In-channel deposit	-	<1.0*	30,500	0.8	115	100.2

Notes: (*) indicates clay fraction was combined with silt fraction for analysis.

The density separation gave visually distinct residues that are clearly evident in the following photomicrographs, where "#1" is the 53-2,000 µm fraction sample, and "#2" is the 250-2,000 µm fraction sample:

Figure 1. Density Separation Photomicrographs



The lightly colored and heavier siliceous material is shown on the left. It contrasts starkly with the more darkly colored carbonaceous fraction shown on the right. From these micrographs it is clear that, like the heavier siliceous sand, the material composing the carbonaceous fraction exists in a range of particle sizes. The relative weight of the fractions was as follows:

Particle Size Fraction	Siliceous Weight Fraction (g)	Carbonaceous Weight Fraction (g)
#1 (53-2,000µm)	12.36	0.13
#2 (250-2,000µm)	12.55	0.14

Table 2. Particle Size Fraction Summary

In both cases, the heavier siliceous material comprised approximately 99 percent of the sample but contained less than 2 percent of the TEQ mass. Conversely, though the light carbonaceous fractions constitute only 1 percent of the sample mass, they contain 98 percent of the furan and dioxin residue measured in the fractions.

REFERENCES

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