Source Water Protection Plan for the Upper Ohio River Public Water Systems

January 2013

Buckeye Water District

City of Toronto

City of Steubenville

With assistance from the Ohio Environmental Protection Agency

And the Ohio River Valley Water Sanitation Commission

Revision Notes

This document will be updated frequently, based on annual reviews of the information. The original plan was drafted in December 2012, and revised December 2013.

December 2013 Revision:

- **Ohio River Clean Fuels**, which was scheduled to be constructed in Wellsville, Ohio, was removed from the potential contaminant sources, because the project reportedly has been cancelled. The facility was designed to produce 53,000 barrels/day of diesel fuel and synthetic naphtha from natural gas and discharge 9.7 million gallons/day of treated wastewater into the Ohio River.
- **Ergon Refinery, The Linde Group** (page 12), and **Apex Terminal** (page 14) were added to the potential contaminant sources
- Maps on Figures 3 and 4 were revised

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Executive Summary

Between Follansbee, West Virginia and East Liverpool, Ohio—a distance of about 30 river miles--there are six communities and one large industry that use the Ohio River as a source of drinking water. In 2012, representatives from several of these communities met to consider what they could do collectively to lessen impacts on the river's water quality from other uses the river provides: industrial transport, industrial cooling, discharge of wastewater, recreation, etc.

Over the course of six meetings, a joint source water protection plan was developed and ultimately agreed to by three of the six public water systems: the City of Toronto, the City of Steubenville and Buckeye Water District, which serves the Village of Wellsville.

The initial step was to identify the activities occurring within the vicinity of these public water systems that could have the greatest potential impact on water quality, due to the amounts of chemicals involved and/or direct discharge to the Ohio River. These included river traffic, steel mills, power plants, chemical manufacturers and petroleum tank farms within this area.

The next step was to identify activities the systems could implement to lessen the threats from the various potential sources of contamination. It was clear that the first line of defense is a facility's own efforts—its Spill Prevention, Control and Counter-measures Plan, Facility Operations Plan, and compliance with environmental regulatory requirements. The second line of defense is the early warning function provided by the Ohio River Valley Water Sanitation Commission (ORSANCO), and spill response by the companies contracted by industries to respond to a spill, coordinating with county Emergency Management Agencies (EMAs) and the Coast Guard. The third line of defense is public awareness and vigilance, which is greatly facilitated by the work performed by the Jefferson County Soil and Water Conservation District. The most effective strategy public water suppliers can pursue is to maintain good contact with all these groups, sharing information and concerns, and working together on solutions to water quality issues.

As a result, the centerpiece of this joint source water protection plan is regularly scheduled meetings between public water suppliers and representatives of the various local industries. Public water suppliers also will improve communications with the county EMA. Other planned activities, focusing on better contact and public information, are included in the implementation plan on the following three pages.

By working together, the public water suppliers can pursue similar goals without overlap, and can share the effort involved. It is hoped that the other communities within this 30-mile stretch that use the Ohio River for public drinking water will recognize the value of this plan and will eventually become formal participants in its implementation.

Implementation Plan

For quick reference, the Implementation Plan is summarized in the following table (pages 2-4). These activities are described in greater detail on pages 19 to 27 of this document.

Blue-shaded blocks indicate activities already in place and ongoing

Activity	***Responsible Party***	***When Implemented***	***Comments***
SOURCE MANAGEMENT ACTIVITIES			
A. Meeting with Industrial Dischargers on River. Meet with representatives of major industrial dischargers on a regular basis to exchange information and renew contacts.	PWS operators, assisted by ORSANCO and Ohio EPA	Annually, in September or October, started in 2012.	First meeting held October 2, 2012; second meeting held November 6, 2013.
B. Communication with towboat operators Investigate purchase of VHF marine radios sharing wavelength with Ohio River commercial traffic	PWS operators	Discussions start immediately	
C. Little Blue Run Dam. Encourage County EMA staff to ensure continued maintenance and inspections of Little Blue Run dam, by attending one quarterly LEPC meeting each year.	Jefferson County EMA staff and partners; designated PWS staff	Once annually, starting in 2013.	
D. Review construction permits.* The Jefferson County SWCD reviews permits for earth-disturbing activities (i.e., new development)	SWCD staff	Ongoing	For sites disturbing more than one acre; promotes sediment trapping, settling facilities, inlet protection, dumping control, etc.
E. Pursue Storm Water Management Plan for Columbiana County communities.	Ohio EPA, Jefferson SWCD	Discussions start immediately	See text, page 25.
EDUCATION AND OUTREACH			
F. Consumer Confidence Report (CCR)	PWS operator and staff	Annually	CCR is issued annually; SWAP and pharmaceutical information will be included starting in 2013
G. Plant tours. Continue to offer tours upon request.	PWS staff	Ongoing – as requested	

Activity	*Responsible Party*	*When Implemented*	*Comments*
H. River Sweep. The signatory systems will continue to promote participation in annual ORSANCO-sponsored River Sweep	ORSANCO; designated City staff	Annually, in June	
I. Brochure. Develop source water protection brochure for hand-out at County Fair, other venues	Appropriate City staff, Ohio EPA, and SWCD staff, working with SWAP planning group	Complete brochure by June 2013	Web page should be designed first, so that brochure can refer to it
J. Web Page. Develop source water protection web page, to be hosted on existing site. Will apply for funding from Ohio Environmental Education Fund.	Web design expert (city or outsourced), working with SWAP planning group	Complete web page by June 2013	Possible hosts: City of Steubenville, Jefferson County SWCD, ORSANCO … Will need to make arrangements for updates and payments for maintenance.
K Storm Drain Marking*. Notices have been placed on storm drains, advising that the drains go directly to the river.	SWCD staff	Ongoing.	When markers disappear or fade, they are replaced.
L. Jefferson County Fair. Provide SWAP information at Jefferson County Fair. **M.** Arrange for ORSANCO to bring its aquarium display in 2013; possibly seek funding from OEEF and/or local industry	PWS staff Designated city staff	Annually, starting August 2013. For August 2013	
N. Marina Signs. Provide marina signs to cooperating marina owners	PWS operator and staff	By September 2013	Operator will initiate effort; appropriate City staff and/or contractors may design and erect signs.
O. ORSANCO GIS Project. ORSANCO will continue to pursue development of a GIS project on Ohio River outfalls (see description on page 26)	Jerry Schulte, other ORSANCO staff	In process	
P. Education of School Children.* Jefferson County SWCD staff run week-long outdoor workshops each year to teach school children about streams and how to protect them. They also conduct trainings at individual schools, on request.	SWCD staff	Several workshops annually	

Activity	*Responsible Party*	*When Implemented*	*Comments*
CONTINGENCY PLANNING			
Q. Early-warning Network. Continue participation in ORSANCO early-warning network	PWS operator	Ongoing	
R. Update Emergency Contacts. PWS staff will notify EMA of changes in contact staff on at least an annual basis.	PWS operator	Starting with first review of the plan in September 2013, and annually thereafter	
SOURCE WATER MONITORING			
S. Raw water sampling. Continue daily monitoring of raw water	PWS operator	Ongoing	
T. Storm water outfall monitoring*. The Jefferson County SWCD samples storm water outfalls to ensure the discharges are meeting water quality standards.	SWCD staff	Ongoing	
U. ORSANCO's ODS monitoring network. Samples river water daily for volatile organics	ORSANCO	Ongoing	Currently the nearest station upstream is at Midland, Pennsylvania, 5 miles upstream from East Liverpool.
V. ORSANCO TDS Study. Monitoring weekly for constituents of total dissolved solids	ORSANCO	December 2011-December 2012	
W. HABs. Arrange for expertise in identifying toxin-producing HABs, and for equipment to analyze for toxins	PWS operator	To be decided – not for immediate future	

*The Jefferson County Soil and Water Conservation District conducts numerous environmental services for the twelve Jefferson County communities (which include Steubenville and Toronto) that have signed onto the Jefferson County Storm Water Management Plan of 2003. The signatory systems provide an annual fee to the SWCD for these services.

Source Water Protection Plan
for the
Upper Ohio River Public Water Systems

Purpose

The intent of this document is to summarize strategies that will be pursued by a group of Ohio River public water systems and the communities they serve, to minimize the threats to their source of drinking water—the Ohio River. As of 2012, this group of public water systems includes:

- The City of Toronto
- The City of Steubenville
- Buckeye Water District (serving the Village of Wellsville)

Collectively, they are referred to in this document as the "Upper Ohio River Public Water Systems".

Although the signatory public water systems all treat the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants, and beyond-conventional treatment is often very expensive. By agreeing to follow this plan to the fullest extent possible, the public water systems and the communities they serve acknowledge that supporting the implementation of measures to prevent spills and releases into the Ohio River can be a relatively economical way to help ensure the safety of the communities' drinking water, while also improving river quality for other uses.

Background

Source Water Protection

Since 1974 the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments were designed to protect the source water contribution areas around ground water supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP was to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of Source Water Protection. The amendments encourage states to establish Source Water Assessment and Protection (SWAP) programs to protect all public drinking water supplies. As part of this initiative states must decide how protection areas for each public water system

will be delineated and inventoried for potential contaminant sources, and given a susceptibility rating.

Unique Challenges for Ohio River Systems

Withdrawing water from, or near, the Ohio River presents many challenges for a water utility. Not only does the Ohio River pose all of the typical treatment concerns of a surface water source, the location, size, and uses of the Ohio River pose additional source water protection concerns.

The Ohio River borders or flows through six states. This is important when considering potential pollution flowing from upstream, as protection efforts may need to be coordinated with these other states. In addition to multiple state jurisdictions, additional jurisdictions on the federal, county, township or local levels also need to be considered.

The Ohio River is also a very valuable resource for many, sometimes competing, uses. In addition to being the direct drinking water source for several million people, many ground water utilities depend on the river as a source of natural recharge to their aquifer. Over 230 million tons of cargo are transported on the Ohio River each year, and 49 power generating stations are located along the river, providing over six percent of the nation's power supply. Additionally, the entire Ohio River is the receiving stream (either directly or indirectly through tributaries) for industrial and sanitary waste produced by over 25 million people. The river from source to mouth is 981 miles long and the entire watershed exceeds 200,000 square miles.

Role of ORSANCO

Due to these wide-ranging interstate concerns the Ohio River Valley Water Sanitation Commission (ORSANCO) was formed in 1948. ORSANCO is an interstate water pollution control agency that manages and operates programs for water quality monitoring and assessment, assists in emergency response management, has established pollution control standards for the Ohio River, and facilitates interstate cooperation and coordination. The Upper Ohio River communities recognize ORSANCO's unique position in promoting source water protection along the Ohio River and this plan reflects the communities' close partnership with ORSANCO, using the Commission's knowledge, authority and resources to protect the water source.

Ohio River Delineations

Due to the size and complex nature of the Ohio River, in 1997 ORSANCO agreed to develop the source water assessment strategy for the Ohio River. ORSANCO's leadership provided a uniform approach to delineating the source water protection areas utilities would protect. A workgroup was formed, composed of regulatory agencies for the six border states and the U.S. EPA Regions 3, 4, and 5. This workgroup developed the Source Water Assessment Strategy for the Ohio River (October 1998).

The Strategy established a tiered-delineation system consisting of three protection zones (Figure 1). The purpose of this tiered-approach is to define the level of source inventory within the Ohio River Basin, and serve as a guide for management and other

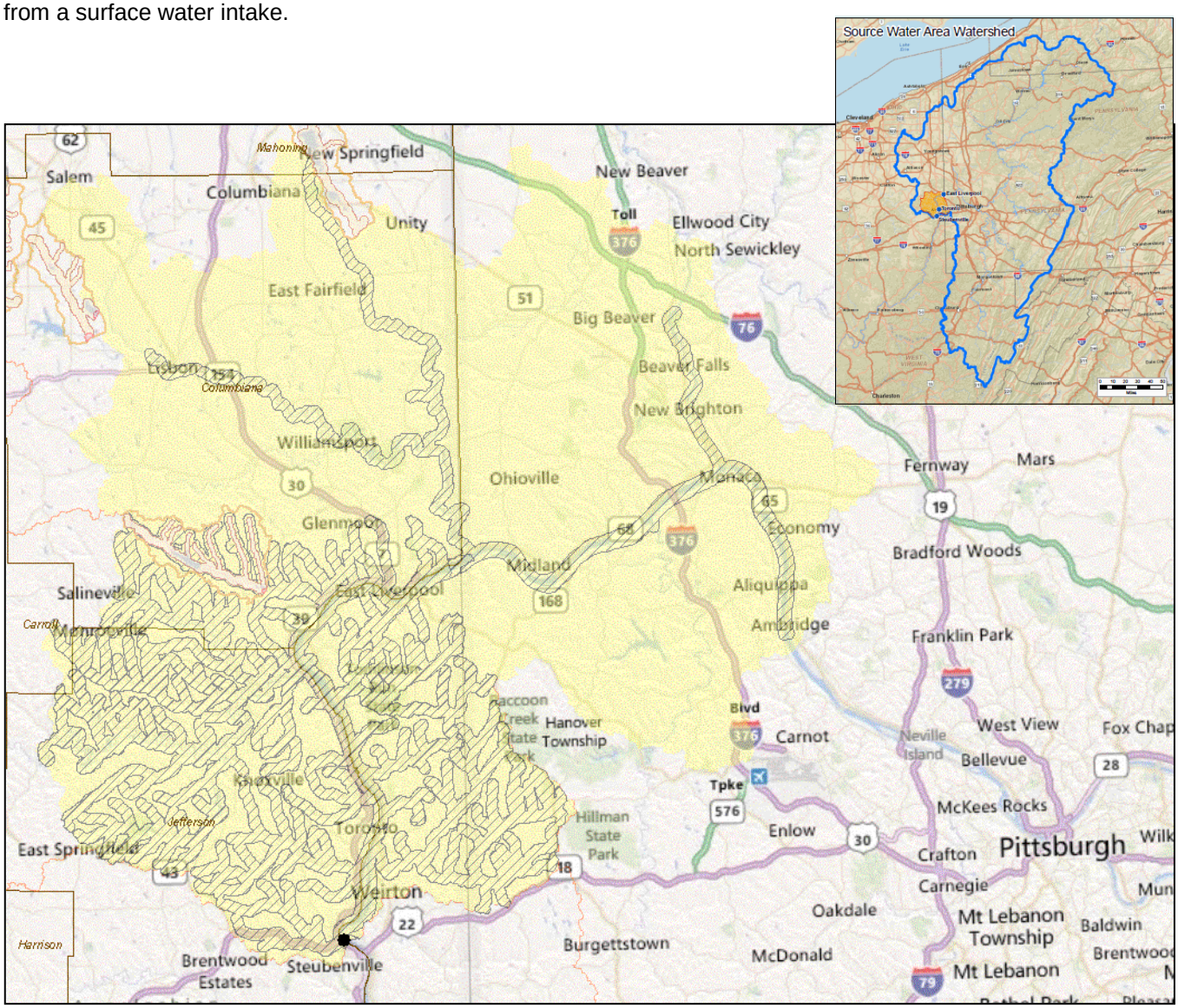
activities to allow water suppliers to most effectively apply their source water protection resources.

Figure 1. Source Water Protection Zones for Ohio River Public Water Systems (shown for City of Steubenville)

Zone I - Zone of Critical Concern (hatchmarked). The Zone of Critical Concern (ZOCC) extends ¼ mile below a water intake to 25 miles upstream the Ohio River and major tributaries identified in U.S. EPA Reach File 1. The lateral extent includes ¼ mile on both sides of the riverbank and major tributaries. The 25 miles upstream is based upon a 5 hour time-of-travel estimate using maximum Ohio River velocities. This is considered the area "within which a contamination event would quickly affect the water supply."

Zone 2 – Zone of High Concern (pale yellow). The Zone of High Concern (ZOHC) extends ¼ mile below a surface water intake, upstream, to ¼ mile below the next Ohio River intake. Major tributaries are incorporated within a 25-mile distance upstream from the intake. The lateral extent includes all 14-digit hydrologic units adjacent to the banks of the Ohio River and major tributaries.

Zone 3 – Upstream Watershed (insert-blue line) Zone 3 is the entire portion of the Ohio River Basin upstream from a surface water intake.



By the year 2000, the states of Ohio and West Virginia had each written a state source water assessment and protection program that followed the guidelines in the Safe Drinking Water Act and the guidance provided by the United States Environmental Protection Agency (U.S. EPA). The state programs provide a process for completing technical assessments of each public water system in the state, incorporating the technique covered in the Source Water Assessment Strategy for the Ohio River. They also encourage public water systems to develop local source water protection plans.

In 2011, staff from Ohio EPA approached the cities of East Liverpool, Toronto and Steubenville about developing a joint source water protection plan. In 2012, additional nearby systems were invited to participate in the development, including public water systems located in West Virginia. Staff from the West Virginia Department of Health and Human Resources, which administers the source water protection program for West Virginia, also participated in the meetings. Ultimately, representatives of five public water systems and one private firm participated in the discussions on which this document is based, and three systems—Toronto, Steubenville and Buckeye Water District—agreed to formally adopt and implement the plan.

Background information on each of the signatory Upper Ohio River communities, including population and a description of the water treatment process, is included in Appendix A.

Identification of Local Source Water Concerns

Area of Focus

The area of focus was identified as the approximately 30-river mile portion of the Ohio River from East Liverpool, Ohio in the north (River Mile 40) to Follansbee, West Virginia in the south (River Mile 71), due to the concentration of both public water systems and major potential contaminant sources within this stretch (Figure 2). The public water systems within the area of focus that have intakes in the Ohio River include:

East Liverpool, Ohio
Buckeye Water District (Wellsville, Ohio)
Toronto, Ohio
Arcelor-Mittal Steel Plating (Weirton, West Virginia)
Weirton, West Virginia
Steubenville, Ohio
Follansbee, West Virginia

Several ground water systems, whose wells draw water from the Ohio River valley aquifer, such as Stratton and Mingo Junction, both in Ohio. Chester, West Virginia pumps water from wells, but the system is required to treat the water as surface water due to the level of infiltration from the Ohio River.

Below Follansbee there are no more surface water systems until the city of Wheeling, West Virginia, about 17 miles downstream.

Also within this stretch of the river are located numerous major potential contaminant sources. These include the W. H. Sammis First Energy coal-powered plant, Arcelor-Mittal steel coating plant, oil refineries, several petroleum tank fields, Heritage-WTI waste incinerator, several chemical plants, two railways paralleling the river (Conrail and Norfolk Southern), and two major highways paralleling the river (Route 7 in Ohio and Route 2 in West Virginia. In addition, there are numerous oil and gas liquids pipelines crossing the river, and heavy barge traffic.

Upriver from East Liverpool and located in Pennsylvania, the Beaver Valley nuclear power plant, the Allegheny-Ludlum steel plant, and Little Blue Run Lake (a coal wastes repository behind a high dam) are additional sources of concern.

Figure 2. Map of Upper Ohio River Area of Focus

Potential Contaminant Source Inventory

The first task of the source water protection planning group was to locate on maps the facilities that they believed could present a substantial threat to their drinking water if a major spill or release occurred, due to the amounts and/or types of chemicals presumably used. This effort is captured in Figures 3-4 below, which also show highways, bridges, and the locations of wastewater and storm water outlets (where a facility spill or release would be most likely to enter the Ohio River).

The following descriptions were developed originally from information available on the Internet and in some cases were corrected and updated by staff from the facilities in question. Unedited facility descriptions are identified here as "Internet Information", with the recognition that information derived solely from the Internet may be incomplete, misinterpreted, or out-of-date.

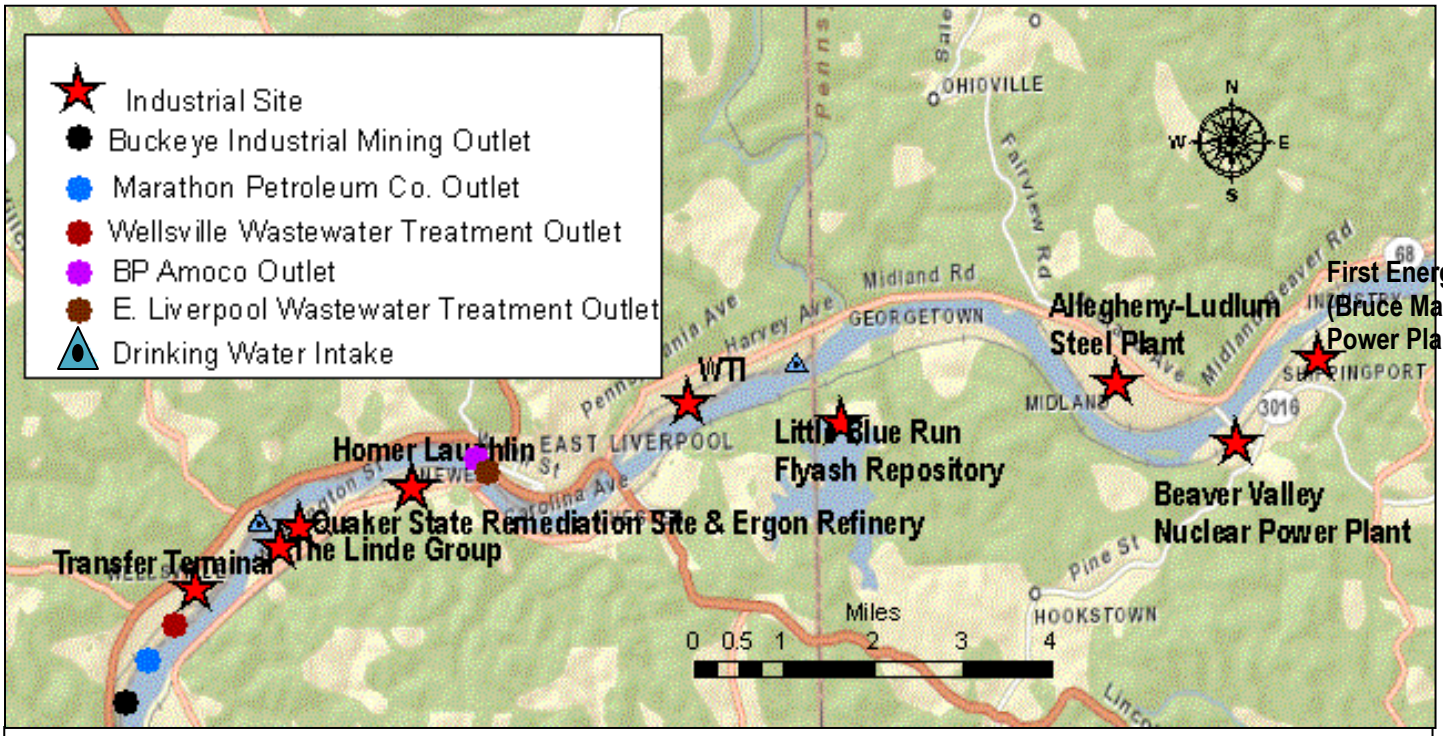
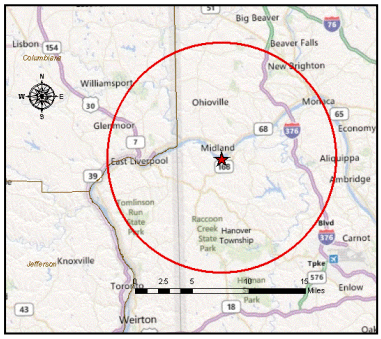


Figure 3. Major industrial facilities and outfalls located along Ohio River between Shippingport, Pennsylvania, and Wellsville, Ohio (locations approximate)



Beaver Valley Nuclear Power Plant (Internet Information). Beaver Valley Power Station is a nuclear power plant covering 1,000 acres (4.0 km^2) near Shippingport, Pennsylvania, United States, 34 miles (55 km) west by north of Pittsburgh, Pennsylvania. The 911-megawatt Beaver Valley plant is operated by FirstEnergy Nuclear Operating Corporation. After the 1979 accident at the Three Mile Island nuclear plant near Harrisburg, Pennsylvania, Congress required that all nuclear power plants develop emergency plans. The Nuclear Regulatory Commission (NRC) requires each plant to have an Emergency Planning Zone (EPZ) with an approximately 10-mile radius. Within the EPZ, the plant operator must maintain warning sirens or other systems and regularly conduct emergency response exercises evaluated by NRC and the Federal Emergency Management Agency (FEMA).

Allegheny-Ludlum Steel Plant (Internet Information). The plant is located near Midland, Pennsylvania,. It produces stainless steel from scrap, then casts it into slabs for shipment to hot rolling mills. The plant also rolls and finishes steel slabs using a proprietary process. According to U.S. EPA's 2010 Toxics Release Inventory, over 1.1 million pounds of chemicals were released under permit to the Ohio River in 2010. These primarily consisted of nitrate compounds, but included some metals compounds (manganese, chromium, nickel, zinc, lead, copper, cobalt) as well as nitric acid and hydrogen fluoride.

Little Blue Run Lake (Internet Information). The 400-foot deep lake, straddling the Pennsylvania-West Virginia border, is a 1,700-acre coal ash impoundment owned by First Energy and containing 100 million tons of fly ash from the nearby 2,375-megawatt Bruce Mansfield power plant. The fly ash is produced from burning coal and includes calcium sulfate collected by the plant's pollution control devices. The former owner of the power plant created the impoundment in 1974 by building a 400-foot-high dam across Little Blue Run near its confluence with the Ohio River

In May 2012 a coalition of residents living near the impoundment announced intent to file a lawsuit against First Energy, citing water quality impacts to private wells, including high arsenic levels, and lowered property values. Also, some are concerned that a catastrophic dam failure like the one that occurred in 2008 at Tennessee's Kingston Fossil Plant flyash containment pond would drain the lake's contents directly into the Ohio River. According to Pennsylvania environmental officials, water samples from the lake do not exceed water quality standards (the lake is primarily regulated by Pennsylvania, though portions of it lie in West Virginia). First

Energy proposes to shut down the pipeline from the power plant to the lake in 2016, followed by closure activities from 2017 to 2032, which will involve placing a liner over 900 acres of the site and covering it with topsoil.

Heritage-WTI (Internet Information). East Liverpool, Ohio. Heritage-WTI is one of the world's largest capacity hazardous waste incinerators, located on a brownfield owned by the Columbiana County Port Authority on the banks of the Ohio River. The original permits for the facility were granted in 1983, a year before Ohio's hazardous waste laws were changed to include siting criteria, which prohibit building such facilities in floodplains. Air emissions from the facility include mercury, dioxins, and lead. The facility discharges metals to the Ohio River under permit 3IN00170; since 2002 these discharges have reportedly dropped from over 1,500 pounds per year to 34 pounds per year.

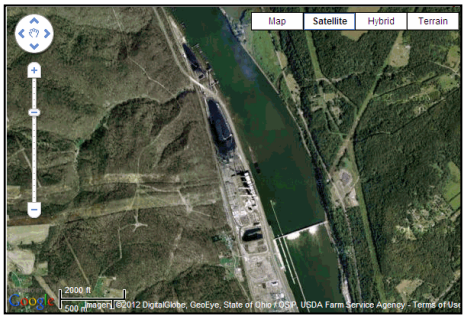
Homer Laughlin China Company (Internet Information). Located in Newell West Virginia, this 37-acre facility bordering the Ohio River produces and sells pottery, and has been in production at this site since 1871. According to the 2010 Toxic Release Inventory, the plant released 2,049.51 pounds of zinc compounds to surface water during 2010.

Quaker State Former Refinery (Internet Information). Quaker State is located on the south bank of the Ohio River in Hancock County, West Virginia, approximately 1.5 miles SW of Newell, West Virginia. The former refinery occupies approximately 70 acres and has nineteen Solid Waste Management Units (SWMUs) and four non-SWMU Areas of Concern (AOC). Contaminants of concern include benzo(a)pyrene, benzo(ghi)perylene, acetone, arsenic, toluene, methyl ethyl ketone and benzene**.** In December 1993 U.S. EPA alleged improper storage and treatment of hazardous wastewater at Quaker State's wastewater treatment plant and ordered Quaker State to perform a RCRA Facility Investigation (RFI) to determine the nature and extent of soil and ground water contamination. As of 2011, cleanup is ongoing. Shell Lubricants, a distribution center that services vehicles and trucks chemicals, now operates on the site, as well as the Ergon Refinery.

Ergon - West Virginia, Inc. (Internet Information). Ergon - West Virginia, Inc. (EWV) acquired the refinery at Newell, West Virginia, from Quaker State in July 1997. Crude oil is refined using the facility's hydrotreater and Methyl Ethyl Ketone (MEK) dewaxing unit. The paraffinic process and base oils are used in a wide variety of applications, including compounding motor oils, gear oils, greases, pharmaceutical and agricultural spray oils, food grade applications and in high-temperature rubber applications. EWV currently has capacity to process over 20,000 barrels per day of crude oil. These are transferred by truck or pipeline to gathering centers in Ohio and Pennsylvania before moving on to the refinery via truck, barge and pipeline. EWV maintains the flexibility to purchase additional crude from other sources and ship it to the refinery via barge or pipeline.

The Linde Group (Internet Information). The Linde Group (Linde) is an international industrial gases and engineering company headquartered in Munich, Germany. The West Virginia plant is located beside the Ohio River, just south of the Ergon site. No specific information is available on the Internet for this facility, but in general the company's products include hydrogen, acetylene, carbon monoxide, carbon dioxide, shielding gases for welding applications, noble

gases and specialty gases. These may be supplied in portable high-pressure gas cylinders, in liquefied form by road tanker, from on-site gas generators or in gaseous form via pipeline.



W. H. Sammis Power Plant. At 2,233 megawatts of capacity, the W. H. Sammis Plant is FirstEnergy's largest power generation facility in Ohio and is situated along the Ohio River in Stratton. A major retrofit of the environmental control systems was completed in 2010. The Sammis Plant dry handles all of its ash and any collected landfill leachate is treated at the plant's waste water treatment facility prior to being discharged through the permitted settling pond. The plant interfaces with the Ohio River in two ways: the plant's once-through cooling system and industrial discharge of the plant's settling ponds. These discharges are reported monthly to Ohio EPA.

According to the 2011 Toxic Release Inventory, the plant released 10,561 pounds of wastes to the Ohio River during 2011 (a 14% reduction from the previous year). These consisted primarily of metal compounds (arsenic, chromium, cobalt, copper, manganese, vanadium, zinc) and were dominated by ammonia (1,527 pounds) and barium compounds (5,772 pounds). http://ofmpub.epa.gov/enviro/tris_control_v2.tris_print?tris_id=43961FRSTNSTATE

In addition, the plant handles over 750,000 gallons of oils such as transformer oil, fuel oil and turbine lubricating oil and over 750,000 gallons of hazardous chemicals (primarily calcium and ammonium hydroxide) onsite, which would be a concern if there was an accidental release.

New Cumberland Locks and Dam. New Cumberland dam is located at River Mile 54.3 on the Ohio side of the river, next to the W. H. Sammis power plant. It was constructed between1955 and 1961, with the locks opening for traffic November 1959. This dam eliminated the original Locks and Dams 7, 8 and 9, which were constructed by the U.S. Army Corps of Engineers between 1904-1914. The dam has a lift of 21 feet and pool length extends 22.6 miles upriver. No records were found of any spills or barge accidents at this dam.

Valley Converting Co (Internet Information). This family-owned company, which has been in business since 1973, buys scrap paper and converts it into paperboard (cardboard), such as that used for notebook backs. In 2007 the company reportedly processed 25,000 tons of recycled paper from Jefferson and Belmont counties and made 24,000 tons of actual cardboard.

TIMET Titanium Metals Corporation. Toronto, Ohio. The company produces titanium mill products. The company receives titanium ingot and slabs for forging and rolling into billet, bar, plate, sheet and strip products. The facility operates under a NPDES permit (industrial and stormwater combined) that was effective August 1, 2012. The facility treats process wastewaters thru an internal treatment plant.

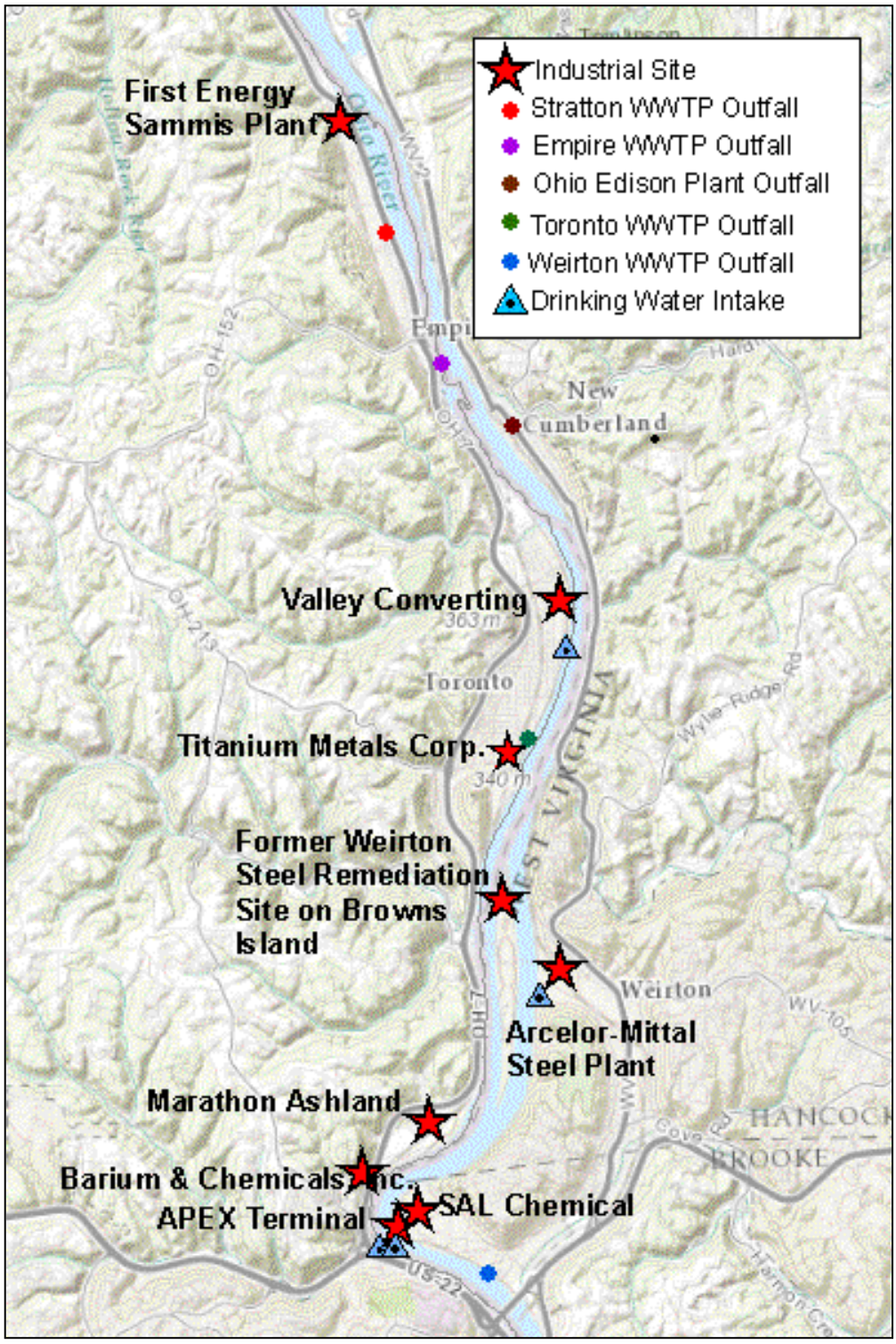
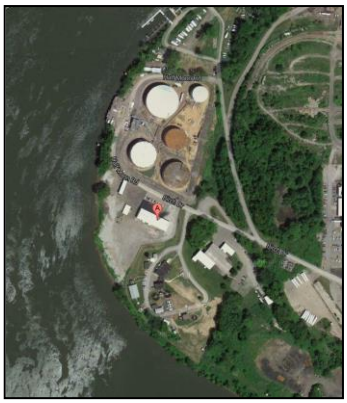


Figure 4. Major industrial facilities and outfalls located along Ohio River between Wellsville and Steubenville, Ohio (locations approximate)

Regulated chemicals discharged in the combined storm water and processed water include oil and grease, nitrogen, cyanide, fluoride, chromium, lead, mercury, nickel, and zinc. The facility has six outfalls, three on Jeddo Run and three on the Ohio River. The wastewater plant (outfall 602/620) is constantly monitored for pH and discharges via outfall 006 on the Ohio River. Signage is in place at each outfall location. TIMET has a "Notification-of- bypass" procedure in effect with the Weirton and Steubenville water systems. According to the 2011 Toxic Release Inventory, the plant released 87,582 pounds of nitrate compounds to the Ohio River during 2011.



Apex Terminal. Apex is an oil producer/distributor with a terminal in the Half Moon Industrial Park in Weirton, West Virginia, overseen by the Weirton Area Port Authority. The facility transfers oil industry products and wastes from trucks to tanks to barges for further transport along the Ohio River. For example, hydraulic fracturing fluids, which consist of concentrated brine with small amounts of industrial chemicals, will be transported downriver to New Matamoras, then trucked to deep injection wells. The drinking water intakes for both the City of Steubenville and the City of Weirton are located in this same vicinity, on the West Virginia side of the river.

Former Weirton Steel Remediation Site on Browns Island. Browns Island is located at Weirton, West Virginia in the Ohio River on the Ohio side of the navigation channel. A former brownfield site that was most recently used as the location of a coke processing facility, the property is owned by Tecumseh Redevelopment, a subsidiary of Arcelor-Mittal. The island is accessible by water and via bridges from both the Ohio and West Virginia river banks. There is no direct rail service to the island.

A RCRA facility assessment (RFA) has been conducted on Browns Island by Weirton Steel Corporation and a RCRA facility investigation (RFI) work plan for the site has been submitted. The RFA was conducted in 1988. The RFI documents are available for review from the West Virginia Department of Environmental Protection (DEP) or USEPA-Region 3.

Marathon Petroleum Company LP. Steubenville, Ohio. This is a fuel supplier with large storage tanks. The main concerns would be collapse of a storage tank or spills during loading of trucks. The facility has an outfall on the Ohio River.

Barium & Chemicals, Inc. Steubenville, Ohio. Barium & Chemicals, Inc. is a 180,000 square foot plant adjacent to the Ohio River north of Steubenville, Ohio. At this location the product line includes approximately 80 inorganic specialty chemical compounds which are used by the electronic, plastic, automotive, rubber, ordnance, pyrotechnic and the specialty chemical industries. The company shipped approximately 3 million pounds of chemicals around the world in 2010. Also during that year, according to the 2010 Toxic Release Inventory, the plant released an estimate of 19 pounds of barium compounds to surface water during 2010. Growth is anticipated by improving the storage capacity in the facility to allow for additional warehousing and renovating the on-site lab, but expansion has been delayed by hurdles with U.S. EPA. The

company was ready to sign onto a voluntary action program with Ohio EPA when the federal agency stepped in and requested retesting and reanalysis of data.

Arcelor-Mittal Weirton, Inc. Weirton, West Virginia.
This steel facility has been in operation since 1909, and covers approximately 1390 acres along the southern bank of the Ohio River. The facility is situated immediately adjacent to residential and commercial portions of the town of Weirton, West Virginia. Weirton has approximately 950 employees that reside in Weirton or the surrounding areas.

Steel–making was initiated at the Weirton facility in 1909. Since then, manufacturing operations have included iron-making, steel-making, hot and cold rolling, tin plating, chrome plating, and galvanizing. However, steel is no longer produced at this facility. Instead, 30,000-pound coils of steel arrive by rail or truck from Indiana or Cleveland, to be pickled, cold rolled, and annealed before being electrolically coated with tin or chrome. The steel coated with tin is primarily sold to customers who make cans, primarily for the food industry. Moved along largely by machines, the steel is uncoiled and fed into an annealing furnace that heats and softens it, then it is cold rolled to razorblade thickness. The steel passes through an acid pickling process to remove rust, grease, etc. then cleaned in a caustic bath, then either is tin or chrome plated electrolically in a bath that contains tin anodes or chrome which adheres to the metal strip. By the time it's cooled, trimmed and rewound, the coil has grown from 3,000 feet to 30,000 feet long. Then the tin-plated steel is wrapped and shrink-wrapped on pallets for shipment to those who make the cans.

Coke and coal tar byproducts were produced at two areas of the site (including an old coke plant on Browns Island) until 1982. Additional activities conducted onsite include four wastewater treatment operations.

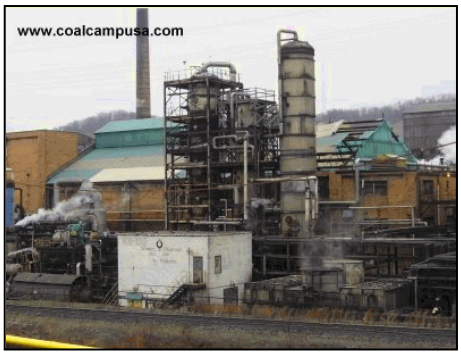
In September 1996, EPA issued a RCRA administrative order directing Weirton Steel Corporation (WSC) to proceed with site investigation and cleanup activities. In October 2007, EPA was notified that the facility's name was changed to ArcelorMittal Weirton, Inc. without a change in ownership.

Currently, the RFI process has been completed in three areas of the facility: CAA I (C & E Outfall Area); CAA II (Mainland Coke Plant); and, CAA XI (Former BOC/Air Products Site). EPA determined that no further action was required at CAA I however, the facility was requested to proceed with the preparation of a Corrective Measures Study Report for CAA XI in 2011. EPA reviewed a RFI Work Plan for CAA III (Browns Island) in early 2011 and expects the investigation work to begin later this summer.

The main contaminants present in the soils, surface water and groundwater are polycyclic aromatic hydrocarbons (PAHs), phenols, petroleum hydrocarbons such as benzene, toluene, and xylene, solvents, heavy metals and cyanide, and polychlorinated biphenyls (PCBs).

SAL Chemical Company. Weirton, West Virginia. SAL Chemical Company, established in 1965, is a repacker and distributor of various industrial and municipal type chemicals. Located in the Half Moon Industrial Park, SAL Chemical sits on a 16 acre lot and employs approximately 40 people. A West Virginia State permitted storm water discharge outlet is monitored and routinely analyzed for several parameters; including pH, Ammonia Nitrogen (as N), Nitrate + Nitrite Nitrogen (as N), Total Suspended Solids and Oil and Grease. Through a combination of secondary containment structures, sorbet materials, inspection and maintenance procedures, a river release is extremely remote. However, SAL Chemical does have a professionally developed Integrated Contingency Plan in place which details how spills and downstream notifications are to be handled.

Mountain State Carbon's Coke Plant (Internet Information). Follansbee, West Virginia. The coke plant at Follansbee, West Virginia was originally owned by Wheeling-Pittsburgh Steel Co. and now operates as Mountain State Carbon, which is a joint venture between the steel company and a Dearborn, Michigan firm.



A consent order issued by the West Virginia DEP gives the plant until Jan. 1, 2013 to meet limits for various hydrocarbons from coal tar, and sets other deadlines for various measures to be taken. Mountain State Carbon has until June 30, 2011, to submit a final design for a new solids removal system for the plant's wastewater. The company also must return a tar decanter to service by November 30, 2011. Two of the plant's five decanters are out of service awaiting repair or replacement. The decanters capture coal tar from the baking of coal into coke.

Other deadlines include completing installation of a new gravity separator solids removal system by January 31, 2012, and completing installation of a new diversion tank by February 29, 2012.

According to its 2010 Toxic Release Inventory, the company emitted 219,309 pounds of toxic chemicals into air or water, including: Mercury, Anthracene, Polycyclic Aromatic Compounds, Phenanthrene, Xylene, Naphthalene, Toluene, Cyanide compounds, and Ammonia. Additional compounds are listed as being emitted into air exclusively. It is not clear how much of the above was discharged into water vs. air.

Wheeling-Nisshin, Inc. Coating Plant (Internet Information). Follansbee, West Virginia. In April 1988, Wheeling-Nisshin started to operate its hot-dip Aluminizing and Galvanizing Line (AGL) and in 1993 a further advanced Continuous Galvanizing Line (CGL) was added, which was the nation's first high speed, hot-dip line specializing in light-gauge coated products. Wheeling-Nisshin has now become one of the largest hot-dip coating mills, producing 700,000 tons a year (AGL-400,000 tons; CGL-300,000) of coated steel used for various automotive, appliance, building and construction applications. U.S. EPA data indicate that Wheeling-Nisshin has greatly reduced its environmental releases since 2005; the TRI reports only five pounds of ammonia released to air in 2010.

Wastewater Outfalls. On the Ohio side of the river, there are 20 wastewater outfalls between Steubenville's public water intake and the Ohio/Pennsylvania border. Only four of the 20 are "major" dischargers (discharging greater than one million gallons per day): Titanium Metals, First Energy-Sammis, Ohio River Clean Fuels, and the East Liverpool wastewater treatment plant. (Steubenville's wastewater treatment plant is also a major discharger, but it is located downstream from the public water intake). Of the 20, six are municipal wastewater treatment plants (for the cities of Toronto and East Liverpool, the villages of Empire, Stratton, Wellsville, and ODOT Park #2). The remainder are outlets for industrial wastewater. For the five years from 2007 to 2012, none of these systems have had infractions of water quality standards requiring enforcement from regulators.

Table 1. Facilities with Permitted Wastewater Outfalls on the Ohio River Between Steubenville and the Ohio/Pennsylvania Border

Facility Name	NPDES Permit #	Size	Type
Allen Oil	0IN00242	Minor	Industrial
Marathon Petroleum	0IN00161	Minor	Industrial
Barium & Chemicals	0IE00009	Minor	Industrial
Titanium Metals	0IE00010	**Major**	Industrial
Toronto Wastewater Treatment Plant	0PD00017	Minor	Municipal
Valley Converting	0IA00006	Minor	Industrial
Toronto Water Treatment Plant	0IV00090	Minor	Industrial
Ohio Edison	0IB00012	Minor	Industrial
Empire Wastewater Treatment Plant	0PA00064	Minor	Municipal
Stratton Wastewater Treatment Plant	0PB00054	Minor	Municipal
First Energy – Sammis Plant	0IB00010	**Major**	Industrial
ODOT Park #11-2	0PP00056	Minor	Municipal
Buckeye Industries Mining	3IN00357	Minor	Industrial
Ohio River Clean Fuels (not open yet)	3IG00097	**Major**	Industrial
Marathon Petroleum	3IG00007	Minor	Industrial
Wellsville Wastewater Treatment Plant	3PD0023	Minor	Municipal
East Liverpool Wastewater Treatment	3PD00009	**Major**	Municipal
Heritage-WTI, Inc.	3IN00170	Minor	Industrial
Hall China Company	3IJ00015	Minor	Industrial
East Liverpool Water Treatment Plant	3IV00183	Minor	Industrial

Highways. State Highway 7 in Ohio, and State Highway 2 in West Virginia both follow the Ohio River. In numerous stretches, they are directly adjacent to the river, so that a chemical spill (from an overturned tanker, for example) could reach the river before HazMat teams could mobilize and contain the spill.

Railways. The Conrail and Norfolk Southern railways also follow the Ohio River closely, and present a similar hazard as overturned tankers, except that a train derailment involving cars carrying toxic chemicals would be a greater-magnitude concern due to the amounts that a railcar can carry, and the likelihood that multiple cars would be involved.

Slumping of hillsides. This portion of the Ohio Valley is characterized by steep hillsides located very close to the river. Slumping and rockfalls have occurred periodically along these hillsides; in 1996, a collapse threatened the main water line for the City of Steubenville. They have also been responsible for breaking petroleum product pipelines, as discussed below.

Many former coal mines also exist in this area, and pose threats of slumping as well as impacting water quality with seeps of acid mine drainage. To combat these problems, projects are reportedly underway in areas downstream from Steubenville to dewater a collapsed mine along the valley wall, and construct pipelines carrying treated acid mine drainage to the Ohio River. Communities should be aware of such projects and their planned discharge locations, to ensure they are not discharging just upriver from a public drinking water intake.

Petroleum Products Pipelines. At least a dozen pipelines cross the Ohio River between the Pennsylvania border and Follansbee. If a pipeline carrying hazardous materials ruptured beneath the river, it could cause significant source water contamination; natural gas, however, would tend to rise into the atmosphere, creating a potential explosive hazard. The Public Utilities Commission of Ohio (PUCO) regulates many of these pipelines but not all. According to their information—which only covers lines the PUCO regulates--there are numerous natural gas lines crossing the river near East Liverpool, Toronto, Steubenville and Mingo Junction. The Ergon Trucking Corporation's Magnolia pipeline carries crude oil from Magnolia (Tuscarawas County) to its terminus in Congo, West Virginia , crossing the Ohio River at Wellsville, less than a half mile above Buckeye Water District's intakes. The proposed ATEX Express pipeline, which carries natural gas liquids, is projected to cross the river a little over a mile upriver from the intakes for Steubenville and Weirton.

Pipelines that follow the river valley longitudinally also pose a risk, primarily where they cross tributaries to the Ohio River. In recent years, at least two pipelines crossing tributaries in this area have released product into the tributaries because of breaks caused by land slumping. Most of the pipelines paralleling the river in this region are natural gas lines. However, a Marathon pipeline listed as carrying petroleum products extends south through the hills northwest of Steubenville, terminating in Steubenville. This line crosses Little Island Creek and its tributaries several times. Little Island Creek discharges into the Ohio River at Costonia, about four miles above the Steubenville and Weirton intakes.

Prioritization of Potential Contaminant Sources

During meetings held during 2012, the protection planning team worked on determining the level and nature of the threat posed by the identified contaminant sources, and then deciding what—if anything—they could do to alleviate the threat. In terms of the volume of chemicals that could be involved in a spill or release, the following are the greatest concerns:

Commercial traffic on river
Ruptured petroleum pipeline
Railway accidents
Release from power plants
Bermed retention ponds

Source Management Strategies

Commercial traffic on River. It is estimated that up to one hundred barges carrying hazardous materials pass through the zone of critical concern within a 24-hour period. Each barge can carry up to 30,000 barrels of petroleum—equal to the amount carried in 40 rail cars. Moreover, a barge spill occurs directly into the Ohio River, making such spills more difficult to contain than releases that originate on land. Every year, several barge accidents are documented on the Ohio River, most often during high-flow and involving collisions with dams or bridges. Barges are regulated by the U.S. Coast Guard, which has the authority to halt all traffic on the river. When an accident occurs, the National Response Center is immediately contacted and it contacts ORSANCO, which then contacts the relevant downstream public water systems, as described below under “Contingency Planning”. Each barge company is required to have a contract with a commercial Hazmat company which must arrive on-site within a specified time period, usually an hour or two. The U.S. Coast Guard itself has similar arrangements with private Hazmat contractors.

Measures that could be taken to help prevent spills would be to persuade the barge companies to avoid operating during high-flow and/or to provide for higher towboat horsepower in the vicinity of dams during high-flow. (This could be proposed by ORSANCO as a voluntary measure for barge operators, or a regulation to be imposed by the U.S. Coast Guard). The communities signatory to this joint source water protection plan would add their support to basinwide efforts to make barge traffic safer.

One strategy worth pursuing is ensuring that marine boat captains and public water system operators can communicate with one another. Most commercial river traffic, and some recreational craft, are equipped with VHF marine radios (transceivers), available for around $100. Public water system operators must occasionally perform an air burst, which blows air out of the intake to remove debris and obstructions such as zebra mussels, etc. An air burst can capsize small boats if they happen to be over it. Where the water plant is located next to the river, the operator can visually check the

river before releasing the air, but in some cases the operator is not within view of the river. The ability to warn all river traffic—including the Coast Guard-- in advance would be safer and help avoid liability for accidents related to air bursts.

Also, ORSANCO staff report a case where a commercial tow boat tied up over a city's intake, and the churning of its propellers caused an influx of turbidity into the treatment plant. Efforts to contact the towboat operator failed because of incompatibilities in communications equipment . These issues illustrate the value of providing public water system managers with a reliable method for communicating with river traffic.

Ruptured pipelines. Pipelines typically have a leak detection system that alerts staff when there is a sudden loss of pressure. It would be useful to know the inspection schedule and to what extent the company is able to pinpoint the location of the leak through its instrumentation (as opposed to having to conduct a field inspection, which could delay remedial response). Only the pipeline companies themselves have the ability to implement any meaningful protective strategies for existing pipelines; however, community leaders should be alert to planned installation of new pipelines, and ensure that project managers are aware of drinking water intake locations.

Railway accidents. Train accidents usually can be attributed to human error, mechanical failure, or improper track maintenance. Derailments can be caused by excessive speed or uneven loading of cars, but more commonly are caused by flaws in the track. Over time, the wooden ties that hold track in place will crack and weaken, allowing track to slip out of alignment. Railway companies inspect the track on a regular basis, but the tracks along the upper Ohio River valley may warrant more frequent inspections than other portions of the lines. Also, replacement of aging wooden ties with concrete ties should be encouraged. Although expensive, concrete ties have become the industry standard. As with pipeline companies, it appears that only the railway companies themselves have the ability to implement meaningful protective strategies for these lines; therefore, no additional protective strategies are proposed here.

Bermed Retention Ponds. Throughout the region there are several retention ponds for coal wastes, which typically are created by damming a stream. In recent years there have been failures of such dams, though not in Ohio. Dam failures are often caused by overtopping, so careful management of water levels is critical. However, for some retention ponds there is no on-site round-the-clock management.

Several members of the planning team felt the dam at Little Blue Run Lake warranted prioritization due to the catastrophic impacts that a failure of this dam would have on downstream communities; on the other hand, a Jefferson County Emergency Management Agency representative said the EMA had studied this contingency and believed the likelihood of such an event was too small to warrant prioritization. In any case, the State of Pennsylvania is responsible for regulatory oversight of the dam, so officials in Ohio and West Virginia have little leverage over this site. Reportedly FirstEnergy plans to 'close' the lake soon—that is, stop depositing power plant wastes

in it. However, the existing coal wastes will remain in the lake, and the dam will remain in place, requiring continued management and maintenance.

Releases from power plants and industrial facilities. The various communities of the upper Ohio River valley have limited authority over the industrial facilities within their jurisdictions. Many of the industries have highly complex processes and their engineers know best what processes or areas are most likely to experience an explosion, leak or other release that could impact the Ohio River—as well as what options may be available to lower that risk. Many of the larger facilities have their own environmental officers, spill prevention training, and emergency response procedures. Minimizing the risks these facilities pose to the Ohio River will occur largely through the combination of existing Clean Water Act regulation*****; continued implementation by the facilities of Spill Prevention, Control and Countermeasures (SPCC) plans required by U.S. EPA; existing early warning and notification procedures facilitated by ORSANCO; and existing emergency response planning by county EMAs.

U.S. EPA's Office of Emergency Response administers the SPCC program, designed to prevent oil spills from reaching the nation's waters. Since 1973, SPCC plans have been required for facilities that (1) are not transportation-related; (2) have an aggregate aboveground storage capacity greater than 1,320 gallons or a completely buried storage capacity greater than 42,000 gallons; and (3) have a reasonable likelihood of discharging into or upon navigable waters of the United States or adjoining shorelines. An SPCC plan is expected to address the following items:

- Facility diagram
- Oil spill predictions
- Facility drainage
- Facility inspections
- Site security
- Five-year plan review
- Management approval
- Appropriate secondary containment or diversionary structures
- Loading/unloading requirements and procedures for tank car and tank trucks
- Personnel training and oil discharge prevention briefings
- Brittle fracture evaluations
- Bulk storage container compliance
- Transfer procedures and equipment (including piping)

Clean Water Act regulation. Ohio EPA's Division of Surface Water and West Virginia's Department of Environmental Protection administer the federal Clean Water Act, which requires a National Pollutant Discharge Elimination System (NPDES) permit for facilities that discharge wastewater into any waters of the state. These permits specify how much of various chemicals may be safely released during a given time period (based on computer modeling), and must be renewed periodically. Staff from these state agencies also conduct routine inspections of these facilities and monitor the streams, evaluating the stream's overall condition by chemical analysis of water samples and assessment of fish and other biota living in the stream being monitored.

Above all, the signatory communities will commit to developing and maintaining communications with representatives of the listed facilities as well as other stakeholders in Ohio River water quality, such as their own wastewater departments, County Soil and Water Conservation Districts, etc. A meeting with industry environmental managers will be planned for at least every 2-3 years. The goals of this meeting will be:

- Enable public water suppliers and industry environmental managers to make acquaintance;
- Review information in joint protection plan for corrections/updates;
- Make sure contact information is up-to-date;
- Give industrial managers a chance to describe what they are doing to protect the Ohio River;
- Discuss opportunities for partnering on public outreach; and
- Discuss protective strategies – what's working, what's not, what else could be done.

Other. The public water suppliers expressed concerns about the potential for higher chloride levels in their source water from road salt and from discharge of water used for hydraulic fracturing in oil and gas wells, which are proliferating in the northeastern counties of Ohio. In Ohio, oil and gas production waters may only be legally disposed of in Class II underground injection wells, which are regulated by the Ohio Department of Natural Resources, Division of Oil and Gas Resources. However, there are concerns about the possibility of illegal dumping into tributaries of the Ohio River. To this end, ORSANCO has been conducting a one-year study of total dissolved solids in the Ohio River, which is described below under "Source Water Monitoring".

Contingency Planning

Existing Early Warning and Notification Procedures. ORSANCO's early-warning program is the foundation of the Upper Ohio River systems' source water contingency planning. When a spill or release is reported on the Ohio River, ORSANCO notifies public water systems downstream and conducts time-of-travel calculations to give the systems an approximate timeline for the arrival of the plume. ORSANCO also samples the plume and reports its findings to the potentially affected systems until the emergency is over. This process is also put into action when a contaminant is detected during daily sampling, where the source of contamination may or may not be known. Typically ORSANCO sends out an e-mail to all the Ohio River public water systems downstream from a spill. In addition, ORSANCO staff make a direct telephone call to those systems most immediately downstream of the spill.

Contingency Planning by Public Water Systems. Contamination reported via email generally does not initiate any immediate action, as ample time is available to react as described above. When a plume approaches, public water officials typically close off the intake(s) and consider starting conservation practices, depending on how long the plume will take to pass and how much storage capacity they have.

Toronto's storage capacity is 3 million gallons, which would only be adequate to provide water to all its users for about 1.5 days. If the Ohio River water remained unusable for longer than this, one option would be to order water to be trucked in (a Hopedale, Ohio provider is listed in the contingency plan). Another option is pumping water from Steubenville via an emergency connection with the county distribution system; however, any contamination affecting the Ohio River at Toronto would likely also be a problem for Steubenville since Steubenville lies downstream. The Toronto water department has a line item of $22,000 in the budget set aside for unforeseeable contingencies.

Steubenville's storage capacity is 10 million gallons, which is adequate to provide water to its users for about two days. If the Ohio River water remained unusable for longer than this, one option would be to order water to be trucked in (a Hopedale, Ohio provider and a second Washington, PA provider are listed in the plant's contingency plan). Another option is pumping water from Toronto via an emergency connection with the county distribution system. This would be a viable option if the source of contamination were located between Toronto and Steubenville; if the source were located upriver from Toronto, the contamination affecting the Ohio River at Steubenville would likely be a problem for Toronto as well.

Buckeye Water District's storage capacity is 8 million gallons, which is adequate to provide water to its users for about 3 days. If the Ohio River water remained unusable for longer than this, one option would be to order water to be trucked in (a Salineville, Pennsylvania provider is listed in the plant's contingency plan). Another option is pumping water from East Liverpool by opening an existing connection. This would be a viable option if the source of contamination were located between East Liverpool and Wellsville; if the source were located upriver from East Liverpool, the contamination affecting the Ohio River at Wellsville would likely be a problem for East Liverpool as well.

None of the systems has a contingency plan for losing the Ohio River as a source, due to unforeseeable circumstances. In such an event, they would most likely construct wellfields in the nearest usable aquifer, which would be the Ohio River aquifer, unless the aquifer were also contaminated. Another option would be to tie in to a ground water-based system (or systems). Most of the sizable ground water systems in the area use the Ohio River valley aquifer, but the cost of running water lines out to them would be prohibitive.

Updating Emergency Contacts. In discussions with the Jefferson County EMA, it was noted that emergency contact information is difficult to keep up to date. The public water suppliers agreed to make updating the EMA on contact information a measure of this plan. Ideally, contact information should be updated as soon as a contact is replaced, but this will be a reminder when the plan is reviewed annually.

Emergency Response Planning by County EMAs. The Jefferson County EMA holds at least one drill/exercise per year with the Local Emergency Planning Commission, and

participates in drills with other local agencies when invited to do so. Also, Jefferson County has a County HazMat Team that can respond to emergencies on the river. However, West Virginia has jurisdiction over the river, so the team responds when West Virginia requests their assistance.

As noted previously, the entity responsible for a spill is also responsible for cleaning it up; all the barge companies and the regulated facilities along the river are supposed to have contracts with clean-up companies, with stipulations that the company be able to arrive on-site within a certain time period, usually one to two hours. In the event that a major spill is detected but the responsible party is not immediately apparent, the U.S. Coast Guard can initiate clean-up using its own contracted clean-up companies.

Education and Outreach

Storm Water Management Plans. State environmental agencies promote, or require, in NPDES permits, storm water management plans (SWMPs) for large industrial facilities as well as for most municipalities with a population exceeding 10,000. SWMPs require public education and outreach activities that frequently overlap with the public education and outreach activities required for a source water protection plan. Typically, each municipality or facility will develop and enforce its own SWMP.

In 2003 Jefferson County passed a county resolution authorizing the development and enforcement of a County SWMP that could be utilized by six signatory townships and six signatory municipalities (including Toronto and Steubenville). The Jefferson County Soil and Water Conservation District staff were authorized to monitor these jurisdictions and bring enforcement cases to the County prosecutor, as needed. The county staff developed a web site on the county SWMP, GPSed the various outfalls, and created a GIS layer for the outfalls. Other goals are to:

- develop brochures, create and publish a Land User Guide;
- develop and implement school curricula;
- begin workshops for construction professionals;
- create a stream monitoring program for streams not already monitored by Ohio EPA;
- initiate a storm drain stenciling program;
- initiate stream clean-up programs (including participation in the annual River Sweep, which is sponsored by ORSANCO);
- continue efforts to remediate acid mine drainage;
- promote BMPs for logging operations;
- publicize these efforts via articles, news releases/stories, and web site information; and
- survey residents to determine the effectiveness of the storm water awareness program.

All of these activities are also source water protection strategies. Therefore, source water protection public education and outreach is already being implemented for the cities of Toronto and Steubenville by the Jefferson County SWCD. However, Wellsville is located in Columbiana County and is a small enough village to be exempt from current requirements. Ohio EPA will discuss ways to reach out to Columbiana County SWCD and any other suitable organizations to make these strategies available to Columbiana County communities along the Ohio River.

ORSANCO's Urban Wet Weather, Combined Sewer Overflow tracking program, Watershed Pollutant Reduction, TMDL and Source Identification program all characterize and promote an understanding of non-point sources of pollutants.

Consumer Confidence Report. The Upper Ohio River systems all publish a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information is included in the CCR about the source of drinking water. The Upper Ohio River systems agree to include information in their CCRs on how to safely dispose of leftover pharmaceuticals, to discourage people in their communities from flushing them down the toilet, which leads to ultimate disposal in the Ohio River. For example, the Jefferson County Sheriff's office collects and safely disposes of pharmaceuticals.

Plant Tours. The public water system staff of all the Upper Ohio River systems regularly provide tours of the water plant upon request, usually to school groups but occasionally to other groups, such as the Boy Scouts.

River Sweep. Toronto and Steubenville residents regularly participate in "River Sweep", which is an annual basinwide riverbank cleanup sponsored by ORSANCO every summer. Begun in 1989, it attracts thousands of volunteers from public organizations, civic groups, recreational clubs and the general public.

Jefferson County Fair. The Jefferson County Fair, held during August, attracts folks throughout the region. The source water protection planning team agreed to provide source water protection information on a regular basis at this annual event. Also, in August 2013, the group will pursue having ORSANCO bring its mobile aquarium to the fair. ORSANCO staff use electro-shocking to obtain fish from the nearest stream of interest (in this case, the Ohio River) so that attendees can see the health and the diversity of fish in the river. After the event, the fish are returned to the river. This display has proved very popular and educational, attracting interest even from individuals who otherwise have little interest in rivers. However, mounting this event costs over $1,000 so the ability to offer this in 2013 will depend on securing funding.

Signage. The signatory systems will take steps to have signs placed at marinas, with the marina owners' consent, instructing boaters to report any significant spills to a given number.

Coordination. The Jefferson County EMA holds quarterly meetings with the Local Emergency Planning Committee, and source water protection planners can request permission to attend periodically, to learn what kinds of emergencies concern the experts, how they would address them, and what the water system might do to be better prepared for such emergencies.

Web Page. The signatory systems will pursue the creation of a web page summarizing this plan and providing interested parties with information on how to assist. They will pursue having the page hosted on an existing web site, such as the City of Steubenville's. They will pursue financial assistance from Ohio EPA's Environmental Education Fund to create and maintain this page.

ORSANCO's Basinwide Education. In addition, ORSANCO provides basinwide opportunities for outreach and public education through a variety of public meetings, which include:

- the triannual meetings of Commissioners;
- public workshops and hearings during the triennial review of the Commission's Pollution Control Standards;
- project-specific workshops, such as the CSO workshop; and
- programs provided by the Commission public information section, such as the mobile aquarium, school-based volunteer monitoring and the ORSANCO Ohio River Education Foundation's floating classroom.

The ORSANCO Educational Foundation (OEF) was founded by ORSANCO in 2003 to design, manage, and raise funds for educational programs in the Ohio River Basin. OEF has developed a curriculum for high schools that includes activities focused on watersheds, point and non-point pollution, and water monitoring. OEF has developed additional programming for elementary schools, community groups, and the general public. OEF also partners with agencies and organizations throughout the Ohio River Watershed to offer training opportunities for teachers, scientists, and environmental educators.

ORSANCO GIS Project. ORSANCO is coordinating the development of a comprehensive, searchable GIS for the Pike Island pool on the Ohio River, based on the existing outfall survey and query program. For example, a user will be able to query the program for a list of all facilities/outfalls from river mile X to river mile Y that discharge mercury and query how much they are permitted to discharge. Similarly, the user could locate all transfer points permitted to offload refined petroleum products or storage tanks that hold refined petroleum products, etc. Discussions include the possibility of making this application available through the web.

Source Water Monitoring

Public Water System Sampling. Public water systems using surface water typically sample the raw water daily to adjust the treatment processes as required by the water quality, which can change very rapidly. Steubenville, Toronto and Buckeye Water District all monitor raw water on a daily basis for turbidity, pH and temperature.

Basinwide Sampling. ORSANCO operates several water quality monitoring programs that support Source Water Program initiatives. ORSANCO's Organics Detection System (ODS) collects water samples on a daily basis from 13 locations on the Ohio River and major tributaries and screens for volatile organic compounds. Detections from this program are reported to ORSANCO offices where they are evaluated. As necessary, notification is then provided to downstream utilities (described above) and reported to the National Response Center. The nearest upstream ODS station is at Midland, Pennsylvania, at Ohio river mile 36, about 5 miles upriver from the Ohio River segment of interest here.

ORSANCO's TDS/Bromide Study. ORSANCO is conducting a study on the levels of total dissolved solids in the Ohio River, which began in December 2011 and will conclude in December 2012. Weekly sampling is conducted at 16 sites along the Ohio River from its source to its mouth at Cairo, Illinois. The closest upstream sampling location to the signatory public water systems is Beaver Falls in Pennsylvania. Another sampling location is at Steubenville, and the next site downstream is at Wheeling, WV. The constituents being studied include bromide, sulfate, chloride, fluoride, nitrate-nitrite, calcium carbonate, bicarbonate, potassium, sodium, magnesium, calcium, pH and conductance. It should be noted that two years ago ORSANCO determined a standard for total dissolved solids of 500 mg/l at a public drinking water intake.

Implementation

Please refer to the implementation plan on pages 2-4 of this plan.

Evaluating Effectiveness

As a systematic measure of effectiveness, the SWAP planning group will review and report, upon request, the success of ORSANCO's plume-tracking and early-warning notification upriver from its intake (see next section). Also, they will report the trends identified in ORSANCO's water quality reports, and document any anecdotal reports of potential source water contamination events detected early or prevented due to the plan's source control or educational efforts.

Other programmatic measures :

- *[If local ordinances are in place that are designed to protect the Ohio River from releases of hazardous materials]:* Has the ordinance achieved its purpose? (If not, why not?) Should it be revised to be more effective?

- *[If local ordinances are <u>not</u> in place]:* Do we have reason to be concerned about how the drinking water source protection area may be used in the future? Should we consider trying to better protect it through a local ordinance?

<u>Pollution Source Control Strategies:</u>

- Have we followed our own schedule of implementation/timeline (pages 2-4) for each of the pollution source control strategies?
- Are there new potential contaminant sources that need to be addressed with new pollution source control strategies?
- Have we implemented any new protective strategies that are not documented here?
- Did any of our strategies result in removal or elimination of a potential source?
- Did any of our strategies result in business owners or individuals modifying practices to decrease the risk of contaminating the drinking water source?
- Did our coordination with other groups (SWCDs, county EMAs, local health dept., local watershed group, etc.) contribute to the implementation of protective strategies?
- Have the partnerships developed during plan implementation been productive?

<u>Education and Outreach:</u>

- Have we followed our own schedule of implementation/timeline for each of the educational strategies?
- Are there any new groups in the population that we need to target with education and outreach strategies?
- Have we implemented any new educational strategies that are not already documented here?

- Has education and outreach targeting any specific group resulted in actions that reduced or could potentially reduce the risk of contaminating the drinking water source?
- Have we received additional funding to continue any particular education and outreach strategy?
- Have we received any accolades, awards or recognition from outside entities or organizations for our educational efforts?
- Have we had any unsolicited requests for SWAP-related education (such as requests for plant tours, requests for presenters/speakers at events, etc.)?
- Did our coordination with other groups (SWCDs, local health dept., local watershed group, etc.) contribute to the successful development and dissemination of SWAP-related information?
- Did we have sufficient staff and resources to complete all the planned educational efforts?
- Have educational efforts been cost effective? Efficient? (Consider level of attendance, attentiveness and participation by audience, comments received, etc., vs. the cost to facilitate the event) Should the frequency of the outreach be increased, decreased, or remain the same?
- Have the partnerships developed during plan implementation been productive?
- Have any of the target groups contacted the public water system for additional information about something they saw or heard about through these activities?

Contingency/Emergency Response:

- Are there any updates needed to the Contingency Plan?
- Did our coordination with emergency responders at the local and county level result in better communication and handling of spill incidents that could impact our drinking water?

Raw Water Monitoring:

- Are there new water quality, potential contaminant source or land use issues that would suggest a need to expand our raw water monitoring parameters?
- Have we partnered with another group (e.g., ORSANCO) to do more raw water quality sampling?
- Do we have any reasons to conclude that raw source water monitoring can be cut back or is no longer needed?

Effectiveness of Basinwide Source Water Protection Efforts. ORSANCO is in a unique position to measure the effectiveness of its efforts, because every year there are hundreds of spills on the Ohio River. Whenever its notification efforts enable a utility to avoid drawing contamination into a drinking water intake, both ORSANCO and the affected communities have scored a source water protection success. ORSANCO annual reports documenting the year's spill events are available at http://www.orsanco.org/rivinfo/pubs/orsa.asp.

Updating the Plan

The signatories to this plan commit to meeting once a year [select month?] to discuss any changes that need to be made in this plan. Circumstances that may prompt revisions include:

- Changes in contaminant sources (new ones appear, existing ones significantly increase risks, decrease risks, or discontinue operations)
- Major changes in water quality are detected;
- Major changes are initiated in a public water system operations;
- Additional communities wish to sign on to the plan;
- Upon evaluation, certain strategies are deemed not worth continuing;
- New strategies become available; etc.

Appendix A

Background information on Upper Ohio River and the signatory public water systems

The following information is condensed and updated from the Drinking Water Source Assessment Reports completed in 2003-2004 for the signatory public water systems by Ohio EPA.

PUBLIC WATER SYSTEM DESCRIPTION

Buckeye Water District

Buckeye Water District operates a community public water system that serves approximately 10,300 people residing in the Village of Wellsville and surrounding areas. The source of water is the Ohio River, with two intakes located at river mile 47.25. The system's treatment capacity is currently 4 million gallons per day, with an average daily production of 1.29 million gallons per day.

The raw water is pumped five miles to an 8 million gallon raw water reservoir. Treatment includes flocculation and sedimentation, followed by filtering through 4 cluster sand filters, then pumping to a 400,000 gallon clear well. Sodium permanganate is added for oxidation, and lime for pH adjustment. Chlorine and fluoride are added before pumping to distribution. During warm months, powdered activated carbon is used to control taste and odor.

City of Steubenville

The City of Steubenville operates a community public water system that serves 18,965 people; in addition to the city's residents, it sells water to the Jefferson County Water and Sewer District. The source of water is the Ohio River, with two intakes at river mile 65.2, approximately 800 feet off the shoreline. The system's treatment capacity is 7.5 million gallons per day, with an average daily production of 4.6 million gallons per day.

Raw water is pumped to a 6.3 million gallon raw water reservoir located next to the plant on University Boulevard. Water is clarified by three superpulsator upflow clarifiers before being sent to four dual media filters that remove the remaining solids. The filters are backwashed approximately every 72 hours. The wastewater produced from this practice is currently discharged to the sanitary sewer system.

Gaseous chlorine, orthophosphate and fluorosilicic acid are added prior to water entering the clearwell, where it resides for the required disinfection time, and then is pumped to five storage tanks with a total storage capacity of 2.65 million gallons.

City of Toronto
The City of Toronto operates a community public water system that serves apopulation of approximately 5,091 people with 2,020 municipal, residential and industrial service connections. The treatment capacity is approximately 5 million gallons per day, but current average production is about 2.6 million gallons per day (MGD) with the City demand of approximately 0.600 MGD.

The water treatment facility pumping station is located along Ohio River at the eastern end of Clark Street, with a 20-inch intake at river mile 59.2. In 2005 the intake was upgraded with new copper and zinc coated screens and dispending capability for potassium permanganate treatment for the prevention of accumulated zebra mussels. It is inspected periodically; the last inspection was in 2005.

Three 2.5 MGD raw water pumps located adjacent to the wet well at the river's edge obtains suction from the wet well and discharges to the north pre sedimentation basins used for hold time for settling purposes. Three 2.5 MGD intermediate pumps discharge to the water treatment plant located at 950 Main Street, west of the pumping station. The new water treatment plant was constructed and put into operation in 2005 and is capable of producing 5 MGD.

Water treatment processes include pH control, coagulation, and organics removal enhanced with potassium permanganate (to address algae and mussels), poly aluminum chloride, lime, poly phosphate, fluoridation, sodium hypochlorite and powdered activated carbon. All sludge removed during treatment is discharged to lagoons located west of the water treatment plant, with a ten-year storage capacity. The three million-gallon storage tank maintains Toronto's distribution system and Jefferson County Water and Sewer demand.

Jefferson County Water and Sewer District purchases bulk water from the City of Toronto for several additional public water systems serving a population of approximately 14,350 people with 5,740 municipal, residential and industrial service connections. Jefferson County's demand requires the City of Toronto water treatment plant to process an average of 1.6 million gallons to 2.2 million gallons extra per day.

HYDROLOGIC SETTING

The land area draining into the Ohio River from East Liverpool to Follansbee is part of the Western Allegheny Plateau ecoregion. Annual average precipitation is approximately 38 inches, of which 13.3 inches becomes surface runoff. Land use in Jefferson County is 96 percent rural, of which 31 percent is farmland. Columbiana County is 29 percent cropland, 17.1 percent pastureland, and 33.5 percent forest.

WATER QUALITY IN RIVER

ORSANCO conducted an 18-year study of water quality trends throughout the entire Ohio River basin, from 1990 to 2007, based on bimonthly sampling of the river water at 31 sampling stations. This study indicated that basinwide there was a strong decrease in metals but a strong increase in chlorides and magnesium (Table A-1). Statistical analysis of flow-adjusted concentrations revealed that significantly more decreasing trends were found in the upper river than the lower river (with Cincinnati being the approximate midpoint between the upper and lower river).

Table A-2 shows that at New Cumberland—the sampling station located centrally within the area of critical concern--there was an increase in chlorides, hardness and magnesium and a decrease in aluminum, manganese and ammonia. The table also shows a noticeable improvement in water quality at the next sampling station downriver, at Pike Island.

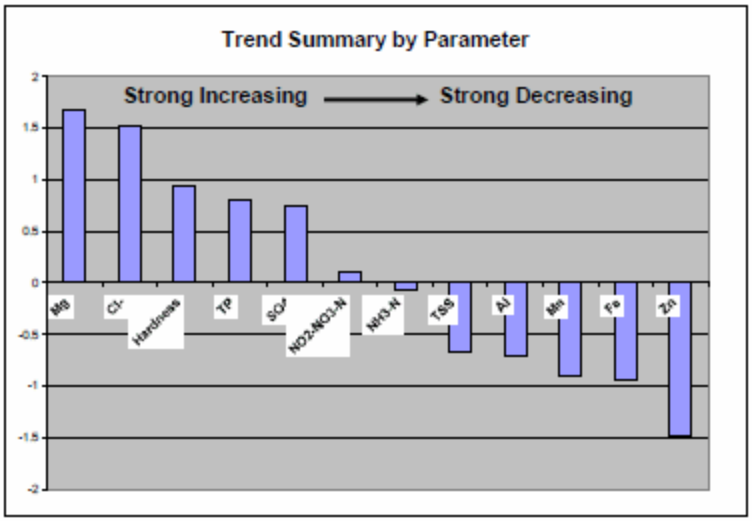


Table A-1. Water Quality Trends on the Ohio River
From ORSANCO, 2008, *Long-Term Water Quality Trends of the Ohio River and its Tributaries, 1990-2007*, page 19

	New Cumberland	Pike Island
Aluminum	DEC	DEC
Chloride	INC	INC
Iron	DEC	DEC
Hardness	INC	0
Magnesium	INC	inc
Manganese	DEC	DEC
Ammonia as nitrate	0	DEC
Nitrate/Nitrite	INC	0
Sulfate	0	0
Total Phosphorus	DEC	DEC
Total Suspended Solids	DEC	DEC
Zinc	DEC	DEC

Table A-2. Ohio River Water Quality Trends Recorded at New Cumberland, WV and Pike Island, 1990-2008. [Data taken from Table 4, page 21 of *Long-Term Water Quality Trends of the Ohio River and its Tributaries, 1990-2007*]

The full report can be viewed at:
http://www.orsanco.org/images/stories/files/publications/trendsreport/2008trendsanalysis.pdf

A fish consumption advisory is in effect for the entire length of the Ohio River. This includes a “Do Not Eat” advisory for carp and for channel catfish more than 17 inches in length. There are limitations for the safe consumption of nine other species. PCBs, mercury and dioxin are the major causes of fish consumption advisories.