Public Health Consult
for
Olin Basin

EPA Site ID# ALD008188708

Prepared by the
Alabama Department of Public Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Foreword

The Agency for Toxic Substances and Disease Registry (ATSDR) was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also called the *Superfund* law. That law set up a fund to pay for identifying and cleaning up our country's hazardous waste sites. The United States Environmental Protection Agency (EPA) and state environmental agencies oversee the site investigation and clean up actions. Historically, public health assessments are conducted by environmental and health scientists from ATSDR. In 1993, the Alabama Department of Public Health (ADPH) entered into a cooperative agreement with ATSDR, the goal of which was that ADPH would develop the capacity to perform this function for ATSDR.

In 1986, the Superfund Amendments and Re-authorization Act (SARA, Title III) required ATSDR to conduct a public health assessment at each site on the EPA National Priorities List (NPL). Public health assessments seek to discover whether people are being exposed to hazardous substances. Under the 1993 cooperative agreement and subsequent renewals, this responsibility has been assumed by ADPH for sites in Alabama. If people are exposed or have the potential to be exposed, a decision is made as to whether the exposure is harmful and at what level health effects might occur; from these data, a determination can be made whether the exposure should be stopped or reduced.

Exposure: ADPH health assessors review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. ADPH typically does not collect and analyze environmental samples. Instead, ADPH reviews sampling data provided by EPA, other government agencies, businesses, or the public. When there is not enough environmental information available, the assessment will indicate that further sampling data are needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ADPH scientists evaluate whether that exposure may result in harmful effects. ADPH, as well as ATSDR, recognizes that children, because of their play activities and their smaller body size, may be most susceptible to these effects. As a policy, unless data are available to suggest otherwise, ADPH health professionals responsible for assessing effects in populations consider children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to children is considered first when evaluating the health threat to a community. The health impact to other high risk groups within the community (i.e., elderly, those with compromised immune systems, chronically ill, women of child-bearing age, and people engaging in high risk practices) also receive special attention during the evaluation.

ADPH uses existing scientific information that can include the results of medical, toxicological, and epidemiologic studies and disease registry data to determine the health effects that may result from exposure. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances may not be available. In such cases, the report will document the need for further data collection activities.

Conclusions: The report assigns a public health hazard category and describes any hazards at the site. It contains a public health action plan that recommends ways to stop or reduce exposure. Because ATSDR and ADPH are advisory agencies, not regulatory, the report identifies actions that are appropriate for EPA, other responsible parties, or the research or education divisions of ATSDR and/or ADPH to conduct. However, if there is an urgent public health hazard, a public health advisory can be issued to warn people of the danger. When appropriate, health education or pilot studies of health effects, full-scale epidemiology studies, diseases registries, surveillance studies, or research on specific hazardous substances can be initiated.

Interactive Process: The development of a health assessment is an interactive process. The approach requires accumulation of information from many sources, including, but not limited to: ATSDR; many city, state, and federal agencies; the companies responsible for cleaning up the site, the principal responsible party (PRP), and the community. Once an assessment has been completed, the conclusions are shared with all interested parties. They are asked to comment on an early draft of the report to make sure the data they provided are presented correctly and responsibly. Sometimes agencies will begin to carry out recommendations when they read the draft conclusions and recommendations.

Community: ADPH needs to determine what people in the area know about the site and what health concerns they may have about the site. Therefore, ADPH gathers information and provides its findings to the public. ADPH works closely with the local health department to assure that the affected population is informed about the type of contamination and conducts health education activities to ensure they understand the health effects and or outcomes from being exposed to a specific contaminant. The public is broadly defined to include people who live or work nearby, property owners, business owners, civic leaders, health professionals, community groups, and anyone else who is interested or concerned. ADPH is available to answer questions or assist the public at all times.

Comments: If you have questions or comments after reading this report, please send them to the Alabama Department of Public Health, 201 Monroe Street, Suite 1470, Montgomery, Alabama 36104.

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Summary and Statement of Issues

The Alabama Department of Environmental Management (ADEM) requested the expertise of the Alabama Department of Public Health (ADPH) in evaluating sampling data that documents levels of contamination in the Olin Basin area to ensure that public health of individuals is protected.

Unfortunately, certain toxic chemicals have been found in some lakes and rivers in Alabama. Some of these chemicals can accumulate in fish. With some of the materials, higher levels of contaminants can be found in older and/or larger fish. When chemical concentrations are elevated in fish, they can pose health risks to people who consume them.

Currently, ADPH provides fish advisories of all the states' waterbodies and works closely with ADEM who conducts collection and testing of fish tissue. ADPH evaluates these data to determine whether a health risk exists, and if so, the significance of the level of risk to population subgroups. ADPH has received calls of concern from local sport fishermen regarding the safety of eating fish caught near the Olin Basin area.

Background

ADEM identified the Olin Basin as a waterway within the state that contained higher levels of mercury (Hg). Mercury is a naturally occurring element and is still found in a variety of products such as barometers, thermometers, paints, and batteries. Manufacturers are seeking non-mercury alternatives for many of these uses. Manufacturers also use mercury in the production of chlorine, caustic soda, urethane foam, and other products. Such wide use has led to unintentional contamination of the environment. Mercury from naturally occurring sources (e.g., geological formations) has also been taken up in growing trees and vegetation. Burning of these materials, either as wood or coal can result in the release of mercury into the air. A large source of this exposure route is from industries which burn coal as fuel. Once in the environment, airborne inorganic mercury is deposited on the earth or water where it is converted to methyl mercury. This is the chemical form that is most hazardous to human health. In recent years, the government has promulgated regulations to limit or ban the use of mercury in various products and industrial processes to minimize this source of mercury.

The level of mercury in fish tissue resulted in Olin Basin being placed on the Alabama Department of Public Health (ADPH) Fish Consumption Advisory List. The advisory stated there should be no consumption of largemouth bass or channel catfish. The Olin Basin is now a part of the Olin Corporation (McIntosh Plant) Superfund site. A brief site background, cleanup progress, and history of the Superfund site from EPA Region 4 webpage is provided as a reference along with updates from recent agency publications.

The Olin Corporation McIntosh Plant site is located approximately 1 mile east-southeast of the town of McIntosh, in Washington County, Alabama. The Olin main plant and associated properties cover approximately 2,200 acres. From 1956 until 1982, Olin produced chlorinated organic fungicides, chlorine, caustic soda and sodium hypochlorite using the Mercury Cell Technology at the site. Presently, Olin produces chlorine, caustic soda, sodium hypochlorite by

the Diaphragm Cell (since 1977) and Membrane Cell Technology (since 1997) methods and also blends and stores hydrazide compounds at the site (since 1988). Releases of mercury and organic chemicals have contaminated the shallow (alluvial) groundwater beneath the site. Discharges of wastewater containing mercury from 1952 through 1974 have contaminated the Olin Basin adjacent to the Tombigbee River. Approximately 500 people live in the area of the site. Everyone in the area utilizes a community well in the Miocene Aquifer approximately 3 miles west and upgradient of the site as a source of drinking water.

The Olin McIntosh plant is both a Resource Conservation and Recovery Act (RCRA) facility and a National Priority List (NPL) site. Since 1984 Olin has clean-closed 9 RCRA hazardous waste management units at the site. One RCRA unit has been closed with waste left in place. In 1987, Olin started treating contaminated groundwater. In 1990, under a Superfund Administrative Order of Consent, Olin removed 11,407 tons of hexachlorobenzene contaminated soil from the site (EPA webpage).

The final Remedial Design for Operable Unit One (OU-1) was approved on September 29, 1998. The construction for the Remedial Action for OU-1 began during the Spring of 2000 and was completed in August 2001. The Record of Decision for Operable Unit Two (Olin Basin and wetlands adjacent to the Tombigbee River) has not been established at this time. (EPA webpage)

The basin is located on private property, is fenced to preclude entry and posted; fishing is not permitted because this is private property, ADPH cannot post an advisory on the Olin Basin itself. Olin regularly monitors the basin area to discourage anyone from trespassing. A portion of the Tombigbee River that is prone to runoff from the basin remains under a posted “no consumption” advisory. The Olin Basin property is monitored through the CERCLA program. Therefore, ADEM and ADPH no longer need to monitor these waters as part of the Fish Tissue Monitoring Program and the “no consumption” advisory will no longer be listed. At one time, the level of dichlorodiphenyltrichloroethane (DDT) was high enough to render a “no consumption” advisory, but recent test results have shown the levels of DDT have fallen below FDA Advisory Levels for largemouth bass and channel catfish. The “no consumption” advisory due to DDT has since been lifted. However, the Tombigbee River waters will continue to be monitored.

Total maximum daily loads (TMDLs) for all pollutants causing violation of applicable water quality standards are established for each identified water body. Such loads are established at levels necessary to implement the applicable water quality standards with seasonal variations and margins of safety. The TMDL process establishes the allowable loading of pollutants, or other quantifiable parameters for a waterbody, based on the relationship between pollution sources and in-stream water quality conditions. This enables states to establish water-quality based controls to reduce pollution from both point and non-point sources and restore and maintain the quality of their water resources (USEPA, 1991).

ADEM, in cooperation with EPA Region 4, have determined that a total maximum daily loads (TMDL) for metal (mercury) in Olin Basin is not necessary due to the following:

- ADEM and EPA Region 4, under the CERCLA and RCRA Programs, are jointly managing the ongoing investigation and mitigation activities to address the DDT and mercury contamination within Olin Basin.

- The CERCLA and RCRA programs have the statutory authority (i.e., enforcement mechanisms) to ensure that appropriate remedial measures are being taken by the responsible parties to protect human health and the environment.

- The CERCLA and RCRA programs are required by law to meet the goals of the Clean Water Act. These requirements are known as applicable or relevant and appropriate federal standards and more stringent state standards, more commonly referred to as ARARs are applied.

ADPH, in cooperation with ADEM, will continue to provide for effective communication and coordination between its TMDL, CERCLA, and RCRA Programs in order to eliminate duplicative efforts during the ongoing investigation and remediation of the Olin Basin.

Olin Basin will be included in category 4b of the 2004 section 303(d) Integrated List. This category includes waterbodies that are impaired or threatened for one or more designated uses, but does not require the development of a TMDL because other pollution control requirements are expected to address all water-pollutant combinations and attain all Water Quality Standards in a reasonable period of time.

Community Health Concerns

ADPH is deeply involved in ensuring that public health is safeguarded in the area of fish consumption. ADPH provides fish consumption advisories for the state and responds to questions and comments from residents and other state agencies that address the safety of eating fish from the waterways of the state.

The two most caught fish around the Olin Basin are the largemouth bass and the channel catfish. Local fisherman have called the ADPH numerous times requesting information regarding the consumption of these two species at this site. ADPH has advised the fisherman that eating fish caught from the Tombigbee River at (mile 60.5) is not recommended.

Data Analysis

The initial analysis of fish tissue data collected by ADEM in 2002 revealed high levels of mercury. Table 1 lists the elevated fish tissue data for mercury in largemouth bass collected from different locations in the basin.

TABLE 1
Mercury in Fish Tissue

Species	Fish number	Parts Per Million	Meets or exceeds FDA Guidance
Largemouth bass	1a	**4.00**	**Exceeds**
Largemouth bass	1b	**4.08**	**Exceeds**
Largemouth bass	2b	**4.76**	**Exceeds**
Largemouth bass	3b	**5.77**	**Exceeds**
Largemouth bass	4b	**9.35**	**Exceeds**
Largemouth bass	5b	**4.03**	**Exceeds**
Largemouth bass	6b	**5.75**	**Exceeds**

Note**: The FDA guidance level for Mercury is 1.00 part per million**
Note: Average for Olin basin is 5.39

Discussion

The mercury concentration that the ADPH uses to add or remove waterbodies on the Fish Consumption Advisories is 1 mg/kg (ppm) in fish tissue. The basis for this concentration is the United States Food and Drug Administration's (USFDA) "Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed", August 2000.

The USFDA standard was selected because it is a health-based standard. EPA levels are based on environmental cleanup values that are lower than those implicated in health effect causation.

ADPH, under a cooperative agreement with ATSDR, reviewed available environmental information for the site and concluded that the primary pathway through which the public would be affected by this contaminant is from ingestion of contaminated fish tissue. This document covers the fish data up to Dec 1, 2003. Any additional fish data collected after this date will be evaluated at a later time.

The levels of mercury for largemouth bass and channel catfish at river mile 60.5 of the Tombigbee River exceed USFDA levels. The Olin basin itself is private property and entry to the basin for fishing is not permitted. The Olin Basin property is monitored through the CERCLA program. Therefore, there is no completed exposure pathway. ADEM and ADPH no longer need to monitor the basin as part of the Fish Tissue Monitoring Program, but the Tombigbee River waters will continue to be monitored.

Children's Health Concerns

ADPH recognizes that infants and children can be more sensitive than are adults to exposure to some environmental contaminants or hazards. Consideration of children as a population subgroup is warranted because: (1) children are more likely to be exposed to certain media (e.g., soil or surface water) because they play and eat outdoors (2) children are shorter than adults, which means that they can breathe dust, soil, and vapors closer to the ground (3) children are

smaller than adults, thus childhood exposure results in higher doses of chemical exposure per body weight. Children can sustain permanent damage if these factors lead to toxic exposure during critical growth stages. ADPH is committed to evaluating children's special interests at sites such as Olin Basin.

ADPH evaluated the likelihood that children living around Olin Basin could be exposed to contaminants at levels of health concern. ADPH stresses that adults and children should adhere to the fish consumption advisory and not eat largemouth bass or channel catfish caught from river mile 60.5 of the Tombigbee River.

Conclusions

The Olin Basin site is currently designated as posing no public health hazard because there is no completed exposure pathway. Currently, a no consumption advisory for fish has been issued. The site itself is fenced and only accessible by persons willing to commit criminal trespass. Olin regularly monitors the basin area to discourage anyone from trespassing.

Recommendations

- ADPH recommends that remedial activities continue until the site meets United States Environmental Protection Agency (USEPA) standards.
- Anglers and fishermen should adhere to the no consumption advisory and should not eat fish caught from the Tombigbee River at (mile 60.5).

Public Health Action Plan

This public health action plan was implemented during the course of the investigation or shortly afterwards.

The CERCLA program will determine all monitoring requirements for the Olin Basin, based on potential risk to Public Health and the Environment.

ADPH Health Educator is directly involved in preparing materials that will educate the public on health effects that may be incurred during remediation of the site.

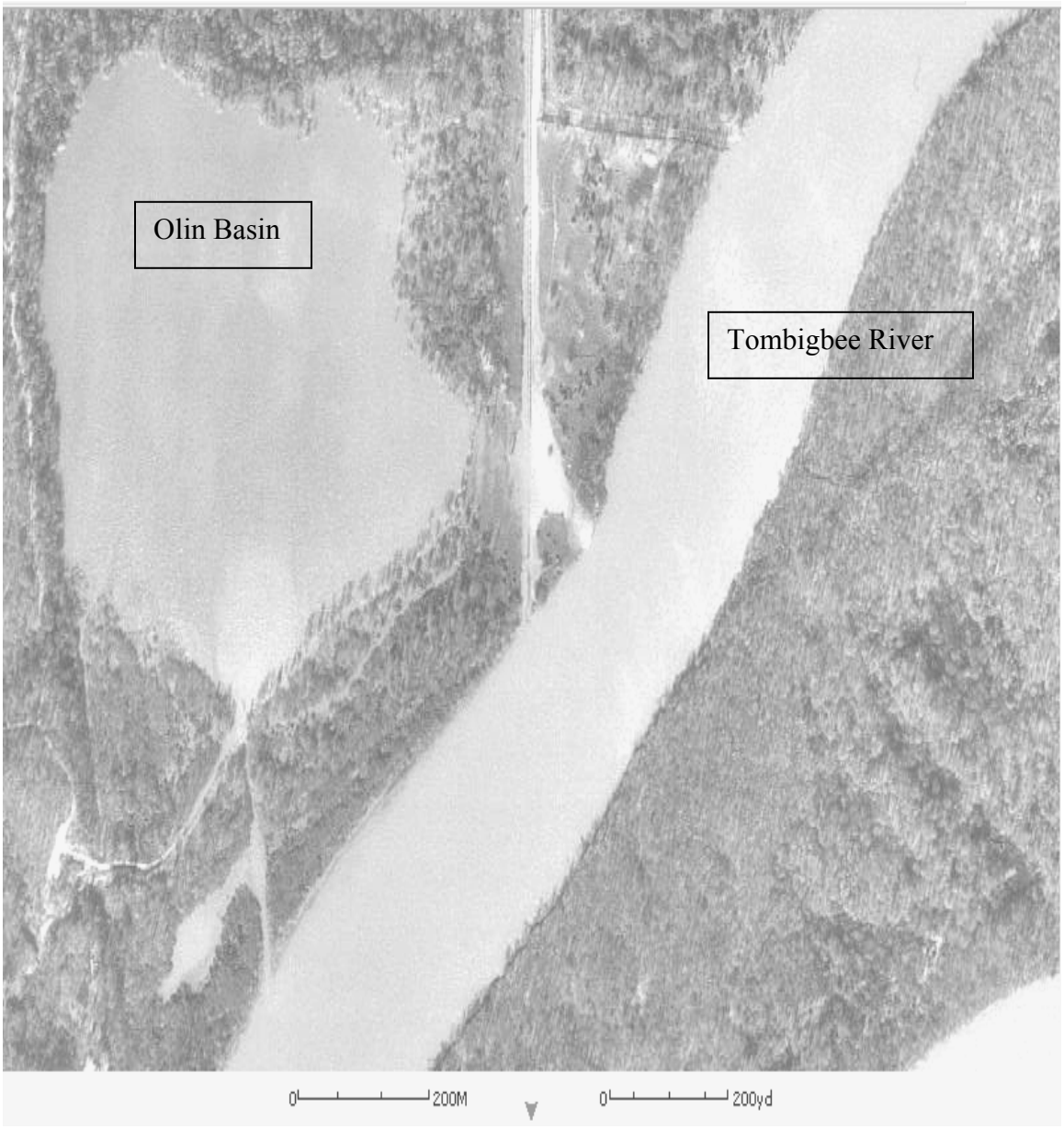
ADEM will continue to monitor mercury levels in fish.

ADPH maintains the existing fish advisory for fish from the Tombigbee River as not to consume largemouth bass and channel catfish.

ADPH will remain close working partners with ADEM and monitor the status of all remedial actions and address any public health questions or concerns regarding the Olin basin contamination.

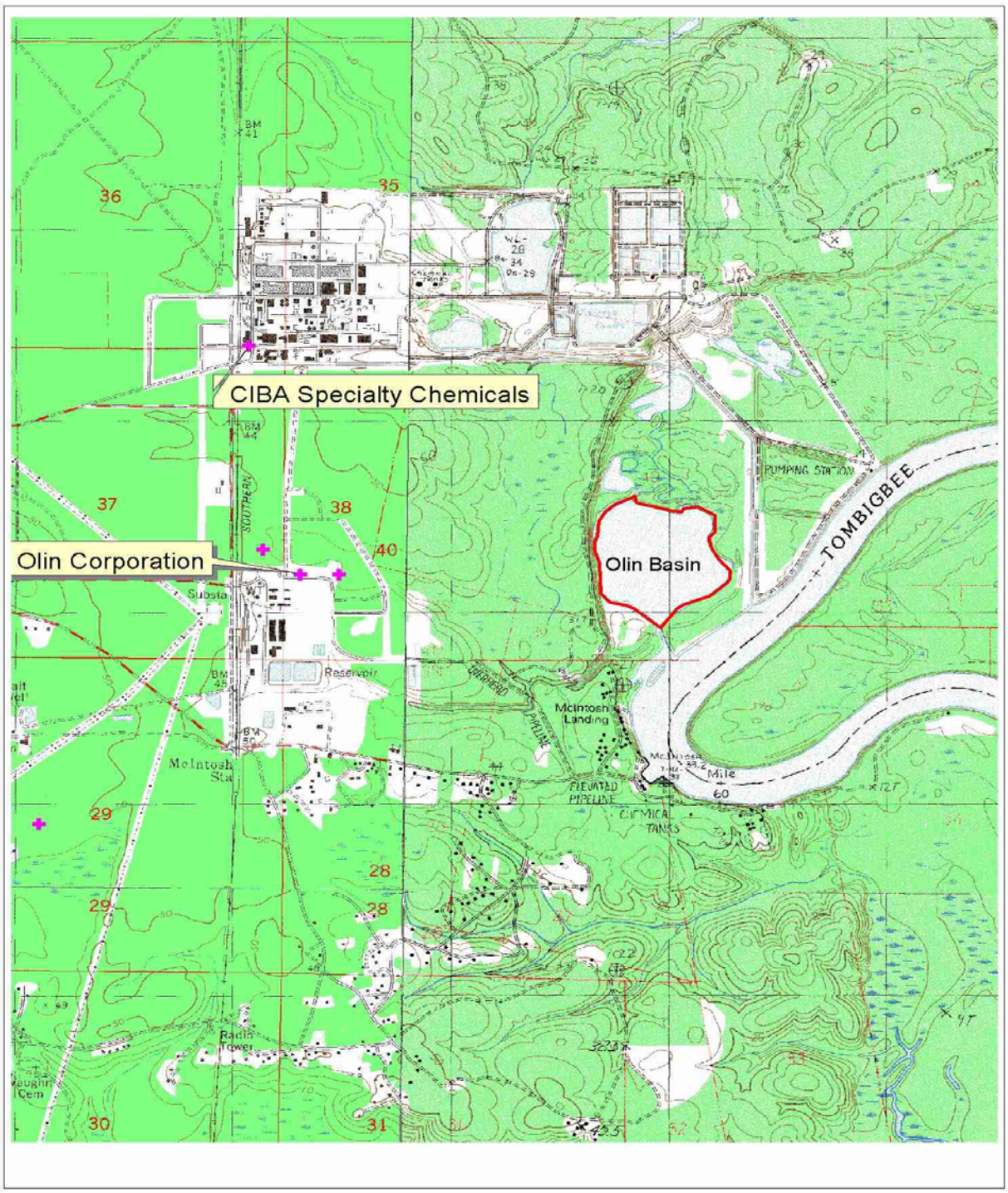
FIGURES

Figure 1



Aerial view of the Olin Basin.

Figure 2



Topographic map of the Olin Basin

APPENDIX 1
Methods for Analyzing and Collecting Fish Tissue Data

No defined statistical method of evaluating target fish tissue concentrations from available fish tissue data currently exists. The ADPH bases their conclusion on whether or not a given water body should be included on the Fish Consumption Advisory by analyzing all relevant data and information and subsequently using their best professional judgment.

Any fish data that the Alabama Public Health Department (ADPH) uses in issuing a Fish Consumption Advisory must conform to all procedures for collection and analysis as described in the ADEM *Standard Operating Procedures And Quality Control Assurance Manual Volume III – Fish Sampling And Tissue Preparation For Bioaccumulative Contaminants (SOP)*. A general overview of these methods is described in the following paragraphs.

Sampling is typically conducted in the fall of the year, generally October-December for the Fish Tissue Monitoring Protocol (FTMP). These months are preferred in fish tissue monitoring programs because:

a) Organic pollutants, primarily stored in fatty (lipid) tissue, would be at the greatest concentration as fat content of fish is highest at this time of year;
b) Target species are more easily collected while water levels are low and as water temperatures cool;
c) Fall collections do not interfere with spawning seasons of target species.

Collection methods may include electrofishing and/or gillnets as needed. At each location, six individuals of the same species are collected from each of two primary feeding groups, predators and bottom-feeders. Where mercury contamination is the primary concern, only predator species may be collected if resources are limited. Collected fish are within a size range identified in the SOP, with the additional requirement that catfish weigh a minimum of one pound as requested by the ADPH.

After collection, fish are weighed and measured and any abnormalities are noted. The skin of each fish is removed and discarded, followed by the removal of the left and right side fillets that are packaged separately and stored until laboratory analysis. Otoliths and spines are removed from the carcass and preserved for age determinations.

Following completion of analyses, all data are compiled and distributed to cooperating agencies and a press release issued to provide analytical results to the public.

References

United States Environmental Protection Agency. 1991. Guidance for Water Quality-Based Decisions: The TMDL Process, Office of Water, EPA 440/4-91-001.

ADEM Administrative Code, 2002. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Alabama Department of Environmental Management's Fish Tissue Monitoring Program.

ADEM *Standard Operating Procedures And Quality Control Assurance Manual Volume III – Fish Sampling And Tissue Preparation For Bioaccumulative Contaminants* (SOP).

Alabama Department of Public Health Fish Consumption Advisories. http://www.adph.org/RISK/Alabama%20Fish%20Consumption%20Advisories%2003.pdf

Food and Drug Administration (FDA) "Action Levels For Poisonous or Deleterious Substances in Human Food and Animal Feed" Industry Activities Staff Booklet, August 2000.http://www.cfsan.fda.gov/~lrd/fdaact.html

Alabama Department of Environmental Management's Water Quality Report to Congress April 1992.

Alabama Department of Environmental Management's Water Quality Report to Congress April 1994.

Alabama's 2002 Water Quality Report to Congress (Clean Water Act 305(b) Report).

Final Report, Field Investigation, Olin Basin Operable Unit 3, Bucks, Alabama, ESD Project Nol 94 E-419, dated August 1994.

EPA Region VI Alabama NPL Caliber Cleanup Site Summaries Webpage, http://www.epa.gov/region4/waste/npl/nplal/olinmcal.htm

OU-2 RGO Support Sampling Report, McIntosh Plant Site, Olin Corporation, McIntosh, Alabama, April 15, 2002.

News Release pertaining to the ADPH 2003 Fish Consumption Advisory can be found at the following webpage address: http://www.adph.org/NEWSRELEASES/default.asp?TemplateNbr=0&DeptID=107&TemplateId=2020

Certification

This Olin Basin Health Consultation was prepared by the Alabama Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was begun.

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Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health assessment, and concurs with its findings.

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Team Leader, Cooperative Agreement Team, SSAB, DHAC, ATSDR