Childhood Cancer among Residents of Eastern Sandusky County

Ohio Department of Health
Sandusky County Health Department
and Ohio Environmental Protection Agency
Progress Report

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OhioEPA

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Introduction

Background

In April 2007, the Sandusky County Health Department (SCHD) and the Ohio Department of Health (ODH) completed an analysis of cancer incidence among childhood residents (ages 0-19) of the city of Clyde and Green Creek Township, by anatomical site/type of cancer, for the years 1996-2006 and 2002-2006[1]. This assessment revealed higher than expected numbers of childhood cancers for the 11-year time period from 1996-2006 and the more recent five-year period from 2002-2006.

In December 2007, Ohio Environmental Protection Agency (Ohio EPA) was contacted by SCHD and asked to attend a meeting with the families affected by childhood cancer to aid ODH in answering questions regarding potential environmental exposures and how they relate to cancer. Ohio EPA attended this meeting in January 2008. Ohio EPA subsequently met with affected families in order to further discuss the environmental conditions in their community.

In 2008, Ohio EPA began to conduct environmental surveillance in the community, and began to conduct a detailed review of file information on historical releases, dumps/landfills and ongoing operations of area businesses. In January 2009, Ohio EPA began additional air and drinking water monitoring in the area.

During this time, ODH also conducted a spatial (geographic) analysis to identify areas of Sandusky County where clustering of childhood cancers is most likely to occur. In May 2009 ODH shared the results of the cluster analysis with the affected parents and the news media.

As the investigation continues, ODH, SCHD and Ohio EPA have continued to utilize all the data and information available to them. ODH is now conducting radiation monitoring and Ohio EPA is conducting air monitoring and a biological and water quality survey.

This joint progress report will describe these efforts and update the community on current ongoing investigations by ODH, SCHD and Ohio EPA.

[1]Cancer Incidence Among Childhood Residents of Clyde City and Green Creek Township, Sandusky County, Ohio, 1996-2006. Chronic Disease and Behavioral Epidemiology Section and the Ohio Cancer Incidence Surveillance System, Ohio Department of Health/Sandusky County Department of Public Health, April 17, 2007.

Ohio EPA file review

Background

At the request of ODH, Ohio EPA conducted an extensive file review to aid local and state health investigators in the continued study of an increased rate of juvenile cancers in the Clyde, Ohio, and Green Creek Township, Ohio, areas.

The following information from Ohio EPA documents and summarizes information available in Ohio EPA's files regarding specific local industry and waste disposal sites in Clyde, Ohio and surrounding townships. A review of files dating back to 1996 was conducted. However, in some instances information prior to 1996 is included. This information is intended to give an overview of specific local industry and waste disposal sites in and around Clyde, Ohio and may not be a comprehensive review of all potential environmental information pertaining to these specific sites.

Whirlpool Corporation, Clyde Division

The largest manufacturing facility in the Clyde area is Whirlpool Corporation, Clyde Division (Whirlpool). This facility manufactures commercial and residential washing machines. The manufacturing plant is located at 119 Birdseye St, Clyde, OH 43410. The property has been utilized for manufacturing since the late 1800s. A brief history of the property follows:

1880s: Clyde Organ Works manufactured church furniture, organs and pianos;

1894-1911: Elmore Manufacturing Company produced bicycles, one-cylinder motor buggies, folding boxes, porcelain signs and light reflectors;

1912: General Motors Corporation purchased the property. Krebs Commercial Car Co. and Clydesdale Motor Trucks Co. produced vehicles there until the early 1920s;

1923: Vitrified Iron Products Co. purchased the property from General Motors and began producing porcelain enamel products;

1934: Davidson Enamel Co. purchased the property and began manufacturing porcelain signs and refrigerator parts;

1943: Davidson Enamel changed its name to Clyde Porcelain Steel and, in addition to porcelain operations, was contracted by the Department of Defense (DoD) during World War II to produce military parts/equipment (i.e. tank doors);

1945-1947: Fire destroyed Plant 1 at the facility, which was rebuilt and expanded in 1946-1947;

1949: Bendix Home Appliance purchased the property;

1950: Avco Manufacturing Corp. purchased the property;

1952: Whirlpool leased part of the property; and

1954: Whirlpool purchased entire property from AVCO.

Air Emissions

Air emissions from Whirlpool originate from three main sources: coating operations, boiler and furnace operations (natural gas combustion), and paint burn-off ovens. Of the sources, the coating operations account for the largest source of air emissions.

The average air emissions at Whirlpool are as follows:

a. Volatile Organic Compounds (VOC's) - 250 tons per year or less;
b. Carbon Monoxide (CO) - approximately 25 tons per year;
c. Nitrous Oxide (NOx) - approximately 25 tons per year; and
d. Particulate Emissions (PE) - approximately 5 tons per year.

VOC's are the largest type of air emissions at Whirlpool. Most of the VOC's emitted are non-toxic and are not required to be reported to Ohio EPA and USEPA under the toxic release inventory program. Those that are reportable are as follows:

a. Glycol ethers - approximately 40 tons per year;
b. Xylene - approximately 10 tons per year; and
c. Ethylbenzene - approximately five tons per year.

The only other air pollutants of note are heavy metals (nickel and zinc), but their emissions are less than 25 pounds per year, each.

The emissions described above are representative of what has been emitted from Whirlpool during the last five to ten years. Beginning in the mid 1990's, paint manufacturers began producing coatings and paints that contained less VOCs. Whirlpool's Toxic Release Inventory (TRI) data can be found on the Sandusky County TRI summary data sheets for the years 1988 through 2007 in Attachment A. The TRI data reflects the lower VOC emissions from the facility due to the use of paints and coatings that contain less volatile organic solvents.

Hazardous Wastes Generated

Most of the painting conducted at Whirlpool is electro-coating with water-based paint. The primary hazardous waste stream generated during the manufacturing process is spent VOC containing solvent generated from cleaning the paint lines. The facility also generates a small amount of hazardous waste when replacing mercury containing thermostats. All hazardous wastes generated are placed in closed containers and stored in a locked room with a bermed floor and fire suspension system.

Hazardous waste generated at the facility is shipped to off-site permitted hazardous waste treatment/disposal facilities. These shipments are tracked using manifests which are required to be kept on-site for a minimum of 3 years. Ohio EPA, Division of Hazardous Waste Management (DHWM) conducts compliance evaluation inspections at the facility to assess compliance with Ohio's hazardous waste generator regulations.

Listed below are the types and amount of hazardous wastes generated by Whirlpool from 2002 to 2007:

2007 = 2900 gallons of spent solvent

48 pounds of mercury-containing waste

106 tons of cadmium and lead contaminated soil

2006 = 6943 gallons of spent solvent

69 pounds of mercury containing waste

2005 = 4425 gallons of spent solvent

29 pounds of mercury-containing waste

8 pounds of sodium cyanide

2004 = 4580 gallons of spent solvent

62 pounds of mercury-containing waste

2003 = 3202 gallons of spent solvent

2002 = 2709 gallons of spent solvent

In 1999 Whirlpool generated waste soils during construction/expansion projects. Because of the historic nature of the manufacturing site, Whirlpool hired a consultant to conduct a study of the soils prior to excavating the areas. Based on this study, Whirlpool elected to manage the soils removed as hazardous wastes. Whirlpool

managed the soils as hazardous waste for lead and cadmium. In 1999, a total of 505 tons of soil was removed and sent to Envirosafe Services of Ohio, Inc. (ESOI), Oregon, Ohio, for disposal.

Ohio EPA, Division of Emergency and Remedial Response, sent a warning letter to Whirlpool dated April 19, 2001. The letter stated that if the facility excavated in an area "where a hazardous waste or solid waste facility was operated," then Whirlpool could be in violation of ORC section 3734.02 (H) and OAC Rule 3745-27-13, which govern the investigatory activities near or in waste disposal areas. A subsequent site visit and conversations with Whirlpool clarified that the soil excavated in 1999 was not from an area in which wastes were disposed or managed; rather, Whirlpool investigated the soils prior to excavation for a construction project based on the possibility of historical deposition and the possibility of contaminants.

In 2007, Whirlpool again generated waste soils during construction/expansion projects. A total of 106 tons of soil was generated from these projects which was sent to ESOI for disposal as hazardous waste.

Spill Responses at Whirlpool Clyde

Ohio EPA has responded to one significant release from the Whirlpool Clyde Facility. In 2003, 2,700 gallons of porcelain mixed with water was accidentally released into a storm sewer which discharged into Raccoon Creek. The porcelain material consisted of silica, china clay and other types of clay. Whirlpool took responsibility for the cleanup, and there was no significant damage to the creek or environment.

Wastewaters Discharge History

The earliest documents related to wastewater in Ohio EPA files are dated 1973. These files indicate that wastewaters from Whirlpool consisted of acidic tank wastewaters, acidic rinse waters and floor and machinery washings. These wastewaters were treated using a lagoon system that involved treatment, clarification and aeration prior to the wastewater being discharged to Raccoon Creek. Sludge was periodically removed from the primary lagoon and taken to a landfill.

Beginning in 1975, Whirlpool was required by their National Pollutant Discharge Elimination System (NPDES) permit to sample for Biological Oxygen Demand (BOD_5), Total Suspended Solids (TSS), oil and grease, copper, nickel, iron, zinc, manganese, Methylene-Blue-Active Substances (MBAS), pH and flow at three outfalls. Beginning in 1977, Whirlpool began sending a portion of its wastewaters to the city of Clyde for treatment rather than discharging to Raccoon Creek.

Each time the NPDES permit was reissued, more stringent monitoring requirements and discharge limits were placed on the company. In December 1989, Whirlpool ceased the discharge of process wastewater to Raccoon Creek altogether and all wastewater effluent was diverted to the City of Clyde Wastewater Treatment Plant.

Solid Waste Disposal

Historically, Whirlpool managed their solid and sludge wastes by disposal in several area dumps. These are described below with a summary of information that Ohio EPA has obtained and has on file. Attachment B is a map showing the locations of the dumps known to be formally utilized by Whirlpool.

In the 1960s through 1970, Whirlpool generated industrial slurry from their porcelain coating process. The material was hauled in tank trucks to off-site dumps due to the high water content and significant volumes generated. Whirlpool utilized the Leach Dump site, the Golembiowski Dump site and Clyde City Dump during this time period. See the **Disposal Areas, Dumps and Landfills** section of this report for summaries of the dumps.

In 1970, Whirlpool leased the property where Golembiowski Dump was located and constructed the Amert Landfill/Disposal Site. Amert was a series of evaporation/settling ponds for the slurry/sludge mixture. Dewatering equipment at this site was operated to reduce volumes. ODH licensed the Amert disposal area.

In 1976, Whirlpool ceased using the Amert disposal site and conducted closure activities requested by Ohio EPA. Sludge was subsequently taken to County Line Landfill and Seneca East Landfill.

Clyde Paint and Supply Company

Clyde Paint and Supply Company (CPS), formerly known as Nagy Auto Body Shop, is located on approximately one acre of ground at 435 West Mulberry Street, Clyde, Ohio. CPS recycled paint sludges generated in off-site manufacturing plants from 1951 through approximately 1985. These sludges were packed in containers at the manufacturing plants and shipped to the CPS facility for processing/recycling. CPS would add xylene and/or mineral spirits to the sludge and sell the recycled paint back to the generator.

The facility utilized three underground storage tanks (USTs): one 6,000-gallon xylene UST; one 2,000-gallon mineral spirits UST; and one 3,000-gallon butyl alcohol UST. The mineral spirits and butyl alcohol USTs, located inside the building underneath the container storage area, were pumped dry and filled with concrete in 1989. The xylene

UST, located outside of the building, was pumped dry and removed from the facility in 1989.

CPS ceased operating in 1985. The last shipment of hazardous waste left the facility in 1987. A closure plan for the hazardous waste container storage area was approved on November 21, 1989. CPS requested to revise the approved closure plan due to difficulty meeting the rinseate clean standards. This revised closure plan was approved on May 3, 1990. Ohio EPA sent a letter to CPS on June 11, 1990 to acknowledge that the container storage area had been properly closed in accordance with the revised closure plan. A brief history of the property follows:

1951: CPS operations were moved to 435 West Mulberry St. in Clyde, Ohio. The initial site of operations is unknown.

1985: CPS ceased operations in December.

1987: Hazardous wastes were removed from the property. Waste included chromium, lead and ignitable hazardous wastes.

1988: CPS submitted a closure plan for the hazardous waste storage area.

1989: Ohio EPA approved the closure plan.

1990: Ohio EPA approved the revised closure plan.

1990: Ohio EPA acknowledges completion of hazardous waste closure activities.

Vickery Environmental, Incorporated

Facility Overview

Vickery Environmental, Incorporated (VEI) is a commercial facility that uses deep well injection technology to dispose of liquid industrial and hazardous wastes generated off site. VEI operates four class I hazardous underground injection wells for the disposal of liquid industrial and hazardous wastes. The facility is located on S. R. 412, near the Ohio Turnpike, approximately four (4) miles north of Clyde. VEI is a permitted commercial hazardous waste facility that can accept many types of hazardous and non-hazardous aqueous wastewater from industrial operations.

VEI receives liquid wastes by bulk tanker truck and totes. All waste streams shipped to the facility are pre-approved by VEI through a waste profile process to assure incoming waste is acceptable for disposal at VEI. Incoming loads are inspected by VEI upon receipt. The load is weighed and sampled. The samples are analyzed in VEI's on-site lab to verify that contents match the waste profile on the shipping manifest. After analysis, loads are unloaded and waste is placed in one of the storage tanks. Waste is

transferred from the storage tanks to the filter buildings and then to one of the wells for injection. Generally, the site accepts waste from 7 a.m. to 7 p.m., Monday through Saturday. At least one VEI employee is on site at all times to monitor the control room, computers and alarms.

Facility History

The site began operations in 1958 under the name Don's Oil Service. In 1970, Don's Oil Service changed its name to Ohio Liquid Disposal (OLD). In 1978, OLD was purchased by Chemical Waste Management (a wholly owned subsidiary of Waste Management, Inc.) In 1998, Chemical Waste Management changed its name to Waste Management of Ohio-Vickery. In 2000, the facility changed its name to Vickery Environmental, Incorporated.

The facility began operation as an oil recovery service to provide waste oil hauling from neighboring industries to a central facility for recovery and eventual resale. As time went on, the facility started to accept various industrial wastes and stored them in surface impoundments. In 1964, the operators were granted permission by the State of Ohio to accept chemical process waste and more surface impoundments were constructed. By the late 1960's, the amount of industrial waste received at the facility exceeded the used oil volumes. This created a waste storage issue due to the capacity of the surface impoundments. In 1972, OLD was granted permission to drill a test hole to evaluate the subsurface conditions for the possible location of an injection well. Deep well injection activities at the site were initiated in 1976 by OLD. VEI, successor to Chemical Waste Management, Inc. and Waste Management of Ohio-Vickery, acquired the Vickery, Ohio, facility from OLD in 1978, and has operated the injection wells since that time. Seven injection wells were drilled on-site throughout the history of the facility (Injection Wells 1, 1A, 2, 3, 4, 5 and 6). The subsurface conditions are noted in key geologic formations and their role in the containment process for underground injection include:

- Injection Interval – the zone that is permitted to directly receive injected waste (Mt. Simon sandstone approximately 2800' to 2950');
- Containment Interval – no fluid may be directly injected into this interval, but the injected fluid may move into this interval. (Knox, Kerbel, Conasauga and Rome formations, approximately 2350' to 2800'). These formations serve to arrest potential vertical movement because of their reduced porosity, compared to the injection interval, and sandstone lenses that serve as pressure "bleed-off" zones (reducing any potential upward driving force);
- Injection Zone – the Injection and Containment intervals combined (2350' to 2950');
- Confining Zone – an additional layer of geologic protection that further inhibits any potential fluid or pressure migration as the result of reduced porosity and

- Lowermost underground source of drinking water (USDW). At Vickery, the Brassfield Formation represents the lowermost USDW is approximately 740' below ground level. This is approximately 2060' above the top of the Injection Interval, approximately 1600' above the top of the Containment Interval and 1060' above the top of the Confining Zone.

During the history of the facility, 12 surface impoundments existed. These surface impoundments were constructed from 1964 through 1975. As waste injection began, the surface impoundments were closed, and from 1979 to 1992 all of the surface impoundments were closed. In the 1970's and early 1980's, several of the injection wells experienced problems due to their design and construction. It was estimated that approximately 45 to 60 million gallons of waste was injected into the containment interval. This interval may receive indirect waste movement but the injection permits specify that waste must be injected into the injection interval (Mt. Simon) only.

Injection Wells 1, 1A and 3 were plugged and abandoned due to mechanical and physical failures. (Injection Well 1 was plugged in July 1980. Well 1A was plugged in November 1987 and Well 3 was plugged in July 1987.) Wells 2, 4 and 5 were recompleted using a combination of liners, resistant cement and fibercast tubing. Well 6 was plugged back and re-drilled (side tracked). This well also incorporated a liner, resistant cement and fibercast tubing. The recompletion work on the injection wells lasted 2-3 years: Well 2: September 1983 – January 1985; Well 4: November 1983 – January 1984; Well 5: November 1983 – June 1984; Well 6: September 1983 – August 1984.

Presently, Injection Wells 2, 4, 5 and 6 are active on-site. These injection wells are regulated under four Underground Injection Control (UIC) permits which were issued on July 16, 2008. Since the reconstruction of the injection wells, testing and data confirm that all waste has been injected into the injection interval. A study conducted by Underground Resource Management, under contract for Ohio EPA, concluded that the site offered a very low risk of environmental problems.

In 1984, an action by the Ohio Attorney General in the form of a Consent Decree against Waste Management was taken due to nuisance conditions and a threat to the environment caused by the surface impoundments. The surface impoundments were the source of odor complaints from this site. The Consent Decree required the facility, in part, to reconstruct the injection wells, close the surface impoundments and create an on-site closure cell in accordance with applicable regulations. CWM-Vickery was granted approval to construct a Toxic Substances Control Act (TSCA) closure cell to dispose of the wastes generated from the closure of the surface impoundments. The closure cell was built between 1986 and 1988 and the waste from the surface

impoundments was moved into the closure cell in 1990.

A Citizens Public Information Committee was organized under the Consent Decree to provide oversight of the facility. Over the past twenty-five (25) years, the Public Information Committee has met regularly to review operations of the disposal facility. It is chaired by the Sandusky County Health Commissioner and consists of members of the community, Sandusky County Board of Health and the Ohio EPA.

A Sandusky County Common Pleas Judge terminated the Consent Decree that created the committee on July 9, 1997. This Court action automatically put into place a new Public Information Committee Agreement that had been worked on and agreed to by the Ohio EPA Director, Waste Management of Ohio-Vickery, the existing Committee and the Sandusky County Board of Health. The committee adopted a set of bylaws in 1998 to guide its meetings and deliberations.

On-Site Inspector Responsibilities

Ohio EPA employs an on-site inspector who is stationed at VEI. Responsibilities for this inspector include site inspections three to five times per week; review of all new and amended waste profiles; daily review of shipping manifests; semi-annual compliance evaluation inspection; permit reviews and modifications; oversight of corrective action-related field work; attend bi-monthly citizen committee meetings; and provide technical support to facility as requested.

Acceptable Waste Streams

Vickery can accept nearly all types of hazardous and non-hazardous aqueous wastewater from industrial operations. Examples of acceptable and unacceptable waste streams are listed below:

<u>Acceptable Waste Streams</u>
Aqueous Wastewaters - Hazardous or Non-Hazardous
Acid Wastewaters
Acids - Acetic, Chromic, Hydrochloric, Nitric, Phosphoric, Sulfuric
Airport De-icing Fluids
Ammonia Wastewater
Brines and Salt Solutions
Caustic/Alkaline Wastewaters
Chemical Manufacturing Wastewaters
Contaminated Groundwater
Galvanizing Solutions
Landfill Leachate
Metal Plating Solutions and Wastewaters
Waste Pickle Liquor

Unacceptable Waste Streams
F-listed Dioxin Wastes
Medical Waste
Radioactive Waste
Releasable Cyanide greater than or equal to 250 ppm
Releasable Sulfide greater than or equal to 500 ppm
TSCA Waste (i.e., PCBs) Unacceptable Wastes
Waste with Flashpoint less than 212 F
Waste with Oil greater than or equal to 10%
Waste with Solvents greater than or equal to 5%

Investigation and clean-up activities

As a regulated hazardous waste treatment, storage and disposal facility, VEI is required to investigate whether waste management practices at the facility have adversely affected the environment. This process is governed by Ohio EPA and U.S. EPA under corrective action authority of the Resource Conservation and Recovery Act (RCRA). Corrective action may be thought of as a facility-wide assessment of potential impacts to human health and the environment. A work plan was developed for 53 waste management units (WMUs) and ten Areas of Concern (AOCs).

Between January 2002 and June 2003, VEI submitted documentation demonstrating two milestones had been meet, which are the "Current Human Exposure Under Control" and the "Migration of Contaminated Groundwater Under Control." This means the investigation has revealed that there is no unacceptable human exposure to contamination that can be reasonably suspected under current land and groundwater use conditions. It also means that no ground water contamination has left the site and monitoring will continue to assure that no contaminants move from the site. Ohio EPA judged these two documents as acceptable in May 2004.

VEI submitted a RCRA Facility Investigation Report to Ohio EPA on August 21, 2009. This report is a comprehensive summary of all Phase I and Phase II activities. Ohio EPA is currently reviewing this report.

Sanitary wastewater treatment

Since January 11, 1988, sanitary wastewater effluent from the on-site package treatment plant has been disposed of on site through the deep well disposal system. In November 2005, a Permit-to-Install was issued for a sanitary wastewater trash trap and storage tank. The installation of these tanks replaced the on-site package treatment plant. The sanitary wastewater continues to be disposed of on site through the deep well disposal system.

Air Emissions

Air emissions from the daily operations at VEI are regulated as a minor source of pollutants by Ohio EPA. However, VEI has had plant upsets which have caused visible air releases. In response to air releases, Ohio EPA requested VEI to conduct a stack test, which was witnessed by Ohio EPA staff on May 30, 2007. Results of the stack test for the hazardous waste receiving and treatment injection system (P001) showed the following measurable air emissions:

Pollutant	Actual Emission Rate*	Allowable Emission Rate	Source Operating Rate*	Maximum Source Operating Rate
Hydrochloric Acid	0.00501 lbs/hr	0.60 lbs/hr	287.7 gpm	319.6 gpm
Nitric Acid	0.00506 lbs/hr	3.0 lbs/hr	287.7 gpm	319.6 gpm
Sulfuric Acid	7.04×10^{-4} lbs/hr	0.10 lbs/hr	287.7 gpm	319.6 gpm
VOC	0.33 lbs/hr as propane	5.0 lbs/hr	287.7 gpm	319.6 gpm

* Average of test runs 1 and 2.

The current NOx allowable emission rate is 91.47 lbs/hr. This emission rate is to account for upset conditions in the tanks that are vented to the scrubber that controls P001. Upset conditions are limited to 240 hours per year.

Releases, Spill Responses and Compliance at VEI

Air Releases

Over the years, the facility has had plant upsets which have caused visible air releases. The Ohio EPA Emergency Response Unit has responded to two air releases at VEI, one in 2003 and the other in 2006. Both incidents originated from the same source at the facility, and resulted in air releases reported to be nitrogen dioxide/nitric oxide/nitrous gas, visible as a red cloud. Specifically, the gas was released due to a chemical reaction that occurred in a 200,000-gallon above-ground storage tank. As the reaction progressed within the tank, a buildup of pressure caused it to vent through a pressure relief valve.

In August 2003, the release drifted in the direction of the Ohio Turnpike. No evacuations were performed, and both the U. S. EPA and Ohio EPA conducted air monitoring using Drager tubes. Monitoring conducted approximately 100 yards downwind of the release point revealed nitrous fumes below 0.5 ppm. This sampling was conducted approximately three hours after the discovery of the release.

In March of 2006, the release drifted toward the south. Consequently, the fire department evacuated several locations downwind as a precaution. This time the company was prepared to perform air monitoring of nitrous fumes using Drager tubes. Their results, obtained approximately 30 minutes after discovery of the release, showed no detection at the fence line of the facility. This release was visible in Clyde.

Releases of nitrogen oxides can be very visible; however, they typically breakdown very rapidly in the atmosphere. They are not classified as potential carcinogens. Levels that are immediately dangerous exceed 100 ppm and would typically cause irritation to eyes, nose and lungs. Shortness of breath, nausea and fluid in the lungs can also occur when exposed to low levels for several days or higher levels. The Occupational Safety and Health Administration (OSHA) limit of nitric oxide permitted in the workplace for an 8 hour day is 25 ppm. .

Surface Water Releases

The Ohio EPA Emergency Response Unit has responded to two surface water releases from VEI, one in 1993 and the other in 2003. In both incidences, above-ground pipeline failed causing the release of waste acid to Little Raccoon Creek.

On April 22, 1993, an above ground pipeline broke causing the release of an estimated 500 to 800 gallons of waste acid. The spilled waste migrated down Meyers ditch and into Little Raccoon Creek. As the waste acid neutralized it formed an orange residue. Upon discovery of this release, the surface water management gate that leads to Meyers ditch was closed and the leaking pipeline line was vacuumed. Surface water flowing onto the site from Meyers ditch was diverted by pumping the water to Little Raccoon Creek on the South side of Route 412. Contaminated water and soil generated from the clean up of the release was managed as hazardous waste.

On February 22, 2003, an above-ground pipeline broke resulting in a release of waste acid that made its way to storm water management gate C-4 and Meyers Ditch before being discovered. Due to the rainfall and despite containment efforts, the spill made its way to Meyers Ditch and Little Raccoon Creek. Constituents with the highest concentrations were chromium, iron, lead and nickel. Roughly 70,673 gallons of contaminated storm water was collected and disposed via deep well injection. Due to the continuous rainfall vacuum trucks could not keep up with the additional storm water that was starting to bypass the Meyers Ditch storm water management gate. Eventually the main gate valve to Little Raccoon Creek had to be opened to prevent a blowout of the gate valve.

Contaminated soil could not be removed until weather conditions improved. In late March 2003, several inches of soil were removed from the affected area and surrounding areas that may have been affected by clean-up activities. Verification

sampling determined that additional soil removal was necessary. After the next round of excavation and removal activities, only one location exceeded risk-based concentrations for residential soil. That exceedance was located onsite and was later excavated, re-sampled and found to be below risk-based concentrations.

Underground Injection Control Summary

VEI currently operates four Class I hazardous underground injection wells. The Ground Water Protection Council describes Class I wells as technologically sophisticated wells which inject larger volumes of hazardous and/or non-hazardous wastes into deep saline formations. These wells are separated from the lowermost underground source of drinking water by layers of impermeable rock.

Examples of the waste fluids may include spent pickle liquor (acids) from iron and steel production facilities, recycling operations process water, incinerator scrubber water and leachate recovered from other solid waste facilities, as well as on-site-generated leachate and storm water. Some of these liquid wastes are considered hazardous because they are listed hazardous waste and/or the waste exhibits one or more hazardous waste characteristics.

Underground Injection

The waste at VEI is injected into the Mt. Simon Sandstone between approximately 2,800 feet and 2925 feet below ground level. The Mt. Simon injection zone is separated from the lowermost underground source of drinking water by approximately 1,600 feet of shales, limestones, dolomites, siltstones and sandstones.

VEI's Injection Wells 2, 5, and 6 are used to inject acidic wastes whereas Well 4 is currently used to inject an alkaline waste stream. Wells 1, 1A, and 3 have been plugged and abandoned. Through September 2008, the total volume injected at the site, including fluids injected into the closed wells, is approximately 1.47 billion gallons. During the last decade, injected waste volumes typically range between 30 to 40 million gallons annually.

Class I Permit Requirements

To demonstrate that a well has mechanical integrity and to ensure that it is being operated safely within the required parameters, VEI must satisfy the following permit conditions:

- Each well is required to be tested annually for mechanical integrity. The mechanical integrity test (MIT) is used to demonstrate that the tubing/packer assembly is intact and has no leaks, and that the injected fluids are properly contained within the permitted intervals;

- An annual pressure build-up and fall-off test provides an estimate of the injection interval pressure increase and response. This information is used to verify the "No Migration" demonstration model;
- Automatic warning and shut down tests are conducted annually to demonstrate that VEI's operating system will automatically shutdown if operational parameters exceed the protective set points. The set points are set so that critical geologic parameters are not exceeded.
- Monthly and quarterly operating reports are required to demonstrate that the continuously recorded well data and operating systems are within the required operating parameters; and,
- Ohio EPA, Underground Injection Control (UIC) inspections to verify the reported information. The most recent annual UIC compliance inspection was March 31, 2009. Semi-annual inspections in 2008 were conducted on June 6 and November 3.

Monitoring, Measurement and Verification

Class I hazardous waste wells are required to satisfy both federal and state requirements to ensure the protection of the lowermost underground source of drinking water. Construction requirements for the wells include multiple layers of protection, including:

- Cement/conductor-surface casing;
- Cement/protection casing;
- Tubing/packer assembly/annulus; and,
- Continuous monitoring of the injection system.

An additional layer of protection at Vickery is provided by the shallow and deep monitoring wells. The deep monitoring well, located in the Knox-Kerbel interval, allows Ohio EPA to monitor conditions within the injection zone.

Clyde and Green Creek Disposal Areas, Dumps and Landfills

This section summarizes Ohio EPA's information on old disposal areas, dumps and landfills used to dispose of residential and manufacturing waste in the Clyde and Green Creek Township area. Some of Ohio EPA's files on these sites are extensive. However, there are a few sites about which little is known.

Clyde is not unlike many communities across Ohio where smaller refuse dumps were operated before environmental regulations existed. In most instances, Ohio EPA evaluates what is known about the dumps to determine if there may be human health or environmental impacts occurring. Ohio EPA prioritizes attention to these dumps based on their proximity to residential areas and drinking water supplies, and the likelihood for the population to be exposed to harmful contaminants. The two most likely routes of exposure to contaminants that may be in waste disposal areas are ingestion of

contaminated drinking water from a leaking dump or vapor intrusion of volatile chemicals into inhabited structures, primarily those with basements.

As indicated earlier in this report, Whirlpool utilized the Clyde City Dump, the Leach Dump Site, the Golembioski Dump Site and the Amert Lagoon Site to dispose of industrial wastes generated at the facility.

Each dump site is summarized below and is identified by location or the name to which it is most commonly referred in Ohio EPA's files. Attachment C is a map indicating the locations of the known disposal areas. Some disposal areas are not shown on the map because their exact location is unknown.

Clyde City Dump

The site contains approximately 11 acres, and is located north of McPhearson Highway (Route 20), just north of the Clyde City Water Pollution Control facility. No permits or licenses to operate were ever issued by the local health department or ODH.

Residential, commercial and industrial wastes were disposed of from the early 1930s through 1969. Wastes were routinely burned and included general refuse, appliances and parts, industrial sludges, wastewater sludges, waste paint and enamel sludges, thinners and solvents, waste oils, plastics and auto parts. The primary industrial users were Whirlpool and its predecessor companies and CPS.

Historically, leachate sampled from the site in the late 1990's contained organic and inorganic contaminants at relatively low concentrations. Soils at the dump contain elevated concentrations of metals and organic contaminants, some of which exceed residential preliminary remediation goals (PRGs). Residential PRGs are very conservative risk based screening values for soils that are protective of human health based on typical homeowner exposure to soil. Exposure routes include direct contact with recreational users of Raccoon Creek and trespassers at the dump.

In 2005, the city of Clyde was authorized by Ohio EPA to conduct voluntary improvements to the dump site. These improvements primarily involved the additional placement of soil on the cap and modifications to existing storm water controls to further minimize the potential for human health and ecological impacts from the dump site. Cap and storm water modifications made at the site minimize the generation of leachate and reduce the possibility of exposure to site contaminants.

Leach Dump Site

This site operated in the 1950s through 1968. The site is located west side of County Road 236 (Spayd Road aka Sherman Rd.) The exact fill boundary and acreage is unknown, but is estimated to be approximately two to three acres in size.

The dump contains general refuse by local haulers and Whirlpool's porcelain sludge.

In late 2001 and early 2002 Whirlpool conducted a voluntary soil removal action. Sampling and analysis was performed at the site prior to the removal project with waste being characterized and delineated for the extent of the material.

There were 33 soil borings conducted prior to the project, and 31 verification soil samples taken subsequent to the removal action to assure completeness. Transportation was conducted in accordance with a Hauling Plan submitted and approved by Green Creek Township Trustees and Sandusky County Engineers Office. The trucks were also fully covered (tarped) prior to leaving the site.

Wastes (2,570 loads estimated at 60,000 tons) were non-hazardous (contained mostly metals and petroleum). Disposal was at BFI landfill in Ottawa County. The project removed a total of 31,720 tons of soil, approximately 1,330 truck loads.

Completion of the project included bringing in clean back-fill and grading to natural conditions as best as possible.

Golembiowski Dump Site

This site operated in the 1950s through 1968 on land owned by Amert. Golembiowski was a local hauler who leased the land and operated the site.

General refuse from the Clyde area was disposed of at the site by local haulers. Whirlpool disposed of sludges for a very short period (two- to three-months) at this site just before the dump closed. The estimated total of sludges disposed during this time by Whirlpool was four million gallons.

The fill area is approximately eight acres in size and is located on the north side of County Road 185, just west of West Maple Street. It is unknown whether the fill area was capped upon closing. Historical records note the area was marshy and wet, either due to a high water table or poor drainage. This site is located immediately south of the Amert Lagoon Site and is currently owned by Whirlpool. According to Whirlpool, a voluntary removal action of wastes was conducted at this site during the same time period of the removal action at the Leach Dump site. No backfill was brought in to areas where wastes were removed.

Amert Lagoon Site

This site was constructed and operated by Whirlpool from 1970 to 1976, and is located on the north side of County Road 185, just west of the intersection with Maple Street. Green Creek Township. The site is now owned by Whirlpool and is located immediately north of the Golembiowski Dump.

The site contains metal finishing wastes and porcelain slurry/sludges. The site was licensed by ODH. The facility contained shallow unlined lagoons five-foot deep and covering an area of approximately four acres.

Vegetation distress adjacent to the lagoons was noticed in 1975 due to runoff and possibly shallow ground water movement. Sampling was conducted that indicated Boron as a contaminant of concern causing toxicity to plants.

The dump was capped with one foot of clay and six inches of topsoil in 1977. A groundwater interceptor trench was installed on the south and east sides of landfill. The site drains to an unnamed tributary of Raccoon Creek.

Sampling was conducted from landfill wastes (nine samples from three borings), domestic wells and monitoring wells (27 samples from 12 wells), surface water (three samples), and shallow soils (43 samples). Note all soil samples taken meet today's residential VAP standards. The waste samples all meet industrial VAP standards. Some metals and trace elements above method detection limits were noted.

A hydrogeologic study was conducted by Whirlpool's consultant in the 1980s and a report was issued in 1990. Boron, a trace mineral and essential nutrient, was a primary contaminant of concern. Because boron is nonhazardous and nontoxic in elemental form, the site was given a low priority for further action.

Unknown Name (Possibly Green Creek Township Dump or Warnecke Dump)

This site is located on the east side of State Route 101 north of Portland Road and south of the Norfolk Southern Railroad. The fill area is estimated to be approximately 2 acres based on aerial photographs. No other information is available.

Meggitt Landfill

The exact location of this site is unknown. File documentation indicates the location to be somewhere on County Road 198 near the Village of Green Springs. County Road 198 forms the western boundary of Green Creek Township. Wastes disposed of were likely general refuse from township residents. No other file information could be located.

Formulated Products Site

This drum site was located on a 2.5 acre parcel in a predominantly residential area. The address at the time was 110 East Street, just east of the downtown district in the City of Clyde. This was the site of a USEPA drum removal action in 1998. Drums contained corrosives, oxidizers, flammables, and waste oils. PCB capacitors, sludge from a pit, and other small containers of material were also removed from the building and the concrete floor was decontaminated. PCB contaminants have the potential to cause both carcinogenic and non carcinogenic health effects in humans based on health studies. Conditions of soil and ground water have not been characterized. The building has been razed and is a vacant lot. Additional information regarding the drum removal action is available through USEPA.

Wickerham Drum Site

This drum site was located in the front yard of a residence at 853 North Main Street. Eighteen drums were used to fill in a low area. The drum contents were dried paint wastes suspected to be from CPS. Two of the drums were characteristically hazardous for chrome, lead, and flashpoint. Mr. Wickerham was previously employed by CPS as a foreman. The drums and associated contaminated soils were removed in 1998 by Mr. Wickerham and the City of Clyde in a joint private voluntary removal action. The removal was overseen by Ohio EPA.

Whirlpool Manufacturing Site

The manufacturing site is located south of McPhearson Highway (Route 20), just south of the Clyde City Fire Station and the Clyde City Water Pollution Control facility. Whirlpool had at least one onsite treatment lagoon and a couple small dump sites on the property that were established by previous owners. The treatment lagoon generated porcelain slurry that was disposed of at the Amert site, Golembiowski site, Leach site, and to a lesser extent Clyde City Dump. At one time, this lagoon discharged directly to Raccoon Creek through a permitted outfall, but now it discharges to the city's sanitary sewer. The treatment lagoon is located on the south side of the site on the west side of Raccoon Creek. Portions of Raccoon Creek have since been tiled on the site.

McGrath Dump

This site is located on the north side of County Road 231 (Stokes Road) behind the residence at address 3954. The fill area is approximately 9 acres containing industrial solid and liquid wastes in addition to some residential waste. The site operated from 1965 through 1968. The last known owner was Don Hedrick. No other information could be located.

Riley Township Dump

The exact location of this dump site is unknown. File documentation reports the location to be somewhere on County Road 232. Wastes disposed of were likely general refuse from township residents. No other information could be located.

Bellevue City Dump

This site is located on the northeast and southeast corners of the intersection of County Road 308 and County Road 113 on the southwest side of town. General refuse and possibly some industrial wastes from the Bellevue area were deposited at this site. No other information could be located.

York Township Dump

The exact location of this dump site is unknown. File documentation reports the location to be somewhere on County Road 205. Wastes disposed of were likely general refuse from township residents. No other information could be located.

Townsend Township Dump

The exact location of this dump site is unknown. File documentation reports the location to be somewhere near the Village of Vickery. Wastes disposed of were likely general refuse from township and village residents. No other information could be located.

ODH, SCHD and Ohio EPA Completed Assessments

Background

ODH has completed the following assessments: Cancer Incidence among Childhood Residents of Clyde City and Green Creek Township, 1996-2006, Clyde City and Green Creek Township area Childhood Cancer Case Review, Consultations with Case Families Regarding Environmental Issues, HAS Review of Public and Private Sources of Drinking Water, and a Cluster Analysis. Ohio EPA has completed the assessment on drinking water sources. Explanations on the completed assessments follow:

ODH

Cancer Incidence among Childhood Residents of Clyde City and Green Creek Township, 1996-2006

ODH and SCHD responded to concerns of residents from Clyde City and Green Creek Township regarding a perceived high rate of cancer among residents 19 years and younger.[2] A review of population-based cancer incidence data from the Ohio Cancer Surveillance System for the years 1996-2006 revealed 36 new cases of cancer among Sandusky County residents 19 years and younger. These 36 cases for all of Sandusky County did not differ significantly from the 34 cases expected based on national background cancer incidence rates.
An assessment of cancer among residents of Clyde City and Green Creek Township, age 19 years and younger, found 10 new cases of cancer when only 5.32 would be expected based on national background cancer incidence rates. For the more recent years of 2002-2006, there were eight new cases in this population when only 2.47

[2] *Cancer Incidence among Childhood Residents of Clyde City and Green Creek Township, Sandusky County, Ohio, 1996-2006. Chronic Disease and Behavioral Epidemiology Section and the Ohio Cancer Incidence Surveillance System, Ohio Department of Health and the Sandusky County Department of Public Health, Final Report, April 17, 2007.*

would be expected. These data analyses indicate that cancer may be occurring in the population age 19 years and younger at a higher than expected rate in the city of Clyde and Green Creek Township area.

Brain and other central nervous cancer was found to be the most common among the Clyde City and Green Creek Township childhood population with four cases, and was significantly higher at pl0.05 than the <1 case expected based on national background. The other six cases in Clyde City and Green Creek Township consists of one case each of Ewings Sarcoma (soft tissue), Hodgkins Lymphoma, Leukemia, Osteosarcoma (bone), rhabdomyosarcoma, and cancer of the testis.

During 2007 there were no known new cases of cancer, but in late 2008 there were two additional cases.

Clyde City and Green Creek Township area Childhood Cancer Case Review

ODH worked with SCHD to conduct a "case-review" to attempt to find factors that may have played a role in the case's personal environment or behaviors that may have played a role.[3] The case-review was conducted by SCHD staff using a standardized questionnaire developed by ODH. The questionnaire gathered information concerning potential exposures to the child during fetal development; medical history; potential exposure in the home environment to chemicals, pesticides, tobacco smoke, etc., parental occupations; drinking water sources; school attendance; history of cancer in the family; and other information to attempt to identify factors that may have played a role in the development of these cancers.

The case-review did not reveal any common or individual factors that may have played a role in these cancers.

Consultations with Case Families Regarding Environmental Issues

In January, 2008, the Health Assessment Section (HAS) of the ODH Bureau of Environmental Health joined Ohio EPA, Northwest District Office Staff in a meeting with case-families to attempt to address whether environmental factors may have played a role in the development of these cancers. The meeting was held at SCHD.

During the meeting the case families expressed concerns regarding potential exposures from area manufacturing facilities, several local landfills, and a toxic waste deep-well injection site.

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[3] *Clyde City and Green Creek Township area Childhood Cancer Case Review, 1996-2006. Chronic Disease and Behavioral Epidemiology Section, Ohio Department of Health and the Sandusky County Department of Public Health. Final Report, February 29, 2008.*

The HAS presented and discussed information regarding the concept of a completed pathway of exposure and how chemicals must get into a persons body, and in sufficient quantity, in order to result in a health problem. The HAS discussed five links that make a completed exposure pathway: (a) Source [where the chemical came from]; (b) Environmental transport [the way the chemical moves from the source to the person, e.g. air, water]; (c) Point of exposure [where contact wit the chemical is made. This may be where the chemical contamination occurred or off-site if the contamination has moved]; (d) Route of exposure [how a person comes into physical contact with the chemical e.g. drinking, eating, breathing]; and (e) Persons who might be exposed [those who are most likely to come into physical contact with the chemical].

HAS Review of Public and Private Sources of Drinking Water

An HAS review of the public and private sources of drinking water used by the case families indicated three different sources of drinking water: (a) The City of Clyde public water supply [Surface impoundment of Raccoon Creek Surface water]. This source is regularly monitored by the Ohio EPA under the authority of the federal Safe Drinking Water Act; (b) The Ohio Northern Rural Water Public Water Supply [Lake Erie Surface Waters] of which is also regularly monitored by the Ohio EPA; and (c) Area private wells [using the underlying bedrock aquifer system].

The diversity of the water supplies being used by the case families, coupled with the required monitoring of public water supplies, and a lack of any historical record of significant chemical contaminants being detected in these water supplies, led the HAS to the opinion that it is unlikely that drinking water contaminants played a role in the development of these cancers.

Cluster Analysis

As a follow-up to the epidemiologic assessment and the case review, ODH in partnership with the Comprehensive Cancer Control and James Cancer Hospital and Solove Research Institute at the Ohio State University, conducted a spatial (geographic) analysis to identify areas of Sandusky County where clustering of childhood cancers is most likely to occur.[4]

The goal of the spatial analysis was to determine whether or not there was clustering of invasive cancers among children residing in Sandusky County during the years 1996-2006. There were two primary objectives for this analysis: (a) To determine the geographic regions in Sandusky County and the surrounding area where the most likely

[4] Investigation of Potential Clustering of Invasive Cancer among Children, Adolescents, and Young Adults in Sandusky County, Ohio, 1996-2006. Ohio Cancer Incidence Surveillance System/Comprehensive Cancer Control Program. Ohio Department of Health and the Comprehensive Cancer Control and James Cancer Hospital and Solove Research Institute at the Ohio State University, May 28, 2009.

clustering of cancers among children has occurred; and, (b) To determine the probability (p-value), or likelihood, that the cluster occurred by chance. A p-value of less than 0.05 was considered statistically significant.

Cases were defined as children age 0-19 years diagnosed with invasive cancer during 1996-2006 while a resident of two geographic regions: (a) Sandusky County [36 cases]; and (b) Sandusky County and surrounding area, which included Ottawa and Seneca Counties and portions of Erie, Hancock, Huron, Lucas, Wood, and Wyandot Counties [277 cases]. Cases were identified through the population-based cancer files and the Ohio Cancer Incidence Surveillance System at the ODH.

The data were analyzed using SatScan, a software program that scans for high rates, (clusters). SatScan identifies the most likely clusters in a defined geographic area. A p-value is calculated for each cluster to determine the probability that the cluster occurred by chance.

Census tracts were selected as the geographic unit of analysis in SatScan. Cancer cases were aggregated to a geographic point in the census tract (the "centroid") in two ways: (a) As the geographic center of the census tract; and (b) As the weighted center of the population within the census tract. Thus there were four separate analyses: (a) Sandusky County using the geographic center of the census tract; (b) Sandusky County using the weighted center of the population within the census tract; (c) Sandusky County and region using the geographic center of the census tracts; and (d) Sandusky County and region using the weighted population centers of the census tracts.

The results from the analysis indicate that for Sandusky County the most likely cluster occurred in the eastern portion of Sandusky County. This cluster had a radius of between 5 to 7 miles and a p-value of less than 0.05, indicating statistical significance, i.e., this clustering could have occurred by chance alone less than five times out of a hundred. The Sandusky County and region analysis indicated that the most likely cluster occurred in the northeastern portion of Sandusky County, extending into Southeastern Ottawa County and Northeastern portion of Sandusky County, extending into Southeastern Ottawa County and Northwestern Erie County. This cluster had a radius of about 7 miles and a p-value greater than 0.05, indicating no statistical significance, i.e., the cluster could have occurred by chance alone more than five times out of a hundred.

The results of the cluster analysis were shared with the affected parents and the news media in May 2009.

SCHD

In addition to those collaborative activities acknowledge by the other agencies, SCHD has maintained communication with the case families, disseminating information from the agencies involved in the investigation. Since the existence of the study, SCHD has received questions and concerns via correspondence from numerous individuals in the

community and the region. SCHD staff has acted upon each of these advisements themselves or by referring to the appropriate agency. Local historical data has been reviewed and incorporated into the study investigation by both the Nursing and Environmental health Divisions of SCHD.

Ohio EPA

Drinking Water

Drinking water sampling was conducted in January and February of 2009. Eleven drinking water samples were collected from two public water systems and domestic water wells. The samples were analyzed for a broad scan of carcinogenic and non carcinogenic chemical compounds. Results of the sampling did not identify any components of drinking water that suggest carcinogenic health concerns. Additional sampling of drinking water was conducted in June 2009. Nine water samples were collected for analysis of pesticides. Samples were obtained from public water systems, domestic wells, reservoirs and a river intake. The analytical results are consistent with the previous drinking water quality results with the detection of low level concentrations of commonly used pesticides in water which is derived from a stream or reservoir. No results from a treated drinking water sample exceeded a maximum contaminant health level standard. No pesticides were detected in any of the domestic water well samples or the Northern Ohio Rural Water sample.

ODH, SCHD and Ohio EPA Current Initiatives

Background

ODH is working with SCHD on three follow-up initiatives to be completed in 2009: (a) a survey for ionizing radiation; (b) an assessment of adverse reproduction outcomes, i.e. fetal deaths, low birth weight, infant death, and congenital anomalies; and (c) administration of a follow-up childhood cancer risk factors questionnaire with a greater emphasis on environmental factors.

Ohio EPA's role in this ongoing investigation is to assist local and state health partners to identify potential sources of past or current contamination to which the residents of Clyde may have been exposed. Ohio EPA is currently conducting investigations in an effort to identify unexpected environmental exposure including air monitoring. Additional investigations may be conducted by Ohio EPA as new information becomes available or in response to requests from local or state health partners.

The following information highlights the ongoing initiatives by ODH, SCHD and Ohio EPA.

ODH

a. Survey for Ionizing Radiation

In June, 2009 the Comprehensive Cancer Control Program at ODH discussed the Sandusky County Childhood Cancer analyses completed to data with the ODH Bureau of Radiation Protection (BRP). The Comprehensive Cancer Control Program requested the BRP to address the issue of potential sources of ionizing radiation in the area. In response the BRP has undertaken six initiatives:

1. *Historical Radioactive Material User Records Search Project* Staff in the Technical Support Section of the BRP are performing a search of available records looking for any indication that radioactive material may have been used in the surrounding area:
    a. During the Manhattan Engineering District era;
    b. By an Atomic Energy Commission contractor;
    c. By a Nuclear Regulatory Commission licensee; or,
    d. Currently used by a State of Ohio radioactive materials licensee;

2. *Historical Review of Davis Besse Nuclear Power Station Environmental Radiological Air Monitoring Results.* BRP Technical Support staff are performing a historic review of the sampling and analytical results from the environmental air sampling program operated by the BRP around the Davis Besse Nuclear Power Station;

3. *Sandusky County Schools Radiological Survey Project*. Twenty public and private elementary, middle, and high schools around eastern Sandusky County were surveyed by BRP health physicists staff during the first two weeks of August, 2009;

4. *Sandusky County Cancer Case Homes Radiological Survey Project.* The BRP has developed a radiological survey plan to perform radiological monitoring of Eastern Sandusky County cancer cluster homes, along with two “control” homes for each case, i.e. homes of similar structure as the cases but without a child that had been diagnosed with cancer. The surveys will be performed without specific knowledge of the case/control status of the home. The results will be used to determine whether there are statistically significant radiological indices unique to the Eastern Sandusky County cancer case homes. In conjunction with the Radiological Survey Project, SCHD personnel will be conducting a radon study in surveyed homes to assess for potential elevations in environmental radon.

5. *Clyde City Environmental Airborne Radioactivity Sampling Project*. BRP has installed an environmental air sampler at the Waste Water Treatment Facility located in Clyde. A paper filter, designed to capture radioactive particulate, and charcoal cartridge, designed specifically for radioactive iodines, are both being

changed on a weekly basis and sent to the ODH Public Health Laboratory for analyses. The air sampling project is scheduled to run through December, 2009; and,

6. *Sandusky County Ohio EPA River/Stream Sediment Analysis for Gross Alpha and Gross Beta*. Ohio EPA collected sediment samples that were sent to the ODH Public Health Laboratory for analyses for gross alpha and gross beta radiation.

b. Assessment of Adverse Reproduction Outcomes

An assessment of adverse reproduction outcomes, i.e. fetal deaths, low birth weight, infant deaths, and presence of congenital anomalies will be conducted for the population in the area where the statistically significant cancer cluster were found.

The rationale for this assessment is that if an environmental factor played a role in the development of the childhood cancers it may have had an impact on developing fetuses and newborn children. This may provide important leads to identify factors that may have played a role in the cancers.

Live births for the years 2003 through 2007 will be used as a denominator for the calculation of rates of adverse reproduction outcomes per 10,000 live births. The live births, fetal deaths, low birth weight babies [less than 2,500 grams], infant deaths, and congenital anomalies will be identified through the population-based, geocoded files in the ODH Office of Vital Statistics. The adverse reproduction outcome rates in the study area will be compared to the Ohio rates for the same years.

c. Follow-up Childhood Cancer Risk Factor Questionnaire

A follow-up ODH *Childhood Cancer Risk Factor Questionnaire* will be administered to the case families in the area where the statistically significant cancer cluster was found. This follow-up instrument will put a greater focus on potential environmental exposures that may have played a role in the development of these cancer.

SCHD

Since the onset of the cancer study, SCHD has been active in routine communications with the case families. In addition to advocating for each case family, SCHD continues to provide local surveillance and oversight for the study itself. Routine meetings, between SCHD and the case families, are held to allow for the disclosure of new information to the families, while maintaining their confidentiality and anonymity. Acting as the study clearinghouse, SCHD will continue to be the lead agency for discussions and information dissemination with local community members and media outlets. For the past year, SCHD has also coordinated monthly conference calls with other local,

state, and federal cluster study partners. Included in these calls are Ohio EPA, ODH, Region 5 Children's Taskforce, United States (US) EPA, and as needed, academic facilities. Additionally, the staff of SCHD continues to have discussions and correspondence with local and state legislators to provide information and advocacy for the study. SCHD personnel will continue to service the ODH air monitors in Clyde to ensure efficiency. SCHD has and will continue to explore other research possibilities that may aid in the study and ongoing investigation. Currently, SCHD staff is working closely with medical personnel to research metabolic and biochemical responses, with regard to pediatric cancers. Throughout the 1980s and 1990s, groundwater monitoring was performed in the areas surrounding VEI. Data from that monitoring is being reviewed again by current SCHD personnel. Utilizing the information from that historical review, SCHD is evaluating the possibility of re-establishing a monitoring study for groundwater in the areas around VEI. SCHD personnel are also investigating the possibilities of constructing various maps to overlay data, both environmental and industrial, in relation to the Eastern Sandusky County cancer cluster.

Ohio EPA

Air

Since March of 2008, Ohio EPA has conducted weekly surveillance of the Clyde area for unusual air emissions and has conducted inspections of local industry to determine compliance with applicable regulations. While odors from local industry have been noted, no significant air violations have been found.

In January 2009, Ohio EPA began monitoring the Clyde area for organic chemicals and heavy metals. Monitoring has been done at various locations in the area with over 78 samples taken to date. The preliminary results of the air monitoring, to date, do not indicate cause for concern. This monitoring will continue through at least the end of the 2009 calendar year.

Biological and Water Quality Survey

Ohio EPA conducted a Biological and Water Quality Survey of the Lower Sandusky River watershed during the summer of 2009. The survey includes an assessment of fish and macro invertebrate populations, stream habitat and water quality and sediment chemistry. Data generated from the study will be used to report on the attainment of aquatic life use designations and to support the development of a Total Maximum Daily Load (TMDL) where impairment is documented. A goal of May 2010 has been set to complete the Technical Support Document that will summarize the results of all environmental testing done in the focus study area.

Conclusion

State and local agencies will continue to work together in the ongoing investigation of the Eastern Sandusky County Cancer Cluster. Additional information gathered in this investigation will be shared with the community as it becomes available. The agencies involved will continue to strive to find answers. However, it is possible that a cause may never be known for the higher than expected number of childhood cancer diagnoses in Eastern Sandusky County.

Attachment A

Whirlpool TRI Data (1998-2007)

WHIRLPOOL CORP - CLYDE DIV TRI Reports 1988-2007

Facility name	Year	Chemical	Fugitive Air lbs/year	Stack Air lbs/year	Total Air lbs/year
WHIRLPOOL CORP - CLYDE DIV	1988	2-ETHOXYETHANOL	250	21812	22062
WHIRLPOOL CORP - CLYDE DIV	1988	ALUMINUM OXIDE (FIBROUS FORMS)	1235	250	1485
WHIRLPOOL CORP - CLYDE DIV	1988	BARIUM	750	250	1000
WHIRLPOOL CORP - CLYDE DIV	1988	DIETHANOLAMINE	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1988	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1988	N-BUTYL ALCOHOL	750	26681	27431
WHIRLPOOL CORP - CLYDE DIV	1988	NICKEL COMPOUNDS	750	250	1000
WHIRLPOOL CORP - CLYDE DIV	1988	PHOSPHORIC ACID	1858	0	1858
WHIRLPOOL CORP - CLYDE DIV	1988	POLYCHLORINATED BIPHENYLS	0	0	0

WHIRLPOOL CORP - CLYDE DIV	1988	SODIUM HYDROXIDE (SOLUTION)	750	0	750
WHIRLPOOL CORP - CLYDE DIV	1988	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1988	TOLUENE	250	28619	28869
WHIRLPOOL CORP - CLYDE DIV	1988	XYLENE (MIXED ISOMERS)	4701	393312	398013
WHIRLPOOL CORP - CLYDE DIV	1988	ZINC (FUME OR DUST)	1349	250	1599
WHIRLPOOL CORP - CLYDE DIV	1989	ALUMINUM OXIDE (FIBROUS FORMS)	1160	250	1410
WHIRLPOOL CORP - CLYDE DIV	1989	BARIUM COMPOUNDS	750	250	1000
WHIRLPOOL CORP - CLYDE DIV	1989	CERTAIN GLYCOL ETHERS	1762	266128	267890
WHIRLPOOL CORP - CLYDE DIV	1989	CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	250	250	500
WHIRLPOOL CORP - CLYDE DIV	1989	COBALT COMPOUNDS	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1989	DIETHANOLAMINE	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1989	ETHYLBENZENE	750	42461	43211

WHIRLPOOL CORP - CLYDE DIV	1989	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1989	N-BUTYL ALCOHOL	250	31154	31404
WHIRLPOOL CORP - CLYDE DIV	1989	NICKEL COMPOUNDS	750	250	1000
WHIRLPOOL CORP - CLYDE DIV	1989	PHOSPHORIC ACID	750	0	750
WHIRLPOOL CORP - CLYDE DIV	1989	POLYCHLORINATED BIPHENYLS	0	0	0
WHIRLPOOL CORP - CLYDE DIV	1989	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1989	TOLUENE	250	38317	38567
WHIRLPOOL CORP - CLYDE DIV	1989	XYLENE (MIXED ISOMERS)	3789	329849	333638
WHIRLPOOL CORP - CLYDE DIV	1989	ZINC COMPOUNDS	1832	250	2082
WHIRLPOOL CORP - CLYDE DIV	1990	ALUMINUM OXIDE (FIBROUS FORMS)	1172	250	1422
WHIRLPOOL CORP - CLYDE DIV	1990	BARIUM COMPOUNDS	750	250	1000
WHIRLPOOL CORP - CLYDE DIV	1990	CERTAIN GLYCOL ETHERS	750	105601	106351

WHIRLPOOL CORP - CLYDE DIV	1990	CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	250	5	255
WHIRLPOOL CORP - CLYDE DIV	1990	COBALT COMPOUNDS	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1990	DIETHANOLAMINE	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1990	ETHYLBENZENE	511	36872	37383
WHIRLPOOL CORP - CLYDE DIV	1990	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1990	N-BUTYL ALCOHOL	241	23101	23342
WHIRLPOOL CORP - CLYDE DIV	1990	NICKEL COMPOUNDS	750	5	755
WHIRLPOOL CORP - CLYDE DIV	1990	PHOSPHORIC ACID	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1990	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	250	0	250
WHIRLPOOL CORP - CLYDE DIV	1990	TOLUENE	250	28417	28667
WHIRLPOOL CORP - CLYDE DIV	1990	XYLENE (MIXED ISOMERS)	3591	295800	299391
WHIRLPOOL CORP - CLYDE DIV	1990	ZINC COMPOUNDS	750	5	755

WHIRLPOOL CORP - CLYDE DIV	1991	BARIUM COMPOUNDS	950	60	1010
WHIRLPOOL CORP - CLYDE DIV	1991	COBALT COMPOUNDS	220	2	222
WHIRLPOOL CORP - CLYDE DIV	1991	DIETHANOLAMINE	200	0	200
WHIRLPOOL CORP - CLYDE DIV	1991	ETHYLBENZENE	300	19000	19300
WHIRLPOOL CORP - CLYDE DIV	1991	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	290	0	290
WHIRLPOOL CORP - CLYDE DIV	1991	N-BUTYL ALCOHOL	280	25777	26057
WHIRLPOOL CORP - CLYDE DIV	1991	NICKEL COMPOUNDS	500	30	530
WHIRLPOOL CORP - CLYDE DIV	1991	PHOSPHORIC ACID	450	0	450
WHIRLPOOL CORP - CLYDE DIV	1991	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	25	0	25
WHIRLPOOL CORP - CLYDE DIV	1991	TOLUENE	481	36005	36486
WHIRLPOOL CORP - CLYDE DIV	1991	XYLENE (MIXED ISOMERS)	3000	250000	253000
WHIRLPOOL CORP - CLYDE DIV	1991	ZINC COMPOUNDS	200	20	220

WHIRLPOOL CORP - CLYDE DIV	1992	BARIUM COMPOUNDS	5	30	35
WHIRLPOOL CORP - CLYDE DIV	1992	CERTAIN GLYCOL ETHERS	609	93609	94218
WHIRLPOOL CORP - CLYDE DIV	1992	COBALT COMPOUNDS	2	0	2
WHIRLPOOL CORP - CLYDE DIV	1992	DIETHANOLAMINE	128	0	128
WHIRLPOOL CORP - CLYDE DIV	1992	ETHYLBENZENE	466	36376	36842
WHIRLPOOL CORP - CLYDE DIV	1992	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	113	0	113
WHIRLPOOL CORP - CLYDE DIV	1992	N-BUTYL ALCOHOL	263	24195	24458
WHIRLPOOL CORP - CLYDE DIV	1992	NICKEL COMPOUNDS	3	20	23
WHIRLPOOL CORP - CLYDE DIV	1992	PHOSPHORIC ACID	1	0	1
WHIRLPOOL CORP - CLYDE DIV	1992	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	2	0	2
WHIRLPOOL CORP - CLYDE DIV	1992	TOLUENE	450	36196	36646
WHIRLPOOL CORP - CLYDE DIV	1992	XYLENE (MIXED ISOMERS)	2256	179892	182148

WHIRLPOOL CORP - CLYDE DIV	1992	ZINC COMPOUNDS	19	20	39
WHIRLPOOL CORP - CLYDE DIV	1993	CERTAIN GLYCOL ETHERS	528	81279	81807
WHIRLPOOL CORP - CLYDE DIV	1993	DIETHANOLAMINE	142	0	142
WHIRLPOOL CORP - CLYDE DIV	1993	ETHYLBENZENE	547	37361	37908
WHIRLPOOL CORP - CLYDE DIV	1993	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	182	0	182
WHIRLPOOL CORP - CLYDE DIV	1993	MANGANESE COMPOUNDS	9	58	67
WHIRLPOOL CORP - CLYDE DIV	1993	N-BUTYL ALCOHOL	258	24757	25015
WHIRLPOOL CORP - CLYDE DIV	1993	NICKEL COMPOUNDS	11	6	17
WHIRLPOOL CORP - CLYDE DIV	1993	PHOSPHORIC ACID	932	0	932
WHIRLPOOL CORP - CLYDE DIV	1993	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	19	0	19
WHIRLPOOL CORP - CLYDE DIV	1993	TOLUENE	371	35808	36179
WHIRLPOOL CORP - CLYDE DIV	1993	XYLENE (MIXED ISOMERS)	2020	147443	149463

WHIRLPOOL CORP - CLYDE DIV	1993	ZINC COMPOUNDS	15	1	16
WHIRLPOOL CORP - CLYDE DIV	1994	CERTAIN GLYCOL ETHERS	547	86215	86762
WHIRLPOOL CORP - CLYDE DIV	1994	DIETHANOLAMINE	238	0	238
WHIRLPOOL CORP - CLYDE DIV	1994	ETHYLBENZENE	237	12042	12279
WHIRLPOOL CORP - CLYDE DIV	1994	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	75	0	75
WHIRLPOOL CORP - CLYDE DIV	1994	MANGANESE COMPOUNDS	10	5	15
WHIRLPOOL CORP - CLYDE DIV	1994	N-BUTYL ALCOHOL	251	24095	24346
WHIRLPOOL CORP - CLYDE DIV	1994	NICKEL COMPOUNDS	12	7	19
WHIRLPOOL CORP - CLYDE DIV	1994	PHOSPHORIC ACID	732	0	732
WHIRLPOOL CORP - CLYDE DIV	1994	TOLUENE	411	40015	40426
WHIRLPOOL CORP - CLYDE DIV	1994	XYLENE (MIXED ISOMERS)	1166	66819	67985
WHIRLPOOL CORP - CLYDE DIV	1994	ZINC COMPOUNDS	13	0	13

WHIRLPOOL CORP - CLYDE DIV	1995	CERTAIN GLYCOL ETHERS	1108	89937	91045
WHIRLPOOL CORP - CLYDE DIV	1995	ETHYLBENZENE	1085	19819	20904
WHIRLPOOL CORP - CLYDE DIV	1995	MANGANESE COMPOUNDS	10	4	14
WHIRLPOOL CORP - CLYDE DIV	1995	N-BUTYL ALCOHOL	285	26734	27019
WHIRLPOOL CORP - CLYDE DIV	1995	NICKEL COMPOUNDS	12	7	19
WHIRLPOOL CORP - CLYDE DIV	1995	PHOSPHORIC ACID	764	0	764
WHIRLPOOL CORP - CLYDE DIV	1995	TOLUENE	448	43598	44046
WHIRLPOOL CORP - CLYDE DIV	1995	XYLENE (MIXED ISOMERS)	1419	82385	83804
WHIRLPOOL CORP - CLYDE DIV	1995	ZINC COMPOUNDS	13	0	13
WHIRLPOOL CORP - CLYDE DIV	1996	CERTAIN GLYCOL ETHERS	2086	161643	163729
WHIRLPOOL CORP - CLYDE DIV	1996	DIETHANOLAMINE	63	0	63
WHIRLPOOL CORP - CLYDE DIV	1996	ETHYLBENZENE	599	9668	10267

WHIRLPOOL CORP - CLYDE DIV	1996	MANGANESE COMPOUNDS	13	5	18
WHIRLPOOL CORP - CLYDE DIV	1996	N-BUTYL ALCOHOL	143	13528	13671
WHIRLPOOL CORP - CLYDE DIV	1996	NICKEL COMPOUNDS	11	7	18
WHIRLPOOL CORP - CLYDE DIV	1996	PHOSPHORIC ACID	1019	0	1019
WHIRLPOOL CORP - CLYDE DIV	1996	SODIUM NITRITE	22	0	22
WHIRLPOOL CORP - CLYDE DIV	1996	TOLUENE	226	22104	22330
WHIRLPOOL CORP - CLYDE DIV	1996	XYLENE (MIXED ISOMERS)	728	46413	47141
WHIRLPOOL CORP - CLYDE DIV	1996	ZINC COMPOUNDS	27	0	27
WHIRLPOOL CORP - CLYDE DIV	1997	CERTAIN GLYCOL ETHERS	1877	145479	147356
WHIRLPOOL CORP - CLYDE DIV	1997	DIETHANOLAMINE	70	0	70
WHIRLPOOL CORP - CLYDE DIV	1997	MANGANESE COMPOUNDS	12	12	24
WHIRLPOOL CORP - CLYDE DIV	1997	NICKEL COMPOUNDS	11	7	18

WHIRLPOOL CORP - CLYDE DIV	1997	PHOSPHORIC ACID	1035	0	1035
WHIRLPOOL CORP - CLYDE DIV	1997	SODIUM NITRITE	23	0	23
WHIRLPOOL CORP - CLYDE DIV	1997	TOLUENE	115	11131	11246
WHIRLPOOL CORP - CLYDE DIV	1997	XYLENE (MIXED ISOMERS)	422	35783	36205
WHIRLPOOL CORP - CLYDE DIV	1997	ZINC COMPOUNDS	26	0	26
WHIRLPOOL CORP - CLYDE DIV	1998	CERTAIN GLYCOL ETHERS	4032	110073	114105
WHIRLPOOL CORP - CLYDE DIV	1998	COBALT COMPOUNDS	229	0	229
WHIRLPOOL CORP - CLYDE DIV	1998	DIETHANOLAMINE	99	0	99
WHIRLPOOL CORP - CLYDE DIV	1998	ETHYLBENZENE	197	17242	17439
WHIRLPOOL CORP - CLYDE DIV	1998	MANGANESE COMPOUNDS	778	78	856
WHIRLPOOL CORP - CLYDE DIV	1998	NICKEL COMPOUNDS	674	67	741
WHIRLPOOL CORP - CLYDE DIV	1998	NITRIC ACID	725	0	725

WHIRLPOOL CORP - CLYDE DIV	1998	SODIUM NITRITE	448	0	448
WHIRLPOOL CORP - CLYDE DIV	1998	TOLUENE	148	14137	14285
WHIRLPOOL CORP - CLYDE DIV	1998	XYLENE (MIXED ISOMERS)	701	64208	64909
WHIRLPOOL CORP - CLYDE DIV	1998	ZINC COMPOUNDS	890	89	979
WHIRLPOOL CORP - CLYDE DIV	1999	BARIUM COMPOUNDS	17	0	17
WHIRLPOOL CORP - CLYDE DIV	1999	CERTAIN GLYCOL ETHERS	6275	169135	175410
WHIRLPOOL CORP - CLYDE DIV	1999	COBALT COMPOUNDS	4	0	4
WHIRLPOOL CORP - CLYDE DIV	1999	DIETHANOLAMINE	108	0	108
WHIRLPOOL CORP - CLYDE DIV	1999	ETHYLBENZENE	211	19562	19773
WHIRLPOOL CORP - CLYDE DIV	1999	MANGANESE COMPOUNDS	13	0	13
WHIRLPOOL CORP - CLYDE DIV	1999	NICKEL COMPOUNDS	18	0	18
WHIRLPOOL CORP - CLYDE DIV	1999	NITRIC ACID	1299	0	1299

WHIRLPOOL CORP - CLYDE DIV	1999	SODIUM NITRITE	9	0	9
WHIRLPOOL CORP - CLYDE DIV	1999	XYLENE (MIXED ISOMERS)	759	69722	70481
WHIRLPOOL CORP - CLYDE DIV	1999	ZINC COMPOUNDS	3	0	3
WHIRLPOOL CORP - CLYDE DIV	2000	BARIUM COMPOUNDS	14	0	14
WHIRLPOOL CORP - CLYDE DIV	2000	CERTAIN GLYCOL ETHERS	5585	149432	155017
WHIRLPOOL CORP - CLYDE DIV	2000	COBALT COMPOUNDS	4	0	4
WHIRLPOOL CORP - CLYDE DIV	2000	ETHYLBENZENE	242	23195	23437
WHIRLPOOL CORP - CLYDE DIV	2000	MANGANESE COMPOUNDS	13	0	13
WHIRLPOOL CORP - CLYDE DIV	2000	NICKEL COMPOUNDS	14	0	14
WHIRLPOOL CORP - CLYDE DIV	2000	NITRIC ACID	1947	0	1947
WHIRLPOOL CORP - CLYDE DIV	2000	SODIUM NITRITE	0	0	0
WHIRLPOOL CORP - CLYDE DIV	2000	XYLENE (MIXED ISOMERS)	857	81635	82492

WHIRLPOOL CORP - CLYDE DIV	2000	ZINC COMPOUNDS	24	0	24
WHIRLPOOL CORP - CLYDE DIV	2001	BARIUM	14	0	14
WHIRLPOOL CORP - CLYDE DIV	2001	CERTAIN GLYCOL ETHERS	5627	149281	154908
WHIRLPOOL CORP - CLYDE DIV	2001	COBALT	4	0	4
WHIRLPOOL CORP - CLYDE DIV	2001	ETHYLBENZENE	262	25318	25580
WHIRLPOOL CORP - CLYDE DIV	2001	MANGANESE COMPOUNDS	13	0	13
WHIRLPOOL CORP - CLYDE DIV	2001	NICKEL	12	0	12
WHIRLPOOL CORP - CLYDE DIV	2001	NITRIC ACID	1245	0	1245
WHIRLPOOL CORP - CLYDE DIV	2001	SODIUM NITRITE	0	0	0
WHIRLPOOL CORP - CLYDE DIV	2001	XYLENE (MIXED ISOMERS)	937	89976	90913
WHIRLPOOL CORP - CLYDE DIV	2001	ZINC COMPOUNDS	14	0	14
WHIRLPOOL CORP - CLYDE DIV	2002	BARIUM	13	5	18

WHIRLPOOL CORP - CLYDE DIV	2002	CERTAIN GLYCOL ETHERS	1436	28848	30284
WHIRLPOOL CORP - CLYDE DIV	2002	COBALT	3	0	3
WHIRLPOOL CORP - CLYDE DIV	2002	ETHYLBENZENE	165	14777	14942
WHIRLPOOL CORP - CLYDE DIV	2002	MANGANESE COMPOUNDS	10	0	10
WHIRLPOOL CORP - CLYDE DIV	2002	NICKEL	10	0	10
WHIRLPOOL CORP - CLYDE DIV	2002	NITRIC ACID	935	0	935
WHIRLPOOL CORP - CLYDE DIV	2002	SODIUM NITRITE	0	0	0
WHIRLPOOL CORP - CLYDE DIV	2002	XYLENE (MIXED ISOMERS)	584	44160	44744
WHIRLPOOL CORP - CLYDE DIV	2002	ZINC COMPOUNDS	11	0	11
WHIRLPOOL CORP - CLYDE DIV	2003	BARIUM	5	0	5
WHIRLPOOL CORP - CLYDE DIV	2003	CERTAIN GLYCOL ETHERS	3830	117803	121633
WHIRLPOOL CORP - CLYDE DIV	2003	ETHYLBENZENE	241	20775	21016

WHIRLPOOL CORP - CLYDE DIV	2003	MANGANESE COMPOUNDS	4	0	4
WHIRLPOOL CORP - CLYDE DIV	2003	NICKEL	4	0	4
WHIRLPOOL CORP - CLYDE DIV	2003	NITRIC ACID	848	0	848
WHIRLPOOL CORP - CLYDE DIV	2003	XYLENE (MIXED ISOMERS)	841	66469	67310
WHIRLPOOL CORP - CLYDE DIV	2003	ZINC COMPOUNDS	9	0	9
WHIRLPOOL CORP - CLYDE DIV	2004	BARIUM	11	0	11
WHIRLPOOL CORP - CLYDE DIV	2004	CERTAIN GLYCOL ETHERS	4000	130463	134463
WHIRLPOOL CORP - CLYDE DIV	2004	ETHYLBENZENE	135	8785	8920
WHIRLPOOL CORP - CLYDE DIV	2004	FORMIC ACID	202	0	202
WHIRLPOOL CORP - CLYDE DIV	2004	MANGANESE COMPOUNDS	5	0	5
WHIRLPOOL CORP - CLYDE DIV	2004	NICKEL	6	0	6
WHIRLPOOL CORP - CLYDE DIV	2004	NITRIC ACID	2018	0	2018

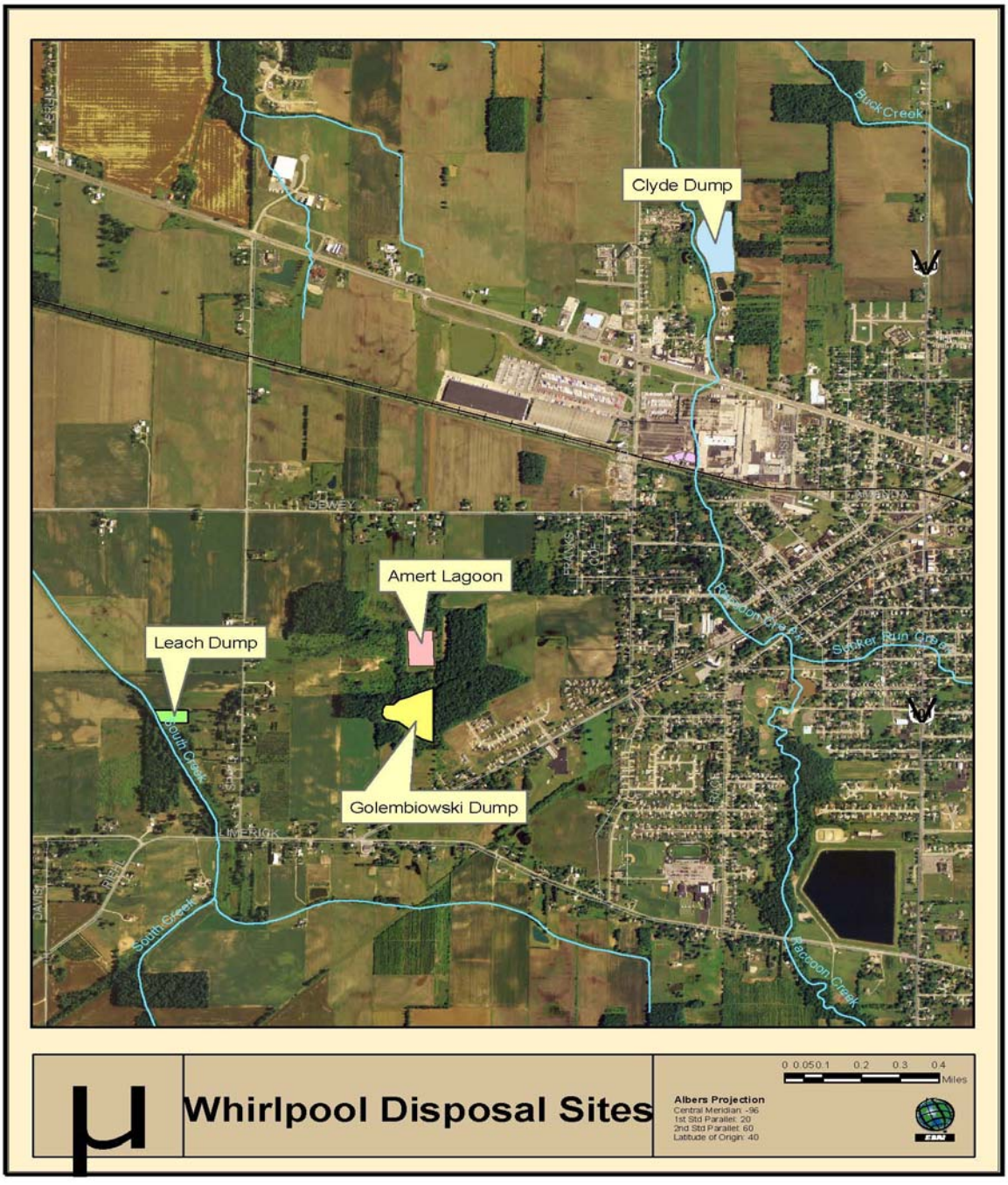
WHIRLPOOL CORP - CLYDE DIV	2004	XYLENE (MIXED ISOMERS)	707	48006	48713
WHIRLPOOL CORP - CLYDE DIV	2004	ZINC COMPOUNDS	25	0	25
WHIRLPOOL CORP - CLYDE DIV	2005	BARIUM	5	0	5
WHIRLPOOL CORP - CLYDE DIV	2005	CERTAIN GLYCOL ETHERS	2040	65056	67096
WHIRLPOOL CORP - CLYDE DIV	2005	ETHYLBENZENE	142	6887	7029
WHIRLPOOL CORP - CLYDE DIV	2005	MANGANESE COMPOUNDS	7	0	7
WHIRLPOOL CORP - CLYDE DIV	2005	NICKEL	7	0	7
WHIRLPOOL CORP - CLYDE DIV	2005	NITRIC ACID	805	0	805
WHIRLPOOL CORP - CLYDE DIV	2005	XYLENE (MIXED ISOMERS)	495	13238	13733
WHIRLPOOL CORP - CLYDE DIV	2005	ZINC COMPOUNDS	9	0	9
WHIRLPOOL CORP - CLYDE DIV	2006	BARIUM	8	0	8
WHIRLPOOL CORP - CLYDE DIV	2006	CERTAIN GLYCOL ETHERS	2425	77267	79692

WHIRLPOOL CORP - CLYDE DIV	2006	ETHYLBENZENE	211	9655	9866
WHIRLPOOL CORP - CLYDE DIV	2006	MANGANESE COMPOUNDS	15	0	15
WHIRLPOOL CORP - CLYDE DIV	2006	NICKEL	7	0	7
WHIRLPOOL CORP - CLYDE DIV	2006	NITRIC ACID	602	0	602
WHIRLPOOL CORP - CLYDE DIV	2006	SODIUM NITRITE	0	0	0
WHIRLPOOL CORP - CLYDE DIV	2006	XYLENE (MIXED ISOMERS)	737	16905	17642
WHIRLPOOL CORP - CLYDE DIV	2006	ZINC COMPOUNDS	6	0	6
WHIRLPOOL CORP - CLYDE DIV	2007	BARIUM	7	0	7
WHIRLPOOL CORP - CLYDE DIV	2007	CERTAIN GLYCOL ETHERS	3253	104642	107895
WHIRLPOOL CORP - CLYDE DIV	2007	ETHYLBENZENE	133	10133	10266
WHIRLPOOL CORP - CLYDE DIV	2007	MANGANESE COMPOUNDS	39	0	39
WHIRLPOOL CORP - CLYDE DIV	2007	NICKEL	6	0	6

WHIRLPOOL CORP - CLYDE DIV	2007	NITRIC ACID	602	0	602
WHIRLPOOL CORP - CLYDE DIV	2007	SODIUM NITRITE	0	0	0
WHIRLPOOL CORP - CLYDE DIV	2007	XYLENE (MIXED ISOMERS)	474	31679	32153

Attachment B

Map of Disposal Sites Utilized by Whirlpool



Attachment C

Map of Disposal Sites in the Clyde and Green Creek Township Area