FEASIBILITY STUDY

SITE 0153

INDIANAPOLIS, INDIANA

U.S. EPA ID NUMBER: INN000510936

PREPARED BY:

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

OFFICE OF LAND QUALITY

SITE INVESTIGATION PROGRAM

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FEASIBILITY STUDY REPORT
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EXECUTIVE SUMMARY

The Indiana Department of Environmental Management (IDEM) has prepared this Feasibility Study (FS) and follow-on documents {Remedial Investigation (RI) and Human Health and Ecological Risk Assessment (HHERA)} to support the de-proposal/de-listing of Site 0153 from the Superfund National Priority List (NPL).

Citizens Water (Citizens) operates the public drinking water supply for the City of Indianapolis, Indiana. In 2013, Citizens notified IDEM that low levels of chlorinated volatile organic compounds (cVOCs) had been detected in the untreated groundwater ("raw") at certain wells located within the Riverside and White River Wellfields ("the Wellfields"). In 2014, IDEM sampled and found low levels of cVOCs in five of the 17 water production wells. Detected cVOC concentrations in the raw water samples were below the maximum contaminant levels (MCLs) allowed by the United States Environmental Protection Agency (U.S. EPA) under the Safe Drinking Water Act (SDWA).

U.S. EPA designated the area as "Site 0153" and proposed it for inclusion on the Superfund NPL. In response to public sentiment and updated information from Citizens, IDEM subsequently requested that U.S. EPA defer listing the Site on the Superfund NPL. On June 8, 2017, U.S. EPA and IDEM entered into a Memorandum of Agreement (MOA) in which Site 0153 was deferred to IDEM's State Cleanup Program as a Superfund alternative. The MOA outlined an Alternative Plan for addressing contamination at Site 0153. As a part of the Alternative Plan, IDEM and Citizens committed to the following response actions to address detections of VOCs in the Wellfields and ensure protection of human health and the environment:

- IDEM would conduct a comprehensive search for Potentially Responsible Parties to identify the potential sources of contamination identified in the wellfields.
- IDEM would oversee investigations of the potential sources of contamination and manage identified sources of contamination through one of the various remediation programs at IDEM, to eliminate their VOC impact contributions to the Wellfields.
- Citizens would remove production well WR-3 from service, install aeration equipment to reduce VOCs, and complete confirmatory sampling of post-treatment water before returning the well to service.
- Citizens would complete the same response action (removal from service, installation of aeration equipment, and completion of confirmatory sampling prior to returning a well to service) if another production well exceeds a drinking water MCL in the future.

- Citizens would develop and implement a Groundwater Monitoring Plan and increase the frequency of sampling of production wells to quarterly for VOCs to monitor concentrations in the wellfields, provide a plan to address potential detections, and ensure continued safety of the drinking water.

IDEM has since taken the lead to investigate the source of these low levels of cVOCs in groundwater and will oversee any necessary cleanup activities. Currently, the source(s) of the cVOCs detected in the Wellfields has not been identified. It is likely that a number of individual sources may be contributing to a commingled groundwater plume, which is impacting the Wellfields. In order to address the impacts to the Wellfields, IDEM is managing individual releases within Site 0153 through one of the various remediation programs at IDEM {e.g. SCP, Voluntary Remediation Program (VRP), Indiana Brownfields Program, etc.}.

PRPs will be responsible for conducting their own site investigations and remediation, under directive from IDEM, to eliminate their cVOC impact contributions to the Wellfields. During this investigation, Citizens has continued to monitor cVOC levels within the production wells, while the IDEM has actively pursued identifying PRPs.

Citizens has also completed substantial efforts since submitting its Alternative Plan in 2016. First and foremost, finished drinking water provided by Citizens to customers has always remained safe for consumption. All historic and current finished drinking water provided by Citizens meets all Safe Drinking Water Act (SDWA) MCLs prior to distribution. As identified in the Alternative Plan, Citizens developed and implemented a Groundwater Monitoring Plan with an increased sampling of production wells from semi-annual to quarterly to monitor cVOC concentrations in the Wellfields.

Citizens has always sampled treated finished drinking water to ensure results are below the MCL prior to distribution. IDEM and Citizens participated in a split-sampling event of active production wells in both Wellfields in February and March 2018. Both IDEM and Citizens results of the split sampling event confirmed that all cVOC concentrations were below MCLs.

As required by the Alternative Plan, Citizens shut down production well WR-3 in September 2016 due to low level MCL exceedances of Trichloroethylene (TCE) in raw groundwater.[1] As a presumptive interim measure, Citizens engineered and installed an aeration system for WR-3 beginning in September 2019. Aeration system construction was completed in late January 2020. Citizens conducted aeration testing on WR-3 from February through April 2020 and WR-3 is now back in service. Currently all raw water generated from production well WR-3, even before

[1] Prior to shutting down WR-3, TCE concentrations ranged from 4.43 to 8.18 micrograms per liter (µg/L). The MCL for TCE is 5.0 µg/L. WR-3 was the only production well which exceeded an MCL.

it is aerated, is below MCLs, providing further evidence that cVOC concentrations in the Wellfields continue to decline.

Aeration is a common-sense, "presumptive remedy" that has already been implemented at the Wellfields as an interim measure and shown to be effective. Citizens proactively installed aeration at WR-3 prior to development of the FS. Results of the pre and post aeration raw water indicates this presumptive remedy successfully reduces cVOC concentrations at the production well even before being mixed with other groundwater/surface water prior to treatment and distribution. There are currently no active production wells in the Wellfields with raw water cVOC concentrations above MCLs. As such, IDEM has prepared this FS to identify, screen, and provide a detailed analysis of potential remedial alternatives that could be utilized in the future to address low-level cVOC impacts in the Wellfields. Specifically, this FS focuses on treating the groundwater at the extraction point in the Wellfields (i.e. at production wells that contain cVOCs over the MCL in the raw water). The FS documents the evaluation process and recommends a treatment alternative capable of reducing or eliminating cVOC concentrations from the production wells, if needed in the future.

The EPA's Guidance for Conducting Remedial Investigations/Feasibility Studies under Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (EPA, 1988) was used during the development of this FS.

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ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFR	Code of Federal Regulations
Citizens	Citizens Water
CSM	Conceptual Site Model
cVOCs	Chlorinated Volatile Organic Compounds
DNAPL	Dense Non-Aqueous Phase Liquid
ESA	Endangered Species Act
ETR	Endangered, Threatened, or Rare
ETR	Endangered, Threatened, Rare
Ft. bg.	Feet Below Grade
GPM	Gallons Per Minute
HHERA	Human Health and Ecological Risk Assessment
HRS	Hazard Ranking System
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
INHDC	Indiana Natural Heritage Data Center
MCLGs	Maximum Contaminant Level Goals
MCLs	Maximum Contaminant Levels
MCPHD	Marion County Public Health Department
MOA	Memorandum of Agreement
NCP	National Contingency Plan
NPL	National Priorities List
OSHA	Occupational Safety and Health Administration
OWQ	IDEM Office of Water Quality
PA	Preliminary Assessment
PRPs	Potentially Responsible Parties
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RGs	Remediation Goals
RI	Remedial Investigation
RSLs	Regional Screening Levels
SARA	Superfund Amendments and Reauthorization Act of 1986
SDWA	Safe Drinking Water Act
SI	Site Inspection
TBC	To Be Considered
TCE	Trichloroethylene
TES	Threatened and Endangered Species
U.S. EPA	United States Environmental Protection Agency
USC	United States Code
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds
WRTP	White River Water Treatment Plant

FEASIBILITY STUDY REPORT
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1.0 INTRODUCTION

The 0153/Riverside Groundwater Contamination Site ("Site 0153" or "Site") is located in Indianapolis, Marion County, Indiana and consists of an area of impacted groundwater in vicinity of the Riverside and White River Municipal Wellfields (the Wellfields). The Wellfields are owned and operated by Citizens Water (Citizens). Low levels of chlorinated volatile organic compounds (cVOCs) have been detected in untreated ("raw") groundwater samples collected from certain water production wells. Treated (finished) water and the drinking water provided to customers by Citizens has met and continues to meet all requirements of the Safe Drinking Water Act (SDWA).

In order to address the impacts to the Wellfields, the Indiana Department of Environmental Management (IDEM) is managing potential individual sources within Site 0153 through one of the various State remediation programs. The IDEM initially identified 89 potential sources of cVOC impacts within a five-year time of groundwater travel to the Wellfields[2]; however, a definitive source(s) of cVOCs impacting the Wellfields has not been identified to-date. It is likely that a number of individual sources may be contributing to a commingled groundwater plume, which are together, impacting the Wellfields. Individual Potentially Responsible Parties (PRPs) have been and will be responsible for conducting their own site investigations and remediation, under directive from the IDEM, to eliminate their cVOC impact contributions to the two Wellfields. During this investigation, Citizens has continued to monitor cVOC levels within the production wells, while the IDEM has actively pursued identifying PRPs within the boundary of Site 0153, narrowed the list of PRPs, and provided oversight to PRPs currently managed within a remediation program at the IDEM. Therefore, current and future PRP sites contributing cVOC impacts to the Wellfields are not the focus of the Site 0153 Feasibility Study (FS).

The focus of the Site 0153 FS is the identification, screening, and detailed analysis of potential remedial alternatives to address raw untreated groundwater being pumped from the Riverside and White River Wellfields, if needed, prior to the distribution of drinking water to customers. The Wellfields are located within Site 0153 and are the focus of this FS. Citizens is responsible for operation of the Wellfields and the supply of drinking water to customers in Indianapolis. The following FS documents this process and suggests a treatment alternative capable of reducing or eliminating cVOC concentrations from the production wells. If future treatment of

[2] The five-year time of groundwater travel to the two well fields is the boundary of Site 0153 as established by the U.S. EPA.

production water is necessary, re-evaluation may be warranted based on newly available technologies. Citizens will communicate to IDEM the chosen remedial technologies required to address impacts associated with production wells located within the Wellfields in the future, if necessary.

1.1 Report Purpose and Organization

In accordance with the *Memorandum of Agreement between United States Environmental Protection Agency, Region 5 and the Indiana Department of Environmental Management for the 0153/Riverside Groundwater Contamination Site, Indianapolis, Indiana* (MOA) (IDEM/U.S. EPA, 2017), the IDEM has completed this FS for Site 0153 in Indianapolis, Marion County, Indiana. The United States Environmental Protection Agency (U.S. EPA) is no longer considering Site 0153 for inclusion on the National Priorities List (NPL) and is allowing the IDEM to ensure necessary investigations and response actions are completed at the Site under the IDEM's State Cleanup Program (SCP) {or similar program e.g. Voluntary Remediation Program (VRP)}. As indicated in the MOA, IDEM response actions for the Site must be substantially similar to that of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the National Contingency Plan (NCP). The FS has been conducted in a manner necessary to meet the requirements of a "CERCLA-protective cleanup" (IDEM/U.S. EPA, 2017). A copy of the MOA is provided as **Appendix A**.

This FS describes the development and evaluation of groundwater treatment alternatives, if needed, for treatment of raw groundwater produced from the Wellfields. The selected treatment alternative will reduce or eliminate unacceptable risks to human health at the production wellheads from exposure to cVOC-impacted groundwater. The FS was conducted based on information presented in the Remedial Investigation (RI) Report (IDEM, July 2020), the determination of risk documented in the Human Health and Ecological Risk Assessment (HHERA) (IDEM, July 2020), and Cost Estimates developed as part of this effort. Alternatives identification and screening retained for detailed analysis have been performed, as applicable, using the presumptive remedy approach as directed by the United States Environmental Protection Agency (EPA)[3] as described in their document entitled *Rules of Thumb for Superfund Remedy Selection* dated August 1997. The EPA's 1988 *Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA* was also used during the development of this report. The report is divided into the following five sections:

- **Section 1.0 Introduction** – This section presents the FS purpose and organization and provides an overview of available background information, including a description and history of the site, site geologic and hydrogeologic conditions, the nature and extent of

[3] https://www.epa.gov/superfund/key-principles-superfund-remedy-selection

contamination, presents a conceptual site model (CSM), and a summary of human health and ecological risks.

- **Section 2.0 Applicability and Review of Remedy Technologies** – This section summarizes the potential applicable or relevant and appropriate requirements (ARARs) and presents the remedial action objectives (RAO's) and remediation goals for the production wells located within the Wellfields.

- **Section 3.0 Development of Alternatives** – This section identifies and describes remedial alternatives that could be used to treat the cVOC impacts in the raw groundwater from the production wells, and compares the alternatives based on effectiveness, implementability, and cost.

- **Section 4.0 Detailed Analysis of Alternatives** – This section provides a detailed analysis of the remedial alternatives. Each alternative is evaluated based on its overall protection of human health and the environment, compliance with ARARs, long-term effectiveness, reduction of toxicity, mobility or volume, short-term effectiveness, implementability, and cost. This section also recommends a remedial alternative to treat the cVOC impacts in the raw groundwater from the production wells and describes any monitoring and contingency plans necessary to implement the selected remedial alternative.

- **Section 5.0 References** – This section identifies references cited in this FS Report.

1.2 Site Background

1.2.1 Site Description

The Site, for purposes of this FS, consists of the Riverside and White River Wellfields, located in Indianapolis, Indiana. The two Wellfields are owned and operated by Citizens Water (Citizens) and are used to supply drinking water to portions of the City of Indianapolis. The Site is relatively flat and is located in Indianapolis, Marion County, Indiana and is depicted on **Figure 1**. In addition to the Wellfields, Site 0153 contains a mix of residential, commercial, industrial, and recreational properties. Major water bodies within the Site include the White River, Fall Creek, and the Indianapolis Water Company Canal.

INFORMATION REDACTED DUE TO CLAIM OF CONFIDENTIALITY – CONFIDENTIAL – NOT SUBJECT TO PUBLIC DISCLOSURE FOR REASONS OF PUBLIC SAFETY, AND CONFIDENTIAL BUSINESS INFORMATION

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Each wellfield contains a series of production wells set or screened in the underlying unconsolidated sand and gravel materials or the deeper bedrock. As of July 2020, raw untreated groundwater is collected from 16 active production wells[4] within the Wellfields. Raw production well analytical results have been included as **Table 1**. The raw groundwater recovered from the production wells is pumped to the WRTP located in the White River Wellfield area for mixing and treatment prior to distribution. Finished water analytical results have been included as **Table 2**. The water is treated using typical water treatment efforts including filtration, chlorination (as a disinfectant), fluorination, and additions of small amounts of ammonia (to aid in minimizing by-products during the disinfection process).

Based on annual averages, the drinking water distributed from the White River Treatment Plant is a mixed water supply composed of approximately 89% raw surface water and approximately 11% raw groundwater. **INFORMATION REDACTED DUE TO CLAIM OF CONFIDENTIALITY – CONFIDENTIAL – NOT SUBJECT TO PUBLIC DISCLOSURE FOR REASONS OF PUBLIC SAFETY, AND CONFIDENTIAL BUSINESS INFORMATION**. Raw groundwater from the Wellfields is always mixed with raw surface water (or "finished" water reserves) to produce the "finished" drinking water supplied to customers.

1.2.2 Site History

Citizens operates the public drinking water supply for the City of Indianapolis, Indiana. As part of its drinking water operations, Citizens mixes groundwater from its Wellfields with surface water from the Indianapolis Central Canal. The mixed water is then treated and filtered "finished". This "finished" drinking water is then distributed to customers. To ensure the safety of the drinking water, Citizens routinely samples the "finished" water for over 300 constituents, including cVOCs. In addition, Citizens has routinely collected and analyzed untreated groundwater samples from individual production wells.

On February 20, 2013, IDEM staff received notice from Citizens that cVOCs were being detected in the "raw" groundwater prior to treatment at the Riverside Municipal Wellfield. Citizens was concerned that the increasing levels of vinyl chloride (VC) in production well RS-29 were approaching the Maximum Contaminant Level (MCL), which is the drinking water standard established by the U.S. EPA pursuant to the SDWA. Citizens expressed concern that the increasing VC levels might adversely impact the use of the well to supply drinking water to residents in Indianapolis. The Riverside Wellfield lies adjacent to the White River Wellfield. Both Wellfields have been impacted by cVOCs migrating to their respective production wells.

[4] Active Riverside Wellfield production wells include RS-7, RS-8, RS-9, RS-17, RS-18, RS-19, RS-22, RS-26, RS-29, RS-A, RS-B and RS-D. Active White River Wellfield production wells include WR-3, WR-7, WR-8 and WR-9. WR-3 was removed from service and reactivated following installation of aeration system.

As part of the Superfund site assessment process and under a Cooperative Agreement with the U.S. EPA, the IDEM prepared a Preliminary Assessment Report (PA Report), dated November 1, 2013 and a Site Inspection Report (SI Report), dated October 23, 2014. A copy of the PA Report and the SI Report are provided in **Appendix B** and **Appendix C**, respectively. (**APPENDICES REDACTED DUE TO CLAIM OF CONFIDENTIALITY – CONFIDENTIAL – NOT SUBJECT TO PUBLIC DISCLOSURE FOR REASONS OF PUBLIC SAFETY, AND CONFIDENTIAL BUSINESS INFORMATION)**. Using data collected during the SI, a Hazard Ranking System (HRS) documentation record was submitted to U.S. EPA determining that the Site qualified for inclusion on the NPL.

In a letter dated August 13, 2015, IDEM's former Commissioner, Thomas Easterly, requested inclusion of the Site on the NPL of hazardous waste sites. In April 2016, U.S. EPA published a Proposed Rule in the Federal Register, proposing to include Site 0153 on the U.S. EPA's NPL. The IDEM, responsive to public requests, subsequently determined that it would be in the best interests of the State and the City of Indianapolis to address the Site in the IDEM's SCP rather than via the federal Superfund Process. During 2016, IDEM officials, the Governor's Office, the Mayor's office, Citizens, and members of the general public requested in letters, meetings, and formal comments on U.S. EPA's proposed rule that U.S. EPA should not list the Site on the NPL, and instead allow IDEM to manage the investigation and remedial actions of Site 0153 pursuant to a state-lead "Alternative Plan." In a letter dated August 18, 2016, the IDEM's former Commissioner, Carol Comer, formally withdrew support for and rescinded IDEM's August 2015 request to include the Site 0153 on the NPL.

After receipt of public comments opposed to listing the Site on the NPL, U.S. EPA began discussions with IDEM in October 2016 to identify the criteria that IDEM would need to satisfy in order for U.S. EPA to consider allowing IDEM to manage Site 0153 in lieu of U.S. EPA. These discussions resulted in the execution of the Site 0153 MOA on June 8, 2017. The MOA specifies the expectations and obligations of each agency regarding Site 0153 and memorializes the agreements necessary to ensure that the response actions undertaken at Site 0153 achieve a "CERCLA-protective cleanup".

In accordance with the Alternative Plan included in the MOA, production well WR-3 was shut down in 2016 due to trichloroethylene (TCE) concentrations that exceeded the MCL. Citizens subsequently installed an aeration system on production well WR-3 beginning in September 2019 with construction completion in late January 2020. Citizens conducted testing efforts on WR-3 from February through April 2020. WR-3 is currently back in service and all "raw" water generated from the production well is below MCLs. WR-3 pre- and post-aeration water analytical results have been included as **Table 3**.

1.2.3 Surrounding Land Use

The Site lies within the City of Indianapolis on land zoned central business zone, regional center/wellfield protection, and heavy industrial (City of Indianapolis, 2019); see **Figure 1**. It is surrounded to the north by commercial property, to the east by commercial and special use areas, to the south by hospitals, parks, and universities, and to the west by the White River. The population of Indianapolis is approximately 867,125 as of 2018 (U.S. Census Bureau, 2019).

1.3 Physical Characteristics

1.3.1 Surface Features

Site 0153 is located within the New Castle Till Plains and Drainageways physiographic province, an area of low relief crossed by many major tunnel-valleys that covers the northeastern headwater area of the West Fork White River Basin (Franzmeier, 2004).

These till plains have low to moderately flat topography stretching approximately 12,000 square miles (mi^2) and have developed on relatively thick Pleistocene glacial drift deposits. These plains are characterized by slightly modified ground moraines and poorly developed end moraines formed during the Wisconsinan glaciation (Franzmeier, 2004).

1.3.2 Surficial Geology

The majority of Site 0153 (over 83%) consists or urban land variants of the Fox and Genesee soil series where public works and structures make identification of native soils infeasible and Udorthents, where the original soil has been cut away and replaced with non-native fill material. The Fox and the Genesee series are composed of well drained soils with 0 to 2 percent slopes. The Fox series is derived from loamy outwash over sandy gravel outwash, while the Genesee is derived from loamy alluvium.

1.3.3 Unconsolidated Geology

The unconsolidated soils of the White River basin are composed of fine-grained deposits of the Trafalgar formation, which were deposited during multiple glacial advances during the Pleistocene Epoch. Glacial sediments, including sand and gravel from each of the advances, filled pre-glacial stream valleys and created buried bedrock valleys. The northern half of the White River basin is covered by thick ground moraine (loamy tills interbedded with layers of stratified sand and gravel), while the outwash that was transported south filled in many of the large stream valleys (Fenelon, 1994). In the vicinity of Site 0153, the estimated thickness of the unconsolidated deposits is approximately 75 to 95 feet (ft.) and consists of fine-grained glacial till (silt and clay) with interbedded layers of sand and gravel. Two distinct sand and gravel layers are found in Site 0153. The Upper Sand and Gravel unit begins at approximately 10 ft. below grade (ft. bg) and extends to approximately 45 ft. bg. The Lower Sand and Gravel unit begins at approximately 55 ft. bg and extends to bedrock (75-95 ft. bg). In most areas, a clay layer separates the upper and lower sand and gravel zones.

1.3.4 Bedrock Geology

According to the Bedrock Geologic Map of Indiana (Gray, Ault, & Keller, 1987), the bedrock in Marion County is located between two regional structural features (Cincinnati Arch to the northeast and Illinois Basin to the southwest). Bedrock in the area dips slightly to the southwest and consists primarily of Devonian-age limestone and dolomite of the Muscatatuck Group. The Muscatatuck Group can be up to 250 ft. thick but is approximately 50 to 60 ft. thick in the vicinity of Site 0153.

1.3.5 Surface-water Hydrology

Site 0153 is located in the White River basin, which encompasses over 5,600 (mi^2) in 27 counties within Indiana and spans nearly the entire width of south-central Indiana (Fenelon, 1994). Marion County is located in the northern portion of this basin, with Fall Creek and Eagle Creek being the largest tributaries. Fall Creek flows through Site 0153 and is one of the major tributaries in the basin with a drainage area of greater than 300 (mi^2) (Fenelon, 1994). Fall Creek drains into White River just southwest of Site 0153.

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1.3.6 Hydrogeology

1.3.6.1 Unconsolidated Aquifers

Four distinct unconsolidated aquifer systems and subsystems are present in proximity of Site 0153. The New Castle/Tipton Till Aquifer System, the New Castle/Tipton Till Aquifer Subsystem, the New Castle/Tipton Till Complex Aquifer System, and the White River and Tributaries Outwash Aquifer System (Indiana Department of Natural Resources, 2011). Site 0153 lies within the White River and Tributaries Outwash Aquifer System (Indiana Department of Natural Resources, 2011).

At Site 0153, an Upper Sand and Gravel unit and a Lower Sand and Gravel Unit have been identified. The upper unit begins at approximately 10 ft. bg. and extends to approximately 45 ft. bg. The lower unit begins at approximately 55 ft. bg. and extends to bedrock (75-95 ft. bg.). In most areas, a clay layer separates the upper and lower units and acts as a barrier to minimize the migration of groundwater from the upper unit to the lower unit.

As of 2020, the Riverside Wellfield, consisting of 12 groundwater production wells, has three wells screened in the Lower Sand and Gravel unit. The three Riverside Wellfield production wells screened in the Lower Sand and Gravel unit produce, on average, between 200 and 900 gallons per minute (gpm). The White River Wellfield is comprised of four groundwater production wells. Each well is screened within the Lower Sand and Gravel unit and produces, on

average, between 300 and 750 gpm. In order to maintain a sustainable yield from the aquifer, the Wellfields groundwater production wells are cycled to provide groundwater to the WRTP.

According to the Potentiometric Surface Map of the Unconsolidated Aquifers of Marion County, Indiana (Indiana Department of Natural Resources, 2012), the regional groundwater flow is towards the White River, with flow on the western side of the county to the east/southeast and flow on the eastern side of the county to the west/southwest. At Site 0153 groundwater flow is generally radial toward the production wells operating in the two Wellfields. Depending on the time of year and the volume of water being extracted by the Wellfields, water for the Wellfields may be drawn from both the White River and Fall Creek, creating localized losing reaches for both streams.

1.3.6.2 Bedrock Aquifers

Three distinct bedrock aquifer systems are present within Marion County. The Borden Group Aquifer System, the New Albany Shale Aquifer System, and the Silurian and Devonian Carbonates Aquifer System. Site 0153 lies within the Silurian and Devonian aquifer which is comprised of limestone and dolostone of the Muscatatuck Group and similar underlying Silurian carbonates. Capable of supporting the needs of domestic and high-capacity users in the area, yields from the carbonate aquifer range from 10 to 1,200 gpm with static water levels ranging from flowing surface outcrops to 227 ft below surface. Wells in this aquifer system penetrate up to 400 ft. into the carbonate bedrock with depths ranging from 30 to 485 ft. Typically overlain by thick clay deposits, this system is at low risk to contamination from surface sources. However, in areas where the system is overlain by unconsolidated deposits composed of primarily sand and gravel outwash materials, risk to contamination is considered high (Indiana Department of Natural Resources, 2011). Nine Riverside Wellfield production wells withdraw groundwater from the bedrock aquifer and produce, on average, between 200 to 900 gpm.

1.3.7 Site Ecology

Ecologically susceptible areas are locations that merit consideration of potential effects on non-human receptors. Because endangered, threated, and/or rare (ETR) species may reside in underground cave systems, karst terrain is also considered an ecologically susceptible area along with surface waters, wetlands, riparian areas, parks, preserves, and other protected habitats. The locations of national parks, forests, and wildlife refuges, state parks, nature preserves, and other protected areas were evaluated as part of this document. No national parks, forests, and wildlife refuges are located in Marion County. However, three state parks are located in Marion County: Fort Harrison State Park, Eagle Creek State Park, and White River State Park. White River State Park, which includes the Indianapolis Zoo and White River Gardens, is located within Site 0153.

A review of state and federally listed ETR species and critical habitats revealed 60 reported ETR species and eight high quality natural communities documented within Marion County, Indiana (Indiana Department of Natural Resources, 2019). According to the United States Fish and

Wildlife Service (U.S. FWS), the only federally-listed endangered species within Marion County are: the Bald Eagle, which prefer to breed and winter in forested areas adjacent to large bodies of water[5]; the Indiana Bat and Northern Long-Eared Bat, which prefer caves/mines for hibernation and small stream corridors and woods for breeding and foraging habitats; and, the Rusty Patched Bumble Bee, which prefers grasslands and undisturbed soil for nesting and hibernating. Additional ecological information including Marion County ETR search results and Wetlands Map are provided in **Appendix D.**

1.4 Remedial Investigation Summary

IDEM prepared the RI Report to evaluate and characterize Site 0153 conditions. IDEM is managing characterization and cleanup of potential sources within the area of Site 0153 under individual state remediation programs. The purpose of the RI Report is to characterize Site 0153 conditions, summarize investigations of discrete PRP sites, discuss the fate and transport of chemicals affecting the Wellfields, evaluate the nature and extent of groundwater impacts within the Wellfields, and summarize risk to human health and the environment.

As noted in the RI report, IDEM has actively pursued the identification of PRPs, narrowed the list of PRPs, and provided oversight to PRPs currently managed within a state remediation program. The IDEM PRP search included the following efforts:

- Conducted records review for every commercial/industrial property located within the Site 0153 5-year time of travel boundary (i.e. the Records Investigation Area). This review identified over 3,900 properties, most of which had no environmental issues (i.e. no history of a documented release, cVOC usage, or cVOC related waste generation).
- Submitted Request for Information (RFI) letters to all properties that warranted further investigation that weren't currently in an IDEM remediation program. To date, the IDEM has sent approximately 140 RFI letters to current/historic owners and operators of a total of 103 properties. All properties that received an RFI letter are depicted on **Figure 2**.
- Utilized RFI response information to determine next steps for each PRP, including (if warranted) submittal of a Notice of Liability (NOL) letter to trigger liability of the recipients. The NOL requires each PRP to confirm the potential for release or spill of chemicals, and requires completion of an investigation and cleanup, if necessary. All properties that received a NOL letter are depicted on **Figure 3**.

To date, IDEM has sent 25 NOL letters. Seventeen sites are actively investigating contamination and 8 have received a No Further Action or similar closure letters. Multiple facilities in the Records Investigation Area were already enrolled in an IDEM remediation program. Facilities with known releases in the Records Investigation Area were also evaluated to determine Site

[5] Despite this preference, there are multiple known Bald Eagle nests documented within Marion County, including several within the central portion of the county along the White River.

0153 PRP status. To further refine its approach to identified PRPs, IDEM developed a priority ranking/classification system that included the following distinctions:

- High Priority - sites with significant contamination (or suspected of having significant contamination) in close proximity to the Wellfields.
- Medium Priority - sites with significant contamination (or suspected of having significant contamination) within Site 0153 but located further from any production wells than high priority facilities.
- Data Gap – sites where additional information is needed to determine if a NOL Letter is appropriate or if IDEM needs to complete an investigation to determine if contamination is present.
- Background Relevance – sites that IDEM has ruled out as potential sources of cVOC impacts to the Wellfields.

All of the high and medium priority PRPs are currently enrolled in one of the state remediation programs and are at various stages of the investigation/remediation process.

Additional key components and conclusions identified in the RI Report include the following:

- cVOCs have been non-detect in finished drinking water. Refer to **Table 2** for finished water analytical results.
- Given that a discrete source(s) of cVOCs has not been identified, and that groundwater is the only impacted medium in the Wellfields, groundwater transport of cVOCs from off-Site sources into the Wellfields is the only credible mechanism capable of producing the impacts observed in production wells.
- IDEM's continued oversight of investigations of the potential sources of contamination and management of identified sources through one of the various state remediation programs will continue to reduce cVOC contributions to the Wellfields.
- Citizens has completed several Alternative Plan requirements to ensure safe drinking water including:
    - Removed WR-3 from service, installed aeration equipment, and completed confirmatory sampling of post-treatment water before returning the well to service; and
    - Developed and implemented a Groundwater Monitoring Plan with an increased frequency of production wells sampling to monitor concentrations in the wellfields.
- Although low-levels of cVOCs have been detected in raw groundwater collected from some production wells, finished drinking water provided to customers by Citizens is safe. All drinking water provided to customers has met and continues to meet all requirements of the SDWA. Furthermore, cVOC concentrations observed in the Wellfields continue to decline. Refer to **Table 1** for raw production well analytical results.

Although not all investigation and remediation of discrete PRP sites are complete, IDEM believes that adequate information is available to rely on for decision making purposes as it pertains to the overall protection of the Wellfields and safety of drinking water supply. IDEM will continue to pursue PRPs, as necessary and appropriate, to limit future potential cVOC contributions to Wellfields. Citizens will continue to monitor groundwater, remove production wells above an MCL from service, and install treatment (e.g. aeration or similar), as needed, prior to returning to service. As always, Citizens will continue to ensure that finished drinking water complies with all SDWA requirements prior to distribution. Refer to the RI Report submitted under separate cover for more detailed information.

1.5 Summary of Human Health and Ecological Risk Assessment

IDEM prepared the HHERA to provide a qualitative assessment and, where appropriate, quantitative analyses, in a conservative manner, of the potential for adverse health effects from exposure to constituents in environmental media associated with the Wellfields. The HHERA is designed to provide a sound basis for current and future risk management decisions. The purpose of the HHERA is to characterize, assess, and summarize risks to human health and the environment associated with the groundwater produced from the Wellfields. To that end, the HHERA focused on the Wellfields and does not focus on individual PRP sites in the immediate or surrounding area. Risk Assessment at individual sites within Site 0153 boundaries, if required, will be conducted separately under IDEM programs.

Key components and conclusions identified in the HHERA include the following:

- Current and historic finished drinking water results are below MCLs, so further risk evaluation of finished drinking water is not warranted or necessary. Refer to **Table 2** for finished water analytical results.
- Site 0153 was proposed for the NPL based on groundwater detections of cVOCs in production wells. All evidence developed to date supports the conclusion that these detections are associated with disparate historic releases from off-Site properties in the surrounding area.
    - The HHERA focuses on cVOCs associated with chlorinated solvents traditionally utilized in dry cleaning, industrial, and manufacturing activities including tetrachloroethene (PCE), TCE, and 1,1,1-trichloroethane (1,1,1-TCA), as well as the respective degradation by-products.
- Chemicals of Potential Concern (COPCs) for risk assessing purposes were developed utilizing production well analytical results collected from the Wellfields since 2004. Refer to **Table 1** for raw production well analytical results.
    - This data set provided 486 data points from the Riverside Wellfield and 150 data points from the White River Wellfield for consideration.
    - COPCs utilized in the HHERA include: TCE, cis-1,2-Dichloroethene (cis-1,2-DCE), and Vinyl chloride (VC).

- An exposure assessment was completed to determine potential exposure pathways, potential future receptors that could be exposed to Wellfield COPCs, and potential exposure routes. The HHERA focused on the public water supply and calculated risk based on the following:
    - Residential (Adult and Child) receptors, and
    - Potential dermal and ingestion exposure routes.
- Operating data, including standard mixing of groundwater and surface water prior to treatment, from 2004 – 2019 were incorporated into the risk calculation to provide accuracy.
- The U.S. EPA Regional Screening Level (RSL) calculator was utilized to determine both carcinogenic risk and non-carcinogenic hazard index for COPCs in the combined, blended Wellfield/Surface Water output.
- HHERA Risk Characterization identified results well within U.S. EPA-acceptable levels (i.e. no unacceptable risk). Results of the HHERA include:
    - Total calculated Carcinogenic Risk of 4.22×10^{-6}. U.S. EPA considers theoretical excess lifetime cancer risks in the range of 1×10^{-6} to 1×10^{-4} to be acceptable under CERCLA.
    - Total calculated Non-Carcinogenic Hazard Index of 0.0250. U.S. EPA considers any Hazard Index of <1.0 acceptable under CERCLA.

As indicated by the results of the HHERA, it is apparent that Citizens can and has safely operated the Wellfields in a manner that protects human health and the environment even though all PRP investigations and remediation efforts are not complete. Ongoing declining cVOC concentrations observed in the Wellfields support the conclusion that PRP investigation/remediation efforts conducted to date are already showing a beneficial reduction of cVOC contributions to raw water. Furthermore, IDEM can rely on Citizens operations to ensure that water supply remains safe for public use. Refer to the HHERA submitted under separate cover for more detailed information.

1.6 Conceptual Site Model

A CSM was developed for the area surrounding the Wellfields to provide information on how groundwater and cVOC impacts move from surrounding areas to the production wells. The CSM also illustrates how the hydrological cycle interacts with the local geology to allow cVOC impacts to interact with exposure pathways (soil, groundwater, and vapor intrusion). Finally, the CSM presents how the complete exposure pathways will be controlled through either an IDEM remediation program or through the Site 0153 Alternative Plan detailed in the MOA for the production wells at the two Wellfields. The treatment of raw groundwater from production wells discussed as part of the Site 0153 Alternative Plan is the focus of the FS. The CSM for the Site is depicted graphically on **Figure 4**.

Groundwater at the Site originates as precipitation falling onto the ground surface and then either infiltrates into the subsurface or runs off to surface waters such as the White River or Fall Creek. Following infiltration, the groundwater flows from areas of higher hydraulic head to areas of lower hydraulic head. That results in groundwater flow towards the White River or Fall Creek within the unconsolidated aquifer. In addition to moving horizontally, groundwater will also move vertically based on hydraulic head differences between subsurface materials and between the unconsolidated and bedrock aquifers. Upon reaching the bedrock, groundwater flows through solution openings in the limestone in a general southwesterly regional flow pattern (Grove 2012).

Pumping from production wells in the two Wellfields intersect a portion of the groundwater that would normally discharge to the White River and Fall Creek or in regional flow pattern for the bedrock. The pumping in the production wells induce capture zones and draws in groundwater from the aquifers in all directions towards the wells. In addition to intersecting groundwater flowing to the river and creek, production wells located near these surface water bodies in the unconsolidated aquifers and may induce recharge from the surface water to the aquifer.

Upon release of cVOCs at unknown locations onto or into the soil, the contaminants mix with the infiltrating groundwater. Eventually the cVOC impact may enter both the unconsolidated and bedrock aquifers based upon the hydraulic and physical characteristics of the aquifers, as discussed previously. The magnitude of the resulting cVOC groundwater impacts are the result of the volume and the duration of the cVOCs released. The cVOC release can manifest as either a dissolved plume or if sufficient mass is released a dense non-aqueous phase liquid (DNAPL)[6]. A DNAPL release can result in long-term release of a dissolved groundwater plume from the top of a confining layer or the bottom of an aquifer. Ultimately, the cVOC-impacted groundwater mixes with other non-contaminated groundwater within the production well capture zones resulting in detected cVOC concentrations within the production wells. Currently, investigations to define the nature and extent of cVOC impacts in vicinity of the Wellfields are on-going, thus, both the future concentration and the time over which the production wells will experience continued cVOC input are unknown.

1.7 Previous Response Action

In accordance with the Alternative Plan included in the MOA, production well WR-3 was shut down in 2016 due to TCE concentrations that exceeded the MCL. Citizens subsequently installed an aeration system on production well WR-3 beginning in September 2019 with construction completion in late January 2020. Citizens conducted testing efforts on WR-3 from March

[6] In addition to causing groundwater impacts detected in the production wells, the released cVOCs may also cause vapor intrusion issues into occupied spaces if the cVOCs are released in sufficient concentrations. Current cVOC concentrations in the Wellfields are not expected to result in vapor intrusion issues in structures above the wellfields. Potential vapor intrusion issues for off-site structures are being handled by IDEM under separate remediation programs and are not the focus of this FS.

through April 2020. Production well WR-3 is currently back in service and all raw water generated from the production well is below MCLs. WR-3 pre- and post-aeration water analytical results have been included as **Table 3**. Consistent with Citizens Groundwater Monitoring plan, WR-3 will continue to be sampled on a quarterly basis along with all other active production wells.

2.0 DEVELOPMENT AND APPLICATION OF REMEDIATION GOALS

This section presents the applicable or relevant and appropriate requirements (ARARs), remedial action objectives (RAOs), and the remediation goals (RGs) for the Wellfields. ARARs are requirements that must be met or should be considered as part of the remediation. The RAOs are a general description of the expected accomplishment of the remediation. The RAOs provide the basis for developing numerical remediation goals, which are used to identify the technologies needed to achieve the RAOs. The RGs are the numerical goals that must be met by the remediation.

2.1 Potentially Applicable or Relevant and Appropriate Requirements

The MOA states on page 4, "IDEM will ensure that any remedy selected at the Site will comply with all applicable or relevant and appropriate federal requirements and any more stringent applicable or relevant and appropriate State requirements to the maximum extent practicable under IDEM's State authorities" (MOA, June 8, 2017). This requirement is echoed in Section 121(d) of CERCLA (42 USC Chapter 103) that requires remedial alternatives attain ARARs. ARARs are federal and state laws that promulgate regulations, standards, criteria, or limitations. Under CERCLA, a requirement may be either "applicable" or "relevant and appropriate," but not both. Section 300.5 of the NCP defines applicable, relevant and appropriate, and to-be-considered (TBC) criteria as follows:

- *Applicable requirements* means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

- *Relevant and appropriate requirements* means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

• *TBC* criteria are advisories, criteria, or guidance developed by U.S. EPA, other federal agencies, or states that may be useful in developing CERCLA remedies. They are neither promulgated nor enforceable; however, they may be useful for determining protectiveness or how a remedial action could be performed.

A qualified State ARAR requirement under CERCLA and the NCP must be (1) a standard, requirement, criterion, or limitation under a State environmental or facility citing law; (2) promulgated; (3) substantive; (4) more stringent than the federal requirement; (5) identified by the State in a timely manner; and (6) consistently applied.

"On-site" CERCLA response actions must comply with the substantive but not the administrative requirements of environmental laws and regulations. Substantive requirements are those pertaining directly to actions or conditions in the environment. Administrative requirements, such as obtaining a permit for treatment system installation, would not be applicable if the Site was being administered by the U.S. EPA as a CERCLA action. However, since Site 0153 is being administered at the state level by the IDEM and the City of Indianapolis, and not as a specific CERCLA action, the remedial alternatives presented in this FS are evaluated based on whether they can meet both substantive and administrative requirements.

ARARs are grouped into three types: chemical-specific, action-specific, and location-specific. **Tables 4** through **6** provide the chemical-specific, action-specific, and location-specific ARARs and TBCs that may apply to remedial actions for the Wellfields.

Chemical-specific ARARs are health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals. For example, a chemical-specific ARAR would be a MCL that establishes a safe drinking water level. **Table 4** lists the preliminary chemical-specific ARARs for the Wellfields.

Action-specific ARARs regulate technology or activities involving specific substances. **Table 5** lists the preliminary action-specific ARARs identified for the Wellfields.

Location-specific ARARs are requirements that restrict actions or contaminant concentration in certain environmentally sensitive areas. Location-specific ARARs, for example, would be State and federal laws and regulations that protect floodplains, wetlands, and locations where endangered species or cultural resources are present. Preliminary location-specific ARARs for the Wellfields are provided in **Table 6**.

2.1.1 Chemical Specific ARARS and TBCs

Potential chemical-specific ARARs for Wellfields were identified based on the cVOCs identified in groundwater in vicinity of the Wellfields. Potential chemical-specific ARARs criteria for

Wellfields drinking water include the Federal SDWA Primary Drinking Water Standards. Potential chemical-specific ARARs and TBC criteria are discussed in the following sections.

2.1.1.1 Safe Drinking Water Act Primary Drinking Water Standards

The federal SDWA established primary drinking water standards as MCLs to protect the quality of drinking water in the public water supply. The MCLs are enforceable standards and are the maximum concentrations of contaminants allowable in the drinking water for public consumption. Because the remedial alternatives evaluated in this FS are for the treatment of groundwater, MCLs are considered applicable.

2.1.1.2 Safe Drinking Water Act Maximum Contaminant Level Goals

The federal SDWA MCLGs are non-enforceable health goals for potable water quality. The MCLGs are classified as a TBC criteria in cases where an existing MCLs has not been developed for a potential drinking water contaminant. cVOCs of concern have established MCLs and, therefore, SDWA MCLGs are not applicable.

2.1.1.3 U.S. EPA Regional Screening Levels

U.S. EPA Health-Based Guidelines for Air, Drinking Water, and Soil RSLs, are non-enforceable possible screening goals to use in the absence of MCLs. The RSLs are classified as a TBC criteria in cases where an existing MCL has not been developed for a potential drinking water contaminant. RSLs are based upon a target cancer risk (TR) of $1x10^{-6}$. Please note in the MOA, the U.S. EPA stated a $1x10^{-5}$ TR is within their acceptable risk range for carcinogens. cVOCs of concern have established MCLs and, therefore, U.S. EPA RSLs are not applicable.

2.1.2 Action-Specific ARARs and TBCs

Action-specific ARARs and TBC are requirements that define acceptable containment, treatment, storage and disposal criteria and procedures. These ARARs generally set performance, design, or other similar action-specific controls or restrictions on particular kinds of activities. Potential action-specific ARARs criteria for the Wellfields include the SDWA, Occupational Safety and Health Administration (OSHA) Standards, the Clean Air Act, and Resource Conservation and Recovery Act (RCRA) Subtitle C Hazardous Waste Identification and Generator Requirements. Potential action-specific TBC criteria for the Wellfields include the CERCLA Off-Site Rule. Potential action-specific ARARs criteria are discussed in the following sections.

2.1.2.1 Safe Drinking Water Act Primary Drinking Water Standards

The federal SDWA established primary drinking water standards as MCLs to protect the quality of drinking water in the public water supply. The MCLs are enforceable standards and are the maximum concentrations of contaminants allowable in the drinking water for public consumption. Because the remedial alternatives evaluated in this FS are for the treatment of groundwater, MCLs are considered applicable as action-specific ARARs.

2.1.2.2 Occupational Safety and Health Administration Standards

OSHA regulations found in 29 CFR 1910 require 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual 8-hour refreshers for site workers who can potentially come into contact with hazardous substances. OSHA regulations are classified as action-specific applicable ARARs since workers may potentially come into contact with hazardous substances during both installation and operation and maintenance activities associated with the treatment equipment. Based on low level cVOCs historically observed and the limited frequency of exposure, HAZWOPER requirements do not apply for production related personnel.

2.1.2.3 Clean Air Act

The Clean Air Act found in 40 CFR 50 to 80 regulates air emissions of substances that may harm public health. Air stripping is a potential alternative being considered for groundwater treatment from the production wells which will result in emissions of cVOCs to the atmosphere. The Clean Air Act is considered an action-specific applicable ARARs to ensure the emissions from the operation of the treatment equipment will be within allowable standards to limit human harm. Should remedial technology air emissions trigger Clean Air Act thresholds, an air permit to operate the equipment should be obtained.

2.1.2.4 RCRA Subtitle C Hazardous Waste Identification and Generator Requirements

RCRA Subtitle C Hazardous Waste Identification and Generator Requirements are found in 40 CFR 261 and deals with solid waste classification and how to characterize and properly dispose of hazardous waste. The RCRA Subtitle C Hazardous Waste Identification and Generator Requirements is considered an action-specific applicable ARARs since waste materials will be disposed off-Site related to the treatment alternatives and these materials must be properly classified prior to disposal. Waste determinations will be made prior to off-Site disposal and are dependent on the remedial technology installed (i.e. aeration, carbon adsorption, ozonation, etc.).

2.1.2.5 CERCLA Off-Site Rule

The CERCLA Off-Site Rule is found in Section 121(d)(3) of the CERCLA regulations and applies to off-Site disposal of hazardous substances. Although waste materials related to the treatment may be disposed off-Site, this rule is non-enforceable and is considered an action-specific TBC for the Wellfields.

2.1.3 Location-Specific ARARs and TBCs

Potential location-specific ARARs for the Wellfields were identified based on geographical position or physical condition of the Site. Potential location-specific ARARs criteria for the Wellfields include the Endangered Species Act and Fish and Wildlife Coordination Act, Executive Order 11988 for Floodplain Management, and RCRA Regulation for Location

Standards. No potential location-specific TBC criteria were identified for the Wellfields. Potential location-specific ARARs criteria are discussed in the following sections.

2.1.3.1 Endangered Species Act and Fish and Wildlife Coordination Act

The Endangered Species Act (ESA), 16 CFR Part 661 and 16 U.S.C. 1531, requires consultation with the applicable agencies for any remedial action that may affect threatened or endangered species. Section 7 of the ESA requires consideration when actions will jeopardize the existence of species that are listed as threatened or endangered by the United States Fish and Wildlife Service or the National Marine Fisheries Service. The ESA is potentially applicable, although threatened or endangered species are not known to be present at the Wellfields within Site 0153.

2.1.3.2 Executive Order 11988 – Floodplain Management

Executive Order 11988 on Floodplain Management, Executive Order 11988, requires that federal agencies evaluate the potential effects of activities in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development. The EPA regulations to implement Executive Order 11988 are provided in 40 CFR 6.302(b). In addition, EPA has developed guidance, the *Policy on Floodplains and Wetlands Assessments for CERCLA Actions* (EPA, 1985). The requirements of this regulation are potentially applicable since a portion of the production wells in Riverside Wellfield which may require treatment in the future are located in a floodplain.

2.2 Remedial Action Objectives

RAOs have been developed for the groundwater being extracted from the two Wellfields. Currently all production well raw water is below applicable U.S. EPA MCLs. If raw water in a production well exceeds an applicable MCL[7] in the future, Citizens will take the well out of service and install and operate a treatment system to remove the contaminants before that well is returned to service. Since the focus of this FS is to continue to provide a safe source of drinking water from the production wells for public consumption, the following RAOs have been developed to accomplish this goal:

- Treat the groundwater to remove cVOCs to concentrations that are protective of human health.
- Provide a long-term solution capable of continuing to provide a constant supply of clean drinking water for the public.

[7] Exceedances of an MCL will be determined through quarterly sampling conducted as part of Citizens Groundwater Monitoring Plan. Verification of an MCL exceedance (e.g. one sample above an MCL, a rolling quarterly average above an MCL, or SDWA/IDEM Office of Water Quality permit requirements) will be established in future submittals required under the MOA (i.e. Remedial Action Plan and/or Record of Decision).

2.3 Remediation Goals

In the MOA, the U.S. EPA outlined their requirements to achieve a cleanup that is substantially similar to a CERCLA response. Page three of the MOA states, "The response action will be protective of human health and the environment, as generally defined for individual human exposure, by remediating to an acceptable risk levels for carcinogens between 10^{-4} and 10^{-6} and for non-carcinogens a Hazard Index of 1 or less; and no significant adverse impacts to ecological receptors. IDEM has proposed using a 10^{-5} risk level as a screening level for determining the need for further remedial level and risk assessment, which is within U.S. EPA's acceptable risk level range for carcinogens."

Based upon the ARARs evaluation performed for this FS along with the requirements outlined in the MOA, federal MCLs have been selected as the remediation goals for the cVOC treatment of groundwater from the production wells in the two Wellfields.

3.0 IDENTIFICATION AND SCREENING OF REMEDIATION ALTERNATIVES

This section identifies, describes, and screens remediation alternatives for treatment of cVOC groundwater constituents pumped from the production wells at the two Wellfields. A presumptive remedy approach based upon the EPA's 1996 document entitled *Presumptive Response Strategy and Ex Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites, Final Guidance* (U.S. EPA 1996) was utilized to develop remedial alternatives for the Wellfields. The EPA presumptive remedies for groundwater treatment are all treatment alternatives that have been shown to successfully treat cVOCs. One additional alternative, ozonation, was added for analysis to provide a full range of available treatment options.

3.1 General Response Actions

3.1.1 No Action

The No Action general response action is required by both EPA guidance (EPA, 1988) and the NCP as a baseline for comparison with other remedial alternatives. The No Action option does not include active remediation or monitoring.

3.1.2 Aeration Treatment

Aeration treatment is a general response action treatment alternative that could be employed to treat the cVOC concentrations in the Wellfields production wells. In fact, production well WR-3 was recently returned to service after installation of an aeration treatment system.

Aeration treatment is a treatment technology commonly used for the removal of VOCs, including cVOCs, from water. This method involves moving air through the contaminated water to volatilize and remove VOC contaminants from the water and transfer them to the air. Following aeration, the vapors are either collected and additionally treated or vented directly to the atmosphere, if contaminant concentrations are acceptable for discharge. The ability for aeration

treatment to remove cVOCs from water is dependent upon the vapor pressure and solubility of the contaminants. The cVOCs seen in the groundwater at the Wellfields are all amenable to aeration and can be successfully removed from the water at the dissolved concentrations observed to date.

Several forms of aeration technology exist including aerators (also known as bubble diffusion), packed-tower air strippers, and tray-type air strippers. Each aeration technology uses the same principal of forcing air through water to volatilize contaminants. Ultimately, the selected aeration equipment is based upon the flow requirements for treatment, with larger flow applications using aerators and packed-tower air strippers and lower flows using tray-type air strippers.

Aeration offers several benefits as a treatment technology. As discussed above, aeration has been shown to be effective in removing dissolved chlorinated solvents from groundwater. In addition, contaminated water is contained during treatment, minimizing the chance for human exposure to untreated ("raw") groundwater.

Aeration also has limitations in that it is not effective for treating DNAPL[8]. Also, aeration systems are susceptible to scaling, especially in areas with high mineral content, requiring increased Operations and Maintenance (O&M) to properly maintain the aeration equipment.

3.1.3 Carbon Adsorption Treatment

Carbon adsorption treatment is another general response action treatment alternative that could be employed to treat the cVOC concentrations in the Wellfields production wells. Carbon adsorption is a commonly used technology for removal of a wide range of organic contaminants from both water and air. This technology typically utilizes one or more vessels of granular activated carbon (GAC) to remove contaminants. Contaminated water or vapors are pumped through vessels containing GAC and the contaminants adsorb to the surfaces of the carbon granules. The effluent from GAC tanks requires regular monitoring to ensure that the GAC continues to effectively remove contaminants since the adsorption of the carbon bed decreases over time as the carbon becomes saturated with contaminants. Eventually when the carbon is spent, the contaminants "break-through" the carbon bed, requiring carbon replacement or regeneration.

Carbon adsorption offers several benefits as a treatment technology. Carbon adsorption has been shown to be effective in treating the cVOCs identified in the groundwater at the Wellfields. Carbon adsorption is also a simple treatment technology that does not require complex equipment to operate. Carbon adsorption systems are also not as susceptible to hard water concerns like aeration systems.

[8] No DNAPL has been detected in any of the production wells at the two Wellfields.

Carbon adsorption also has disadvantages. The technology requires frequent testing to ensure proper treatment continues and "break-through" of contaminants is avoided. Also, change-out of the carbon, when spent, can lead to down-time of the system if a second parallel system is not installed. This secondary system, of course, adds additional capital cost to the system. Finally, depending upon the contaminants being treated and their concentrations, the spent carbon may require management as a hazardous waste under RCRA regulations.

3.1.4 Ozonation Treatment

Ozonation treatment is another general response action treatment alternative that could be employed to treat the cVOC concentrations in the Wellfields production wells. Ozone treatment is a technology that has been used extensively in water treatment, primarily for disinfection. But ozonation can also be used as a treatment for cVOCs like those identified in the Wellfields.

Ozonation is an oxidation process and is employed by adding ozone gas to the water. When added to water containing cVOC contaminants, the ozone oxidizes the contaminants, breaking them down ultimately to oxygen, water and salts. These salts can then be removed from the treated water using processes already present at the WRTP.

Ozonation can be an efficient and cost-effective method for cVOC water treatment, but the technology must be carefully designed and monitored. Ozone is naturally an unstable compound and must be produced on-site.

3.1.5 Advanced Oxidation

Advanced oxidation is a newer treatment technology for groundwater remediation relative to other technologies, but it can be used to treat cVOCs like those identified at the Wellfields. Advanced oxidation technology typically combines the use of ultraviolet light (UV) and chemical oxidants like ozone or hydrogen peroxide to form hydroxyl radicals to react with and destroy contaminants.

Site-specific conditions need to be considered when implementing UV Oxidation, and detailed design and control are necessary for successful remediation. For this reason, pilot testing is often helpful for evaluating requirements for the system design. UV lamps must be designed carefully to deliver the proper level of radiation for breakdown of the hydrogen peroxide to produce the hydroxyl radicals for contaminant treatment. Oxidant dosing must be precisely controlled and monitored.

UV Oxidation treatment can be a highly effective method for remediation of contaminated groundwater. Particularly where contaminated vapor emissions are highly regulated or impermissible, UV Oxidation can provide an emission-free treatment method. It does, however, require detailed design and maintenance, and energy requirements can lead to high operating

cost. The cost of advanced oxidation equipment also tends to be higher than other treatment types.

3.1.6 Anaerobic Biological Reactor

Anaerobic biological reactor treatment is another general response action treatment alternative that could be employed to treat the cVOC concentrations in the Wellfields production wells. This type of bioreactor operates through the growth of anaerobic bacteria in which the microbes use the cVOCs for cellular respiration instead of oxygen. The bioreactor produces a waste biomass that typically requires offsite disposal. Additional treatment is needed after the bioreactor, with the type of treatment depending on the end use of the water. If the treated water is intended for potable use, aeration (to re-oxygenate the water), filtration (to remove residual biomass and any other solids), and disinfection would be required. A backwash storage tank and other equipment would be needed to allow backwashing of the filter. This equipment requires a large area to operate and is expensive.

Although these types of bioreactors can effectively destroy cVOCs, they are quite sensitive to the operational conditions needed to keep the bacteria thriving. Upsets can result in numerous treatment shutdowns making the reactor system less reliable than other treatment types; as a result, O&M costs are relatively high.

3.2 Initial Screening Process and Evaluation Criteria

Each remedial alternative identified in Section 3.1 was initially screened to eliminate alternatives deemed infeasible to implement or possessing limitations that might prevent attainment of the RAO's for the Site. Based on the results of the screening, each individual remedial alternative was either retained or removed from a more detailed analysis in Section 4. The factors used in the initial screening evaluation include:

- Technical effectiveness
- Implementability
- Cost

Technical effectiveness is an evaluation of the ability of an individual remedial alternative to effectively meet the RAO's. For the Wellfields, technical effectiveness ascertains how proven and reliable the remedial alternative is in reduction of contaminant concentrations in the groundwater being treated from a production well. This screening factor also examines potential impacts to human health and the environment during construction and subsequent operation of the alternative.

Implementability is an evaluation of how easily the remedial alternative can be applied. This factor also examines the alternative's ability to obtain administrative approvals and/or public acceptance and the availability of support services and equipment necessary to perform the process option.

Cost is an evaluation that uses capital plus operation and maintenance (O&M) costs without detailed estimates. The initial cost analysis uses engineering judgement to evaluate each of the technologies in relative terms to each other.

3.3 Results of Initial Screening Using Evaluation Criteria

Table 7 presents the results of the general response action screening for the treatment of "raw" production well water at the Wellfields. The general response actions that have been retained are used in the development of remedial alternatives in Section 4.0.

Each general response action was rated based upon the effectiveness, implementability and cost factors as described in Section 3.2, above. Each of the general response actions was assigned a rating for each factor as shown in **Table 7**. If a general response action received a rating of either low effectiveness and/or difficult implementability it was eliminated and not carried forward to detailed analysis. The exception to this scoring process was the "No Action" alternative, which must be carried forward based upon requirements of the NCP (40 CFR 300.403(e)(6)). An anaerobic biological reactor was the only option dropped from further analysis based upon the initial screening evaluation.

The following general response actions will be carried through to more detailed analysis in Section 4.0.

- No Action
- Aeration
- Carbon Adsorption
- Ozonation
- Advanced Oxidation

4.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

A detailed analysis was performed to compare the treatment technologies for "raw" production well water for the Wellfields. Currently all raw production well water is below applicable U.S. EPA MCLs. However, if raw water in a production well exceeds an applicable MCL in the future, Citizens will take the well out of service and install and operate a treatment system to remove the contaminants before that production well is returned to service. This detailed analysis continues the screening of the five treatment technologies carried through from Section 3.0 and evaluates the currently available remedial alternatives. The five treatment technologies were evaluated individually against U.S. EPA evaluation criteria (EPA, 1988) and then compared to each other to select a recommended treatment alternative for the Wellfields if treatment is required for any of the production wells in the future. The following analysis includes:

- Section 4.1 - A description of the EPA evaluation criteria utilized to assess each alternative;

- Section 4.2 - The detailed analysis of the treatment alternatives based upon the EPA evaluation criteria;
- Section 4.3 - Recommended treatment alternative; and
- Section 4.4 - Post Alternative Monitoring and Contingency Plans.

4.1 Evaluation Process and Criteria

The EPA (EPA, 1988) and the NCP require that each treatment alternative be evaluated against nine evaluation criteria. The criteria provide the comparison of the relative performance and advantages and disadvantages for each alternative. The nine criteria are categorized into three groups including threshold criteria, balancing criteria, and modifying criteria. Threshold criteria are requirements that must be met by an individual alternative for it to be eligible for selection. Balancing and modifying criteria are used to compare and ultimately choose the most appropriate alternative. The nine evaluation criteria are listed in **Table 8** below followed by a detailed description for each.

Table 8 Evaluation Criteria for Production Wells

Criteria Group	Number of Criteria in Group	Criteria Description
Threshold Criteria	2	Protection of human health and the environment
		Compliance with ARARs
Balancing Criteria	5	Long-term effectiveness and permanence
		Reduction in toxicity, mobility, or volume
		Short-term effectiveness
		Implementability
		Cost
Modifying Criteria	2	State acceptance
		Community acceptance

4.1.1 Threshold Criteria

An alternative must meet both threshold criteria discussed below to be eligible for selection. If an alternative does not meet the threshold criteria, it may not be accepted[9]. Section 2.1 and **Tables 4** through **6** present the potential ARARs for the Wellfields.

[9] The exception is if ARARs are not met, a waiver can be obtained if it meets one of six exceptions in the NCP.

4.1.1.1 Protection of Human Health and the Environment

This threshold criterion evaluates the extent to which an alternative protects human health and the environment. The overall alternative protectiveness focuses on whether an alternative provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment, in the case of this FS. Since this is a criterion that must be met to be accepted, it is given a pass or fail rating in subsequent detailed analysis of alternatives.

4.1.1.2 Compliance with ARARs

ARARs compliance is a CERCLA statutory requirement of alternative selection. As discussed in Section 2.1, ARARs are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws, which are either “applicable” or “relevant and appropriate” according to CERCLA. Being an "applicable requirement" or a “relevant and appropriate requirement” were previously defined in Section 2.1. An evaluation of this criterion describes how an individual alternative complies with ARARs. Since this is a criterion that must be met to be accepted, it is given a pass or fail rating in subsequent detailed analysis of alternatives.

4.1.2 Balancing Criteria

Five balancing criteria are used for conducting a comparative analysis of alternatives. Each of these balancing criteria are discussed below.

4.1.2.1 Long-term Effectiveness and Permanence

The long-term effectiveness and permanence criterion evaluate an alternative’s ability to prevent or minimize risk to both public health and the environment following achievement of the RAOs. The long-term effectiveness and permanence criterion also consider both the magnitude of residual risk and any long-term controls required to manage the risk.

For the Wellfields treatment alternatives, an example of residual risk would be the risk posed by treatment residuals. The residual characteristics would then be considered to determine if they remain hazardous and, if so, determine if the residuals volume, toxicity, and mobility present a long-term risk.

Finally, long-term controls would be assessed to determine if they are adequate and suitable to manage the treatment residuals. In the case of treatment residuals, this assessment examines the containment systems to determine if they provide protection to limit exposure to human and environmental receptors.

4.1.2.2 Reduction in Toxicity, Mobility, or Volume

Selecting a remedial action to reduce the toxicity, mobility, or a volume of hazardous substances via treatment technologies is the statutory preference by the EPA during the FS process. According to the EPA (EPA, 1988), this preference is satisfied when treatment is used to reduce the principal threats at a site through: destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

This evaluation criteria examines the following factors:

- The treatment process and what is being treated;
- The amount of hazardous materials being treated or destroyed;
- The degree of expected reduction in toxicity, mobility or volume;
- The degree to which the treatment is irreversible;
- The type and quantity of treatment residuals; and,
- Whether the alternative satisfies the statutory preference for treatment.

4.1.2.3 Short-term Effectiveness

The short-term effectiveness criterion evaluates the effects of the alternative during the construction and implementation phase until response objectives are met (e.g., a cleanup target has been met). Under this criterion, alternatives should be evaluated with respect to their effects on human health and the environment during implementation of the remedial action. Factors examined include:

- Protection of the community during remedial actions such as air-quality associated with the treatment or transportation of hazardous materials;
- Protection of workers during remedial actions;
- Environmental impacts; and,
- Time until the remedy is achieved.

4.1.2.4 Implementability

Implementability is the technical and administrative feasibility to implement the alternative and the availability of services and materials required for implementation. Technical feasibility examines:

- The ability to properly construct and operate the alternative;
- The reliability of the technology; and,
- The ability to properly monitor the effectiveness of the technology.

Administrative feasibility examines the availability of:

- Permits to implement and operate the alternative,
- Support services for the treatment, storage, and disposal of generated wastes; and,
- Specialized equipment or technical experts to support the action.

4.1.2.5 Cost

This criterion evaluates the construction and any long-term costs needed to operate and maintain an alternative. Cost estimates generated for this evaluation are intended to provide a basis for alternative evaluation and comparison purposes only[10]. Grossly excessive costs when compared to the alternative effectiveness may be used as one of several factors to eliminate an alternative. Also, an alternative providing similar effectiveness and implementability to another alternative, but at greater cost, may be eliminated. The alternatives are sized prior to costing based on technical literature, past experience, and general professional judgment.

An alternative must be cost effective. Cost-effectiveness is determined by evaluating the following balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and, short-term effectiveness of the alternative. From this evaluation the cost is compared to the overall effectiveness to determine if the alternative is cost effective. See **Table 9** for the alternatives cost summary.

4.1.3 Modifying Criteria

Stakeholder acceptance is needed for any action, so they are used as modifying criteria in the detailed analysis. These modifying criteria include State and community acceptance as discussed below.

4.1.3.1 State Acceptance

In response to public sentiment and updated information from Citizens, IDEM requested that U.S. EPA defer listing the Site on the Superfund NPL. In accordance with the MOA, Site 0153 was deferred to IDEM's SCP as a Superfund alternative. Due to the IDEM request to manage Site 0153 at the State Level and EPA deferral, the evaluation of this modifying criteria will be assumed as accepted.

4.1.3.2 Community Acceptance

The community acceptance criterion evaluates which portions of the alternative interested persons in the community either support, have reservations, or oppose. Evaluation of community acceptance will be limited to acceptance of the alternatives at other similar sites, if available.

[10] Additional cost evaluation would be needed for bidding or construction purposes.

4.2 Assumptions Used to Develop Treatment Alternative Costs

The costing provided in Section 4.0 for each treatment alternative are based upon the following assumptions:

- Design, treatability testing, and post-installation testing costs are based upon professional experience with design of these treatment system types.
- WR-3 is being used as an example production well to evaluate feasibility of remedial alternatives. Variability in production capacity, well construction, and operation will not significantly affect the evaluation between wells in Wellfields.
- The design flow rate used for treatment alternative costing was assumed to be 800 gpm, which is the approximate flow rate of production water treated from production well WR-3.
- Concentration data from production well WR-3 were used for equipment sizing.
- The costs assume the treatment equipment will be installed on a per well basis (as opposed to treatment scaled to treat multiple wells at once).
- The installation cost for each alternative is based upon 30% of the equipment cost[11].
- The costs assume that adequate space is available for the equipment installation. A placeholder cost was assumed for equipment upgrades necessary to accept the equipment during installation since the exact configuration of the installation location is unknown.
- Operation and Maintenance (O&M) costing is based upon 30 years of operation.
- Since treatment system testing costs are assumed to be the same for all alternatives, these costs are not estimated.

The above referenced assumptions are further detailed for each remedial alternative below including the costing basis (actual costs, vendor-provided, professional experience, or a combination thereof), specific O&M activities, and disposal (if needed). FS costing associated with each remedial alternative has been included as **Table 9**.

4.2.1 Baseline – No Action Alternative Specific Cost Assumptions

Since the No Action alternative has no activity, the costing assumptions do not apply.

4.2.2 Aeration Alternative Specific Cost Assumptions

The aeration alternative equipment and O&M costing is based on actual costs for the aeration system installed on production well WR-3. The removal efficiency for WR-3 is currently 50-60%. The O&M costs for the aeration alternative assumes the system would be washed four times a year to limit biofouling of the system packing. In addition, the O&M costs assume the aeration system packing would be replaced with new packing material every three years. Electricity cost are costs to operate the aeration blower for the system.

[11] This is a standard engineering practice for cost evaluation purposes.

4.2.3 Carbon Adsorption Specific Cost Assumptions

The carbon adsorption alternative equipment and O&M costing is based on vendor cost information. The cost assumes an activated carbon system consisting of four 20,000-pound carbon vessels with associated piping and equipment will be installed. O&M costing assumes the labor, shipping and activated carbon cost to change-out of one 20,000-pound carbon vessels each year with off-site regeneration by the carbon supplier or landfill disposal.

4.2.4 Ozonation Specific Cost Assumptions

The ozonation alternative equipment and O&M costing is based on both vendor costing and professional experience with purchase, installation and O&M associated with these systems. The ozonation system uses a compressor to supply ambient air to the ozonation equipment that uses electrical current to produce the ozone. Given the corrosive nature of the ozone, according to Ozone Technologies, Inc., frequent part, piping and seal changeout will be required to keep the equipment in operating order. The estimated electricity usage is approximately 500,000 kilowatt hours per year.

4.2.5 Advanced Oxidation Specific Cost Assumptions

The advanced oxidation alternative equipment and O&M costing is based on vendor cost information. Hydrogen peroxide (35%) solution is utilized by the system to produce the hydroxyl radical for the oxidation of the cVOCs, thus requiring a hydrogen peroxide storage tank and supply. The estimated hydrogen peroxide usage is 10,000 gallons per year. The advanced oxidation system also contains 18 high voltage ultraviolet lamps that will require periodic changeout each year. It is estimated that the advanced oxidation system will use over 1,600,000 kilowatt hours per year of electricity.

4.3 Detailed Evaluation of Remediation Alternatives

Alternatives were evaluated in the following sections based upon the threshold, balancing and modifying criteria discussed in Section 4.1 above. See the attached **Table 10** for a summary of the detailed remedial alternative analyses.

4.3.1 Baseline – No Action

Protection of Human Health and the Environment – The No Action alternative provides no protection for human health. Under this alternative no action would occur; therefore, the current conditions would continue to effect human health. Although the concentrations of contaminants may decrease over time, the rate and certainty of this decrease is unknown. The No Action alternative "Fails" since this alternative does not protect human health.

Compliance with ARARs – The No Action alternative will not achieve or will not comply with ARARs, and therefore, it "Fails" this criterion.

Long-Term Effectiveness – The No Action alternative does not effectively or permanently prevent human cVOC exposure in drinking water. No Action, therefore, does not provide long-term effectiveness and would rate "Low" for this criterion.

Reduction in Toxicity, Mobility or Volume – The No Action alternative does not reduce contaminants in the environment, so it rates the "None" criterion.

Short-Term Effectiveness – The No Action can be immediately implemented and poses no risk to workers, the community, or the environment due to implementation. Although there are no short-term impacts, there is no water quality improvement. For these reasons, the No Action alternative rates "Low" for this criterion.

Implementability – The No Action alternative can be implemented immediately with no delay and, thus, rates a "High" for this criterion.

Cost – No costs are associated with the No Action alternative. It ranks 1st for this balancing criterion. See **Table 9** for the alternatives cost summary.

Community Acceptance – The No Action alternative does not protect human health and is unlikely to comply with ARARs in the foreseeable future. The No Action alternative would not be accepted for this Site since it is not protective of human health and the environment.

Summary – The No Action alternative will not meet the RAOs for the Wellfields.

4.3.2 Aeration

Protection of Human Health and the Environment – The Aeration alternative provides protection for human health by reduction of cVOCs to concentrations below MCLs. Aeration is a common treatment technology used in WWTPs and has been successfully used to treat these types of cVOCs to reach MCL concentrations. Although, the liberated cVOCs will be discharged to the atmosphere, the treatment will be performed in accordance with an air discharge permit (if required) to meet acceptable limits. The Aeration alternative is rated as "Pass" for this threshold criterion.

Compliance with ARARs – The Aeration alternative would comply with the chemical-specific, action-specific, and location-specific ARARs. Aeration treatment of groundwater would reduce the concentrations of cVOCs and meet the applicable or relevant standards for the Wellfields. The Aeration alternative is rated as "Pass" for this threshold criterion.

Long-Term Effectiveness – The Aeration alternative can effectively remove the cVOC contaminants from the Wellfields groundwater. Aeration has been used at the Site to treat the groundwater from the WR-3 production well, and results have shown the treatment to be

effective in reducing concentrations. The Aeration alternative is rated as "High" for this balancing criterion.

Reduction in Toxicity, Mobility or Volume – Aeration will remove cVOCs from the groundwater and will produce occasional packing wash water and off-gas of cVOCs to the atmosphere under an air discharge permit (if required). For these reasons, the Aeration alternative is rated as "Medium" for this balancing criterion.

Short-Term Effectiveness – The Aeration equipment has a longer lead time to construct, install, and test before it would be capable of reaching the RAO's (approximately ¾ to 1 year) than carbon adsorption but shorter than Advanced Oxidation. Although the Aeration system will produce off-gas, the treatment will be performed in accordance with an air discharge permit (if required) to meet acceptable air discharge limits. Based upon these reasons, the Aeration alternative is rated as "Medium" for this balancing criterion.

Implementability – Aeration equipment is a proven technology, reliable and can be easily maintained. An air permit may be required to operate the aeration treatment but air permits for these contaminants are common and should not limit implementation of this alternative. Outside vendors would be needed to deliver replacement packing over the life of the aerator. Based upon these reasons, the Aeration alternative is rated as "High" for this balancing criterion.

Cost – The Aeration alternative has the second lowest cost of the alternatives, ranking 2nd next to the zero cost for the No Action alternative for this balancing criterion. See **Table 9** for the alternatives cost summary.

Community Acceptance – The Aeration alternative protects human health and will comply with ARARs. Generally, this alternative is considered an acceptable technology in other remedial action applications for similar NPL sites[12].

Summary – The Aeration alternative will meet the RAOs for the Wellfields.

4.3.3 Carbon Adsorption

Protection of Human Health and the Environment – The Carbon Adsorption alternative provides protection for human health by reduction of cVOCs to concentrations below MCLs. Carbon Adsorption has been successfully used to treat these types of cVOCs to reach MCL concentrations. The Carbon Adsorption alternative is rated as "Pass" for this threshold criterion.

[12] Aeration is used to treat cVOCs and other compounds in Sturgis, Michigan according to QED Environmental Systems, Inc. (QED, 2011). In addition, aeration has been used to treat cVOCs at the Vancouver, Washington Water Station 1 (URS Greiner, 1998) and Water Station 4 URS Greiner, 1999).

Compliance with ARARs – The Carbon Adsorption alternative would comply with the chemical-specific, action-specific, and location-specific ARARs. Carbon adsorption treatment of groundwater would reduce the concentrations of cVOCs and meet the applicable or relevant standards for the Wellfields. The Carbon Adsorption alternative is rated as "Pass" for this threshold criterion.

Long-Term Effectiveness – The Carbon Adsorption can effectively remove the cVOC contaminants from the Wellfields groundwater. This alternative, however, would require carbon changeouts creating a treatment residual for either regeneration or disposal. The Carbon Adsorption alternative is rated as "Medium" for this balancing criterion.

Reduction in Toxicity, Mobility or Volume – Carbon Adsorption will remove cVOCs from the groundwater but will also produce treatment residuals as discussed above. For these reasons, the Carbon Adsorption alternative is rated as "Medium" for this balancing criterion.

Short-Term Effectiveness – The Carbon Adsorption alternative has a shorter lead time to construct, install, and test before it would be capable of reaching the RAO's (approximately 1/2 to 3/4 year faster than the other alternatives). Based on these reasons, the Carbon Adsorption alternative is rated as "High" for this balancing criterion.

Implementability – Activated Carbon equipment is non-complex, reliable and can be easily maintained. Outside vendors will have to be relied upon for providing and delivery of replacement carbon. Based upon these reasons, the Carbon Adsorption alternative is rated as "Medium" for this balancing criterion.

Cost – The Carbon Adsorption alternative has the second highest cost of the alternatives, ranking 4th for this balancing criterion. See **Table 9** for the alternatives cost summary.

Community Acceptance – The Carbon Adsorption alternative protects human health and will comply with ARARs. Generally, this alternative is considered an acceptable technology in other remedial action applications for similar NPL sites[13].

Summary – The Carbon Adsorption alternative will meet the RAOs for the Wellfields.

4.3.4 Ozonation

Protection of Human Health and the Environment – The Ozonation alternative provides protection for human health by reduction of cVOCs to concentrations below MCLs. Although not as common as Aeration and Carbon Adsorption, Ozonation has been successfully used to

[13] Carbon Adsorption is being used to treat groundwater production wells associated with the Garden City Groundwater Plume (US EPA, 2018).

treat these types of cVOCs to reach MCL concentrations. The Ozonation alternative is rated as "Pass" for this threshold criterion.

Compliance with ARARs – The Ozonation alternative would comply with the chemical-specific, action-specific, and location-specific ARARs. Ozonation treatment of groundwater would reduce the concentrations of cVOCs and meet the applicable or relevant standards for the Wellfields. The Ozonation alternative is rated as "Pass" for this threshold criterion.

Long-Term Effectiveness –Ozonation would permanently remove the cVOCs from the groundwater. The Ozonation equipment can suffer from reliability concerns due to the tendency of residual ozone to cause equipment breakdowns, which may affect long-term effectiveness. The Ozonation alternative is rated as "Medium" for this balancing criterion.

Reduction in Toxicity, Mobility or Volume – Ozonation would reduce the cVOCs to below MCLs through destruction of the cVOC contaminants. It satisfies the statutory preference for treatment. Based upon these reasons, the Ozonation alternative is rated as "High" for this balancing criterion.

Short-Term Effectiveness – The Ozonation equipment has a longer lead time to construct, install, and test before it would be capable of reaching the RAO's (approximately ¾ to 1 year); longer than carbon adsorption but shorter than Advanced Oxidation. Based upon these reasons, the Ozonation alternative is rated as "Medium" for this balancing criterion.

Implementability – Ozonation equipment is a complex piece of equipment to construct and operate from a technical feasibility standpoint. From an administrative feasibility standpoint, the system requires specialized personnel to maintain the equipment. Based upon the corrosivity of residual ozone, there can also be reliability issues with the equipment. Based upon these reasons, the Ozonation alternative is rated as "Low" for this balancing criterion.

Cost – The Ozonation alternative is in the middle of the resulting cost, ranking 3rd for this balancing criterion. See **Table 9** for the alternatives cost summary.

Community Acceptance – The Ozonation alternative protects human health and will comply with ARARs. Generally, this alternative is considered an acceptable technology in other remedial action applications for similar NPL sites[14].

Summary – The Ozonation alternative will meet the RAOs for the Wellfields.

[14] According to Oxidation Technologies, Inc. as of 2013 at least 277 Water Treatment Plants in the US utilize ozone. Although the most common use of ozone is as a disinfectant, ozone can also destroy cVOCs.

4.3.5 Advanced Oxidation

Protection of Human Health and the Environment – The Advanced Oxidation alternative provides protection for human health by reduction of cVOCs to concentrations below MCLs. Although not as common as Aeration and Carbon Adsorption, Advanced Oxidation has been successfully used to treat these types of cVOCs to reach MCL concentrations. The Advanced Oxidation alternative is rated as "Pass" for this threshold criterion.

Compliance with ARARs – The Advanced Oxidation alternative would comply with the chemical-specific, action-specific, and location-specific ARARs. Advanced Oxidation treatment of groundwater would reduce the concentrations of cVOCs and meet the applicable or relevant standards for the Wellfields. The Advanced Oxidation alternative is rated as "Pass" for this threshold criterion.

Long-Term Effectiveness –Advanced Oxidation would permanently remove the cVOCs from the groundwater with no residuals other than carbon dioxide and water. The Advanced Oxidation alternative is rated as "High" for this balancing criterion.

Reduction in Toxicity, Mobility or Volume – Advanced Oxidation would reduce the cVOCs to below MCLs through destruction of the cVOC contaminants. It satisfies the statutory preference for treatment. Based upon these reasons, the Advanced Oxidation alternative is rated as "High" for this balancing criterion.

Short-Term Effectiveness – The Advanced Oxidation equipment has a long lead time to construct, install, test (approximately 1 to 1.5 years) before it would be capable of reaching the RAO's. In addition, since it uses hydrogen peroxide, there is risk to the community during storage of the hydrogen peroxide in tanks. Based upon these reasons, the Advanced Oxidation alternative is rated as "Low" for this balancing criterion.

Implementability – The Advanced Oxidation equipment is a complex piece of equipment to construct and operate from a technical feasibility standpoint. From an administrative feasibility standpoint, the system requires specialized personnel to maintain the equipment and to provide and store hydrogen peroxide. Based upon these reasons, the Advanced Oxidation alternative is rated as "Low" for this balancing criterion.

Cost – The Advanced Oxidation alternative has the highest combined cost of any of the alternatives, ranking 5th for this balancing criterion. See **Table 9** for the alternatives cost summary.

Community Acceptance – The Advanced Oxidation alternative protects human health and will comply with ARARs. Generally, this alternative is considered an acceptable technology in other remedial action applications for similar NPL sites[15].

Summary – The Advanced Ozonation alternative will meet the RAOs for the Wellfields.

4.4 Recommended Remedial Alternative

A scoring system was developed and assigned to the balancing criteria discussed in Section 4.3, above, to select the recommended alternative for the Wellfields. This scoring and the total score for each alternative are provided on **Table 10**. Note that the No Action alternative was not scored since it did not pass the threshold criterion as required by the EPA (EPA, 1988) for acceptance.

The balancing criteria, excluding cost, were scored as either high, medium or low depending upon how the alternative meets the individual criterion:

- A high ranking meets the requirements of the criterion and was scored as three points.
- A medium ranking generally meets the criterion requirements, but with some exceptions and was scored as two points.
- A low score did not meet the criterion requirements for various reasons and was scored as one point.

Costing would have been used to select the recommended alternative in the case of a tie in the scoring between two alternatives. Since a tie did not occur, the costing was provided as required by the FS process to show the relative costs of the various alternatives.

Based upon this scoring system, the Aeration alternative is the recommended alternative for treatment of groundwater from production wells in the Wellfields. It passes the threshold criteria for acceptance, and scored high for long-term effectiveness and implementability, and medium for reduction in toxicity, mobility, or volume, and short-term effectiveness.

As of 2020, the cVOC concentrations in the production wells within the Wellfields are below the applicable U.S. EPA MCLs, and, therefore, continue to provide safe and reliable drinking water. In order to ensure future protection of human health, Citizens, as part of the remedial action plan for Site 153, commits to quarterly monitoring of production wells for cVOCs and, if concentrations in an individual production well exceed a MCL[16] in the future, Citizens will remove the production well from service and install a treatment system before returning the

[15] UV Oxidation is used to treat environmental contaminants in Aurora, Colorado according to Trojan UV (Trojan UV, 2008).

[16] Exceedances of an MCL will be determined through quarterly sampling conducted as part of Citizens Groundwater Monitoring Plan. Verification of an MCL exceedance (e.g. one sample above an MCL, a rolling quarterly average above an MCL, or SDWA/IDEM OWQ permit requirements) will be established in future submittals required under the MOA (i.e. Remedial Action Plan and/or Record of Decision).

production well to service. The FS evaluates currently available remedial technologies and associated criteria for reduction of cVOCs from a production well. Since the remedial action plan is a commitment for the future, these remedial alternatives may change, and re-evaluation may be warranted based on newly available technologies. Citizens will communicate to IDEM the chosen remedial technologies required to address impacts associated with production wells located within the Wellfields in the future, if necessary.

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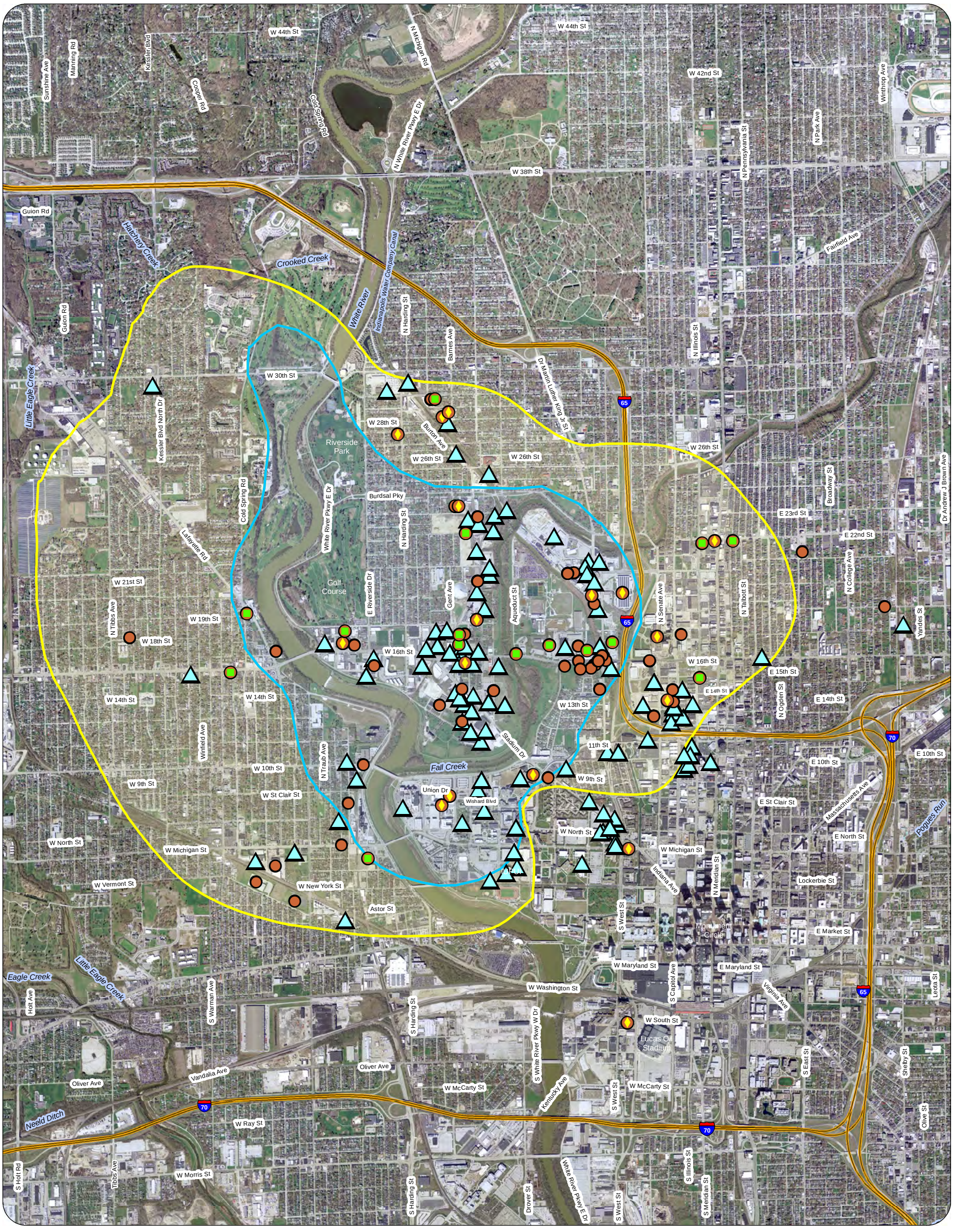
FIGURES

Figure 1 - Site 0153 Time of Travel Map



- Documented Chlorinated Solvent Management or Release
  65 Sites at this status
- Information Request Sent
  21 Sites at this status
- Notice of Liability Sent
  19 Sites at this status
- Documented Contributor to Well Field Impact
  No sites at this status
- No Further Evaluation for Well Field Impact
  131 Sites at this status
- Wellhead 1 Year Delineation
- Wellhead 5 Year Delineation

Non Orthophotography Data
State of Indiana Geographic Information Office Library

Orthophotography
Obtained from 2016 Indiana Map Framework Data
(www.indianamap.org)
Map Projection: UTM Zone 16 N
Map Datum: NAD83

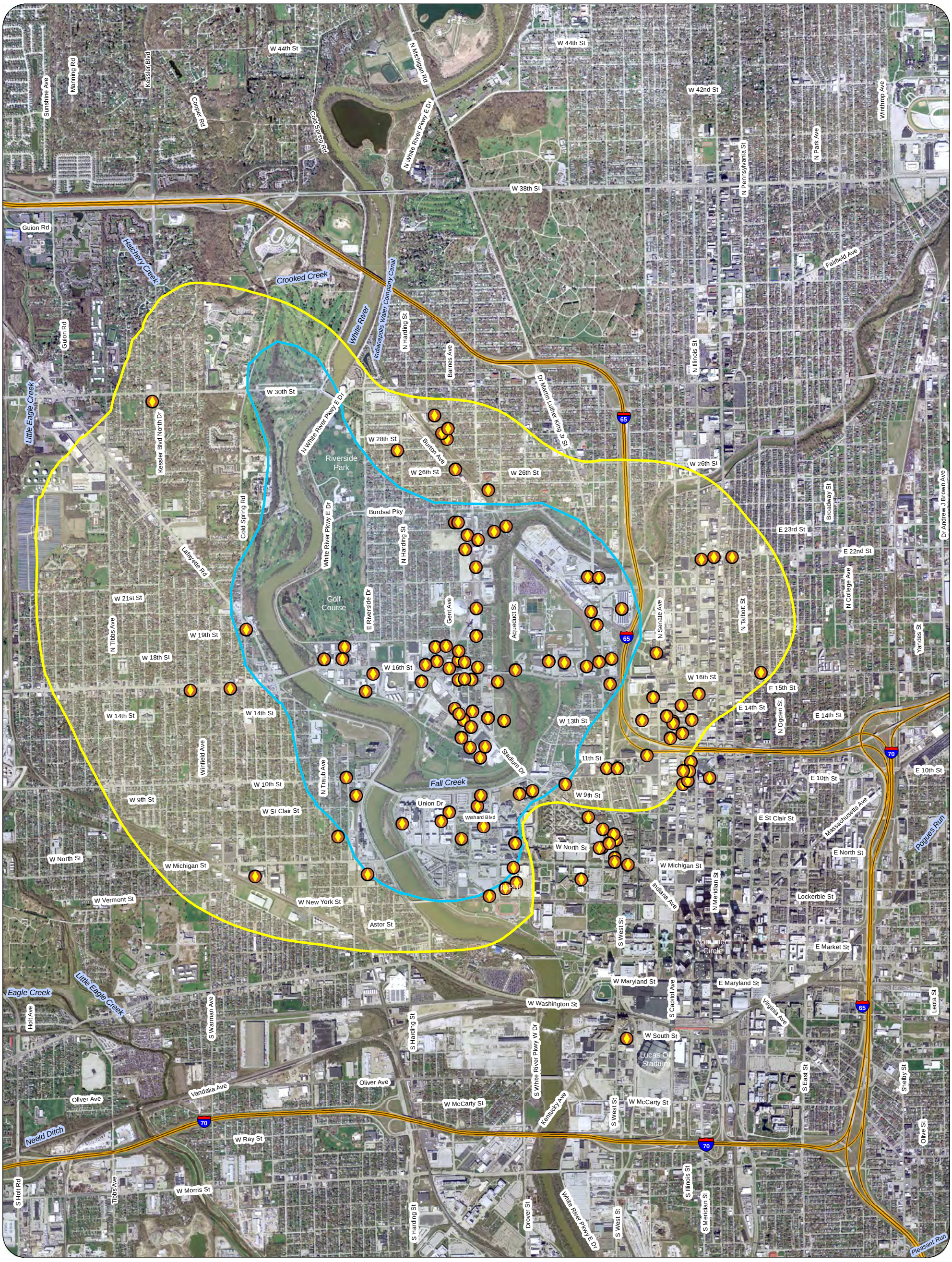
This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

August 5, 2020

Diane Osborn, LPG, GISP
Indiana Department of Environmental Management
Office of Land Quality - Engineering & GIS Services

0 0.5 1 Miles
0 0.75 1.5 Km

Figure 2 - Site 0153 Time of Travel Map
Information Request Letters



Non Orthophotography Data
State of Indiana Geographic Information Office Library

Orthophotography
Obtained from 2016 Indiana Map Framework Data
(www.indianamap.org)
Map Projection: UTM Zone 16 N
Map Datum: NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Information Request Sent
104 Information Requests sent

Wellhead 1 Year Delineation

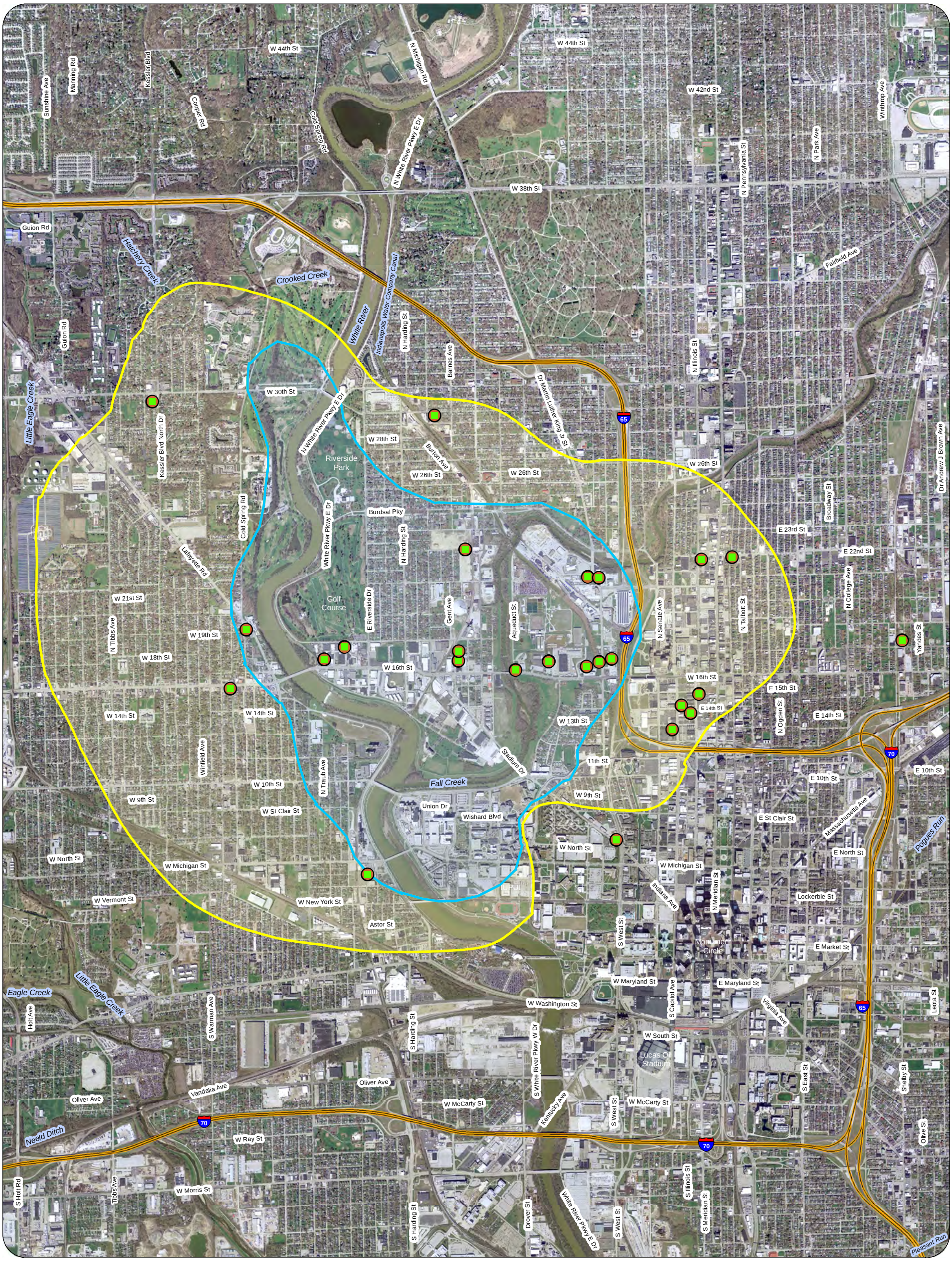
Wellhead 5 Year Delineation

Augest 5, 2020

Diane Osborn, LPG, GISP
Indiana Department of Environmental Management
Office of Land Quality - Engineering & GIS Services

0 0.5 1 Miles
0 0.75 1.5 Km

Figure 3 - Site 0153 Time of Travel Map
Notice of Liability Letters



Non Orthophotography Data
State of Indiana Geographic Information Office Library

Orthophotography
Obtained from 2016 Indiana Map Framework Data
(www.indianamap.org)
Map Projection: UTM Zone 16 N
Map Datum: NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Notice of Liability Sent
25 Notice of Liability requests sent

Wellhead 1 Year Delineation

Wellhead 5 Year Delineation

August 5, 2020

Diane Osborn, LPG, GISP
Indiana Department of Environmental Management
Office of Land Quality - Engineering & GIS Services

0 0.5 1 Miles
0 0.75 1.5 Km

PROPERTIES WITHIN 5-YEAR TOT

Media	Complete Exposure Pathway?	Controls?
Soil	Controlled	IDEM Remediation Program
Groundwater	Controlled	IDEM Remediation Program
Vapor ntrusion	Controlled	IDEM Remediation Program

WHITE RIVER

Media	Complete Exposure Pathway?	Controls?
Surface Water	Controlled	IDEM Remediaton Program
Sediment	Controlled	IDEM Remediaton Program

RIVERSIDE PRODUCTION WELLS

Media	Complete Exposure Pathway?	Controls?
Soil	N/A	N/A
Groundwater	Controlled	Site 0153 Alternative Plan
Vapor Intrusion	N/A	N/A

PROPERTIES WITHIN 5-YEAR TOT

Media	Complete Exposure Pathway?	Controls?
Soil	Controlled	IDEM Remediation Program
Groundwater	Controlled	IDEM Remediation Program
Vapor Intrusion	Controlled	IDEM Remediation Program

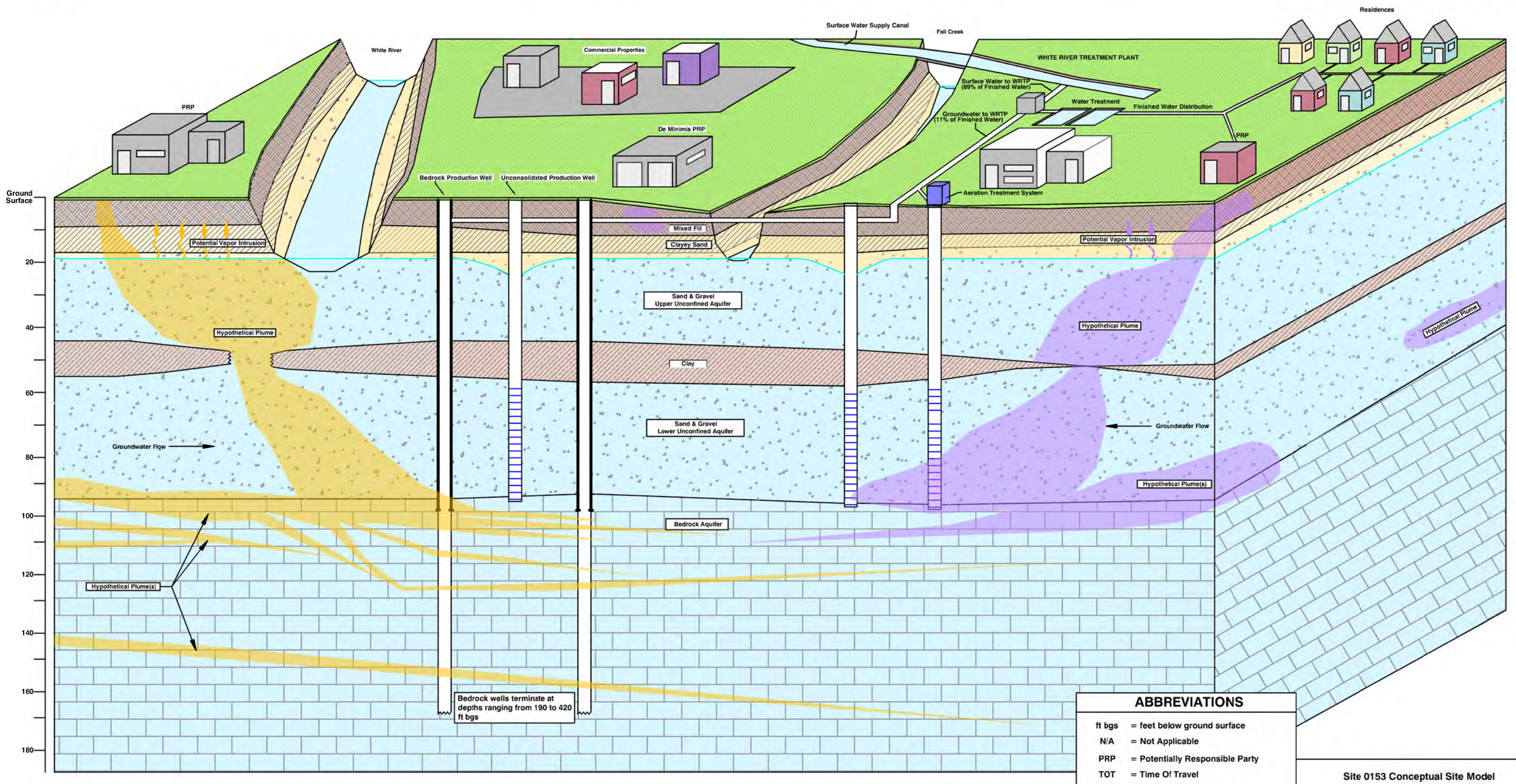
WHITE RIVER PRODUCTION WELLS

Media	Complete Exposure Pathway?	Controls?
Soil	Controlled	N/A
Groundwater	Controlled	Site 0153 Alternative Plan, including aeration
Vapor Intrusion	N/A	N/A

PROPERTIES WITHIN 5-YEAR TOT

Media	Complete Exposure Pathway?	Controls?
Soil	Controlled	IDEM Remediation Program
Groundwater	Controlled	IDEM Remediation Program
Vapor Intrusion	Controlled	IDEM Remediation Program

SOUTHWEST **NORTHEAST**



ABBREVIATIONS

ft bgs	= feet below ground surface
N/A	= Not Applicable
PRP	= Potentially Responsible Party
TOT	= Time Of Travel
WRTP	= White River Treatment Plant

Site 0153 Conceptual Site Model

Figure 4

TABLES

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS7	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	**0.67**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	**0.55**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	**2.23**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	**1.74**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	**0.52**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	**3.20**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	**3.40**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	**3.92**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	**4.00**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	**6.01**	<0.50	<0.50	<0.50	**0.55**	<0.50
	12/02/2009	<0.50	<0.50	<0.50	**1.83**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	**0.96**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	**1.43**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/20/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	**1.00**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	**0.55**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/02/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	**0.57**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	**0.70**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/27/2018	<0.50	<0.50	<0.50	**0.71**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	**1.13**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	**0.30** J	<0.50	<0.50	<0.50	<0.50	<0.50
	08/27/2019	<0.50	<0.50	<0.50	**1.00**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	**1.78**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	**1.95**	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

BRL = Below Laboratory Reporting Limits
J = Result is estimated between the MDL and reporting limit.
MDL = Method Detection Limit
NDP = No Data Provided
USEPA = United States Environmental Protection Agency
All results and MCLs are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS8	07/22/2005	<0.50	<0.50	<0.50	**1.72**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	**5.17**	<0.50	<0.50	<0.50	**1.52**	<0.50
	04/20/2006	<0.50	<0.50	<0.50	**6.30**	<0.50	<0.50	<0.50	**1.56**	<0.50
	07/18/2006	<0.50	<0.50	<0.50	**5.01**	<0.50	<0.50	<0.50	**0.57**	<0.50
	10/25/2006	<0.50	<0.50	<0.50	**7.79**	<0.50	<0.50	<0.50	**1.28**	<0.50
	02/02/2007	<0.50	<0.50	<0.50	**9.44**	<0.50	<0.50	<0.50	**1.61**	<0.50
	04/25/2007	<0.50	<0.50	<0.50	**8.21**	<0.50	<0.50	<0.50	**1.02**	<0.50
	10/03/2007	<0.50	<0.50	<0.50	**9.03**	<0.50	<0.50	<0.50	**1.35**	<0.50
	07/24/2008	<0.50	<0.50	<0.50	**7.24**	<0.50	<0.50	<0.50	**0.61**	<0.50
	10/22/2008	<0.50	<0.50	<0.50	**10.4**	<0.50	<0.50	<0.50	**1.10**	<0.50
	03/25/2009	<0.50	<0.50	<0.50	**6.97**	<0.50	<0.50	<0.50	**0.83**	<0.50
	12/02/2009	<0.50	<0.50	<0.50	**4.48**	<0.50	<0.50	<0.50	**1.13**	<0.50
	03/03/2010	<0.50	<0.50	<0.50	**4.92**	<0.50	<0.50	<0.50	**0.99**	<0.50
	08/25/2010	<0.50	<0.50	<0.50	**3.64**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	**2.52**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	**6.39**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	**5.86**	<0.50	<0.50	<0.50	**0.56**	<0.50
	02/19/2013	<0.50	<0.50	<0.50	**6.38**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	**7.06**	<0.50	<0.50	<0.50	**0.56**	<0.50
	05/20/2014	<0.50	<0.50	<0.50	**5.79**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	**3.02**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	**6.69**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	**3.09**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	**5.30**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/02/2017	<0.50	<0.50	<0.50	**5.87**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	**3.58**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/19/2017	<0.50	<0.50	<0.50	**2.56**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	**2.03**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	**4.12**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	**4.83**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	**4.28**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/2018	<0.50	<0.50	<0.50	**2.57**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	**4.85**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	**4.35**	<0.50	<0.50	<0.50	<0.50	<0.50
	08/27/2019	<0.50	<0.50	<0.50	**4.84**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	**4.59**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	**0.08 J**	**0.08 J**	<0.50	**4.66**	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

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The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS9	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	**0.80**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	**0.92**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	**0.56**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	**1.07**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	**1.51**	<0.50	<0.50	<0.50	**0.51**	<0.50
	04/25/2007	<0.50	<0.50	<0.50	**0.91**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	**1.73**	<0.50	<0.50	<0.50	**0.56**	<0.50
	01/09/2008	<0.50	<0.50	<0.50	**2.86**	<0.50	<0.50	<0.50	**0.52**	<0.50
	04/15/2008	<0.50	<0.50	<0.50	**2.26**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	**2.14**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	**2.07**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	**2.82**	<0.50	<0.50	<0.50	**0.58**	<0.50
	10/20/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	**0.63**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	**0.65**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	**0.84**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	**1.13**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	**0.68**	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	**0.52**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	**1.18**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	**0.68**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	**1.14**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	**0.85**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	**0.67**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/2018	<0.50	<0.50	<0.50	**0.57**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2019	<0.50	<0.50	<0.50	**0.97**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	**0.30** J	<0.50	<0.50	<0.50	<0.50	<0.50
	08/27/2019	<0.50	<0.50	<0.50	**0.59**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	**2.42**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	**2.53**	<0.50	<0.50	<0.50	<0.50	<0.50

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		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS17	10/19/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/01/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/20/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS18	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/09/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/01/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/20/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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TABLE 1
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		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS19	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/20/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/23/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/28/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS22	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/17/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/11/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/27/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/28/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
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USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS26	07/22/2005	<0.50	<0.50	<0.50	**0.58**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	**0.55**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	**0.63**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	**0.62**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	**1.18**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	**0.54**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	**1.35**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	**1.14**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	**0.96**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	**1.67**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	**1.06**	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	**1.43**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	**1.26**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	**1.01**	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	**0.65**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	**2.47**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	**2.26**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	**2.12**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	**0.60**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/27/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2019	<0.50	<0.50	<0.50	**0.36** J	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	**0.16** J	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

BRL = Below Laboratory Reporting Limits
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MDL = Method Detection Limit
NDP = No Data Provided
USEPA = United States Environmental Protection Agency
All results and MCLs are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
August Mack ENVIRONMENTAL		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS29 (Renamed RS29R in January 2020)	04/06/2004	<0.50	<0.50	NDP	**14.2**	<0.50	<0.50	<0.50	**2.25** ^	<0.50
	07/22/2005	<0.50	<0.50	<0.50	**11.7**	<0.50	<0.50	<0.50	**1.47**	<0.50
	01/25/2006	<0.50	<0.50	<0.50	**18.4**	**0.54**	<0.50	<0.50	**3.07** ^	<0.50
	04/20/2006	<0.50	<0.50	<0.50	**13.9**	<0.50	<0.50	<0.50	**1.81**	<0.50
	07/18/2006	<0.50	<0.50	<0.50	**13.1**	<0.50	<0.50	<0.50	**1.31**	<0.50
	10/25/2006	<0.50	<0.50	<0.50	**12.3**	<0.50	<0.50	<0.50	**1.34**	<0.50
	02/02/2007	<0.50	<0.50	<0.50	**13.7**	<0.50	<0.50	<0.50	**1.32**	<0.50
	04/25/2007	<0.50	<0.50	<0.50	**10.8**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	**13.5**	<0.50	<0.50	<0.50	**1.23**	<0.50
	03/03/2010	<0.50	<0.50	<0.50	**15.1**	<0.50	<0.50	<0.50	**1.63**	<0.50
	08/25/2010	<0.50	<0.50	<0.50	**10.5**	<0.50	<0.50	<0.50	**0.91**	<0.50
	03/17/2011	<0.50	<0.50	<0.50	**12.2**	<0.50	<0.50	<0.50	**1.10**	<0.50
	03/08/2012	<0.50	<0.50	<0.50	**16.6**	<0.50	<0.50	<0.50	**1.02**	<0.50
	11/28/2012	<0.50	<0.50	<0.50	**15.4**	<0.50	<0.50	<0.50	**1.17**	<0.50
	02/19/2013	<0.50	<0.50	<0.50	**16.1**	<0.50	<0.50	<0.50	**0.57**	<0.50
	11/25/2013	<0.50	<0.50	<0.50	**15.7**	<0.50	<0.50	<0.50	**1.09**	<0.50
	05/20/2014	<0.50	<0.50	<0.50	**15.3**	<0.50	<0.50	<0.50	**0.67**	<0.50
	09/19/2014	<0.50	<0.50	<0.50	**10.8**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	**9.91**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	**12.2**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	**9.05**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	**10.6**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	**10.3**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	**9.29**	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	**10.5**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/21/2017	<0.50	<0.50	<0.50	**9.58**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	**8.55**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	**9.54**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	**9.14**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/2018	<0.50	<0.50	<0.50	**10.8**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2019	<0.50	<0.50	<0.50	**6.59**	<0.50	<0.50	<0.50	**0.19** J	<0.50
	04/29/2019	<0.50	<0.50	<0.50	**6.76**	<0.50	<0.50	<0.50	<0.50	<0.50
	08/27/2019	<0.50	<0.50	<0.50	**6.54**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/20/2020	**0.32** J	**0.08** J	<0.50	**8.62**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/04/2020	**0.31** J	**0.11** J	<0.50	**7.93**	<0.50	<0.50	<0.50	<0.50	<0.50
RS30	09/18/2018	<0.50	<0.50	<0.50	**2.81**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/17/2019	<0.50	<0.50	<0.50	**1.55**	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

BRL = Below Laboratory Reporting Limits
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MDL = Method Detection Limit
NDP = No Data Provided
USEPA = United States Environmental Protection Agency
All results and MCLs are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RSA	12/17/2004	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/22/2004	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/28/2005	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/19/2005	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/01/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/24/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/17/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/17/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/27/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/27/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RSB	12/22/2004	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/27/2005	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/19/2005	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/01/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/27/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/27/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/30/2019	<0.50	**0.41** J	<0.50	**0.55**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	**0.25** J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	**0.25** J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	**0.29** J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	**0.37** J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

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The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RSC	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/19/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/27/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/03/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/04/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/18/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/09/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/18/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/27/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/27/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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BRL = Below Laboratory Reporting Limits
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The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RSD	10/19/2005	<0.50	<0.50	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/27/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	**0.57**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/29/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/20/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/15/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/13/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/02/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/05/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/27/2019	<0.50	<0.50	<0.50	**0.23** J	<0.50	<0.50	<0.50	<0.50	<0.50
	10/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

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TABLE 1
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		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
WR7	04/06/2004	<0.50	**0.52**	NDP	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	**0.54**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/19/2006	<0.50	**0.55**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	**0.62**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/31/2007	<0.50	**0.52**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	**0.52**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	**0.53**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	**0.61**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/17/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/21/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/13/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/22/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/27/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/22/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/29/2019	<0.50	**0.20** J	<0.50	**0.21** J	<0.50	<0.50	<0.50	<0.50	<0.50
	08/26/2019	<0.50	**0.14** J	<0.50	**0.26** J	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/2019	<0.50	**0.22** J	<0.50	**0.31** J	<0.50	<0.50	<0.50	<0.50	<0.50
	01/16/2020	<0.50	**0.24** J	<0.50	**0.29** J	<0.50	<0.50	<0.50	<0.50	<0.50

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BRL = Below Laboratory Reporting Limits
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TABLE 1
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		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
WR8	07/21/2005	<0.50	<0.50	<0.50	**0.95**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	**1.09**	<0.50	<0.50	**0.57**	<0.50	<0.50
	04/19/2006	<0.50	**0.52**	<0.50	**0.90**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	**0.73**	<0.50	**1.12**	<0.50	<0.50	**0.51**	<0.50	<0.50
	10/25/2006	<0.50	**1.76**	<0.50	**0.91**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/31/2007	<0.50	**0.58**	<0.50	**1.02**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	**0.84**	<0.50	**1.05**	<0.50	<0.50	**0.51**	<0.50	<0.50
	10/03/2007	<0.50	**1.09**	<0.50	**0.96**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	**0.81**	<0.50	**0.94**	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	**0.84**	<0.50	**0.97**	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	**1.02**	<0.50	**0.93**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	**1.69**	<0.50	**0.91**	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	**1.87**	<0.50	**0.67**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	**0.81**	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	**0.66**	<0.50	**0.91**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	**0.81**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	**0.60**	<0.50	**0.92**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	**0.94**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	**0.57**	<0.50	**1.07**	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	**0.65**	<0.50	**1.14**	<0.50	<0.50	**0.54**	<0.50	<0.50
	05/21/2014	<0.50	**0.64**	<0.50	**1.02**	<0.50	<0.50	<0.50	<0.50	<0.50
	09/17/2014	<0.50	<0.50	<0.50	**0.94**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	**0.55**	<0.50	**1.13**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/21/2015	<0.50	**0.64**	<0.50	**1.14**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/2016	<0.50	**0.67**	<0.50	**1.00**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2016	<0.50	**0.81**	<0.50	**0.90**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	**0.71**	<0.50	**0.92**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	**0.63**	<0.50	**1.17**	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	**0.81**	<0.50	**1.01**	<0.50	<0.50	<0.50	<0.50	<0.50
	11/22/2017	<0.50	**0.87**	<0.50	**0.65**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	**0.53**	<0.50	**0.93**	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	**0.65**	<0.50	**1.27**	<0.50	<0.50	<0.50	<0.50	<0.50
	08/22/2018	<0.50	**0.50**	<0.50	**1.00**	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2018	<0.50	**0.70**	<0.50	**1.10**	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	**0.64**	<0.50	**1.36**	<0.50	<0.50	**0.47** J	<0.50	<0.50
	04/29/2019	<0.50	**0.44** J	<0.50	**1.19**	<0.50	<0.50	**0.36** J	<0.50	<0.50
	08/26/2019	<0.50	**0.47** J	<0.50	**1.13**	<0.50	<0.50	**0.40** J	<0.50	<0.50
	10/15/2019	<0.50	**0.59**	<0.50	**1.35**	<0.50	<0.50	**0.42** J	<0.50	<0.50
	01/16/2020	<0.50	**0.53**	<0.50	**1.20**	<0.50	<0.50	**0.36** J	<0.50	<0.50

Abbreviations & Notes

BRL = Below Laboratory Reporting Limits
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MDL = Method Detection Limit
NDP = No Data Provided
USEPA = United States Environmental Protection Agency
All results and MCLs are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
WR9	07/21/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/19/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/31/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	**6.12** ^	**6.54**	<0.50	<0.50	<0.50	**2.46**	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.51**	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	**1.28**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/09/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	**0.52**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.52**	<0.50	<0.50
	05/21/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/17/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/21/2015	<0.50	**2.87**	**1.87**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/2016	<0.50	**0.70**	**0.62**	<0.50	<0.50	<0.50	**0.55**	<0.50	<0.50
	10/12/2016	<0.50	**1.20**	**0.84**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/01/2017	<0.50	**0.60**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/14/2017	<0.50	**0.54**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/29/2017	<0.50	**0.68**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/22/2017	<0.50	**0.91**	**0.57**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/20/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	06/06/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/22/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/12/2018	<0.50	**0.55**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/2019	<0.50	**0.32** J	**0.21** J	<0.50	<0.50	<0.50	**0.42** J	<0.50	<0.50
	04/29/2019	<0.50	**0.22** J	<0.50	<0.50	<0.50	<0.50	**0.33** J	<0.50	<0.50
	08/26/2019	<0.50	**0.19** J	**0.23** J	**0.19** J	<0.50	<0.50	**0.34** J	<0.50	<0.50
	10/15/2019	<0.50	**0.19** J	<0.50	**0.19** J	<0.50	<0.50	**0.38** J	<0.50	<0.50
	01/16/2020	<0.50	**0.22** J	**0.14** J	<0.50	<0.50	<0.50	**0.33** J	<0.50	<0.50

Abbreviations & Notes

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MDL = Method Detection Limit
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USEPA = United States Environmental Protection Agency
All results and MCLs are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
The following wells have been abandoned or taken out of service over the course of monitoring. Data presented is for reference only.										
WR3 (Out of Service - June 2016)	04/07/2004	<0.50	**6.95** ^	NDP	**1.74**	<0.50	<0.50	**0.90**	<0.50	<0.50
	01/26/2005	<0.50	**6.78** ^	NDP	**1.60**	<0.50	<0.50	**0.87**	<0.50	<0.50
	04/21/2005	<0.50	**7.20** ^	**1.26**	**1.68**	<0.50	<0.50	**0.84**	<0.50	<0.50
	07/21/2005	<0.50	**7.57** ^	**1.31**	**1.87**	<0.50	<0.50	**0.92**	<0.50	<0.50
	10/19/2005	<0.50	**6.65** ^	**1.29**	**1.57**	<0.50	<0.50	**0.83**	<0.50	<0.50
	01/25/2006	<0.50	**8.18** ^	**1.27**	**1.81**	<0.50	<0.50	**0.95**	<0.50	<0.50
	04/19/2006	<0.50	**7.69** ^	**1.23**	**1.63**	<0.50	<0.50	**0.88**	<0.50	<0.50
	10/25/2006	<0.50	**5.64** ^	**0.94**	**1.30**	<0.50	<0.50	**0.74**	<0.50	<0.50
	01/31/2007	<0.50	**6.92** ^	**1.26**	**1.42**	<0.50	<0.50	**0.83**	<0.50	<0.50
	04/25/2007	<0.50	**5.37** ^	**0.91**	**1.40**	<0.50	<0.50	**0.82**	<0.50	<0.50
	07/23/2008	<0.50	**4.67**	<0.50	**1.69**	<0.50	<0.50	**0.66**	<0.50	<0.50
	10/22/2008	<0.50	**5.27** ^	**0.55**	**1.95**	<0.50	<0.50	**0.79**	<0.50	<0.50
	12/02/2009	<0.50	**4.43**	**0.58**	**1.43**	<0.50	<0.50	**0.60**	<0.50	<0.50
	03/03/2010	<0.50	**5.55** ^	**0.75**	**1.63**	<0.50	<0.50	**0.72**	<0.50	<0.50
	08/25/2010	<0.50	**5.60** ^	**0.83**	**1.59**	<0.50	<0.50	**0.78**	<0.50	<0.50
	03/17/2011	<0.50	**6.09** ^	**0.83**	**1.32**	<0.50	<0.50	**0.63**	<0.50	<0.50
	11/28/2012	<0.50	**6.54** ^	**0.88**	**1.59**	<0.50	<0.50	**0.82**	<0.50	<0.50
	02/19/2013	<0.50	**6.12** ^	**0.71**	**1.70**	<0.50	<0.50	**0.79**	<0.50	<0.50
	11/25/2013	<0.50	**5.33** ^	**0.84**	**1.69**	<0.50	<0.50	**0.69**	<0.50	<0.50
	02/19/2014	<0.50	**6.36** ^	**0.96**	**1.63**	<0.50	<0.50	**0.76**	<0.50	<0.50
	05/21/2014	<0.50	**6.11** ^	**0.72**	**2.01**	<0.50	<0.50	**0.79**	<0.50	<0.50
	09/17/2014	<0.50	**5.24** ^	**0.61**	**1.67**	<0.50	<0.50	**0.61**	<0.50	<0.50
	03/10/2015	<0.50	**5.68** ^	**0.76**	**1.72**	<0.50	<0.50	**0.66**	<0.50	<0.50
	10/21/2015	<0.50	**5.44** ^	**0.62**	**1.70**	<0.50	<0.50	<0.50	<0.50	<0.50
	03/14/2016	<0.50	**5.55** ^	**0.70**	**1.67**	<0.50	<0.50	**0.68**	<0.50	<0.50
WR6 (Out of Service - 2007) (Abandoned)	04/06/2004	<0.50	**12.7** ^	NDP	**1.26**	<0.50	<0.50	**1.84**	<0.50	<0.50
	01/26/2005	<0.50	**12.4** ^	NDP	**1.22**	<0.50	<0.50	**1.43**	<0.50	<0.50
	04/21/2005	<0.50	**13.3** ^	**9.99**	**1.26**	<0.50	<0.50	**1.44**	<0.50	<0.50
	07/21/2005	<0.50	**15.9** ^	**11.5**	**1.39**	<0.50	<0.50	**1.67**	<0.50	<0.50
	10/19/2005	<0.50	**15.6** ^	NDP	**1.42**	<0.50	<0.50	**1.59**	<0.50	<0.50
	01/25/2006	<0.50	**18.9** ^	**12.1**	**1.44**	<0.50	<0.50	**1.61**	<0.50	<0.50
	04/19/2006	<0.50	**19.2** ^	**12.3**	**1.25**	<0.50	<0.50	**1.42**	<0.50	<0.50
	10/25/2006	<0.50	**18.3** ^	**12.0**	**1.11**	<0.50	<0.50	**1.26**	<0.50	<0.50

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^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 1
RIVERSIDE AND WHITE RIVER PRODUCTION WATER cVOC ANALYTICAL RESULTS

		Chlorinated Volatile Organic Compounds (cVOCs)								
		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
RS2 (Out of Service - March 2015) (Abandoned)	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	**3.25**	<0.50	<0.50	<0.50	**0.51**	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/17/2011	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/25/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/20/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	09/17/2014	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/10/2015	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
RS27 (Out of Service - March 2014) (Abandoned)	07/22/2005	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/20/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/18/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/25/2006	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/25/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/03/2007	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	04/15/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	10/22/2008	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	12/02/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/03/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/25/2010	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	03/08/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/28/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/19/2013	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
RS28 (Out of Service - 1989) (Abandoned)	09/18/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

BRL = Below Laboratory Reporting Limits
J = Result is estimated between the MDL and reporting limit.
MDL = Method Detection Limit
NDP = No Data Provided
USEPA = United States Environmental Protection Agency
All results and MCLs are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of MCL exceedances:
^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 2

RIVERSIDE AND WHITE RIVER
FINISHED WATER cVOC ANALYTICAL RESULTS

		Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level		**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample ID	**Date Collected**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
WHITE RIVER PLANT (WR PD)	02/08/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/11/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/09/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/07/2016	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/08/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/16/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/15/2017	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/27/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/16/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/15/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/12/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/11/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	05/15/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	08/12/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	02/12/2020	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Abbreviations & Notes

cVOC = Chlorinated Volatile Organic Compound
USEPA = United States Environmental Protection Agency
PD = Pump Discharge
NE = Not Established
NDP = No Data Provided
BRL = Below Laboratory Reporting Limits
All results and Screening Levels are reported in micrograms per liter (µg/L).

The following notes summarize the symbol and color of screening level exceedances:

^ = At or Above USEPA Maximum Contaminant Level (MCL)

TABLE 3
WR3 cVOC ANALYTICAL RESULTS
PRE- AND POST-AERATION PRODUCTION WATER

August Mack Project No.:
JU0082.380

			Chlorinated Volatile Organic Compounds (cVOCs)								
			Tetrachloroethene	Trichloroethene	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl Chloride	Chloroethane
USEPA Maximum Contaminant Level			**5**	**5**	**200**	**70**	**100**	**7**	**NE**	**2**	**NE**
Sample Location	**Date Collected**	**Sample ID**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
WR3	02/11/2020	Pre	<0.079	**2.35**	**0.28** J	<0.177	<0.11	<0.092	<0.129	<0.165	<0.226
	02/20/2020	Pre	<0.079	**2.25**	**0.23** J	**0.19** J	<0.11	<0.092	<0.129	<0.165	<0.226
		Post	<0.079	**1.12**	<0.11	<0.177	<0.11	<0.092	<0.129	<0.165	<0.226
	03/02/2020	Pre	<0.079	**3.36**	**0.47** J	**0.77**	<0.11	<0.092	**0.18** J	<0.165	<0.226
		Post	<0.079	**1.73**	**0.26** J	**0.55**	<0.11	<0.092	<0.129	<0.165	<0.226
	03/11/2020	Pre	<0.079	**3.75**	**0.38** J	**0.99**	<0.11	<0.092	**0.26** J	<0.165	<0.226
		Post	<0.079	**1.99**	**0.18** J	**0.70**	<0.11	<0.092	**0.13** J	<0.165	<0.226
	03/17/2020	Pre	<0.079	**4.01**	**0.40** J	**1.19**	<0.11	<0.092	**0.32** J	<0.165	<0.226
		Post	<0.079	**2.28**	**0.19** J	**0.85**	<0.11	<0.092	**0.18** J	<0.165	<0.226
	04/07/2020	Pre	<0.079	**3.40**	**0.42** J	**1.02**	<0.11	<0.092	**0.34** J	<0.165	<0.226
		Post	<0.079	**1.88**	**0.21** J	**0.81**	<0.11	<0.092	**0.23** J	<0.165	<0.226
	04/15/2020	Pre	<0.079	**3.89**	**0.42** J	**1.32**	<0.11	<0.092	**0.38** J	<0.165	<0.226
		Post	<0.079	**2.12**	**0.22** J	**0.98**	<0.11	<0.092	**0.25** J	<0.165	<0.226
	04/22/2020	Pre	<0.079	**4.10**	**0.43** J	**1.47**	<0.11	<0.092	**0.43** J	<0.165	<0.226
		Post	<0.079	**2.48**	**0.23** J	**1.00**	<0.11	<0.092	**0.26** J	<0.165	<0.226
	04/28/2020	Pre	<0.079	**3.91**	**0.43** J	**1.24**	<0.11	<0.092	**0.38** J	<0.165	<0.226
		Post	<0.079	**2.37**	**0.24** J	**0.95**	<0.11	<0.092	**0.25** J	<0.165	<0.226

Abbreviations & Notes

MDL = Method Detection Limit
J = Result is detected between the MDL and reporting limit.
USEPA = United States Environmental Protection Agency
Pre = Results are from samples taken prior to aeration treatment.
Post = Results are from samples taken following aeration treatment.

All results and MCLs are reported in micrograms per liter (µg/L).
Non-detect results are reported to the MDL.

The following notes summarize the symbol and color of screening level exceedances:

^ = At or Above USEPA Maximum Contaminant Level (MCL)

Table 4 Potential Chemical-Specific ARARs and TBCs

Source	Standard, Requirement, Criterion, Limitation	Description of Standard	ARARs or TBC	Comments
Safe Drinking Water Act, National Primary Drinking Water Standards	40 CFR, Part 141.61	MCLs for public water systems	Applicable	The NCP defines MCLs as relevant and appropriate for groundwater determined to be a current or potential source of drinking water.
Safe Drinking Water Act, Maximum Contaminant Level Goals (MCLGs)	40 CFR, Part 141.50	Potable water quality goals	TBC	MCLGs that have non-zero values are relevant and appropriate for groundwater to be a current or potential source of drinking water. Maximum contaminant goals are non-enforceable health goals.
U.S. EPA Health-Based Guidelines for Air, Drinking Water, and Soil (Regional Screening Levels)	Tables at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. United States Environmental Protection Agency, Regional Screening Levels for Chemical Contaminants at Superfund Sites (February 20, 2020)	Human health risk-based screening levels for contaminants in soil and groundwater under different land use scenarios	TBC	Possible screening and/or cleanup goals to use in absence of MCLs values for specific contaminants based on a target cancer risk (TR) of $1x10^{-6}$. U.S. EPA in the MOA agreed a $1x10^{-5}$ TR was acceptable.

Table 5 Potential Action-Specific ARARs and TBCs

Source	Standard, Requirement, Criterion, Limitation	Description of Standard	ARARs or TBC	Comments
Safe Drinking Water Act, National Primary Drinking Water Standards	40 CFR, Part 141.61	Treatment for public water systems	Applicable	Defines treatment standards for current and potential sources of drinking water.
Occupational Safety and Health Administration (OSHA)	29 CFR 1910	Requires 40-hour HAZWOPER training and annual 8-hour refreshers for site workers	Applicable	For installation and operation and maintenance activities.
Clean Air Act (CAA)	40 CFR 50-80	The CAA regulates air emissions of substances that may harm public health.	Applicable	During operation of all air emission treatment options.
RCRA Subtitle C Hazardous Waste Identification and Generator Requirements	40 CFR 261	A solid waste is a hazardous waste if it exhibits any characteristics of ignitability, corrosivity, reactivity or toxicity.	Applicable	Disposal of waste materials related to treatment.
CERCLA Off-Site Rule	CERCLA Section 121(d)(3)	Applies to off-Site disposal of hazardous substances	TBC	Disposal of waste materials related to treatment.

Table 6 Potential Location-Specific ARARs and TBCs

Source	Standard, Requirement, Criterion, Limitation	Description of Standard	ARARs or TBC	Comments
Endangered Species Act and Fish and Wildlife Coordination Act	16 CFR Part 661 and 16 U.S.C. 1531	Actions must be taken to conserve critical habitat in areas where there are endangered or threatened species.	Potentially Applicable	Potential ETR species in the area.
Executive Order 11988 – Floodplain Management	40 CFR Part 6, Subpart A; 40 CFR 6.302	Activities taking place within floodplains must be performed to avoid adverse impacts and preserve beneficial values.	Potentially Applicable	Pertinent to activities that may occur within the floodplain. A portion of the RSWF production wells are located in the floodplain.
Resource Conservation and Recovery Act (RCRA) Regulations – Location Standards	40 CFR Part 264.18	Regulates the design, construction, operation, and maintenance of hazardous waste management facilities within the 100-year floodplain.	Potentially Applicable	Applicable for on-site treatment, storage, or disposal of hazardous waste.

Table 7 Treatment Alternatives General Response Action Screening Analysis

Remedial Action Objective	General Response Action	Effectiveness	Implementability	Cost	Comment or Further Description	Result of Screening
Treatment of Groundwater to Below MCLs	No Action	○	●	●	Per 40 CFR 300.403(e)(6) of the revised NCP (March 8, 1990), this option must be evaluated as a baseline against other options.	**Retain as Baseline**
	Aeration	●	●	◑	Effectiveness: Proven technology Implementability: Easy to implement Cost: Moderate capital and O&M cost	**Retain**
	Carbon Adsorption	●	●	◑/○	Effectiveness: Proven technology Implementability: Easy to implement Cost: Moderate capital and high O&M cost	**Retain**
	Ozonation	●	◑	◑	Effectiveness: Proven technology Implementability: Moderately hard to implement Cost: Moderate capital and O&M cost	**Retain**
	Advanced Oxidation	●	◑	○	Effectiveness: Proven technology Implementability: Moderately hard to implement Cost: High capital and O&M cost	**Retain**
	Anaerobic Biological Reactor	○	○	○	Effectiveness: Easy to upset Implementability: Large footprint Cost: High capital and O&M cost	**Do Not Retain**

Notes: CFR = Code of Federal Regulations
NCP= National Contingency Plan

Ratings:
○ = Low Effectiveness, Difficult Implementability, High Cost
◑ = Moderate Effectiveness, Moderate Implementability, Moderate Cost
● = High Effectiveness, Easy Implementability, Low Cost

Table 9
Cost Estimates of Alternatives

Activity	Baseline No Action	Alternative 1 Aeration	Alternative 2 Carbon Adsorption	Alternative 3 Ozonation	Alternative 4 Advanced Oxidation
Design/Treatability Testing/Post-Installation Testing1	$0	**$50,000**	**$50,000**	**$75,000**	**$85,000**
Capital Cost					
Equipment		$650,000	$600,000	$570,000	$740,000
Installation (30% of Equipment Cost)		$195,000	$180,000	$171,000	$222,000
Building Upgrades	$0	$25,000	$25,000	$25,000	$25,000
Compressor		--	--	$10,000	--
Hydrogen Peroxide Tank		--	--	--	$10,000
Electrical Service Installation		$10,000	$10,000	$15,000	$15,000
Subtotal		**$880,000**	**$815,000**	**$791,000**	**$1,012,000**
Operation & Maintenance[2] (30 years)					
Electricity[3] Cost		$454,000	$198,000	$1,200,000	$3,900,000
Media[4] Wash with Labor		$360,000	--	--	--
Media[4] Replacement with Labor	$0	$150,000	$3,000,000		
Ozone Replacement Parts with Labor		--	--	$120,000	--
Lamp Replacement with Labor		--	--	--	$450,000
Hydrogen Peroxide (35%)		--	--	--	$1,950,000
Subtotal		**$964,000**	**$3,198,000**	**$1,320,000**	**$6,300,000**
Total	**$0**	**$1,894,000**	**$4,063,000**	**$2,186,000**	**$7,397,000**

Notes: [1] = Design, Treatability Testing, and Post Installation Testing costs based upon experience with these system types.

[2] = Operation and maintenance cost based upon costing provided by vendors or Citizens for the aeration system multiplied by 30 years.

[3] = Electricity costs are based upon electrical usage provided by vendors for specific equipment components.

[4] = Media for the aeration alternative is the packing material. Media for the carbon adsorption alternative is activated carbon.

Table 10
Alternatives Comparative Evaluation

Criterion	Baseline	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Action	**Aeration**	**Carbon Adsorption**	**Ozonation**	**Advanced Oxidation**
Evaluation Criteria[1] with Assigned Scoring					
Protection of Human Health and Environment	Fail	Pass	Pass	Pass	Pass
Compliance with ARARs/TBCs	Fail	Pass	Pass	Pass	Pass
Long-Term Effectiveness	Low	High – 3 pts	Medium – 2 pts	Medium – 2 pts	High – 3 pts
Reduction in Toxicity, Mobility, or Volume	None	Medium – 2 pts	Medium – 2 pts	High – 3 pts	High – 3 pts
Short-Term Effectiveness	Low	Medium – 2 pts	High – 3 pts	Medium – 2 pts	Low – 1 pt
Implementability	High	High – 3 pts	Medium – 2 pts	Low – 1 pts	Low – 1 pt
Community Acceptance	Low	Medium – 2 pts	Medium – 2 pts	Medium – 2 pts	Medium – 2 pts
Score Total	**NA**	**12**	**11**	**10**	**10**
Estimated Costs[2]					
Design	$0	$50,000	$50,000	$75,000	$85,000
Capital Costs	$0	$880,000	$815,000	$791,000	$1,012,000
O&M (30 Years)	$0	$964,000	$3,198,000	1,320,000	$6,300,000
Total	**$0**	**$1,894,000**	**$4,063,000**	**$2,186,000**	**$7,397,000**
Cost Rank (Low to High)	1st	2nd	4th	3rd	5th

Notes: [1] = Refer to Section 4.3 of the Feasibility Study for details of the evaluation.
[2] = Refer to **Table E-1** in **Appendix E** for costing details.
ARARs = Applicable or Relevant and Appropriate Requirements; TBCs= to be considered.
NA – Not scored since it failed one or more threshold criterion.

APPENDIX A
Memorandum of Agreement for the 0153/Riverside Ground Water Contamination Site, Indianapolis, Indiana

MEMORANDUM OF AGREEMENT

BETWEEN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 5

AND

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

FOR THE

0153/ RIVERSIDE GROUND WATER CONTAMINATION SITE, INDIANAPOLIS, INDIANA

I. PURPOSE

This Memorandum of Agreement (MOA) specifies the plans and expectations of the Indiana Department of Environmental Management (IDEM) and the United States Environmental Protection Agency (EPA) at the Riverside Ground Water Contamination Superfund Site (Site) in order to ensure that the response actions undertaken at the Site are substantially similar to actions that would otherwise be taken under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP). Once the Site remedial action is successfully completed, it is expected that EPA will have no further interest in considering the Site for final listing on the National Priorities List (NPL) and that the Site will be de-proposed from the NPL.

II. BACKGROUND

The Site is located in Indianapolis, Marion County, Indiana. On February 20, 2013, IDEM staff received notice from Citizens Energy Group (Citizens) that elevated levels of vinyl chloride (VC) and cis-1,2-dichloroethene (cis-1,2-DCE) were being detected in the groundwater prior to treatment ("raw water") at the Riverside Municipal Wellfield. Citizens was concerned that the increasing levels of VC in Well RS29 were approaching the Maximum Contaminant Level (MCL) for VC, which might adversely impact the use of that well to supply drinking water to residents in Indianapolis. Riverside and White River Wellfields supply drinking water to over 17,000 people in Indianapolis.

On May 20 and 21, 2014, IDEM staff conducted a groundwater Site Inspection at the Riverside and White River Wellfields. A total of 25 water samples, taken prior to entry into the treatment facility, were obtained. The samples consisted of 19 groundwater samples, four (4) duplicate samples, and two (2) trip blanks. The ground water samples were collected from 19 municipal wells located in the Riverside and White River Wellfields. All samples were analyzed for volatile organic compounds (VOCs) only. Vinyl chloride, cis-1,2-DCE, trichloroethylene (TCE),

and 1,1,1 trichloroethane were the primary VOCs detected. Although VOCs were detected in some of the municipal wells, none of the concentrations of VOCs exceeded any MCL set by EPA in raw water. All raw water is treated and tested by Citizens prior to distribution and no VOCs have been detected in water leaving the utility (finished water) which is the water sent to customers.

Using the data collected during the Site Inspection, a Hazard Ranking System (HRS) documentation record was submitted to EPA determining that the Site qualified for the NPL. The HRS documentation identified approximately 89 potential sources of VOC contamination to the Riverside and White River Wellfields' five-year time of travel of groundwater. More than fifteen (15) sites are already in one of IDEM's remediation programs, and have either addressed the potential sources at their site or are on track to do so. As described more fully in Section IV B. below, a number of individual sources may be contributing to a commingled volatile organic compound (VOC) groundwater plume, and an undetermined number of individual Potentially Responsible Parties (PRPs) would be held responsible for conducting site investigations and remediation of their sites. For an illustration of the potential Site area, *see* **Attachment B.**

On August 13, 2015, IDEM's former Commissioner, Thomas Easterly, requested inclusion of the Site on the NPL. In April 2016, EPA proposed to add the Site to the NPL in the Federal Register. IDEM has since determined that it would be in the best interests of the State and City, and responsive to the majority of the public's requests, to address the Site in IDEM's State Cleanup program. IDEM officials, along with members of the City of Indianapolis Mayor's office, and Citizens requested, in letters written in May 2016 and also at a meeting in July 2016, that EPA allow IDEM to manage the investigation and remedial actions at the Site (**Attachment B**). The August 18, 2016 letter from former Commissioner Carol Comer formally withdrew support for including the Site on the NPL.

In October 2016, EPA Region 5 began discussions outlining certain criteria that IDEM would need to satisfy in order for EPA to consider allowing IDEM to manage the Site in lieu of EPA. After taking into consideration community feedback, IDEM has renamed the Site as "Site 0153" and all future documentation from IDEM will reflect the name change. Based on IDEM's strategy plan and commitments made in this agreement meeting the deferral criteria, EPA is allowing IDEM to ensure necessary investigations and response actions are completed at the Site. Once the required response actions at the Site are successfully completed, it is expected that EPA will have no further interest in considering the Site for listing, unless there is a release or potential for release that poses an imminent threat to human health or the environment. In addition, when response actions are completed, the Site may be archived in the Superfund Enterprise Management System (SEMS).

III. IMPLEMENTATION

A. **State Program**- IDEM is authorized under state law to implement a hazardous substances remediation program which should ensure that response actions at the Site are carried out and that these actions are protective of human health and the environment. Furthermore, IDEM has sufficient capabilities, resources, expertise and authorities to ensure that a remediation is

completed to the protective levels required under CERCLA and will coordinate with EPA, other interested agencies, and the public on different phases of implementation.

B. **Site Eligibility**- The State of Indiana has expressed interest in having the Site listing deferred and in IDEM overseeing the response at the Site under state law. IDEM agrees to pursue response actions at the Site in a timely manner. EPA and IDEM agree that a deferral should address the Site sooner than, and at least as quickly as EPA would expect to respond. The Site is included in the SEMS inventory and has been assessed and scored for listing on the NPL. The State will not request, nor utilize, Superfund trust fund money to implement any portion of the actions required by this Agreement.

C. **Community Acceptance**- During the public comment period for the proposed NPL listing (published in the Federal Register April 7, 2016, with the public comment period ending on September 5th, 2016), community groups held public meetings to discuss the proposed listing. IDEM and EPA provided outreach to the affected community in at least three (3) public meetings held in April and July of 2016. IDEM and EPA explained to the community the differences between a response action under state law pursuant to the terms of a proposed Deferral Agreement and a response conducted under the NCP and requested feedback from the community. IDEM informed EPA of its outreach efforts and conveyed the general results of the feedback and viewpoints of the community. Comments provided as part of the public comment period showed that community members mostly supported EPA deferral of the Site, but they also requested more involvement in the process. EPA participated in a public meeting with IDEM held on March 25, 2017 to inform the public of the deferral process and to explain IDEM's strategy to address the Site. The response from the community was mixed, with some preferring to list the Site on the NPL while the majority were in favor of EPA deferring the Site to IDEM oversight. The community requests will be addressed as part of the Community Involvement Plan required by IDEM's Site Investigation Strategy (**Attachment C**).

EPA is aware that the Riverside Civic League sent IDEM a list of requests entitled "Requests of the Local Plan Principle" in a letter dated August 23, 2016 (Letter) and that IDEM responded to the requests made in the Letter (Response). IDEM will complete a Community Involvement Plan, as described in **V. Community Participation** of this MOA. Target completion date of the Community Involvement Plan is Fall 2017 (*see* **IV. Procedural Requirements B. Schedule for Performance**). The Riverside Civic League Letter and IDEM Response will become part of the Community Involvement Plan.

D. **Cleanup Levels**- IDEM will pursue CERCLA-protective cleanups[1] of the Site that will be substantially similar to a CERCLA response. The response action will be protective of human health and the environment, as generally defined for individual human exposure, by remediating to an acceptable risk level for carcinogens between 10^{-4} and 10^{-6} and for non-carcinogens a Hazard Index of 1 or less; and no significant adverse impacts to ecological receptors. IDEM has proposed using a 10^{-5} risk level as a screening level for determining the need for further remedial investigation and risk assessment, which is within EPA's acceptable risk level range for

[1] The term CERCLA-protective cleanup is defined in OSWER Directive 9375 - 6-11 , *Guidance on Deferral of NPL Listing Determinations While States Oversee Response Actions* (May 3. 1995)

carcinogens. The response actions will also address sources of contamination to the extent feasible. IDEM will give preference to solutions that will be reliable over the long term. In addition, IDEM will ensure that any remedy selected at the Site will comply with all applicable or relevant and appropriate[2] federal requirements and any more stringent applicable or relevant and appropriate State requirements to the maximum extent practicable under IDEM's State authorities. Soils, sediments, subsurface intrusion, surface and groundwater will be investigated and assessed as part of the comprehensive risk assessment that will be conducted at the Site. The comprehensive risk assessment will include the consideration of potential exposure pathways to residents and sensitive populations that might exist in and around the Riverside neighborhood. EPA anticipates that the CERCLA- protective remedy includes the recognition that ground waters of the United States are valued natural resources, and that response actions will ensure the remedies are protective and will not present a threat to the Riverside and White River Wellfields.

E. **Natural Resources Trustees**- IDEM will promptly notify the appropriate State and Federal trustees for natural resources of discharges and releases at the Site that are injuring or that may injure natural resources, and include the trustees, as appropriate, in activities at the Site. The State shall, consistent with CERCLA and the NCP, seek to coordinate necessary assessments, evaluations, investigations, and planning with State, Affected Tribal and Federal Trustees.

IV. PROCEDURAL REQUIREMENTS

A. **Roles and Responsibilities**- IDEM has primary responsibility, with minimal EPA involvement, to provide for a timely CERCLA-protective cleanup under state authority and to support the public's right of participation in the decision-making process. EPA's role will generally be limited to review of IDEM semi-annual and annual reports and consultation on the proposed remedy. However, EPA may request reports, data, or other documentation related to the remedial activities at the Site, as it deems appropriate, or arrange for IDEM to provide certain draft documents for EPA review as they are prepared. EPA will not provide financial assistance for site activities to the State, affected Tribes or the community during a deferral.

In the event that community members or affected Tribal governments request that EPA reconsider deferral of the Site or request EPA's intervention in response actions, the EPA agrees to meet with IDEM to discuss the community concerns and to review the response actions in light of this MOA and the EPA's Deferral Guidance, and make a decision regarding whether terminating the deferral is warranted.

The following are the contacts for the agencies (any changes may be made by notice):

[2] The phrase "applicable or relevant and appropriate requirements" shall be defined by reference to Section 121 of CERCLA, 42 U.S.C. § 9621, the National Contingency Plan *(see* 40 C.F.R. § 300.5 definitions of applicable requirements" and "relevant and appropriate requirements"). and applicable EPA Guidance.

IDEM Management	EPA Management
Peggy Dorsey, Assistant Commissioner Ind. Dept. of Environmental Management Office of Land Quality IGCN 11th Floor 100 N. Senate Ave. Indianapolis, IN 46204 317-234-0337 pdorsey@idem.in.gov	Margaret M. Guerriero, Acting Director US Environmental Protection Agency Superfund Division SI-6J 77 W. Jackson Blvd. Chicago, IL 60604 312-886-0399 guerriero.margaret@epa.gov
IDEM Project Manager	**EPA Technical**
Ryan Groves Ind. Dept. of Environmental Management Office of Land Quality IGCN 11th Floor 100 N. Senate Ave. Indianapolis, IN 46204 317-232-3413 rgroves@idem.in.gov	Katherine Thomas US Environmental Protection Agency Superfund Division SR-6J 77 W. Jackson Blvd. Chicago, IL 60604 312-353-5878 thomas.katherine@epa.gov
IDEM Legal	**EPA Legal**
Tim Junk Ind. Dept. of Environmental Management Office of Legal Counsel IGCN 13th Floor 100 N. Senate Ave. Indianapolis, IN 46204 317-2349581 tjunk@idem.in.gov	Nola Hicks US Environmental Protection Agency Office of Regional Counsel C-14J 77 W. Jackson Blvd. Chicago, IL 60604 312-886-7949 hicks.nola@epa.gov

B. **Schedule for Performance**- Due to the nature of the Site, including 1) the number of individual sources that may be contributing to a commingled plume; 2) that individual Potentially Responsible Parties (PRPs) will be conducting the site investigations and remediation; and 3) that some PRPs are already managed within a remediation program at IDEM, the parties agree that a Schedule for Performance regarding the Site as a whole will necessarily be broad and speculative. A tentative proposed schedule of events for the Site cleanup is set forth in the following table. The Target Completion timelines in the table are subject to change. EPA shall be notified of a change in a Target Completion as soon as IDEM becomes aware that such a change is necessary or unavoidable.

Task	Target Completion
Complete Community Involvement Plan	**Fall of 2017**
Begin Phase I Remedial Investigation	**Within 3 months of issuance of Notice Letters**
Prepare Removal Work Plan as necessary	**If any imminent threat is discovered, removal will be expedited.**
Complete additional Remedial Investigation as necessary	**Following submittal of Remedial Investigation Report and IDEM request for additional RI**
Complete Human Health and Ecological Risk Assessment	**Six months after final RI information is gathered.**
Complete Feasibility Study	**90 days post complete RI and HHERA.**
Proposed Remedial Action Public Comment Period	**30 days from publication of draft Proposed Plan.**
Record of Decision	**180 days from end of Public Comment Period.**
Remedial Design	**One year from publication of Record of Decision.**
Implement Remedial Action	**Six months from final Remedial Design/Technical Specifications**

C. **Documentation Submissions to EPA**- IDEM will make available all Site data, reports, and other documentation to EPA upon request.

D. **IDEM Reporting to EPA**- IDEM will provide written reports to EPA at least annually on whether the conditions in this Agreement are being met and on the progress in the investigation, assessment and response actions. In addition, IDEM will report in writing to EPA at least semi-annually on any difficulties that it is having meeting the conditions of this Agreement. Following the submission of a report required or requested, EPA may request a briefing or meeting with IDEM to discuss the report(s).

E. **Proposed Remedial Action**- IDEM will provide a written report to EPA on the proposed remedial action (Draft Record of Decision Staff Report) both before and after soliciting public comment. EPA and IDEM will determine prior to the briefing the appropriate staff to review the proposed remedial action report and attend the briefings.

V. COMMUNITY PARTICIPATION

IDEM will ensure public involvement that is substantially similar to the intent of the NCP and in accordance with the Community Involvement Plan (CIP). which IDEM will have finalized by the fall of 2017. IDEM will ensure the following actions are undertaken as required by the CIP:

A. Site files will be maintained at the IDEM project manager's office or as required by the CIP.

B. Site related documents will be made available online in IDEM's Virtual File Cabinet (VFC) at https://vfc.idem.in.gov/DocumentSearch.aspx under State Cleanup Site No. 0153 and as required by the CIP. The community groups expressing an interest in the Site will be included in discussions to determine the best and most efficient way to provide information to the groups. This information will become a part of the CIP.

C. Through the CIP, or other agreement with IDEM, the affected community will be able to acquire technical assistance in interpreting information with regard to the nature of the hazard, investigations, and studies conducted, and implementation decisions at the Site. This technical assistance will be in the form of an appropriate conveyance that can be used to hire a technical expert to explain monitoring reports and decision documents and advise the community.

VI. COMPLETION OF STATE RESPONSE ACTION

Certification and Confirmation- Once IDEM considers the response action at the Site to be complete, it will certify to EPA, any affected Tribal Governments with which it has MOUs, and the affected community that the remedy has been successfully completed and intended cleanup levels achieved. As part of the certification, IDEM will submit for EPA review a response action completion documentation substantially similar to that described in the June 1992 OSWER Direct "Remedial Action Report; Documentation for Operable Unit Completion" (OSWER Directive 9355.0-39FS). EPA will review the certification and supporting information, and may choose to initiate a deferral completion inquiry to confirm the certification. EPA will work with IDEM to address any data deficiencies hindering the confirmation and agree to a time frame for completion of the inquiry. If the response at the Site is confirmed as complete, the Site will not be further evaluated for NPL listing, unless EPA receives information of a release or potential release at the site which poses a significant threat to human health or the environment. Upon completion of response actions and confirmation by EPA, the Site will be archived in SEMS.

VII. AGREEMENT TERMINATION AND MODIFICATION

EPA may terminate this Memorandum of Agreement at any time after providing 30 days' notice to IDEM which notice shall include the basis for such termination as provided in this paragraph. This Memorandum of Agreement may be terminated: 1) if the response is not CERCLA-protective; 2) is unreasonably delayed; 3) is inconsistent with this Memorandum of Agreement; 4) does not adequately address the concerns of the affected community or affected Tribal governments with whom IDEM has MOUs, or 5) for other reasons constituting a violation of this agreement, such as the State's inability to enforce compliance; or the absence of appropriate funding to complete the response action. IDEM may also choose at any time, after 30 days' notice to EPA, to terminate this Memorandum of Agreement for any reason. During any 30-day notice period required by this paragraph, EPA and IDEM agree to meet to discuss the decision to terminate this Memorandum of Agreement.

Upon termination of this Memorandum of Agreement, EPA will consider taking any necessary response actions including initiating the rulemaking process to formally list the Site on the NPL. EPA and IDEM will coordinate efforts to notify the community of the termination of this Memorandum of Agreement. These actions will assure the public that EPA will continue to respond at the Site. At EPA's request, IDEM will provide to EPA all information in its possession regarding the Site to the extent permitted by State law.

This Memorandum of Agreement adheres to EPA's "Guidance of Deferral of NPL Listing Determinations While States Oversee Response Actions" (OSWER Directive 9375.6 11) dated May 3, 1995. If there are any conflicting provisions, this Agreement prevails. Furthermore, this Deferral Agreement may be modified at any time upon agreement of both parties. Notwithstanding any provision of this Deferral Agreement, EPA and IDEM retain their respective authorities and reserve all rights to take any and all response actions authorized by law.

VIII. AGREEMENT APPROVALS

Robert A. Kaplan, Acting Regional Administrator
Region 5, United Stated Environmental Protection Agency

6/8/17
Date

Bruno L. Pigott, Commissioner
Indiana Department of Environmental Management

6/8/17
Date

ATTACHMENTS

(A) Letters/Comments Requesting Deferral (Comer, Citizens, Hoggsett)
(B) Map Showing PRPs and Wellfields
(C) Site Investigation Strategy

Attachment A

Indiana Department of Environmental Management
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Michael R. Pence
Governor

Carol S. Comer
Commissioner

August 18, 2016

Mr. Robert Kaplan
Acting Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Mail Code: R-19J
Chicago, Illinois 60604-3507

Re: Proposed Riverside National Priorities List
Site EPA-HQ-OLEM-2016-0153

Dear Mr. Kaplan:

By this letter, the Indiana Department of Environmental Management (IDEM) withdraws and rescinds the August 13, 2015, letter from IDEM's former Commissioner requesting inclusion of the Riverside Ground Water Contamination site (identified by the U.S. Environmental Protection Agency as Site 0153) on the National Priorities List (NPL) of hazardous waste sites, a copy of which is attached as Exhibit A. IDEM respectfully requests that U.S. EPA not include Site 0153 on the NPL and proposes an alternative approach to protecting public health and the environment by addressing the presence of Chlorinated Volatile Organic Compounds (CVOCs) at Site 0153. IDEM worked with Citizen's Energy Group (Citizens), the City of Indianapolis (the City) and the Marion County Public Health Department (MCPHD) to develop a proposed alternative plan (the Plan) to address Site 0153. Exhibit B outlines the current version of that Plan, which was jointly drafted by IDEM, Citizens, the City and MCPHD.

Background

Site 0153 is located on the northwest side of downtown Indianapolis. While Site 0153 is not yet delineated, it is generally comprised of two multi-well wellfields known as the Riverside and White River wellfields. These wellfields, owned and operated by Citizens, provide drinking water to a portion of the City of Indianapolis. Marion County officials indicate that seven private drinking water wells may exist within Site 0153.

Though low levels of CVOCs are present in the raw water drawn from some of the wells in the wellfields, the drinking water provided to Citizens' customers does not contain, and has never contained, CVOCs. The drinking water provided to Citizens' customers is completely safe to drink.

Basis for Withdrawal

Information available to IDEM at the time of the August 13, 2015, letter indicated that certain wells in the wellfields were impacted by CVOCs at levels that caused concern for public health. There was also a concern that the CVOCs could migrate to other wells in the wellfields, and that concentrations could increase, creating the potential for harm to public health. Based on the data provided at that time, IDEM sought inclusion of Site 0153 on the NPL. However, that data reflected only a snapshot in time and is now outdated.

In April of 2016, Citizens provided IDEM additional technical information that had not previously been shared with the agency. That data led IDEM to re-evaluate its initial request for listing Site 0153 on the NPL. Exhibit B contains illustrations of this data, which span the time period from 2006 to 2016 and indicate that the levels of CVOCs in both wellfields are decreasing. In addition, with the exception of one well (WR3), all CVOCs in the raw water supply are below U.S. EPA's Maximum Contaminant Levels (MCLs) for drinking water.

Fifteen sites that may have contributed to the CVOC contamination are currently in one of IDEM's remediation programs. Many of those sites have already addressed their contamination sources, while others are on track to do so. IDEM believes these efforts have contributed, at least in part, to the declining levels of CVOCs in the groundwater.

In light of the new information and greater understanding of activities in the area, IDEM no longer believes Site 0153 is an NPL caliber site that should be addressed by the Superfund program. Had all of these data and factors been known in August of 2015, IDEM would not have proposed Site 0153 for the Superfund program. For these reasons, IDEM respectively requests that U.S. EPA not include Site 0153 on the NPL.

Alternative Plan

Withdrawing Site 0153 from inclusion on the NPL does not eliminate the need to address the CVOC contamination at Site 0153. Steps must still be taken to protect public health and the environment from the contamination. The proposed Plan is designed for that purpose. Exhibit B is a draft document, and the Plan may evolve over time in response to new information or additional comments from the public, U.S. EPA, and others. As you review the proposed Plan, please consider the following:

1. IDEM fully supports the Plan and will dedicate four project managers and one attorney to this project to ensure its full and complete implementation under the auspices of IDEM's State Cleanup Program.

2. IDEM will also:

    a. determine whether any private drinking water wells exist within the five year time of travel of groundwater and if so, test those wells for CVOC contamination. If shown to be contaminated, IDEM will devise a plan to ensure an alternate water source is provided.

    b. conduct a comprehensive search for potentially responsible parties through all reasonably available records, and pursue all identifiable responsible parties to obtain their cooperation in remediating Site 0153, including contributing to the cost of remediation.

    c. review and scrutinize all sites in reasonable proximity of Site 0153 that are currently being addressed in our State Cleanup Program and Voluntary Remediation Program (VRP) for their possible roles as Responsible Parties.

    d. collect soil, vapor and groundwater samples through the agency's push-probe drilling equipment (Geoprobe) where no RPs can be found, but sources are suspected.

    e. identify any completed exposure pathways (including human consumption of groundwater and vapor intrusion) and devise plans to eliminate those pathways.

    f. delineate groundwater impacts, to the extent feasible.

    g. address the sources of contamination as necessary and as practical through mechanisms such as, but not limited to, physical removal, institutional controls and monitoring.

    h. report regularly to U.S. EPA on the progress of implementing the Plan and enter into a Memorandum of Understanding with U.S. EPA to memorialize IDEM's obligations under the Plan.

    i. ensure that Citizens discharges all of its responsibilities under the Plan, including:

        i. conducting more frequent sampling in the wellfields,
        ii. removing WR3 from service and installing aeration equipment to reduce CVOCs before the well is put back in service, and

iii. removing any other production wells from service that exceed a drinking water MCL, and installing aeration equipment to reduce CVOC concentrations before the well is put back in service.

3. The Indiana Governor's Office has committed to funding the Plan.

4. IDEM has engaged local neighborhood residents and stakeholders and found that many have expressed concerns with the proposal to list Site 0153 on the NPL, and have expressed support for the alternative Plan.

5. The City of Indianapolis supports the Plan. Mayor Hogsett and his Administration have been actively engaged in the Plan's development and prefer the Plan to listing Site 0153 on the NPL.

6. The Marion County Public Health Department supports the Plan and prefers the Plan to listing Site 0153 on the NPL.

7. The Plan is locally driven, which will facilitate its implementation and allow for a quick response to challenges that arise during its implementation.

8. IDEM is confident that the Plan can be completed in less time and with fewer resources than a traditional Superfund investigation and cleanup.

9. IDEM commits to continuing to keep residents and stakeholders informed and up-to-date. IDEM engaged local community members as the Plan was developed to ensure that all stakeholders understood the nature of the Plan as well as to address community members' concerns. IDEM will hold regularly scheduled public meetings, prepare and disseminate materials tracking the Plan's progress, and maintain a dedicated web page to provide the local community with easy access to the materials, the public meeting schedule, and other information related to the implementation of the Plan. IDEM has already established the website and published information at: www.idem.in.gov/Site0153.

10. If IDEM's request is approved, the agency commits to changing the name of the Site from Riverside to Site 0153, pursuant to the concerns and request of the local community.

With regard to a timeline for implementing the Plan, although we are confident that this project can be handled more quickly under the Plan we have proposed than under the Superfund program, IDEM estimates that it will take at least six years to complete, given the magnitude of the work.

As you can see, the Plan has broad, bipartisan support among local stakeholders. IDEM commends Citizens, the City of Indianapolis, the Marion County Public Health Department and the members of the public who have participated in this process for helping develop a proposal that protects the health of Hoosiers in the Riverside community by addressing the CVOC contamination in a cost-effective manner. They have all been partners in the effort to solve this problem, and we welcome their continued dedication to our community and to protecting public health and the environment.

Should you or your staff have additional questions or need further information, my staff and I would be happy to meet with you in person or by teleconference. My administrative assistant, Mary Fields at 317-232-8611, would be happy to coordinate schedules.

Thank you for your consideration. We look forward to working with you on this matter.

Sincerely,

Carol S. Comer
Commissioner
Indiana Department of Environmental Management

cc: Joe Hogsett, Mayor, Indianapolis
Joseph Sutherland, Citizen's Energy Group

Exhibit A

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Michael R. Pence
Governor

Thomas W. Easterly
Commissioner

August 13, 2015

Ms. Susan Hedman
Regional Administrator
U.S. EPA, Region V, R-19J
77 West Jackson Boulevard
Chicago, Illinois 60604-3507

Dear Ms. Hedman:

Re: Proposed Inclusion of the Riverside Ground Water Contamination Site Indianapolis, Marion County, Indiana on the National Priorities List of Hazardous Waste Sites

The Indiana Department of Environmental Management (IDEM) is providing this letter to convey its support to the United States Environmental Protection Agency (U.S. EPA) regarding inclusion of the Riverside Ground Water Contamination site on the National Priorities List (NPL) of hazardous waste sites. The Riverside Ground Water Contamination site is a contaminated ground water plume that encompasses an area of approximately 62 acres and affects two wellfields.

The Citizens Energy Group operates the drinking water utility for the city of Indianapolis. Raw water sample results obtained by IDEM from five (5) municipal wells confirmed detections of vinyl chloride (VC) and trichloroethylene (TCE). The VC and TCE levels in two of the wells exceed U.S. EPA Superfund Chemical Data Matrix benchmarks. The impacted wells provide drinking water to more than 10,000 people in Indianapolis. IDEM has identified over 100 potential sources of contamination to the well fields, including sites in the Voluntary Remediation Program, RCRA Corrective Action Program, Brownfields Program, and the State Cleanup Program, but a definitive source of the contamination has not been identified.

This site qualifies for inclusion on the NPL because:

1) The site meets the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria for listing on the NPL, scoring sufficiently high pursuant to the Hazard Ranking System (HRS).

2) The site requires a long-term response action.

An NPL listing would allow for proper and timely investigation of the nature and extent of the contamination of the potential sources and enable the U.S. EPA to determine cleanup alternatives for the impacted areas, thereby protecting human health and the environment. The NPL listing appears to be the most viable alternative for addressing the existing environmental problems.

As the Commissioner of IDEM, I am authorized by Indiana Governor Michael R. Pence to act in these matters on his behalf. I have considered my staff's recommendations and I fully support the designation of the Riverside Ground Water Contamanition site for inclusion on the NPL. I request that the U.S. EPA assign a Remedial Project Manager and/or On-Scene Coordinator to implement the process. If you require any additional information or have any questions, please contact Mark Jaworski of the Site Investigation Program at 317/233-2407 or via e-mail at mjaworsk@idem.in.gov.

Sincerely,

Thomas W. Easterly
Commissioner

cc: Denise Boone, U.S. EPA
Nuria Muniz, U.S. EPA
Mark Jaworski, IDEM
Rex Osborn, IDEM

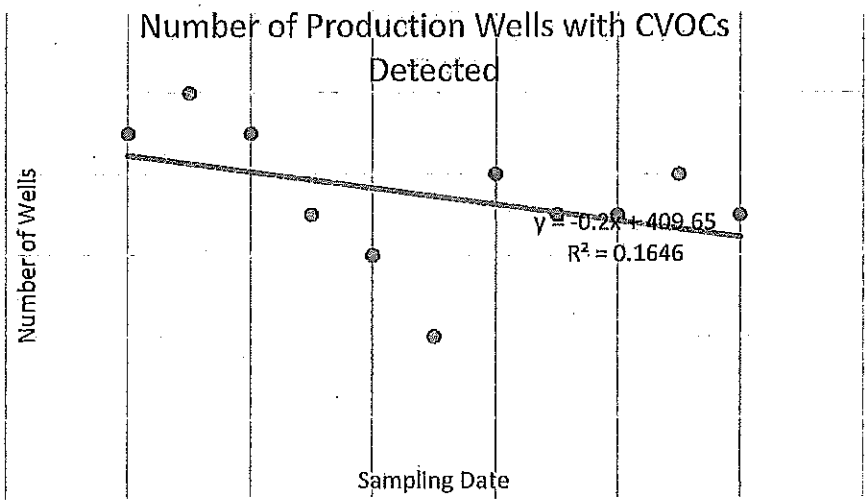
Exhibit B

Proposed Alternative to U.S. EPA Proposed Rule
"Riverside Groundwater Contamination Site"

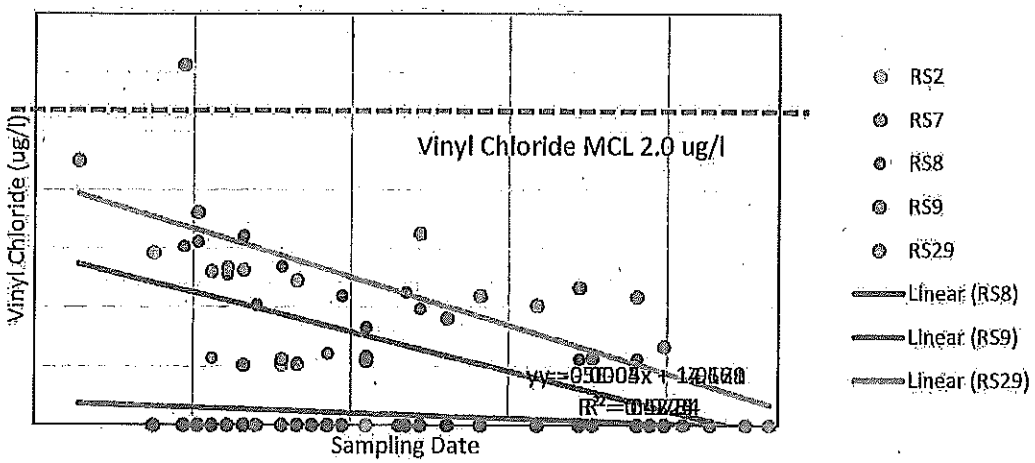
August 18, 2016

Trace levels of certain chlorinated solvents (also called "chlorinated volatile organic compounds" or "CVOCs") have been detected in some of the groundwater production wells in the Riverside and White River Groundwater Production Well Fields owned and operated by Citizens Water in Indianapolis (collectively, the "Well Fields"). These detections have led the U.S. Environmental Protection Agency (U.S. EPA) to propose to list the "Riverside Groundwater Contamination Site" as a federal Superfund Site.

Sampling data initially provided to the Indiana Department of Environmental Management (IDEM) by Citizens Water, and forwarded to EPA as part of the Superfund scoring process, is outdated. Citizens has recently provided additional sampling information to IDEM, and with the exception of one production well, "White River 3" (WR-3), trace detections of CVOCs in these wells are currently below U.S. EPA's drinking water standards that apply to finished drinking water. In addition, as the following graphs demonstrate, overall concentrations of CVOCs in the Well Fields are declining:



Citizens Riverside and White River Well Field
Vinyl Chloride Detections



Notwithstanding these detections, no CVOCs have ever been detected in the drinking water supplied to Citizens Waters' customers. In addition, five Citizens' production wells and a geothermal well in the Riverside Well Field are planned to be removed and relocated as part of a planned redevelopment project in the area called "16 Tech." The closure and abandonment of these wells will alter groundwater flow and CVOC distribution and concentrations in the Well Fields.

Various state and local stakeholders have developed a proposed alternative to a Superfund listing to address CVOCs detected in area groundwater and to ensure human health and the environment are protected. The elements of this alternative proposal are described below.

Citizens Water Plan to Ensure Continued Safety of Public Water and to Assist in Source Assessment & Mitigation

Despite the current safety of the drinking water supplied to customers and the declining CVOC trend, Citizens Water would be willing to take the following measures as an alternative to a Superfund listing to ensure the continued safety of its drinking water and to assist State and local governmental agencies with assessing and mitigating potential contaminant source areas in the vicinity of the Well Fields:

1. Citizens would take production well WR-3 out of service, install an aeration treatment system to reduce CVOC levels, and then test the water post-treatment to ensure levels are below EPA's drinking water standards. Upon receipt of satisfactory test results, Citizens would return WR-3 to service. At that point, all "raw water" being produced by Citizens'

production wells would be below EPA's finished water standards before it is mixed with surface water and treated in Citizens' treatment process.

2. Citizens would take the same measures at any production well in the future if verified sample results exceed drinking water standards, thus ensuring that water produced from Citizens' production wells – even before mixing and treatment – would continue to be below EPA's standards.

3. Citizens would increase the frequency of its voluntary sampling for VOCs from the production wells and monitoring wells in the Well Fields from semi-annual to quarterly, and would share those results with IDEM as they are received.

4. Citizens would develop and implement a Groundwater Quality Monitoring Plan required by the recently adopted Indianapolis/Marion County ordinance to track CVOC concentrations in the Well Fields, and would develop a plan to address those detections to ensure continued safety of drinking water. The results of this sampling program would be shared with U.S. EPA, IDEM, and the four local agencies identified in the ordinance to help determine if further measures are warranted.

5. Citizens would support State and local governmental agencies, including IDEM, the City of Indianapolis, and the Marion County Public Health Department (MCPHD), in their efforts to assess and, if necessary, mitigate impacts associated with potential CVOC source areas in the general area identified by EPA in its proposed listing rule. Citizens would support the MCPHD in connection with its review of any requests to install any new private groundwater wells in the area of concern, and support efforts to connect any existing, impacted private groundwater wells to water supplied by Citizens. Citizens would also review environmental remediation proposals submitted to or developed by IDEM for any source area located with the then-current Five-Year Time-of-Travel, and provide comments to IDEM and the Responsible Party(ies) regarding the effectiveness of the proposal to protect the Well Fields. Finally, Citizens would use the results of its on-going Groundwater Quality Monitoring Plan described above to help evaluate these proposals.

Citizens would be willing enter into an agreement with U.S. EPA and IDEM that includes these commitments.

State and Local Government Plans for Assessing and Mitigating Potential CVOC Source Areas

Various governmental agencies and other stakeholders have developed the following multi-pronged plan to identify and address potential CVOC source areas that could adversely impact area groundwater, the Well Fields, or other receptors (*e.g.*, private wells, vapor intrusion issues) that they would be willing to implement in lieu of a Superfund listing:

1. IDEM, the City and MCPHD have substantial information about various potential source areas of CVOCs in and around the Well Fields, including soil and groundwater data, some of which are currently in IDEM programs such as the Voluntary Remediation Program, State

Clean-Up Program or Leaking Underground Storage Tank program. The City and MCPHD would provide information in their possession relating to these source areas to IDEM. IDEM would then review and assess all relevant information and data to identify those sites currently in IDEM programs that warrant additional investigation, given their potential contribution to CVOC impacts in the area of the Well Fields.

2. IDEM would review its existing soil and groundwater data, and any information from the City and MCPHD, to determine what data gaps exist in the area of the Well Fields, and to identify the existence of sites potentially impacting groundwater in that area that are not currently in one of IDEM's programs, and which might be a source of CVOCs.

3. To fill these data gaps and identify potential CVOC sources, property owners and/or other responsible parties would conduct investigations on properties under their ownership or control, at their own cost. As necessary and appropriate, IDEM would exercise its regulatory authority to require the performance of those investigations. Further, IDEM could also conduct its own investigations as needed utilizing funding sources such as monies from known responsible parties. All such investigations would be focused on those areas in which existing data and information indicates a reasonable likelihood of CVOCs. The purpose of these investigations would be to generate meaningful soil and groundwater data to identify potential source areas that would then be the subject of further investigation and/or IDEM enforcement.

4. The City and MCPHD would work collaboratively with IDEM to develop IDEM's priority list for further investigation, identify property owners, and obtain access agreements. To the extent necessary, Citizens Water would work alongside these entities to engage with the public with regard to this effort. The City would also direct Brownfield grant money to assist in performing environmental assessments for "orphan share" sites in the area of the Well Fields.

5. MCPHD would work with IDEM, Citizens Water, and the City to identify potential private wells in the area, to sample those wells for which access is granted, and to evaluate options to connect any impacted private wells to public water. MCPHD would also use its existing authority to evaluate requests to install new private drinking water wells within the area of concern, and to work with all interested stakeholders in connection with any such requests.

6. With information supplied by Citizens regarding current and future pumping scenarios, IDEM will determine the appropriate boundaries for the area to be evaluated.

7. In order to assist the local community's efforts to monitor the development and implementation of the Plan, IDEM, the City, and MCPHD will secure funding that will allow the local community to engage the services of its own consultant with the technical expertise to facilitate meaningful community involvement.

regulations.gov

Comment submitted by Joseph H. Hogsett, Mayor, City of Indianapolis

Site Data
Regulatory Agenda
Agency Report Required by Statute

This is a Comment on the Environmental Protection Agency (EPA) Proposed Rule: National Priorities List

For related information, Open Docket Folder

Comment Period Closed
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Comment

SUBJECT: Docket EPA-HQ-OLEM-2016-0153 Comment

FROM: The Consolidated City of Indianapolis and Marion County, Indiana

TO:
--OLEM via Regulations.gov
--Mr. Robert Kaplan
Acting Regional Administrator
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Mail Code: R-19J Chicago, Illinois 60604-3507
--Terry Jeng
jeng.terry@epa.gov

The Consolidated City of Indianapolis and Marion County, Indiana ("City") fully supports the proposed alternative plan ("Plan") to address the Riverside Ground Water site (identified by the U.S. Environmental Protection Agency as Site 0153.)

The City also concurs with the Indiana Department of Environmental Management's (IDEM's) letter dated August 18, 2016, withdrawing its request regarding Site 0153. IDEM indicates that due to new data and additional investigation, IDEM no longer believes Site 0153 is an NPL caliber site and should not have been proposed as such.

Since becoming aware of this situation earlier this year, City efforts have been dedicated to obtaining an outcome that protects the public's health and the safety of our drinking water supply. At the urging of local civic leaders, City representatives have convened and participated in community discussions centered on creating a local alternative that could achieve these critical public health results in a way that would be more beneficial to the interests of the affected neighborhoods than an NPL listing of this site.

It is significant that the development of that Plan engaged all sectors of the community - neighborhood residents, area businesses, the water utility, as well as both state and local agencies including the local health department. The City believes that under the proposed Plan, state and local agencies are uniquely positioned to obtain and react to new data, respond to community concerns, and implement remediation in a timely manner.

The City's primary concern is the health and safety of its citizens. Based on the most up-to-date information made available by IDEM and Citizens Energy Group, the City is convinced that the City's drinking water supply and the health of its residents will be thoroughly protected by the Plan proposed by IDEM. While the City appreciates the ongoing role that the EPA will play as a regulatory agency, the City believes that a local solution in this instance will be successful and provide an efficient, responsive effort to address public health and environmental concerns within the affected area.

Respectfully,

Joseph H. Hogsett
Mayor of Indianapolis, Indiana

Possible Contamination Sources
Within the 5 Year Time of Travel Wellhead Protection Area
Site 015 (formerly Riverside) Groundwater Contamination

Attachment B

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Mapped By:
Shane Moore, Office of Land Quality
Date:10/13/2015
Sources:
Non Orthophotography
Data - Obtained from the State of Indiana Geographical Information Office Library
Document - Potential Sources of Chlorinated Solvents Reference 4 (table on pages 381-385)
- Well Head Protection Area Reference 59
- RS 29 Reference 4, pages 71-74
- Plume created based on results in Reference 4, page 119
Orthophotography - Obtained from Indiana Map Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N Map Datum: NAD83

N
W E
S

0 275 550 1,100 Meters
0 900 1,800 3,600 Feet

IDEM

- Possible GW Contamination Sources
- PWS Well RS 29
- GroundWater Plume Boundary
- Wellhead 5 Year Delineation
- Wellhead 1 Year Delineation

Table 1: Riverside Potential Sources

Label	Name	Address	Distance (ft)	Distance (m)	AI_ID_	Other_ID_s	Reported_R	Documented	Take_Sampl	Type_	Notes___M	Label
0	DPW/Merrs Corp	1021 Burdsall	7124.96589	2171.689534	22656	BFD 4980024	Y	N	0	Maintenance	MCHD Violations for salt and solid waste	0
1	Northside Trucking/Pallent Repair	1037 W 25th St	7870.690845	2398.986493	16605	IND058477936	N	Y	1	haz waste hauler	Haz waste Notice lists F001-F012, etc see.VFC 42735550	1
2	Chevron Chemical Co./Saint Clair Properties Limited Warehouse (Carrier/Bryant)	1100 W 21st	5275.529258	1607.981266	15981	IND982219107	Y	Y	1	manufacturing	Brownfields/ City of Indy Phase1 Report is VFC 66905974 /Andrea R. new wells planned by Dec 2013	2
3	Industrial Coatings / United Coatings/ IU Methodist & Neuropsych Center	1102 W 16th	3044.156364	927.8588301	17130 / 16168	IND984956888/ IND984866202	Y	N	0	manufacturing	conditionally exempt generator - no groundwater impacts, release to soil only	3
4	Benham Press / Disc Graphics / Awning Partners Sign Group	1160 W 16th	2793.303994	851.3990302	22076	IND006066641 / BFD 4030010	Y	?	?	printer, etc.	RCRA violations, paint waste violations VFC 62498373 Has an ERC, part of Brownfields? Has MWs too	4
5	Central Soya	2235 Montcalm / 1102 - 1160 W 18th	3813.330067	1162.302967	16021	IND006413272 / FID 18135	Y	N	0	Grain facility, LUST	Releases of soybean oil	5
6	Aero Industries / Fruehauf Corp / Mayflower/ Lincoln Technical Institute	1201 Stadium Dr	2194.383977	668.8482147	16396	IND150600344	N	Y	1	maintenance	F002 (spent CVOCs) / F004 ; MCHD Violations	6
7	Indianapolis Water Company	1220 Waterway	1058.077666	322.5020624	13668	IND006938351 / FID 011510	Y	N	0	water company	diesel LUST has NFA; has a maitenance shop. Conditionally exempt F001	7

8	Perry Manufacturing / Overbay-Tehan Corp.	1233 W 18th / 1244 W 16th (& 2535 Burton??)	3439.662543	1048.409109	18377	FID 10100	N	N	?	manufacturing	gas/diesel USTs, large old building along tracks, make scaffolding now	8
9	West 16th Garage / Lloyd L & Louis L Shonkwiler / Microtel Inn & Suites	1244 W 16th	2855.068742	870.2249247	18506	FID 10100 / 200804504	Y	N	1	Truck Maintenance	adj. to south of Perry / only BTEX+MTBE sampling	9
10	Johnson Controls	1255 N Senate	6631.647237	2021.326013	17486	IND964976381	N	Y	?	manufacturing	small generator F002, D001, D005; Part of 14th St Corridor CVOC plume	10
11	Stewart Manufacturing	1280 N Senate	6630.146539	2020.8686	n/a	n/a	Y	Y	1	n/a	part of Co-mingled 14th St Corridor CVOC plume	11
12	Henley's Cabinets / Custom Printing /Chemcraft Satron Finishes inc.	1310 N Capitol	7164.748709	2183.815337	16911	IND 982616112	N	Y	?	furniture refinishing	small generator F003, F005, D007, D008, D018, D035, D039, D040 listed PCE and TCE - Within the 14th ST Corridor Plume	12
13	H-N Advertising & Display Co / Bowes Industries	1324-1334 N Capitol	7152.405368	2180.053086	23884	IND006035968 / FID 21455	N	N	0	printing/ manufacturing	UST (unknown)	13
14	Sherwin William distributor	1401 Milburn	2651.273252	808.1080612	n/a	n/a	N	N	0	distributor	no data on VFC, etc.	14
15	Karstadt-Reed Dry Cleaners	1449 N Illinois	7800.715192	2377.657915	n/a	n/a	Y	Y	1	dry cleaner	Top of the 14th St Corridor Co-mingled CVOC plume	15
16	Stromberg Sales /Paradigm Group	1525 Riverside	2613.773254	796.6780624	21138	FID 22445	N	N	0	car sales	diesel, gasoline and fuel oil releases	16
17	Component Machine	1631 N Gent Ave	2830.787449	862.8239868		200412100	Y	Y	1	manufacturing	State Cleanup Documented TCE/PCE in groundwater Jerry O. & Scott Johanson	17

18	ITT Hoffman / Kindred Hospital / Vencor	1700 W 10th	1513.261015	461.2419426	16313	IN0032921	Y	N	1	manufacturer	water violation 1986, removed contaminted soil w/Cr Ni & Pb in 1990 (made plumbing fixtures)	18
19	Gardner Mirror Corporation / Wallace Expanding Machines	1705 Lafayette / 24 W 19th Street	4752.040298	1448.421836	16850	IND98490467 / FID 16834	N	N	0	manufacturing	diesel UST removed	19
20	Indiana Retirement Home	1731 N Capitol	7620.183089	2322.631731	n/a	n/a	N	N	0	nursing care?	listed as a "landfill" for medical/solid waste per 2007 WHPA	20
21	Southeastern Trailways	1810 W 16th	3165.631437	964.8844312		FID 000274 / INDR000016873	Y	Y	0	buses	Documented part of Flexdar plume (non-contributor)	21
22	Harold Richards	1825 Montcalm	3951.188357	1204.322173	n/a	n/a	N	N	0	central soya	fuel storage for Central Soya? Nothing in VFC	22
23	Peerless Pump / Sterling Fluid Manufacturing	2005 Dr MLK Jr	6726.549613	2050.252256	11493	IND990734873	Y	N (?)	1	manufacturing	State Cleanup (Nilia) LUST diesel, gas and stoddard (BTEX+ MTBE only) verbal report that CityofIN may have Ph2 data showing CVOCs	23
24	Citizens Coke Langsdale	2150 Dr MLK Jr	7147.645689	2178.602336	n/a	VRP	Y	N	?	Coal MGP	Bill Holland is PM. Full VOCs on Groundwater??	24
25	White Metal Manufacturing / Rexall Drug & Chemical Co / DART Industries / Draft-Kraft / Wheeling Stamping (*part of Rumpke now??)	2099 Montcalm	5247.574699	1599.460717	25759	IND980606396	n/a	?(likely)	1	manufacturing	PA/VSI in 1984 no samples taken MCHD records	25

26	Rumpke /Republic Recycling / United Brake Systems / Heavy Duty Friction Service Group	2235 Montcalm	5878.553654	1791.783096	24663	VRP 6030103 / FID 1570 / IND006062616	Y	N	?	recycling/former manufacturing	possible asbestos/ LUST for diesel&waste oil / Small quantity generator of D001 / VRP included north&south of 21st / residual were metals & PAHs& TMBs / Damon R. VFC# 62825015	26
27	Industrial Heat Treating / BodyCote Thermal	2131 Dr. MLK Jr. / 500 W 21st St	7028.999468	2142.438969	11491	IND006417315	Y	Y	1	manufacturing	Complaint (VFC 38838458) re: drums, fire, release Small generator of F001, F010, F011, & F012 & P030 MCHD had PA/VSI from 1992 TWO VAPOR DEGREASERS	27
28	Dorothy Shamrock Coal	2110-2112 Dr. MLK Jr.	6895.780734	2101.8339	20624	4960013	Y	N	0	coal yard	PAHs, oil staining, see VFC 14540029, MCHD files	28
29	Excelsior Laundry and Cleaners	2179 N Illinois	9408.696645	2867.770646	15994	IND016405854	N	Y	1	dry cleaner	active dry cleaners	29
30	45 Minute Cleaners	2179 N Pennsylvania	10137.22308	3089.825495	16751	IND981783475	N	Y	1	dry cleaner	closed dry cleaners	30
31	Sparkle Cleaners	2198 N Meridian	9944.458007	3031.070703	17902	IND000481325	N	Y	1	dry cleaner	active ? As recent as 2009	31
32	Sparkle Cleaners	2119 Central	11624.45728	3543.134464	?	?	N	?	1	dry cleaner	nothing in IDEM file but the name?? No documents	32
33	Jim's Dry Cleaners	2605 W 16th	5445.400131	1659.757907	26751	IN0000204065	N	Y	1	dry cleaner	inspection in 2001 not sure if active now	33

34	Reuas Engineering	555 W 16th	5014.922147	1528.548221	15986	IN006067243	N	N	?	?	small generator F012 (quenching wastewater solids w/cyanide)	34
35	McBroom Electric Co.	800 W 16th	4162.822778	1268.828342	17874	IND042612321 / INR000015778 / FID 5818	N	Y	1	electrical manufacturing	F001 (spent chlorinateds) and D040 (TCE)	35
36	McFarling Foods	333 W 16th	6742.281683	2055.047391	18336	FID 6056 / BFD 4980005	Y	N	0	food storage	Brownfield; within the 14th St Corridor Plume / USTs, diesel fuel, etc.	36
37	Schuchman Metals / Langsdale Metals /Republic Services	829 Langsdale	6381.719104	1945.147921	20353 / 26312	IND 042812321 / FID 15160 / LUST199307532	Y	N (?) sampled?	1	salvage junk yard	Site investigation VFC 5983115 / Rosy H. is PM / mostly BTEX data any full VOCs?? Aluminum smelting refractory brick	37
38	Republic Services / SMI Recycling/ Circle City	832 Langsdale	6592.625368	2009.432148	14525	IND 980904213 Landfill 49-06	N	N	1	salvage junk yard	combined w/above property? Legal Survey VFC 63589110, asbestos/air permits	38
39	Prototype/ PCG Pump & Engine	1125 W 16th	2907.468732	886.1964413	na	n/a	N	N	?	??	print shop? No RCRA - listed in WHPA list, not in VFC	39
40	Capitol Tool & Dye	1141 W 16th	2833.277885	863.5830717	n/a	n/a	N	N	0	machine shop	not in VFC	40
41	Executive 1 Hour Cleaners	2658 N Harding	8371.348688	2551.586999	n/a	n/a	N	?	1	dry cleaners	not in VFC	41
42	Martin Luther King Corridor	MLK & W 16th	5652.83534	1722.984157	22740	BFD 4980006	Y	Y	1		MLK Corridor Plume Andrea Robertson	42
43	Universal Sign	507-545 W 16th	5295.846747	1614.174037	22740	BFD 4980006	Y	Y	1	manufacturing	MLK Corridor Plume	43
44	Parker Properties	524-570 W 16th	4943.641074	1506.821751	22740	BFD 4980006	Y	Y	1	repair	MLK Corridor Plume	44

45	Challenge Machine	506 N Elder	3139.651731	956.9658171	15984	IND006066906	N	N	?	machine shop	vacant, west of White River, reported no hazmat	45
46	Republic Creosoting Company	738 Miley	2413.405927	735.6061029	25775	IND980606511	N	N	?	creosoting	west of river, inspections only no samples	46
47	B&W Constructors	560 N Elder	2957.353515	901.4013224	n/a	n/a	N	N	0	metal fab	west of river, not in VFC	47
48	Addie's 45 Minute Dry Cleaners /Forty Five Minute Cleaners	960 Indiana Ave	3510.188754	1069.905498	n/a	INR000007419	N	Y	1	dry cleaners	South of Fall Creek, MCHD violations	48
49	Meadors Tool & Dye / Perry Manufacturing / Sanitec of Indiana Treatment Facility	2020 Montcalm	4764.470015	1452.210414	21973 / 19818	INR000104935 / SW 49-54	N	N	0	manufacturer / medical waste disposal	D001, D002 Large quantity generator "waste oxidizng solid"	49
50	Stanley Signs	1133 Burdsall	6981.689131	2128.018779	18260	INR000103101	N	N	0	signs/paints	D001, F003, F005 conditionally exempt (no chlorinateds)	50
51	Hittle Tool & Dye	2122 Dr. MLK Jr	6960.634406	2121.601299	16164	IND006065536	N	N	1	machine shop	conditionally exempt D001 HISTORICAL CONCERNS??	51
52	Bredenstein Printing	1922 Dr. MLK Jr	6309.375088	1923.097465	n/a	n/a	N	N	?	printer, etc.	not in VFC	52
53	Michigan Auto / U Pull & Pay	940 W 16th St	3662.760462	1116.409353	39533	INR000124114	N	N	1	salvage yard	D001 minor violations, no CVOCs listed, MCHD mosquito violations	53
54	American 1 Hour Cleaners / Morleys Cleaners	1901 Lafayette / 1901 N Belleview Place	5916.811727	1803.444157	24157	IND984898528	N	Y	1	dry cleaners	F002 , D039	54
55	Service Labs / Servaas Laboratories	1200 Waterway	1299.380653	396.0512104	20412	IND981090749	N	N	0	lab for water co	F005, U159 (spent petroleum-solvents)	55
56	Motor Pool (Stadium)	1448 Stadium	2035.013254	620.2720201	n/a	n/a	N	N	0	vehicle storage	not in VFC	56

57	Quality Linen Service / Quality Products Inc.	1277 W 29th	9574.788013	2918.395293	17350	INR000007450 / FID 9848	N	Y	1	industrial	violations w/PCE handling, same owner as Master Wear in Martinsville, gasoline UST, D005, D007, D008	57
58	D-A Lubricant Company	1340 W 29th	9602.08112	2926.714232	11500 / 23836/ *14562*	VRP 6020701 / IND006065296 / BFD 4130103	Y	N	1	lubricant manufacturing	Contaminant list did NOT include CVOCs (BTEX/TPH/PAH only) (*Al id is mixed w/Portage Co. site) F005, D035, D001, Ph1 ESA in Dec. 2012 VFC 67345008; began manufacturing in 1919	58
59	Tri-State Bearings / "Vacant Building"	1640 Alonso Watford Sr Dr	5188.278764	1581.387317	n/a	n/a	N	?	?	?	historically industrial area / MLK Plume / address in VFC but no records	59
60	One Stop Salvage Co.	502 W 16th Place	5450.079404	1661.184149	n/a	n/a	N	N	?	salvage yard	MCHD found complaint unjustified	60
61	Star Service Station	502 W 16th Street	5468.470352	1666.78971	21590	VRP 6960401 FID 19333 and 016513	Y	N	0	service station	LUST	61
62	D&M Auto Parts	505 W 16th St	5425.207608	1653.603226	n/a	n/a	N	N	?	salvage yard	MCHD complaints	62
63	Speedway Volkswagen / Speedway International Inc.	1930 W 16th	3557.254863	1084.251247	24974	IND016445512 / 200011210/ FID 11445	Y	Y	1	dealership	waste oil tank removed pre-1986 PCE in groundwater sample	63
64	Parcel 1099990 ? ("not sure")	1600 Dr. MLK Jr	5682.9698	1732.169139	n/a	n/a	Y	Y	1	?	MCHD complaint - drums of PCE from Morley's Cleaners on a vacant lot near 16th & MLK; Part of MLK Plume??	64

65	Site Oil Company /Abandon Site	1402 Dr. MLK Jr	5249.936808	1600.180688	25135	BFD 4030001 / FID 22845	Y	N	0	service station	USTs and a "pit" Brownfield NFA 21823335 complete scan; no CVOCs encountered	65
66	M&L Auto Repair	1520 Dr. MLK Jr	5450.992343	1661.462413	N/a	n/a	N	?	1	truck&bus repair	not in VFC	66
67	Bock Equipment Company / American Block	1900 Dr. MLK Jr	6245.121897	1903.513093	n/a	n/a	Y	Y	1	contractors	MLK 16th Street Plume MCHD documented TCE in soil	67
68	National Sand Blasting	2278 Montcalm	5928.057557	1806.871886	n/a	n/a	N	Y	1	sand blaster	MCHD complaints, PERC listed in MCHD inspection; issues w outdoor chemical storage - paint room venhilation No VFC	68
69	Reynolds Recycling	2089 Montcalm	5187.208557	1581.061117	n/a	n/a	N	N	0	recycling	MCHD complaint; probably part of another address?	69
70	Fall Creek and 16th Park	?	4534.655831	1382.163053	N/a	n/a	N	N	1	former dump	city dump on 1915 Sanborn Map; aerial photographs	70
71	Flexdar	1825 W 18th	3884.81138	1184.090471		SCP 200404159	Y	Y	1	manufacturer	in State Cleanup. Source of "Flexdar Plume"	71
72	S. Cohn and Sons/ Suron	1402 N Capitol	7219.727315	2200.572815	28328	SCP 6070101	Y	Y	1	former manufacture	Within the 14th St Corridor plume; contributor; State Cleanup Jeff K.	72
73	Michaelis / Fame Laundry	1352 N Illinios	7678.383245	2340.371138	23287	BFD 4091202	Y	Y	1	dry cleaner	Within the 14th St Corridor plume; contributor; State Cleanup; Jeff K	73

74	Greater Diversified Supply	1234 N Capitol	7105.892105	2165.875844	n/a	SCP 200606202	Y	Y	1	dry cleaner	Known to have PCE in groundwater; State Cleanup Kevin H.	74
75	Stewart Manufacturing	1280 N Senate	6630.146539	2020.8686		6040306	Y	Y	1	manufacturer	VRP; within the 14th St Corridor plume; contributor; Jeff K	75
76	19th St Corridor Plume	19th and Cornell	13253.09327	4039.5427	?	?	Y	Y	1	?	State Cleanup ; known to have PCE & VC	76
77	Wash Rite Company Inc	1720 Alvord St	13613.79537	4149.484697	n/a	200803020	Y	Y	1	dry cleaner	part of 19th St Corridor Plume; Jerry O.	77
78	Courtsey Cleaners	805 W 10th St	4102.339736	1250.393112	n/a	n/a	N	Y	1	dry cleaner	in VFC w/no records	78
79	Printing Partners / Vacant Commercial	929 W 16th St	3547.854148	1081.38591		INR000135772	N	Y	1	printer	D001, D002, D011, D018 & D039 (PCE) see VFC 68611483	79
80	Rex Metal Craft	1716 Rembrandt	3338.377005	1017.537279	16694	IND981002348	N	N	0	metal fab	F003 (waste non-halogenated)	80
81	CSX/Moorefield Yard	250 N Belmont	5249.447301	1600.031486	n/a	n/a	?	?	?	former rail yard	Several sites are now ontop of here at Belmont & New York	81
82	Shell Oil	Belmont	4038.030296	1230.791595	22624	BFD 4980013	Y	Y	1	bulk station	Former bulk facility, was part of/next to? CSX yard, has TCE in H20	82
83	Dickey & Sons Tool	2450 Turner Ave	5856.294618	1784.998543	17386	BFD 4090206	Y	Y	1	machine shop	TCE extends off-site	83
84	Herff Jones	1411 N Capitol	7269.422505	2215.719909	18857	BFD 4040007	Y	N	0	class rings	Sampled full scan, no CVOCs detected	84
85	Indy Parks	1426 W 29th	9628.949194	2934.90362	19673	BFD 4020002	Y	N	0	garage	former parks maintenance garage / some full scan VOCs no CVOCs detected (AI Id is mixed w/ SCP cleaners in Peru??)	85

86	Goodwill Industries	1635 W Michigan	2873.251611	875.767063	20195	IND006938278	Y	Y	1	industry	F002 and D001 small generator/ former CSX yard??	86
87	EMP Corporation / American Metals Industries	413 N Tremont	5028.455232	1532.673106	16851	IND984890475	N	N	0	metals	waste type not listed; out of business	87
88	Thomas L Green Co.	202 N Miley	4835.26133	1473.787606	19941	IND006066450	N	N	0	manufacturer	made buscuit plant equipment F005	88
89	Dewercs One LLC / Tuchman's Cleaners	30th & Kessler	8354.95763	2546.591004	23805	VRP 6051002	Y	Y	?	dry cleaner	kicked out of VRP last sampled in 2010	89

Site Investigation Strategy
Site 0153 Plume (formerly Riverside Groundwater Contamination)
Indianapolis, IN
EPA ID# INN000510936

This document presents the Site Investigation Strategy (SIS) for the Site 0153 (formerly Riverside) groundwater contamination plume located in downtown Indianapolis, IN. The purpose of this document is to present the strategy for addressing the contamination present in the Riverside and White River wellfields, including: identifying Potentially Responsible Parties, delineating the nature and extent of contamination, determining the potential risk of the contamination and any completed exposure pathways, and selecting an appropriate remedial action to mitigate that risk or exposure.

Background

Site 0153 is located in Indianapolis, Marion County, Indiana. On February 20, 2013, IDEM staff received notice from Citizens Energy Group that elevated levels of vinyl chloride (VC) and cis-1,2-dichloroethene (cis-1,2-DCE) were being detected in their Riverside municipal wellfield. Citizens Energy was concerned that the increasing levels of VC in Well RS29 are approach9ing the Maximum Contaminant Levels (MCL) for VC, which may adversely impact the use of that well to supply drinking water to residents in Indianapolis. The MCL for VC is 2.0 µg/L. The Riverside/White River Wellfield supplies drinking water to over 17,000 people in Indianapolis.

On May 20 and 21, 2014, IDEM staff conducted a site inspection at the Riverside Groundwater Contamination site. A total of 25 raw water samples were obtained. The samples consisted of 19 ground water samples, four (4) duplicate samples, and two (2) trip blanks. The ground water samples were collected from 19 municipal wells located in the Riverside and White River Wellfields. All samples were analyzed for volatile organic compounds(VOCs) only. Vinyl chloride, cis-1,2-DCE , trichloroethylene (TCE), and 1,1,1 trichloroethane were the primary VOCs detected. Although VOCs were detected in some of the municipal wells, the concentrations of the VOCs did not exceed any MCL set by the EPA in raw water. All raw water is treated and tested by Citizens Water Utility prior to distribution and no VOCs have been detected in finished water sent to customers. Results of water system tests can be found on the State Drinking Water Information System (SDWIS) website at https://myweb.in.gov/IDEM/DWW/index.jsp.

The Hazard Ranking System (HRS) documentation record submitted to EPA currently has identified upwards of 89 potential sources of VOC contamination to the White River and Riverside Wellfields' five-year time of travel of groundwater. More than fifteen (15) sites are in one of IDEM's remediation programs, and have either addressed their potential sources or are on track to do so. For an illustration of the site area, including potential identified site sources, see Attachment A.

On August 13, 2015, IDEM's former Commissioner, Thomas Easterly, requested inclusion of the Site on the National Priorities List (NPL). However, IDEM has since determined it would be in the best interests of the site, and responsive to citizen requests, to address the site in IDEM's State Cleanup program. Commissioner Carol Comer sent a letter to EPA on August 18, 2016, formally withdrawing support for the Riverside Groundwater Contamination Site (now known as Site 0153) to be included on the NPL (Attachment B).

Path Forward

The Site exhibits unacceptable levels of groundwater contamination from multiple sources, and threatens municipal drinking water supplies. Additional information regarding the nature and extent of VOC contamination, any possible sources of contamination, and potentially completed exposure pathways must be collected. IDEM commits to following a CERCLA-like strategy to evaluate the contamination at Site 0153 as outlined below:

Preliminary Data Gathering/Conceptual Site Model Development

There are currently 15 potential contamination source sites in the Site 0153 five-year time of travel for groundwater that are in one of IDEM's remediation programs. The information collected for these sites to date is valuable to building a conceptual site model (CSM). IDEM staff will ask the programs for these sites to submit their most recent groundwater, soil, and vapor intrusion data sets as well as monitoring well construction data as electronic records to IDEM's SAMPDB sample database. IDEM's GIS section will use that information to build a site overview map and base conceptual site model. These sites will be asked to perform a data gap analysis to determine whether they need additional investigation and monitoring wells to evaluate potential contributions to the wellfield.

- Immediate Impact Mitigation:

  As part of this preliminary data gathering activity, IDEM staff will determine whether any private drinking water wells exist within the five-year time of travel of groundwater to the Riverside and White River Wellfields, and if so, test those wells for VOC contamination. If shown to be contaminated, IDEM will devise a plan to ensure an alternate water source is provided.

PRP Search

Using the preliminary CSM as a guide, IDEM will conduct a comprehensive search for potentially responsible parties (PRPs) through all reasonably available records, and pursue all identifiable potentially responsible parties to obtain their cooperation in investigating and remediating Site 0153. IDEM staff will attempt to create a cooperative approach, wherein all identified PRPs work together to investigate both their own potential site-specific contamination issues as well as their potential contribution to the plume affecting the Riverside and White River wellfields (PRP Cooperative). IDEM staff will work with the responsible parties to develop a multi-party Agreed Order on Consent to

complete this work. If a site is identified but no Responsible Parties can be found, IDEM will undertake the work to address that site. Due to the density of sites and the nature of the contamination, there is a potential for commingled plumes. Other sources and responsible parties do not preclude delineation of on-site sources. IDEM will use all available enforcement authority to ensure all potentially responsible parties participate in this process.

Site Investigation

IDEM staff will take a tiered approach to understanding the nature of the contamination at Site 0153:

- Site-specific investigation of the nature and extent of impacts on individual properties will be completed by PRPs with oversight by IDEM project managers and Science Services staff, using the principles outlined in the Non-Rule Policy Documents "Remediation Closure Guide" and "Remediation Program Guide - State Cleanup Program" (Attachment C).
- Vicinity-wide evaluation of the entire project area, including understanding how the sites are connected, multiple plume behavior analysis, and identification of sources to the Riverside and White River Wellfield contamination will be undertaken by the PRP Cooperative, with oversight and input from the Lead IDEM Project Manager and Lead IDEM Geologist. The Lead Project Manager and Lead Geologist will review all site investigation work plans and reports to ensure each investigation is conducted with the overall goal of determining potential contribution to Site 0153 in mind.

Sampling on all sites will include soil, vapor, and groundwater samples. Initial samples will be analyzed for the full suite of potential contaminants in order to determine the correct list of contaminants of concern. Each site will be delineated horizontally and vertically until groundwater and soil impacts are below the RCG Residential Tap Water/Residential Soil standards. All sites must coordinate to gauge and sample wells on a regular basis. This information will be valuable to determining the potential source of contamination. Because of the toxicity of the contamination and the drinking water receptor, the delineation must be confirmed with repeatable groundwater data (wells). All data will be submitted to IDEM's SAMPDB database.

Risk Assessment/Cleanup Goals

IDEM staff will evaluate all Site Investigation-generated data against the IDEM Residential standards for soil, groundwater, and soil vapor. Those standards are derived using EPA Region 5 standards and calculated to be protective at a level of $1x10^{-5}$, which is within the Superfund acceptable risk range of $1x10^{-6}$ to $1x10^{-4}$.

Site Technical Decision Points

Once an individual site has been delineated to residential levels and all data and information has been submitted to the satisfaction of the site Project Manager, the site will be directed to mitigate any source areas, vapor intrusion, or other local, on-property impacts. This remedial decision, including all supporting information, conclusions, risk evaluations, and impact to local communities, will be detailed

in a Site Decision Document submitted to IDEM for review and approval by the Site Project Manager, Site Technical Staff, Lead Project Manager, Lead Geologist, and the State Cleanup Section Chief.

When the majority of sites have determined their nature and extent impacts and all data has been collected and evaluated, the PRP Cooperative, with comment from the IDEM Lead Project Manager and Lead Geologist, will draft a document that provides an overview of all relevant site-wide data and the conclusions regarding the nature of the groundwater contamination affecting the wellfields, all relevant source areas, and potential risk for future contamination to the wellfields. The PRP Cooperative will also draft a feasibility analysis of potential cleanup strategies that will protect the existing wells and reduce or eliminate impacts to the wellhead protection area.

Decision Document

IDEM staff will evaluate the results of the Site Investigation and Feasibility Analysis documents and will draft a Decision Document that will summarize the results of the investigations, risk evaluations, and feasibility analysis (including potential 30-year cost evaluations) of all potential cleanup actions for the Site 0153 plume. This document will evaluate the potential cleanup actions using the Superfund Nine Criteria, which include:

Threshold Criteria
1. Overall protection of human health and the environment
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Primary Balancing Criteria
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility or volume
5. Short-term effectiveness
6. Implementability
7. Cost

Modifying Criteria
8. State (EPA) acceptance
9. Community acceptance

The draft Decision Document will be presented to the public as a proposal at a public meeting, and any written or oral comments will be gathered and responded to before the Decision Document is signed by the Assistant Commissioner of the Office of Land Quality. The PRP Cooperative will also be presented a copy of the draft Decision Document and given the opportunity to comment.

Site 0153 Responsible Party Agreement

All parties/property owners that are shown to have a plume source or contributing areas will be asked to come to an agreement to fund the remedial action chosen in the Decision Document. This agreement will include each site's cost contribution and future financial assurances, as well as the structure of the

collective group's responsibility to implement the remedial action, the role of IDEM staff to approve remedial design and remedial action activities, and future operations and maintenance responsibilities.

Site 0153 Public Participation Plan

IDEM staff commit to holding at least a quarterly meeting in the Site 0153 area to update the public regarding progress at the site. In addition, links to publicly available site documents will be placed on the Site 0153 website. The documents will also be placed in an information repository that will be established in a local library or other public location. The draft site Decision Document will be presented to the public for input and comment before the document is final. IDEM staff are committed to communicating with the public in an open and transparent way in order to keep them informed of the site activities in their area. IDEM staff will also determine if any other methods of communication are preferred by the community and will revise this approach as necessary to ensure the needs of the community are being met. IDEM will ensure that both Spanish and English translations of outreach information are available. In addition, financial assistance to citizens groups to be able interpret any site-related technical documents will be made available either through PRPs or IDEM itself if no PRPs are identified.

Citizens Water Utility

Citizens Water has stated it would be willing to take the following measures to ensure the continued safety of its drinking water and to assist State and local governmental agencies with assessing and mitigating potential contaminant source areas in the vicinity of the Wellfields:

- Citizens would take production well WR-3 out of service, install an aeration treatment system to reduce VOC levels, and then test the water post-treatment to ensure VOC levels are below EPA's maximum contaminant limits (MCLs) for drinking water. Upon receipt of sustained satisfactory test results, Citizens would return WR-3 to service. At that point, all "raw water" being produced by Citizens' two production wells would be below EPA's standards before it is mixed with surface water and treated in Citizens' treatment process.
- Citizens would take the same measures at any production well in the future if verified sample results exceed MCLs, thus ensuring that water produced from Citizens' production wells, even before mixing and treatment, would continue to be below EPA Safe Drinking Water Act Maximum Contaminant Level (MCL) standards.
- Citizens would increase the frequency of its voluntary sampling for VOCs from the production wells and monitoring wells in the Wellfields from semi-annual to quarterly, and would share those results with IDEM as they are received.
- Citizens has developed and implemented Groundwater Quality Monitoring Plan, dated January 17, 2017as required by a recently adopted Indianapolis/Marion County ordinance, to track CVOC concentrations in the Wellfields. The results of this sampling program will be shared with EPA, IDEM, and the four local agencies identified in the ordinance to help determine if further measures are warranted.

IDEM Commitments

IDEM understands that the nature and complexity of Site 0153 will require a large allocation of resources to complete successfully. Therefore, the Governor's Office and IDEM commit to hiring an additional three project managers, a geologist, and an attorney to be dedicated to the project. In addition, state funding has been secured in the amount of $1 million per year to ensure work is completed in a timely manner.

IDEM staff believe this strategy will result in a complete and thorough evaluation of the contamination affecting the White River and Riverside wellfields, will be protective of human health and the environment, be responsive to the concerns expressed by local agencies, and will be acceptable to the citizens who live in the area.

List of Anticipated Deliverables

Site 0153 Remedial Investigation

A comprehensive evaluation of the nature and extent of contamination affecting the Riverside and White River Wellfields, including groundwater, soil, and vapor intrusion evaluations as well as source identification.

Site 0153 Risk Assessment

Evaluation of all data generated in the Remedial Investigation to determine if the site poses a risk to human health or the environment. This document will clarify contaminants of concern, compare concentrations against IDEM's Residential and Industrial closure values, and will determine the appropriate cleanup criteria for the site.

Site 0153 Feasibility Analysis

This document will determine potential remedies for any unacceptable risk associated with Site 0153. The document will also list potential Applicable or Relevant and Appropriate Requirements as well as cost evaluations for the potential remedies.

Site 0153 Decision Document

This document will summarize the results of the Remedial Investigation, the Risk Assessment, and the Feasibility studies, as well as summarize all ARARs for the site. The document will then outline the remedy preferred by IDEM and the PRPs. This document will be then made available in draft for public comment. All written public comments will be responded to as an addendum to the Decision Document.

Community Involvement Plan

This document will outline the ways in which IDEM intends to communicate with the public, including primary contacts, strategies for email and print communications, commitments to public meetings, location of a public information repository, how to find public records, availability sessions, and any other methods of communication and location of information relevant to the site. The public will be solicited for their input into this plan before it is drafted to ensure the plan meets the community's needs.

APPENDIX B

Preliminary Assessment Report, Indiana Department of Environmental Management, November 1, 2013

APPENDIX REDACTED DUE TO CLAIM OF CONFIDENTIALITY – CONFIDENTIAL – NOT SUBJECT TO PUBLIC DISCLOSURE FOR REASONS OF PUBLIC SAFETY, AND CONFIDENTIAL BUSINESS INFORMATION

APPENDIX C

Site Inspection Report, Indiana Department of Environmental Management, dated October 23, 2014

APPENDIX REDACTED DUE TO CLAIM OF CONFIDENTIALITY – CONFIDENTIAL – NOT SUBJECT TO PUBLIC DISCLOSURE FOR REASONS OF PUBLIC SAFETY, AND CONFIDENTIAL BUSINESS INFORMATION

APPENDIX D
Marion County ETR Search Results and Wetlands Map

Indiana County Endangered, Threatened and Rare Species List

County: Marion

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Cyprogenia stegaria	Eastern Fanshell Pearlymussel	LE	SE	G1Q	S1
Epioblasma obliquata perobliqua	White catspaw	LE	SE	G1T1	SX
Epioblasma rangiana	Northern Riffleshell	LE	SE	G2	S1
Epioblasma triquetra	Snuffbox	LE	SE	G3	S1
Fusconaia subrotunda	Longsolid	C	SX	G3	SX
Lampsilis fasciola	Wavyrayed Lampmussel		SSC	G5	S3
Obovaria subrotunda	Round Hickorynut	C	SE	G4	S1
Plethobasus cicatricosus	White Wartyback	LE	SX	G1	SX
Plethobasus cooperianus	Orangefoot Pimpleback	LE	SX	G1	SX
Plethobasus cyphyus	Sheepnose	LE	SE	G3	S1
Pleurobema clava	Clubshell	LE	SE	G1G2	S1
Pleurobema plenum	Rough Pigtoe	LE	SE	G1	S1
Pleurobema rubrum	Pyramid Pigtoe		SX	G2G3	SX
Ptychobranchus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula cylindrica cylindrica	Rabbitsfoot	LT	SE	G3G4T3	S1
Toxolasma lividus	Purple Lilliput	C	SSC	G3Q	S2
Venustaconcha ellipsiformis	Ellipse		SSC	G4	S2
Villosa lienosa	Little Spectaclecase		SSC	G5	S3
Insect: Hymenoptera					
Bombus affinis	Rusty-patched Bumble Bee	LE	SE	G1	S1
Insect: Lepidoptera (Butterflies & Moths)					
Hyperaeschra georgica	A Prominent Moth			G5	S2
Insect: Neuroptera					
Sisyra sp. 1	Indiana Spongilla Fly		ST	GNR	S2
Fish					
Percina evides	Gilt Darter		SE	G4	S1
Amphibian					
Necturus maculosus	Common mudpuppy		SSC	G5	S2
Reptile					
Clemmys guttata	Spotted Turtle	C	SE	G5	S2
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Emydoidea blandingii	Blanding's Turtle	C	SE	G4	S2
Thamnophis butleri	Butler's Garter Snake		SE	G4	S1
Bird					
Aimophila aestivalis	Bachman's Sparrow			G3	SXB
Ardea alba	Great Egret		SSC	G5	S1B
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Botaurus lentiginosus	American Bittern		SE	G5	S2B

Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
This data is not the result of comprehensive county surveys.

Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list

GRANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank

SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

Indiana County Endangered, Threatened and Rare Species List

County: Marion

Species Name	Common Name	FED	STATE	GRANK	SRANK
Buteo platypterus	Broad-winged Hawk		SSC	G5	S3B
Certhia americana	Brown Creeper			G5	S2B
Chordeiles minor	Common Nighthawk		SSC	G5	S4B
Falco peregrinus	Peregrine Falcon		SSC	G4	S2B
Haliaeetus leucocephalus	Bald Eagle		SSC	G5	S2
Helmitheros vermivorus	Worm-eating Warbler		SSC	G5	S3B
Ixobrychus exilis	Least Bittern		SE	G5	S3B
Lanius ludovicianus	Loggerhead Shrike		SE	G4	S3B
Mniotilta varia	Black-and-white Warbler		SSC	G5	S1S2B
Nycticorax nycticorax	Black-crowned Night-heron		SE	G5	S1B
Pandion haliaetus	Osprey		SSC	G5	S1B
Rallus elegans	King Rail		SE	G4	S1B
Setophaga cerulea	Cerulean Warbler		SE	G4	S3B
Setophaga citrina	Hooded Warbler		SSC	G5	S3B
Sitta canadensis	Red-breasted Nuthatch			G5	S1B
Mammal					
Lasiurus borealis	Eastern Red Bat		SSC	G3G4	S4
Myotis lucifugus	Little Brown Bat	C	SE	G3	S2
Myotis septentrionalis	Northern Long Eared Bat	LT	SE	G1G2	S2S3
Myotis sodalis	Indiana Bat	LE	SE	G2	S1
Taxidea taxus	American Badger		SSC	G5	S2
Vascular Plant					
Chelone obliqua var. speciosa	Rose Turtlehead		WL	G4T3	S3
Deschampsia cespitosa	Tufted Hairgrass		SR	G5	S3
Hydrastis canadensis	Golden Seal		WL	G3G4	S3
Juglans cinerea	Butternut		ST	G4	S2
Melanthium virginicum	Virginia Bunchflower		SE	G5	S1
Panax quinquefolius	American Ginseng		WL	G3G4	S3
Poa wolfii	Wolf Bluegrass		SR	G4	S3
Rubus odoratus	Purple Flowering Raspberry		ST	G5	S2
Trifolium stoloniferum	Running Buffalo Clover	LE	SE	G3	S1
High Quality Natural Community					
Forest - flatwoods central till plain	Central Till Plain Flatwoods		SG	G3	S2
Forest - floodplain mesic	Mesic Floodplain Forest		SG	G3?	S1
Forest - floodplain wet	Wet Floodplain Forest		SG	G3?	S3
Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	G3?	S3
Forest - upland dry-mesic Central Till Plain	Central Till Plain Dry-mesic Upland Forest		SG	GNR	S2
Forest - upland mesic Central Till Plain	Central Till Plain Mesic Upland Forest		SG	GNR	S3

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Indiana County Endangered, Threatened and Rare Species List

County: Marion

Species Name	Common Name	FED	STATE	GRANK	SRANK
Wetland - fen	Fen		SG	G3	S3
Wetland - marsh	Marsh		SG	GU	S4

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U.S. Fish and Wildlife Service

National Wetlands Inventory

Site 0153 - Wetlands Map

April 15, 2020

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper