FOURTH FIVE-YEAR REVIEW REPORT
FOR
ARKWOOD, INC. SUPERFUND SITE
BOONE COUNTY, ARKANASAS

September 2016

Prepared for

U.S. Environmental Protection Agency
Region 6
DALLAS, TEXAS

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FOURTH FIVE-YEAR REVIEW REPORT
ARKWOOD, INC. SUPERFUND SITE
EPA ID#: ARD084930148
BOONE COUNTY, ARKANSAS

This memorandum documents the U.S. Environmental Protection Agency's performance, determinations, and approval of the Arkwood, Inc. Superfund Site (Site) fourth five year review under Section 121(e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. Code Section 9621(c), as provided in the attached fourth Five-Year review Report.

Summary of the Fourth Five-Year Review Report

The Fourth Five-Year Review (FYR) for the Arkwood, Inc. Superfund Site, located near Omaha, Boone County, Arkansas, was conducted to determine if the remedy is and will continue to be protective of human health and the environment.

On February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral non-cancer toxicity value, or reference dose (RfD), of $7x10^{-10}$ mg/kg-day for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in EPA's Integrated Risk Information System (IRIS). As part of the dioxin reassessment for the Site, in October 2014, McKesson Corporation, the Responsible Party (RP), submitted a revised conceptual site model (CSM) and work plans for implementation of soil sampling and a supplemental groundwater tracing study. Field work was conducted from October 2014 to January 2015. The RP submitted the dioxin reassessment document for the Site soil in December 2015.

During the current FYR period the protectiveness of the groundwater remedy is being verified to determine to what extent contaminated groundwater bypasses New Cricket Spring, which may present additional potential exposure pathways and risks. A contaminant fate and transport investigation is being conducted which includes supplemental groundwater dye trace studies for low and high flow conditions.

During the current FYR period a Corrected Deed Notice was filed by Mr. C. C. Grisham, executor of the estate of Mary Faye Grisham, then-owner of the Site (May 29, 2014). Concurrently, a section of the perimeter fence was relocated. The Corrected Deed Notice includes restrictions such as limiting future use of the Site to industrial use only, no digging in the capped area without prior written approval, and no extraction or use of the groundwater underlying the Site.

Environmental Indicators
Human Exposure Status: Under Control
Contaminated Groundwater Status: Under Control
Site-Wide Ready for Reuse

Actions Needed

The following actions must be taken for the remedy to be protective in the long term:

- Further assessment of the dioxin soil data is required to determine if additional response actions are needed to achieve long-term protectiveness.

- A revision of the Corrected Deed Notice may be needed, if the pending dioxin re-evaluation results in a justification for this action.
- Evaluate the soil to groundwater pathway to determine if contaminated soils are contributing to the groundwater contamination.
- Conduct contaminant fate and transport investigation to determine if New Cricket Spring captures all of the contaminated groundwater.
- At the time the ROD was signed, the AWQS was lower than the MCL for PCP (1.01 mg/L). Since that time, the MCL for PCP has been revised to 1 µg/L which is lower than the AWQS. Site data will be evaluated relative to the MCL for PCP until such time as a decision document can be properly filed.

Determination

The remedy at the Arkwood, Inc. Superfund Site is protective of human health and the environment in the short-term because access and institutional controls are in place, the soils remedy removed or capped dioxin-containing soils, and the groundwater remedy treats contaminated water from New Cricket Spring. For the remedy to be protective in the long-term the actions identified in this report should be addressed.

Pam Phillips, Acting
Carl E. Edlund, P.E.
Director, Superfund Division
U.S. Environmental Protection Agency Region 6

9/30/16
Date

CONCURRENCES
FOURTH FIVE-YEAR REVIEW REPORT
ARKWOOD, INC. SUPERFUND SITE
EPA ID#: ARD084930148
BOONE COUNTY, ARKANSAS

Stephen L. Tzhone
Remedial Project Manager

9/26/2016
Date

Carlos A. Sanchez
Chief, AR/TX Section

9/26/16
Date

John C. Meyer
Chief, Superfund Remedial Branch

9/26/16
Date

Gloria Moran
Attorney, Office of Regional Counsel

9/28/16
Date

Mark A. Peycke
Chief, Superfund Branch, Office of Regional Counsel

09/28/16
Date

Pamela Phillips
Deputy Director, Superfund Division

9/30/16
Date

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Concurrence List
Fourth Five Year Review
Arkwood, Inc. Superfund Site
Omaha, Boone County, Arkansas
EPA ID No. ARD084930148

Mark Moix, P.E.
Engineer
Regulated Waste Program, Office of Land Resources, ADEQ

8-16-2016
Date

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Engineer P.E. Branch Manager
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8/16/2016
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Regulated Waste Program, Office of Land Resources, ADEQ

8-16-2016
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8/16/2016
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Regulated Waste Program, Office of Land Resources, ADEQ

8/16/16
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Regulated Waste Program, Office of Land Resources, ADEQ

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Regulated Waste Program, Office of Land Resources, ADEQ

8-16-16
Date

Tammie J. Hynum
Acting Senior Operations Manager
Regulated Waste Program, Office of Land Resources, ADEQ

8-16-2016
Date

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ISSUES/RECOMMENDATIONS

FOURTH FIVE-YEAR REVIEW REPORT
ARKWOOD, INC. SUPERFUND SITE
EPA ID#: ARD084930148
BOONE COUNTY, ARKANSAS

Issues and Recommendations Identified in the Five-Year Review:

OU(s):	**Issue Category: Remedy Performance**			
Sitewide	**Issue:** The non-cancer toxicity level for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was released in 2012 and the dioxin soil screening level has been revised.			
	Recommendation: Further assessment of the site data is required to determine the need for additional response actions to achieve long-term protectiveness.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

OU(s):	**Issue Category: Institutional Controls**			
Sitewide	**Issue:** The institutional controls currently in place may need to be modified, if the dioxin re-evaluation results in justification for this action.			
	Recommendation: Following completion of the site specific dioxin re-evaluation, amend the current ICs as appropriate.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

OU(s):	**Issue Category: Remedy Performance**			
Sitewide	**Issue:** Long-term protectiveness of the groundwater remedy needs to be verified to determine if contaminated soils are contributing to the groundwater contamination and if New Cricket Spring captures all of the contaminated groundwater.			
	Recommendation: Conduct contaminant fate and transport investigation to determine if New Cricket Spring captures all the contaminated groundwater and there is no colloidal transport of dioxin.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

OU(s):	Issue Category: Remedy Performance			
Sitewide	**Issue:** At the time the ROD was signed, the AWQS was lower than the MCL for PCP (1.01 mg/L). Since that time, the MCL for PCP has been revised to 1 µg/L which is lower than the AWQS.			
	Recommendation: Site data will be evaluated relative to the MCL for PCP until such time as a decision document can be properly filed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

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LIST OF ABBREVIATIONS & ACRONYMS

ADEQ	Arkansas Department of Environmental Quality
ADPC&E	Arkansas Department of Pollution Control & Ecology
AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
AWQS	State of Arkansas Water Quality Standards
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CD	Consent Decree
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CSM	Conceptual Site Model
COC	Contaminant of Concern
Dioxin	Polychlorinated dibenzo-p-dioxins and dibenzofurans
DO	Dissolved Oxygen
DUs	Decision Units
EC	Engineering Control
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
ICs	Institutional Controls
IRAD	Interim Remedial Action Design
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MMI	Mass Merchandisers, Inc.
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
OUL	Ozark Underground Laboratory
PAHs	Polycyclic aromatic hydrocarbons
PCDD/F	2,3,7,8-polychlorinated dibenzo-p-dioxin and furan
PCP	Pentachlorophenol
PER	Preliminary Engineering Report
PPB	Parts per billion
PRAP	Preliminary Remedial Action Plan
QA/QC	Quality Assurance/Quality Control
RAO	Remedial Action Objectives
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study

RfD	Reference Dose
ROD	Record of Decision
RP	Responsible Party
RPM	Remedial Project Manager
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SOW	Statement of Work
TBC	To Be Considered
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ	Toxicity equivalence
UU/UE	Unlimited Use/Unrestricted Exposure
WQS	Water Quality Standard
µg/kg	microgram per kilogram

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The Arkansas Department of Environmental Quality (ADEQ) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering U.S. Environmental Protection Agency (EPA) policy.

This is the Fourth FYR for the Arkwood, Inc. Superfund Site. The triggering action for this **statutory** review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of One Operable Unit (OU) which includes a remedy for soil and groundwater, both of which are addressed in this FYR.

The Arkwood, Inc. Superfund Site Five-Year Review was led by Mark Moix, the ADEQ Project Engineer. Participants included Dianna Kilburn, the ADEQ Geologist Supervisor, and Stephen Tzhone, the EPA Region 6 Remedial Project Manager (RPM). The review began on July 6, 2015.

Site Background

The Arkwood Site is an 18-acre parcel of land located within a valley surrounded mostly by steep wooded terrain within the Ozark Highlands of northern Arkansas (Appendix C, Figure 2). The Site is bordered to the east by Old US Highway 65, to the south and west by Old Cricket Road, and to the north by a rail line of the Missouri and Northern Arkansas Railroad. The Site ground surface gradually slopes from the southeast to the northwest. The Site lies within an area of karst terrain characteristic of the region. Site soil is a cherty clay overlying limestone and dolomite which contain fissures and solution channels.

The Site operated as a wood treatment facility from 1962 to 1984 and at various times used the chemicals pentachlorophenol (PCP) and creosote (polycyclic aromatic hydrocarbons (PAHs)s), as preservatives. The remedy implemented for the soil, completed in 1995, consisted of excavation, backfill with topsoil, and a grass covered cap, with offsite incineration. The Site is well-maintained, enclosed by a perimeter fence and is inspected on a regular basis. The groundwater remedy, implemented in 1996, consists of sampling and treatment of the New Cricket Spring water and has continued to operate during the current FYR period. The remaining buildings on the site are used for storage and the Site is inactive.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Arkwood, Inc.		
EPA ID: ARD084930148		
Region: 6	**State:** AR	**City/County:** Omaha, Boone County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: State ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Mark Moix		
Author affiliation: Arkansas Department of Environmental Quality		
Review period: 8/18/2011 – 8/18/2016		
Date of site inspection: 10/15/2015		
Type of review: Statutory		
Review number: 4		
Triggering action date: 8/18/2011		
Due date *(five years after triggering action date)*: 8/18/2016		

II. RESPONSE ACTION SUMMARY

The Site was developed in the 1950's when a railroad company excavated about 40 to 50 feet below natural grade to obtain fill dirt for constructing a railroad embankment. Arkwood, Inc. began wood treating operations at the Site in 1962. The operations consisted of a millwork shop, a wood-treating plant that used creosote and PCP in its process, and a yard for storing treated wood products prior to sale. Wood-treating operations involved bringing untreated timber posts and poles to the Site, and placing the wood materials into a treatment cylinder where the chemical preservatives were introduced under pressure.

Basis for Taking Action

Near-surface soils were contaminated by the former wood-treating operations that used creosote and PCP in the processes. New Cricket Spring, located down valley immediately west of the Site, was contaminated by the former Site activities. Site soils and sludges were contaminated with PCP, PAHs, and 2,3,7,8-polychlorinated dibenzo p-dioxin and furan (PCDD/F) congeners (dioxin). The 1990 Record of Decision (ROD) documented the

principal threat from the Site was direct contact with soils contaminated above health-based levels, and the long-term threat these soils posed to the groundwater. New Cricket Spring contained concentrations of PCP above the Arkansas Water Quality Standard.

Pathways of potential exposure to site constituents were determined to be: exposure to PCP through both ground and surface water at New Cricket Spring and exposure to soil contaminated with PCP, PAHs, and dioxin on the Site. Routes of exposures were determined to be through ingestion and dermal contact. Three exposure scenarios were considered to assess risk from the Site. The first scenario reflected current site conditions for the adult receptor with exposure to only the railroad ditch. The second scenario represented the most probable future land use of occasional visitations by hunters and other recreational users. A set number of exposures were estimated for the child and adult receptors to the railroad ditch and the Site, and for the adult receptor to New Cricket Spring. The third scenario represents a worst-case residential scenario. Daily exposure was assumed for the adult and child receptors to affected soil on the Site, and drinking affected water from a well on the Site. Also, a set number of exposures were estimated for the child and adult receptors to the railroad ditch, and daily exposure to New Cricket Spring by the adult receptor for the third scenario.

Response Actions

The Site was formally added to the National Priorities List (NPL) on March 31, 1989. In May 1986, the responsible party (RP), Mass Merchandisers, Inc. (MMI) (now the McKesson Corporation), entered into an Administrative Order on Consent (AOC) with the EPA which required a Remedial Investigation/Feasibility Study (RI/FS) be conducted. MMI conducted a RI/FS to determine the nature and extent of contamination and to investigate possible remedies for the Site. A Consent Decree was entered into between the United States of America, on behalf of the Administrator of the EPA, and the property owner on July 11, 1988 to provide access to the Site to conduct the RI/FS. The RI/FS was completed by MMI on May 23, 1990. The RI/FS provided the basis of clean up levels defined in the ROD.

Remedial Action Objectives (RAOs)

The EPA Regional Administrator for Region 6 signed the ROD on September 28, 1990. The ROD's selected soil remedy required excavation of all soils that met the definition of "affected soil". Affected soil was defined as soil containing greater than 300 mg/kg PCP, or greater than 20 µg/kg dioxin as 2,3,7,8-TCDD equivalents, or greater than 6.0 mg/kg PAHs as Benzo-a-pyrene equivalents. The ROD's selected groundwater remedy required PCP-contaminated water from New Cricket Spring to be treated to the State of Arkansas Water Quality Standards (AWQS).

Sitewide Soil Remedy Components

- Construct a temporary incinerator on the site.
- Excavate all soils that contain greater than 300 mg/kg PCP, or greater than 20 µg/kg dioxin as 2,3,7,8-TCDD equivalents, or greater than 6.0 mg/kg PAHs as Benzo-a-pyrene equivalents (affected soil).
- Excavate the soils from the on-site sinkhole.
- Sieve and wash the excavated soils.
- Backfill the washed coarse materials that no longer meet the definition of affected soils.
- Incinerate on-site all washed materials that still meet the definition of affected soils.
- Backfill ash in the excavated areas.
- Place a topsoil cap over the entire Site.
- Seed the site with native grasses.
- Fence the entire site to prevent access.
- A notice will be negotiated into the deed to the property restricting land use to industrial uses but warning against future excavation on the site.

Sitewide Groundwater Remedy Components

- Monitoring area springs during, and two years after, the soils remediation to determine the degree to which natural attenuation is taking effect.
- If PCP levels are above AWQS after a post-remedial monitoring period of two years, erect a water treatment system at New Cricket Spring to treat to AWQS.
- Treat New Cricket Spring until levels fall below state standards.
- Monitor selected drinking water wells for 30 years.
- Provide selected water well users with city water lines to remove any uncertainty in their water supply.

Modified Remedy Components

The ROD's soil remedy component of on-site incineration was significantly modified due to a substantial decrease in the volume of materials to be incinerated. Therefore, rather than implement the design, testing, and operation of an on-site incinerator, MMI and EPA agreed that off-site incineration would be more appropriate for the soil remedy. The 1995 Explanation of Significant Differences (ESD) documented this significant change from the original selected remedy.

The sieve and wash remedy component in the ROD was modified after pilot studies performed during the remedial design. It was determined dry sieving the affected soils without washing cleaned the coarse fraction adequately to meet the RAO prior to backfilling onsite.

Table 1: Arkwood 1990 Record of Decision

Media	PCP Cleanup Level	Dioxin Cleanup Level	PAHs Cleanup Level
Contaminated Soil	300 mg/kg	20 µg/kg as 2,3,7,8-TCDD equivalents	6.0 mg/kg as Benzo-a-pyrene equivalents
Contaminated Ground Water	State of Arkansas Water Quality Standards *	NA	NA

*The PCP cleanup level, based on the AWQS, was updated at various times:

1998: surface water quality standard: monthly average: PCP 9.3 µg/L, and daily maximum: PCP 18.7 µg/L (ADPC&E, January 1998).

2012: surface water quality standard: monthly average: PCP 15.57 µg/L, and daily maximum: PCP 20.29 µg/L (ADEQ, February 2012).

2012-2014: maximum contaminant level: PCP 1.0 µg/L (See references in Appendix A: ADEQ, November 2012; ADEQ, October 2013; ADEQ, January 2014; U.S. EPA, January 2014). At the time the ROD was signed, the AWQS was lower than the MCL for PCP (1.01 mg/L). Because the AWQS was determined to be more protective, the AWQS was selected as the cleanup level for PCP in groundwater. Since that time, the MCL for PCP has been revised to 1 µg/L which is lower than the AWQS. Site data will be evaluated relative to the MCL for PCP until such time as a decision document can be properly filed.

Status of Implementation

Soil Remedy Components

MMI implemented the ROD's soil remedy in two phases. Phase I soil remediation began on August 1, 1994. It included excavation of affected soil, pretreatment of the soil, and storage of the pretreated soil for final treatment followed by backfilling activities. Phase I soil remediation was completed by mid-August 1995. Phase II of the project consisted of off-site incineration of affected soil, and Site closure, excluding

groundwater issues. The soil remediation project was completed in December 1995. Site closure activities were then completed which included construction of a perimeter fence, backfilling and regrading with topsoil, and seeding the Site with native grasses.

Groundwater Remedy

During the Remedial Investigation (RI) a total of fifteen domestic and municipal wells and thirteen springs in the vicinity of the Arkwood site were sampled. The effort consisted of six separate sampling events (two each of low, moderate and high flow conditions) from May 1987 to January 1990. New Cricket Spring was the only location where PCP contamination was detected consistently. PAHs contaminant detection occurred in one domestic well downgradient from the Site (Duggan well W-38) during the second sampling event, but could not be confirmed in the subsequent sampling events. A PCP contaminant detection occurred in the spring at the south end of the railroad tunnel during the final RI sampling event (high flow condition). As a final task of the RI, a groundwater tracing investigation was completed in September 1992. Conclusions drawn from the investigation were: groundwater from the Site occurs mainly as conduit flow, groundwater flow from the Site is confined to the Cricket Creek and Walnut Creek Basins since no dye was recovered from any regional springs outside these two basins, and there was no documented dye flow to any of the domestic wells sampled. As part of the remedy, a water utility line was extended to the groundwater users immediately down gradient from the Site in Cricket Valley to remove any uncertainty in their water supply. Monitoring of selected drinking water wells for the remainder of the following thirty-year period did not occur.

Additional groundwater sampling for four springs was conducted for the four years (1996-1999) following completion of the soil remedy. Sampling was conducted for Walnut Creek Spring, the South Railroad Tunnel Spring, Old Cricket Creek Spring and New Cricket Spring. During this four-year period PCP contamination was detected once for Walnut Creek Spring and twice for the South Railroad Tunnel Spring. Again, New Cricket Spring was the only location where PCP contamination was detected consistently. The sampling frequency of New Cricket Spring was increased from quarterly to monthly in May 2000. In April 2001, MMI sampled Walnut Creek Spring, the South Railroad Tunnel Spring and Old Cricket Creek Spring at EPA's request after MMI asked to suspend sampling of these three springs. PCP contamination was not detected in these three springs (see Appendix B, Table B-2). Sampling of these three springs ceased, but the sampling of New Cricket Spring continued on a monthly basis.

During the two-year period (1996-1997) following soil remediation, New Cricket Spring continued to exceed the AWQS. Construction and installation of a water treatment system at New Cricket Spring was completed in February 1997. The treatment system was upgraded in November 1997 and October 1999 to increase its capacity.

During the current FYR period, the water treatment system at New Cricket Spring continues to operate effectively under natural flow conditions.

Institutional Controls

A deed notice was filed to provide notice of the remedy by the executor of the estate in August 2010. A corrected deed notice was filed by the executor of the estate in May 2014. The engineering controls (ECs) listed in the corrected deed notice include a secure perimeter fence, a cap of topsoil and grass, and a storm water control system. The ECs require continued inspection, maintenance and operation to ensure the remedy remains protective of human health and the environment. In addition, potential future Site use is limited to industrial use only, and commercial or residential uses are prohibited.

The land use restrictions include no digging in the capped area (without prior written approval from the EPA, in consultation with the ADEQ) and no activities that would cause soil erosion in the capped area. Certain types of construction over the topsoil and grass may be acceptable as long as the integrity of the soil remedy is not impacted. No extraction or use of the groundwater underlying the Site is allowed (unless authorized by

the EPA and/or ADEQ for investigation, remediation, or monitoring purposes). No activities are allowed that would affect the integrity of any remedial or monitoring system, such as groundwater monitoring wells or impermeable reactive barriers. No development of the Site is allowed for any non-industrial use.

The corrected deed notice with revisions to the description of the metes and bounds reduced the Site's restricted area from approximately 30 acres to about 18 acres which is comparable to the acreage noted in the ROD. A partial relocation of the Site's perimeter fence was implemented. Existing fencing was removed from the approximate 12 acres on the east side of the Site which is now unrestricted. New fencing and metal bollards with steel cable and warning placards were installed at the new east boundary of the 18-acre restricted part of the Site in October 2014 (Appendix D, Corrected Deed Notice).

IC Summary Table

Table 2: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Sitewide soils and groundwater	Yes	Yes	Sitewide 18 acres	Use restrictions: Industrial use only, no unauthorized digging in capped area, no groundwater extraction or use, and no activities that would affect the integrity of any remedial or monitoring systems.	Deed Notice and Restrictions, May 29, 2014

Systems Operations/Operation & Maintenance

Operation and maintenance (O&M) activities include operation of the primary ozone treatment system at the mouth of New Cricket Spring. Samples are taken monthly from the mouth of New Cricket Spring and at the effluent weir following treatment for analysis of PCP. The RP provides a monthly progress report with the analytical results to demonstrate the groundwater remedy continues to meet the applicable standards.

Injection of the non-ozonated waters near the sinkhole ceased on September 10, 2012. In January 2014, the EPA provided direction for the path forward on groundwater remediation activities for the Site: the groundwater cleanup standard for PCP should be the Maximum Contaminant Level (MCL) of 1.0 µg/L, the groundwater injection system should remain off, and monitoring of New Cricket Spring and the ozone treatment station effluent should remain at a monthly frequency.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** five-year review, as well as, the recommendations from the **last** five-year review and the current status of those recommendations.

The Third FYR, signed by the EPA on August 18, 2011, identified that the deed notice recorded in August 2010 needed to be corrected. A corrected deed notice was prepared with revisions to the description of the metes and bounds, a notice that the Site is restricted for industrial use only, and additional restrictions prohibiting any activities that would affect the integrity of any remedial or monitoring systems. It was executed and recorded (filed for record) on May 29, 2014, with the State of Arkansas, Boone County Circuit Clerk's Office by the executor of the estate in trust for the Site property.

Table 3: Protectiveness Determinations/Statements from the 2011 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Protective	The remedial actions for the soil and groundwater are protective of human health and the environment. Since both media remedies are protective, the remedy for the Site is protective of human health and the environment.

Table 4: Status of Recommendations from the 2011 FYR

OU #	Issue	Recommendations	Current Status	Completion Date (if applicable)
Sitewide	Deed restriction needs corrections to the metes and bounds and a restriction to industrial use only for the capped area.	Correction to metes and bounds description and the restriction to industrial use only be placed in the Deed Restriction.	Completed	5/29/2014

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

The Responsible Party (RP) was notified of the initiation of the five-year review on July 6, 2015. A public notice was made available by publishing in the local newspaper, the Harrison Daily Times, on July 22, 2015, stating that there was a five-year review and inviting the public to submit any comments to the ADEQ. The results of the review and the report will be made available at the Site information repositories located at the U.S. Environmental Protection Agency, Region 6, 1445 Ross Avenue, Suite 1200, Dallas, TX 75202-2733 and the Arkansas Department of Environmental Quality, Records Management Section, 5301 Northshore Drive, North Little Rock, Arkansas 72118.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The results of these interviews are summarized below. Completed interview forms are included in Appendix H.

Interviews were conducted with the executor of the estate in trust for the Site property and the executor’s family, the mayor of Omaha, Arkansas, an adjacent resident, the RP representative, and the Boone County sheriff’s department. Interviews were conducted on October 14, 2015, and October 15, 2015.

The executor of the estate in trust for the Site property considered the work at the Site to have been conducted properly since the surface remediation, and the management of the Site has been excellent. The executor was concerned with the acquisition of an industry for the Site and wanted to sell or lease the Site property to continue to address the need for jobs and reduce unemployment in the area, especially if the Site would be potentially allowable for reuse in an industrial land use scenario. The mayor of Omaha commented the Site has been mowed frequently and well maintained. He has not received any complaints about the Site, and was not aware of any vandalism, trespassing, or emergency responses from local authorities.

The adjacent resident stated that she was not concerned and not aware of any community concerns about the Site. Her residence was connected to the city water utility several years ago. The RP representative stated the Site has been and continues to be properly maintained and is visited a minimum of two times per week by O&M personnel. The RP representative was not aware of any community concerns or any significant breaches in security or significant trespasser activity. The county sheriff's office could not find any record of a response made to the Site by one of the deputies within the past five years.

Data Review

Sitewide Soil

Decision unit sampling for the surface soil sampling event was conducted at the Site in October 2014 for the dioxin reassessment (see section V. Technical Assessment, Question B summary). The results of the soil sample analysis for 2,3,7,8-PCDD/F dioxin congeners and a comparison to the 2,3,7,8-TCDD toxicity equivalent quotient (TEQ) soil screening levels can be found in the RP's Dioxin Reassessment at Arkwood, Inc. Superfund Site, dated December 30, 2015 (see Appendix A - Reference List).

The document is under review by EPA and describes the dioxin reassessment soil decision units (DUs) as:

- DU 1 (Uncappped Area East) is the uncapped eastern section of the Site where no treated wood storage or processing activities were conducted based on available information. This DU is approximately 1.2 acres in area.

- DU 2 (Capped Area) is the capped area of the site that covers all of the formerly excavated areas. This DU is the largest DU covering 82% of the site with an area of approximately 11 acres.

- DU 3 (Northern Perimeter Ditch) is the northern perimeter ditch area spanning from the natural berm area on the western side of the Site to the northeastern-most perimeter adjacent to a formerly excavated and capped area. This DU is approximately 0.14 acres in area and 467 meters (m) in length.

- DU 4 (Southern Perimeter Ditch) is an area that also spans from the natural berm area on the western side of the Site to the southeastern-most perimeter adjacent to a formerly excavated and capped area. This DU is approximately 0.17 acres in area and 560 m in length.

- DU 5 (Berm Area) is the sedimentation zone and basin (natural berm area) formed by the confluence of the north and south perimeter ditches. This DU is bounded to the north by the fenceline and to the south by the road. The area of this DU is approximately 28 ft x 64 ft (0.04 acres).

- DU 6 (Uncapped Area West) is the uncapped area of the site between the entrance and the capped area (i.e. DU 2). This DU is approximately one acre in area.

- DU 7 (Railroad Ditch) is the railroad ditch area that receives stormwater overflow from the natural berm area of the site during exceptionally heavy rain events.

Samples collected from these DUs were analyzed using EPA Method 1613B for the seventeen 2,3,7,8-PCDD/F congeners. The TCDD toxic equivalent (TEQ) concentration for each sample was calculated, based on the 2005 World Health Organization toxic equivalency factors.

In the RP's Dioxin Reassessment, the average or 95% UCL TEQ concentrations for each of the DUs were compared to the TCDD soil screening levels calculated for the Industrial Worker, Maintenance Worker, and Adolescent Trespasser risk scenarios. These comparisons are summarized in Table 5.

Table 5: Comparison of Soil Samples to Screening Levels

Decision Unit	Unadjusted Decision Unit Soil Concentration (pg/g)	Industrial Worker Soil Screening Level of 730 pg/g?	Maintenance Worker Soil Screening Level of 12,100 pg/g?	Adolescent Trespasser Soil Screening Level of 8,500 pg/g?
1	841	Above	Below	n/a
2	248	Below	Below	n/a
3	1095	Above	Below	n/a
4	1502	Above	Below	n/a
5	1777	Above	Below	n/a
6	2149	Above	Below	Below
7	5506	Above	Below	Below

n/a: Not applicable. The Adolescent Trespasser Scenario is only applicable to parts of DU 6, which are outside the Site fence, and DU 7.

Comparing the TEQ concentrations to the industrial worker soil screening level, all of the DUs except DU 2, exceeded the industrial soil screening level of 730 pg/g. However, none of the DUs exceeded the maintenance worker soil screening level of 12,100 pg/g. In addition, DU 6 and DU 7 did not exceed the adolescent trespasser soil screening level of 8,500 pg/g.

The RP's Dioxin Reassessment noted that while the PCDD/F concentrations in soil for DUs 1, 3, 4, 5, and 6 exceed the industrial worker soil screening level (based on a hypothetical future industrial use), the PCDD/F concentrations in soil at these particular DUs do not pose a noncancer hazard under current site conditions (i.e. current maintenance worker use). Also, current site conditions were not anticipated to change as there were no active or pending proposals identified for any current or future specific industrial use.

However, the RP noted that if there was a proposed change in site use (i.e. from maintenance use to a potentially allowable industrial use), the noncancer hazards associated with the new site use, and possibly the remedy itself, would need to be re-evaluated because DUs 1, 3, 4, 5, and 6 have TEQ soil concentrations that exceed the industrial worker soil screening level.

In July 2016, the RP purchased the Site property, formerly owned by an estate in trust.

Currently, the RP's Dioxin Reassessment document, the applicability of soil risk exposure scenarios and comparison with DUs, and the anticipated future use of the Site remains under review by the EPA and ADEQ.

Sitewide Groundwater

The 1990 Record of Decision (ROD) specified that contaminated groundwater must achieve AWQS. The groundwater remedy consisted of monitoring and treatment of the water from New Cricket Spring to meet the applicable standards, via a water treatment system at New Cricket Spring. This water treatment system has operated continuously since its construction in 1997 (except for minor down time for any repairs or part replacement).

During part of this FYR period, from April 2011 to November 2011, the injection of the non-ozonated water near the former sinkhole was halted. A rebound in PCP concentrations at New Cricket Spring was observed and most of the PCP concentrations measured at the spring outflow exceeded the AWQS, and exceedances were frequent during periods of low flow (Appendix C, Figure 3).

From November 2011 to September 2012, the injection of the non-ozonated water resumed, which maintained a spring flow of about 15 gallons per minute (gpm),at a minimum. After injection was restarted, the majority of the PCP concentrations measured at the spring outflow were below the AWQS (Appendix C, Figure 4).

In September 2012 the injection of the non-ozonated water was halted again to confirm that injected groundwater was impacting PCP measurements at New Cricket Spring by making them biased low. Again, after injection was halted, a rebound in PCP concentrations at the spring outflow was observed (Appendix C, Figure 5).

Currently, the treatment of groundwater at New Cricket Spring continues under natural flow conditions, without any water injection.

The cleanup level for PCP has also been updated during this FYR period. Previously, in January 1998, the Arkansas Department of Pollution Control & Ecology (ADPC&E) used the surface water quality standard for PCP as the cleanup level at New Cricket Spring. In February 2012, continuing the use of the surface water quality standard, the ADEQ updated the PCP cleanup level to to 15.57 µg/L for the Chronic Standard (monthly average) and 20.29 µg/L for the Acute Standard (daily average) to reflect more recent pH values from the nearest water quality monitoring station. In September 2012, the collection of temperature, pH, and dissolved oxygen data from the treatment station discharge was added to assist in future revisions to the cleanup level for PCP.

From November 2012 to January 2014, ADEQ communicated to EPA that the application of the surface water quality standard pertains to aquatic toxicity only and does not address potential human health concerns. In addition, ADEQ noted that much of the groundwater which rises from New Cricket Spring and becomes surface water, returns to groundwater, and appears to migrate offsite as groundwater. ADEQ also reasoned in a letter dated October 7, 2013 (see Appendix I), that the MCL could be applied if the surface water is or could potentially be used as a drinking water source. Because the water which exits the ozone treatment system via a weir into a ditch reenter the groundwater system, ADEQ reported requesting that the RP apply a reporting limit of 1 µg/L, and reported that the RP agreed to do it. Also, potential concerns were raised regarding groundwater circumventing New Cricket Spring and migrating beyond the spring as groundwater. The ADEQ recommended that due to these reasons, the drinking water quality standard for PCP at the MCL of 1.0 µg/L should be the cleanup level.

In January 2014, EPA informed the RP that the treatment station effluent would need to meet the MCL for PCP of 1.0 µg/L (or 1 ppb). Progress reports submitted monthly by the RP include the analytical laboratory data for the spring and weir samples and a summary of the monitoring data. The New Cricket Spring monitoring data for the most recent five-year period (and for years earlier) can be found in Appendix B, Table B-5.

Currently, a conceptual groundwater model of complete capture of the solute plume at Arkwood by New Cricket Spring forms the basis for the groundwater remedy. As indicated in ADEQ and EPA letters from 2012-2014, information has been identified regarding groundwater and surface water interaction, groundwater bypass of New Cricket Spring, and groundwater that can potentially be used as drinking water from the Site. In addition, seeps and other discharges in locations other than New Cricket Spring were directly observed in site visits by EPA and ADEQ, indicating that New Cricket Spring is being bypassed to an unknown extent.

In June 2016, EPA sent a letter to the RP recommending the implementation of an additional dye test at high flow and additional monitoring wells to increase the ability to monitor karst flow and spring flow, address data gaps regarding the effectiveness of capture by New Cricket Spring, and establish whether an unacceptable amount of underflow or bypass flow is occurring with attendant contaminant transport, both solute (PCP) and colloidal (dioxin).

Site Inspection

The FYR inspection of the Site was conducted on October 15, 2015. In attendance were Mark Moix and Dianna Kilburn of the ADEQ; Stephen Tzhone of the U.S. EPA; and James Fleer of the McKesson Corporation. The purpose of the inspection was to assess the protectiveness of the remedy.

The Site remedy components inspected included the topsoil cap, access controls and the offsite water treatment station at New Cricket Spring. Site access is controlled by a perimeter fence along the northeast, southwest and part of the southeast boundaries of the Site, a locked entrance gate at the northwest boundary, and steel cable with bollards along the remaining southeast boundary (Appendix C, Figure 6).

The topsoil cap appeared to be in excellent condition with ample vegetative cover, and without any signs of soil erosion, stressed vegetation or animal burrowing. The Site had been recently mowed by the RP's contractor. A 'CAUTION' warning sign was attached to the Site entrance gate, as well as several places along the fence line bordering Old Cricket Road, and along the cable fencing. These signs note the Site is a hazardous substance site and lists the EPA project manager's name and phone number. Several breaches were noted in the fence line along the northeast boundary, and a tree had fallen on the cable fencing along the southeast boundary. Mr. Fleer commented the fence breaches would be resolved as soon as possible (Appendix C, Figure 7).

The Site's building structures and two gravel drives appeared to be in good condition. Storm water ditches, one each along the northeast and southwest edges of the Site, meet forming a confluence near the northwestern edge at the base of a rocky berm. The ditches were well-vegetated with no signs of erosion. No issues were noted with the building or the equipment. There were equipment manuals maintained in the Site's front office building and in the room beneath the soil silos. Additional equipment manuals, as-built drawings, maintenance logs and training records are kept at Mr. Fleer's office in Kansas City, Kansas.

The offsite water treatment station at the mouth of New Cricket Spring was in overall good condition and in operation during the inspection. The spring and treatment building are enclosed within a security fence along Old Cricket Road.

Mr. Fleer indicated that he will contact the mayor of Omaha, AR, to provide him with contact information for McKesson's two O&M contractors in accordance with the Contingency/ Emergency Response Plan. The Site inspection checklist and photographs are included in the appendices (Appendix F, Site Inspection Checklist; and Appendix G, Site Inspection Photographs).

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:
The soil remedy meets the clean-up goals specified in the 1990 ROD (based on an industrial risk scenario).

However, on February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, which resulted in updated preliminary remedial goals for the industrial risk scenario at dioxin sites. Subsequently, soil sampling performed during the current FYR period has indicated the soil remedy may not be sufficiently protective of human health and the environment for the future industrial worker risk scenario in several sampled areas (see Data Review, Sitewide Soil).

The groundwater remedy continues to operate and function by treating the water from New Cricket Spring to meet the AWQS. However, the protectiveness of the groundwater remedy should be verified to determine whether an unacceptable amount of underflow or bypass flow is occurring with attendant contaminant transport, both solute (PCP) and colloidal (dioxin).

Other remedy components, such as access controls and fencing, were in place with minor and routine repairs noted. A corrected Deed Notice and Restrictions was filed with the county clerk's office during the current FYR period to satisfy the last FYR's recommendation (see Appendix D).

Remedial Action Performance

The soil remedial action (excavation, offsite incineration, and topsoil capping of remaining soils) meets the clean-up goals specified in the ROD, and continues to contain and minimize exposure to remaining Site COCs. Changes in the non-cancer toxicity factor for 2,3,7,8-TCDD resulted in updated preliminary remedial goals for the Site (based on an industrial risk scenario). Subsequent soil sampling indicates that while the topsoil cap is protective of human health and the environment for the future industrial worker, several other Site surface areas are not (see Data Review, Sitewide Soil). However, the soil sampling does indicate that all Site areas are protective for the current and future maintenance worker scenario. The applicability of different soil risk exposure scenarios and the anticipated future use of the Site continues to be under review by the EPA and ADEQ.

The groundwater remedial action (water treatment system at New Cricket Spring, treatment to AWQS) meets the clean-up goals specified in the ROD and continues to operate and function as designed, with performance data collected monthly at the New Cricket Spring and the water treatment system outfall. However, potential concerns involving groundwater becoming surface water and returning to groundwater, and groundwater circumventing New Cricket Spring and migrating beyond the spring as groundwater have been identified (see Data Review, Sitewide Groundwater). Also, at the time the ROD was signed, the AWQS was lower than the MCL for PCP (1.01 mg/L). Since that time, the MCL for PCP has been revised to 1 µg/L which is lower than the AWQS.

Therefore, long-term protectiveness of the groundwater remedy should be verified to determine whether an unacceptable amount of underflow or bypass flow is occurring with attendant contaminant transport, both solute (PCP) and colloidal (dioxin). Also, site data will be evaluated relative to the MCL for PCP until such time as a decision document can be properly filed.

Operating procedures, as implemented, continue to maintain the effectiveness of remedy as intended by the ROD. There have not been large variances in O&M costs that indicate a potential remedy problem.

System Operations/O&M

Monitoring activities at the New Cricket Spring water treatment system continue to be conducted on a monthly basis. The RP has been requested to install a limited number of strategically located up-gradient and down-gradient sentinel monitoring wells to provide additional monitoring data for determining remedy effectiveness and protectiveness.

A potential opportunity to reduce costs of monitoring and sampling at New Cricket Spring and the water treatment system would be to reduce the monitoring frequency from monthly to quarterly. The RP requested a frequency reduction in November 2013. The EPA did not agree with the recommendation because PCP levels were occasionally still above the U.S. EPA MCL of 1.0 µg/L after treatment. The EPA did agree the sampling and analysis program may be modified to quarterly in the future, provided the continued operation of the water treatment system meets the groundwater cleanup standard at all times. Currently, adjustments are made to the operation of the treatment system for PCP levels to consistently remain below 1.0 µg/L after treatment.

According to the annual and monthly progress reports, there have been no recurring equipment breakdowns or changes that would indicate any potential issues affecting protectiveness.

Implementation of Institutional Controls and Other Measures

Access controls (locked entrance gate, perimeter fencing and cables, and warning signs) are in place as noted in the October 2015 FYR site inspection checklist (Appendix F). A lack of warning signs and a few breaches were noted along the north fence line, and a fallen tree was on the cable fencing along the southeast boundary; the RP stated these would be addressed as soon as possible. The contact number on the signs should be updated to a toll free number and possibly the addition of a website address. Once these items are addressed, the access controls will be considered effective in preventing exposure from site soils. Regarding the Site Contingency and Emergency Response Plan, the RP was requested to contact the mayor of Omaha, Arkansas to provide him with the RP contractors' contact information.

A Corrected Deed Notice and Restrictions were filed to revise the description of the metes and bounds which reduced the Site's restricted area from approximately 30 acres to about 18 acres as was intended in the ROD. Among the restrictions of the Corrected Deed Notice are limiting future use of the Site to industrial use only, prohibiting commercial or residential use, no digging in the capped area without prior written approval, and no extraction or use of the groundwater underlying the Site, except if authorized by the EPA and/or ADEQ for investigation, remediation or monitoring purposes (Appendix D).

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

In February 2012, the EPA released the final human health non-cancer dioxin reassessment for use at Superfund sites to ensure protection of human health. The Site CSM was updated in August 2014 and field implementation of soil sampling and groundwater tracing was conducted from October 2014 to January 2015.

For soils, it was found that surface dioxin concentrations, at all of the DUs except DU 2, exceeded the industrial soil screening level of 730 pg/g. However, none of the DUs exceeded the maintenance worker soil screening level of 12,100 pg/g. In addition, DU 6 and DU 7 did not exceed the adolescent trespasser soil screening level of 8,500 pg/g. The soil remedy is considered protective in the short-term for on-site exposure; however, long-term protectiveness is currently being assessed.

The cleanup level for PCP has also been updated during this FYR period. In February 2012, the ADEQ updated the PCP cleanup level to to 15.57 µg/L for the Chronic Standard (monthly average) and 20.29 µg/L for the Acute Standard (daily average), using the surface water quality standard. However, in November 2012 to January 2014,

ADEQ communicated to EPA that the application of the surface water quality standard pertains to aquatic toxicity only and does not address potential human health concerns. In addition, ADEQ noted that much of the groundwater which rises from New Cricket Spring and becomes surface water, returns to groundwater, and appears to migrate offsite as groundwater. ADEQ also reasoned in a letter dated October 7, 2013 (see Appendix I), that the MCL could be applied if the surface water is or could potentially be used as a drinking water source. Also, potential concerns were raised regarding groundwater circumventing New Cricket Spring and migrating beyond the spring as groundwater. The ADEQ recommended that due to these reasons, the drinking water quality standard for PCP at the MCL of 1.0 µg/L should be the cleanup level.

In January 2014, EPA confirmed to the RP that the New Cricket Spring water treatment system effluent would need to meet the MCL for PCP of 1.0 µg/L (or 1 ppb). The New Cricket Spring monitoring data for the most recent five-year period can be found in Appendix B, Table B-5.

Changes in Standards and TBCs

The 1990 ROD specified that contaminated groundwater must achieve AWQS. The PCP cleanup level, based on the AWQS, was updated at various times:

- 1998: surface water quality standard: monthly average: PCP 9.3 µg/L, and daily maximum: PCP 18.7 µg/L (ADPC&E, January 1998).
- 2012: surface water quality standard: Monthly Average: PCP 15.57 µg/L, and daily maximum: PCP 20.29 µg/L (ADEQ, February 2012).
- 2012-2014: maximum contaminant level: PCP 1.0 µg/L (ADEQ, November 2012; ADEQ, October 2013; ADEQ, January 2014; U.S. EPA, January 2014). At the time the ROD was signed, the AWQS was lower than the MCL for PCP (1.01 mg/L). Because the AWQS was determined to be more protective, the AWQS was selected as the cleanup level for PCP in groundwater. Since that time, the MCL for PCP has been revised to 1 µg/L which is lower than the AWQS. Site data will be evaluated relative to the MCL for PCP until such time as a decision document can be properly filed.

Changes in Toxicity and Other Contaminant Characteristics

The Regional Screening Levels (RSLs) for Site contaminants in soil have been updated since the ROD was issued. On February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral non-cancer toxicity value, or reference dose (RfD), of $7x10^{-10}$ mg/kg-day for 2,3,7,8-TCDD in EPA's Integrated Risk Information System (IRIS). The new dioxin RfD was approved for immediate use at Superfund sites to ensure protection of human health and the environment. This change resulted in updated preliminary remedial goals[2] for the Site (based on an industrial risk scenario).

Currently, the industrial RSL for PCP is 4 mg/kg and for benzo(a)pyrene is 0.29 mg/kg. The industrial RSL for dioxin is 2.2×10^{-5} mg/kg for cancer risk and 7.2×10^{-4} mg/kg for non-cancer effects.

Changes in Risk Assessment Methods

The RP, with EPA and ADEQ oversight, developed a revised Site CSM, work plans for implementation of soil sampling and a supplemental groundwater tracing study. Seven DUs were developed for surface soils at the Site and in accordance with Interstate Technology and Regulatory Council guidance for incremental soil sampling. The RP performed the soil sampling activities in October 2014 and the results of the soil sample analysis and a comparison to the soil screening levels were presented in the RP's Dioxin Reassessment document, dated December 30, 2015.

[2] https://www.epa.gov/superfund/risk-assessment-dioxin-superfund-sites

Currently, the RP's Dioxin Reassessment document, the applicability of soil risk exposure scenarios and comparison with the DUs, and the anticipated future use of the Site continue to be under review by the EPA and ADEQ.

Changes in Exposure Pathways

The CSM considered dioxin in Site soil from the areas affected by former processing and/or storage of treated wood materials as the main contaminant source, as well as residual contamination in the drainage ditches and uncapped areas. The CSM assumed direct exposure routes for dioxin, including incidental ingestion, dermal contact and inhalation for future industrial use for the Site, and trespasser scenarios for the Site, the adjacent railroad ditch area, and New Cricket Spring.

According to the FYR interview, the executor of the estate for the Site property[1] indicated that the approximate 12 acres on the east side of the Site, which is now outside the fence, has been sold to a home builder who also bought 52 acres of land across Old Cricket Road south of the Site. The executor also expressed an interest to re-use the Site for future industrial use purposes, which is potentially allowable under the corrected Deed Notice and Restrictions.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

As indicated in ADEQ and EPA letters from 2012-2014, information has been identified regarding groundwater and surface water interaction, groundwater bypass of New Cricket Spring, and groundwater that can potentially be used as drinking water from the Site. In addition, seeps and other discharges in locations other than New Cricket Spring were directly observed in site visits by EPA and ADEQ, indicating that New Cricket Spring is being bypassed to an unknown extent.

In June 2016, EPA sent a letter to the RP recommending the implementation of an additional dye test at high flow and additional monitoring wells to increase the ability to monitor karst flow and spring flow, address data gaps regarding the effectiveness of capture by New Cricket Spring, and establish whether an unacceptable amount of underflow or bypass flow is occurring with attendant contaminant transport, both solute (PCP) and colloidal (dioxin).

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the Five-Year Review:

OU(s): Sitewide	**Issue Category: Remedy Performance**			
	Issue: The non-cancer toxicity level for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was released in 2012 and the dioxin soil screening level has been revised.			
	Recommendation: Further assessment of the site data is required to determine the need for additional response actions to achieve long-term protectiveness.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

[1] The executor of the estate sold the Site property to the RP on July 11, 2016.

OU(s):	Issue Category: Institutional Controls			
Sitewide	**Issue:** The institutional controls currently in place may need to be modified, if the dioxin re-evaluation results in justification for this action.			
	Recommendation: Following completion of the site specific dioxin re-evaluation, amend the current ICs as appropriate.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

OU(s):	Issue Category: Remedy Performance			
Sitewide	**Issue:** Long-term protectiveness of the groundwater remedy needs to be verified to determine whether an unacceptable amount of underflow or bypass flow is occurring with attendant contaminant transport, both solute (PCP) and colloidal (dioxin).			
	Recommendation: Conduct contaminant fate and transport investigation to determine if New Cricket Spring captures all the contaminated groundwater and there is no colloidal transport of dioxin.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

OU(s):	Issue Category: Remedy Performance			
Sitewide	**Issue:** At the time the ROD was signed, the AWQS was lower than the MCL for PCP (1.01 mg/L). Since that time, the MCL for PCP has been revised to 1 µg/L which is lower than the AWQS.			
	Recommendation: Site data will be evaluated relative to the MCL for PCP until such time as a decision document can be properly filed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	RP	EPA	9/30/2019

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy at the Arkwood, Inc. Superfund Site currently protects human health and the environment because access and institutional controls are in place, the soils remedy removed or capped dioxin containing soils, and the groundwater remedy treats contaminated water from New Cricket Spring. In order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness: an evaluation of whether additional response actions are needed for dioxins in soil and an assessment of the effectiveness of the groundwater remedy, including the extent of groundwater capture by New Cricket Spring.

VIII. NEXT REVIEW

The next five-year review report for the Arkwood, Inc. Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

ADPC&E, letter, January 30, 1998, RE: New Cricket Spring, Arkwood Superfund Site, Omaha, Arkansas

ADEQ, letter, February 14, 2012, RE: New Cricket Spring Water Quality Standards, Arkwood Superfund Site, Omaha, Arkansas

ADEQ, letter, November 6, 2012, RE: Monthly Progress Report-September 2012, Arkwood, Inc. Site, Omaha, Arkansas

ADEQ, letter, October 7, 2013, RE: Cleanup Standards for Groundwater and Surface Water, Arkwood Superfund Site, Omaha, Arkansas

ADEQ, letter, December 17, 2013, RE: Dioxin Reassessment – Conceptual Site Model and Proposed Decision Unit Plan, and Groundwater Issues/Historic Hydrogeological Investigation Review for Arkwood, Inc. Site, Omaha, Arkansas

ADEQ, letter, January 6, 2014, RE: Groundwater Remedy Evaluation – New Cricket Spring, Arkwood, Inc. Site, Omaha, Arkansas

Cardno ChemRisk, December 17, 2012, Site Inspection and Screening Risk Assessment for Dioxins/Furans letter report, Arkwood, Inc. Site

Cardno ChemRisk, August 15, 2013, revised August 27, 2014, Conceptual Site Model and Proposed Decision Unit Plan for the Arkwood, Inc. Site

Cardno ChemRisk, December 30, 2015, Dioxin Reassessment at Arkwood, Inc. Superfund Site - Risk Evaluation of Analytical Data from Decision Unit Sampling

ERM-Southwest, Inc., March 30, 1990, Arkwood, Inc. Remedial Investigation Report

ERM-Southwest, Inc., September 1990, Arkwood, Inc. Record of Decision

McKesson Corporation, August 2011 to November 2015, Arkwood, Inc. Site Monthly Progress Reports

McKesson Corporation, June 2012 (Revised August 2012), Arkwood, Inc. Superfund Site Groundwater Remediation Summary

McKesson Corporation, August 29, 2014, Dioxin Reassessment – Final Conceptual Site Model, Final Supplemental Groundwater Tracing Study Work Plan, and Draft Work Plan for Implementation: Decision Unit Plan Sampling and Analysis, Arkwood, Inc. Site, Omaha, Arkansas

McKesson Corporation, October 9, 2014, Dioxin Reassessment – Final Conceptual Site Model; Final Work Plan for Implementation: Decision Unit Plan and Sampling; and Final Supplemental Groundwater Tracing Study Work Plan, Arkwood, Inc. Site, Omaha, Arkansas

Oxford Environmental and Safety, Inc., March 13, 2013; 2012 Annual Report, Arkwood, Inc. Site, Omaha, Arkansas
Oxford Environmental and Safety, Inc., November 2013, Arkwood, Inc. Superfund Site Groundwater Remedy Evaluation-New Cricket Spring Treatment

Oxford Environmental and Safety, Inc., February 26, 2015; 2014 Annual Report, Arkwood, Inc. Site, Omaha, Arkansas

Ozark Underground Laboratory , September 21, 1992, Groundwater Tracing Investigation Final Report, Arkwood, Inc. Site, Omaha, Arkansas

Ozark Underground Laboratory , March 2015, revised January 2016, Supplemental Groundwater Tracing Summary Report, Arkwood, Inc. Superfund Site

R2P5 Environmental Remediation, Inc., November 1997, Arkwood, Inc. Site, Activity Report I, July 1996 – September1997

R2P5 Environmental Remediation, Inc., November 1998, Arkwood, Inc. Site, Activity Report II, July 1997 – September 1998

R2P5 Environmental Remediation, Inc., November 1999, Arkwood, Inc. Site, Activity Report III, July 1998 – September 1999

R2P5 Environmental Remediation, Inc., November 2000, Arkwood, Inc. Site, Activity Report IV, July 1999 – September 2000

R2P5 Environmental Remediation, Inc., January 2002, Arkwood, Inc. Site, Annual Activity Report V, October 2000 – September 2001

R2P5 Environmental Remediation, Inc., April 2003, Arkwood, Inc. Site, Annual Activity Report VI, October 2001 – September 2002

R2P5 Environmental Remediation, Inc., April 2004, Arkwood, Inc. Site, Annual Activity Report VII, October 2002 – September 2003

R2P5 Environmental Remediation, Inc., April 2005, Arkwood, Inc. Site, Annual Activity Report VIII, October 2003 – September 2004

R2P5 Environmental Remediation, Inc., March 2006, Arkwood, Inc. Site, Annual Activity Report IX, October 2004 – September 2005

R2P5 Environmental Remediation, Inc., March 2010, Arkwood, Inc. Site, Annual Activity Report XIII, January 2009 – December 2009

The Forrester Group, May 21, 1993, Preliminary Engineering Report, Arkwood, Inc. Site

The Forrester Group, July 23, 1993, Report on Additional Pilot Scale Field Studies, Arkwood, Inc. Site

The Forrester Group, June 29, 1994, Interim Remedial Action Design, Arkwood, Inc. Site

The Forrester Group, June 29, 1994, Preliminary Remedial Action Plan, Arkwood, Inc. Site

The Forrester Group, July 1996, Site Closeout Report, Arkwood, Inc. Site

U.S. EPA, September 23, 1992, Corrected Consent Decree, United States of America, Plaintiff, v. Mass Merchandisers, Inc., Defendant

U.S. EPA Region 6, June 14, 1995, Explanation of Significant Differences, Arkwood, Inc. Site

U.S. EPA Region 6, February 2001, Arkwood, Inc. First Five-Year Review Report

U.S. EPA Region 6, February 2006, Arkwood, Inc. Second Five-Year Review Report

U.S. EPA Region 6, March 2011, Arkwood, Inc. Third Five-Year Review Report

U.S. EPA, National Risk Management Research Laboratory, Ground Water and Ecosystems Restoration Division, June 27, 2012, Arkwood Superfund Site (12-R06-002) memorandum

U.S. EPA Region 6, letter, January 29, 2014, Groundwater Cleanup Standard, Groundwater Remedy Evaluation - New Cricket Spring, Arkwood, Inc. Superfund Site

U.S. EPA Region 6, letter, October 6, 2014, Dioxin Reassessment – Final Conceptual Site Model, Final Supplemental Groundwater Tracing Study Work Plan, and Draft Work Plan for Implementation: Decision Unit Plan Sampling and Analysis, Arkwood, Inc. Superfund Site, Omaha, Arkansas

U.S. EPA Region 6, letter, October 21, 2014, Final Work Plan for Implementation: Decision Unit Plan and Sampling, and Final Supplemental Groundwater Tracing Study Work Plan, Arkwood, Inc. Superfund Site, Omaha, Arkansas

U.S. EPA Region 6, letter, June 8, 2016, Groundwater Data Gaps and Proposed Actions, Supplemental Groundwater Tracing Summary Report, Arkwood, Inc. Superfund Site

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APPENDIX B – EXISTING SITE INFORMATION

Site Chronology

Table B-1: Site Chronology	
Event	**Date**
Arkwood, Inc. commences wood-treating operations.	1962 to 1973
Mass Merchandisers Inc. (MMI) takes over operation of the plant under a lease agreement with the owner,.	1973 to June 1984
Arkansas Department of Pollution Control and Ecology (ADPC&E) receives a complaint about potentially affected water in the railroad tunnel.	Prior to May 1981
Preliminary investigations by ADPC&E indicate detectable levels of PCP in the area immediately surrounding the Site.	1981-1985
Plant operation ceases.	June 1984
U.S. Environmental Protection Agency (EPA) proposes adding the Site to the National Priorities List (NPL).	September 4, 1985
EPA and MMI enter into an Administrative Order on Consent (AOC) for performance of a Remedial Investigation/Feasibility Study (RI/FS).	May 15, 1986
Entry into Consent Decree between the United States of America, on behalf of the EPA, and the property owner to provide access to the Site for the RI/FS.	July 11, 1988
Site is added to the National Priorities List (NPL).	March 31, 1989
Remedial Investigation/Feasibility Study completed	May 23, 1990
EPA issues a Record of Decision (ROD) for the Site.	September 28, 1990
Groundwater Tracing Investigation	February to April 1991
Execution of a Consent Decree between EPA and MMI for Site remediation	May 30, 1991
Entry into a corrected Consent Decree between EPA and MMI for Site remediation	September 24, 1992
EPA approves Remedial Design Work Plan (RDWP) for Site	September 1992
Preliminary Engineering Report approved for Site	November 16, 1993
Remedial Action activities commence	February 1994
Preliminary Remedial Action Plan Submittal (Phase I Interim Remedial Action)	October 1994
Final Remedial Design Submittal (Phase I Interim Remedial Action)	October 1994
Preliminary Interim Remedial Action Statement of Completion Report Submittal	February 1995
Explanation of Significant Differences (ESD) is executed, changing treatment of the affected soils to incineration at an offsite facility.	June 14, 1995
Remedial Action is complete (Final Site Walk-Through)	December 13, 1995
Site Close-out Report	July 1996
Ozone pilot treatment system is installed at the Site and New Cricket Spring.	February 1997

Table B-1: Site Chronology	
Event	**Date**
Ozone pilot treatment system is upgraded with ozone diffuser and baffles.	November 1997 to January 1998
A newer, higher capacity ozone treatment system is installed at New Cricket Spring.	October to December 1999
Arkwood, Inc. Site First Five-Year Review	February 2001
An ozone injection pilot system is installed and operated near the sinkhole.	December 2005 to August 2009
Arkwood, Inc. Site Second Five-Year Review	February 2006
Injection of non-ozonated groundwater near the sinkhole	August 2009 to April 2011
Cessation of injection of non-ozonated groundwater near the sinkhole	April 2011 to November 2011
Arkwood, Inc. Site Third Five-Year Review	August 18, 2011
Resume injection of non-ozonated groundwater near the sinkhole	November 2011 to September 2012
Second cessation of injection of non-ozonated groundwater near the sinkhole	September 10, 2012 to Present
Groundwater Remedy Evaluation - New Cricket Spring Treatment Report	November 2013
Site Inspection and Screening Risk Assessment for Dioxins/Furans letter report	December 2012
Conceptual Site Model and Proposed Decision Unit Plan	August 27, 2014
Dioxin reassessment decision unit sampling performed	October 2014
Supplemental groundwater tracing study performed	November 2014 to January 2015
Dioxin Reassessment at Arkwood, Inc. Superfund Site - Risk Evaluation of Analytical Data from Decision Unit Sampling letter report	December 30, 2015
Supplemental Groundwater Tracing Summary Report	January 2016
High Flow Groundwater Dye Tracing Study Work Plan Submitted	February 9, 2016

Site Background

Physical Characteristics

The Arkwood, Inc., Site is located within the Ozark Highlands of northern Arkansas. The Site lies approximately one-half mile southwest of Omaha, in Section 27, Township 21 North and Range 21West, Boone County, Arkansas (Appendix C, Figure 1). The township of Omaha, Arkansas has a population of 169 (2010 U.S. Census). The property is bordered to the southeast by the old U.S. Highway 65, to the northeast by the Missouri & Northern Arkansas Railroad (formerly, the Missouri Pacific Railroad), and to the southwest by Old Cricket Road (Appendix C, Figure 2). The Site comprises an approximately 15-acre triangular shaped parcel that slopes gently toward the north-west. It is situated in a valley on Cricket Creek Road, bounded by ridges covered with native tree species. The remediated Site is covered with grass and enclosed by a fence. Near-surface soils were contaminated by the former wood-treating operations that used creosote and PCP in the processes. The Site is in an area of karst geology that is characterized by subsurface fractures and channels. New Cricket Spring, located down valley about 1,000 feet north-west of the site, was contaminated by the former Site activities.

Adjacent property along the top of the steeply-sloped wooded hillside immediately north of the rail line is occupied by a rental self-storage unit facility and by the Omaha School District. South of the Site, beyond Old

Cricket Road, is a tract of mostly undeveloped woodland. The remainder of the general area surrounding the Site is rural residential with the closest hydrologically down-gradient residence approximately one half-mile from the Site. Prior to soil remediation, the most affected soils were near the surface, in particular the treatment area, the railroad ditch area and the wood storage yard (Appendix C, Figure 2).

PCP was the most readily identifiable and frequently encountered organic constituent at the Site. Various PAHs and low levels of dioxin were also found in Site soils, but were less widespread than PCP.

Revised Site Boundaries

During 2014, the Site boundaries incorporated in the deed restriction were re-defined in a corrected deed notice and restrictions resulting in re-classifying approximately 12 acres on the easternmost portion of the Site as no longer part of the deed restricted area. As a result, the RP removed some fencing from the previous Site boundary. New Site boundary fencing, in the form of a six-foot tall chain link fence, was installed across a roadway that accessed the Site from the east and a steel cable fence was installed along the remaining eastern boundary. The steel cable fencing was utilized in these areas due to significant changes in terrain and the wooded nature of the Site boundary which would have required significant earthwork and tree removal to make the boundary amenable to chain link fencing. Caution signage was added to the new sections of steel cable and chain link fencing to provide warning regarding the nature of the Site.

Hydrology

The Arkwood Site is located within the Boone Formation of Mississippian age, and consists primarily of limestone, with varying amounts of chert. The upper weathered portion of the limestone is referred to as the epikarstic zone, about 30 feet thick, with the abundance of solutional voids decreasing with depth. The epikarstic zone has been modified by solution and by partial in-filling with sediments derived from dissolution of the bedrock and from overlying soil and residuum. The former sinkhole was a feature within the epikarstic zone and New Cricket Spring is a discharge point for groundwater from the vicinity of the former sinkhole.

1991 Groundwater Tracing Study

In 1991 the Ozark Underground Laboratory (OUL) conducted a groundwater tracing study at the Arkwood Site. Dyes for the study were introduced at two locations:

At the south-eastern corner of the Site, lateral to and up-gradient of the sinkhole (the point of discharge of constituent contaminants at the Site); and approximately 25 feet past (and down-gradient of) New Cricket Spring.

The stated objectives of the tracer dye test were:

- To identify local and regional springs which receive waters from the Arkwood Site;
- To determine if waters from the Site flow to springs in topographic basins other than Cricket Creek and Walnut Creek; and
- To help characterize groundwater movement from the vicinity of the Site to springs and streams in the region.

The tracer tests involved the dispersal of a batch of fluorescein and rhodamine dye (18,000 gallons) on the ground at the locations outlined above.

The 1991 dye tracing indicated that the Site was underlain by a groundwater divide. It appears that the location of the groundwater divide is mobile, and dependent upon the groundwater elevation at any particular time. Following heavy or prolonged rainfall, with higher groundwater levels, the groundwater divide migrates further up-gradient (up the valley), then moves down-gradient as groundwater levels recede after the rain event has passed. Under normal (moderate) weather conditions, groundwater from the south-eastern area of

the Site discharges to the Walnut Creek catchment, and groundwater from the north-western area of the Site discharges to the Cricket Creek catchment.

2014/15 Groundwater Tracing Study

In response to ongoing uncertainty as whether New Cricket Spring receives all of the contaminated groundwater from the Site, at a Site inspection in March 2014, a semi-quantitative dye trace was proposed from the vicinity of the former sinkhole to New Cricket Spring. From November 2014 to January 2015, a further tracer study was carried out at the Site as follows:

- Introduce two tracer dyes into two separate shallow wells in the epikarstic zone near the former sinkhole (one dye in each well);
- Periodically collect composite water samples and flow rate measurement from New Cricket Spring to permit calculation of a semi-quantitative mass balance; and
- Collect activated carbon and grab water samples in selected locations in both Cricket Creek and Walnut Creek watersheds to determine if any detectable concentration of either of the dyes discharges to any locations in addition to New Cricket Spring.

In the 2014/15 groundwater tracing study, dye traces introduced around the former sinkhole only discharged to New Cricket Spring. From the 2014/15 dye tracing test it became apparent that under low, normal or moderate groundwater levels, contaminants previously released from the Site do migrate to and discharge from New Cricket Spring. However, at a certain (unknown) threshold water level in the epikarst formation (and consequential high flow rate from New Cricket Spring), the elevation of the groundwater divide is exceeded potentially resulting in contaminant discharge to the adjacent railroad tunnel spring, and potentially further up the valley. When the critical groundwater level has been determined, in conjunction with relevant rainfall and hydro-geological data, it may be possible to estimate the return period frequency for contaminated groundwater to discharge to the railroad tunnel spring. The frequency of contaminated discharges to the railroad tunnel and up-valley can be used to assess the potential risk from Site contaminants.

New Cricket Spring Flow

Based on spring-flow measurements, rainfall predictably affects the observed flow rate in New Cricket Spring. Monitoring records indicate that if sufficient rainfall occurs that surface runoff develops, an increase in spring flow generally occurs within a few hours. Depending upon the volume and duration of rainfall, the flow rate at New Cricket Spring diminishes over a period of a day to several days, to pre-precipitation flow rates.

Groundwater Monitoring

Water samples have been collected on a monthly frequency for analytical testing at the mouth of New Cricket Spring and at the treatment system discharge weir.

Land and Resource Use

The 1990 Record of Decision (ROD) identified the former land use of the Site as a wood treating facility. Currently, the Site land use is inactive and maintained by the RP (Appendix G, Site Inspection Checklist). The Site property, formerly owned by an estate in trust, was recently sold to the RP in July 2016. During the ownership by the estate in trust, the executor of the estate in trust expressed a desire to sell or lease the Site property for potential industrial use in an effort to address unemployment in the local community[1] (Appendix I, Interviews). The May 2014 corrected deed notice limits future use of the Site to industrial use only, making commercial or residential use prohibited. The deed notice also prohibits extraction or use of the groundwater underlying the Site, except if authorized by the EPA and/or ADEQ for investigation, remediation or monitoring purposes. Part of the selected groundwater remedy for the 1990 ROD provided city water for the groundwater users immediately down gradient from the Site in Cricket Valley. Recreational areas for water

[1]The executor of the estate sold the Site property to the PRP on July 11, 2016.

sport, fishing, scuba diving and camping within approximately 20 miles of the Site include Bull Shoals Lake to the east and Table Rock Lake and Lake Taneycomo in south Missouri to the north and northwest.

History of Contamination

The Site was developed in the 1950's when a railroad company excavated about 40 to 50 feet below natural grade to obtain fill dirt for constructing a railroad embankment. Arkwood, Inc. began wood treating operations at the Site in 1962. The operations consisted of a millwork shop, a wood-treating plant that used creosote and PCP in its process, and a yard for storing treated wood products prior to sale. Wood-treating operations involved bringing untreated timber posts and poles to the Site, and placing the wood materials into a treatment cylinder where the chemical preservatives were introduced under pressure (Appendix C, Figure 2).

In 1973, the Site owner leased the wood-treating facility to Mass Merchandisers, Inc. (MMI). MMI continued to operate the Arkwood plant until June 1984. Subsequently, the remaining inventory was sold or removed from the Site. In January 1985, MMI's lease expired and was not renewed. The owner dismantled the plant in 1986.

During its 20-plus years of operation, wastes from plant operations were disposed of onsite. From 1962 through 1971, wastes were reportedly dumped into a sinkhole adjacent to the treatment plant or incinerated in a boiler inside the treatment plant. The sinkhole was subsequently sealed and the wastes were placed in a ditch adjacent to the railroad until approximately 1973 when MMI began using a chemical recovery process. The ashes from the onsite boiler were disposed in a former ash pile located near the northwest end of the Site. Other wastes included liquids used to wash the treatment plant floor and equipment. Such waste liquids were accumulated in a holding tank and then spread over the wood storage yard to control dust. The approximate amount of these wastes generated annually was estimated to be approximately 500 gallons per year.

The Arkansas Department of Pollution Control and Ecology (ADPC&E) received a complaint about the Site in 1981 during a widening project for the railroad tunnel next to the Site. Preliminary investigations revealed detectable levels of PCP in area groundwater.

Initial Response

In October 1981, MMI met with ADPC&E to develop a plan of study to address the limits of the problem area, and a plan of corrective action with a schedule for the implementation of corrective measures. The plan was submitted to the ADPC&E in December 1981. Numerous investigative activities followed to determine the impact of the Site on the surrounding environment. These activities included waste characterization, and sampling of springs and wells in the area. Monthly groundwater sampling was initiated in May 1982 by MMI. Preliminary sampling data detected PCP-contaminated groundwater in the off-site New Cricket Spring channel west of the plant , and in a spring to the east inside the railroad tunnel (PAH-contaminated groundwater was initially detected in domestic water supply wells Birmingham old well W-11B and Duggan well W-38, but subsequent sampling events could not confirm the PAH contamination). MMI poured a concrete pad over the sinkhole previously used for waste disposal, and modified the treatment plant area and its standard operating procedures to control the release of wood treating chemicals at the Site.

In July 1982, a preliminary assessment of the site-specific geology indicated the direction of the groundwater flow was predominately to the west, following the regional dip of the outcropping limestone. The monthly groundwater and surface water sampling program continued until December 1984.

In the spring of 1985, MMI conducted three separate sampling events. One event was a Site hydrogeological investigation which included monitoring the quality of water samples from wells, springs and streams in the area and completing soil borings. In May 1985, another Site sampling included analysis of sludges, groundwater and surface waters for PCP and other constituents. In June of 1985, a third sampling event was conducted in which three well and spring samples were collected and three soil and sludge samples were

obtained for purposes of waste characterization. These investigations documented the presence of PCP, PAHs, and dioxins.

In September 1985, EPA proposed the Site for inclusion on the National Priorities List (NPL). The Site was formally added to the NPL on March 31, 1989.

In May 1986, MMI entered into an Administrative Order on Consent (AOC) with the EPA. A Remedial Investigation/Feasibility Study (RI/FS) Work Plan was prepared for MMI in compliance with the Consent Order, and finalized in December 1986. With EPA oversight, MMI conducted a RI/FS to determine the nature and extent of contamination and to investigate possible remedies for the Site. Efforts to conduct the RI/FS began in 1987 pursuant to the AOC. A Consent Decree was entered into by the United States of America, on behalf of the EPA (United States) with the property owner on July 11, 1988, to provide access to the Site to conduct the RI/FS. The RI/FS was completed by MMI on May 23, 1990.

The RI's numerous soil borings, monitoring well and spring sampling events provided an abundance of analytical data. On-site soils were most affected near the surface. PCP was the most frequently encountered organic constituent at the Site. PCP was detected in surface soils of the wood storage yard, the trolley/treatment area and within the offsite railroad ditch area. In addition to PCP, various PAHs typically associated with wood treating operations and low levels of dioxin were also found in Site soils. However, the occurrence of PAHs was much less widespread than PCP and was not as good an an indicator of affected soil as PCP. The unconfined karst aquifer underlying the Site made it difficult to determine aquifer characteristics, such as flow direction, gradient, and velocity. The constituents PCP and PAHs were detected in groundwater of some of the Site wells and wells in the vicinity of the railroad ditch. Affected groundwater was also detected in New Cricket Spring and in one railroad tunnel spring sample. None of the domestic or municipal wells sampled during the study contained confirmed evidence of wood treatment compounds.

An "Endangerment Assessment" (EA) was also performed as part of the RI (August 30, 1989). Representative concentrations of the various contaminants were calculated to assess the risk to human health and the environment posed by the Site. The Feasibility Study (May 23, 1990) identified remedial technology alternatives with detailed design analysis and cost estimation to address the risks identified in the EA. The calculated concentrations of the various contaminants of the EA formed the basis of clean up levels defined in the ROD.

Basis for Taking Action

The Regional Administrator for EPA Region 6 approved the Record of Decision (ROD) for the Site on September 28, 1990. The 1990 ROD documented that the principal threat from the Site was direct contact with soils contaminated above health-based levels. In addition, the 1990 ROD stated that these soils posed a long-term threat to groundwater. Site soils were contaminated with PCP, PAHs, and dioxin. Contaminated materials were defined as all Site materials that contain greater than 300 milligrams per kilogram (mg/kg) PCP, greater than 20 micrograms per kilogram (µg/kg) dioxin as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) equivalents, or greater than 6.0 mg/kg PAHs as benzo-a-pyrene equivalents. The PCP soil clean up level of 300 mg/kg was based on the MCL of 1 mg/L. New Cricket Spring contained concentrations of PCP above the Arkansas Water Quality Standard.

The 1990 ROD specified selected remedies for both the affected Site soils and sludges, and for the affected groundwater. Excavation and onsite incineration was selected for the affected sludges and soils. The excavated material would be sieved and washed, tested, and material meeting the clean-up criteria would be backfilled onsite. The material that does not meet clean-up criteria would be incinerated on Site before backfilling. This remedy would eliminate the direct contact threat from the Site soils and the railroad ditch. The long-term threat to the groundwater would be eliminated since no contamination above health-based levels would be left on Site.

Additionally, a topsoil cap would eliminate the threat from contact with any soils remaining with contaminants above the clean-up goals; a perimeter fence would further reduce the risk by restricting Site access; and a notice in the deed would limit the Site to industrial use and prohibit future excavation. The selected remedy for the affected groundwater would be a combination of monitored natural attenuation; providing groundwater users immediately downgradient from the Site in Cricket Creek valley with city water; and groundwater recovery from New Cricket Spring, treatment to meet the State of Arkansas Water Quality Standards, and surface discharge.

In April 1991, a Consent Decree (CD) was entered between the United States of America, on behalf of the EPA (United States) and MMI to remediate the Site. The CD includes the ROD and a Statement of Work (SOW) as Appendices A and B, respectively, (collectively the Consent Decree). A corrected CD was entered on September 23, 1992, including the same attachments.

In September 1992, EPA approved the Remedial Design Work Plan (RDWP) for the Site. The RDWP provided a definition of the pre-design studies, design elements, review schedules, and deliverables to EPA and ADPC&E for MMI to implement the CD. The remedial design was performed in three phases: predesign studies, preliminary engineering, and a final remedial design. Some of the predesign studies included additional field sampling to further delineate the volume of affected soil requiring excavation, pilot studies for the sieve and wash system, and an incineration characterization study. Pursuant to the RDWP, MMI prepared a Preliminary Engineering Report (PER), dated May 21, 1993. The PER presented the results of certain predesign studies and criteria for the remedial designs of the sieve and wash, the incinerator, and other site facilities. The total volume of soil excavation estimated in the FS was reduced based on the additional soil sampling results of the PER. Sieve and wash pilot studies indicated that dry sieving alone may result in a material that would meet the Remedial Objectives and that the washing process may not be necessary. The PER identified supplemental bench scale and pilot scale studies would be needed to determine if dry sieving alone was sufficient. And, the PER's incineration characteristics study determined the soils to be easily incinerable. The Additional Field Scale Pilot Studies (dated July 23, 1993) recommended the soil treatment remedial design proceed on the basis of using field drying techniques, followed by chain flailing and dry sieving alone prior to incineration and backfilling activities. Based on evaluation of the results of the pre-design studies documented in the PER and in the subsequent Report on Additional Field Scale Pilot Studies, MMI proposed a phased approach for the soil remedy.

EPA agreed to the phased approach on November 16, 1993. Phase I of the soil project for the Site consisted of the pretreatment and storage stage of the remedy specified in the ROD and CD. This phase also included backfilling activities that were necessary to minimize adverse environmental impacts prior to implementation of Phase II. MMI prepared an Interim Remedial Action Design (IRAD) and Preliminary Remedial Action Plan (PRAP) to describe the Phase I remedial activities. The EPA conditionally approved both the IRAD and PRAP on June 29, 1994. Preparation of the Site for Phase I activities began in February 1994 and was completed in July 1994. Phase I remediation began on August 1, 1994, and was suspended due to weather on October 14, 1994. Work performed during this period included excavation of affected soil, pretreatment of this soil, and storage of the pretreated soil for final treatment. Phase I activities performed during 1994 are documented in the Preliminary Interim Remedial Action Statement of Completion Report submitted to EPA in February 1995. Phase I remediation resumed in May 1995 and was completed by mid-August 1995.

Phase II of the project was the Final Remedial Action for the Site and consisted of off-site incineration of affected materials and Site closure, excluding groundwater issues. The ROD and CD specified onsite incineration for the remedy for affected materials at the Site. However, due to changes in conditions since entry of the ROD and CD, MMI and EPA agreed that off-site incineration was a more appropriate remedy. To document the change in the final remedy, EPA prepared an Explanation of Significant Difference (ESD) that was signed by the Regional Administrator on June 14, 1995. The soil remediation project was completed December 13, 1995.

Although none of the domestic or municipal wells sampled during the study contained confirmed evidence of wood-treatment compounds, an extension to the Omaha municipal water line was constructed in 1991 to provide city water to designated residences down gradient from the Site as a safeguard. As set forth in the CD and based on the results of a dye tracing study, the springs were sampled quarterly for four years after the soil remediation was completed. In addition, an ozone pilot system was installed in February 1997. Based on the results of the pilot study, the treatment system was upgraded in late 1997 and a new, higher capacity system was installed in 1999. A second ozone injection pilot study was conducted from December 2005 through August 2009 with the goal of accelerating the reduction of residual PCP in the subsurface between the Site and New Cricket Spring. Non-ozonated water was injected in the vicinity of the sinkhole from September 2009 to March 2011 as a means of continued flushing and to facilitate efficient operation of the treatment system at New Cricket Spring. During April 2011 to November 2011 the injection of the non-ozonated water was halted to evaluate New Cricket Spring's PCP concentrations under natural flow conditions. During November 2011 to September 2012, the injection of the non-ozonated water was re-started at the request of the EPA. In September 2012 the injection of the non-ozonated water was halted a second time. The treatment of the spring water continues under natural flow conditions without any water injection.

Remedial Actions

Remedy Selection

Soil Remedy

The EPA Regional Administrator for Region 6 signed the Record of Decision (ROD) on September 28, 1990. The ROD stated that all Site soil containing greater than 300 mg/kg PCP, greater than 20 µg/kg dioxin as 2,3,7,8-TCDD equivalents, or greater than 6.0 mg/kg carcinogenic PAHs as benzo(a) pyrene equivalents met the definition of "affected soil" and were to be incinerated onsite. However, final treatment of the contaminated material was changed to incineration at an offsite facility.

Groundwater Remedy

As part of the groundwater remedy, treatment at New Cricket Spring was required if, after two years following completion of the soil remedy, the water quality at the spring did not meet Arkansas Water Quality Standards. Since the spring continued to exceed standards after the two-year period, installation of a water treatment system was initiated. In addition, the selected groundwater remedy required city water to be provided for the groundwater users immediately down gradient from the Site in Cricket Valley to remove any uncertainty in their water supply.

The EPA determined that this remedy was protective of human health and the environment, attained federal and state requirements that are applicable or relevant and appropriate, was cost-effective compared to equally environmentally protective alternatives, and utilized permanent solutions and alternative treatment technologies to the maximum extent practicable.

Remedy Implementation

Mass Merchandisers, Inc. (MMI) managed the remedial activities. Roy F. Weston, Inc., provided oversight for the EPA during the implementation of the soil remediation. The remedial actions were completed in phases.

Soil Remediation

Near-surface soils were contaminated by the former use of creosote and PCP in the treatment processes. The 1990 ROD specified that all contaminated sludge and soil would be excavated, pre-treated onsite, and then incinerated onsite. Contaminated soils were defined as those soils containing contaminants greater than the following clean up goals: 300 mg/kg PCP, 6.0 mg/kg PAHs as benzo-(a)-pyrene equivalents ,

and 20 µg/kg TCDD equivalents. The pretreatment step was anticipated to produce a coarse material fraction separate from the fine, affected soils. The 1990 ROD provided that the coarse material be tested and, if clean up goals were met, the material could be backfilled onsite. The 1990 ROD stipulated that coarse materials not meeting the clean-up goals would be incinerated along with the fines.

Based upon information generated in the RI/FS, the 1990 ROD estimated the volume of contaminated soils to be about 20,400 cubic yards to an approximate depth of one to two feet on the main area of the Site, a depth of six to seven feet in the former sinkhole area, and a depth of four to five feet in the railroad ditch area. The ROD estimated the volume of sludge in the railroad ditch area and material in the sinkhole totaled 425 cubic yards.

In order to optimize the design as well as the implementation of the soils remedy, the Remedial Design (RD) and Remedial Action (RA) activities outlined in the CD were completed in two phases. The CD Statement of Work (SOW) outlined in the initial consideration of a phased approach, to be determined during the preliminary design (SOW, Section II (A)(21), p. 17). The EPA approved a phased approach and detailed the split of remedial activities for each of 2 phases in correspondence with MMI dated November 16, 1993. The EPA issued a fact sheet to describe the approved phased approach on May 6, 1994.

The phased approach allowed remedial activities to be started one year ahead of the original RD/RA schedule provided in the CD. Implementation of the phased RD/RA project also provided information which helped determine that the volume of affected fines was much less than that estimated in the ROD (3,500 cubic yards as compared to 7,000 cubic yards), prior to the completion of the remedial design for Phase II. This information was used to plan and complete an Explanation of Significant Differences (ESD) on June 14, 1995, which changed one aspect of the soil remedy. Rather than constructing an onsite incinerator, the small volume of fine material (and other affected debris) was shipped off-site for incineration and disposal. The ESD described the resource savings for the RP which completed the soils remedy two years ahead of the CD schedule.The soils remedy also eliminated the concerns about constructing an incinerator in close proximity to the Omaha School.

The Phase I RD/RA included excavation, pretreatment, and temporary storage of contaminated soil onsite, and the recovery and storage onsite of approximately 600 gallons of contaminated liquids from the sinkhole. The Phase I RA was initiated in spring 1994 and was completed in summer 1995. The Phase II RD/RA included off-site incineration and Site closure activities. The Phase II RA was initiated upon completion of Phase I and all soil remedial activities were completed on December 13, 1995. A total of approximately 8,700 cubic yards of soil was excavated and pretreated resulting in approximately 5,200 cubic yards of clean coarse material and 3,500 cubic yards of affected fine soil. The affected soil and liquids were transported offsite and incinerated.

Site Closure Activities

As a part of Site closure activities, MMI performed the following activities: constructed a perimeter fence along the north boundary of the Site (the rest of the Site was fenced previously); backfilled and regraded the remediated areas. An additional 600 cubic yards of topsoil was brought to the Site in addition to approximately 11,000 cubic yards of topsoil was stockpiled during the Site preparation period; seeded the Site with a variety of grasses; and completed a survey of the re-graded Site. The EPA, ADPC&E, and MMI performed a final inspection on December 13, 1995. Site maintenance activities include inspecting the Site regularly to assess the condition of the vegetative cover, storm water ditches and perimeter fencing.

Groundwater Remediation

A major conclusion from the Arkwood Remedial Investigation Report (April 4, 1990) concerning groundwater was: "It was determined that the Site is underlain by a shallow, unconfined karst aquifer

within the St. Joe Formation. Water movement appears to be dominated by conduit flow through fractures and other features that have been widened and enlarged by solution activity. A diffuse flow component of the aquifer appears to transport water from zones of storage within the deeper residuum clays and subcutaneous zone to the larger conduit network. The apparent lack of a well-defined water table complicates the determination of aquifer characteristics such as flow direction, gradient and velocity. The affected groundwater emerging from New Cricket Spring provides evidence to indicate that this spring is hydraulically down-gradient of the Arkwood Site and that it is formed by the only major conduit to which affected groundwater has been shown to be converging. PCP levels detected in New Cricket Spring have been found to range from 1.0 to 2.3 mg/L."

The 1990 ROD specified that New Cricket Spring would be monitored for two years following completion of the soil remedy. If the concentration of PCP did not meet the State of Arkansas Water Quality Standards via natural attenuation at the end of the two year monitoring period, treatment of the spring would be required.

During the intervening two years, the PCP concentrations at New Cricket Spring dropped significantly. However, since the levels remained above State of Arkansas Water Quality Standards, a water treatment system was installed at the Site and New Cricket Spring in February 1997. The water treatment system was upgraded in late 1997/early 1998 by the installation of an ozone diffuser and a stainless steel baffle system at New Cricket Spring. In fall 1999, a new, higher capacity treatment system was installed at New Cricket Spring.

An ozone injection pilot study near the former onsite sinkhole was operated from December 2005 through August 2009 with a goal of accelerating the reduction of residual PCP in the subsurface between the Site and New Cricket Spring. From the remainder of 2009 to September 2012 non-ozonated water was injected intermittently in the vicinity of the sinkhole as a means of flushing the groundwater and facilitating the efficient operation of the treatment system at New Cricket Spring.

From April 2011 to November 2011, the injection of the non-ozonated water near the former sinkhole was halted. A rebound in PCP concentrations at New Cricket Spring was observed and most of the PCP concentrations measured at the spring outflow exceeded the State of Arkansas Water Quality Standards, and exceedances were frequent during periods of low flow (Appendix C, Figure 3).

From November 2011 to September 2012, the injection of the non-ozonated water was restarted, which maintained a spring flow of about 15 gallons per minute (gpm),at a minimum. After injection was restarted, the majority of the PCP concentrations measured at the spring outflow were below the State of Arkansas Water Quality Standards (Appendix C, Figure 4).

In September 2012 the injection of the non-ozonated water was halted again to confirm that injected groundwater was impacting PCP measurements at New Cricket Spring by making them biased low. Again, after injection was halted, a rebound in PCP concentrations at the spring outflow was observed (Appendix C, Figure 5). Currently, the treatment of groundwater at New Cricket Spring continues under natural flow conditions, without any water injection.

Initially, in January 1998, the Arkansas Department of Pollution Control & Ecology (ADPC&E) utilized the surface water quality standard for PCP as the cleanup level at New Cricket Spring. In February 2012, continuing the use of the surface water quality standard, the ADEQ updated the PCP cleanup level to to 15.57 µg/L for the Chronic Standard (monthly average) and 20.29 µg/L for the Acute Standard (daily average) to reflect more recent pH values from the nearest water quality monitoring station. In September 2012, the collection of temperature, pH, and dissolved oxygen data from the treatment station discharge was added to assist in future revisions to the cleanup level for PCP.

In November 2012 to January 2014, ADEQ identified to EPA that the application of the surface water quality standard pertains to aquatic toxicity only and does not address potential human health concerns. In addition, ADEQ noted that much of the groundwater which rises from New Cricket Spring and becomes surface water, returns to groundwater, and appears to migrate offsite as groundwater. In addition, concerns were raised regarding groundwater circumventing New Cricket Spring and migrating beyond the spring as groundwater. The ADEQ recommended that due to these reasons, the drinking water quality standard for PCP at the MCL of 1.0 µg/L should be the cleanup level.

In January 2014, EPA identified to the RP that the treatment station effluent would need to meet the MCL for PCP of 1.0 µg/L (or 1 ppb). Progress reports submitted monthly by the RP include the analytical laboratory data for the spring and weir samples and a summary of the monitoring data. The New Cricket Spring monitoring data for the most recent five-year period can be found in Table B-5 in this appendix.

Sampling of Springs

Based on the dye tracing studies, four springs were identified for monitoring: New Cricket Spring, Walnut Creek Spring, Cricket Creek Spring, and Railroad Tunnel Spring. These springs were sampled quarterly from 1996 through 1999 except during periods of insufficient flow. In 2000, spring sampling was reduced to only New Cricket Spring, since this is the only spring that continued to show contamination with PCP. Monthly sampling was initiated in May 2000. Three samples are collected monthly at the Site: one from the mouth of the spring, one from the effluent weir of the treatment station, and a duplicate sample generally from the mouth of the spring, but occasionally from the weir. The third sample is used by the laboratory to run quality assurance/quality control QA/OC analyses. Three types of surrogate compounds are evaluated for recovery as presented in the analytical reports attached to the monthly reports. Data from the sampling is shown in Table B-2 and Table B-3 in this appendix, and Figure 8 in Appendix C.

New Cricket Spring Water Flow

The periods of non-ozonated groundwater injection resulted in increased base flow rates in New Cricket Spring. The injected water accounted for approximately 15 to 20 gallons per minute as measured at New Cricket Spring, when water injection was occurring. The flow values provided in Tables 8 and 9 have been adjusted to account for additional base flow rates during the periods of groundwater injection. The annual average flows at New Cricket Spring for the current five year period are approximately equal to or less than the flows of the previous five year period. The 2012, 2013 and 2015 average flows were as low as or lower than the flows observed during the period of 1996-2011, and consistent with the drought conditions during those periods. A comparison of the New Cricket Spring flows for the previous 20 years can be observed on Figure 9.

The water flow through New Cricket Spring responds fairly rapidly to rainfall events. New Cricket Spring water flow rates are recorded at the time of each sampling event. The reported monthly flow rates varied from less than one gallon per minute (gpm) (0.13 and 0.25 gpm) in September 2011 and September 2014 to 310 gpm in May 2011. The New Cricket Spring annual average water flows for 1996 through 2015 is presented in Table B-4 in this appendix.

System Operation/Operation and Maintenance

Treatment System Operations

The groundwater treatment system at New Cricket Spring is an ozone oxidation system. Groundwater from the spring is piped to a sump adjacent to the treatment building. The treatment system is composed of an ozone generator and a mass transfer system. The mass transfer system is designed for injection of the ozone into the water stream and to allow for contact between the ozone and water streams. The mass transfer system has the capability for recirculation to allow for variable flow from the spring. The affected

water is processed through the treatment system and the treated water is discharged over a weir into the receiving stream. Table B-5 of this appendix presents the results of operational data for 2005 to 2015.

Equipment operations consisted of operating the groundwater treatment system at New Cricket Spring, and maintenance of the facilities located at the Site. The treatment system continues to effectively treat the PCP that is present in New Cricket Spring prior to its discharge to a tributary to Cricket Creek. Routine maintenance and parts replacement occurred over the current period. No significant parts replacement was required and only minimal downtime was incurred associated with routine maintenance activities. During the FYR Site inspection the RP stated the general O&M costs average about $125,000 annually plus electrical utility costs. The annual O&M costs estimated in the 1990 Feasibility Study for the 1990 ROD was $194,000. Adjusting for inflation, the estimated annual O&M costs would be equivalent to a present value of approximately $350,000 (Appendix G, Site Inspection Checklist).

A pilot ozonated-water injection system was installed in late 2005 at the Site and operated until August 2009. The pilot system injected ozonated water into the subsurface beneath the Site to a depth of approximately twenty-five feet to treat residual concentrations of PCP which impact New Cricket Spring. During its operation the pilot ozonated-water injection system alternated between nine different injection points in the vicinity of the former sinkhole on the main Site. The injection of non-ozonated groundwater continued from August 2009 to March 2011. The non-ozonated groundwater injection was halted from April to November 2011, and then re-started again from December 2011 until September 2012. On September 10, 2012, groundwater injection was discontinued permanently. The treatment of the spring water continues under natural flow conditions without any water injection. The second and third columns of Table B-5 of this appendix presents the operational data for the pilot ozone injection system during its operation from 2005 to 2009, and the injection of non-ozonated groundwater from 2009 to 2012.

Table B-2: Spring Samples 1996, 1997, 1998 1999 & 2001

New Cricket Spring		PCP Concentrations (ppb)			
Date	**Flow GPM**	**New Cricket Spring**	**Walnut Creek Spring**	**Cricket Creek Spring**	**Railroad Tunnel Spring**
7/2/96	112	688	10.6	ND	111
10/11/96	2	651	Insufficient Flow	Insufficient Flow	Insufficient Flow
1/20/97	34	681	ND	ND	148
3/16/97	34	330	ND	ND	ND
7/18/97	2	775	Insufficient Flow	Insufficient Flow	Insufficient Flow
9/30/97	50	560	ND	ND	ND
1/20/98	42	561	ND	ND	ND
5/7/98	65	196	ND	ND	ND
7/23/98	3	561	Insufficient Flow	Insufficient Flow	Insufficient Flow
11/4/98	8	570	ND	ND	ND
1/29/99	60	288	ND	ND	ND
7/12/99	42	ND	ND	ND	ND
4/2/2001	-------	-------	ND	ND	ND

ND = non detect

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
7/2/1996	112		688	
10/11/1996	2		651	
		57		**670**
1/20/1997	34		681	
3/16/1997	34		330	
7/18/1997	2		775	
9/30/1997	50		560	
		30		**586**
1/20/1998	42		561	
5/7/1998	65		196	
7/23/1998	3		561	
11/4/1998	8		570	
		30		**472**
1/29/1999	60		288	
7/12/1999	42		ND	
		51		**288**
3/8/2000	5		284	
5/15/2000	2		272	
6/23/2000	75		389	
7/28/2000	3		627	
8/20/2000	2		424	
9/25/2000	1		577	
10/26/2000	1		114	
11/27/2000	25		632	
		14		**415**
2/26/2001	3		338	
3/13/2001	3		376	
4/27/2001	3		349	
5/27/2001	2		388	
7/27/2001	48		560	
8/27/2001	6		372	
9/27/2001	2		895	
10/22/2001	6		275	
11/30/2001	28		441	
12/22/2001	60		114	
		16		**411**

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
1/28/2002	12		373	
2/21/2002	15		372	
3/8/2002	22		318	
3/22/2002	42		226	
4/22/2002	22		79	
5/28/2002	70		71	
6/26/2002	17		259	
8/2/2002	17		231	
8/27/2002	12		178	
9/25/2002	10		95	
10/28/2002	8		461	
12/7/2002	2		398	
12/29/2002	35		218	
		21		**255**
2/3/2003	7		340	
3/7/2003	35		228	
4/8/2003	12		274	
6/4/2003	42		147	
7/7/2003	9		220	
8/7/2003	10		221	
8/28/2003	6		71	
9/29/2003	2		534	
10/28/2003	24		200	
12/10/2003	21		150	
		18		**237**
1/3/2004	26		139	
2/3/2004	29		144	
3/3/2004	28		84	
4/3/2004	30		85	
5/5/2004	65		115	
5/15/2004	20		102	
6/9/2004	12		300	
6/30/2004	30		222	
8/9/2004	6		84	
9/3/2004			43	
		27		**132**
10/4/2004	12			
11/3/2004	94		155	
11/14/2004	26		75	
11/22/2004	28		75	

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
12/1/2004	35		72	
12/21/2004	9		253	
		34		**134**
1/3/2005	10		279	
2/3/2005	12		155	
3/1/2005	34		208	
4/4/2005	9		148	
4/25/2005	6		121	
5/3/2005	9		150	
6/2/2005	3		151	
6/20/2005	2		55	
7/13/2005	2		95	
8/3/2005	12		85	
10/3/2005	27		63	
11/3/2005	6		278	
11/14/2005	6		15	
11/28/2005	8		47	
12/20/2005	27		7	
12/26/2005	27		11	
11/28/2005	8		47	
		10		**132**
1/2/2006	21		42	
1/9/2006	20		32	
1/16/2006	28		32	
1/23/2006	33		16	
1/30/2006	41		34	
2/6/2006	38		<5.10	
2/13/2006	34		24	
2/20/2006	21		6	
2/27/2006	26		20	
3/6/2006	16		25	
3/13/2006	57		107	
3/20/2006	48		26	
3/27/2006	27		4.09J	
4/3/2006	24		11	
4/10/2006	16		39	
4/17/2006	22		8	
4/24/2006	16		7	
4/27/2006	50		11	
4/29/2006	193		28	

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
5/1/2006	94		23	
5/8/2006	59		52	
5/15/2006	22		15	
5/22/2006	16		<5.00	
5/30/2006	17		6	
6/7/2006	3		253	
6/12/2006	2		LE	
6/19/2006	17		52	
6/26/2006	17		75	
7/5/2006	22		10	
7/17/2006	17		22	
8/7/2006	17		24	
8/14/2006	17		<5.00	
9/5-6/2006	23		7	
9/18/2006	24		6	
10/2/2006	24		17	
10/16/2006	41		40	
10/16/2006	81		92	
10/18/2006	27		118	
11/7/2006	41		53	
11/20/2006	24		57	
11/30/2006	636		<50.0	
12/4/2006	59		<54.3	
12/6/2006	37		<52.6	
12/18/2006	21		24	
		47		**39**
1/8/2007	21		17	
1/22/2007	79		35	
2/5/2007	27		26	
2/19/2007	47		20	
3/5/2007	27		<5.00	
3/19/2007	25		NA	
4/9/2007	23		<5.00	
4/23/2007	30		7	
5/7/2007	21		2.90J	
5/21/2007	20		4.36J	
6/4/2007	20		<5.00	
6/18/2007	21		10	
7/9/2007	20		15	
7/23/2007	18		9	

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
8/6/2007	1		191	
9/10/2007	23		217	
9/24/2007	18		16	
10/10/2007	18		6	
10/22/2007	18		1190	
11/5/2007	18		209	
11/19/2007	18		20	
12/3/2007	18		20	
12/17/2007	32		87	
		24		**123**
1/7/2008	23		<5.00	
1/21/2008	23		58	
2/4/2008	24		52	
2/18/2008	83		57	
3/3/2008	580		<5.00	
3/17/2008	44		11	
4/7/2008	78		10	
4/12/2008	240		7	
4/13/2008	100		7	
4/14/2008	78		8	
5/10/2008	68		75	
5/27/2008	18		189	
6/9/2008	30		77	
6/23/2008	580		6	
7/7/2008	80		194	
7/10/2008	140		254	
7/21/2008	42		477	
8/4/2008	22		108	
8/18/2008	36		31	
9/1/2008	25		32	
9/22/2008	40		22	
10/6/2008	21		20	
10/20/2008	21		13	
11/3/2008	24		<5.00	
11/17/2008	30		28	
12/1/2008	24		12	
12/22/2008	24		<5.00	
		93		**76**
1/5/2009	32		7	
1/26/2009	27		<5.00	

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
2/9/2009	90		<5.00	
2/23/2009	31		6	
3/9/2009	30		6	
3/23/2009	30		<5.00	
4/6/2009	38		6	
4/20/2009	243		9	
5/4/2009	343		8	
5/18/2009	51		6	
6/8/2009	38		<5.00	
6/29/2008	25		9	
7/20/2009	47		39	
8/10/2009	24		31	
9/13/2009	22		8	
10/12/2009	104		21	
11/9/2009	45		<50	
12/7/2009	28		8	
		69		**13**
1/10/2010	42		13	
2/15/2010	87		11	
3/15/2010	35		<5.00	
4/15/2010	40		10	
5/17/2010	180		11	
6/13/2010	43		15	
7/8/2010	33		66	
8/19/2010	17		16	
9/21/2010	33		28	
10/18/2010	20		15	
11/20/2010	21		5	
12/16/2010	24		6	
		48		**18**
1/18/2011	23		3	
2/9/2011	27		10	
3/17/2011	49		14	
4/19/2011	58		13	
5/2/2011	310		11	
5/3/2011	271		9	
5/4/2011	156		11	
5/4/2011	123		16	
5/5/2011	83		18	
5/9/2011	34		44	

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
6/9/2011	7		52	
7/18/2011	1		19	
8/15/2011	1		39	
9/13/2011	1		<5.00	
10/18/2011	24		52	
11/16/2011	30		31	
12/19/2011	60		12	
		74		**22**
1/19/2012	32		<5.00	
2/14/2012	40		7	
3/29/2012	51		8	
4/18/2012	23		20	
5/23/2012	18		11	
6/11/2012	18		7	
7/30/2012	15		6	
8/24/2012	14		<5.00	
9/24/2012	1		73	
10/15/2012	4		27	
11/19/2012	1		29	
12/28/2012	1		25	
		18		**21**
1/16/2013	4		41	
2/24/2013	4		45	
3/13/2013	23		19	
4/22/2013	22		27	
5/16/2013	14		18	
6/21/2013	1		22	
7/23/2013	1		27	
8/23/2013	5		65	
9/18/2013	1		55	
10/16/2013	2		66	
11/13/2013	3		115	
12/18/2013	44		33	
		10		**44**
1/13/2014	48		46	
2/17/2014	6		75	
3/17/2014	152		13	
4/23/2014	11		49	
5/19/2014	57		74	
6/4/2014	2		66	
7/9/2014	2		87	

Table B-3: New Cricket Spring Samples 1996-2011				
Date	**Flow GPM**	**Average GPM**	**New Cricket Spring PCP (ppb)**	**Average PCP (ppb)**
8/14/2014	1		48	
9/10/2014	1		12	
10/22/2014	2		137	
11/17/2014	2		103	
12/16/2014	14		46	
		25		**63**
1/13/2015	5		88	
2/11/2015	2		118	
3/17/2015	47		21	
4/20/2015	22		30	
5/18/2015	66		16	
6/11/2015	5		41	
7/26/2015	5		52	
8/18/2015	2		46	
9/21/2015	2		76	
10/20/2015	1		41	
11/11/2015	5		85	
12/17/2015	29		44	
		16		**55**

Table B-4 New Cricket Spring Average Flow Rates (gpm) 1996-2015

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
JAN		29	179	3	10	7	16	26	24	16	27	50	3	10	22	3	17	4	48	5
FEB		104	76	2	3	50	16	19	30	28	30	37	34	41	67	7	25	4	6	2
MAR		115	127	8	2	14	63	24	27	22	37	26	292	10	15	29	36	23	152	47
APR		42	36	5	8	5	70	15	22	12	54	27	104	121	20	38	8	22	11	22
MAY	15	18	40	8	5	5	59	22	23	9	41	21	23	177	160	163	3	14	57	66
JUN	6	21	9	84	8	5	95	20	16	2	10	21	285	12	23	7	3	1	2	5
JUL	12	12	9	6	84	17	18	12	21	6	19	19	67	27	13	1	0	1	2	5
AUG	7	12	20	6	1	8	8	5	17	7	17	1	9	4	0	1	1	5	1	2
SEP	50	16	12	5	1	6	8	2	12	13	24	21	13	2	13	0	0	1	1	2
OCT	12	13	20	9	1	10	8	10	32	23	43	18	1	84	0	24	4	2	2	1
NOV	127	30	12	6	2	9	27	22	50	8	234	18	7	25	1	10	1	3	2	5
DEC	58	41	33	13	4	74	23	17	12	25	39	25	4	8	4	40	1	44	14	29
AVG	36	38	48	13	11	18	34	16	24	13	48	24	70	43	28	27	8	10	25	16

Table B-5: Ozone Injection Pilot Study & New Cricket Spring Monitoring Data

Date	Variables		Spring	PCP		pH	DO%	Distance (ft)
	Water Inj	O3 Inj	Flow	Mouth	Weir			
12/8/05			5.00					
12/9/05	35		5.00					
12/14/05	35	1lb/10 g	21.00	28				
12/15/05	35	1lb/10 g	30/27	29.3				
12/20/05	36	1lb/10 g	27.00	7.39	<5.10			
12/26/05	36	1lb/10 g	27.00	11.4	11.1			
1/2/06	36	1lb/10 g	21.00	42.4	35.1			
1/9/06	36	1lb/10 g	20.00	32.4	33			
1/16/06	36	1lb/10 g	27.50	32.3	<5.00			
1/23/06	36	1lb/10 g	34/32	15.9	<5.00			
1/30/06	36	1lb/10 g	41.00	34.3	<5.00			
2/6/06	36	1lb/10 g	38.00	<5.10	<5.00			
2/13/06	36	1lb/10 g	34.00	23.9	<5.00			
2/20/06	36	1lb/10 g	21.00	5.53	4.19J			
2/27/06	36	1lb/10 g	26.00	19.9	<5.00			
3/6/06	34	1-2lb/10 g	16.00	25.1	<5.00			
3/13/06	33	1-2lb/10 g	57.00	107	<5.00			
3/20/06	32	1-2lb/10 g	48.00	26.2	<5.00			
3/27/06	32	1-2lb/10 g	27.00	4.09J	<5.00			
4/3/06	34	2-3lb/10 g	24.00	11.3	<5.00			
4/10/06	33	2-3lb/10 g	16.40	39.3	<5.00			
4/17/06	34	2-3lb/10 g	22.00	7.94	7.82			
4/24/06	35	2-3lb/10 g	16.00	7.0	<5.00			
4/27/06	33	2-3lb/10 g	50.00	11.3	NA			
4/29/06	33	2-3lb/10 g	193.00	28.2	NA			
5/1/06	33	2-3lb/10 g	94.00	23.4	7.16			
5/8/06	33	2-3lb/10 g	59.00	52.3	23.3			
5/15/06	34	2-3lb/10 g	21.70	14.9	<5.00			
5/22/06	34	2-3lb/10 g	16.00	<5.00	<5.00			
5/30/06	34	2-3lb/10 g	16.70	5.64	<5.00			
6/7/06	0	0	3.00	253	<5.00			
6/12/06	0	0	2.19	LE	LE			
6/19/06	34	0	16.70	52.1	14.3			
6/26/06	34	0	16.70	74.7	<5.00			
7/5/06	35	0	21.70	9.8	<5.00			
7/17/06	34	0	16.70	21.9	4.01J			
8/7/06	34	0	16.70	23.6	18			
8/14/06	34	0	16.70	<5.00	5.22			
9/5-6/06	34	0	23.00	6.57	<5.10			
9/18/06	34	0	24.00	6.29	<5.00			
10/2/06	34	0	24.00	16.8	<5.00			
10/16/06	34	2-3lb/10 g	41.00	39.6	2.22J			
10/16/06	34	5-6lb/10g	81.00	92.3	19.4			
10/18/06	34	5-6lb/10g	27.00	118	<5.00			
11/7/06	35	2-4lb/10g	41.00	52.7	4.70J			
11/20/06	35	2-4lb/10g	24.00	57.4	<5.00			
11/30/06	35	5-6lb/10g	636.00	<50.0	<5.00			
12/4/06	35	5-6lb/10g	59.00	<54.3	<5.00			
12/6/06	35	5-6lb/10g	37.00	<52.6	<5.00			
12/18/06	35	2-3lb/10 g	21.00	24.1	<5.00			
1/8/07	35	2-3lb/10 g	21.00	16.7	<5.00			
1/22/07	35	2-3lb/10 g	79.00	34.6	<5.00			
2/5/07	35	2-3lb/10 g	27.00	25.9	<5.00			
2/19/07	35	2-3lb/10 g	47.00	19.6	<5.00			
3/5/07	35	2-3lb/10 g	27.00	<5.00	<5.00			
3/19/07	35	2-3lb/10 g	25.00	NA	NA			
4/9/07	35	2-3lb/10 g	23.00	<5.00	<5.00			
4/23/07	35	2-3lb/10 g	30.00	7.27	<5.00			

Table B-5: Ozone Injection Pilot Study & New Cricket Spring Monitoring Data

Date	Variables		Spring	PCP		pH	DO%	Distance (ft)
	Water Inj	O3 Inj	Flow	Mouth	Weir			
5/7/07	35	2-3lb/10 g	21.00	2.90J	<5.00			
5/21/07	35	2-3lb/10 g	20.00	4.36J	<5.00			
6/4/07	35	2-3lb/10 g	20.00	<5.00	<5.00			
6/18/07	35	0	21.00	9.62	<5.00			
7/9/07	35	0	20.00	15.0	<5.00			
7/23/07	35	0	18.00	8.65	<5.00			
8/6/07	0	0	1.00	191	9.19			
9/10/07	35	0	23.00	217	26.4			
9/24/07	35	0	18.00	16.2	19.4			
10/10/07	35	2-3lb/10 g	18.00	5.63	1.15J			
10/22/07	35	2-4lb/10g	18.00	1190	53.7			
11/5/07	35	2-4lb/10g	18.00	209	7.93			
11/19/07	35	2-4lb/10g	18.00	19.8	24.1			
12/3/07	35	2-4lb/10g	18.00	20.1	<5.00			
12/17/07	36	2-4lb/10g	32.00	87.4	1.20J			
1/7/08	36	2-4lb/10g	23.00	<5.00	<5.00			
1/21/08	36	2-4lb/10g	23.00	58	<5.00			
2/4/08	36	2-4lb/10g	24.00	52	<5.00			
2/18/08	35	2-4lb/10g	83.00	57	15			
3/3/08	35	5-6lb/10g	580.00	<5.00	<5.00			
3/17/08	35	5-6lb/10g	44.00	11	<5.00			
4/7/08	35	5-6lb/10g	78.00	10	<5.00			
4/12/08	35	5-6lb/10g	240.00	6.5	NA			
4/13/08	35	5-6lb/10g	100.00	6.8	NA			
4/14/08	35	5-6lb/10g	78.00	8.2	NA			
5/10/08	36	5-6lb/10g	68.00	75	<5.00			
5/27/08	0	0	18.00	189	<5.00			
6/9/08	35	2-4lb/10g	30.00	77	<5.00			
6/23/08	35	2-4lb/10g	580.00	5.6	<5.00			
7/7/08	35	2-4lb/10g	80.00	194	189			
7/10/08	35	5-6lb/10g	140.00	254	20			
7/21/08	35	5-6lb/10g	42.00	477	<5.00			
8/4/08	35	2-4lb/10g	22.00	108	14			
8/18/08	35	2-4lb/10g	36.00	31	<5.00			
9/1/08	35	2-4lb/10g	25.00	32	<5.00			
9/22/08	35	2-4lb/10g	40.00	22	<5.00			
10/6/08	35	2-4lb/10g	21.00	20	<5.00			
10/20/08	33	2-4lb/10g	21.00	13	<5.00			
11/3/08	35	2-4lb/10g	24.00	<5.00	<5.00			
11/17/08	35	2-4lb/10g	30.00	28	<5.00			
12/1/08	35	2-4lb/10g	24.00	12	<5.00			
12/22/08	33	2-4lb/10g	24.00	<5.00	<5.00			
1/5/09	35	2-4lb/10g	32.00	7.3	<5.00			
1/26/09	32	2-4lb/10g	27.00	<5.00	<5.00			
2/9/09	33	2-4lb/10g	90.00	<5.00	<5.00			
2/23/09	33	2-4lb/10g	31.00	6	<5.00			
3/9/09	34	2-4lb/10g	30.00	5.7	<5.00			
3/23/09	33	2-4lb/10g	30.00	<5.00	<5.00			
4/6/09	32	2-4lb/10g	38.00	5.8	<5.00			
4/20/09	32	2-4lb/10g	243.00	8.5	<5.00			
5/4/09	33	2-4lb/10g	343.00	8.2	8.7			
5/18/09	33	2-4lb/10g	51.00	6.2	<5.00			
6/8/09	35	2-4lb/10g	38.00	<5.00	<5.00			
6/29/08	33	2-4lb/10g	25.00	9.1	<5.00			
7/20/09	32	2-4lb/10g	47.00	39	<5.00			
8/10/09	32	2-4lb/10g	23.70	31	<5.00			
9/13/09	32	0	22.00	8	<5.00			
10/12/09	32	0	104.00	21	<5.00			
11/9/09	32	0	45.00	<50	<5.00			
12/7/09	32	0	28.00	8.2	<5.00			
1/10/10	32	0	42.00	13	<5.00			
2/15/10	32	0	87.00	11.1	<5.00			
3/15/10	32	0	35.00	<5.00	<5.00			

Table B-5: Ozone Injection Pilot Study & New Cricket Spring Monitoring Data

Date	Variables		Spring	PCP		pH	DO%	Distance (ft)
	Water Inj	O3 Inj	Flow	Mouth	Weir			
4/15/10	32	0	40.00	9.62	<5.00			
5/17/10	32	0	180.00	11	<5.00			
6/13/10	32	0	43.00	15	<5.00			
7/8/10	32	0	33.00	66	<2			
8/19/10	0-	0	17.00	16.3	<5.00			
9/21/10	34	0	33.00	28.2	<5.00			
10/18/10	37	0	20.00	14.9	<10.00			
11/20/10	37	0	21.00	4.89	<4.00			
12/16/10		0	23.55	6.15	<5.00			
1/18/11	37	0	22.83	3.39	2.86			
2/9/11	37	0	26.76	10.4	<10.0			
3/17/11	37	0	49.03	14.2	<5.00			
4/19/11	37	0	57.55	12.5	<5.00			
5/2/11			310.00	11				
5/3/11			271.00	8.92				
5/4/11			156.00	10.8				
5/4/11			123.00	15.8				
5/5/11			83.00	18				
5/9/11	37	0	33.91	43.8	<5.00			
6/9/11	0	0	6.80	52.4	<5.00			
7/18/11	0	0	0.58	18.6	<5.00			
8/15/11	0	0	1.00	38.9	<5.00			
9/13/11	0	0	0.13	<5.00	<5.00			
10/18/11		0	23.71	52.4	<5.00			
11/16/11		0	29.64	30.6	<5.00			
12/19/11		0	60.25	11.5	<5.00			
1/19/12	40	0	31.82	<5.00	<5.00			
2/14/12	40	0	40.38	6.68	<5.00			
3/29/12	40	0	50.81	7.95	<5.00			
4/18/12	40	0	22.54	20	<5.00			
5/23/12	40	0	18.18	10.9	<5.00			
6/11/12	40	0	17.87	7.13	<5.15			
7/30/12	40	0	15.10	5.68	<5.00			
8/24/12	40	0	13.75	<5.00	<5.00	7.46	341.9	12
9/24/12	0	0	0.40	73.2	<5.00	7.07	216.4	15
10/15/12	0	0	4.48	26.7	<5.00	7.85	209.1	12
11/19/12	0	0	0.73	28.8	<5.00	7.91	247.6	12
12/28/12	0	0	1.22	25	<1.00	6.41	241.1	12
1/16/13	0	0	3.72	40.5	2.12	6.71	256.3	12
2/24/13	0	0	4.10	45.3	<1.00	7.63	190.7	12
3/13/13	0	0	23.00	18.6	<1.00	6.72	214.3	12
4/22/13	0	0	21.62	26.7	<1.00	6.52	226.8	12
5/16/13	0	0	14.33	18.3	<1.00	6.69	238.0	12
6/21/13	0	0	1.44	22.3	<1.00	7.76	249.7	12
7/23/13	0	0	0.93	27.1	<1.00	6.92	238.2	12
8/23/13	0	0	5.27	65.4	<1.00	7.72	196.5	12
9/18/13	0	0	1.43	54.6	<1.00	8.03	204.7	12
10/16/13	0	0	1.63	66.1	<1.00	7.25	236.4	12
11/13/13	0	0	2.68	115	1.71	6.65	25.92**	12
12/18/13	0	0	43.77	33	1.28	7.13	236.7	12
1/13/14	0	0	48.39	45.8	2.55	6.47	259.6	12
2/17/14	0	0	6.10	75.4	<1.00	7.10	121.6***	12
3/17/14	0	0	151.50	12.8	2.47	6.36	218.7	12
4/23/14	0	0	11.26	49.4	<1.00	7.34	219.1	12
5/19/14	0	0	56.62	73.9	<1.00	6.68	205.1	12
6/4/14	0	0	2.45	65.7	<1.00	7.39	202.0	12
7/9/14	0	0	2.32	87.1	<1.00	7.68	214.8	12
8/14/14	0	0	0.26	47.6	<1.00	7.75	208.7	12
9/10/14	0	0	0.25	12.1	<1.00	7.02	199.7	12
10/22/14	0	0	2.02	137	<1.00	7.22	231.1	12
11/17/14	0	0	1.71	103	<1.00	6.82	210.1	12
12/16/14	0	0	13.86	45.9	<1.00	7.40	257.8	12
1/13/15	0	0	5.47	88.4	<1.00	7.57	206.4	12

Table B-5: Ozone Injection Pilot Study & New Cricket Spring Monitoring Data

Date	Variables		Spring	PCP		pH	DO%	Distance (ft)
	Water Inj	O3 Inj	Flow	Mouth	Weir			
2/11/15	0	0	2.29	118	<1.00	7.08	13.7**	12
3/17/15	0	0	47.44	20.7	1.06	6.76	158.7	12
4/20/15	0	0	21.61	29.7	<1.00	6.19	121.5	12
5/18/15	0	0	66.15	16.3	<1.00	7.39	168.1	12
6/11/15	0	0	5.46	41.3	<1.00	6.51	171.0	12
7/26/15	0	0	5.25	52.2	<1.00	7.32	192.4	12
8/18/15	0	0	1.99	45.8	<1.00	7.35	217.4	12
9/21/15	0	0	2.32	76.1	<1.00	8.25	226.3	12
10/20/15	0	0	1.14	41.1	<1.00	6.03	187.0	12
11/11/15	0	0	5.00	84.6	2.20	7.19	143.4	12

NOTES: Flow rates in gallons per minute (gpm)
O3 injection rates in pounds per 10 gallons
billion (ppb)
NA - not analyzed
LE - Lab Error - samples not usable

*Not recorded until 9/24/12
**Measured as mg/L, not as % DO PCP concentrations in parts per
*** Very heavy flow rate

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APPENDIX C – SITE MAPS & FIGURES

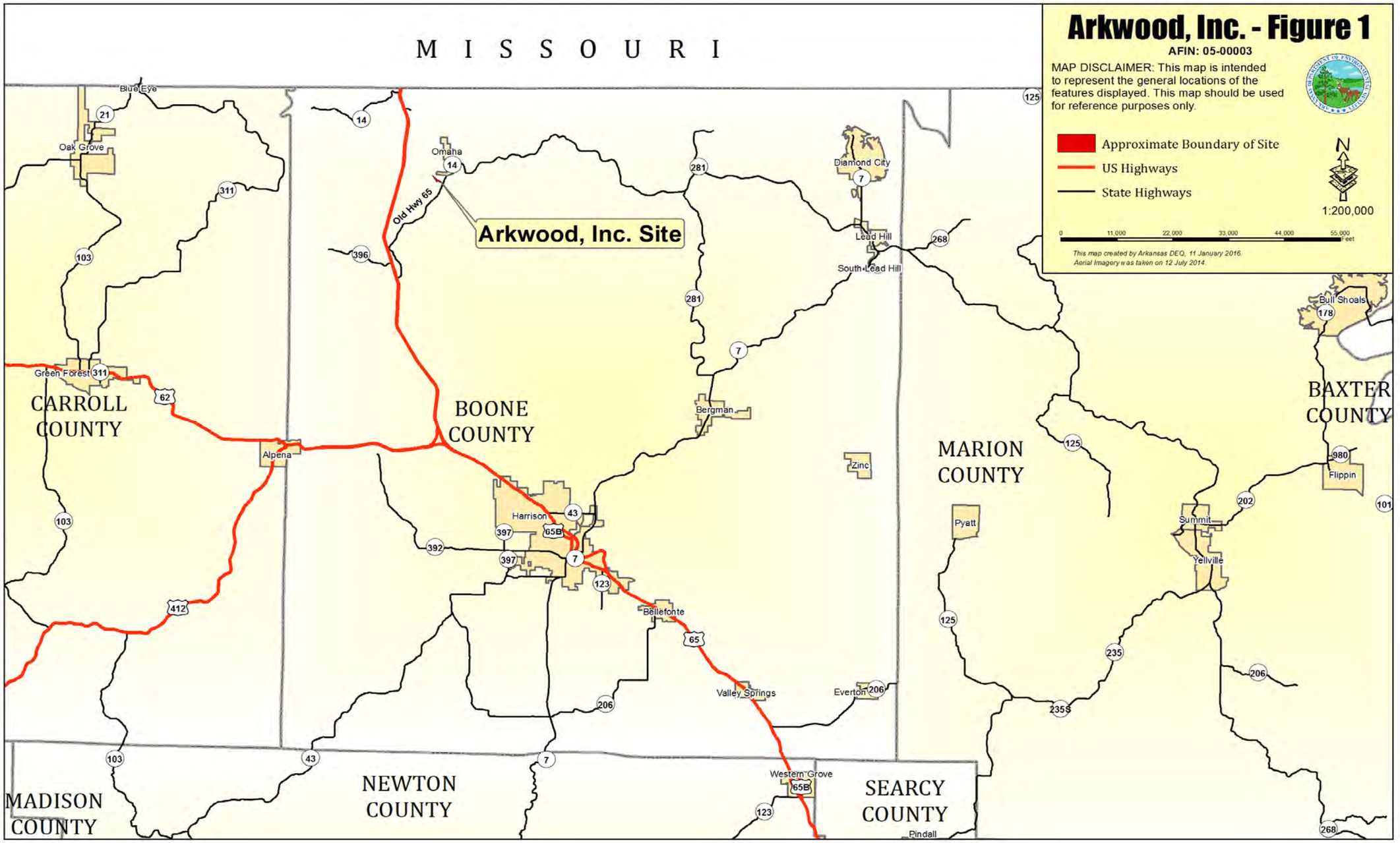


Figure 1 General Location Map

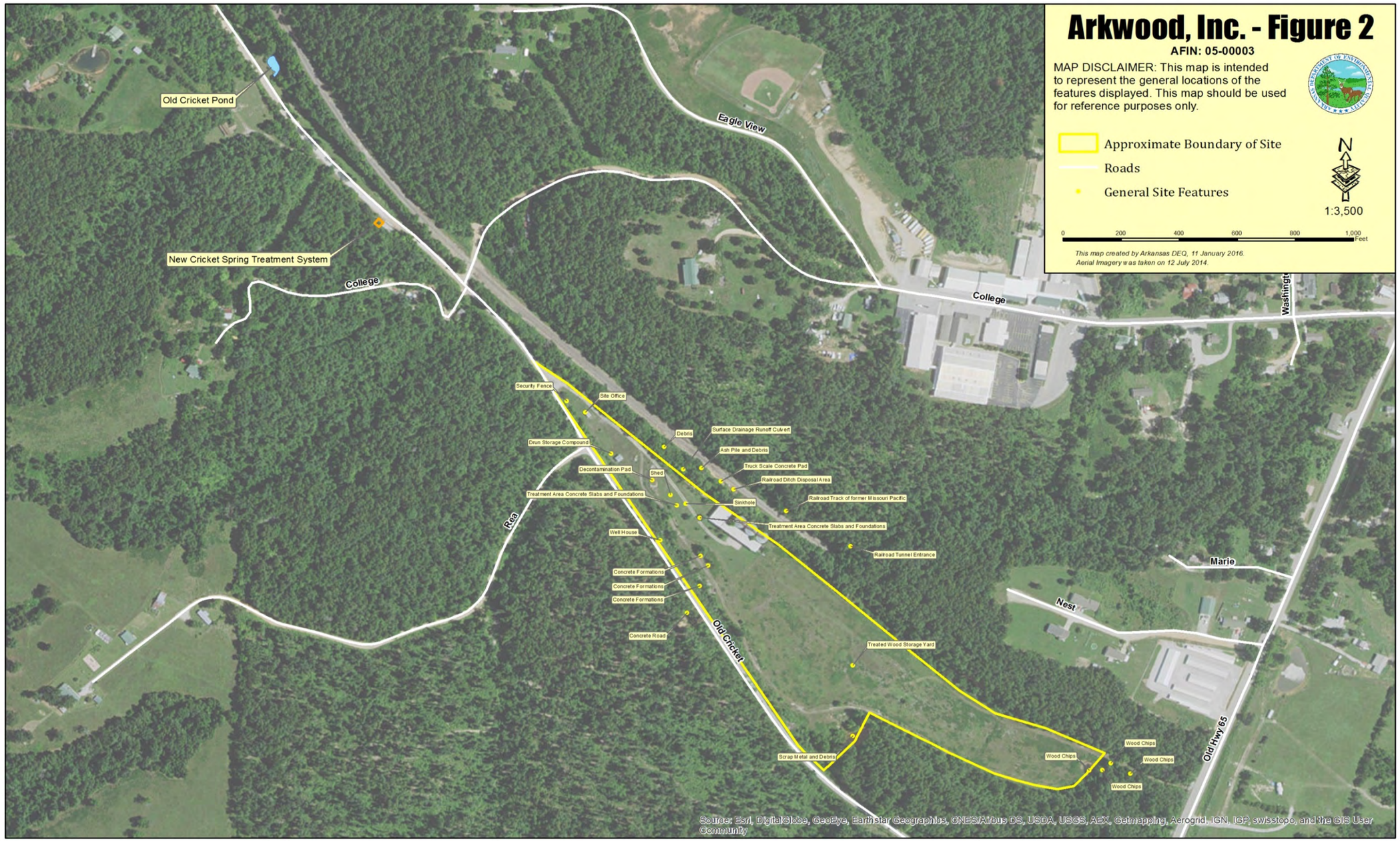


Figure 2 General Site Features Map

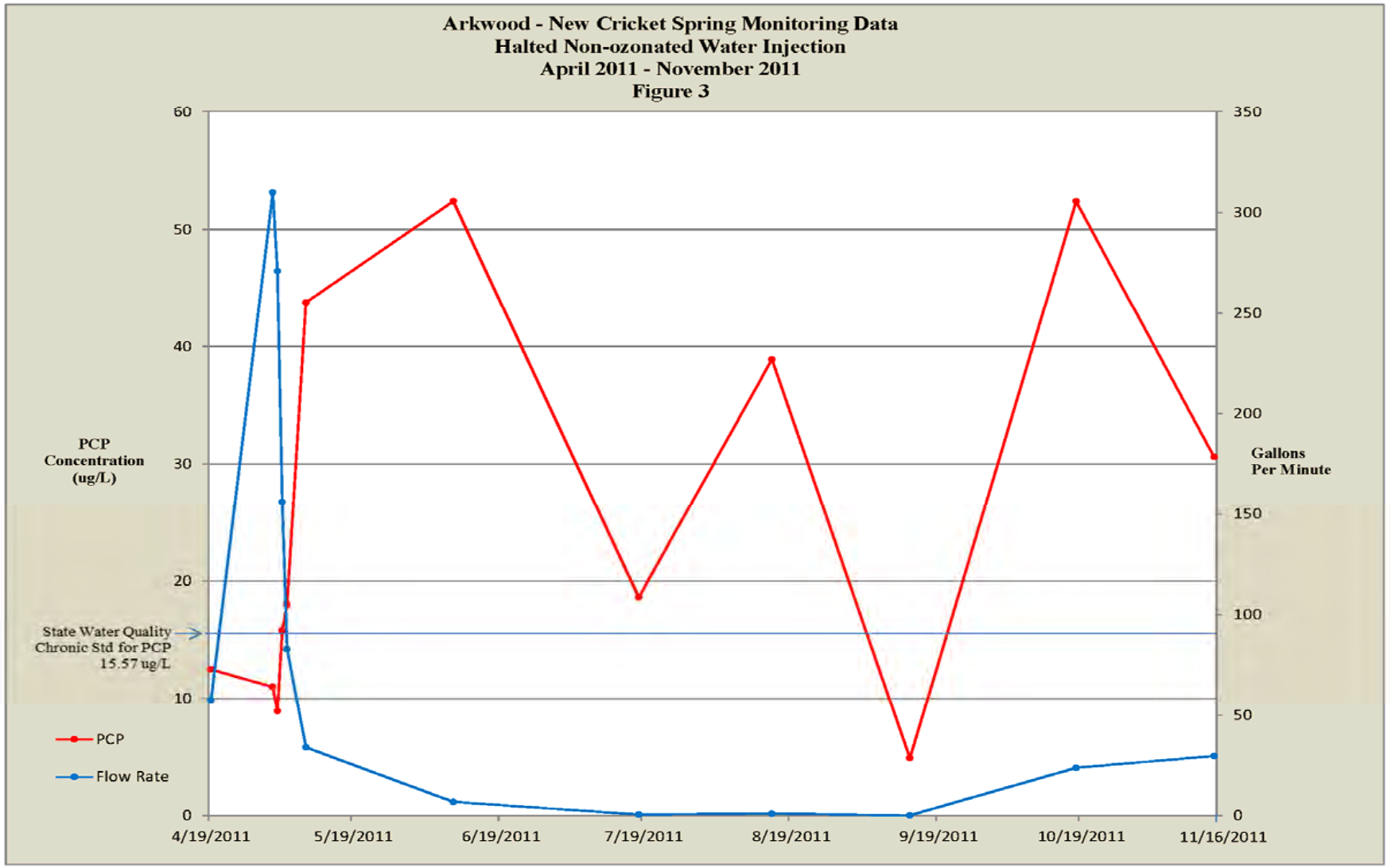


Figure 3 Halted Non-ozonated Water Injection

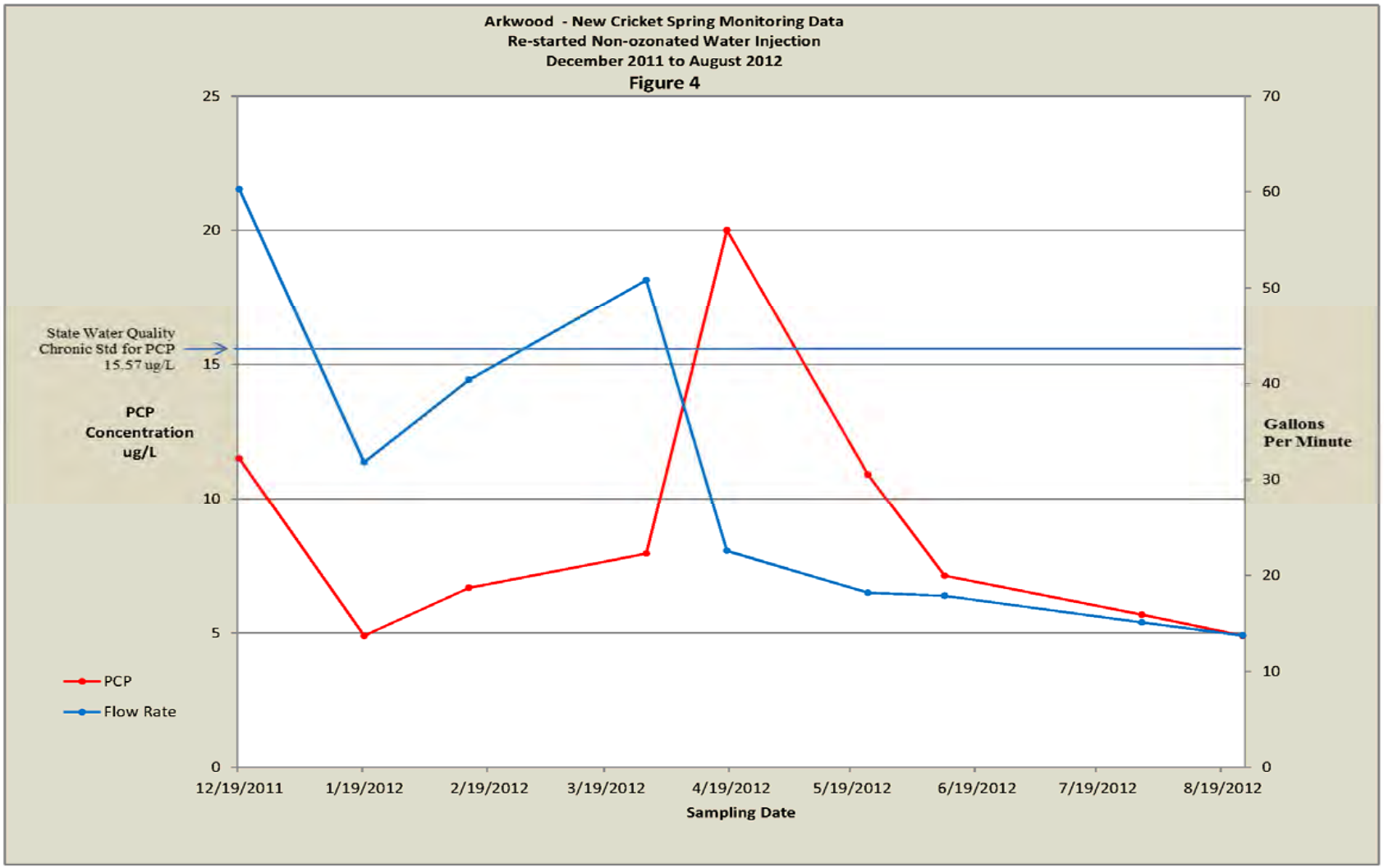


Figure 4 Re-started Non-ozonated Water Injection

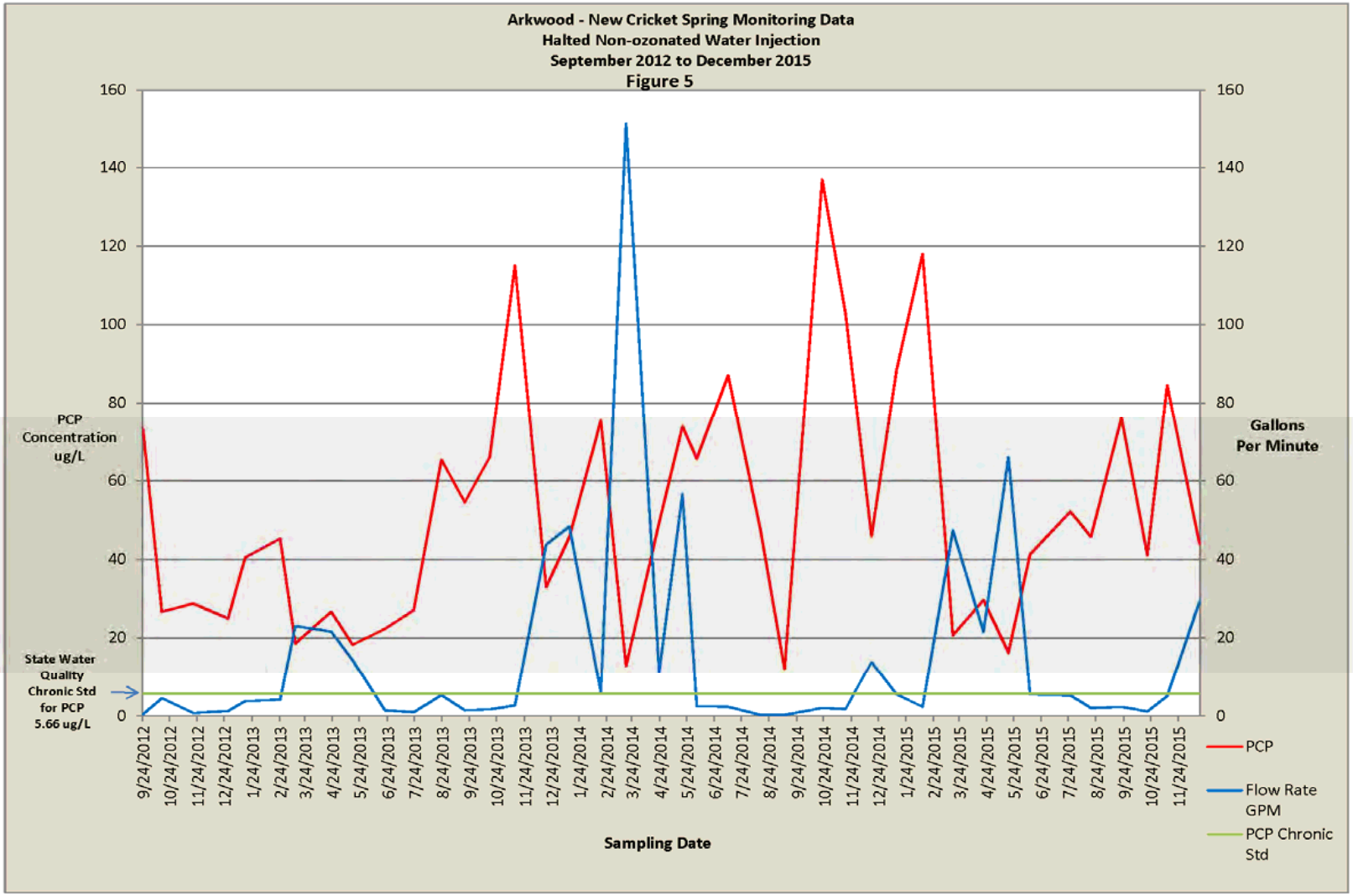


Figure 5 Halted Non-ozonated Water Injection

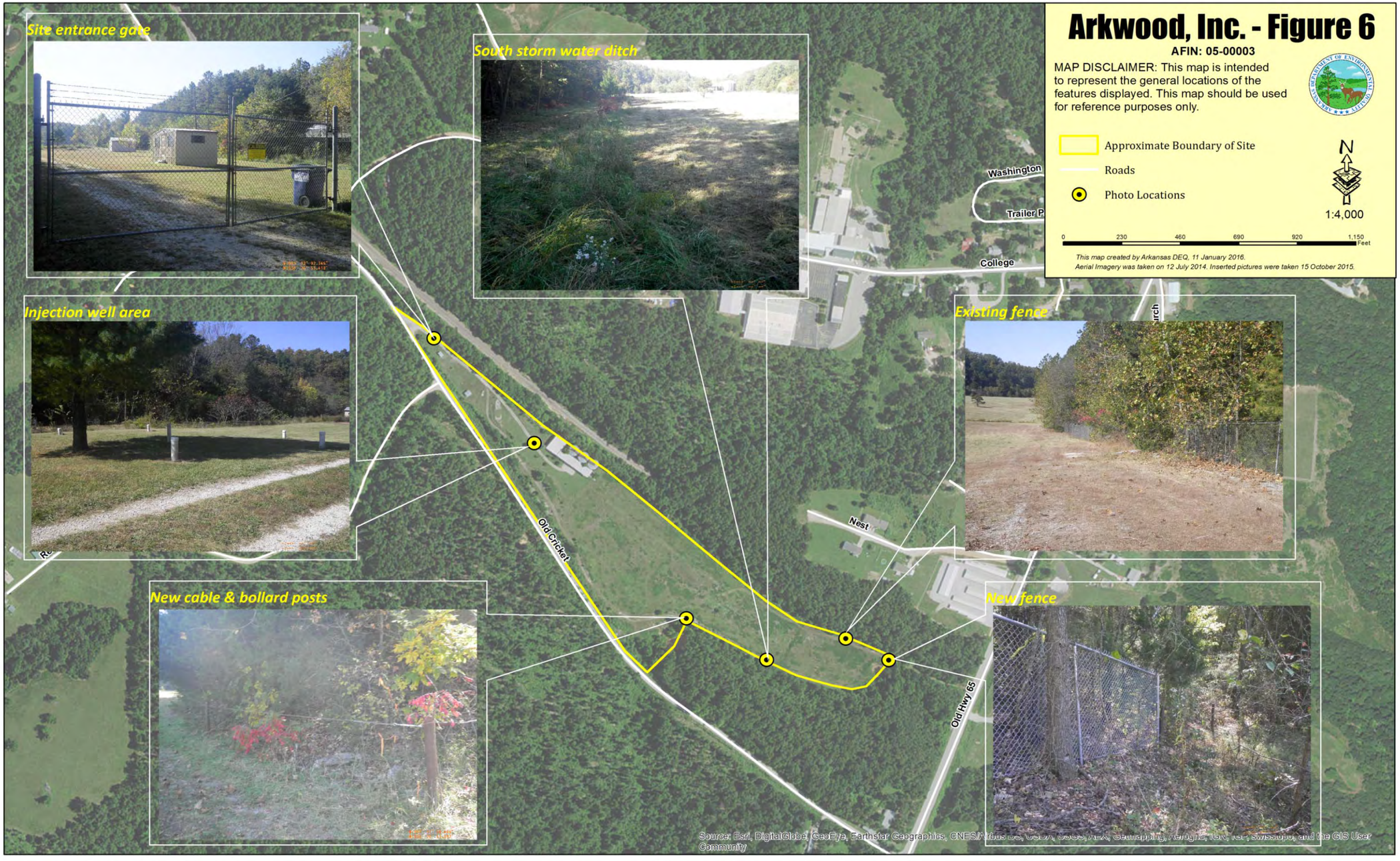


Figure 6 Photo Locations Map

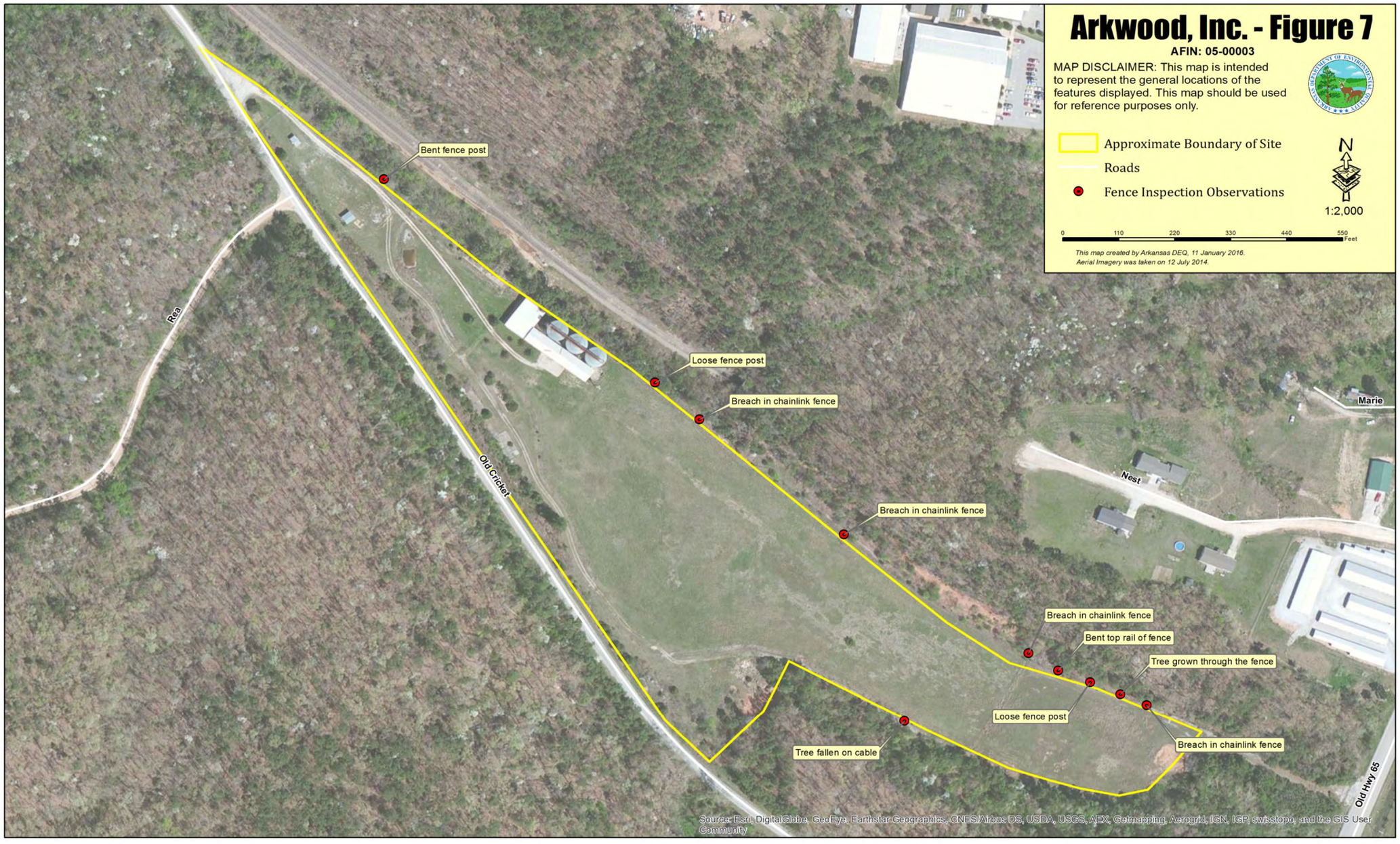


Figure 7 Site Inspection Map

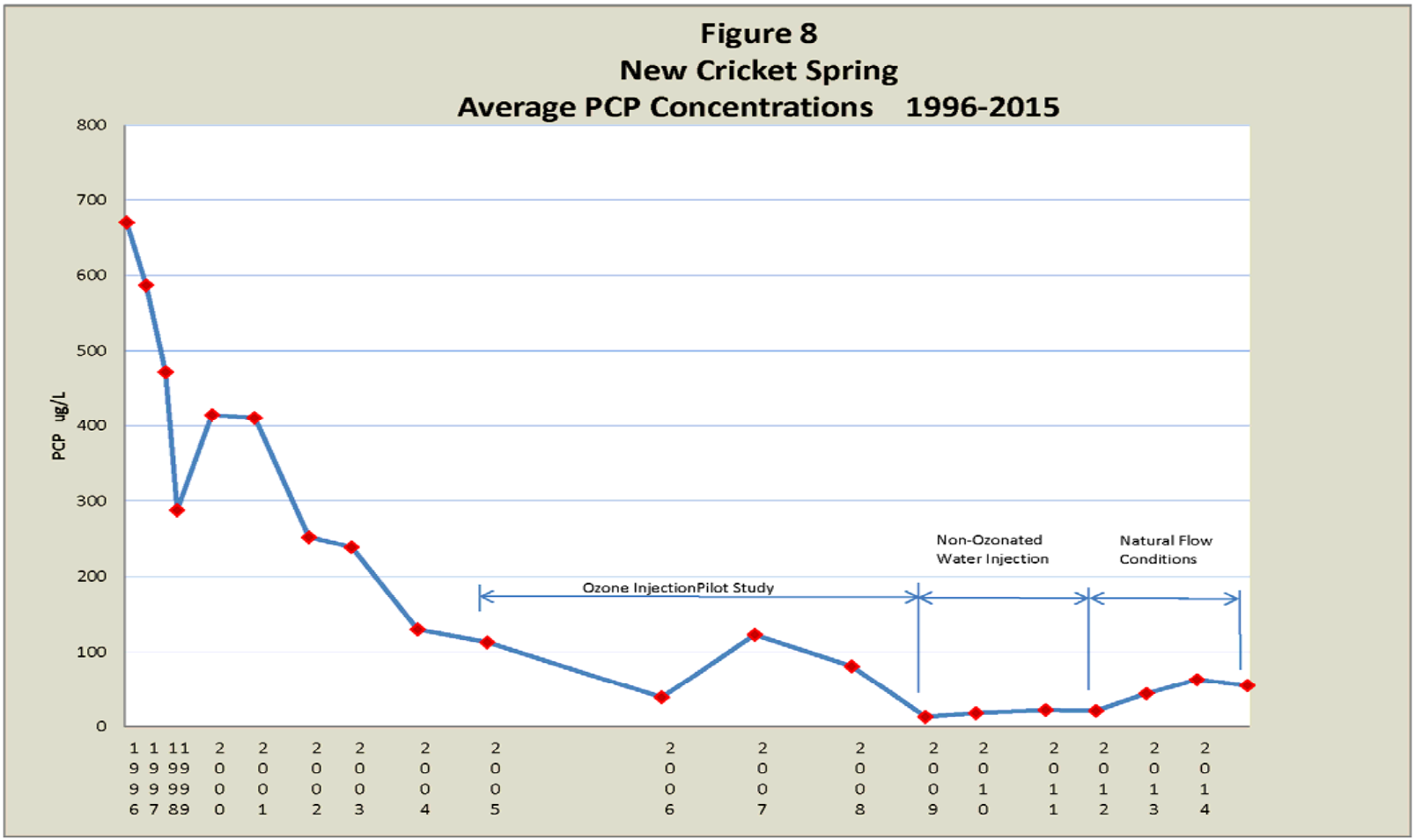


Figure 8 New Cricket Spring Average PCP Concentrations

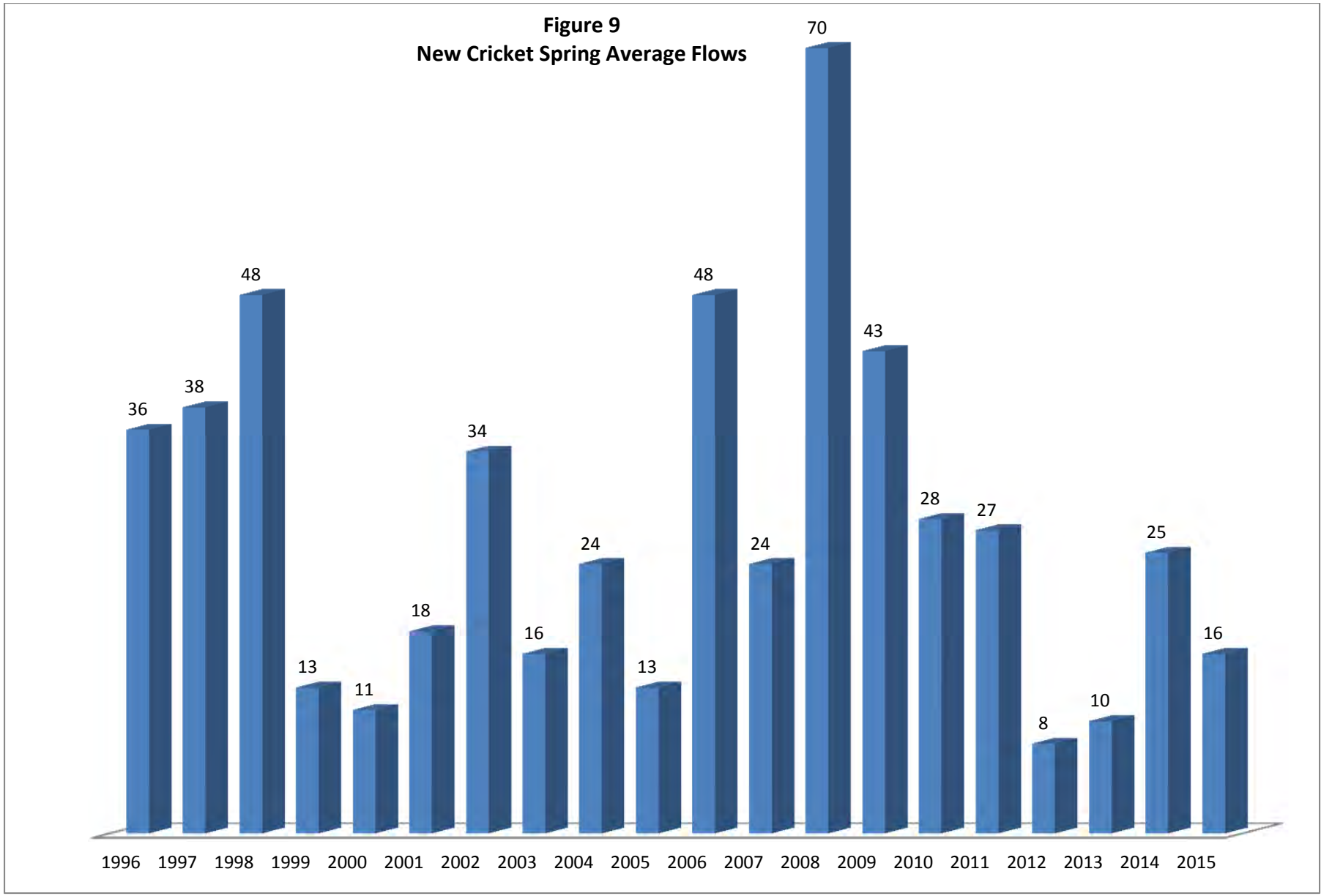


Figure 9 New Cricket Spring Average Flows

APPENDIX D – CORRECTED DEED NOTICE

2014002477

FILED FOR RECORD
05/29/2014 3:32PM
RHONDA WATKINS Clerk

By _____ D.C.

CORRECTED DEED NOTICE AND RESTRICTIONS

This Corrected Deed Notice and Restrictions is made as of the 1st day of MAY, 2014, by the Estate of Mary Faye (Burke) Grisham with C.C. Grisham as Executor. Mr. C.C. Grisham's principal place of business is located at 1 Meriwether Pond, Harrison, AR 72601 (together with his/her/its/their successors and assigns, collectively "Owner").

1. THE PROPERTYAND THE SITE. The Estate of Mary Faye (Burke) Grisham with Mr. C.C. Grisham as Executor is the owner in fee simple of certain real property (the "Property") on the tax map of Boone County, Arkansas; the Property is also known as the United States Environmental Protection Agency ("U.S.EPA") Arkwood Superfund Site ("Site) listed on the National Priorities List ("NPL") on March 31, 1989. The Site consists of approximately 18.076 acres described in more detail in Section 3 herein, and in Exhibit A (Figure I-3 "Site Location Map") and Exhibit B (Figure I-7 "General Site Features" Map), which are attached hereto and made a part hereof.

2. EFFECT OF CORRECTED DEED NOTICE AND RESTRICTIONS. This Corrected Deed Notice and Restrictions revises, amends and supersedes the Deed Notice executed and recorded (filed for record) by C.C. Grisham, Executor of the Estate of Mary Faye (Burke) Grisham, owner of the Property on August 30, 2010 in Boone County, Arkansas. (File No.10 004447) ("2010 Deed Restrictions"). The terms and conditions set forth herein as applicable to the Property and/or Site replace those set forth in the 2010 Deed Restrictions.

3. AFFECTED PROPERTY (THE SITE). Exhibit C, which is Exhibit A of the Consent Decree, U.S. v. Hallie C. Ormond, C.C. Grisham and Mary F. Burke, Civil Action No. 87-3034, July 12, 1988, the legal description of the Property delineated herein as follows: Part of the Northeast Quarter of the Southwest Quarter and part of the South Half of the Northwest Quarter and part of the Northwest Quarter of the Southeast Quarter of Section 27, Township 21 North, Range 21 West, Boone County, Arkansas, more particularly described to-wit: Commencing at a stone marking the Southeast corner of the Northeast Quarter of the Southwest Quarter of Said Section 27, thence North 86° 02' 53" West 946.17 feet, thence North 01° 28' 49" East 970.62 feet to the place of beginning said point being located on northerly right-of-way of county road, thence with said northerly right-of-way North 31° 53' 10" West 492.77 feet, thence North 33°15' 00" West 345.29 feet, thence North 29° 35' 17" West 345.49 feet, thence North 34° 06'52" West 118.66 feet, thence North 39° 10' 31" West 92.00 feet, thence North 43° 16' 58" West 107.38 feet, thence leaving said northerly right-of-way North 42° 42' 38" East 2.83 feet to the southerly right-of-way of Missouri Pacific Railroad, thence with said southerly right-of-way South 47° 17' 22" East 49.77 feet, thence South 48° 16' 00" East 318.53, thence South 48° 19' 25" East 602.13 feet, thence South 49° 01' 52" East 95.36 feet, thence South 50° 04' 43" East 99.37 feet, thence South 51° 43' 07" East 98.58 feet, thence South 53° 45' 52" East 100.98 feet, thence South 55° 55' 22" East 103.00 feet, thence South 57° 46' 36" East 12.20 feet, thence South 32° 13' 24" West 135.00 feet, thence South 57° 46' 36" East 245.44 feet , thence North 32° 13' 24" East 106.15 feet to the North line of a deed dated February 22, 1961, and recorded in Deed Book 85, Pages 164-165 in the Circuit Clerk and ex-officio Recorder Office in and for Boone County, Arkansas, thence along said North line South 56° 29' 35" East 1004.34 feet, thence leaving said North line South 23° 30' 25" West 154.07 feet to the approximate toe of slope of hill side, thence with said approximate toe of slope South 48° 18' 45" West 47.44 feet ,thence South 80° 10' 42" West 100.89 feet, thence North 76° 14' 40" West 132.91 feet, thence North 68° 01' 53" West 282.88 feet, thence North 52° 56' 23" West 164.49 feet thence North 63° 51' 10" West

200.07 feet, thence South 29° 26' 53" West 116.89 feet, thence South 03° 41' 49" West 144.76 feet, to the northerly right-of-way of County Road, thence leaving said approximate toe of slope and following said northerly right-of-way of County Road North 46° 17' 18" West 70.92 feet, thence North 41° 56' 22" West 86.18 feet, thence North 36° 55' 21" West 86.29 feet, thence North 33° 04' 49" West 111.09 feet, thence North 31° 53' 10" West 289.85 feet to the place of beginning and containing 18.076 acres more or less and subject to existing easements and right-of ways.

4. AGENCY. The U.S. EPA is the agency responsible for overseeing the investigation and remediation of the Site under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA") program.

5. SOIL REMEDIATION. Under the direction of the U.S.EPA, soil remediation activities, including soil excavation, off-site removal of soils with contaminant concentrations above U.S. EPA-approved cleanup levels and capping of the Site were completed on December 1, 1995 with a final inspection performed by the U.S. EPA and Arkansas Department of Pollution Control and Ecology ("ADPCE"), now known as the Arkansas Department of Environmental Quality ("ADEQ") on December 13, 1995. As defined by the 1990 Record of Decision ("ROD") for the Site, soil cleanup levels were established at industrial levels, specifically, 300 mg/kg pentachlorophenol ("PCP"), 20 ug/kg dioxin ("2,3,7,8-TCDD") and 6.0 mg/kg carcinogenic polynuclear aromatic hydrocarbons ("Benzo(a)pyrene").

6. RESIDUAL SOIL CONTAMINATION. Pursuant to the ROD, soil contamination remains at the Site in concentrations that do not allow for unlimited use and unrestricted exposures at the Site. Notice and warning of the residual contamination on the Site is necessary to prevent any inappropriate land uses (i.e., non-industrial).

7. GROUND WATER CONTAMINATION. Under the direction of the U.S.EPA, treatment of PCP in water emanating from downgradient of the Site was implemented in 1997. Ground water extraction and use of the ground water underlying the Site is prohibited, except as authorized by the U.S. EPA and/or ADEQ for approved investigation, monitoring or remediation activities, or should a variance be granted for ground water use in a deep well on the Site. A variance for ground water use in a deep water well shall be granted only if the integrity of the well is intact and no migration of contaminants between the contaminated shallow zone and deep water can be demonstrated.

8. ENGINEERING CONTROLS. The engineering controls at the Site are limited to:

   i) a secure fence around areas of the Site as depicted in Exhibit D (Figure 4);
   ii) a topsoil and grass cover cap as depicted in Exhibit E (Figure 5); and
   iii) a storm water control system.

9. CONTINUING INSPECTION, MAINTENANCE AND OPERATION: Use of the Site by any and all persons is subject to the inspection, maintenance and operation of the engineering controls in Section 8 above and ensuring that the remedial action of which each engineering control is a part remains protective of human health, safety and the environment.

10. FUTURE LAND USE. This Corrected Deed Notice and Restrictions is being recorded to the title to the Site, in part, to ensure that any future use of the Site is limited to industrial use. Residential or commercial uses shall be prohibited.

11. LAND USE RESTRICTIONS. Use of the Site by any and all persons is subject to the following land use restrictions:

i. No digging in the capped area unless prior written approval is obtained from the U.S.EPA, in consultation with ADEQ, based on the submittal of a proposed excavation plan.
ii. No activities that cause soil erosion and/or disrupt the integrity of the capped area. Surface construction over the top soil and grass, including covering it with concrete, asphalt or other surface materials, may be acceptable to EPA and/or ADEQ as long as the integrity of the soils remedy is not impacted. Any surface construction activities over the top soil and grass will be conducted in close cooperation with McKesson Corporation.
iii. No extraction or use, for any purpose, of the ground water underlying the Site, except as authorized by the U.S. EPA and/or ADEQ for investigation, monitoring or remediation, or should a variance be granted for ground water use in a deep well on the Site. A variance for ground water use in a deep water well shall be granted only if the integrity of the well is intact and no migration of contaminants between the contaminated shallow zone and deep water can be demonstrated.
iv. No activities that will affect the integrity of any current or future remedial or monitoring system such as ground water monitoring wells and/or impermeable reactive barriers.
v. No development of the Site for residential or commercial use or any other non-industrial use.

The land use restrictions apply to the entirety of the affected Property described herein above.

12. ACCESS. The U.S. EPA, ADEQ and their agents and representatives shall have full access to the Site at all times to inspect and evaluate the continued protectiveness of the remedial action or for other purposes authorized under Federal and Arkansas law, including this Corrected Deed Notice and Restrictions.

13. NOTICES. The Owner and subsequent owners shall cause all leases, grants, and other written transfers of an interest in the Property to contain a provision expressly requiring all holders thereof to take the Property subject to the restrictions contained herein and to comply fully with the requirements in this Corrected Deed Notice and Restrictions. Nothing contained in this paragraph shall be construed as limiting any obligation of any person to provide any notifications required by any law, regulation, or order of any governmental authority. The Owner and any subsequent owners shall provide written notice to the U.S. EPA and ADEQ at least 30 calendar days before the effective date of any conveyance, grant, gift, or other transfer, in whole or in part, of the owner's interest in the Property. The Owner is not required to provide notice when the conveyance of the Owner's interest, in whole or in part, is made by bequest to a beneficiary. The beneficiary shall provide written notice of such conveyance or bequest at least 45 calendar days after the effective date of the conveyance or bequest.

The Owner and any subsequent owners shall submit written notice under Section 13 above to:

Superfund Division, Remedial Branch
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202

AND

Arkansas Department of Environmental Quality
Chief, Hazardous Waste Division
5301 Northshore Drive
North Little Rock, AR 72118

14. ENFORCEMENT OF VIOLATIONS. This Corrected Deed Notice and Restrictions is intended, in part, to provide notice that future use of the Site is restricted to industrial use, to provide a warning of the risks associated with the on-site contamination, to protect the integrity of the Site engineering controls, to prevent exposure to residual soil contamination, and to prohibit use of the groundwater except as authorized by the U.S.EPA and/or ADEQ. The restrictions provided herein are enforceable by U.S. EPA and/or ADEQ against any person who violates this Corrected Deed Notice and Restrictions. To enforce violations of this Corrected Deed Notice and Restrictions, the U.S.EPA and/or ADEQ may initiate one or more enforcement actions and require additional remediation, and assess damages.

15. MODIFICATION AND TERMINATION.

i. Any person may request in writing, at any time, that the U.S.EPA, with notice to ADEQ, modify or terminate this Corrected Deed Notice and Restrictions where performance of subsequent remedial actions, a change of conditions at the Site, or adoption of revised remediation standards suggest that modification of the Corrected Deed Notice and Restrictions would be appropriate.

ii. This Corrected Deed Notice and Restrictions may be revised or terminated only upon filing of an instrument, approved by the U.S. EPA (Exhibit F, Approval Letter), in the office of the Boone County Circuit Clerk, 100 N. Main Street, Ste. 200, Harrison, Boone County, Arkansas, 72601 expressly modifying or terminating this Corrected Deed Notice and Restrictions. Should U.S.EPA determine that this Corrected Deed Notice and Restrictions requires modification or termination for the reasons listed in 15i above, U.S.EPA intends to consult and obtain comments from the stakeholders, including the Owner, ADEQ and McKesson Corporation, to modify or terminate the Corrected Deed Notice and Restrictions. When the modified or terminated instrument, containing comments from the stakeholders, is finalized and approved for recording by U.S.EPA, the U.S. EPA will request the Owner to sign and record the modified or terminated instrument.

17. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Corrected Deed Notice and Restrictions as of the date first written above.

Estate of Mary Faye (Burke) Grisham with C.C. Grisham as Executor

CC Grisham

C.C. Grisham, Executor

CC Grisham

Signature

STATE OF ARKANSAS

SS.:

COUNTY OF BOONE

I certify that on 1st day of May, 2014, C.C. Grisham personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) This person is the Executor of the Estate of Mary Faye (Burke) Grisham, the Owner named in this document; and

(b) This person signed this proof to attest to the truth of these facts.

CC Grisham

Signature

CC Grisham

C.C. Grisham, Executor for the Estate of Mary Faye (Burke) Grisham

Signed and sworn before me on 1st day of May, 2014

, Notary Public

Daniel J. Fraser, II, Notary

[Print name and title]

DANIEL FRASER II
NOTARY PUBLIC-STATE OF ARKANSAS
BOONE COUNTY
My Commission Expires 01-13-2024
Commission # 12397055

Exhibit A

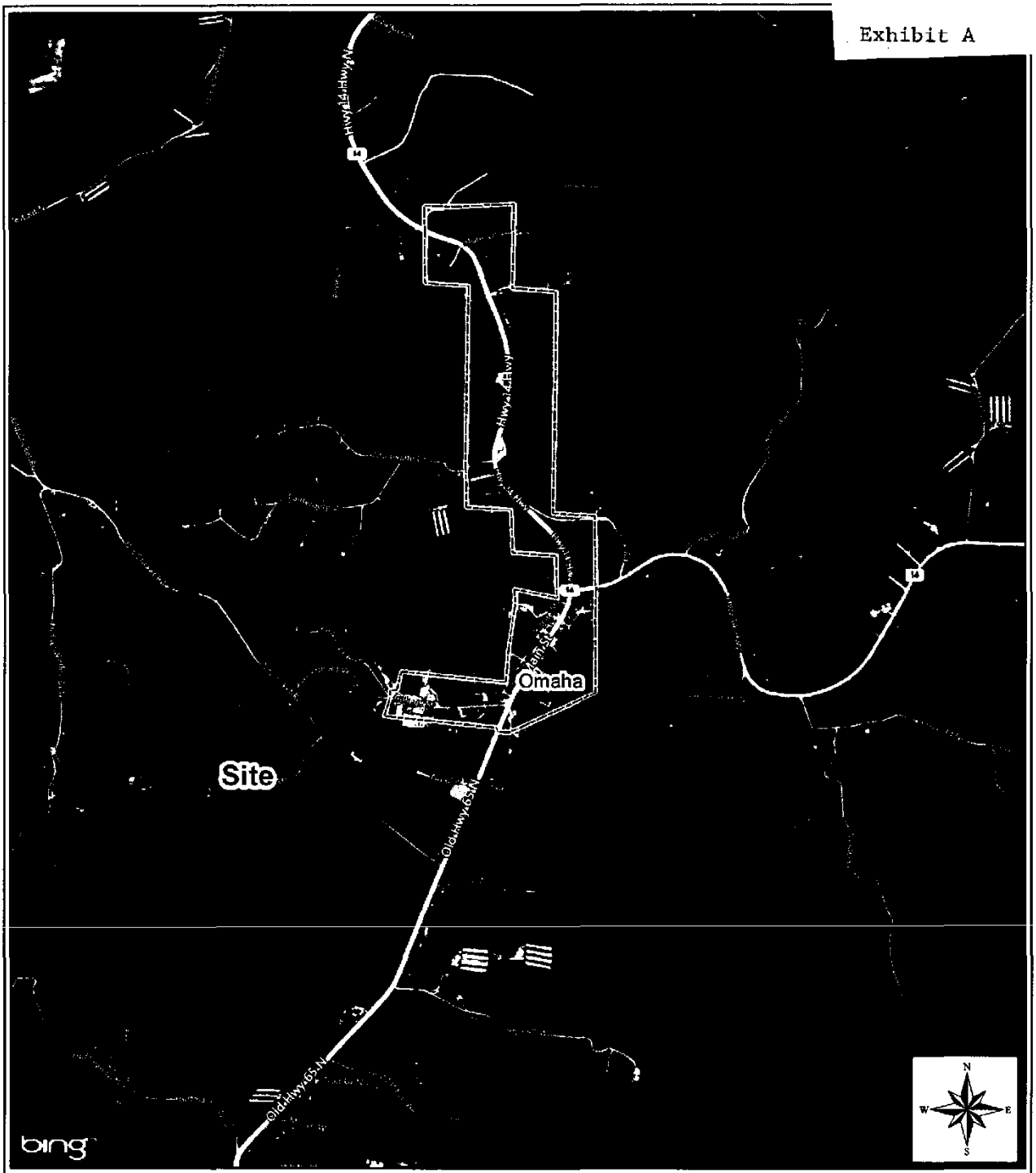


Figure I-3

Site Location Map
Arkwood, Inc. Site
Omaha, Arkansas

Site Location

Data Sources: Site Boundary from Consent Decree, *U.S. v. Hallie C. Ormond, C.C. Grisham and Mary F. Burke*, Civil Action No. 87-3034, July 12, 1988) for Corrected Deed Notice and Restrictions for C.C. Grisham Executor of the Estate of Mary Faye (Burke) Grisham, owner of the Property on May 5, 2014 in Boone County, Arkansas.
Basemap from Bing Hybrid.

EPA Region 6
GIS Support
Dallas, TX
20140505JD01

LOCKHEED MARTIN

Exhibit B

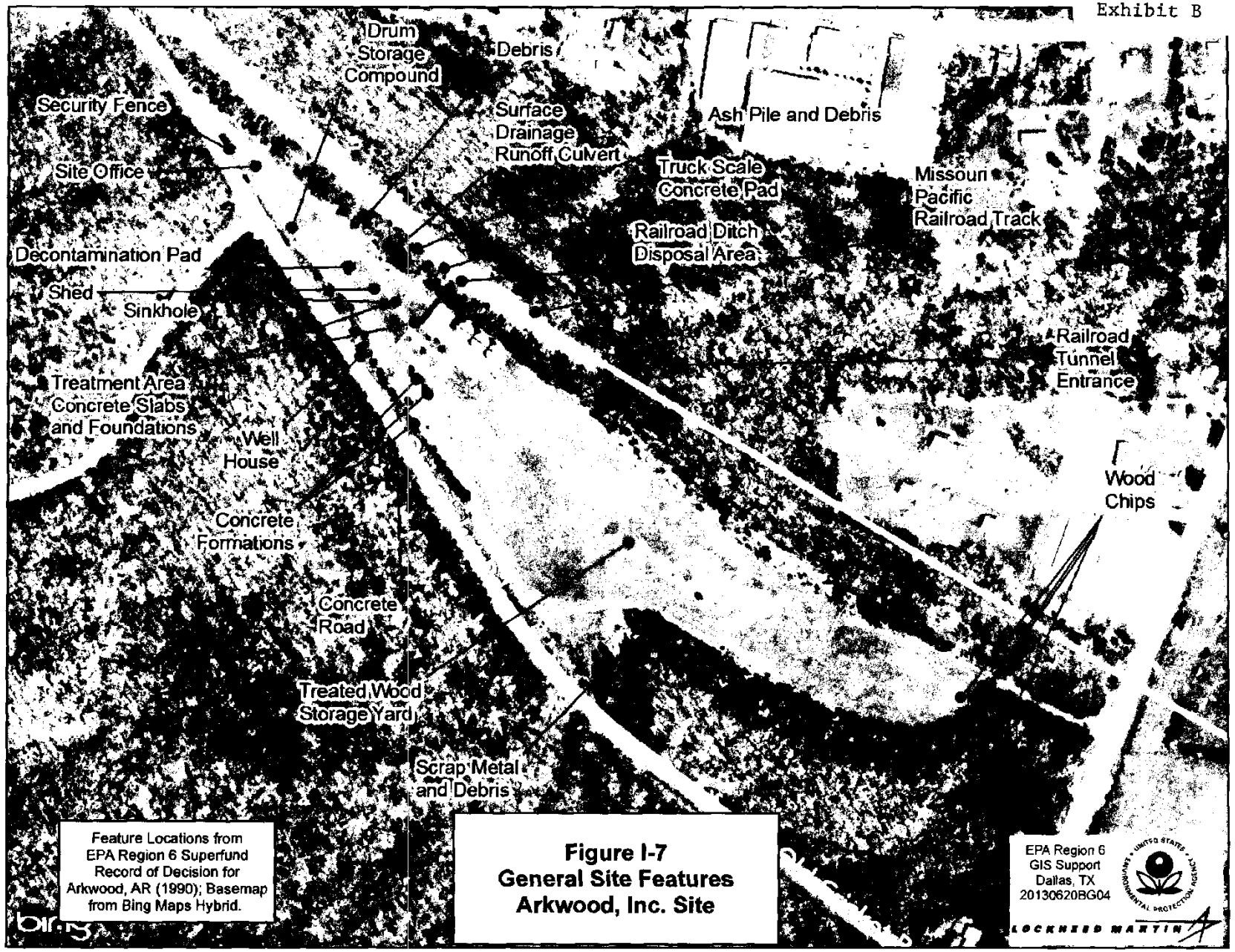


Figure I-7
General Site Features
Arkwood, Inc. Site

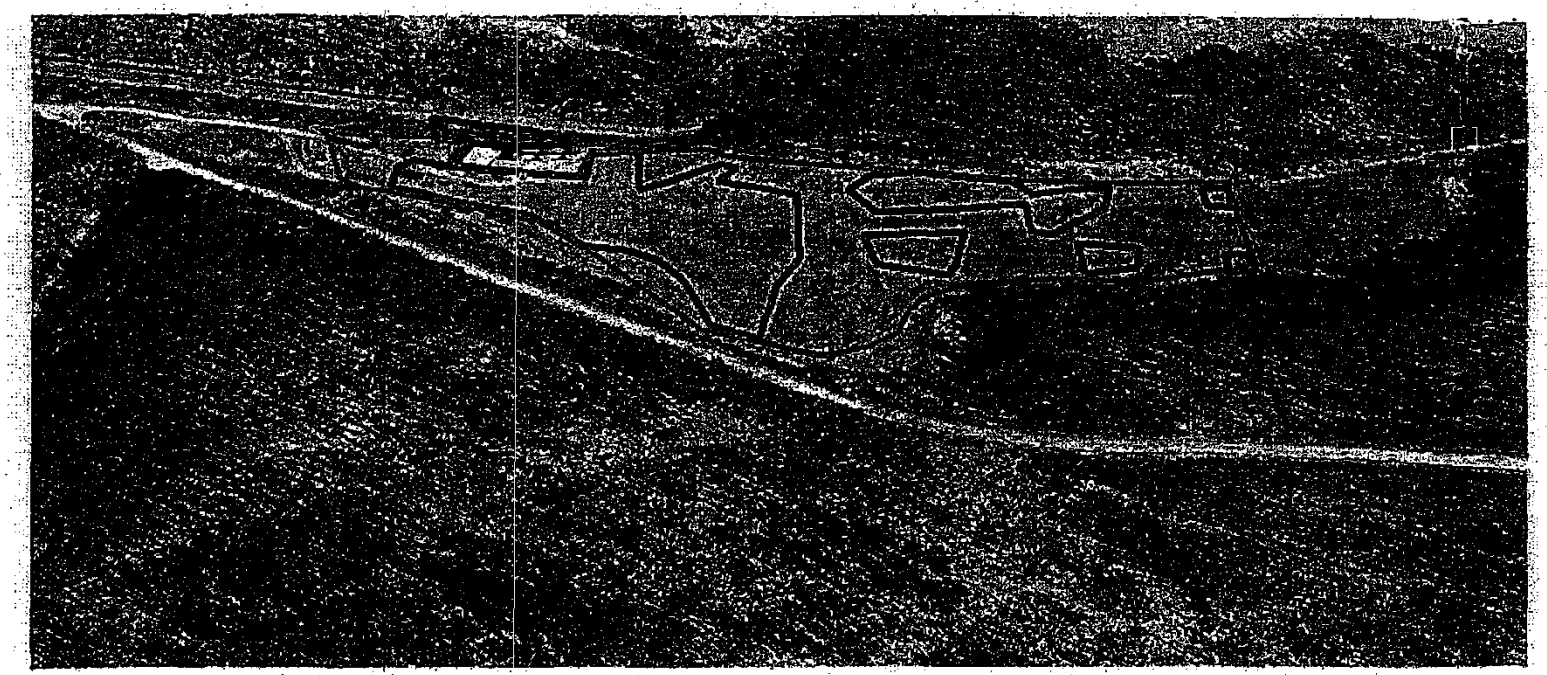
EXHIBIT "A"

Part of the Northeast Quarter of the Southwest Quarter and part of the South Half of the Northwest Quarter and part of the Northwest Quarter of the Southeast Quarter of Section 27, Township 21 North, Range 21 West, Boone County, Arkansas, more particularly described to-wit: Commencing at a stone marking the Southeast corner of the Northeast Quarter of the Southwest Quarter of said Section 27, thence North 86° 02' 53" West 946.17 feet, thence North 01° 28' 49" East 970.62 feet to the place of beginning said point being located on northerly right-of-way of county road, thence with said northerly right-of-way North 31° 53' 10" West 492.77 feet, thence North 33° 15' 00" West 345.29 feet, thence North 29° 35' 17" West 345.49 feet, thence North 34° 06' 52" West 118.66 feet, thence North 39° 10' 31" West 92.00 feet, thence North 43° 16' 58" West 107.38 feet, thence leaving said northerly right-of-way North 42° 42' 38" East 2.83 feet to the southerly right-of-way of Missouri Pacific Railroad, thence with said southerly right-of-way South 47° 17' 22" East 49.77 feet, thence South 48° 16' 00" East 318.53 feet, thence South 48° 19' 25" East 602.13 feet, thence South 49° 01' 52" East 95.36 feet, thence South 50° 04' 43" East 99.37 feet, thence South 51° 43' 07" East 98.58 feet, thence South 53° 45' 52" East 100.98 feet, thence South 55° 55' 22" East 103.00 feet, thence South 57° 46' 36" East 12.20 feet, thence South 32° 13' 24" West 135.00 feet, thence South 57° 46' 36" East 245.44 feet, thence North 32° 13' 24" East 106.15 feet to the North line of a deed dated February 22, 1961, and recorded in Deed Book 85, Pages 164-165 in the Circuit Clerk and Ex-officio Recorder Office in and for Boone County, Arkansas, thence along said North line South 56° 29' 35" East 1004.34 feet, thence leaving said North line South 23° 30' 25" West 154.07 feet to the approximate toe of slope of hill side, thence with said approximate toe of slope South 48° 18' 45" West 47.44 feet, thence South 80° 10' 42" West 100.89 feet, thence North 76° 14' 40" West 132.91 feet, thence North 68° 01' 53" West 282.88 feet, thence North 52° 56' 23" West 164.49 feet, thence North 63° 51' 10" West 200.07 feet, thence South 29° 26' 53" West 116.89 feet, thence South 03° 41' 49" West 144.76 feet to the northerly right-of-way of County Road, thence leaving said approximate toe of slope and following said northerly right-of-way of County Road North 46° 17' 18" West 70.92 feet, thence North 41° 56' 22" West 86.18 feet, thence North 36° 55' 21" West 86.29 feet, thence North 33° 04' 49" West 111.09 feet, thence North 31° 53' 10" West 289.85 feet to the place of beginning and containing 18.076 acres more or less and subject to existing easements and right-of-ways.

Filed for Record 5th Day of
19 99 at 3:35 o'clock PM
Helen Seitz, Clerk
By: Blair Adams, DC

Figure 4: Fence line at Arkwood Site

Figure 5. Capped and Excavated Areas of the Arkwood, Inc. Site



Capped Area (Encircling Line)

Excavated Areas (Non-contiguous Areas)

Exhibit F

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202-2733

May 6, 2014

VIA FAX

Mr. C.C. "Bud" Grisham
1 Meriwether Pond
Harrison, AR 72602

RE: Corrected Deed Notice and Restrictions – Second Final
Arkwood Inc. Site, Boone County, Arkansas

Mr. Grisham:

Pursuant to the phone conversations on April 29, 2014, May 5 and 6, 2014, I am enclosing the Corrected Deed Notice and Restrictions for the Arkwood Inc. site, Boone County, Arkansas for your signature and recording in Boone County, Arkansas. This Corrected Deed Notice and Restrictions is approved by U.S.EPA and revises, amends and supersedes the Deed Notice that you executed and recorded (filed for record) on August 30, 2010 (File 10 004447) as Executor of the Estate of Mary Faye (Burke) Grisham, owner of the Arkwood Inc. site.

This Corrected Deed Notice and Restrictions incorporates comments from you, your son, Charles "Curt" Grisham, Jr., U.S.EPA (Region and HQ), and the Arkansas Department of Environmental Quality (ADEQ), and McKesson Corporation. As we discussed, this letter will represent the approval of the U.S.EPA (to be Exhibit F). Upon the recording of the Corrected Deed Notice and Restrictions, the August 30, 2010 Deed Notice is terminated. The terms and conditions in the Corrected Deed Notice and Restrictions replace those set forth in the August 30, 2010 Deed Notice.

As the Executor of the Estate of Mary Faye (Burke) Grisham, owner of the Arkwood Inc. site, please sign in the presence of a notary public and record the enclosed Corrected Deed Notice and Restrictions for the Arkwood Inc. site. After recording the Corrected Deed Notice and Restrictions, please mail a copy of the recorded Corrected Deed Notice to me at the address below for U.S.EPA's records.

EXHIBIT F-2

If you have any questions, please do not hesitate to contact me at 214-665-3193. Thank you for your attention to this matter.

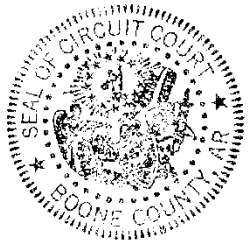
Sincerely,

Gloria Moran

Gloria Moran
Assistant Regional Counsel
Superfund Branch
U.S. EPA, Region 6
1445 Ross Avenue
Dallas, Texas 75202
(214) 665-3193
(214) 665-6460 (fax)

Enclosure

cc: Mr. John Edgcomb, w/ enclosures



STATE OF ARKANSAS } SS
COUNTY OF BOONE }
I hereby certify that this instrument
was filed for record in my office the
05/29/2014 3:32PM and duly recorded.
Record as Instrument # 2014002477
Witness my hand and the court seal this
05/29/2014 3:32PM
RHONDA WATKINS
Circuit Clerk and Recorder

By _____ D.C.

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APPENDIX E –INITIAL PUBLIC NOTICE

Arkansas Department of Environmental Quality

Notice of Five Year Review
Arkwood, Inc. Superfund Site

EPA I.D. Number: ARD084930148
Facility Location: Old Cricket Creek Road, west of Old U.S. Highway 65, Omaha, Boone County, Arkansas
WEB Address: http://www.epa.gov/superfund/sites/cursites/index.htm

The United States Environmental Protection Agency (USEPA) and the Arkansas Department of Environmental Quality (ADEQ) are conducting a Five Year Review for the Arkwood, Inc. Superfund Site (Arkwood). The Five Year Review is being conducted to determine whether the remedy at the Site remains protective of human health and the environment. The Site is located in Boone County, approximately one-half mile southwest of Omaha, Arkansas. The Site lies west of Old U.S. Highway 65 and north of Old Cricket Creek Road.

The lead agency for conducting the Five Year Review is the USEPA. This will be the fourth Five Year Review for the Arkwood Site. This review will be conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). Section 121 of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires the remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at the Site be subject to a Five Year Review and states that the selected remedial action should comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws.

In September1990 the Record of Decision (ROD) promulgated the selected remedial alternative which included excavation and offsite incineration of soils contaminated with PCP, PAHs and dioxins; quarterly monitoring of the area springs; and an offsite ozone treatment system installed offsite immediately downstream of New Cricket Spring to reduce the remaining PCP concentrations to State of Arkansas surface water quality standards. The operation of the offsite ozone treatment system and monthly sampling of New Cricket Spring continues.

Once completed, the results of the fourth Five Year Review will be made available to the public at the following information repository:

Arkansas Department of Environmental Quality
Hazardous Waste Division
5301 Northshore Drive
North Little Rock, AR 72118-5317
(501) 682-0833

Individuals who wish to comment regarding this Five Year Review or otherwise participate should contact:

Tammie J. Hynum
Chief, Hazardous Waste Division

Arkansas Department of Environmental Quality
5301 Northshore Drive, North Little Rock, AR 72118-5317
Phone: (501) 682-0833

Web Site: http://www.adeq.state.ar.us

Any person, including Potentially Responsible Parties (PRPs), who wishes to comment, must do so by delivering or mailing the written comments, along with their name and address, to ADEQ.

All comments must be received by 4:30 p.m. on August 21, 2015. Only comments regarding the Five Year Review will be considered.

Dated this 22nd Day of July 2015

Becky W. Keogh
Director
Arkansas Department of Environmental Quality

Certificate of Publication

Customer Name: ADEQ FISCAL DIVISION
Legal Description: Notice of Five Year Review, Arkwood, Inc. Superfund Site

STATE OF ARKANSAS
SS
COUNTY OF BOONE

I, Carol Lawson upon oath state that I am Business Manager of the HARRISON DAILY TIMES, a weekly newspaper published at Harrison, Boone County, Arkansas, and that said newspaper has a bona fide circulation in said county, that the annexed advertisement was inserted, and published, in said newspaper for 1 **consecutive weeks,** as follows:

1st insertion: 07/22/2015
2nd insertion:
3rd insertion:
4th insertion:
5th insertion:
6th insertion:

Carol Lawson
Business Manager

Subscribed to and sworn to before me this 07/22/2015
Lynda Neal, D.C.

(FEE, $113.50)

Arkansas Department of Environmental Quality
Notice of Five Year Review
Arkwood, Inc. Superfund Site
EPA I.D. Number:
ARD084930148
Facility Location:
Old Cricket Creek Road, west of Old U.S. Highway 65, Omaha, Boone County, Arkansas
WEB Address:
http://www.epa.gov/superfund/sites/cursites/index.htm
The United States Environmental Protection Agency (USEPA) and the Arkansas Department of Environmental Quality (ADEQ) are conducting a Five Year Review for the Arkwood, Inc. Superfund Site (Arkwood). The Five Year Review is being conducted to determine whether the remedy at the site remains protective of human health and the environment. The site is located in Boone County, approximately one-half mile southwest of Omaha, Arkansas. The site lies west of Old U.S. Highway 65 and north of Old Cricket Creek Road.
The lead agency for conducting the Five Year Review is the USEPA. This will be the fourth Five Year Review for the Arkwood site. This review will be conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). Section 121 of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires the remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at the site be subject to a Five Year Review and states that the selected remedial action should comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws.
In September1990 the Record of Decision (ROD) promulgated the selected remedial alternative which included excavation and offsite incineration of soils contaminated with PCP, PAHs and dioxins; quarterly monitoring of the area springs; and an offsite ozone treatment system

APPENDIX F – SITE INSPECTION CHECKLIST

Arkwood, Inc. Site
Omaha, Boone County, Arkansas
Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under Superfund program. N/A means "not applicable".

I. SITE INFORMATION

Site Name: Arkwood, Inc.	**EPA ID:** ARD ARD084930148
City/State: Omaha/ Arkansas	**Date of Inspection:** October 15, 2015
Agency Completing Site Inspection: EPA & ADEQ	**Weather/temperature:** Clear skies/75ºF

Remedy Includes: (Check all that apply)

☒ Topsoil cap
☒ Access controls
☒ Institutional controls
☐ Groundwater pump and treatment
☒ Surface water collection and treatment (offsite ozone treatment station at New Cricket Spring)

Attachments: ☒ Inspection team roster attached ☒ Site figure attached ☒ Site photographs attached

II. INTERVIEWS (Check all that apply)

1. O&M site manager: McKesson Corporation
   Contact: James Fleer, Project Coordinator, Director, Environmental Services
Phone Number: (913) 238 - 8348

2. Local regulatory authorities and response agencies (i.e. State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
10/20/2015 phone call to the Boone County Sheriff's Office, Criminal Investigation Division: the clerk did not find record of any responses made to residences near the site on the east end of Old Cricket Road after searching the data base from 2009 to present.

3. Other interviews (optional): ☐ N/A ☒ Additional report attached

III. ONSITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

1. O&M Documents

☒	O&M Manuals	☒ Readily available	☒ Up to date	☐ N/A
☐	As-Built Drawings	☐ Readily available	☐ Up to date	☐ N/A
☐	Maintenance Logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: There are some equipment manuals kept in the site's front office building and in the room beneath the soil silos. Other equipment manuals, as-built drawings and maintenance logs are kept at Mr. Fleer's office in Kansas City, Kansas.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

2. Health and Safety Plan Documents

☒	Site-Specific Health and Safety Plan	☒ Readily available	☒ Up to date	☐ N/A
☐	Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A

Remarks: The HASP was reviewed by all involved with the October 2014 dioxin reassessment soil sampling event. Regarding a Contingency/Emergency Response Plan, Mr. Fleer will contact the mayor of Omaha, AR to provide him with contact information for McKesson's two O&M contractors.

3. O&M and OSHA Training Records ☐ Readily available ☒ Up to date ☐ N/A

Remarks: The 8-Hour HAZWOPER Refresher Training has been taken by employees and contractors. The records for the training are kept at Mr. Fleer's office in Kansas City, Kansas.

4. Permits and Service Agreements

☐	Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐	Effluent Discharge	☐ Readily available	☐ Up to date	☒ N/A
☐	Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐	Other permits	☐ Readily available	☐ Up to date	☒ N/A

Remarks:
The future modification work planned for the effluent ditch from the New Cricket Spring ozone treatment station will require a 404 permit from the US Army Corp of Engineers. The Arkwood, Inc. Superfund site is exempt from State permit requirements. However, the effluent ditch from the treatment station is considered "waters of the state." The site manager would not need to actually obtain a Short Term Activity Authorization (STAA) permit (APC&EC Reg. 2 at 2.305), but would need to meet the intent of the permit.

5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

6. Settlement Monument Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

7. Spring Monitoring Records ☒ Readily available ☐ Up to date ☐ N/A

Remarks: A site inspection log which documented the weekly operating parameters of the treatment station equipment was available for viewing. Monthly Progress Reports are submitted to EPA and ADEQ by the site manager which contain the sampling results and flow rate for the spring and discharge weir.

8. Leachate Extraction Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

9. Discharge Compliance Records ☒ Readily available ☐ Up to date ☐ N/A

Remarks: Monthly Progress Reports are submitted to EPA and ADEQ by the site manager which demonstrates compliance with the discharge concentration limit.

10. Daily Access/Security Logs ☒ Readily available ☒ Up to date ☐ N/A

Remarks: A visitors log is maintained at the site's front office and was signed by all team members during the five-year review site inspection.

IV. O&M COSTS ☒ Applicable ☐ N/A

1. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☒ Contractor for PRP
☐ Other:

IV. O&M COSTS ☒ Applicable ☐ N/A

2. O&M Cost Records

☐ Readily available ☐ Up to date ☐ Funding mechanism/agreement in place
Original O&M cost estimate: ☐ Breakdown attached
The site manager stated the general O&M costs average about $125,000 annually plus electrical utility costs.

3. Unanticipated or Unusually High O&M Costs During Review Period ☒ N/A
Describe costs and reasons: The annual O&M costs estimated in the 1990 Feasibility Study for the 1990 ROD was $194,000. Taking inflation into account, this is equal to approximately $350,000 annual O&M costs today. The estimated amount listed in section 2 does not exceed this amount.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

1. Fencing

1. Fencing damaged ☒ Location shown on site map ☒ Gates secured ☐ N/A
Remarks: A few breaches were noted in the chain link fence along the north edge of the site. Mr. Fleer stated the breaches would be fixed in the near future (Appendix C, Figure 6).

2. Other Access Restrictions

1. Signs and other security measures ☒ Location shown on site map ☐ N/A
Remarks: Several 'No Trespassing' signs are attached to the site entrance gate, the fence line bordering Cricket Road, and the cable fencing along the east side of the site.

3. Institutional Controls

1. Implementation and enforcement

Site conditions imply ICs not properly implemented: ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced: ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive by): EPA and ADEQ performed a joint site inspection with the site manager.
Frequency: 5 years
Responsible party/agency: EPA
Contact
Name: Stephen Tzhone
Title: Superfund Remedial Project Manager
Date: As scheduled
Phone Number: 214-665-8409
Reporting is up-to-date: ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency: ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met:

	☒ Yes	☐ No	☐ N/A
Violations have been reported:	☐ Yes	☒ No	☐ N/A

Other problems or suggestions: None ☐ Additional report attached (if additional space required)

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A
2. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A Remarks: The IC was updated with the correct metes and bounds and additional deed restrictions, and filed with the Boone County clerk in May 2014.
4. General
1. Vandalism/trespassing ☒ Location shown on site map ☐ No vandalism evident Remarks: The only sign of vandalism/trespassing were the breaches in the north fence line noted in item V.1 above.
2. Land use changes onsite ☒ N/A Remarks: No land use changes onsite noted during visit.
3. Land use changes offsite ☐ N/A Remarks: The property owner has sold the (12) adjacent acres east of the site to a land developer.
VI. GENERAL SITE CONDITIONS
1. Roads ☒ Applicable ☐ N/A
1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A Remarks:
2. Other Site Conditions
1. Remarks:
VII. SOIL CAP ☒ Applicable ☐ N/A
1. Cap Surface
1. Settlement (Low spots) ☐ Location shown on site map ☒ Settlement not evident Areal extent: Depth: Remarks:
2. Cracks ☐ Location shown on site map ☒ Cracking not evident Lengths: Widths: Depths: Remarks:
3. Erosion ☐ Location shown on site map ☒ Erosion not evident Areal extent: Depth: Remarks:
4. Holes ☐ Location shown on site map ☒ Holes not evident

Areal extent: Depth: Remarks:	
5. Vegetative Cover ☒ Cover properly established ☒ No signs of stress ☒ Grass ☐ Trees/Shrubs Remarks:	
6. Alternative Cover (armored rock, concrete, etc.) ☒ N/A Remarks:	
7. Bulges ☐ Location shown on site map ☐ Bulges not evident ☒ N/A Areal extent: Height: Remarks:	
8. Wet Areas/Water Damage ☐ Wet areas/water damage not evident ☒ N/A ☐ Wet areas ☐ Location shown on site map Areal extent: various sizes ☐ Ponding ☐ Location shown on site map Areal extent: ☐ Seeps ☐ Location shown on site map Areal extent: ☐ Soft subgrade ☐ Location shown on site map Areal extent: Remarks:	
9. Slope Instability ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability Areal extent: ☒ N/A Remarks:	
2. Benches ☐ Applicable ☒ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)	
VII. SOIL CAP ☒ Applicable ☐ N/A	
1. Flows Bypass Bench ☐ Location shown on site map ☐ N/A or okay Remarks:	
2. Bench Breached ☐ Location shown on site map ☐ N/A or okay Remarks:	
3. Bench Overtopped ☐ Location shown on site map ☐ N/A or okay Remarks:	
3. Letdown Channels ☐ Applicable ☒ N/A	
1. Settlement ☐ Location shown on site map ☐ No evidence of settlement Areal extent: Depth: Remarks:	
2. Material Degradation ☐ Location shown on site map ☐ No evidence of degradation Material type : Areal extent: Remarks:	

3. Erosion ☐ Location shown on site map ☐ No evidence of erosion
Areal extent: Depth:
Remarks:

4. Undercutting ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent: Depth:
Remarks:

5. Undercutting ☐ Location shown on site map ☐ No evidence of undercutting
Type:
Areal extent: Depth:
Remarks:

6. Excessive Vegetative Growth ☐ No evidence of excessive growth
☐ Evidence of excessive growth ☐ Vegetation in channels but does not obstruct flow
☐ Location shown on site map Areal extent:
Remarks:

4. Cover Penetrations ☐ Applicable ☒ N/A

1. Gas Vents ☐ N/A
☐ Active ☐ Passive ☐ Routinely sampled
☐ Properly secured/locked ☐ Functioning ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M
Remarks:

VII. SOIL CAP ☐ Applicable ☒ N/A

2. Gas Monitoring Probes
☐ Routinely sampled
☐ Properly secured/locked ☐ Functioning ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M
Remarks:

3. Monitoring Wells (within surface area of landfill) ☐ N/A
☐ Routinely sampled
☐ Properly secured/locked ☐ Functioning ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M
Remarks: None

4. Leachate Extraction Wells ☐ N/A
☐ Routinely sampled
☐ Properly secured/locked ☐ Functioning ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M
Remarks:

5. Settlement Monuments ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks:

5. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. Gas Treatment Facilities ☐ N/A
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs O&M
Remarks:

2. Gas Collection Wells, Manifolds, and Piping ☐ N/A
☐ Good condition ☐ Needs O&M
Remarks:

3. Gas Monitoring Facilities (e.g. gas monitoring of adjacent homes or buildings) ☐ N/A
☐ Good condition ☐ Needs O&M
Remarks:

6. Cover Drainage Layer ☐ Applicable ☒ N/A

1. Outlet Pipes Inspected ☐ Functioning ☐ N/A
Remarks:

2. Outlet Rock Inspected ☐ Functioning ☐ N/A
Remarks:

VII. SOIL CAP ☒ Applicable ☐ N/A

7. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. Siltation ☐ Siltation evident ☐ N/A
Area extent: Depth:
Remarks:

2. Erosion ☐ Erosion evident ☐ N/A
Area extent: Depth:
Remarks:

3. Outlet Works ☐ Functioning ☐ N/A
Remarks:

4. Dam ☐ Functioning ☐ N/A
Remarks:

8. Retaining Walls ☐ Applicable ☒ N/A

1. Deformations ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement: Vertical displacement: Rotational displacement:
Remarks:

2. Degradation: ☐ Location shown on site map ☐ Degradation not evident
Remarks:

9. Perimeter Ditches/Off-site discharge ☒ Applicable ☐ N/A
1. Siltation ☐ Location shown on site map ☒ Siltation not evident Areal extent: Depth: Remarks: The site has two drainage ditches. One ditch is along the north edge and the second ditch is along the south edge of the property. A confluence of the two drainage ditches is located between the main entrance drive and the north property line. No silt was observed in either ditch.
2. Vegetative Growth ☐ Location shown on site map ☒ Vegetation does not impede flow Area extent: Type: Remarks: Both the north and south drainage ditches are covered with vegetative grasses and rock.
3. Erosion ☐ Location shown on site map ☒ Erosion not evident Areal extent: Depth: Remarks:
4. Discharge Structure ☐ Location shown on site map ☒ N/A ☐ Functioning ☐ Good condition Remarks:

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. Settlement ☐ Location shown on site map ☐ Settlement not evident
Areal extent: Depth:
Remarks:

2. Performance Monitoring ☐ N/A
☐ Performance not monitored
☐ Performance monitored Frequency:
☐ Performance not monitored Head differential:
Remarks:

IX. GROUNDWATER (SPRING WATER) REMEDIES ☒ Applicable ☐ N/A

1. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Pumps, Wellhead Plumbing, and Electrical
☐ All required wells located ☐ Good condition ☐ Needs O&M
Remarks:

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ N/A
☐ All required wells located ☐ Good condition ☐ Needs O&M
Remarks:

3. Spare Parts and Equipment ☐ N/A
☐ Readily available ☐ Good condition
☐ Requires Upgrade ☐ Needs to be provided
Remarks:

2. Spring Water collection Structures, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Collection structures, Pumps, and Electrical ☐ N/A
☒ Good condition ☐ Needs O&M
Remarks: Spring water from New Cricket Spring flows through a collection weir where the flow rate is measured.

2. Surface Water Collection System Pipelines, Valve Boxes, and Other Appurtenances ☐ N/A
☒ Good condition ☐ Needs O&M
Remarks: The spring water flows through underground piping and into the influent sump next to the treatment building.

3. Spare Parts and Equipment ☐ N/A
☒ Readily available ☒ Good condition
☐ Requires Upgrade ☐ Needs to be provided
Remarks: Spare equipment parts and supplies are stored on shelves inside the treatment building.

IX. GROUNDWATER (SPRING WATER) REMEDIES ☒ Applicable ☐ N/A
3. Treatment System ☒ Applicable ☐ N/A
1. Treatment Train (Check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ Carbon absorbers ☐ Filters (list type): ☐ Additive (list type, e.g. chelation agent, flocculent) ☒ Others (list): ozone treatment system for removal of pentachlorophenol (PCP) ☒ Good condition ☐ Needs O&M ☐ Sampling ports properly marked and functional (Water samples are collected on a monthly basis at the mouth of New Cricket Spring and from the discharge zone of the primary treatment system (12 feet from the discharge weir in the drainage ditch). ☒ Sampling/maintenance log displayed and up to date ☒ Equipment properly identified ☐ Quantity of groundwater treated annually (list volume): ☐ Quantity of spring water treated annually (list volume): Remarks: Treatment system was in operation during site visit.
2. Electrical Enclosures and Panels (properly rated and functional) ☐ N/A ☒ Good condition ☐ Needs O&M Remarks:
3. Tanks, Vaults, Storage Vessels ☐ N/A ☒ Good condition ☐ Needs O&M Remarks: The sump adjacent to the treatment building appears to be in good condition and covered with protective steel grating for safety.
4. Discharge Structure and Appurtenances ☐ N/A ☒ Good condition ☐ Needs O&M Remarks: Treated effluent leaves treatment station by flowing through a discharge weir and into a drainage ditch leading to a tributary to Cricket Pond and Cricket Creek.
5. Treatment Building(s) ☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs Repair ☒ Chemicals and equipment properly stored Remarks: Some spare parts and supplies are stored on shelves inside the treatment station.
6. Monitoring Wells (pump and treatment remedy) ☒ N/A ☐ All required wells located ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Needs O&M Remarks:

IX. GROUNDWATER (SPRING WATER) REMEDIES	☐ Applicable	☒ N/A
4. Monitored Natural Attenuation	☐ Applicable	☒ N/A
1. Monitoring Wells (natural attenuation remedy)		☒ N/A
☐ All required wells located ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled		
☐ Good condition ☐ Needs O&M		
Remarks:		
5. Long Term Monitoring	☐ Applicable	☒ N/A
1. Monitoring Wells		☐ N/A
☐ All required wells located ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled		
☐ Good condition ☐ Needs O&M		
Remarks:		
X. OTHER REMEDIES	☐ Applicable	☒ N/A

XI. OVERALL OBSERVATIONS

1. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e. to contain contaminant plume, minimize infiltration and gas emission, etc.).

Remarks: Part of the Record of Decision's selected groundwater remedy is treatment of the water from New Cricket Spring to meet the Arkansas Surface Water Quality Standard, which resulted in installation of the primary ozone treatment station at New Cricket Spring. In 2012 ADEQ requested the remedy treatment standard be changed to the Maximum Contaminant Level for PCP since the treatment station effluent eventually returns to the state of ground water. The monthly progress report data submitted by the site manager have indicated the treatment station continues to successfully treat the PCP-contaminated water from New Cricket Spring to meet the Maximum Contaminant Level for PCP.

2. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Remarks: As observed during the October 2015 site inspection, the site manager continues to effectively implement O&M procedures on and offsite. The site currently remains secure due to perimeter fencing, a locked entrance gate and a cable/pipe bollard system equipped with caution signage warning unauthorized persons to keep out and providing EPA contact information. The soil cap and vegetative cover were recently mowed appeared in good condition during the site visit. The onsite process equipment building/soil storage silo area appears to be clean and well maintained. The offsite primary ozone treatment station is in good condition and continues to operate effectively, providing for long-term effectives of the groundwater remedy. A corrected deed notice was filed by the estate executor in May 2014 to ensure long-term protectiveness of the onsite remedy. The deed notice contains restrictions limiting the site to industrial use, prohibiting digging or construction on the soil cap without prior approval, and prohibiting extraction of the groundwater except for investigation, monitoring or remediation.

XI. OVERALL OBSERVATIONS
3. Early Indicators of Potential Remedy Failure
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. Remarks: There have not been any unanticipated changes in the cost or scope of O&M during the current review period that would indicate a potential remedy failure.
4. Opportunities for Optimization
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Remarks: Operation of the remedy has been performed in an efficient and effective manner during the current review period.

Arkwood, Inc. Site Inspection Team Roster October 15, 2015		
Name	**Organization**	**Title**
Stephen Tzhone	US EPA Region 6 Superfund Division Remedial Branch	Remedial Project Manager
Dianna Kilburn	Arkansas Department of Environmental Quality Office of Land Resources Waste Programs	Geologist Supervisor
Mark Moix	Arkansas Department of Environmental Quality Office of Land Resources Waste Programs	Engineer
James Fleer	McKesson Corporation, Environmental Services	Director

APPENDIX G – SITE INSPECTION PHOTOGRAPHS

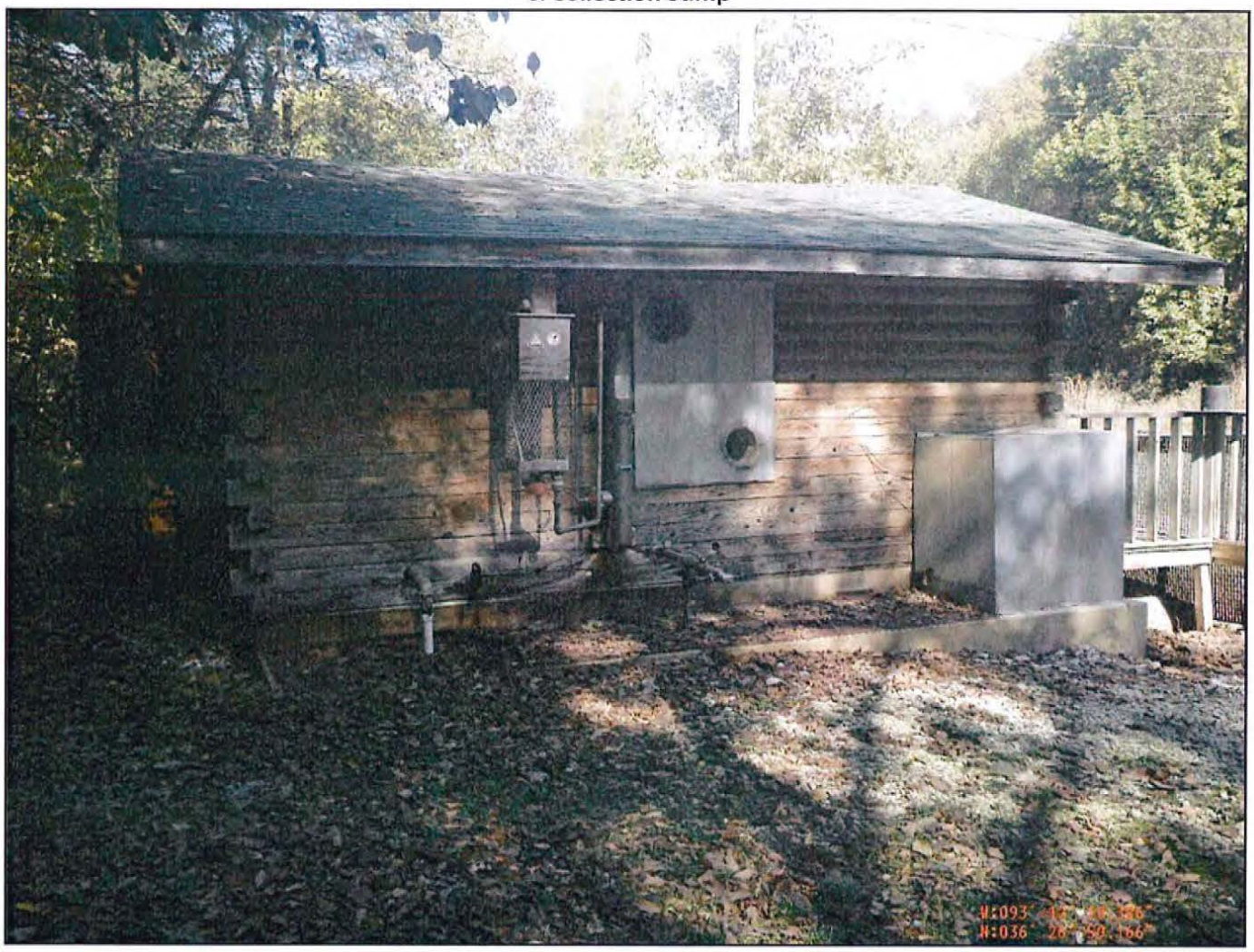
Photo 1: Site Entrance Gate
Warning Sign

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ DK

Photo 2: Mouth of New Cricket Spring

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ

Photo 3: Ozone Treatment Station
& Collection Sump



Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ DK

Photo 4: Site Stormwater Ditch - South

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ DL

Photo 5: Site Former Sinkhole Area
With Injection Wells

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ DK

Photo 6: Site Cable/Bollard System
Near East End

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ DK

Photo 7: Fallen Tree on Site Cable/Bollard System
Near East End

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ

Photo 8: New Perimeter Fencing
At East End

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ

Photo 9: Breach in Perimeter Fencing
On North Side

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ

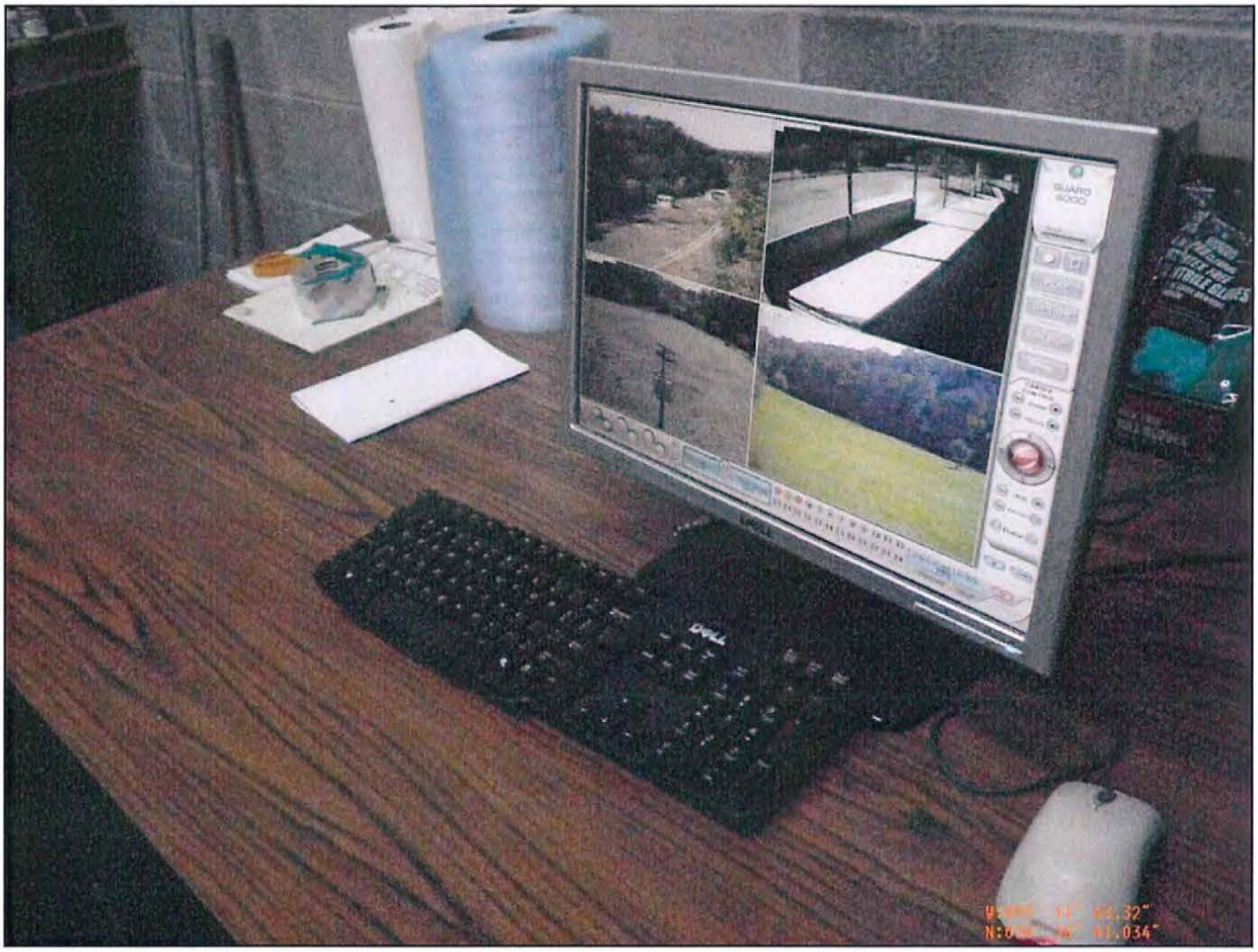
Photo 10: Breach in Perimeter Fencing
On North Side

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ

Photo 11: Breach in Perimeter Fencing
On North Side

Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ

Photo 12: Site Surveillance System



Attributes	
Facility	Arkwood Inc. Superfund Site
Event	5 Yr Review Inspection
Date	October 15, 2015
Site Location	Old Cricket Rd, Omaha, AR
AFIN	70-00049
Photographer	Mark Moix MM
Witness	Dianna Kilburn, ADEQ DK

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APPENDIX H – INTERVIEW FORMS

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Arkwood, Inc. Superfund Site		**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas		**Date:** 8-10-2015
Contact Made By:		
Name: Stephen Tzhone	**Title:** Remedial Project Manager	**Organization:** US EPA
Telephone No.: (214) 665-8409 **E-Mail:** : tzhone.stephen@epa.gov	Street Address: 1445 Ross Avenue, Suite 1200 City, State, Zip: Dallas, TX 75202-2733	
Name: Mark Moix	Title: Engineer PE	**Organization:** ADEQ (Project Team)
Telephone No.: (501) 682-0852 **E-Mail:** moix@adeq.state.ar.us	**Street Address:** 5301 Northshore Drive **City, State, Zip:** North Little Rock, AR 72118-5317	
Individual/Group Contacted:		
Name: BILL GRISHAM	**Title:** EXECUTOR-LAND OWNER OF	**Organization:** ARKWOOD SI
Telephone No.: 870-741-4805 **E-Mail Address:**	**Street Address:** 2 MERIWETHER POINT **City, State, Zip:** HARRISON, AR 72601	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Arkwood, Inc. Superfund Site. The scope of the review is from August 2011 to present.

1. What is your general impression of the work conducted at the site during this review period? (*Work at an active site may include activities such as frequent sampling, construction/demolition, and operation of treatment systems while work at an inactive site may include infrequent sampling, maintenance of perimeter fence/barriers, or*

Since surface remediation is complete, the work (mainly by Mother Nature) has been conducted properly.

2. From your perspective, what effects have site operations *(or inactive status)* had on the surrounding community?

The surrounding community (which has never had any health concerns from this site, or off-site water) has suffered from significant job loss. ADEQ needs to quit wasting time and resources on the miniscule amount of Penta in a single spring, and be helpful in restoring these jobs.

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** 8-10-2015

3. During this review period, are you aware of any community concerns regarding the site or its operation and administration *(If the site is inactive, please consider the ongoing maintenance of fencing and equipment)*? If so, please provide details.

The community is concerned with the immediate acquisition of an industry to be located on this prime railroad site.

All parties (including ADEQ) need to concentrate on the re-use of the site by an industry.

4. Are you aware of any events, incidents, or activities at the site during this review period, such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.

Yes, there have been numerous trespassing issues regarding ingress, egress, and storage of a large boat by persons connected to McKesson. Jean Mescher can fill you in on this.

5. Do you feel well informed about the site's activities and progress *(If site is inactive, please consider maintenance, sampling activities, and agency evaluations.)?* If not, please indicate how you would like to be informed about the site activities – for example, by e-mail, regular mail, fact sheets, meetings, etc.

I am not informed at all of any activity or progress by ADEQ to encourage industry for the site. The EPA, by contrast, has been exemplary in this regard.

6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation? *(If site is inactive, please consider maintenance of fences or equipment and the site's appearance.)*

Management of this site is excellent.

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	EPA ID No.: ARD084930148
Location: Omaha, Boone County, Arkansas	Date:

Please add any other comments in the space below.

COMMENTS:

9 YEARS AGO (SEE ATTACHED), MR. DEVINE (DIRECTOR, ADEQ) WAS SUPPORTIVE AND COMMITTED TO HELPING AN INDUSTRY LOCATE ON THIS HIGHLY DEVELOPED, AND WELL LOCATED RAILROAD SITE. IN 9 YEARS, I HAVE SEEN NOT ONE THING ADEQ HAS DONE TO FOLLOW MR. DEVINE'S LEAD. INSTEAD, ADEQ HAS ONLY WASTED TAXPAYERS' MONEY ON OLD CRICKET SPRING ISSUES; A SPRING THAT IS NOT (NOR HAS EVER BEEN) ANY THREAT TO HUMAN HEALTH: SEE EPA SCIENTIFIC FINDING ATTACHED. I AM CONFIDENT OUR NEW ADMINISTRATON AND NEW ADEQ DIRECTOR WILL CORRECT THIS, AND SEE TO IT THAT NORTH BOONE COUNTY GETS SOME HELP.

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ADEQ
ARKANSAS
Department of Environmental Quality

CERTIFIED MAIL No. 91 7199 9991 7030 4
Return Receipt Requested

July 28, 2015

Mr. C.C. "Bud" Grisham
1 Meriwether Pond
Harrison, AR 72602

RE: Arkwood, Inc. CERCLA Superfund Site, Omaha, Arkansas
Fourth Five-Year Review
EPA ID# ARD084930148; AFIN# 05-00003

Mr. Grisham,

The U.S. Environmental Protection Agency (US EPA) and Arkansas Department of Environmental Quality-Hazardous Waste Division (ADEQ) have begun the fourth Five-Year Review process for the Arkwood, Inc. Superfund site located one-half mile southwest of Omaha, Arkansas as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA-SARA, Section 121). This process includes a document review, a general site conditions inspection, writing a Five Year Review report, and a brief interview with known interested parties. Please see the attached public notice.

The US EPA and ADEQ will be conducting interviews on Wednesday October 14, 2015 and Thursday October 15, 2015. If you would like to be interviewed for the Five Year Review, please contact me at 501-682-0852 or via e-mail moix@adeq.state.ar.us. A form with the interview questions is attached.

Thank you,
Mark Moix

Mark Moix, PE
Arkansas Department of Environmental Quality
Hazardous Waste Division
5301 Northshore Drive
North Little Rock, AR 72118
moix@adq.state.ar.us
phone (501)682-0852

MARK – CONFIRMING OUR TELE. VISIT I'M LOOKING FORWARD TO THE INTERVIEW @ MY HOUSE/OFFICE OCT. 14. PLEASE CALL ME A FEW DAYS AHEAD @ 870-741-4805. THANKS, Bud 8-15-2015

attachments

ADEQ
ARKANSAS
Department of Environmental Quality

November 15, 2006

Representative Charles L. Ormond
1500 View Street
Morrilton, AR 72110-3725

Re: Arkwood Superfund Site

Dear Representative Ormond:

Based on your October 23, 2006 letter and our recent discussions, I have looked into the current status of Arkwood superfund site. The Arkwood superfund site has just had its second five year review (as performed by EPA) in February 2006. The review concluded that while the remedy is protective of human health and the environment, ongoing groundwater treatment is still needed to treat Pentachlorophenol in the groundwater. In addition, the responsible party for the site, McKesson, has begun a pilot program for injecting ozonated water in a local sinkhole to speed up reduction of Pentachlorophenol in the formation upgradient from the New Cricket Spring. Based on the initial results of this study, the Department is hopeful that this process will decrease the time frame needed to insure that the Pentachlorophenol is removed from the springs and that a full delisting of the site can be accomplished.

Since remediation of the surface of the site has been completed, McKesson may petition for a partial delisting of the surface portion of the site at any time. The Arkansas Department of Environmental Quality would be supportive of this effort and this would allow for the redevelopment of the site. Initial discussions with the EPA also indicate that they would allow a partial delisting of this site. Based on all available information, I see no reason the site can not be redeveloped and placed back into productive use. As we have discussed, this would allow Boone County's economic development agency to market this site for future industrial uses. Any efforts that you could undertake to encourage McKesson to request the partial delisting would expedite redevelopment of the site.

Please let me know if I can provide any further information.

Sincerely,

Marcus C. Devine
Director

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
8001 NATIONAL DRIVE / POST OFFICE BOX 8913 / LITTLE ROCK, ARKANSAS 72219-8913 / TELEPHONE 501-682-0744 / FAX 501-682-0798
www.adeq.state.ar.us

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

NOV 4 1999

The U.S. Environmental Protection Agency (EPA) as a policy tries to return remediated Superfund sites to productive use at the earliest possible opportunity. At the Arkwood Superfund Site (site) the part that was remediated at the site related to phased action which consisted of pretreatment and storage of contaminated soil near the wood treating plant followed by off-site incineration of the contaminated soil. This remedy was completed in June 1995 and memorialized in the "Preliminary Closeout Report" of June 1996. Deletion from the National Priorities List (NPL) is not dependent on the Five-Year Review. The EPA had contemplated partially delisting the remediated wood treating area , but the remediation of groundwater through fractures in the subsurface at New Cricket Springs is ongoing. The Responsible Party (RP) McKesson, who performed the remedy at the wood treating plant, has indicated that they feel the remediated area should not be put to unrestricted use at this time , as it can recontaminate the New Cricket Spring through fractures in the subsurface and nullify McKesson's efforts to clean up the stream. However, cleanup of the groundwater New Cricket Spring, is anticipated soon. As soon as this happens EPA plans to delist the site from the NPL and return it to productive use.

I hope this information is helpful to you. If you have any questions regarding this matter, please feel free to contact me or Shawn Ghose of my staff at (214) 665-6782.

Sincerely yours,

Myron O. Knudson, P.E.
Director
Superfund Division

HP Officejet 4622 e-All-in-One

Fax Log for
Charles C. Grisham
870-356-0525
Jan-00-00 00:00AM

Last Transaction

Date	Time	Type	Station ID	Duration	Pages	Result
				Digital Fax		
Jan 00	00:00AM	Fax Sent	16507287304	1:46 N/A	4	OK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

March 19, 2012

Mr. Clyde Rhodes
Hazardous Waste Division Chief
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Re: Arkwood Inc. Superfund Site

Dear Mr. Rhodes,

The designated representative for the property owner of the Arkwood Inc. Superfund site has requested that EPA provide you with a letter regarding the site's designation as "Site Wide Ready for Anticipated Use".

In January 2011, EPA designated the Arkwood Inc. Superfund site, located in Boone County, Arkansas, as "Site Wide Ready for Anticipated Use". The SWRAU designation is defined as a *"construction complete National Priorities List site where, for the entire site,*

(1) All cleanup goals in the Record of Decision or other remedy decision document have been achieved for media that may affect current and reasonably anticipated future land uses of the site, so that there are no unacceptable risks; and
(2) All institutional or other controls required in the Record of Decision have been put in place.

EPA is currently working with the property owner and your agency to update the current institutional controls for the site to allow for industrial reuse only. EPA concurs that the Arkwood Inc. Superfund site is ready for industrial reuse. The designated representative for the property owner has advised EPA that he is seeking potential purchasers for the Arkwood Inc. Superfund site and EPA supports efforts to bring the site into industrial reuse.

If you have any questions, please feel free to contact me at 214-665-7393 or via email at luckett.casey@epa.gov.

Sincerely,

Casey Luckett Snyder

Casey Luckett Snyder
Superfund Reuse Coordinator

In answer to the question: "How dangerous is Penta in the Water?"

Larry Wright, EPA Director, Hazardous Waste Division, Dallas, TX, is quoted as follows:

Assuming the water has 1.05 parts per million for chronic exposure if a person were to consume 2 liters of the water every day of their lives for 70 years at a level exceeding 1.05 ppm they would stand a one in a million improved chance of contacting cancer and thats what the standards are based on."

http://www.epa.gov/oppsrrd1/reregistration/pentachlorophenol/

This is the most compelling evidence I have found that the water issue at Arkwood is in fact a red-herring non-issue and an exceedingly expensive one at that.

1) Pentachlorophenol for use as a pesticide was re-registered by the EPA in 2008.

Here is an excerpt from the attached EPA "Reregistration Eligibility Decision for Pentachlorophenol (List B Case 2505)" approved by Frank T. Sanders, Director, Antimicrobials Division, on September 28, 2008:

"Surface water runoff from pentachlorophenol treated utility poles may be a possible source for pentachlorophenol or its transformation products in drinking water or in foods. Estimated Environmental Concentrations (EECs) for surface water have been calculated by the Agency. Drinking water levels of concern (DWLOCs) for acute and chronic dietary risk from drinking water were calculated. DWLOCs calculated for surface water for pentachlorophenol were ***10,465 ppb for adult males and females and 2,990 ppb for children ages 1-6.***" (emphasis added)

Even so, this highest-ever recorded concentration of pentachlorophenol in New Cricket Spring is less than one-eighth of the EPA drinking water level of concern for adults and less than one-half the drinking water level of concern for children ages 1-6 for acute and chronic dietary risk from drinking water as expressed in the 2008 EPA reregistration document cited above.

4) New Cricket Spring has never been a source of drinking water. Pentachlorophenol from the Arkwood site has never impacted any source of drinking water.

rrison Daily Times Wednesday

108 years continuous service to North Arkansas

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HARRISON, ARKANSAS — JULY 31, 1985

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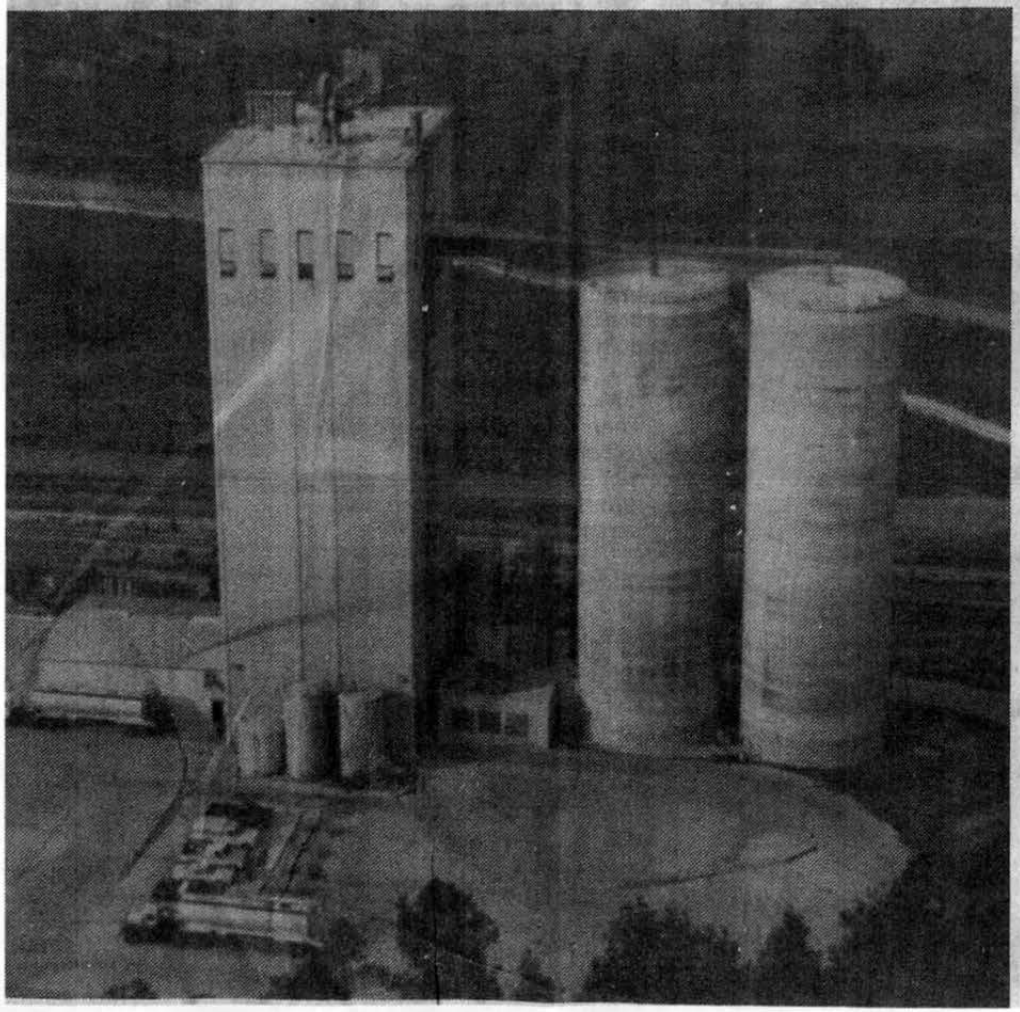
ADEQ CHILLED THIS OUT

yson Foods Considering Boone Investment



By J.E. Dunlap, Jr.
Publisher

Tyson Foods, Inc., the largest supplier of fresh chicken west of the Appalachian Mountains, say they are considering construction of a mill near Omaha in North Boone County which will supply feed to poultry houses in Boone and Carroll counties.

A capital expenditure of $3 to $4 million is required for this size mill.

As they become available many new poultry houses will be supplied by this facility.

Several months ago, negotiations for the feed mill site were initiated between Bud Grisham, representing the H.C. Ormond estate and Tyson Foods, Inc. An option has been signed enabling Tyson to purchase the site just south of Omaha.

A Tyson Foods spokesman said, "The consideration of Boone County for this key operation comes after an extensive search in other counties and states. This location on the Missouri Pacific Railroad and on U.S. 65 is ideal. But, just as important are the solid, hard-working people of North Boone County."

Mr. Grisham said, "Hallie, Jo and I have had many fine, loyal employees from this area over the years, so we were confident in recommending this work force to Tyson Foods. We are also confident this huge Tyson operation will attract other industry to this fine location right on the MoPac and U.S. 65. We envision an industrial park which can be the biggest boost ever to the economy of the Omaha area."

Carloads of corn and soybean meal will be mixed with other ingredients in a computerized operation. The feed will then be delivered by a fleet of Tyson trucks to the breeding and grow-out farms.

Tyson Foods has annual sales of near $1 billion and its stock is traded over the counter.

Tyson announced this week that it had net sales of $286.8 million and net income of $9.4 million for the third quarter that ended June 29. Each share of common stock earned 47 cents.

That compares to income of $5.2 million on $189.5 million in revenue for the

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SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148	
LOCATION: HARRISON, BOONE COUNTY, ARKANSAS	**Date:** October 14, 2015	
Contact Made By:		
Name: Mark Moix	**Title:** Engineer PE	**Organization:** ADEQ (Project Team)
Telephone No.: (501) 682-0852 **E-Mail:** moix@adeq.state.ar.us	**Street Address:** 5301 Northshore Drive **City, State, Zip:** North Little Rock, AR 72118-5317	
Individual/Group Contacted:		
Name: Mr. C.C. 'Bud' Grisham, , Ms. Mary Jo Grisham, and family	**Title:**	**Organization:**
Telephone No.: **E-Mail Address:**	**Street Address:** 1003 West Central Avenue **City, State, Zip:** Harrison, AR 72602	

Meeting at the home of Jo Grisham, Harrison, Arkansas. Met with Jo Grisham, Bud Grisham, and family. (The standardized questions were not covered during the interview as they had previously been submitted by Mr. C.C. 'Bud' Grisham (see separate interview form). Additional comments from the group are included below.)

CC 'Bud' Grisham states it is all about jobs for the community/industry; the Grisham's have provided thousands of jobs for the State of Arkansas. They want to sell or lease the land to continue to address job/ employment in the area. The EPA has been helpful with the Grisham's main thrust to help the industry; the State of Arkansas has not been too helpful. They have received letters from the EPA (Director Knudson, Casey Luckett Snyder, and Don Williams) supporting productive re-use of the site as early as possible. Although ADEQ Director Devine did send a letter to their State Representative to reuse the property, they would like a (current) letter from the State supporting reuse. Four or five weeks ago a buyer shows up. Twelve acres contiguous to the site is sold to a home builder. And home builder also bought 52 acres across Old Cricket Road. Copies of these letters were attached to the bill of sale. He said his son and a local congressman did research on the Site, and found out Arkwood has the lowest NPL score of sites in Region 6. He asked if a statement about the Hazard Score number and ranking could be noted in the Five-Year Review (FYR) report.
Tzhone said the purpose of the FYR is to determine if the remedy remains protective. That kind of statement is not usually included in the report itself, but the request as part of the interview will be considered.
CC 'Bud' Grisham says he feels this will help with reuse, along with the number of letters, correspondence from EPA to Bud regarding delisting of the site.

CC 'Bud' Grisham asks if the EPA agrees with the statement that they are only waiting for the State's approval to delist the site.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** October 14, 2015

Tzhone replies that for the process of delisting, there are two parts left remaining for the remedy completion:
1. The Dioxin reevaluation started in 2012 has a drastic reduction in the protective limit, and
2. Groundwater at the site as a class 2 aquifer- meaning it could potentially be used as a potable water source. Class level is determined by the State. There is a need to restore the groundwater to a protective level. These two elements must be met before consider delisting.

CC 'Bud' Grisham asks if there is a current health risk on-site or off-site.

Tzhone said a revised Human Health risk assessment is in the process. If this question is about if the public health is affected, a public health assessment is done by the Centers for Disease Control (CDC). The CDC will work with the Arkansas Department of Health on that. Now on-site, in the soil covered area, the current Human Health is protective. Other areas outside of the cover exceed the new dioxin level and must be addressed. The risk assessors will evaluate specific risk pathways including scenarios for a trespasser or an occasional user. The areas outside of the cover are not safe for residential or industrial users. Based on the evaluation, deed restrictions or remediation may be needed. Soil cover is protective for industrial use. The risk calculation for the occasional user/trespasser is not done yet. It may take more sampling.

CC 'Bud' Grisham asks if the railroad ditch and adjacent area would be safe if industry capped the area with concrete or hot mix first off.
CC 'Bud' Grisham's son said that area would need to be capped with concrete for future industrial use, such as for a fork lift.

Tzhone replies the EPA risk assessors rejected the adjustments to the dioxin soil results; they accepted the unadjusted numbers which do not allow for future industrial use outside of the soil cap area.

CC 'Bud' Grisham asks if there is a risk at the spring

Tzhone said the classification allowing for use of the water requires application of the Maximum Contaminant Level (MCL).

Kilburn said the State must comply with the federal-mandated MCL value which is based on the part of the population most at risk, the infants and the elderly.

Tzhone said since it is classified as a Class II aquifer (possible drinking water use) the EPA's hands are tied as far as relaxing the strict standard. The aquifer classification would have to be changed before relaxing the standard.

CC 'Bud' Grisham's son asks about the Cardno Chem Risk data report, saying its (dioxin) results are within an order of magnitude (of the screening levels).

Tzhone said those were the adjusted values that were not accepted by the EPA risk assessors. They accepted the only the unadjusted values.

CC 'Bud' Grisham's son has requested other documents that have been sent from EPA, but he has not received them yet. (He references the recent EPA comments on the draft dioxin report.)

Tzhone said the region 6 office does not handle FOIA requests. They are handled by CIMS.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** October 14, 2015

CC 'Bud' Grisham's son said the cap is protective, for soil.

Tzhone said only the soil under the cover-is protective. It would be for industrial use only. The outside areas surrounding the cap are not protective.

CC 'Bud' Grisham's son asks if industry could come in and use the covered area.

Tzhone replies if the protectiveness of the remedy is broken, EPA attorney would issue liability notices to all current and past owners and operators.
CC 'Bud' Grisham said industry could deal with the soil cap issues and the testing at the spring if reasonable. They would take care of human health, but not water bugs.

CC 'Bud' Grisham's son asks if EPA and State could take another look at re-defining the water level values.

Kilburn said it is potentially drinkable spring water, so we apply the MCL.

Tzhone said the State would need to change the classification of the aquifer. But, the goal is to protect any potential user, even if there is not one.

CC 'Bud' Grisham's son said Mr. Arjmandi's letter lists an acute limit and a chronic limit, a maximum and a minimum.

Kilburn states that Regulation 2 applies to the surface waters across the state. The limit is a calculated number based on equations in Reg. 2 using data from a water monitoring station. The limit was recalculated in 2012 using data from a much closer station than the station data Mr. Arjmandi's letter was based on. But for the groundwater, the MCL applies.

Tzhone said because the groundwater surface water interface is complicated by the karst geology, they must be more protective and therefore apply the MCL.

CC 'Bud' Grisham's son said the 11/6/2012 ADEQ comment letter (for September 2012 Monthly Progress Report) introduces the MCL as being applicable.

Tzhone said that all of the conduits from the groundwater to surface water are not known.

CC 'Bud' Grisham's son said the dye test shows that only New Cricket Spring comes from the Site.
Tzhone replied the EPA's hydrogeologist has questioned how there could be only one outlet in a karst environment. The supplemental dye test proved that nothing is getting through the karst 'swiss cheese' during low flow events. A dye test now needs to be performed during high flow conditions.

CC 'Bud' Grisham's son asks if the EPA and State have the incentive to have this done.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** October 14, 2015

Tzhone replied that yes, the EPA has sent a letter to the PRP, requesting a high flow conditions study. EPA talks had been going on throughout the past summer about this.

CC 'Bud' Grisham's son asks if he could get a copy of this letter also.

Tzhone replied he would not be able to give it to him because of legal restraints.

Tzhone said the EPA wants an official log of the requests.
CC 'Bud' Grisham said he wants a letter from the state of Arkansas. He mentions the EPA letter to Arkansas for industrial use (letter from Ms. Luckett-Snyder). He wants a letter saying that the State agrees that reuse is the goal.

Tzhone said they must be assured the remedy is completely protective of all media and the reuse is in concert with the mitigation methods.

CC 'Bud' Grisham's son said the capped area is protective – industry *can* come in now.

CC 'Bud' Grisham said he will request political help to get reuse and jobs in the area.

Tzhone said Arkwood is one of the first sites chosen for the dioxin reevaluation process.

CC 'Bud' Grisham's son said if they find a bona fide prospective purchaser, they can't get inside because of dioxin. He asks if the EPA would require McKesson to clean up more.

Tzhone said if the current risk is protective for the recreational user/trespasser, the EPA will not require clean up to industrial use if the deed restriction includes anticipated future use limited to recreational user/ trespasser. But, the areas surrounding the soil cap are not safe for industrial or residential users.

CC 'Bud' Grisham's son asks if the Site still shows as being ready for anticipated reuse.

Tzhone replies he does not know and he will ask Carlos Sanchez.

CC 'Bud' Grisham's son discusses dioxin levels calculated with Tzhone. The son asked for an extension to respond to official questionnaire.

Tzhone said he could have more time to submit answers to the questions.

CC 'Bud' Grisham's son asks if the upcoming 5 year review will mention the congressional review by Congressman Womack's office.

Tzhone said the five-year review is not usually a complete summary of everything. The review will not include every single piece of correspondence of the past five years.

CC 'Bud' Grisham's son mentions the Class 2 status of the aquifer, the MCL, and a better explanation of groundwater surface water interaction.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** October 14, 2015

CC 'Bud' Grisham's son comments the aquifer and surface water are connected. He mentions the June 2015 memo from J. Rausher to Tzhone, and asked if it will be in the five year review.

Tzhone said yes, they are interconnected, and that a summary of the reevaluation will be in the 5 year review report.

CC 'Bud' Grisham's son asks if the 4th five-year review will show Site remedy as remaining protective.

Tzhone said it will be for the soil cap area. The other areas will depend on how much of the dioxin reevaluation is completed when the five-year review report is completed. It also depends on the response from McKesson. Then it will be determined what uses will be acceptable without remediation, and what uses would require remediation, and what questions still remain.

CC 'Bud' Grisham's son summarizes by saying the five-year report will name technical factors and status of the protectiveness of the remedy, and any outstanding issues will be identified.

Tzhone said if the risk evaluation and response from McKesson is accepted.

CC 'Bud' Grisham's son asked where the numbers are in the five-year review.

Tzhone said the status of the reevaluation will be in the report. Evaluation on the remedy protectiveness on some parts of the Site will be included, but not on all parts.

CC 'Bud' Grisham's son asks if the Site is ready for Site-Wide Ready for Anticipated Use (SWRAU), yes or no?

Tzhone replied, for all purposes, what does SWRAU really mean? If all around the edges of the Site need further assessment, and groundwater standards have to be met, is it really ready for Site-wide use?

CC 'Bud' Grisham's son asks if partial delisting will be decided with the five-year review.
Tzhone replies there will not be a deletion until the reevaluation is complete. The five-year review will include community concerns for delisting and reuse.

Tzhone received comments from CC 'Bud' Grisham's son regarding his difficulty of obtaining information documents. Community involvement is lacking and not what it should be. Public is at a disadvantage in obtaining information. There are issues with the FOIA process. His recent FOIA requests have not been answered in a timely manner. CC 'Bud' Grisham's son has concerns with the federal government's electronic data management system (CIMS). Tzhone agreed to include his requests in the five-year review.

Moix said to CC 'Bud' Grisham's son that placing all of the Site documents on the FTP site is not possible (in response to his earlier request). CC 'Bud' Grisham's son did access the key documents that were placed there.

CC 'Bud' Grisham's son said theoretically if the Site user broke the protective cap, EPA legal….

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** October 14, 2015

Tzhone said……attorney could issue liability letters to all current and past owners, operators and generators. According to Superfund law, all owners, operators, and generators would be tagged, it would be retroactive, and there is no statute of limitations. All of these would be included in the pool of eligible candidates.

CC 'Bud' Grisham said that to sum it up, it is all about industry and jobs. The EPA has told him more than once that they are supportive of reuse of the Site. It would help to have a letter from the State saying this as well.

Kilburn said the State is not ready to say the Site is ready for reuse yet until the entire remedy is protective.

CC 'Bud' Grisham asks if the EPA agrees with the State's comment, mentioning the letters he has received in the past that supported reuse of the Site.

Tzhone used analogies about the health concerns of cigarette smoking, and about a reduction in the highway speed limit coupled with the shift in people's thinking/attitude as to what used to be thought of as safe, as no longer safe, to demonstrate the similar shift in thinking that has occurred as to (the) what level of dioxin is considered safe. Had they known about the 2012 new dioxin standards, those letters would not have been written.

CC 'Bud' Grisham said that he sees they will not get anything done going this way, so they will go the political route, and work with their congressman.

CC 'Bud' Grisham said to make sure the ownership is stated clearly in the five-year review report; it is noted in the deed. He is not the owner of the Property. The Property belongs to an estate in trust. He is the executor, and his son handles the financial duties.

CC 'Bud' Grisham's son asked about the path forward for the protectiveness of the remedy.
Tzhone said the protectiveness of the remedy for all components and recommendations will be in the five-year review.

CC 'Bud' Grisham's son asked if he would see the draft 5 year review to comment on it.

Tzhone said the draft report is usually reviewed by the regulators, and that usually the public notice comment period and interviews are for the public input.

CC 'Bud' Grisham's son said to expect any written comments from him within 2 weeks.

12:45 pm left Grisham's home.

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SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Arkwood, Inc. Superfund Site		**EPA ID No.:** ARD084930148
LOCATION: OMAHA, BOONE COUNTY, ARKANSAS		**Date:** October 14, 2015
Contact Made By:		
Name: Mark Moix	Title: Engineer PE	**Organization:** ADEQ (Project Team)
Telephone No.: (501) 682-0852 **E-Mail:** moix@adeq.state.ar.us	**Street Address:** 5301 Northshore Drive **City, State, Zip:** North Little Rock, AR 72118-5317	
Individual/Group Contacted:		
Name: Mr. Leslie King	**Title:** Mayor	**Organization:** City of Omaha
Telephone No.: (870)426-3388 **E-Mail Address:** cityofomaha@omahaweb.net	**Street Address:** Omaha City Hall 23713 Old Highway 65 P.O. Box 249 **City, State, Zip:** Omaha, AR 72662	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Arkwood, Inc. Superfund Site. The scope of the review is from August 2011 to present.

1. What is your general impression of the work conducted at the Site during this review period? (*Work at an active site may include activities such as frequent sampling, construction/demolition, and operation of treatment systems while work at an inactive site may include infrequent sampling, maintenance of perimeter fence/barriers, or redevelopment of site for a new use.)*

   He has lived in the area for 18 years. The Site has looked the same. He has been mayor since January, 2015. He has a four-year term. He has noticed that the Site is mowed and maintained. The County has fixed the road (Old Cricket Road).

2. From your perspective, what effects have Site operations *(or inactive status)* had on the surrounding community?
   The Site is outside the City limits.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
LOCATION: OMAHA, BOONE COUNTY, ARKANSAS	**Date:** October 14, 2015

Survey Questions (Continued)

3. During this review period, are you aware of any community concerns regarding the Site or its operation and administration *(If the site is inactive, please consider the ongoing maintenance of fencing and equipment)*? If so, please provide details.

   The fence is intimidating looking.

4. Are you aware of any events, incidents, or activities at the Site during this review period, such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.

   Not at all to his knowledge.

5. Do you feel well informed about the Site's activities and progress *(If site is inactive, please consider maintenance, sampling activities, and agency evaluations.)?* If not, please indicate how you would like to be informed about the site activities – for example, by e-mail, regular mail, fact sheets, meetings, etc.

   He did not really feel well informed about the Site's activities and progress. He requested to be added to the mailing list. E-mail, regular mail and/or fact sheets would be fine. He provided his business card with contact information.

6. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation? *(If site is inactive, please consider maintenance of fences or equipment and the site's appearance.)*

   Maybe to post a larger sign, stating what it is.

7. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please describe the purpose and results. *(This question is for public officials who have a responsibility to maintain public safety. Please note if this question does not apply to you.)*

   No.

8. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and results. *(This question is for public officials who have a responsibility to maintain public safety. Please note if this question does not apply to you.)*

   Not since has been mayor.

9. Have there been any changes in state or federal environmental standards which may call into question the protectiveness or effectiveness of the remedial action? *(This question is for public officials with the responsibility of determining if public health and safety are at risk. Please note if this question does not apply to you.)*

   Non-applicable.

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
LOCATION: OMAHA, BOONE COUNTY, ARKANSAS	**Date:** October 14, 2015

10. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site? *(This question is for people who are responsible for the site. Please note if this question does not apply to you.)*

    Non-applicable.

Please add any other comments in the space below.

Tzhone: Is the Site zoned?
Mayor King: No plans to move out that way in the near future (towards the Site which is southwest of the city of Omaha). Any plans would likely involve expanding north along Old Highway 65, such as a utility easement right-of-way along the highway. Can the Site be used in the future?

Tzhone: Yes, however restrictions exist. Industrial use is acceptable on the covered area.

Mayor King: No inquiries for reuse that he is aware of. The City sign shows 169 people, but he thinks that the number has decreased since the new highway was built. There are three tire repair/supply businesses and a (horticultural) nursery/orchard. There used to be a dozen or so businesses in Omaha along the Old Highway 65. That is what killed Omaha.

There are water customers near the Site. Eight (8) months ago a contractor to build a new house asked about running a water line from a neighbor's house. He was told that the City does not do that; it creates a water pressure issue. They gave him a cost estimate. Nothing has been built yet.

(He referenced a map print out of the area, and marks the approximate location of the possible new residence.)

Tzhone: If remediation later is needed a City meeting would be held. Does the City have facilities available?

Mayor King: Yes, contact Gina in the Mayor's office. There is the FEMA building available, just north of City Hall, or a room at the south end of the City Hall/Fire Department building; it holds 50 to 60 people.

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SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Arkwood, Inc. Superfund Site		**EPA ID No.:** ARD084930148
Location: Boone County, Arkansas		**Date:** October 14, 2015
Contact Made By:		
Name: Mark Moix	**Title:** Engineer PE	**Organization:** ADEQ (Project Team)
Telephone No.: (501) 682-0852 **E-Mail: :** moix@adeq.state.ar.us	Street Address: 5301 Northshore Drive City, State, Zip: North Little Rock, AR 72118-5317	
Individual/Group Contacted:		
Name: adjacent resident	**Title:** owner	**Organization:**
Telephone No.: ( ) **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Arkwood, Inc. Superfund Site. The scope of the review is from August 2011 to present.

1. What is your general impression of the work conducted at the Site during this review period? (*Work at an active site may include activities such as frequent sampling, construction/demolition, and operation of treatment systems while work at an inactive site may include infrequent sampling, maintenance of perimeter fence/barriers, or redevelopment of site for a new use.)*

   She doesn't go up and down Old Cricket Road much. She hasn't noticed anyone down there. She used to walk down the hill by there (for exercise).

2. From your perspective, what effects have Site operations *(or inactive status)* had on the surrounding community?

   They moved here in 1988 and are on city water now. They wanted to buy land to the north, but were not able to (their property is pie-shaped). This year the property (adjacent approximate 12 acres) has been sold by the owner Mr. Bud Grisham (he called a month or two ago). She understands that houses will be built on it.

3. During this review period, are you aware of any community concerns regarding the Site or its operation and administration *(If the site is inactive, please consider the ongoing maintenance of fencing and equipment)*? If so, please provide details.

   No, none.

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Boone County, Arkansas	**Date:** October 14, 2015

4. Are you aware of any events, incidents, or activities at the Site during this review period, such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.

   No. Before the fence went up, people used to use the site for dumping (deer carcasses, etc.).

5. Do you feel well informed about the Site's activities and progress *(If site is inactive, please consider maintenance, sampling activities, and agency evaluations.)?* If not, please indicate how you would like to be informed about the Site activities – for example, by e-mail, regular mail, fact sheets, meetings, etc.

   She is not too well informed about the Site, but she didn't expect there to be any more concern. No, it's not necessary to send her information about Site activities.

6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation? *(If site is inactive, please consider maintenance of fences or equipment and the site's appearance.)*

   Nothing at all; it's out of her purview. She is not concerned about the Site. It has not impacted her life.

7. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please describe the purpose and results. *(This question is for public officials who have a responsibility to maintain public safety. Please note if this question does not apply to you.)*

   Non-applicable.

8. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and results. *(This question is for public officials who have a responsibility to maintain public safety. Please note if this question does not apply to you.)*

   Non-applicable.

9. Have there been any changes in state or federal environmental standards which may call into question the protectiveness or effectiveness of the remedial action? *(This question is for public officials with the responsibility of determining if public health and safety are at risk. Please note if this question does not apply to you.)*

   Non-applicable.

10. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the Site? *(This question is for people who are responsible for the site. Please note if this question does not apply to you.)*

    Non-applicable.

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Boone County, Arkansas	**Date:** October 14, 2015

Please add any other comments in the space below.

No additional comments.

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SUPERFUND FIVE-YEAR REVIEW SITE SURVEY

Site Name: Arkwood, Inc. Superfund Site	**EPA ID No.:** ARD084930148
Location: Omaha, Boone County, Arkansas	**Date:** October 15, 2015

Contact Made By:

Name: Mark Moix	**Title:** Engineer PE	**Organization:** ADEQ (Project Team)
Telephone No.: (501) 682-0852 **E-Mail:** moix@adeq.state.ar.us	**Street Address:** 5301 Northshore Drive **City, State, Zip:** North Little Rock, AR 72118-5317	

Individual/Group Contacted:

Name: James Fleer	**Title: Director, Env. Services**	**Organization: McKesson**
Telephone No.: (913) 238-8348	**Street Address**: One Post Street 34th Floor	
E-Mail Address: james.fleer@mckesson.com	**City, State, Zip:** San Francisco, CA 94104	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Arkwood, Inc. Superfund Site. The scope of the review is from August 2011 to present.

1. What is your general impression of the work conducted at the Site during this review period? *(Work at an active site may include activities such frequent sampling, construction/demolition, and operation of treatment systems while work at an inactive site may include infrequent sampling, maintenance of perimeter fence/barriers, or redevelopment of site for a new use.)*

Work has continued as scheduled and is on-going to maintain and operate the Site. The Site has been and continues to be properly maintained with no known significant breaches in security or significant trespasser activity. A Corrected Deed Notice and Restrictions covering the Site was recorded on May 29, 2014. A significant soil sampling activity was conducted in October 2014 as part of the dioxin reassessment process and a supplemental dye trace study was performed between November 2014 and January 2015 to verify that New Cricket Spring is the principal discharge point for fluid flow from the former sinkhole area, a principal waste disposal location utilized by the former Arkwood wood treating facility. No other discharge points were identified during the supplemental dye trace study. The data collected during the supplemental dye trace study along with the historical data (previous dye trace studies and groundwater and surface water samples) collected during investigation activities conducted during the RI/FS process indicate New Cricket Spring is the principal discharge point and the only remaining discharge point that exhibits detectable concentrations of Chemicals of Concern (COCs).

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	EPA ID No.: ARD084930148
Location: Omaha, Boone County, Arkansas	Date: October 15, 2015

2. From your perspective, what effects have Site operations *(or inactive status)* had on the surrounding community?

Site operations have had no significant effect on the surrounding community. Municipal-supplied water is available to neighboring and surrounding properties via a water main installed historically along Old Cricket Road and well restrictions eliminate the potential for nearby residents to install drinking water wells. The Site has been closed for decades, so traffic flow and other activities that may or may not affect the surrounding community are minimal to non-existent.

3. During this review period, are you aware of any community concerns regarding the Site or its operation and administration *(If the site is inactive, please consider the ongoing maintenance of fencing and equipment)?* If so, please provide details.

I am not aware of any community concerns regarding the Site, Site maintenance activities, or Site administration. I am aware that the current Site owner has expressed concern about the current regulatory status of the Site and his desire to return the Site to industrial use by lease or sale.

4. Are you aware of any events, incidents, or activities at the Site during this review period, such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.

There have been no known emergency response activities with or related to the Site during this review period. Minor incidents of trespassing, theft, and/or vandalism have occurred. Incidents resulting in damage and/or theft have been reported to the Boone County Sheriff's office and have been investigated and addressed by the Sheriff's office. Trespassing incidents have been monitored to assess frequency, duration, and commonality. Action to reduce trespassing has included repair of breaches in Site fencing, improved signage and signage placement, enhanced monitoring measures, and direct communication with trespassers when identified.

5. Do you feel well informed about the Site's activities and progress *(If site is inactive, please consider maintenance, sampling activities, and agency evaluations.)?* If not, please indicate how you would like to be informed about the site activities - for example, by e-mail, regular mail, fact sheets, meetings, etc.

Yes, we feel informed about site activities and progress.

6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation? *(If site is inactive, please consider maintenance of fences or equipment and the site's appearance.)*

On-going operations and maintenance activities should be continued to ensure the success of the remedy.

7. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please describe the purpose and results. *(This question is for public officials who have a responsibility to maintain public safety. Please note if this question does not apply to you.)*

Not applicable.

Survey Questions (Continued)

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Arkwood, Inc. Superfund Site	EPA ID No.: ARD084930148
Location: Omaha, Boone County, Arkansas	Date: October 15, 2015

8. Have there been any complaints, violations, or other incidents related to the Site that required a response by your office? If so, please summarize the events and results. *(This question is for public officials who have a responsibility to maintain public safety. Please note if this question does not apply to you.)*

Not applicable

9. Have there been any changes in state or federal environmental standards which may call into question the protectiveness or effectiveness of the remedial action? *(This question is for public officials with the responsibility of determining if public health and safety are at risk. Please note if this question does not apply to you.)*

Not applicable

10. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the Site? *(This question is for people who are responsible for the site. Please note if this question does not apply to you.)*

No. Site operations and maintenance activities are routinely reviewed to evaluate optimization opportunities. Sampling efforts are conducted on a monthly basis and are used to verify effectiveness of system operations and compliance with applicable standards.

Please add any other comments in the space below.

The Site is visited a minimum of two times per week by operations and maintenance personnel and additionally as needed to maintain Site operations and address any identified issues including system malfunction and notification of trespassing, vandalism, or theft. The Site is also visited at least monthly for the purpose of sampling New Cricket Spring and to provide supplemental oversight, operations, and maintenance review. Inspections/reviews by regulatory personnel have occurred intermittently during the review period. Oversight of the recent soil sampling and supplemental dye trace activity was performed by EPA, ADEQ, and/or EPA contractors.

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APPENDIX I – ADEQ LETTER OF OCTOBER 7, 2013

ADEQ

A R K A N S A S
Department of Environmental Quality

October 7, 2013

U.S. EPA Region 6
Attention Stephen Tzhone, RPM
Mail Code 6SF
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

RE: Cleanup Standards for Groundwater and Surface Water; Arkwood Superfund Site, Omaha, Arkansas; EPA ID No. ARD084930148; AFIN 05-00003

Dear Mr. Tzhone:

The Arkansas Department of Environmental Quality-Hazardous Waste Division and Water Division (ADEQ) have again reviewed the Administrative Record for the Arkwood site and are restating our position regarding the remedial levels and criteria for the site. The maximum contaminant level (MCL) should be applied to groundwater beneath and near the site. The Arkansas Water Quality Standard (WQS) should be applied to surface water. ADEQ and EPA agree that not all of the groundwater flows to New Cricket Spring. The applicable standard depends on the receptor and the point of contact.

As discussed on several conference calls recently and as documented in the Record of Decision (ROD), the EPA put forth the remedial goal for pentachlorophenol (PCP) in groundwater as the MCL. In 1990 the MCL for PCP was a provisional number and was set at 1.01 mg/L. Because the PCP contaminated groundwater was determined to surface in New Cricket Spring, the Arkansas WQS was calculated. Using the nearest water quality monitoring point, the calculated level was set at 18.7 ug/L. In 1991, EPA established an MCL of 0.001 mg/L for PCP.

A Memorandum was sent to the file from EPA regarding the MCL for PCP as it was used to calculate the soil target action level. It was determined that the soil target action level would be protective. EPA also determined the scheduled review of two years of groundwater monitoring and the Five Year Reviews would be an adequate check for identification of any potential problems. In 1994, in response to a request to plug and abandon the groundwater monitoring wells at the site, ADEQ expressed concern that levels of PCP in New Cricket Spring were above the Arkansas WQS. ADEQ also noted the soil clean up level was based on the provisional MCL of 1 mg/L and not the current MCL of 1 ug/L.

The current MCL of 1ug/L for PCP should be applied to groundwater. Groundwater is water below the surface of the earth. The Arkansas WQS of 15.57 ug/L for PCP should be applied to surface water. The MCL could be applied if the surface water is or could potentially be used as a drinking water source. Because the water which exits the ozone treatment system via a weir into a ditch reenters the groundwater system, ADEQ has requested McKesson apply a reporting limit of 1 ug/L. McKesson has agreed to do this. ADEQ has also requested McKesson to collect pH,

temperature, and dissolved oxygen levels when collecting surface water samples. McKesson has agreed to do this. The site specific Arkansas WQS was re-calculated as part of the third five year review. Water quality data from a state water quality sampling station in the same water shed as the site was used. The re-calculated chronic WQS is now 15.57 ug/L.

ADEQ still holds the opinion the MCL of 1 ug/L for PCP is a federal standard and should be applied to groundwater. The Arkansas WQS of 15.57 ug/L for PCP is a state standard and should be applied to surface water.

All applicable or relevant regulatory changes are reviewed during the five year review of the site. The next five year review is due March 31, 2016. Should you have any questions regarding this correspondence, please contact me at 501-682-0844 or by e-mail at kilburn@adeq.stae.ar.us.

Sincerely,

Dianna Kilburn, P.G.
Geologist Supervisor
Hazardous Waste Division