THIRD FIVE-YEAR REVIEW REPORT FOR LEMON LANE LANDFILL SUPERFUND SITE BLOOMINGTON, INDIANA

Prepared by

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Region 5
Chicago, Illinois

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Date

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APPENDICES

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CBS	CBS Corporation
CD	Consent Decree
CDA	Consent Decree Amendment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EFTS	Excess Flow Treatment System
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
GAC	Granular Activated Carbon
GPM	Gallons per Minute
IC	Institutional Control
ICS	Illinois Central Spring
ICSTF	Illinois Central Spring Treatment Facility
IDEM	Indiana Department of Environmental Management
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PTS	Primary Treatment System
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RD/RA	Remedial Design/Remedial Action
ROD	Record of Decision
RPM	Remedial Project Manager
SOW	Statement of Work
UCL	Upper Confidence Limit

EXECUTIVE SUMMARY

This is the third Five-Year Review (FYR) for the Lemon Lane Landfill Superfund (Site) located in the City of Bloomington, Monroe County, Indiana. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this Policy FYR was the signing of the previous FYR on May 24, 2010.

The Lemon Lane Landfill is located in Bloomington, Indiana and is a former 10-acre municipal landfill that accepted both municipal and industrial waste material, including large quantities of polychlorinated biphenyl (PCBs) from Westinghouse Electric Corporation electric capacitor plant in Bloomington. PCB contamination has migrated from the Site and deep into the rock under and around the site. Groundwater flows through karst conduits and is released predominantly at Illinois Central Spring and other small springs in the area. Three operable units (OUs) were used to address the unacceptable risk to human health and the environment posed by releases, or threatened releases at, or from, the Site and include remedies for source control, water and sediment. All three OUs are completed and the remedies are in the operation and maintenance phase.

Because the remedial actions at all OUs are protective, the Site does not pose a risk to human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Lemon Lane Landfill		
EPA ID: IND980794341		
Region: 5	**State:** IN	**City/County:** Bloomington, Monroe County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Thomas Alcamo		
Author affiliation: Remedial Project Manager		
Review period: 6/1/2010 – 5/1/2015		
Date of site inspection: 4/23/2015		
Type of review: Policy		
Review number: 3		
Triggering action date: 5/24/2010		
Due date *(five years after triggering action date)*: 5/24/2015		

Five-Year Review Summary Form (continued)

Issues and Recommendations Identified in the Five-Year Review:
None

Operable Unit 1, 2, 3 and Sitewide Protectiveness Statement
Protectiveness Determination: Protective
Protectiveness Statement: Because the remedial actions at all OUs are protective, the Site does not pose a risk to human health and the environment. The source control remedy continues to function as designed and the landfill continues to eliminate the direct contact threat and minimize migration. The water/sediment OUs continue to reduce the amount of PCBs being released to Clear Creek which has improved the PCB levels in fish tissue.

I. INTRODUCTION

The purpose of a FYR is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action."*

EPA conducted a FYR on the remedy implemented at the Lemon Lane Landfill Superfund Site in Bloomington, Monroe County, Indiana. EPA is the lead agency for developing and implementing the remedy for the Site. Indiana Department of Environmental Management, as the support agency representing the State of Indiana, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the third FYR for the Lemon Lane Landfill Superfund Site. The triggering action for this policy review is the completion date of the previous FYR. The FYR is being completed as a policy FYR because the Site was placed on the National Priorities List prior to the Superfund Amendments Reauthorization Act (SARA) of 1986 and the Enforcement Decision Document was signed before SARA. The Site consists of three OUs, all of which are addressed in this FYR.

II. PROGRESS SINCE THE LAST REVIEW

Table 1: Protectiveness Determinations/Statements from the 2010 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The Source Control Operable Unit is functioning as intended by the 2000 ROD Amendment and is protective of human health and the environment.
2/3	Protectiveness Deferred	The final elements of the site remedy, selected in the 2006 ROD Amendment for OU2 and OU3, are in RD/RA and construction is expected to be completed in 2012. A protectiveness determination will be made after the construction of the water and sediment operable units.
Sitewide	Protectiveness Deferred	A site wide protectiveness determination cannot be made at this time because remedies at Operable Units 2 and 3 have not been implemented.

Table 2: Status of Recommendations from the 2010 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
1	Mouse burrows on landfill cap	Trap mice and fill in burrows. Continue to inspect for burrows.	CBS	EPA & State	6/1/2010	Completed	6/1/2010
2	Continuing release of PCBs from springs	Implement OU2 and OU3 site remedies	CBS	EPA & State	9/30/2012	Completed	9/26/2012
2 &3	Complete RD/RA for water and sediment operable units	Currently on schedule to meet construction completion deadline described in the Consent Decree	CBS	EPA & State	9/30/12	Completed	9/26/2012
	Restrictive Covenants and/or other institutional controls have not been finalized	Complete Institutional Controls Work Plan and record restrictive covenants and/or other institutional controls	CBS	EPA	9/30/12	Completed	8/29/2014

Remedy Implementation Activities

Detail on the Site background, Site chronology, and remedial actions taken place prior to this third FYR are contained in Appendix A. Since the second FYR in May 2010, CBS Corporation has completed all the remedy components required in the 2009 Consent Decree Amendment (CDA) for OUs 2 and 3. The source control OU 1 was completed in December 2000.

Prior to the signing of the second FYR on May 24, 2010, the Federal Court on July 24, 2009, approved the CDA to address the water and sediment OUs 2 and 3, respectively, and allowed CBS Corporation to begin implementation under the direction of the governmental parties. The parties to the CDA are EPA, Indiana Department of Environmental Management (IDEM), City of Bloomington, Monroe County, and CBS Corporation. A complication to approval (entry) of the CDA by the Federal Court was a citizen's lawsuit against EPA regarding the remedies for the Lemon Lane Landfill and two other sites associated with the Westinghouse 1984 Consent Decree. The Federal Court at one point consolidated the citizen's lawsuit with the Consent Decree case to resolve both issues at the same time. OU 2 and 3 cleanup activities could not begin until the court entered the CDA. EPA and Department of Justice (DOJ) responded to public comments and submitted the Consent Decree Amendment to the court on March 20, 2009. On July 24, 2009, the Federal Court deconsolidated the two matters and entered the CDA. Entry of the CDA triggered the start of remaining cleanup activities. On March 29, 2013, Federal Judge Richard Young entered a judgment in favor of the United States in the citizen's lawsuit. The judgment was appealed by the citizens in the Seventh Circuit Court of Appeals and on May 1, 2014, the Seventh Circuit ruled in favor of the United States. The United States Supreme Court denied further appeal by the citizens on November 10, 2014.

Attached to the CDA is a Statement of Work (SOW) for the Lemon Lane Landfill which describes the work required to be implemented by CBS Corporation through the September 29, 2006 Record of Decision (ROD) Amendment. The Lemon Lane Landfill ROD Amendment for the water and sediment OUs included Remedial Action Objectives (RAOs) for the water and sediment which were as follows:

- Reduce the amount of PCBs released from groundwater to Clear Creek through mass reduction.
- Reduce PCB levels in fish for beneficial reuse by reducing PCBs released to Clear Creek.
- Reduce the amount of PCB mass in sediments that may be available to fish by reducing PCBs released to Clear Creek.

To meet the RAOs, the remedy described in the September 29, 2006 ROD Amendment for the water and sediment OUs consisted of the following:

- Continue to treat Illinois Central Spring (ICS) with the 1,000 gallons per minute (gpm) water treatment plant with 1.2 million gallons of stormwater storage.
- Expand the current water treatment plant by treating water which bypasses the 1,000 gpm treatment plant and exceeds the 1.2 million gallon stormwater storage during large storm events by implementing a stormwater treatment system capable of treating 5,000 gpm.

Known as the Excess Flow Treatment System (EFTS), the EFTS would consist of 8 Calgon Model 12 or their equivalent carbon adsorption vessels each with 20,000 pounds of granular activated carbon (GAC). Based upon a treatability study, the stormwater storage system is expected to remove about 95% of the PCBs from the storage tanks. During the design phase, it may be determined that a different configuration may be an improvement to the 8 carbon adsorption vessels proposed and the storage tank overflow treatment system may be modified. The combined treatment systems will treat nearly 100% of the ICS water and remove 99.9% of the PCB mass from ICS.

- Install a new effluent line to handle all treated water and stormwater.
- Capture and treat Quarry B Spring and Rinker Spring at the Illinois Central Spring Treatment Facility (ICSTF), if required.
- Develop an Operations and Maintenance Plan for the collection and treatment system and a monitoring program to monitor the effectiveness of the remedy.
- Implement a soil/sediment cleanup at the ICS emergence, swallowhole area and Quarry Springs area. The cleanup criteria is 1 part per million (ppm) PCBs on average in drainage ways and 5 ppm PCBs in non-drainage ways. The amount of PCB-contaminated material is 3,000 cubic yards to be disposed of in an off-site permitted landfill. Final volumes will be determined based upon a pre-design sampling event.
- Establish institutional controls /deed restrictions which will be required to prevent development on the landfill cap and prevent development within the drainage ways.

After entry of the CDA, development began immediately on the design planning documents and on March 15, 2010, the delineation sampling for the soil/sediment cleanup at the ICS emergence area, swallowhole area, and Quarry Springs area began. Concurrently, construction activities began on the installation of the new effluent line on July 5, 2010. Delineation sampling was completed on July 20, 2010, and excavation at the ICS emergence area, swallowhole area, and Quarry Springs area began on August 9, 2010. The effluent line construction and testing was completed on August 25, 2010. Drainage improvements including the installation of a French drain at the ICS emergence, sealing the swallowhole with grout, installation of a new culvert, and installation of new surface water drainage ways occurred concurrently with the excavation activities. The excavation and drainage improvements were completed on September 29, 2010. A total of 288 tons of PCB-contaminated soils and sediment with a concentration of greater than 50 ppm PCBs and 1,047 tons of PCB-contaminated soil and sediment with a concentration of less than 50 ppm were disposed of off-site in approved, permitted landfills.

On October 21, 2010, the pre-final inspection for the soil/sediment cleanup and drainage improvements occurred. No issues were identified in the inspection. The final cleanup criteria for drainage ways (1 ppm PCBs on average) and non-drainage ways (5 ppm PCBs on average) were met in all areas. Samples collected from the ICS Emergence area showed an average concentration of 0.3 ppm in the drainage ways and 1.5 ppm in the non-drainage ways. Samples collected from the swallowhole area showed an average concentration of 0.1 ppm in the drainage ways and 2.5 ppm in the non-drainage ways. Finally, in the Quarry Springs area, sampling data showed an average concentration of 0.2 ppm in the drainage ways and 2.1 ppm in the non-drainage ways.

Construction on the expansion of the ICSTF began on November 1, 2010. The eight carbon adsorption vessels were installed and became operational in April 2011. The pre-final inspection for ICSTF was completed on April 7, 2011. Construction was complete for OUs 2 and 3 on September 26, 2012.

Institutional Controls

As part of the sitewide remedy, Institutional Controls (ICs) were required to restrict property use, maintain the integrity of the remedy, and assure the long term protectiveness for areas which do not allow for unlimited use/unlimited exposure (UU/UE). A summary of the implemented ICs for the Site is listed in Table 3 and are further discussed below and maps showing the area in which the ICs apply is included in Appendix B.

The ICs, as shown in Table 3, were completed and recorded in Monroe County by CBS Corporation and the City of Bloomington in August 2014. The parcels include the following:

- Portion of CBS Corporation property adjacent to the Lemon Lane Landfill
- The ICS Emergence Property that is owned by CBS Corporation
- The Lemon Lane Landfill which is owned by the City of Bloomington
- The ICSTF property which is owned by the City of Bloomington.

EPA signed the certification to document Sitewide Ready for Anticipated Use on September 24, 2014.

Table 3: Summary of 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)
Groundwater, soil and sediment	Yes	Yes	CBS Illinois Central Spring Emergence Property	The CBS Illinois Central Spring Emergence Property shall not be used for any residential purpose including, but not limited to residences, hotels or motels, hospitals or in-patient medical care, playgrounds or recreational facilities, or daily care facilities (day care centers, schools, senior citizen facilities, nursing homes, or assisted living facilities). The CBS Illinois Central Spring Emergence property shall not be used for the purpose of growing food crops.	Environmental Restrictive Covenant recorded August 25, 2014

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)
				There shall be no construction of wells or other devices to extract groundwater for consumption, irrigation, or any other use, except for wells and devices that are part of the approved remediation system or are otherwise part of an environmental investigation or remediation activity. Unless approved in writing by CBS and EPA, there shall be no activities that materially interfere with or alter the drainage. Unless approved in writing by CBS and EPA, there shall be no damage to, removal of, or interference with the following remediation system components: - Fence - Constructed drainage way - French Drain - Pipe conveyance and culvert Figure B-1 in Appendix B shows the ICS Emergence area.	
Soil/groundwater	Yes	Yes	City of Bloomington, Indiana Water Treatment Plant Property	The City of Bloomington, Indiana Water Treatment Plant property shall not be used for any residential purpose including, but not limited to residences, hotels or motels, hospitals or in-patient medical care, playgrounds or recreational facilities, or daily care facilities (day care centers, schools, senior citizen facilities, nursing homes, or assisted living facilities). The City of Bloomington, Indiana Water Treatment Plant Property shall not be used for the purpose of growing food crops. Any soil excavation must be approved in writing by CBS and EPA and be performed in accordance with a soil excavation, testing, and management plan, as well as a health and safety plan, that comply with all applicable state, federal and local laws. Nothing herein shall limit or conflict with any other legal requirements regarding construction	Environmental Restrictive Covenant recorded August 29, 2014

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)
				methods and techniques that must be used to minimize risk of exposure while conducting work in contaminated areas. There shall be no construction of wells or other devices to extract groundwater for consumption, irrigation, or any other use, except for wells and devices that are part of the approved remediation system or are otherwise part of an environmental investigation or remediation activity. Unless approved in writing by the Indiana Department of Environmental Management (IDEM) and EPA, there shall be no activities conducted that interfere with the water treatment plant operations. Unless approved in writing by IDEM and EPA, there shall be no damage to, removal of, or interference with the following remediation system components: - Influent lines - Spring Receiving Sump - Effluent Line - Swallow Hole drainage way CBS shall be allowed the opportunity to comment on any request sent to IDEM and EPA. Figure B-2 in Appendix B shows the ICS Water Treatment Plant property.	
Soil and groundwater	Yes	Yes	Portion of Lemon Lane Landfill CBS Property	There shall be no construction of wells or other devices to extract groundwater for consumption, irrigation, or any other use, except for wells and devices that are part of the approved remediation system or are otherwise part of an environmental investigation or remediation activity. The following land use and activity restrictions apply to those portions of the Landfill Fenced Area and the Sargent Pond Area: - The Landfill Fenced Area and the Sargent Pond Area shall not	Environmental Restrictive Covenant recorded August 25, 2014

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)
				be used for any residential purpose including but not limited to, residences, hotels or motels, hospitals or in-patient medical care, playgrounds or recreational facilities, or daily care facilities (e.g., daycare centers, schools, senior citizen facilities, nursing homes, or assisted living facilities). - The Landfill Fenced Area and Sargent Pond Area shall not be used for purposes of growing food crops. - Unless approved in writing by CBS and EPA, there shall be no damage to, removal of, or interference with the Landfill Fenced Area fence. - Unless approved in writing by CBS and EPA, there shall be no damage to, removal of, or interference with the drainage way from landfill on adjacent parcel to Sargent's Pond and constructed outlet and Sargent's Pond. - Any soil excavation on the Landfill Fenced Area or the Sargent Pond Area must be approved in writing by CBS and EPA and be performed in accordance with a soil excavation, testing, and management plan, as well as a health and safety plan, that comply with all applicable state, federal and local laws. Nothing herein shall limit or conflict with any other legal requirements regarding construction methods and techniques that must be used to minimize risk of exposure while conducting work in contaminated areas.	

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)
				CBS shall be allowed the opportunity to comment on any request sent to IDEM and EPA. Figure B-3 in Appendix B shows the CBS portion of the Lemon Lane property.	
Soil and groundwater	Yes	Yes	Lemon Lane Landfill – City of Bloomington Indiana Property	There shall be no construction of wells or other devices to extract groundwater for consumption, irrigation, or any other use, except for wells and devices that are part of the approved remediation system or are otherwise part of an environmental investigation or remediation activity The Lemon Lane Landfill - City of Bloomington property shall not be used for any residential purpose including, but not limited to, residences, hotels, or motels, hospitals or in-patient medical care, playgrounds or recreational facilities, or daily care facilities (e.g. day care centers, schools, senior citizen facilities, nursing homes, or assisted living facilities). Lemon Lane Landfill - City of Bloomington property shall not be used for purposes of growing food crops. There shall be no interference with drainage from the landfill cap. Any soil excavation must be approved in writing by IDEM and EPA and be performed in accordance with a soil excavation, testing, and management plan, as well as a health and safety plan, that comply with all applicable state, federal and local laws. Nothing herein shall limit or conflict with any other legal requirements regarding construction methods and techniques that must be used to minimize risk of exposure while conducting work in contaminated areas. Unless approved in writing by CBS and EPA, there shall be no damage to, removal of, or interference with the	Environmental Restrictive Covenant recorded August 29, 2014

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)
				following remediation system components: - Piezometers - Fence - Engineered Barrier (cap within fence line) There shall be no interference with drainage from the landfill cap. Figure B-4 in Appendix B shows the City of Bloomington Lemon Lane Landfill property.	

Current Compliance:

Based on inspections and discussions with CBS Corporation, City of Bloomington and IDEM, EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs. The remedy appears to be functioning as intended. No Site uses which are inconsistent with the implemented ICs or remedy IC objectives have been noted during the Site inspection.

Long-Term Stewardship:

Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for long-term stewardship is required to ensure that the ICs are maintained, monitored, and enforced so that the remedy continues to function as intended. Long-term stewardship involves assuring effective procedures are in place to properly maintain and monitor the Site. Long-term stewardship will ensure effective ICs are maintained and monitored and the remedy continues to function as intended with regard to ICs.

Four parcels require ICs and two of the parcels are owned by the City of Bloomington and the two other parcels are owned by CBS. CBS and City of Bloomington are parties to the 1984 Consent Decree, which was amended in 2009. The Consent Decree Amendment required the two parties to implement ICs. The four parcels are inspected frequently to ensure that the ICs remain effective.

System Operation/Operation and Maintenance Activities

CBS continues to perform maintenance activities at the Lemon Lane Landfill as described in the Cap Inspection and Maintenance Plan, dated June 2001. Inspections occur quarterly at the landfill and the quarterly inspections reports are submitted by CBS to the governmental parties.

No major issues, including landfill subsidence, have occurred since the last FYR. Annual costs for maintenance of the landfill and groundwater/spring water monitoring is approximately $35,000.

At the ICSTF, two separate treatment systems are used to treat ICS. The Primary Treatment System (PTS) became operational in May 2000 and treats 1,000 gpm of PCB-contaminated spring water. The treatment system consists of a clarifier, multi-media filters, bag filters, and GAC adsorption. During some storm events, spring flow at ICS can go above 1,000 gpm and as part of the PTS, two storage tanks capable of storing 1.2 million gallons of stormwater from ICS are used when the capacity of the 1,000 gpm system is reached. The stored water is treated later when flows from ICS go below 1,000 gpm. As part of the September 2006 ROD Amendment, an EFTS was installed to address stormwater bypassing the PTS and the stormwater storage tanks. In April 2011, the EFTS became operational. The EFTS can treat up to 5,000 gpm through 8 GAC vessels each holding 20,000 pounds of GAC. The combined treatment systems treat a total of 6,000 gpm. To date, the total amount of PCB-contaminated water treated by the primary and excess flow treatment systems is approximately 1.6 billion gallons. The EFTS has treated approximately 49 million gallons of PCB-contaminated water since April 2011. The EFTS is used infrequently and has operated approximately 2.5% of the time since it became operational in April 2011. The facility has operated the following number of days since April 2011:

- In 2011, the EFTS operated 12 days.
- In 2012, the EFTS operated 3 days.
- In 2013, The EFTS operated 5 days.
- In 2014, the EFTS operated 13 days.

IDEM has issued a substantive permit under CERCLA and the Clean Water Act that was part of the CDA for the primary treatment system. The discharge criterion is 0.3 parts per billion (ppb) or micrograms per liter (µg/L) for PCBs and the treated effluent is sampled one time per week. The facility continues to meet the discharge criteria.

The PTS Operation and Maintenance (O&M) Plan was revised in May 2013 taking into consideration the system improvements implemented by CBS since the second FYR. In addition, an O&M Plan for the EFTS was also approved in May 2013.

Since the second FYR, CBS Corporation has addressed a number of major maintenance items at the ICSTF. The following list summarizes significant improvements and/or major maintenance work done by CBS at the ICSTF in the past 5 years:

- Primary Treatment System (PTS) carbon change-out (lead vessels) – September 2010
- Replacement of two Spring Receiving Sump (SRS) pumps (200 gpm and 800 gpm) – September 2010
- Cleanout of sediment from SRS - every two years from September 2010 onward
- Replacement/rebuild of other two SRS pumps (200 and 800 gpm) – May 2011
- Removal of failing epoxy coating and re-coating of SRS storage tank exteriors – October 2011
- Sediment removal and cleaning of SRS storage tank interiors – May 2012

- Removal of failing epoxy coating and re-coating of SRS storage tank interiors – June through August 2012
- Rebuild of 2,500 gpm SRS pump – November 2012
- Replacement/upgrade of Variable Frequency Drive (VFD) for SRS pumps – June 2013
- Rebuild of 2,500 gpm SRS pump – November 2013
- Recoating of facility roof – Started October 2014 and finished May 2015
- Rebuild of one Panelview process control display– November 2014
- Replacement/upgrade of SRS tank level controls – planned for mid-2015
- Replacement/upgrade of one Panelview process control display – planned for mid-2015

The annual O-&-M costs are approximately $225,000 to run the ICSTF.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

CBS was notified of the initiation of the five-year review on 9/1/2014. The Lemon Lane Landfill Superfund Site Five-Year Review was led by Thomas Alcamo of the EPA, Remedial Project Manager for the Site, and Cheryl Allen, the Community Involvement Coordinator (CIC). Jessica Fliss, of the IDEM assisted in the review as the representative for the support agency.

The review, which began on 9/1/2014, consisted of the following components:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection; and
- Five-Year Review Report Development and Review.

Community Notification and Involvement

A notice was published in the local newspaper, the "Bloomington Herald Times", on April 24, 2015 stating that there was a five-year review was underway and inviting the public to submit any comments to EPA. The results of the review and the report will be made available at the Site information repository located at Indiana University Library, 1020 East Tenth Street, Bloomington, Indiana.

Document Review

This five-year review consisted of a review of relevant documents including O&M records and monitoring data. Applicable soil/sediment/water cleanup standards, as listed in the May 2000 and September 2006 ROD Amendments, were also reviewed.

Data Review

A Long-term Groundwater Monitoring Plan has been in place since April 2003 for the Lemon Lane Landfill and includes surface water monitoring at nearby springs, flow and water level measurements, and crest gage observations in four piezometers within the landfill cap to evaluate backflooding. In December 2009, the governmental parties agreed to modify the Long-term Groundwater Monitoring Plan until a revised plan could be developed taking into consideration additional investigations that were underway. In December 2009, the Long-term Groundwater Monitoring Plan was modified by the Consent Decree parties. In addition, a Groundwater Investigation Plan for the Quarry and Rinker Springs was developed to further evaluate the Quarry Springs and Rinker Springs to determine if the springs required capture and treatment. The following is a summary of the sampling performed under the modified Long-term Groundwater Monitoring Plan and Groundwater Investigation plan:

- Surface water sampling at the springs below and shown in Figure 1.
    - Quarry Springs Combined
    - Illinois Central Spring
    - Quarry A Spring
    - Quarry B Spring
    - Quarry D Spring
    - Cattail Seep
    - Rinker Spring
    - Quarry A Culvert
    - Swallowhole Spring A
    - Swallowhole Spring B1
    - Swallowhole Spring B2

- Flow measurements at the Quarry Springs and Rinker Spring
- Crest gage observations in four landfill piezometers
- Sampling and flow measurements during one storm event at several Quarry Springs and Rinker Spring

Table 6A provides a summary of the monitoring data.

The revised Long-term Groundwater Monitoring Plan was approved on May 15, 2015, and includes the following monitoring requirements:

- Quarterly sampling and analysis for PCBs and total suspended solids at the Quarry-Rinker spring system including the following:
    - ICS at the emergence (non-storm)
    - Rinker Spring
    - Quarry D Spring
    - Quarry B Spring
    - Quarry Combined
    - Quarry A culvert
    - Cattail Seeps
    - Quarry A Spring (if flowing)
- Flow measurements at the Quarry Springs and Rinker Springs
- Quarterly crest gage observations in the four landfill piezometers
- Storm event sampling and flow measurements every three years at ICS and Quarry-Rinker spring system

- The governmental parties and CBS will reevaluate the monitoring program every two years.

1. Evaluation of Landfill Backflooding

Four piezometers have been installed into the Lemon Lane Landfill through the landfill cap to monitor groundwater levels within the landfill footprint and are shown on Figure 2. Figure 3 provides a cross-section of the landfill showing the piezometer placements. The four piezometers installed into the landfill have been placed into areas of deep bedrock or sinkholes that were filled with waste materials. The shallow "S" piezometers (AS and BS) are screened across the native soil/waste interface in the deepest part of the two on-site buried sinkholes. Two "D" piezometers (AD and BD) are screened across the soil/bedrock interface below the landfill waste material. Table 4 provides the construction details for the piezometers. The piezometers are monitored by making periodic measurements of the maximum recorded water level depth relative to the piezometer bottom elevation. These data are recorded by crest gages that record the maximum water level depth above the piezometer bottom over a given period of time. Table 5 shows apparent crest gage movement.

An extensive review of data associated with the piezometers was conducted for the 2010 Lemon Lane Landfill FYR. The piezometer water level rise, or depth, necessary to saturate the waste material or native soil interface was determined and is listed in column 9 of Table 4. The depth is determined by subtracting the base of the waste or bedrock elevation (Column 8) from the piezometer bottom elevation (Column 4). These water depths then represent the critical depths which if exceeded indicate that general saturation of the waste or native soil above bedrock likely occurred during the observation period. The crest gage data are shown in Table 5, and the critical depth values for each of the four landfill cap piezometers are listed in the heading at the top of the table.

The crest gage data in Table 5 were evaluated in the second FYR to determine if backflooding of waste materials was occurring. Piezometer PZ-AS is installed at a bottom elevation of 845.1 feet above mean sea level and piezometer PZ-BS is installed at a bottom elevation of 843.1 feet. The respective base of waste elevations at these two locations are 848.1 feet and 846.0 feet. From these piezometer bottom and base waste elevations, apparent movement values less than the critical values of 3.0 feet for PZ-AS and less than 2.9 feet for PZ-BS indicate that no wetting of the base of the waste has occurred. As shown in Table 5, none of the recorded apparent movement values exceeds the appropriate critical value. Therefore, there is no evidence from Table 5 data that show saturated conditions at the base of waste have ever occurred at either piezometer location, and it was determined that no backflooding occurs into the waste material.

Similarly, the bedrock piezometer PZ-AD is installed at a bottom elevation of 822.3 feet, and bedrock piezometer PZ-BD is installed at a bottom elevation of 823.9 feet. The corresponding bedrock elevations at these piezometers are 829.9 feet and 832.5 feet. From these data, apparent movement values of 7.6 feet for PZ-AD and 8.6 feet for PZ-BD are critical values indicating bedrock backflooding of the soil.

Bedrock piezometer data for PZ-AD and PZ-BD in Table 5 indicate that there is minimal storm response during the dry season from July to October, except for large storms. During wetter seasons, storm response is more frequent. However, as shown in Table 5, none of the apparent movement data collected since the last FYR at PZ-AD or PZ-BD indicate that any bedrock backflooding of the native soil or waste has occurred.

In addition to monitoring the four piezometers, CBS records water levels in monitoring well MW-6 because (1) it is located adjacent to the deepest part of the landfill, (2) has shown the largest water level response of any near-site monitoring well, and (3) the well water level tracks consistently with the flow rate of the karst groundwater discharge point at ICS. The highest water level ever recorded for MW-6 was in January 2005 and was 10 feet lower than the deepest part of the waste material remaining on-site. Also, it appears that the water level in MW-6 does not correlate well with the PZ-BD piezometer and is not a good proxy substitute.

In summary, the review of the Lemon Lane piezometer crest gage and MW-6 water level data collected show the following:

- There is no evidence that the landfill-soil interface is ever wetted at either the PZ-AS or PZ-BS piezometer locations.
- There is no evidence that the soil-bedrock interface is ever backflooded at the PZ-BD location, and PZ-AD has rarely backflooded and has not backflooded into waste material. Based on the evaluation, EPA does not anticipate future problems with landfill settlement or sinkhole piping. No landfill settlement has been observed in the quarterly inspections.

2. Evaluation of the Rinker and Quarry Springs System

As part of the September 29, 2006 ROD and 2009 Consent Decree Amendment, CBS Corporation was required to investigate, after the ICSTF remedial actions had been completed, the remedy's effect on flow and PCB concentrations discharged from the Quarry Springs Area to assess whether these spring flows would also require collection and treatment.

As stated previously, the ICSTF collects and treats karst groundwater emerging at the ICS that is contaminated by PCBs leaching from the former Lemon Lane Landfill. Treated water is discharged into the headwaters of the West Fork of Clear Creek, which is the receiving stream. The ICSTF has two separate PCB treatment trains. EPA constructed the PTS in 2000 as an interim pilot facility. The PTS removes solids by use of clarifiers, multimedia filters, and bag filters before GAC treatment. The PTS is able to treat up to 1,000 gpm of spring water. Spring water flows in excess of the 1,000-gpm treatment capacity are stored by two above-grade storage tanks capable of storing a total of 1.2 million gallons for treatment later when flows are below 1,000 gpm.

During some storm events, spring flow rates at times exceeded the treatment and storage capacity of the PTS, thereby allowing some discharge of untreated, PCB-contaminated spring water to the West Fork of Clear Creek. In response to these discharges, the Lemon Lane Landfill SOW, as included in the CDA, required CBS to expand the capacity of the ICSTF and to provide certain other remedial actions related to control of PCB discharges. These remedial actions were completed in early April 2011 and involved the following:

- Construction of the EFTS to treat spring water overflowing the two 653,000-gallon storage tanks. EFTS treatment occurs through eight Calgon Model 12 GAC treatment tanks, allowing a total plant-flow capacity of 6,000 gpm. The plant-flow capacity now exceeds the highest spring flow ever observed at ICS and allows treatment of all ICS water.
- Construction of a new combined PTS and EFTS effluent line. The new effluent line of treated water bypasses (around) a segment of PCB-contaminated underground karst conduit known to re-contaminate clean effluent water.

PCBs associated with the Lemon Lane Landfill are known to discharge from other springs and seeps that are tributary to the West Fork of Clear Creek. These springs are located a short distance downstream of ICS within the Quarry Springs Area (see Figure 1), and are referred to as Rinker, Quarry A (QS-A), and Quarry B (QS-B). The Lemon Lane Landfill SOW required CBS to conduct investigations after the ICSTF remedial actions had been completed to assess the remedy's effect on flow and PCB concentrations discharged from the Quarry Springs Area to assess whether these spring flows would also require collection and treatment. This investigation also included Quarry D Spring (QS-D), first detected as a discrete spring flow during the 2010 remedial actions (see Figure 1). This investigation is discussed in detail below.

A. Post-Remedy Investigation

By November 2010, CBS had installed the following flow measurement instrumentation as part of the post-remedy investigation:

- A recording weir at Quarry B Spring providing hourly flow data.
- A discharge pipe at Rinker Spring, allowing accurate spot-flow measurement using a bucket-fill method.
- A discharge pipe at Quarry D Spring, allowing accurate spot-flow measurement using a bucket-fill method.
- A recording weir with tail water-correction capability installed immediately upstream of the new ICSTF effluent line and downstream from the Rinker, Quarry A, Quarry B, and Quarry D locations. CBS measures the combined discharge and aggregate PCB content of all the upstream springs and surface water runoff at this location, referred to as Quarry Combined.

The initial sampling locations involved in the post-remedy investigation were Quarry A, Quarry B, Quarry D, Quarry Combined, and Rinker Spring. CBS has collected samples at each of these locations monthly for PCB analysis during non-storm conditions beginning in September 2010. Based on apparent PCB mass-balance discrepancies, Quarry A Culvert and Cattail Seep were added to the monthly monitoring network in January 2012.

Data collected from November 2010 to-date are considered in this evaluation because gaged flow data were obtained for these samples. In addition, CBS also conducted same-day sampling at ICS. Associated flows for these samples were obtained from the normal ICSTF operating records. These data provide a benchmark to assess the relative amounts of PCB mass that are captured or not captured by the current combined ICSTF processes.

Data used in this evaluation are summarized in Table 6B. There are a total of 42 monthly same-day sample sets that were collected during the period of November 2010 to April 2014 at ICS, Quarry Combined, Rinker, Quarry B, and Quarry D springs. Fewer data sets are available for Quarry A, Cattail Seeps, and Quarry A Culvert. Where these data pair with Quarry Combined data, they are also included in Table 6B. The table contains the PCB concentrations in ppb (µg/L), measured or estimated flow rate (gpm), and calculated instantaneous PCB mass discharge (micrograms per minute [µg/min]) for each sample.

The Quarry and Rinker Springs were also evaluated during a storm event in April 2011 to determine if storm events produce higher PCB concentrations in spring water. ICS is known to produce a high concentration pulse of PCBs during a storm event related to the timing of storm surges from PCB source areas within the karst system. These pulses have been known to generate short-term PCB concentrations of several hundred ug/L. The storm sampling was conducted to determine if the any of the Quarry springs showed similar PCB pulses under the post-remediation flow regime.

B. Analysis – PCB Concentrations

Time-series plots of PCB concentrations from November 2010 to April 2014 are presented in Figures 4 through Figure 11. Figure 4 shows plots for the five spring sampling locations that are tributary to the Quarry Combined sampling location. Figures 5 to 10 show individual time-series plots depicting where action levels were exceeded at each sample location. This analysis considers the action level for PCBs to be 0.3 µg/L. This value is specified in the CDA as the discharge limitation for PCBs at ICSTF and the concentration requiring collection and treatment under Section II.C.4 of the Lemon Lane Landfill SOW.

There are apparent seasonal variations in the spring water data, with the highest PCB concentrations typically associated with the August, September, and October dry weather months. These seasonal variations are consistent with those observed in long-term data obtained from ICS. PCB concentrations may exceed the 0.3 µg/L action level under dry weather conditions. These elevated results occur most frequently for dry season samples at Quarry B, Quarry D, and Rinker Springs. Only one sample result above the action level occurred in July 2011 at the downstream Quarry Combined sampling location (see Figure 10), and no elevated results have been observed at Quarry A Spring (see Figure 6).

The Quarry Combined sampling location has a lower PCB concentration than Quarry B, Quarry D, and Rinker Springs for a large number of the sample events. This situation probably results from dilution of the individual spring-flow concentrations with surface water flow, principally from Quarry A Spring, Quarry A Culvert, and perhaps Quarry C Spring.

Figure 11 and Table 7 below illustrate the confidence intervals associated with the mean PCB concentration at each sampling location. The height of each box in Figure 11 shows the 99 percent upper confidence limit (UCL) associated with the mean PCB concentration observed during the post-remediation period. As shown in Table 7, all 99 percent UCLs are less than the action level of 0.3 μg/L, and thus collection of the spring discharges pursuant to Section II.C.4 of the Lemon Lane Landfill SOW does not appear necessary.

Table 7: Mean PCB Concentration Confidence Limits (ug/l)

Parameter	Cattail Seep	Quarry A Spring	Quarry B Spring	Quarry D Spring	Rinker Spring	Quarry Combined
Mean	0.1871	0.08889	0.2717	0.219	0.2383	0.1755
Std. Dev.	0.04904	0.03919	0.07341	0.07562	0.08928	0.03597
99% UCL	0.2082	0.1273	0.2889	0.2349	0.2552	0.1847
99% LCL	0.1588	0.05137	0.2405	0.1839	0.197	0.1609

During a storm event occurring from April 18 to April 21, 2011, Quarry Combined Springs, Quarry B Spring, Quarry D Spring, Rinker Spring and the Quarry A Culvert were sampled on a four hour interval. Results showed no large PCB peaks at any of the monitored locations, and storm flow concentrations were generally lower than those observed during non-storm conditions. Sixteen samples taken from the Quarry Combined Springs showed no samples exceeding 0.3 ug/L, and half of the samples were at non-detect levels. At Quarry B Spring, only 3 samples out of 15 showed PCB concentrations slightly above 0.3 ug/L. At Quarry D spring, no samples exceeded of 0.3 ug/L, and at Rinker Spring only one sample out of 16 slightly exceeding 0.3 ug/L. No PCBs were detected at the Quarry A Culvert. Overall, the average PCB concentrations at each monitored location during the storm were equivalent to, or in most cases lower than, the non-storm averages shown in Table 7.

C. Analysis – Flows

Figure 12 shows flow rates (in gpm) at Quarry B, Rinker, Quarry D springs, and the Cattail Seep as a function of the Quarry Combined flow rate for the 42 monthly measurement events. The plot also shows as the "Sum of Sources," the summed flow rate from these locations. The Sum of Sources flow is close to, and in some cases actually exceeds, the Quarry Combined flow at lower flow rates. Rinker Spring is the principal contributor to Quarry Combined flow under low-flow conditions. As discharge increases, a greater proportion of the Quarry Combined flow is derived from Quarry B Spring, and Quarry B is the primary source of flow at Quarry Combined discharges above about 80 gpm (Figure 12). Quarry A, Quarry D, and Cattail Seeps do not provide significant flow contributions to Quarry Combined in comparison to either Rinker or Quarry B springs.

Ideally, the summed flow rate should equal the Quarry Combined flow for each measurement event if all tributary sources to Quarry Combined are included in the measurements. Figure 13 shows a plot of the Sum of Sources flow at Quarry A, Quarry B, Rinker, and Quarry D Springs and the Cattail Seep divided by the Quarry Combined flow (expressed as a percentage) in relation to the total measured flow rate at the Quarry Combined location. The plot further indicates that summed flows tend to be higher than the Quarry Combined measurement at low flow rates, but they tend to be lower than the Quarry Combined measured flow at higher flow rates. Overall, the summed flows are within 50 to 150 percent of the Quarry Combined flows for 74 percent of the measurement events. Reasons for the differences in flow between the Quarry

Combined location and its tributary sources could include (1) measurement errors in estimating flows at various flow rates, and (2) contributing flows from other sources at higher flow rates. The most significant of these contributing flows is likely surface water runoff through the Quarry A Culvert. This flow may be substantial, but has been only infrequently measured in combination with the other springs. The flow through the Quarry A Culvert includes discharge from the recently discovered Swallowhole A, Swallowhole B1, and Swallowhole B2 Springs located near the ICSTF during CBS's soil and sediment removal action in 2010. These flows do not contain PCBs based on CBS sampling data. PCBs have not been reported for samples collected at any of these springs or at the Quarry A Culvert.

D. Analysis – PCB Mass Discharge

Section II.C.4 of the Lemon Lane Landfill SOW specifies that EPA will also consider the PCB mass discharge in evaluating the need for further spring water collection. Figure 14 shows PCB Mass Discharge (μg/min) at Quarry B, Quarry D, and Rinker Springs, and the Cattail Seep as a function of Quarry Combined flow. The plot also shows as the "Sum of Sources," the total PCB mass discharge summation from Quarry A, Quarry B, Quarry D, and Rinker Springs and the Cattail Seep. This value may be compared to the Quarry Combined mass discharge plot.

As may be noted from the figure, at low flows the observed PCB discharge at Quarry Combined is derived predominantly from Rinker Spring. This observation is consistent with the flow data, discussed above, indicating that Quarry Combined flow is largely derived from Rinker Spring under low-flow conditions (see Figure 12). Several low-flow data points actually indicate that PCB mass discharge at Rinker Spring is higher than the PCB mass discharge at the Quarry Combined sampling location under these flow conditions. Quarry B Spring represents an increasingly significant proportion of the Quarry Combined PCB mass at higher Quarry Combined PCB mass discharges and appears to be the primary source of PCBs at Quarry Combined discharges above about 80 gpm (see Figure 14).

Figure 13 also shows a plot of the Sum of Sources PCB mass discharge at Quarry A, Quarry B, Rinker, and Quarry D Springs, and the Cattail Seep divided by the Quarry Combined mass discharge (expressed as a percentage) in relation to the total measured flow rate at Quarry Combined. Similar to the corresponding flow data shown in this plot, the summed mass discharges tend to be higher than the Quarry Combined mass flow rate at low discharges. The summed mass discharges at discharges greater than about 20 gpm are generally 50 to 90 percent of the Quarry Combined values. Overall, the summed mass discharges are within the range of 50 to 150 percent of the Quarry Combined mass discharge for 69 percent of the measurement events. As shown in Figure 13, the Sum of Sources total flow and total PCB mass follow similar trends with respect to Quarry Combined flow. At low flow rates, the summations may generate <u>excess</u> flow (up to 160 percent) and higher PCB mass (up to 400) than is present at the Quarry Combined location. At higher discharges, the flow and mass summations are generally <u>deficient</u> relative to the Quarry Combined data, and the deficiencies are present in roughly equal proportions (10 to 50 percent).

Reasons for <u>excess</u> summations at low flow could include:

- PCBs lost along the flow path from the spring emergence to Quarry Combined during low-flow conditions.
- Underestimate of flow at Quarry Combined.

Reasons for deficient summations at high flow could include:

- Submersion of the Quarry Combined weir at higher flow rates (causing an overestimate of flow and PCB mass at that location).
- Unaccounted flow and PCB inputs to Quarry Combined, most likely from non-discrete channel seepage below the spring measurement points.

E. Analysis – PCBs Not Captured by Current Treatment System

Figure 15 compares the ICS PCB mass discharge rate versus the Quarry Combined PCB mass discharge rate over the range of sampled ICS flows. Regression lines through the plot origin are shown for both data sets. The Quarry Combined data represent PCB mass rate that is not captured, or treated, by the ICSTF, whereas the ICS data indicate the amount of PCB mass routed to the ISCTF for treatment. From Figures 12 and 13, the Quarry Combined data appear to be a reasonable high estimate of un-captured PCB mass discharge rate because the PCB mass discharge and flow there are greater than the sum of the contributing flow and PCB masses over most of the range of flows observed. Comparison of the slopes of the regressions lines in Figure 15 indicates that, on average, the un-captured PCB mass discharge rate at Quarry Combined represents about 0.6 to 0.8 percent of the total PCB mass inflow to ICSTF over the sampled range of flow rates. This level would appear to be a nominal PCB release compared with the PCB capture provided by the current ICSTF. The principal sources for this un-captured mass are Rinker Spring at low flow and Quarry B Spring at higher flow conditions.

Figure 16 shows the Quarry Springs Combined flow as a function of ICS flow. From these data, an estimate may be made of the PCB concentration in the West Fork of Clear Creek (the receiving stream). The West Fork of Clear Creek may be assumed to be mixture of untreated water from the Quarry Combined sampling station and treated effluent water from the ICSTF discharge located a short distance downstream (see Figure 1). The additional PCB content in the West Fork of Clear Creek may be estimated by dividing the Quarry Combined PCB mass discharge by the sum of ICS flow and Quarry Combined flow. The data for this computation are included in Table 6B in and the results are shown in Figure 16 as a function of ICS Flow.

Except during very low-flow conditions, the calculated additional PCB concentration in the West Fork of Clear Creek contributed by the various Quarry Springs is less than 0.1 μg/L. Under very low-flow conditions, the additional PCB contribution to the West Fork of Clear Creek may increase slightly above this level in response to the greater proportion of flow derived from Rinker Spring, the highest remaining PCB source under these low-flow conditions (see Figure 13). The additional PCB contribution at flow rates greater than about 100 gpm to the West Fork of Clear Creek from all of the Quarry Springs, as monitored at the Quarry Combined sampling location, is estimated to be in the 0.06 to 0.08 μg/L range downstream of the ICSTF effluent outfall.

F. Conclusions

- The un-captured PCB mass discharge rate at Quarry Combined is estimated to be about 0.6 to 0.8 percent of the total PCB mass inflow to ICSTF over the sampled range of flow rates. This percentage would appear to be a nominal PCB release compared with the PCB capture provided by the current ICSTF.

- The principal sources for this un-captured mass are Rinker Spring at low flow and Quarry B Spring at higher flow conditions. Based on considerable post-remediation sample data for both of these springs, the 99 percent UCL mean PCB concentrations are below the 0.3 µg/L action level specified in Section II.C.4 of the Lemon Lane Landfill SOW.

- The additional level of PCBs released from all of the spring sources from the upstream end of the West Fork of Clear Creek to below (downstream of) the ICSTF outfall may be conservatively estimated from Quarry Combined sample data to be 0.06 to 0.08 µg/L.

- Collection and treatment of additional spring sources does not appear to be warranted, particularly in light of recent IDEM and EPA fish tissue sampling at locations in the West Fork of Clear Creek downstream of the ICSTF outfall.

3. Fish Tissue Analysis

In October 2014 and November 2014, EPA funded the sampling of fish tissue in Clear Creek, downstream of the ICSTF. The sampling completed by EPA follows the latest IDEM fish sampling survey conducted in Clear Creek in 2012. Locations sampled are shown in Figure 17 and include the following:

- Clear Creek at Allen Street (CC-1).
- Clear Creek at Country Club Road (CC-2)
- Clear Creek at Fluckmill Road (CC-3)
- Clear Creek at Gore Road

Whole fish and fillets were analyzed during the sampling event. Whole fish were targeted in the smaller upstream reaches of Clear Creek and fillet samples were targeted in the downstream reaches where edible fish were present. Target fish species were split into three main categories, or feeding guilds: bottom feeder (benthic), omnivore, and top predator. Within each category, target species and sizes were selected for comparison to the historical sample data at a specific location, and a minimum of three, but preferably four or five, samples were targeted for specific guilds at each location. The primary species for bottom feeder was white sucker (*Catostomus commersonii*), with secondary target species of hogsucker (*Hypentelium nigricans*), redhorse (*Moxostoma carinatum*), or bullhead catfish (*Ameiurus* spp.). The omnivore primary species was creek chub (*Semotilus atromaculatus*), with secondary target species of spotted sucker (*Minytrema melanops*) or stoneroller (*Campostoma anomalum*). For top predator samples, the primary species varied with location between green sunfish (*Lepomis cyanellus*) and longear sunfish (*Lepomis megalotis*), with secondary species of rock bass (*Ambloplites rupestris*), green sunfish, longear sunfish, or bluegill (*Lepomis macrochirus*). Where neither the primary nor secondary species could be captured; a species of the same feeding guild was substituted. All omnivore samples were whole fish, whereas bottom feeders and top predators were a mix of whole fish and fish fillet samples.

Table 8 provides a summary of the 2014 fish sampling data. Table 9 provides a summary of historical fish sampling data, by year, for selected species / sample types (whole fish or fillet) at locations CC-1 and CC-2. These are the closest sampling locations to the Site and are therefore the locations where remedy effects should be most pronounced. The species / sample types selected are among those that have been repeatedly sampled through time such that any trends may be identified. EPA's sampling results are consistent with IDEM's previous sampling results showing a dramatic improvement in fish tissue concentrations in Clear Creek since water treatment remediation activities began in 2000. The average PCB Aroclor concentration reported for seven pan fish fillet samples collected about 3.0 miles downstream of the ICSTF in October and November 2014 was 37 ppb (micrograms per kilogram [µg/Kg]), which is less than the current IDEM un-restricted fish consumption advisory level of 50 µg/Kg for Group I fish . The fish tissue PCB concentrations show a dramatic improvement compared to similar pan fish fillet sample results in 2004 when PCB concentrations for six samples ranged from 190 to 770 ppb. EPA is in the process of performing a rigorous data and trend evaluation that will likely be available by August 2015.

Based on the recent fish tissue analysis, the remedy is meeting the RAOs for the water and sediment OUs.

Site Inspection

The FYR inspection for the Site was conducted on 4/23/2015. In attendance were Thomas Alcamo, EPA; Jessica Fliss of IDEM, John Langley of City of Bloomington Utilities; Pat Kniep of PSARA Technologies (consultant for CBS) and Steven Wade of PSARA Technologies (ICSTF Operator). The purpose of the inspection was to assess the protectiveness of the remedy. Since the last FYR in 2010, a number of inspections have taken place at the landfill and at the ICSTF. The FYR inspection checklist was used during the inspection.

The landfill inspection showed the fencing and gates in good condition. The inspection over the landfill cap did not show any issues, with the cap vegetation in good condition and with no erosion or holes observed. Drainage ditches and the sedimentation pond were free of vegetation and debris and appeared to be operating as designed. The four landfill piezometers and monitoring wells showed no damage.

The FYR inspection for the ICSTF took place on 4/23/15. The O&M Plan was available along with the daily operator logs. Process equipment for both the PTS and EFTS have been well maintained by CBS. As process equipment fails, CBS upgrades the technology as necessary. The EFTS only operates a few times during the year but the carbon vessels are backwashed monthly to ensure that they are ready to operate efficiently when required.

Interviews

During the FYR process, discussions regarding the Site remedy have taken place with CBS Corporation, IDEM, the City of Bloomington, and Monroe County about the Lemon Lane Landfill. No formal interviews were completed during this FYR.

IV. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?
Yes.

Remedial Action Performance

Yes, the remedial action continues to operate and function as designed and intended in the ROD Amendments. The cap continues to be inspected quarterly and any repairs are made by CBS Corporation. The PTS and EFTS continue to operate as designed and CBS continues to operate the treatment plant and perform the necessary maintenance to keep the plant operating as designed. CBS continues to sample the treated effluent from the PTS weekly and the plant has consistently met the 0.3 µg/L (ppb) PCB discharge criteria through IDEM's substantive permit requirements. Evaluation of the Quarry Springs and Rinker Spring data shows that those springs are consistently under the 0.3 parts per billion discharge criteria 99% of the time and less than 1% of the total PCB mass released.

System Operations/O&M

CBS continues to perform the necessary operation and maintenance on the ICSTF. Section II contains a list of ICSTF improvements CBS has undertaken since the last FYR. The O&M Plans for both the PTS and EFTS have been updated to take into consideration the ICSTF improvements. It is expected with the continuing maintenance activities by CBS, the discharge criteria will continue to be met.

Opportunities for Optimization

CBS continues to evaluate opportunities for improvement in performance and reducing O&M costs. CBS has built offices for its consultants within the ICSTF to reduce costs and continues to evaluate the ICSTF in finding ways to improve performance.

Early Indicators of Potential Issues

The continued replacement and improvement of equipment at the ICSTF has avoided the potential of affecting the protectiveness of the remedy. CBS's continuing evaluation of the GAC treatment vessels is critical in ensuring that the system operates at its full potential.

Implementation of Institutional Controls and Other Measures

All ICs are in place for the Lemon Lane Landfill. Fencing surrounding the Lemon Lane Landfill and ICS remain in good condition.

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

Yes.

Changes in Standards, Exposure Pathways, Toxicity and Other Contaminant Characteristics

No new standards, toxicity factors, risk assessment methods or newly identified contaminants have been discovered and the remedy remains protective. In addition, no changes in the expected land use are anticipated but the new I-69 route may bring additional commercial development in the area surrounding the Lemon Lane Landfill.

Expected Progress Towards Meeting RAOs

The source control OU1 remedy is functioning as designed and remains protective. Construction completion for the water (OU2) and sediment (OU3) was accomplished in September 2012 and that remedy is also functioning as designed and remains protective.

The source control OU1 remedy is progressing as expected and is functioning as designed and remains protective. The RAOs continue to be met and the cap prevents a direct contact threat. The continuing monitoring of four piezometers in the landfill show that the waste material is not wetted, thereby helping to minimize the PCBs being released to ICS. The water and sediment OUs 2 and 3 respectively are complete and the RAOs for OU2 and OU3 are being met. The treatment of ICS with the PTS and EFTS, drainage improvements, and soil/sediment cleanup near the ICSTF have reduced the amount of PCBs being released to Clear Creek, reduced PCB levels in fish tissue, and reduced the amount of PCBs in sediment that may be available to fish.

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

No, the source control, water and sediment OUs are functioning as designed and remain protective. All ICs are in place and CBS continues to perform O&M activities.

Technical Assessment Summary

The remedy for the Lemon Lane Landfill is functioning as intended. The landfill cap continues to prevent direct contact to waste material and backflooding of waste material is not occurring. CBS continues to perform any necessary maintenance on the landfill cap and the fencing surrounding the landfill remains in good shape. The ICSTF continues to meet the discharge criteria and CBS has performed all the necessary maintenance. The Quarry Springs and Rinker Spring investigation has shown that capturing and treating those springs are unnecessary and PCB concentrations in fish tissue have decreased since the implementation of the Site remedy. In addition, all ICs have been put in place for the 4 parcels associated with the Lemon Lane Landfill.

No new information has become available which could change the protectiveness of the Site remedy, including toxicity data and cleanup levels. The RAOs are being met for all three OUs and operation and maintenance, including monitoring, are being completed by CBS.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

No issues were identified during this five-year review period affecting the current or future protectiveness of the remedy. However, several items were identified for follow-up:

- Complete the evaluation of fish tissue trends and plan for next sampling event in 2016.
- Continue to monitor the springs associated with Lemon Lane Landfill, including Quarry Springs and Rinker Spring to determine if any changes occur in flow or PCB concentrations.

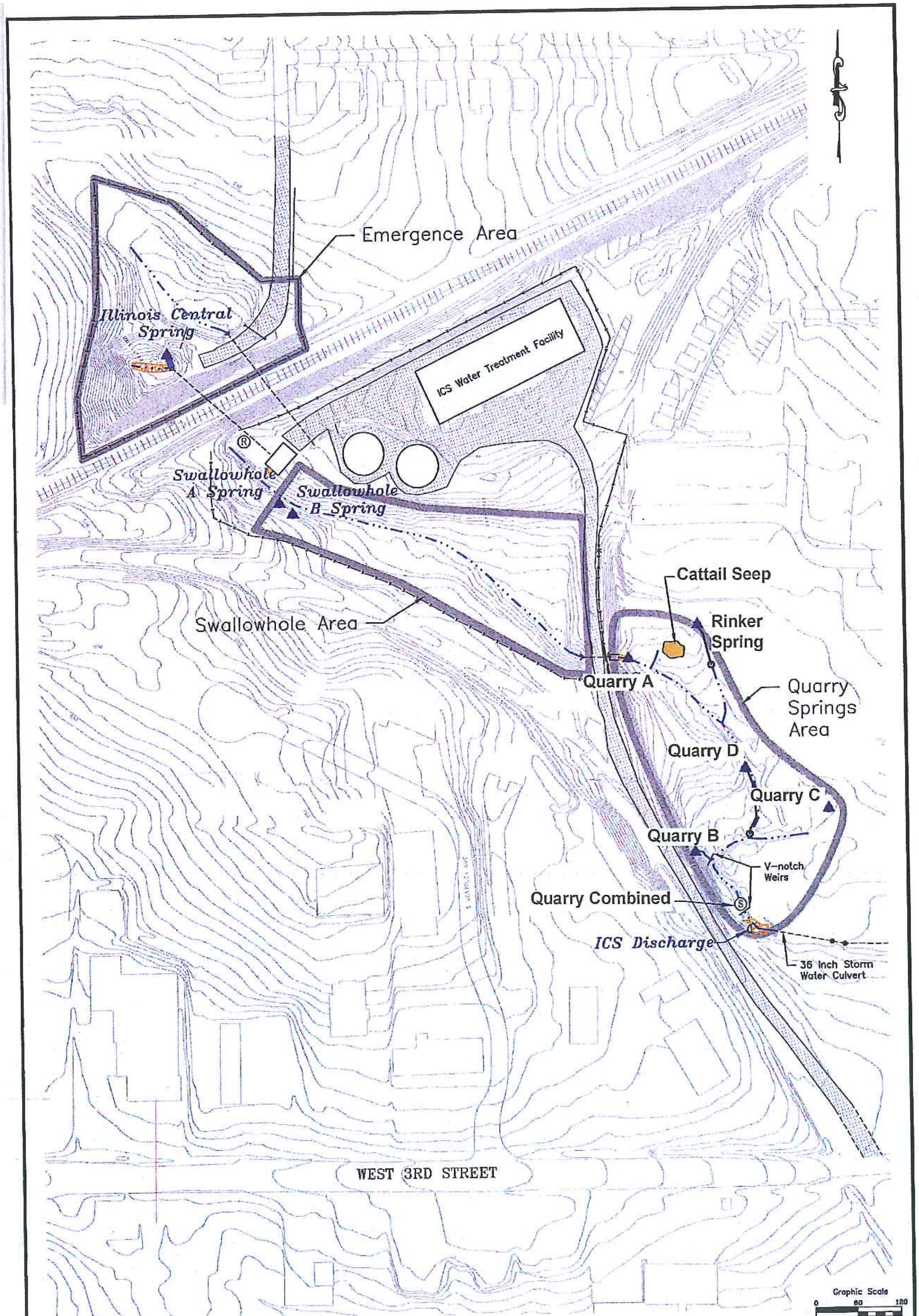
VI. PROTECTIVENESS STATEMENT

Operable Units 1, 2, 3 and Sitewide Protectiveness Statement
Protectiveness Determination: Protective
Protectiveness Statement: Because the remedial actions at all OUs are protective, the Site is protective of human health and the environment. The source control remedy continues to function as designed and the landfill continues to eliminate the direct contract threat and minimize contaminant migration. The water/sediment OUs continue to reduce the amount of PCBs being released to Clear Creek which has improved the PCBs levels in fish tissue.

VII. NEXT REVIEW

The next five-year policy review report for the Lemon Lane Landfill Superfund Site is required five years from the completion date of this review.

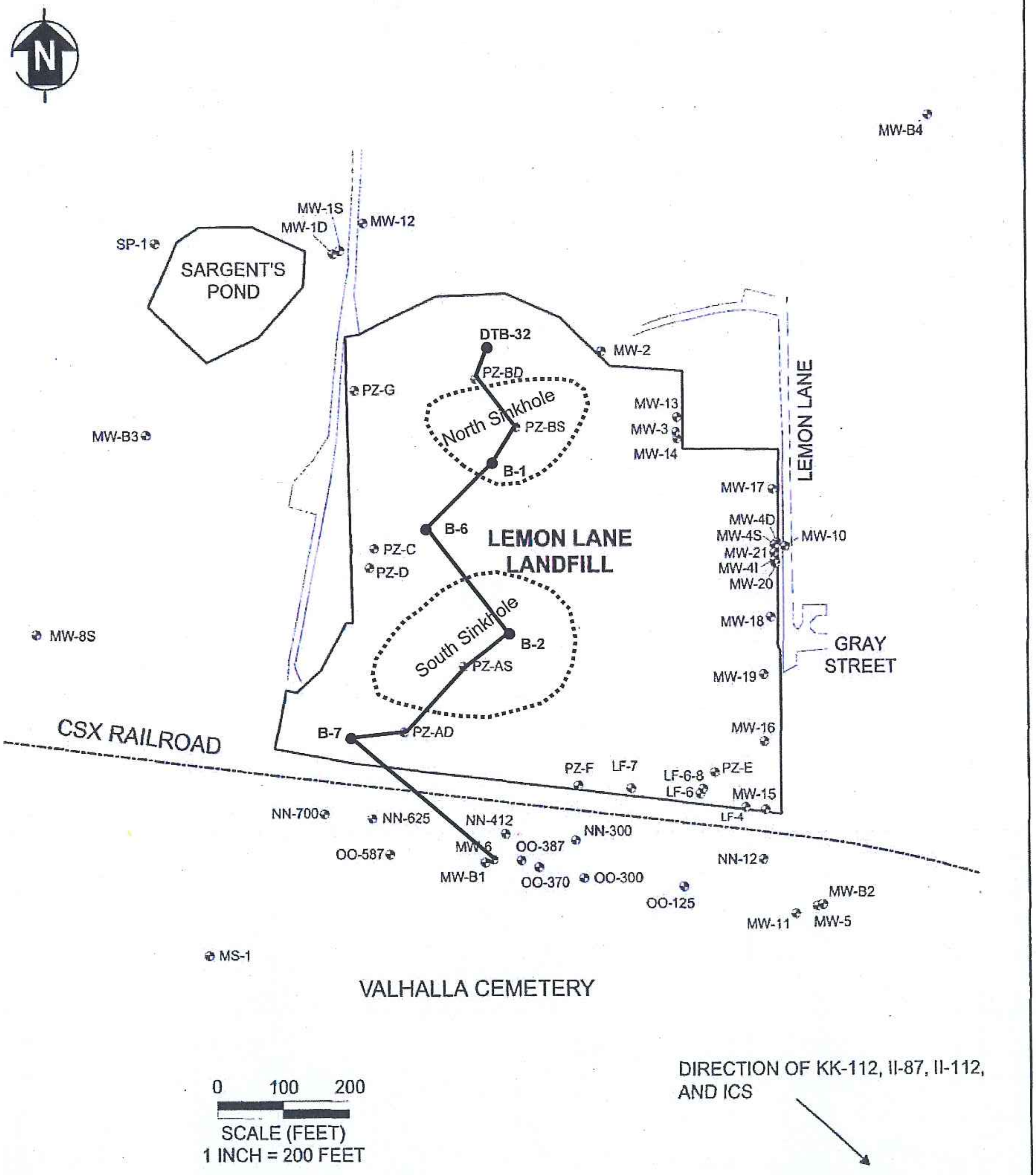
FIGURES AND TABLES



CBS Corporation

Figure 1
Monitoring and Sampling Locations
Lemon Lane Landfill
and Associated Springs

Drawn By:	Date:	Scale:
RLR	7/6/11	1"=120'



LEGEND

MW-6 ⊕ MONITORING WELL OR PIEZOMETER LOCATION AND DESIGNATION

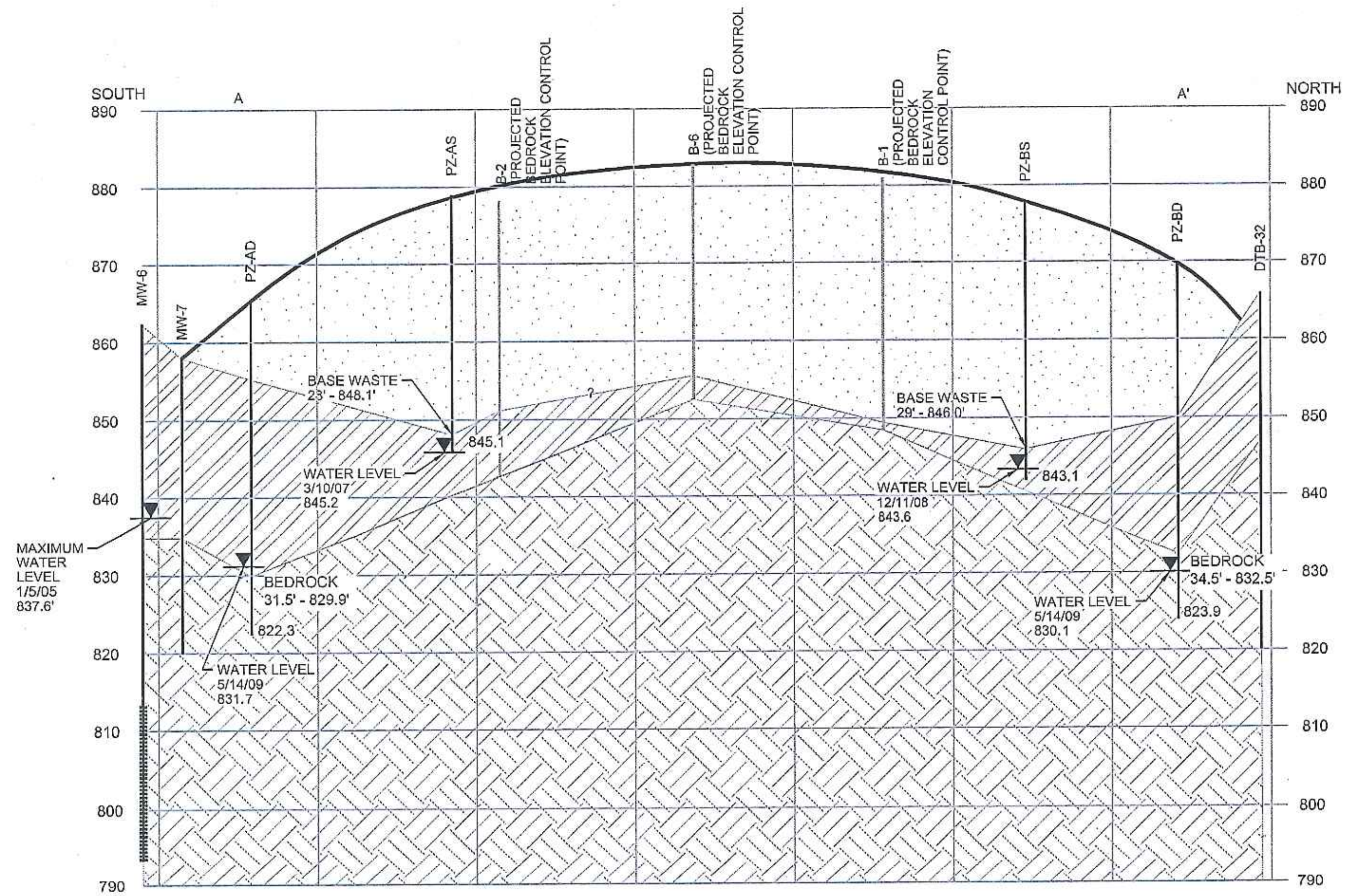
● SOIL BORING

CROSS SECTION LINE (FIGURE 2)

LEMON LANE LANDFILL
BLOOMINGTON, INDIANA

FIGURE 2
SITE MAP

Tetra Tech EM Inc.



SOIL/FILL

CLAY

LIMESTONE

? INFORMATION NOT AVAILABLE FOR FILL/CLAY CONTACT AT LOCATIONS B-1, B-2 AND B-6

WATER LEVEL ELEVATIONS ARE PRESENTED IN FEET AMSL. THE ELEVATIONS AND DATES SHOWN REPRESENT THE MAXIMUM ELEVATIONS MEASURED AT PIEZOMETERS PZ-AD AND PZ-BD.

NOTE:
SOIL BORINGS B-1, B-2, B-6, AND DTB-32 WERE DRILLED PRIOR TO THE REMEDIAL ACTION AND ARE PROJECTED ONTO THE SCHEMATIC DIAGRAM; THEREFORE, THESE SOIL BORINGS ARE INCLUDED ONLY TO PROVIDE BEDROCK SURFACE ELEVATION CONTROL POINTS.

0 5 10
VERTICAL SCALE IN FEET AMSL

0 100 200
HORIZONTAL SCALE IN FEET

LEMON LANE LANDFILL
BLOOMINGTON, INDIANA

FIGURE 3
GEOLOGIC SCHEMATIC A–A'

TETRA TECH EM INC.

v.9.0.34 ltd.

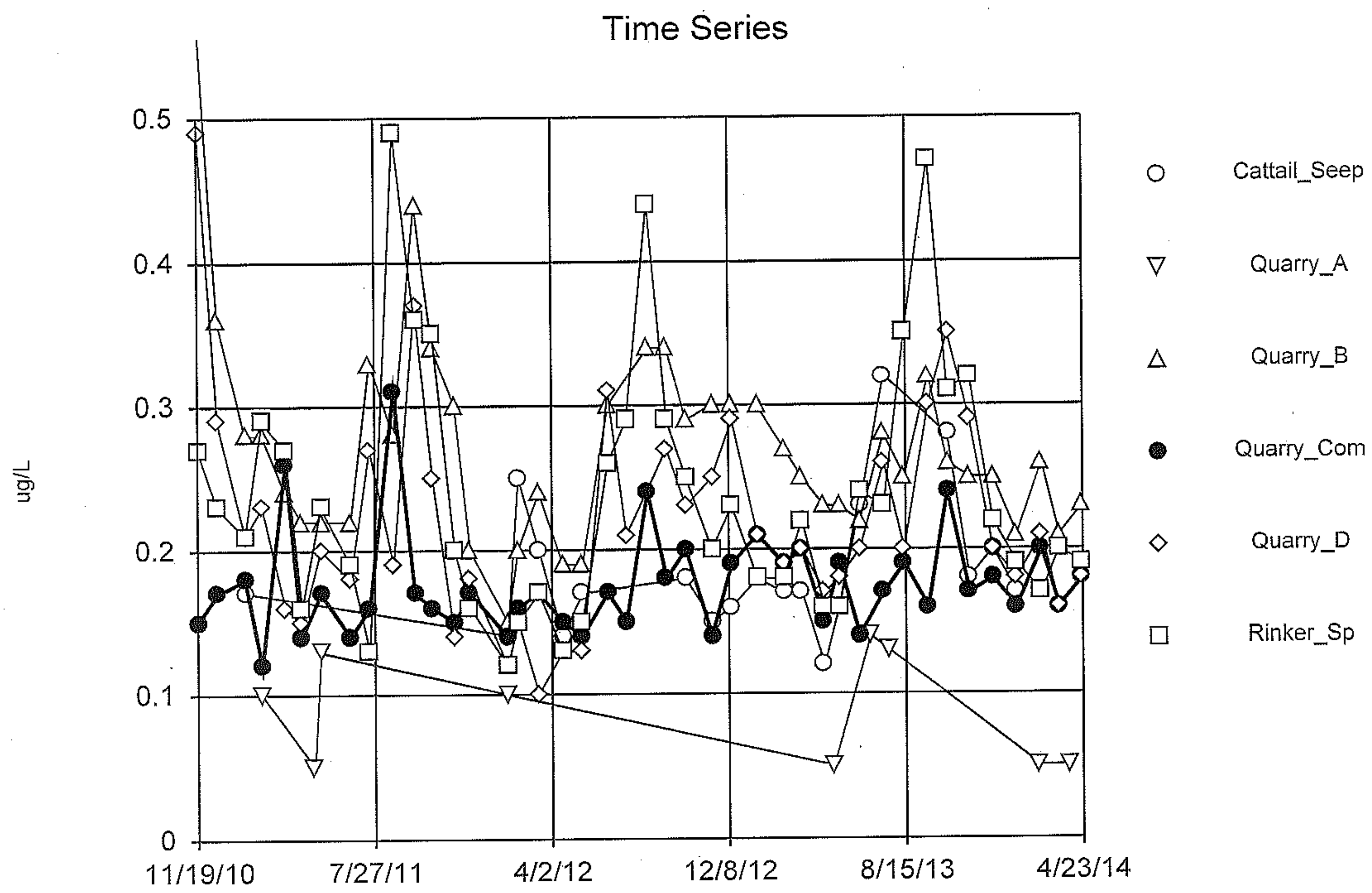


Figure 4

Constituent: PCB   Analysis Run 1/22/2015 3:05 PM

Facility: Quarry Springs   Data File: QuarrySprings

v.9.0.34 ltd.

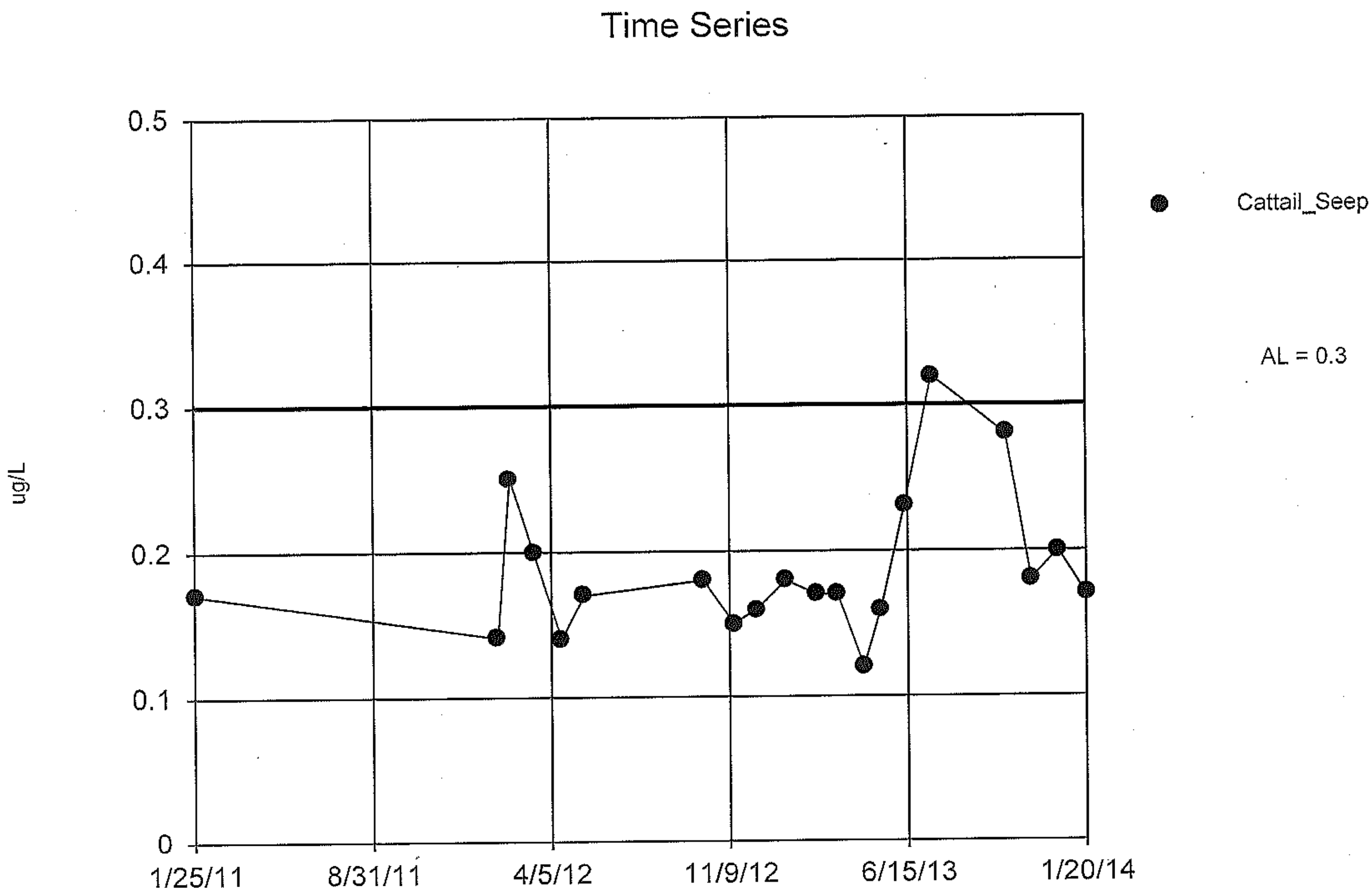


Figure 5

Constituent: PCB   Analysis Run 1/22/2015 1:58 PM

Facility: Quarry Springs   Data File: QuarrySprings

v.9.0.34 ltd.
Hollow symbols indicate censored values.

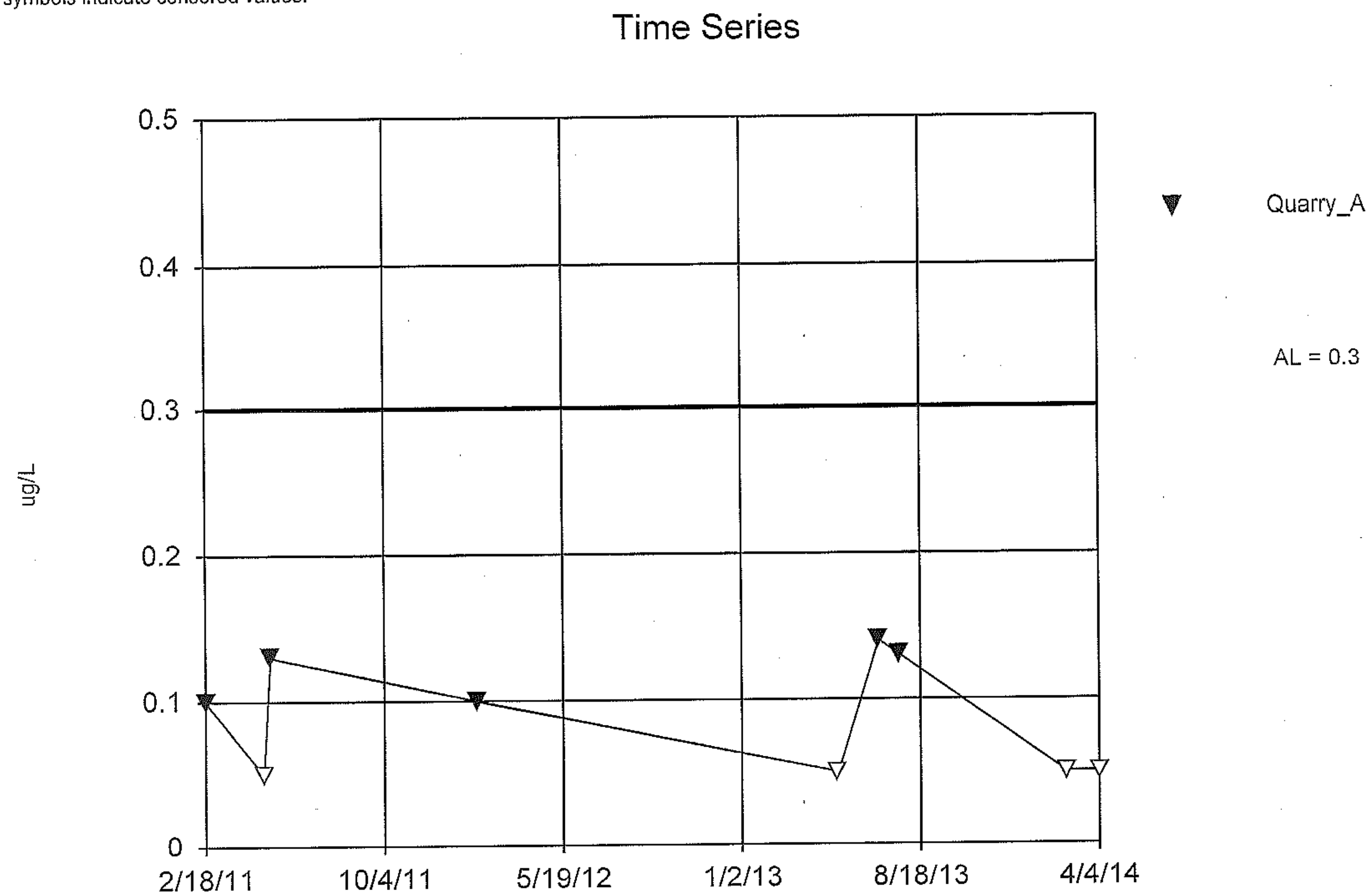


Figure 6

Constituent: PCB   Analysis Run 1/22/2015 2:01 PM

Facility: Quarry Springs   Data File: QuarrySprings

v.9.0.34 ltd.

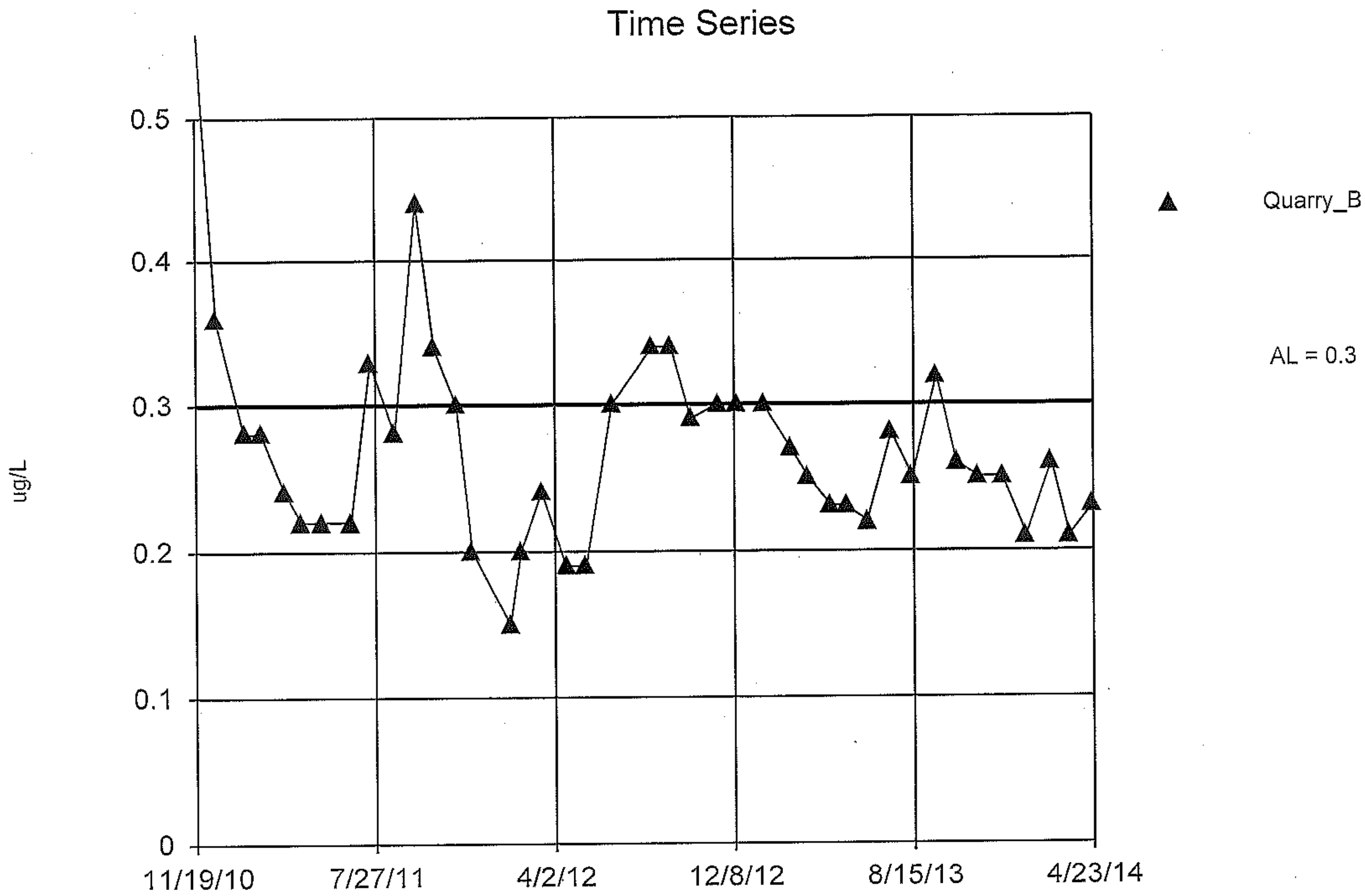


Figure 7

Constituent: PCB   Analysis Run 1/22/2015 2:08 PM

Facility: Quarry Springs   Data File: QuarrySprings

v.9.0.34 ltd.

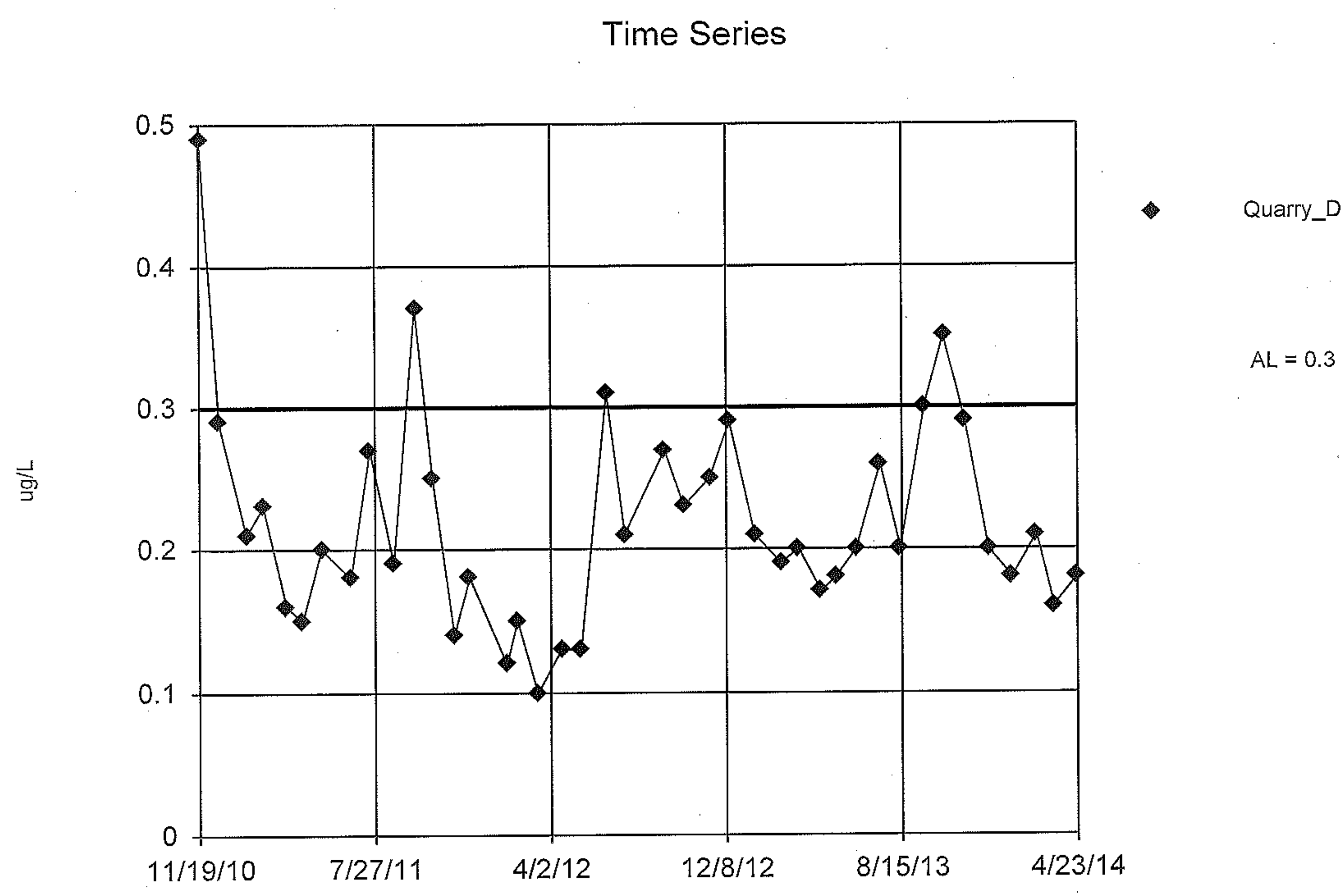


Figure 8

Constituent: PCB Analysis Run 1/22/2015 2:11 PM

Facility: Quarry Springs Data File: QuarrySprings

v.9.0.34 ltd.

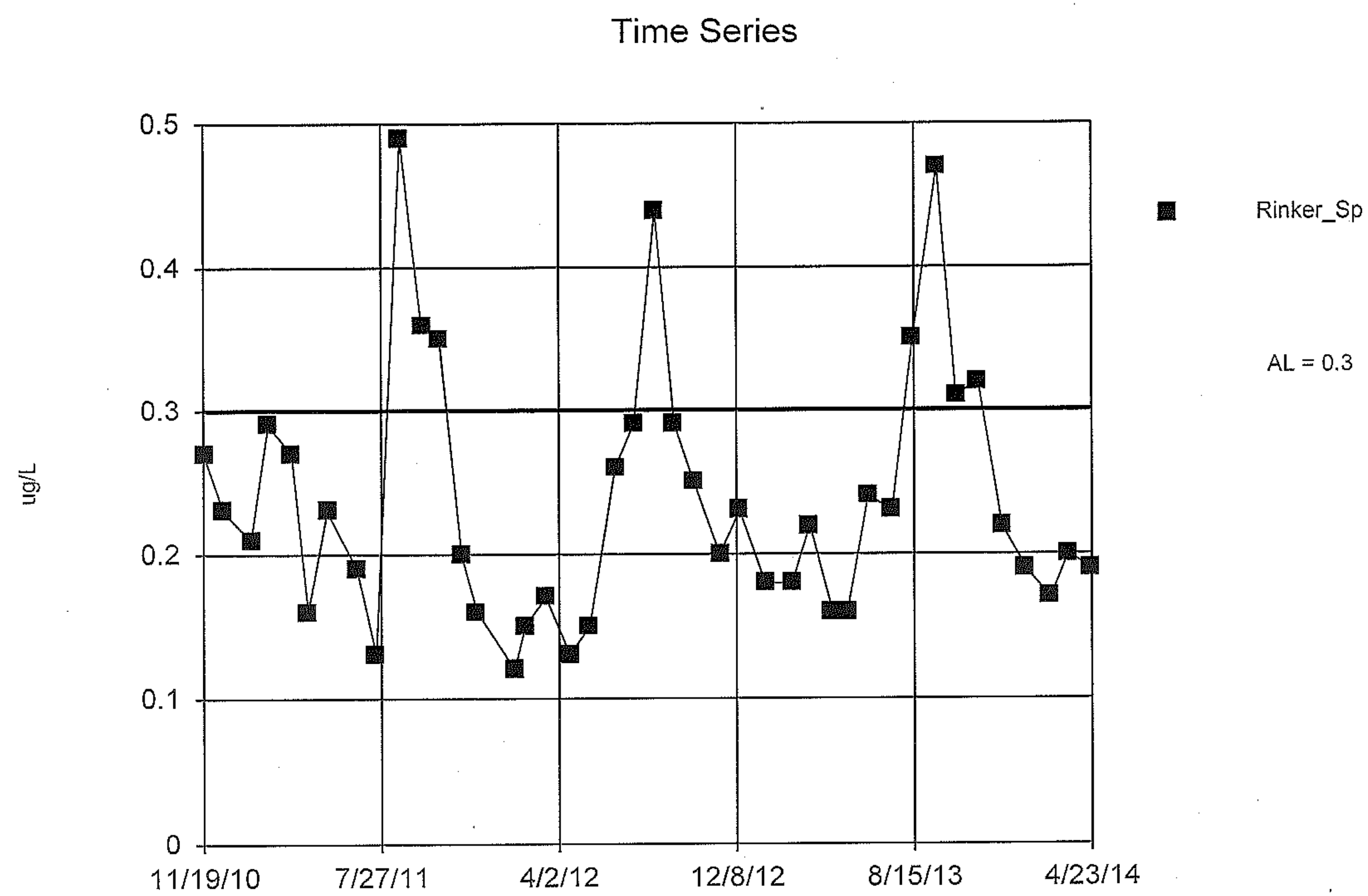


Figure 9

Constituent: PCB Analysis Run 1/22/2015 2:12 PM

Facility: Quarry Springs Data File: QuarrySprings

v.9.0.34 ltd.

Time Series

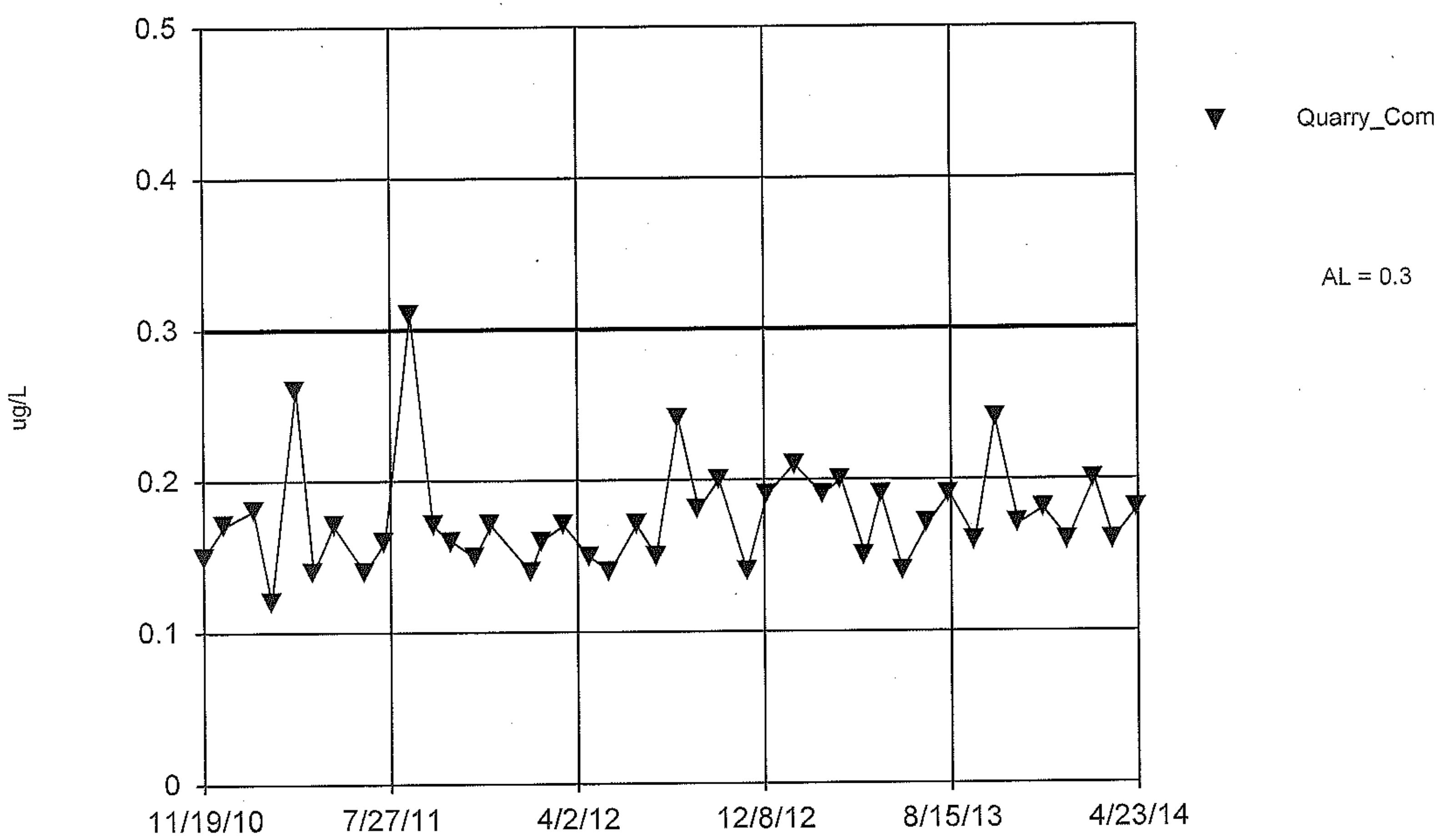


Figure 10

Constituent: PCB   Analysis Run 1/22/2015 2:09 PM

Facility: Quarry Springs   Data File: QuarrySprings

v.9.0.34 ltd.

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-station alpha = 0.01.

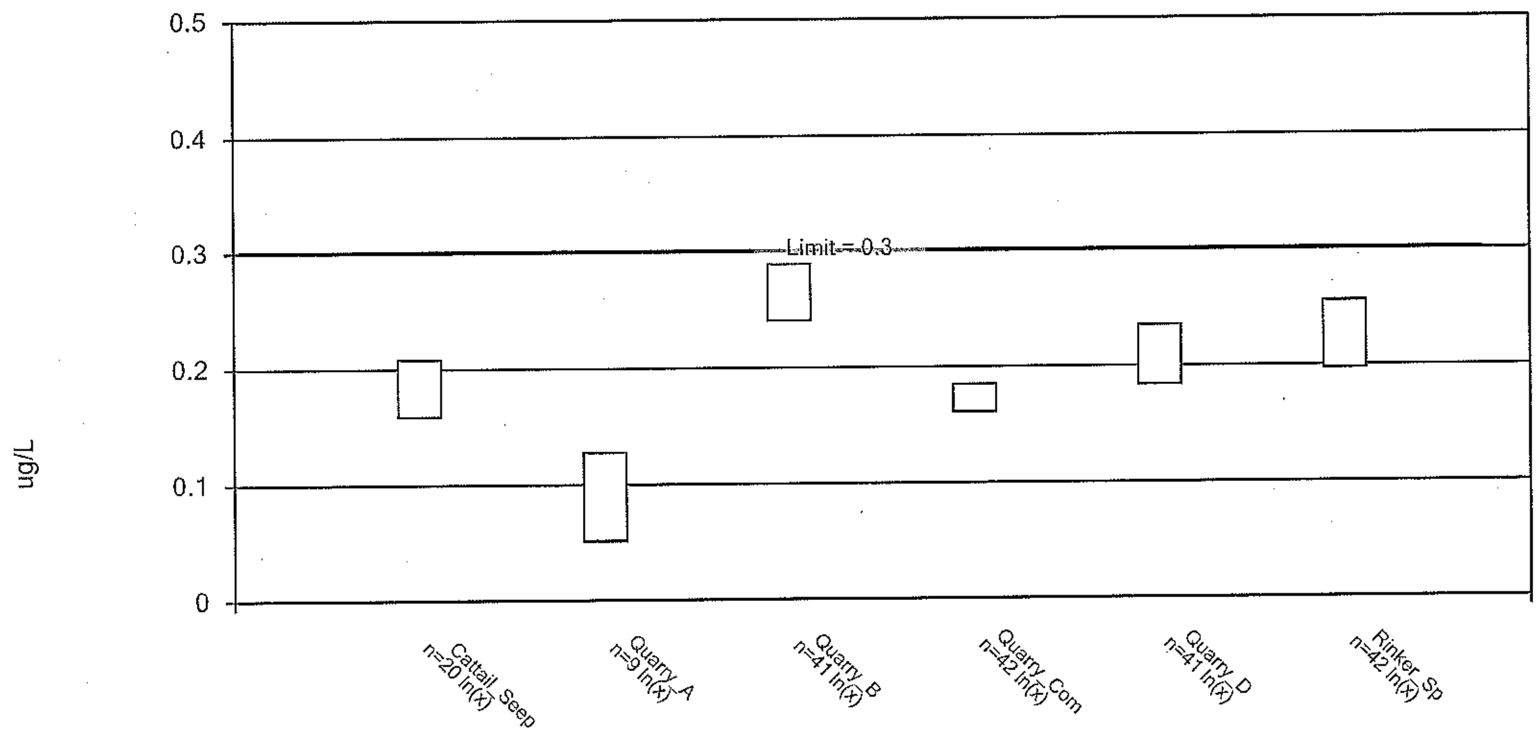


Figure 11

Constituent: PCB Analysis Run 1/22/2015 2:40 PM

Facility: Quarry Springs Data File: QuarrySprings

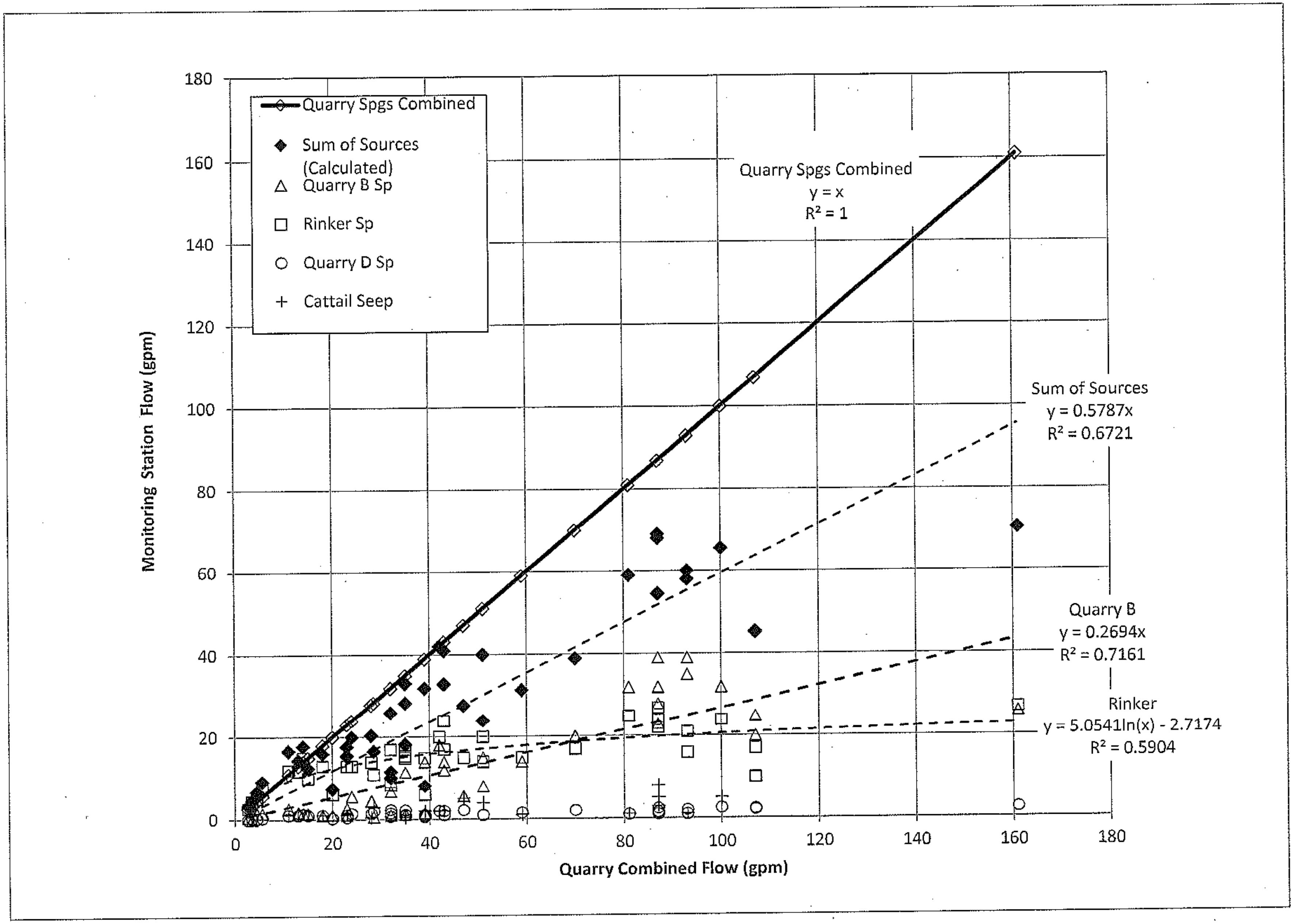


Figure 12: Quarry Springs Flow Correlation (Post Remediation)

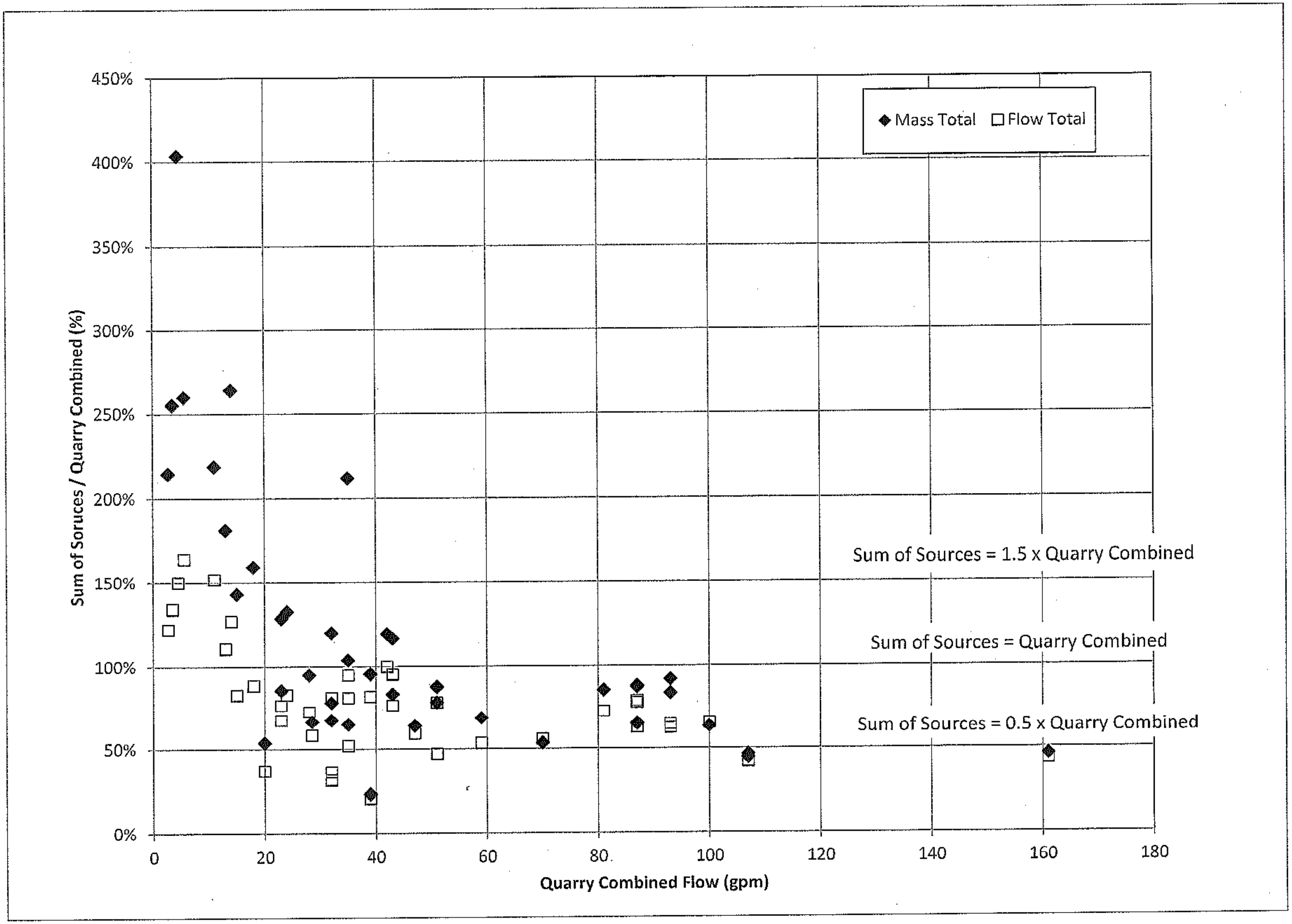


Figure 13. Flow and PCB Mass Totals as a Percentage of Quarry Combined

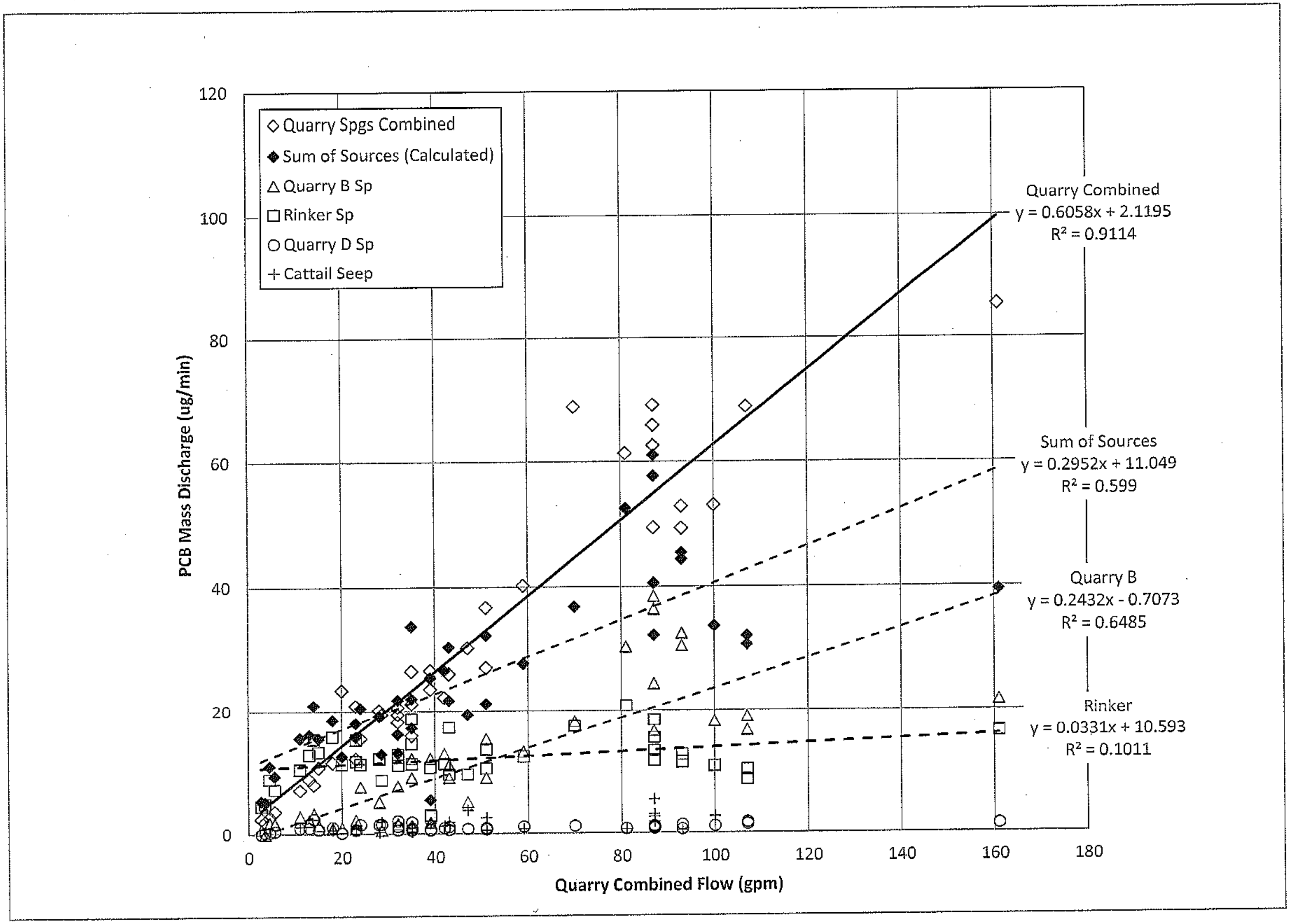


Figure 14. PCB Mass Flow Rates (Post Remediation)

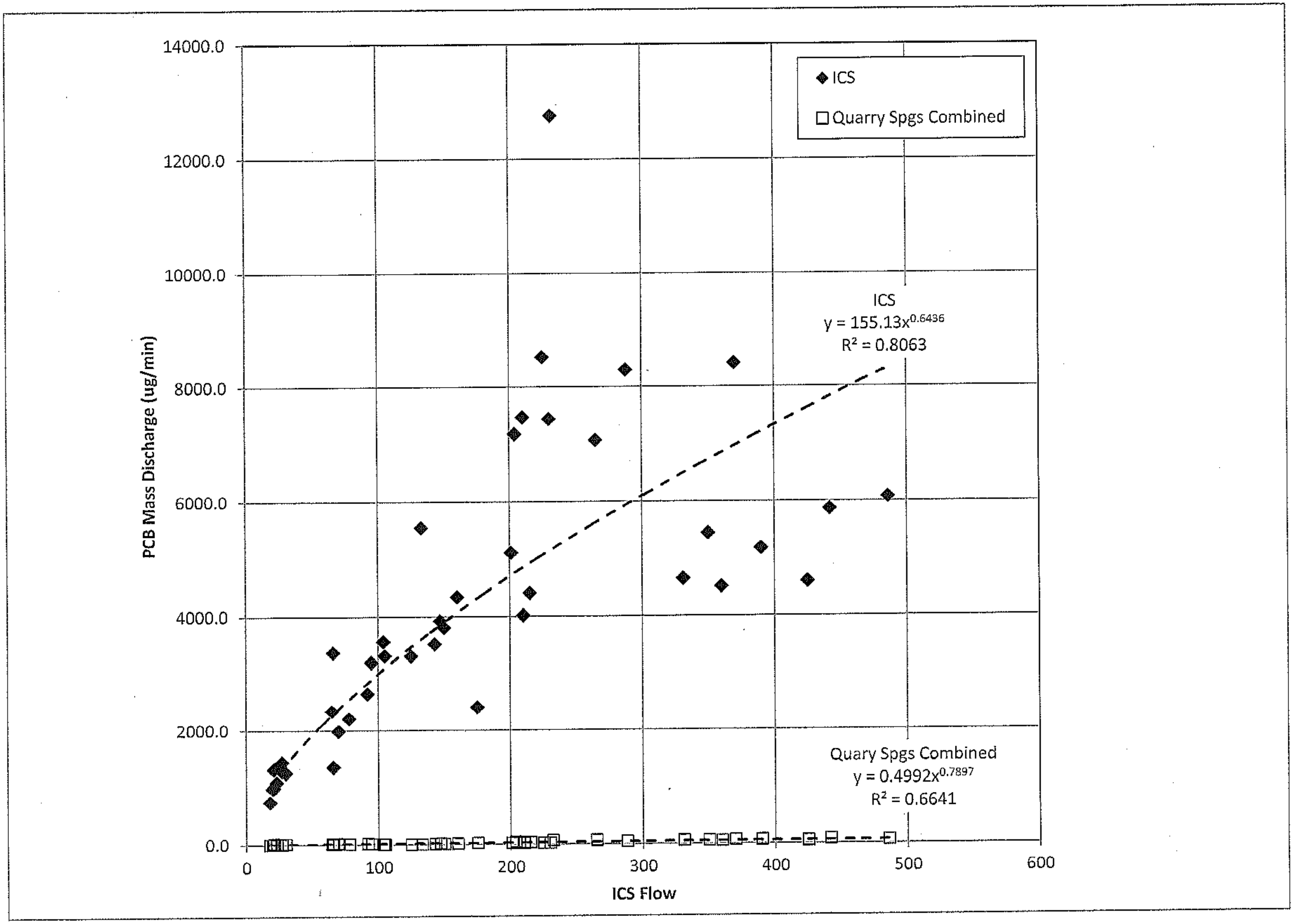


Figure 15: PCB Mass Flow Comparison, Illinois Central Spring and Quarry Combined Gage

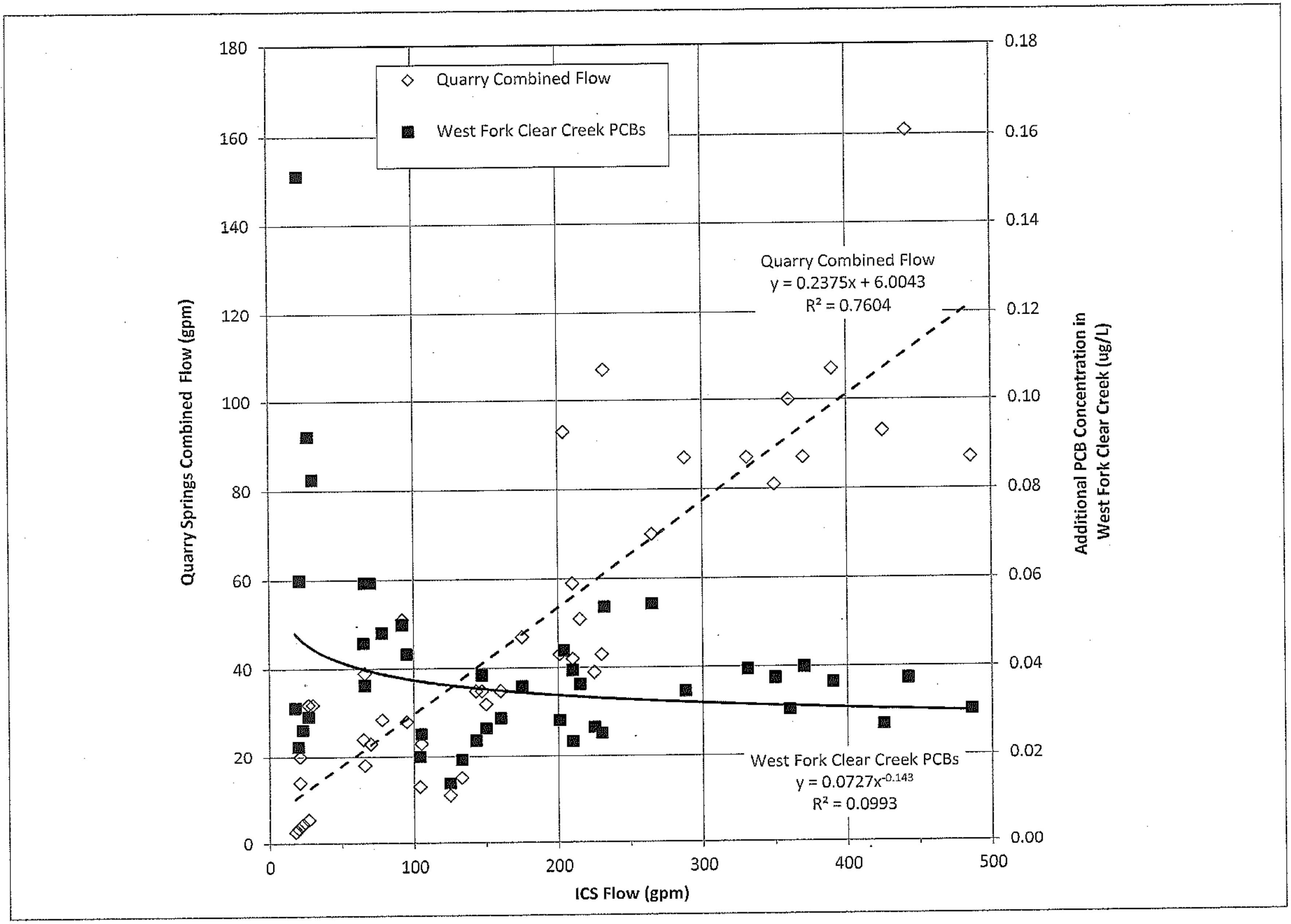
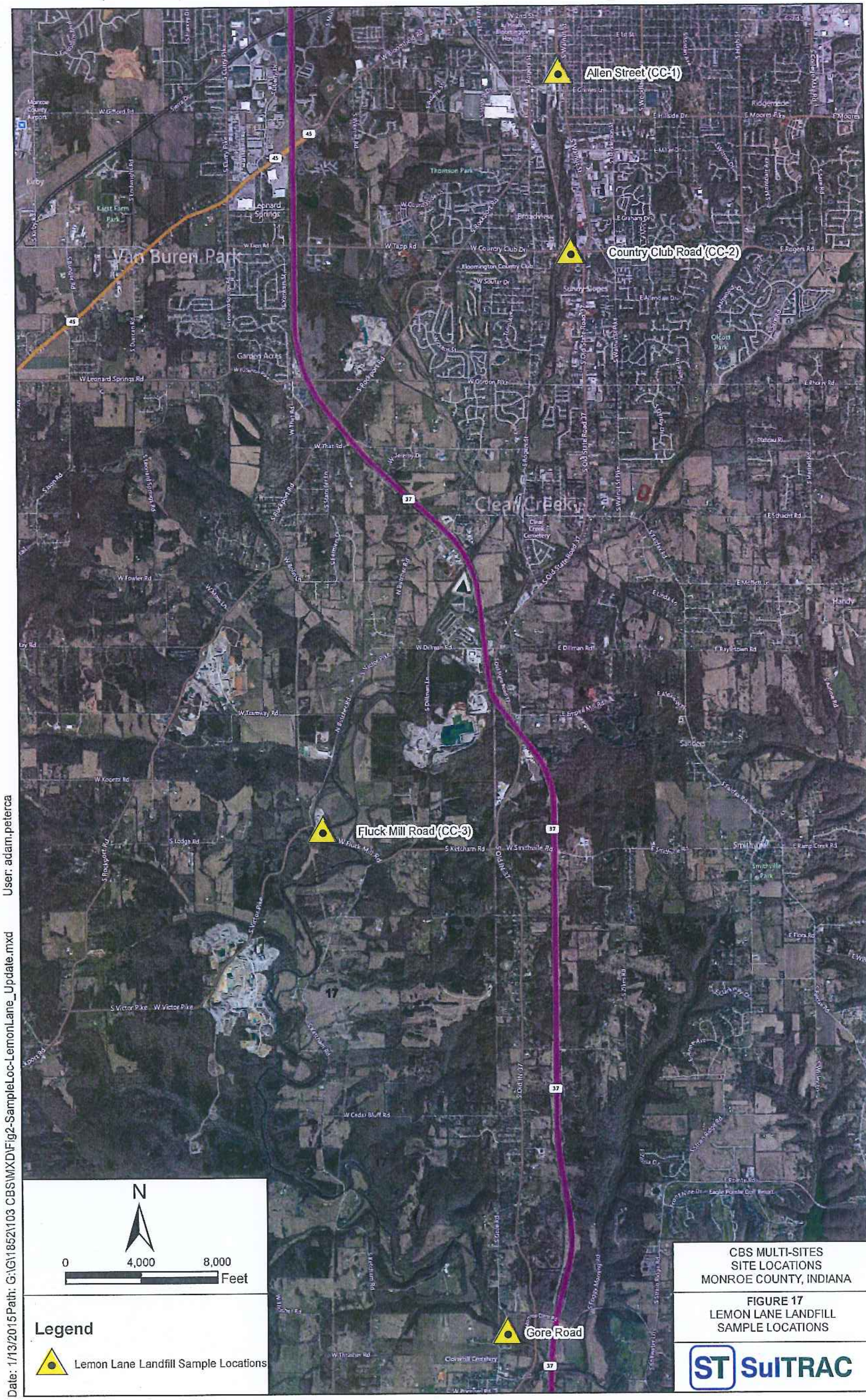


Figure 16. Quarry Combined Flow Correlation and Estimated Additional PCB Concentration in West Fork Clear Creek



CBS MULTI-SITES
SITE LOCATIONS
MONROE COUNTY, INDIANA

FIGURE 17
LEMON LANE LANDFILL
SAMPLE LOCATIONS

SulTRAC

Date: 1/13/2015 Path: G:\G\1852\103 CBS\MXD\Fig2-SampleLoc-LemonLane_Update.mxd User: adam.peterca

Table 4
Lemon Lane Landfill
Piezometer Construction Details

					1	2	3	4	5	6	7	8	9	10	11	12
Site	Station	State Plane Easting (ft)	State Plane Northing (ft)	TOC Elevation[1] (ft MSL)	Riser Top Elevation (ft MSL)	Ground Surface Elevation (ft MSL)	Screen-Riser Length (ft)	Bottom Elevation (ft MSL) (1) - (3)	Original Ground Elevation (ft MSL)	Base Waste/ Bedrock (ft)	Interface Type	Base Waste / Bedrock ELevation (GWMP) (5) - (6)	Water Level Rise Needed to Wet Interface (ft) (8) - (4)	Max Recorded Water Level Rise (ft)	Max Water Level Rise EL.	Max Date
LL	PZ-AD	3100882	1429690	868.50	868.50	865.4	46.2	822.3	861.4	31.5	Soil / Bdrk	829.9	7.6	9.42	831.7	5/14/2009
LL	PZ-AS	3100974	1429785	882.56	882.47	879.1	37.4	845.1	876.1	28	Waste / Soil	848.1	3.0	0.15	845.2	3/10/2007
LL	PZ-BD	3100992	1430207	872.42	872.50	869.8	48.6	823.9	867.0	34.5	Soil / Bdrk	832.5	8.6	6.15	830.1	5/14/2009
LL	PZ-BS	3101054	1430137	880.27	880.31	877.9	37.2	843.1	875.0	29	Waste / Soil	846.0	2.9	0.5	843.6	12/11/2008

Notes:

(1) TOC = Top of Casing/Top of Outer Casing/Top of Procover

Table 5
Lemon Lane Landfill Cap Piezometers
Apparent Crest Gage Movement

Date	Apparent Movement (ft)			
	PZ-AD	PZ-AS	PZ-BD	PZ-BS
Critical Value	7.6	3.0	8.6	2.9
12/27/2013	None	None	None	0.11
11/21/2013	None	None	None	None
10/7/2013	None	None	None	None
9/3/2013	None	None	None	None
8/2/2013	None	None	None	None
6/27/2013	None	None	None	None
5/23/2013	None	None	None	None
3/28/2013	None	None	None	None
2/17/2013	None	None	0.13	None
1/11/2013	None	None	None	None
12/05/2012	None	None	None	None
11/09/2012	None	0.14	None	0.15
10/02/2012	None	None	None	None
9/07/2012	0.6	None	0.5	None
5/02/2012	None	None	None	None
4/09/2012	None	None	None	None
1/18/2012	None	None	None	None
12/5/2011	2.29 (7)	None	None	None
11/23/2011	None	None	None	None
10/28/2011	None	None	None	None
10/15/2011	None	None	None	None
9/26/2011	None	None	None	None
9/16/2011	None	None	None	None
6/28/2011	None	None	0.17	None
4/20/2011	None	None	None	None
4/12/2011	None	None	None	None
4/5/2011	None	None	None	None
2/17/2011	None	None	None	None
12/3/2010	None	None	None	None
10/27/2010	None	None	None	None
9/28/2010	None	None	None	None
7/8/2010	N.R. (6)	None	0.18	None
2/18/2010	0.31	None	0.17	None
12/18/2009	0.31	None	0.18	None
10/22/2009	0.23	None	0.20	None
8/31/2009	0.43	None	0.17	None
7/23/2009	0.43	None	0.19	None
7/6/2009	0.41	None	0.25	None
6/24/2009	None	None	None	None
5/14/2009	9.42 (7)	None	6.15 (7)	None
5/1/2009	None	None	None	None

Table 5
Lemon Lane Landfill Cap Piezometers
Apparent Crest Gage Movement

Date	Apparent Movement (ft)			
	PZ-AD	PZ-AS	PZ-BD	PZ-BS
Critical Value	7.6	3.0	8.6	2.9
4/10/2009	0.14	None	0.17	None
4/7/2009	0.13	None	0.18	None
2/14/2009	0.27	None	0.27	None
12/11/2008	None	None	None	0.50
11/13/2008	None	None	None	None
7/18/2008	0.27	None	0.24	None
6/25/2008	New gage installed	None	New gage installed	None
6/5/2008	>= 7.67 (7)	None	>= 5.38 (7)	None
5/20/2008	> 2.8	None	0.53	None
4/30/2008	None	None	0.29	None
4/18/2008	0.22	None	0.20	None
4/8/2008	0.15	None	0.23	None
2/25/2008	0.28	0.14	0.15	0.17
10/19/2007	None	None	None	None
9/28/2007	None	None	None	None
9/12/2007	None	None	None	None
8/27/2007	None	None	None	None
8/3/2007	None	None	None	None
7/6/2007	None	None	None	None
6/26/2007	None	None	None	None
6/12/2007	None	None	None	None
5/31/2007	None	None	None	None
5/7/2007	None	None	None	None
4/24/2007	0.15	None	0.11	None
3/23/2007	N.R. (6)	None	0.16	None
3/10/2007	0.50	0.15	0.11	None
2/21/2007	0.17	None	0.14	0.23
2/9/2007	None	None	None	None
1/18/2007	< 0.55	None	< 0.73	None
1/2/2007	0.52	None	0.72	None
11/9/2006	0.30	None	None	None
9/15/2006	None	None	None	None
8/22/2006	None	None	None	None
8/3/2006	None	None	None	None
7/25/2006	None	None	None	None
7/12/2006	None	None	0.17	None
6/20/2006	0.08	None	0.14	None
6/12/2006	0.18	None	None	None
5/18/2006	0.17	None	0.15	None
5/2/2006	> 2.95	None	0.45	None
3/31/2006	0.84	None	None	None

Table 5
Lemon Lane Landfill Cap Piezometers
Apparent Crest Gage Movement

Date	Apparent Movement (ft)			
	PZ-AD	PZ-AS	PZ-BD	PZ-BS
Critical Value	7.6	3.0	8.6	2.9
3/14/2006	> 2.95	None	> 2.95	None
2/28/2006	0.23	None	0.26	None
2/20/2006	None	None	None	None
2/15/2006	0.27	None	0.25	None
2/3/2006	None	None	None	None
1/11/2006	None	None	None	None
1/5/2006	None	None	None	None
12/21/2005	None	None	None	None
11/4/2005	None	None	None	None
10/11/2005	None	None	None	None
9/20/2005	N/A [5]	None	0.21	None
8/8/2005	None	None	0.17	None
7/19/2005	None	None	0.22	None
6/21/2005	None	None	0.12	None
6/1/2005	0.43	None	None	None
5/25/2005	N.R. [4]	None	None	None
4/15/2005	None	None	None	None
3/24/2005	None	None	None	None
2/18/2005	None	None	2.53 [3]	None
2/3/2005	None	None	0.08	None
12/7/2004	0.2	None	0.24	None
10/21/2004	None	None	None	None
10/6/2004	None	None	None	None
9/9/2004	None	None	None	None
8/30/2004	None	None	None	None
8/10/2004	None	None	None	None
7/29/2004	None	None	None	None
7/12/2004	None	None	None	None
6/24/2004	None	None	None	None
6/10/2004	None	None	None	None
5/21/2004	None	None	None	None
5/10/2004	None	None	0.28	None
4/23/2004	None	None	None	None
4/9/2004	None	None	None	None
3/12/2004	None	None	None	None
3/2/2004	None	None	(2)	None
2/13/2004	None	None	(2)	None
2/4/2004	None	None	(2)	None
1/15/2004	0.46	None	(2)	None
12/31/2003	None	None	(2)	None
12/8/2003	None	None	(2)	None

Table 5
Lemon Lane Landfill Cap Piezometers
Apparent Crest Gage Movement

Date	Apparent Movement (ft)			
	PZ-AD	PZ-AS	PZ-BD	PZ-BS
Critical Value	7.6	3.0	8.6	2.9
11/26/2003	None	None	(2)	None
11/7/2003	None	None	(2)	None
10/23/2003	None	None	(2)	None
10/9/2003	None	None	(2)	None
9/29/2003	None	None	(2)	None
9/11/2003	None	None	(2)	None
9/3/2003	None	None	(2)	None
8/14/2003	None	None	(2)	None
7/31/2003	None	None	(2)	None
7/16/2003	1.35	None	(2)	None
7/2/2003	None	None	(2)	None
6/20/2003	0.35	None	(2)	None
6/5/2003	None	None	(2)	None
5/19/2003	0.45	None	(2)	None
5/8/2003	None	None	(2)	None
4/23/2003	None	None	(2)	None
4/7/2003	None	None	(2)	None
3/21/2003	None	None	(2)	None
3/5/2003	None	None	(2)	None
2/20/2003	None	None	(2)	None
2/11/2003	None	(1)	(2)	None
1/28/2003	None	(1)	(2)	None
1/13/2003	None	None	(2)	None
12/30/2002	None	None	(2)	None
12/13/2002	None	None	(2)	None
12/2/2002	None	None	(2)	None
11/14/2002	None	None	(2)	None

Notes:

(1) Crest gauge could not be removed from Piezometer AS on this date, ice-bound.

(2) Datalogger was installed Nov. 2001 to Mar. 2003; Crest gauge was installed in PZ-BD on 3/8/2004.

(3) This reading appears unreasonably high for a period of relatively normal precipitation.

(4) No record of a visit to this station on this date was found at the time this report was written.

(5) Crest gage became untied and fell to bottom of PZ-AD this day. No reading available.

(6) Crest gage unreadable

(7) Hand measured water level using a water level probe.

Table 6A
Lemon Land Landfill
Post-Remediation Quarry Springs Area
Monitoring Data

Station	Sample ID	Sample Date	PCB (ppb)	Qual	TSS mg/L	Conductivity (uS/cm)	Temperature (°C)	Flow (gal/min)	Flow Method
Quarry A Sp	LL13836	4/4/14	0.10	U	1	451	10.6	8	Visual
Quarry A Sp	LL13818	2/21/14	0.10	U	8	443	10.2	1	Visual
Quarry A Sp	LL13768	7/24/13	0.13		2	489	16.2	3	Visual
Quarry A Sp	LL13757	6/27/13	0.14		2	464	15.6	5	Visual
Quarry A Sp	LL13736	5/6/13	0.10	U	8	515	12.9	2	Visual
Quarry A Sp	LL13720	2/27/13	0.10	U	3	491	10.7	4	Visual
Quarry A Sp	LL13617	1/31/12	0.10	U	12	619	12.1	2	Visual
Quarry A Sp	LL13557	5/12/11	0.13		21	519	17.9	10	Visual
Quarry A Sp	LL13551	5/3/11	0.10	U	1	539	12.7	4	Visual
Quarry A Sp	LL13451	2/18/11	0.10	U	22	549	12.4	2.5	Bucket
Cattail Seep	LL13845	4/23/14	0.23		24	635	14.9	2.0	Visual
Cattail Seep	LL13832	3/21/14	0.24	J	14	664	10.8	1.0	Visual
Cattail Seep	LL13824	2/24/14	0.16		15	637	10.5	5.0	Visual
Cattail Seep	LL13814	1/20/14	0.17		27	656	10.9	2	Visual
Cattail Seep	LL13805	12/17/13	0.20		34	754	10.2	1	Visual
Cattail Seep	LL13797	11/14/13	0.18		48	648	9.2	1	Visual
Cattail Seep	LL13789	10/14/13	0.28		46	661	13.2	1	Visual
Cattail Seep	LL13765	7/16/13	0.32		82	699	16.3	1	Visual
Cattail Seep	LL13753	6/12/13	0.23		60	673	21.4	1	Visual
Cattail Seep	LL13745	5/14/13	0.16		12	645	14.2	3	Visual
Cattail Seep	LL13733	4/23/13	0.12		8	595	13.5	1	Visual
Cattail Seep	LL13725	3/22/13	0.17		13	606	10.3	1	Visual
Cattail Seep	LL13716	2/25/13	0.17		22	790	12.1	4	Visual
Cattail Seep	LL13708	1/18/13	0.18		23	604	10.8	8	Visual
Cattail Seep	LL13701	12/13/12	0.16		31	697	8	0.5	Visual
Cattail Seep	LL13692	11/15/12	0.15		35	688	11.5	1	Visual
Cattail Seep	LL13684	10/9/12	0.18	J	23	664	14.6	0.5	Visual
Cattail Seep	LL13649	5/16/12	0.17	J	19	655	14.8	2	Visual
Cattail Seep	LL13641	4/18/12	0.14	J	6	635	13.8	5	Visual
Cattail Seep	LL13633	3/15/12	0.20		37	670	13.9	5	Visual
Cattail Seep	LL13625	2/15/12	0.25		54	663	9.9	2	Visual
Cattail Seep	LL13616	1/31/12	0.14	J	25	615	11.8	5	Visual
Cattail Seep	LL13440	1/25/11	0.17	J	6	782	10.8	3	Visual
Rinker Sp	LL13844	4/23/14	0.19		1	728	11.9	15	Bucket
Rinker Sp	LL13831	3/21/14	0.20	J	1	767	11.3	15	Bucket
Rinker Sp	LL13823	2/24/14	0.17		1	776	10.3	24	Bucket
Rinker Sp	LL13813	1/20/14	0.19		1	744	12.8	24	Bucket
Rinker Sp	LL13804	12/17/13	0.22		1	843	14	15	Bucket
Rinker Sp	LL13796	11/14/13	0.32		1	742	15.6	13	Bucket
Rinker Sp	LL13788	10/14/13	0.31		2	735	16.5	13	Bucket
Rinker Sp	LL13781	9/17/13	0.47		<1	858	16.5	5	Bucket
Rinker Sp	LL13774	8/13/14	0.35		1	762	17.2	10	Bucket
Rinker Sp	LL13763	7/16/13	0.23		<1	761	17.1	12	Bucket
Rinker Sp	LL13751	6/12/13	0.24		2	768	14.2	13	Bucket
Rinker Sp	LL13743	5/14/13	0.16		<1	732	12.7	22	Bucket
Rinker Sp	LL13731	4/23/13	0.16		<1	700	12.2	21	Bucket

Table 6A
Lemon Land Landfill
Post-Remediation Quarry Springs Area
Monitoring Data

Station	Sample ID	Sample Date	PCB (ppb)	Qual	TSS mg/L	Conductivity (uS/cm)	Temperature (°C)	Flow (gal/min)	Flow Method
Rinker Sp	LL13723	3/22/13	0.22		<1	736	11.5	25	Bucket
Rinker Sp	LL13715	2/25/13	0.18		<1	877	12.6	20	Bucket
Rinker Sp	LL13707	1/18/13	0.18		<1	699	13.9	27	Bucket
Rinker Sp	LL13699	12/13/12	0.23		<1	768	14.6	14	Bucket
Rinker Sp	LL13691	11/15/12	0.20		<1	767	15.8	14	Bucket
Rinker Sp	LL13682	10/9/12	0.25		<1	757	16.9	15.4	Bucket
Rinker Sp	LL13676	9/12/12	0.29		1	795	18	11.7	Bucket
Rinker Sp	LL13669	8/16/12	0.44		<1	912	17.3	2.7	Bucket
Rinker Sp	LL13664	7/17/12	0.29		<1	859	16.8	4.4	Bucket
Rinker Sp	LL13657	6/21/12	0.26		1	776	16.4	7.3	Bucket
Rinker Sp	LL13648	5/16/12	0.15	J	<1	709	14	20	Bucket
Rinker Sp	LL13640	4/18/12	0.13	J	1	682	12.7	24	Bucket
Rinker Sp	LL13632	3/15/12	0.17	J	1	755	12.4	15	Bucket
Rinker Sp	LL13624	2/15/12	0.15	J	<1	691	12.1	17	Bucket
Rinker Sp	LL13615	1/31/12	0.12	J	<1	699	12.8	24	Bucket
Rinker Sp	LL13608	12/9/11	0.16	J	3	695	14.3	35	Visual
Rinker Sp	LL13601	11/17/11	0.20	J	2	728	15.5	17	Bucket
Rinker Sp	LL13594	10/17/11	0.35		1	805	17.3	8.4	Bucket
Rinker Sp	LL13587	9/22/11	0.36		<1	803	17.5	9.1	Bucket
Rinker Sp	LL13580	8/23/11	0.49		1	804	18.4	6.1	Bucket
Rinker Sp	LL13573	7/20/11	0.13	J	<1	757	17.6	6	Bucket
Rinker Sp	LL13566	6/23/11	0.19	J	<1	631	17.1	16	Bucket
Rinker Sp	LL13556	5/12/11	0.23		1	661	13.1	10	Bucket
Rinker Sp	LL13470	4/15/11	0.16	J	<1	670	11.9	27	Bucket
Rinker Sp	LL13458	3/23/11	0.27		1	747	12.1	17	Bucket
Rinker Sp	LL13450	2/18/11	0.29		<1	862	12.7	17	Bucket
Rinker Sp	LL13441	1/25/11	0.21		1	896	12.8	11	Bucket
Rinker Sp	LL13433	12/17/10	0.23		1	795	12.3	13	Bucket
Rinker Sp	LL13428	11/29/10	0.27		<1	712	15.3	15	Bucket
Rinker Sp	LL13422	11/19/10	0.52		<1	805	15.9	8.9	Bucket
Rinker Sp	LL13415	10/19/10	0.57		<1	886	16.9	3	Bucket
Rinker Sp	LL13407	9/30/10	0.55		<1	977	17.1	3.5	Bucket
Rinker Sp	LL13400	8/19/10	1.4		2	994	18.1	7	Visual
Quarry D Sp	LL13843	4/23/14	0.18		<1	620	15.0	1	Bucket
Quarry D Sp	LL13830	3/21/14	0.16	J	<1	655	10.1	1	Bucket
Quarry D Sp	LL13822	2/24/14	0.21		<1	682	11.1	1	Bucket
Quarry D Sp	LL13812	1/20/14	0.18		<1	640	13.4	1	Bucket
Quarry D Sp	LL13803	12/17/13	0.20		<1	721	9.9	1.5	Bucket
Quarry D Sp	LL13795	11/14/13	0.29		<1	724	12.2	1	Bucket
Quarry D Sp	LL13787	10/14/13	0.35		<1	818	14.4	0.5	Bucket
Quarry D Sp	LL13780	9/17/13	0.30		<1	862	15.7	0.25	Bucket
Quarry D Sp	LL13773	8/13/14	0.20		<1	880	18.9	1	Bucket
Quarry D Sp	LL13762	7/16/13	0.26		<1	741	17.3	1	Bucket
Quarry D Sp	LL13750	6/12/13	0.20		<1	739	17.7	1	Bucket
Quarry D Sp	LL13742	5/14/13	0.18		<1	680	14.9	1.5	Bucket
Quarry D Sp	LL13730	4/23/13	0.17		<1	663	13.3	1	Bucket

Table 6A
Lemon Land Landfill
Post-Remediation Quarry Springs Area
Monitoring Data

Station	Sample ID	Sample Date	PCB (ppb)	Qual	TSS mg/L	Conductivity (uS/cm)	Temperature (°C)	Flow (gal/min)	Flow Method
Quarry D Sp	LL13722	3/22/13	0.20		<1	688	10.3	1	Bucket
Quarry D Sp	LL13714	2/25/13	0.19		<1	740	11.3	1	Bucket
Quarry D Sp	LL13706	1/18/13	0.21		<1	721	10	1	Bucket
Quarry D Sp	LL13698	12/13/12	0.29		<1	792	11.2	1.4	Bucket
Quarry D Sp	LL13690	11/15/12	0.25		<1	783	13.3	1	Bucket
Quarry D Sp	LL13683	10/9/12	0.23		<1	787	16.9	1.1	Bucket
Quarry D Sp	LL13675	9/12/12	0.27		<1	921	23	1	Bucket
Quarry D Sp	LL13663	7/17/12	0.21		<1	1047	31.3	0.3	Bucket
Quarry D Sp	LL13656	6/21/12	0.31		<1	894	27.2	0.4	Bucket
Quarry D Sp	LL13647	5/16/12	0.13	J	<1	727	16.7	2	Bucket
Quarry D Sp	LL13639	4/18/12	0.13	J	<1	669	15.1	2.4	Bucket
Quarry D Sp	LL13631	3/15/12	0.10	U	<1	702	13.6	2.2	Bucket
Quarry D Sp	LL13623	2/15/12	0.15	J	<1	696	10.4	2	Bucket
Quarry D Sp	LL13614	1/31/12	0.12	J	<1	643	11.3	2.5	Bucket
Quarry D Sp	LL13607	12/9/11	0.18	J	1	702	11.6	2.1	Bucket
Quarry D Sp	LL13600	11/17/11	0.14	J	1	694	13.3	2.3	Bucket
Quarry D Sp	LL13593	10/17/11	0.25		<1	890	20.4	0.7	Bucket
Quarry D Sp	LL13586	9/22/11	0.37		<1	921	19.4	1.5	Bucket
Quarry D Sp	LL13579	8/23/11	0.19	J	1	900	32.4	0.3	Bucket
Quarry D Sp	LL13572	7/20/11	0.27		<1	808	22.3	0.6	Bucket
Quarry D Sp	LL13564	6/23/11	0.18	J	<1	634	19.7	2	Bucket
Quarry D Sp	LL13555	5/12/11	0.20		<1	638	16.9	2.3	Bucket
Quarry D Sp	LL13469	4/15/11	0.15	J	<1	641	12.1	2.4	Bucket
Quarry D Sp	LL13457	3/23/11	0.16	J	1	665	15.2	2	Bucket
Quarry D Sp	LL13448	2/18/11	0.23		<1	742	13.2	2.2	Bucket
Quarry D Sp	LL13439	1/25/11	0.21		1	740	10.8	2	Bucket
Quarry D Sp	LL13432	12/17/10	0.29		2	763	9.2	1.4	Bucket
Quarry D Sp	LL13427	11/29/10	0.28		4	729	14.3	1.5	Bucket
Quarry D Sp	LL13421	11/19/10	0.49		3	865	11.4	1.3	Bucket
Quarry D Sp	LL13414	10/19/10	0.52		17	866	16.8	0.5	Visual
Quarry D Sp	LL13406	9/30/10	0.56		5	899	18.8	0.15	Visual
Quarry D Sp	LL13404	9/20/10	0.52		17	943	20.9	3	Visual
Quarry Spgs "A+C"	LL13565	6/23/11	0.11	J	5	604	19.7	15	Visual
Quarry Spgs "A+C"	LL13554	5/12/11	0.14		18	611	18.1	45	Visual
Quarry Spgs "A+C"	LL13468	4/15/11	0.10	U	10	572	12	25	Visual
Quarry Spgs "A+C"	LL13456	3/23/11	0.15	J	13	645	16.5	40	Visual
Quarry Spgs "A+C"	LL13447	2/18/11	0.10	U	2	774	13.9	100	Visual
Quarry Spgs "A+C"	LL13431	12/17/10	0.11	J	1	764	8.9	7	Visual
Quarry Spgs "A+C"	LL13413	10/19/10	0.10	U	1	872	13.7	0.5	Visual
Quarry Spgs "A+C"	LL13399	8/19/10	0.70		330	1024	21.4	1	Visual
Quarry B Sp	LL13841	4/23/14	0.23		1	626	12.6	14	Weir
Quarry B Sp	LL13828	3/21/14	0.21	J	3	663	11.5	12	Weir
Quarry B Sp	LL13820	2/24/14	0.26		1	695	11.3	39	Weir
Quarry B Sp	LL13811	1/20/14	0.21		1	671	12.3	14	Weir
Quarry B Sp	LL13802	12/17/13	0.25		1	756	12.7	14	Weir
Quarry B Sp	LL13794	11/14/13	0.25		5	730	12.2	1	Weir

Table 6A
Lemon Land Landfill
Post-Remediation Quarry Springs Area
Monitoring Data

Station	Sample ID	Sample Date	PCB (ppb)	Qual	TSS mg/L	Conductivity (uS/cm)	Temperature (°C)	Flow (gal/min)	Flow Method
Quarry B Sp	LL13786	10/14/13	0.26		6	802	13.9	1	Weir
Quarry B Sp	LL13779	9/17/13	0.32		6	923	14.4	1.5	Weir
Quarry B Sp	LL13772	8/13/14	0.25		3	879	15.1	1.5	Weir
Quarry B Sp	LL13761	7/16/13	0.28		5	740	15.4	2.7	Weir
Quarry B Sp	LL13749	6/12/13	0.22		<1	714	14.7	2.7	Weir
Quarry B Sp	LL13741	5/14/13	0.23		<1	670	13.1	28	Weir
Quarry B Sp	LL13729	4/23/13	0.23		<1	653	12.8	35	Weir
Quarry B Sp	LL13721	3/22/13	0.25		<1	676	11.4	32	Weir
Quarry B Sp	LL13713	2/25/13	0.27		<1	767	12.1	15	Weir
Quarry B Sp	LL13705	1/18/13	0.30		<1	732	12.6	32	Weir
Quarry B Sp	LL13697	12/13/12	0.30		<1	817	12.9	4.5	Weir
Quarry B Sp	LL13689	11/15/12	0.30		1	825	14.5	8	Weir
Quarry B Sp	LL13681	10/9/12	0.29		<1	799	16.1	1.2	Weir
Quarry B Sp	LL13674	9/12/12	0.34		1	981	17.9	1.7	Weir
Quarry B Sp	LL13668	8/16/12	0.34		5	987	18.7	0.6	Weir
Quarry B Sp	LL13655	6/21/12	0.30		10	866	18.0	1.5	Weir
Quarry B Sp	LL13646	5/16/12	0.19		3	731	14.3	18	Weir
Quarry B Sp	LL13637	4/18/12	0.19		1	681	13.1	23	Weir
Quarry B Sp	LL13630	3/15/12	0.24		<1	722	12.7	5.6	Weir
Quarry B Sp	LL13622	2/15/12	0.20	J	<1	769	12	12	Weir
Quarry B Sp	LL13613	1/31/12	0.15	J	<1	652	12.3	32	Weir
Quarry B Sp	LL13606	12/9/11	0.20		1	736	13.6	25	Weir
Quarry B Sp	LL13599	11/17/11	0.30		1	786	14.4	6.8	Weir
Quarry B Sp	LL13592	10/17/11	0.34		3	906	15.7	1	Weir
Quarry B Sp	LL13585	9/22/11	0.44		2	937	16.6	1	Weir
Quarry B Sp	LL13578	8/23/11	0.28		6	893	18.9	1	Weir
Quarry B Sp	LL13571	7/20/11	0.33		2	789	17.9	1.5	Weir
Quarry 8 Sp	LL13563	6/23/11	0.22		<1	685	15.0	39	Weir
Quarry B Sp	LL13553	5/12/11	0.22		2	653	13.4	20	Weir
Quarry B Sp	LL13467	4/15/11	0.22		1	636	12.2	26	Weir
Quarry B Sp	LL13455	3/23/11	0.24		10	693	12.6	20	Weir
Quarry B Sp	LL13446	2/18/11	0.28		1	838	12.8	12	Weir
Quarry B Sp	LL13438	1/25/11	0.28		1	860	13.0	0.6	Weir
Quarry B Sp	LL13430	12/17/10	0.36		5	844	12.5	5.6	Weir
Quarry B Sp	LL13426	11/29/10	0.39		11	835	15.0	4	Weir
Quarry B Sp	LL13420	11/19/10	0.57		8	877	12.0	1.5	Weir
Quarry B Sp	LL13412	10/19/10	0.72		50	833	13.1	0.2	Visual
Quarry B Sp	LL13398	8/19/10	0.85		170	837	16.9	0.5	Visual
Quarry Spgs Combined	LL13841	4/23/14	0.18		9	650	14.8	39	Weir
Quarry Spgs Combined	LL13828	3/21/14	0.16	J	1	685	10.6	35	Weir
Quarry Spgs Combined	LL13820	2/24/14	0.20		2	686	11.6	87	Weir
Quarry Spgs Combined	LL13810	1/20/14	0.16		7	682	11.1	43	Weir
Quarry Spgs Combined	LL13801	12/17/13	0.18		6	774	11.1	59	Weir
Quarry Spgs Combined	LL13793	11/14/13	0.17		3	722	10.8	18	Weir
Quarry Spgs Combined	LL13785	10/14/13	0.24		15	723	13.9	23	Weir
Quarry Spgs Combined	LL13778	9/17/13	0.16		6	868	14.5	4.5	Weir

Table 6A
Lemon Land Landfill
Post-Remediation Quarry Springs Area
Monitoring Data

Station	Sample ID	Sample Date	PCB (ppb)	Qual	TSS mg/L	Conductivity (uS/cm)	Temperature (°C)	Flow (gal/min)	Flow Method
Quarry Spgs Combined	LL13771	8/13/14	0.19		11	790	16.9	15	Weir
Quarry Spgs Combined	LL13760	7/16/13	0.17		<1	733	16.8	11	Weir
Quarry Spgs Combined	LL13748	6/12/13	0.14		1	740	16.8	23	Weir
Quarry Spgs Combined	LL13740	5/14/13	0.19		<1	677	14.2	87	Weir
Quarry Spgs Combined	LL13728A	4/23/13	0.15		<1	649	13	93	Weir
Quarry Spgs Combined	LL13728	3/22/13	0.20		5	661	10.3	81	Weir
Quarry Spgs Combined	LL13712	2/25/13	0.19		2	787	13.2	51	Weir
Quarry Spgs Combined	LL13704	1/18/13	0.21		3	699	11.8	87	Weir
Quarry Spgs Combined	LL13696	12/13/12	0.19		4	784	10.3	28	Weir
Quarry Spgs Combined	LL13688	11/15/12	0.14		<1	767	12.3	51	Weir
Quarry Spgs Combined	LL13680	10/9/12	0.20		2	763	16.1	35	Weir
Quarry Spgs Combined	LL13673	9/12/12	0.18		1	840	23.9	13	Weir
Quarry Spgs Combined	LL13667	8/16/12	0.24		4	828	23.7	2.7	Weir
Quarry Spgs Combined	LL13661	7/17/12	0.15	J	4	811	34.1	3.5	Weir
Quarry Spgs Combined	LL13654	6/21/12	0.17	J	1	803	26.4	5.6	Weir
Quarry Spgs Combined	LL13645	5/16/12	0.14	J	4	719	14.4	42	Weir
Quarry Spgs Combined	LL13638	4/18/12	0.15	J	<1	684	13.4	87	Weir
Quarry Spgs Combined	LL13629	3/15/12	0.17	J	3	714	13.7	47	Weir
Quarry Spgs Combined	LL13621	2/15/12	0.16	J	1	806	10.7	43	Weir
Quarry Spgs Combined	LL13612	1/31/12	0.14	J	3	663	12.1	100	Weir
Quarry Spgs Combined	LL13605	12/9/11	0.17	J	5	690	12.2	107	Weir
Quarry Spgs Combined	LL13598	11/17/11	0.15	J	2	739	13.2	32	Weir
Quarry Spgs Combined	LL13591	10/17/11	0.16	J	4	826	19.8	32	Weir
Quarry Spgs Combined	LL13584	9/22/11	0.17	J	11	845	17.1	32	Weir
Quarry Spgs Combined	LL13577	8/23/11	0.31		28	777	30.0	20	Weir
Quarry Spgs Combined	LL13570	7/20/11	0.16	J	<1	775	21.1	39	Weir
Quarry Spgs Combined	LL13562	6/23/11	0.14	J	8	641	17.8	93	Weir
Quarry Spgs Combined	LL13552	5/12/11	0.17		8	636	16.9	107	Weir
Quarry Spgs Combined	LL13466	4/15/11	0.14	J	4	590	12.1	161	Weir
Quarry Spgs Combined	LL13454	3/23/11	0.26		6	674	15.9	70	Weir
Quarry Spgs Combined	LL13445	2/18/11	0.12	J	2	789	14.8	35	Weir
Quarry Spgs Combined	LL13437	1/25/11	0.18	J	5	845	12.9	29	Weir
Quarry Spgs Combined	LL13429	12/17/10	0.17	J	1	822	8.6	24	Weir
Quarry Spgs Combined	LL13419	11/19/10	0.15	J	8	834	7.6	14	Weir
Quarry Spgs Combined	LL13411	10/19/10	0.10	U	<1	861	12.9	2.5	Visual
Quarry Spgs Combined	LL13405	9/30/10	0.10	U	8	983	15.0	1	Visual
Quarry Spgs Combined	LL13397	8/19/10	0.14	J	22	892	22.4	5	Visual
Quarry A Culvert	LL13837	4/4/14	0.10	U	6	423	11.6	240	Visual
Quarry A Culvert	LL13819	2/21/14	0.10	U	1	423	11.6	60	Visual
Quarry A Culvert	LL13737	5/6/13	0.10	U	1	475	14.6	3	Bucket
Quarry A Culvert	LL13550	4/21/11	0.10	U	2	441	11.6	632	Bucket
Quarry A Culvert	LL13521	4/20/11	0.10	U	83	305	12.9	1500+	Visual
Quarry A Culvert	LL13501	4/19/11	0.10	U	3	385	12.3	412	Bucket
Quarry A Culvert	LL13460	3/23/11	0.10	U	1	503	18	20	Bucket
Swallowhole Sp A	LL13838	4/4/14	0.10	U	14	427	12	30	Visual
Swallowhole Sp A	LL13769	7/24/13	0.10	U	7	461	13.2	1	Visual

Table 6A
Lemon Land Landfill
Post-Remediation Quarry Springs Area
Monitoring Data

Station	Sample ID	Sample Date	PCB (ppb)	Qual	TSS mg/L	Conductivity (uS/cm)	Temperature (°C)	Flow (gal/min)	Flow Method
Swallowhole Sp A	LL13759	6/27/13	0.10	U	35	439	13.4	1	Visual
Swallowhole Sp A	LL13738	5/6/13	0.10	U	6	471	12.7	1	Visual
Swallowhole Sp A	LL13461	3/23/11	0.10	U	9	495	13.6	0.5	Visual
Swallowhole Sp B1	LL13839	4/4/14	0.10	U	8	422	12.1	120.0	Visual
Swallowhole Sp B1	LL13809	12/17/13	0.10	U	47	543	12.5	5	Visual
Swallowhole Sp B1	LL13770	7/24/13	0.10	U	2	461	13.3	15	Visual
Swallowhole Sp B1	LL13758	6/27/13	0.10	U	<1	444	13.1	20	Visual
Swallowhole Sp B1	LL13739	5/6/13	0.10	U	2	463	12.8	10	Visual
Swallowhole Sp B1	LL13462	3/23/11	0.10	U	4	500	13.1	3	Visual
Swallowhole Sp B2	LL13840	4/4/14	0.10	U	10	426	11.9	3	Visual
Swallowhole Sp B2	LL13463	3/23/11	0.10	U	11	499	13.2	0.5	Visual

Notes:

Samples were analyzed to a detection limit of 0.1 parts per billion (ppb) for all PCB parameters except Aroclor 1221 (0.2 ppb) limit 0.2 ppb).

Bucket = Flow calculated by measuring the time required to fill a container of known volume .

Visual = Visual flow estimate

J -Estimated value, below calibration range.

Table 6B
Lemon Lane Landfill
Post-Remediation PCB Mass Computations

	Quarry Spgs Combined							Rinker Sp							Quarry B Sp						
Date	Sample ID	PCB[a], ppb	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)	Sample ID	PCB[a], ppb	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)	Sample ID	PCB[a], ppb	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)
4/23/14	LL13841	0.18		9	39	Weir	26.6058	LL13844	0.19		1	15	Bucket	10.8015	LL13841	0.23		1	14	Weir	12.2038
3/21/14	LL13828	0.16	J	1	35	Weir	21.224	LL13831	0.20	J	1	15	Bucket	11.37	LL13828	0.21	J	3	11.5	Weir	9.15285
2/24/14	LL13820	0.20		2	87	Weir	65.946	LL13823	0.17		1	24	Bucket	15.4632	LL13820	0.26		1	39	Weir	38.4306
1/20/14	LL13810	0.16		7	43	Weir	26.0752	LL13813	0.19		1	24	Bucket	17.2824	LL13811	0.21		1	14	Weir	11.1426
12/17/13	LL13801	0.18		6	59	Weir	40.2498	LL13804	0.22		1	15	Bucket	12.507	LL13802	0.25		1	14	Weir	13.265
11/14/13	LL13793	0.17		3	18	Weir	11.5974	LL13796	0.32		1	13	Bucket	15.7664	LL13794	0.25		5	1	Weir	0.9475
10/14/13	LL13785	0.24		15	23	Weir	20.9208	LL13788	0.31		2	13	Bucket	15.2737	LL13786	0.26		6	1	Weir	0.9854
9/17/13	LL13778	0.16		6	4.5	Weir	2.7288	LL13781	0.47		<1	5	Bucket	8.9065	LL13779	0.32		6	1.5	Weir	1.8192
8/14/13	LL13771	0.19		11	15	Weir	10.8015	LL13774	0.35		1	10	Bucket	13.265	LL13772	0.25		3	1.5	Weir	1.42125
7/16/13	LL13760	0.17		<1	11	Weir	7.0873	LL13763	0.23		<1	12	Bucket	10.4604	LL13761	0.28		5	2.7	Weir	2.86524
6/12/13	LL13748	0.14		1	23	Weir	12.2038	LL13751	0.24		2	13	Bucket	11.8248	LL13749	0.22		<1	2.7	Weir	2.25126
5/14/13	LL13740	0.19		<1	87	Weir	62.6487	LL13743	0.16		<1	22	Bucket	13.3408	LL13741	0.23		<1	28	Weir	24.4076
4/23/13	LL13728A	0.15		<1	93	Weir	52.8705	LL13731	0.16		<1	21	Bucket	12.7344	LL13729	0.23		<1	35	Weir	30.5095
3/22/13	LL13728	0.20		5	81	Weir	61.398	LL13723	0.22		<1	25	Bucket	20.845	LL13721	0.25		<1	32	Weir	30.32
2/25/13	LL13712	0.19		2	51	Weir	36.7251	LL13715	0.18		<1	20	Bucket	13.644	LL13713	0.27		<1	15	Weir	15.3495
1/18/13	LL13704	0.21		3	87	Weir	69.2433	LL13707	0.18		<1	27	Bucket	18.4194	LL13705	0.30		<1	32	Weir	36.384
12/13/12	LL13696	0.19		4	28	Weir	20.1628	LL13699	0.23		<1	14	Bucket	12.2038	LL13697	0.30		<1	4.5	Weir	5.1165
11/15/12	LL13688	0.14		<1	51	Weir	27.0606	LL13691	0.20		<1	14	Bucket	10.612	LL13689	0.30		1	8	Weir	9.096
10/9/12	LL13680	0.20		2	35	Weir	26.53	LL13682	0.25		<1	15.4	Bucket	14.5915	LL13681	0.29		<1	1.2	Weir	1.31892
9/12/12	LL13673	0.18		1	13	Weir	8.8686	LL13676	0.29		1	11.7	Bucket	12.85947	LL13674	0.34		1	1.7	Weir	2.19062
8/16/12	LL13667	0.24		4	2.7	Weir	2.45592	LL13669	0.44		<1	2.7	Bucket	4.50252	LL13668	0.34		5	0.6	Weir	0.77316
7/17/12	LL13661	0.15	J	4	3.5	Weir	1.98975	LL13664	0.29		<1	4.4	Bucket	4.83604	Trickle				0	Weir	0
6/21/12	LL13654	0.17	J	1	5.6	Weir	3.60808	LL13657	0.26		1	7.3	Bucket	7.19342	LL13655	0.30		10	1.5	Weir	1.7055
5/16/12	LL13645	0.14	J	4	42	Weir	22.2852	LL13648	0.15	J	<1	20	Bucket	11.37	LL13646	0.19		3	18	Weir	12.9618
4/18/12	LL13638	0.15	J	<1	87	Weir	49.4595	LL13640	0.13	J	1	24	Bucket	11.8248	LL13637	0.19		1	23	Weir	16.5623
3/15/12	LL13629	0.17	J	3	47	Weir	30.2821	LL13632	0.17	J	1	15	Bucket	9.6645	LL13630	0.24		<1	5.6	Weir	5.09376
2/15/12	LL13621	0.16	J	1	43	Weir	26.0752	LL13624	0.15	J	<1	17	Bucket	9.6645	LL13622	0.2	J	<1	12	Weir	9.096
1/31/12	LL13612	0.14	J	3	100	Weir	53.06	LL13615	0.12	J	<1	24	Bucket	10.9152	LL13613	0.15	J	<1	32	Weir	18.192
12/9/11	LL13605	0.17	J	5	107	Weir	68.9401	LL13608	0.16	J	3	17	Bucket	10.3088	LL13606	0.2		1	25	Weir	18.95
11/17/11	LL13528	0.15	J	2	32	Weir	18.192	LL13601	0.2	J	2	17	Bucket	12.886	LL13599	0.3		1	6.8	Weir	7.7316
10/17/11	LL13591	0.16	J	4	32	Weir	19.4048	LL13594	0.35		1	6.4	Bucket	11.1426	LL13592	0.34		3	1	Weir	1.2886
9/22/11	LL13584	0.17	J	11	32	Weir	20.62	LL13587	0.36		< 1	9.1	Bucket	12.42	LL13585	0.44		2	1	Weir	1.67
8/23/11	LL13577	0.31		28	20	Weir	23.50	LL13580	0.49		1	6.1	Bucket	11.33	LL13578	0.28		6	1	Weir	1.06
7/20/11	LL13570	0.16	J	< 1	39	Weir	23.65	LL13573	0.13	J	< 1	6	Bucket	2.96	LL13571	0.33		2	1.5	Weir	1.88
6/23/11	LL13562	0.14	J	8	93	Weir	49.35	LL13566	0.19	J	< 1	16	Bucket	11.52	LL13563	0.22		< 1	39	Weir	32.52
5/12/11	LL13552	0.17		8	107	Weir	68.94	LL13556	0.23		1	10	Bucket	8.72	LL13553	0.22		2	20	Weir	16.68
4/15/11	LL13466	0.14	J	4	161	Weir	85.43	LL13470	0.16	J	< 1	27	Bucket	16.37	LL13467	0.22		1	26	Weir	21.68
3/23/11	LL13454	0.26		6	70	Weir	68.98	LL13458	0.27		1	17	Bucket	17.40	LL13455	0.24		10	20	Weir	18.19
2/18/11	LL13445	0.12	J	2	35	Weir	15.92	LL13450	0.29		< 1	17	Bucket	18.68	LL13446	0.28		1	11.5	Weir	12.20
1/25/11	LL13437	0.18	J	5	28.5	Weir	19.44	LL13441	0.21		1	11	Bucket	8.75	LL13438	0.28		1	0.6	Weir	0.64
12/17/10	LL13429	0.17	J	1	24	Weir	15.46	LL13433	0.23		1	13	Bucket	11.33	LL13430	0.36		5	5.6	Weir	7.64
11/19/10	LL13419	0.15	J	8	14	Weir	7.96	LL13428	0.27		< 1	15	Bucket	15.35	LL13420	0.57		8	1.5	Weir	3.24

Table 6B
Lemon Lane Landfill
Post-Remediation PCB Mass Computations

	Quarry D Sp							Cattail Seep							Quarry A						
Date	Sample ID	PCB[a], ppb	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)	Sample ID	PCB[a], ppb	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)	Sample ID	PCB[a], ppb	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)
4/23/14	LL13843	0.18		<1	1	Bucket	0.68	LL13845	0.23		24	2	Visual	1.74							
3/21/14	LL13830	0.16	J	<1	1	Bucket	0.61	LL13832	0.24	J	14	1	Visual	0.91							
2/24/14	LL13822	0.21		<1	1	Bucket	0.80	LL13824	0.16		15	5	Visual	3.03							
1/20/14	LL13812	0.18		<1	1	Bucket	0.68	LL13814	0.17		27	2	Visual	1.29							
12/17/13	LL13803	0.20		<1	1.5	Bucket	1.14	LL13805	0.20		34	1	Visual	0.76							
11/14/13	LL13795	0.29		<1	1	Bucket	1.10	LL13797	0.18		48	1	Visual	0.68					0	Visual	
10/14/13	LL13787	0.35		<1	0.5	Bucket	0.66	LL13789	0.28		46	1	Visual	1.06							
9/17/13	LL13780	0.30		<1	0.25	Bucket	0.28														
8/14/13	LL13773	0.20		<1	1	Bucket	0.76												0	Visual	
7/16/13	LL13762	0.26		<1	1	Bucket	0.99	LL13765	0.32		82	1	Visual	1.21							
6/12/13	LL13750	0.20		<1	1	Bucket	0.76	LL13753	0.23		60	1	Visual	0.87							
5/14/13	LL13742	0.18		<1	1.5	Bucket	1.02	LL13745	0.16		12	3	Visual	1.82							
4/23/13	LL13730	0.17		<1	1	Bucket	0.64	LL13733	0.12		8	1	Visual	0.45					0	Visual	
3/22/13	LL13722	0.20		<1	1	Bucket	0.76	LL13725	0.17		13	1	Visual	0.64					0	Visual	
2/25/13	LL13714	0.19		<1	1	Bucket	0.72	LL13716	0.17		22	4	Visual	2.58					0	Visual	
1/18/13	LL13706	0.21		<1	1	Bucket	0.80	LL13708	0.18		23	8	Visual	5.46					0	Visual	
12/13/12	LL13698	0.29		<1	1.4	Bucket	1.54	LL13701	0.16		31	0.5	Visual	0.30					0	Visual	
11/15/12	LL13690	0.25		<1	1	Bucket	0.95	LL13692	0.15		35	1	Visual	0.57					0	Visual	
10/9/12	LL13683	0.23		<1	1.1	Bucket	0.96	LL13684	0.18	J	23	0.5	Visual	0.34					0	Visual	
9/12/12	LL13675	0.27		<1	1	Bucket	1.02												0	Visual	
8/16/12					0	Bucket	0												0	Visual	
7/17/12	LL13663	0.21		<1	0.3	Bucket	0.24												0	Visual	
6/21/12	LL13656	0.31		<1	0.4	Bucket	0.47												0	Visual	
5/16/12	LL13647	0.13	J	<1	2	Bucket	0.99	LL13649	0.17	J	19	2	Visual	1.29					0	Visual	
4/18/12	LL13639	0.13	J	<1	2.4	Bucket	1.18	LL13641	0.14	J	6	5	Visual	2.65					0	Visual	
3/15/12	LL13631	0.1	U	<1	2.2	Bucket	0.83	LL13633	0.20		37	5	Visual	3.79					0	Visual	
2/15/12	LL13623	0.15	J	<1	2	Bucket	1.14	LL13625	0.25		54	2	Visual	1.90					0	Visual	
1/31/12	LL13614	0.12	J	<1	2.5	Bucket	1.14	LL13616	0.141	J	25	5	Visual	2.67	LL13617	0.10	U	12	2	Visual	0.76
12/9/11	LL13607	0.18	J	1	2.1	Bucket[b]	1.43					1	Visual						0		
11/17/11	LL13600	0.14	J	1	2.3	Bucket[b]	1.22												0		
10/17/11	LL13593	0.25		< 1	0.7	Bucket[b]	0.66												0		
9/22/11	LL13586	0.37		< 1	1.5	Bucket[b]	2.10					0	Visual						0		
8/23/11	LL13579	0.19	J	1	0.3	Bucket[b]	0.22												0		
7/20/11	LL13572	0.27		< 1	0.6	Bucket[b]	0.61												.0		
6/23/11	LL13564	0.18	J	< 1	2	Bucket[b]	1.36					3	Visual						0		
5/12/11	LL13555	0.20		< 1	2.3	Bucket[b]	1.74								LL13557	0.13		21	10	Visual	4.93
4/15/11	LL13469	0.15	J	< 1	2.4	Bucket[b]	1.36					15	Visual						0		
3/23/11	LL13457	0.16	J	1	2	Bucket[b]	1.21												0		
2/18/11	LL13448	0.23		< 1	2.2	Bucket[b]	1.92								LL13451	0.10	U	22	3	Visual	0.95
1/25/11	LL13439	0.21		1	2	Bucket[b]	1.59	LL13440	0.171	J	6	3	Visual	1.94					0		
12/17/10	LL13432	0.29		2	1.4	Bucket[b]	1.54												0		
11/19/10	LL13421	0.49		3	1.3	Bucket[b]	2.41												0		

Table 6B
Lemon Lane Landfill
Post-Remediation PCB Mass Computations

	Sum of Sources (Calculated)				ICS									West Fork Clear Creek
Date	Flow Sum (gpm)	Percent of Flow Explained	PCB Sum (ug/min)	Percent of Mass Explained	Sample ID	Sample Collect Date	PCB[a] (ppb)	Qual	TSS, mg/L	Flow, gal/min	Flow Estimation Method	Mass (ug/min)		Calculated Additional PCB Contribution (ug/L)
4/23/14	32.00	82%	25.43	96%	LL13847	4/23/14	10		<1	225	ICS Instr.	8527.5		0.03
3/21/14	28.50	81%	22.04	104%	LL13834	3/21/14	7.15		<1	160	ICS Instr.	4335.8		0.03
2/24/14	69.00	79%	57.72	88%	LL13826	2/24/14	3.3		<1	486	ICS Instr.	6078.4		0.03
1/20/14	41.00	95%	30.40	117%	LL13816	1/20/14	8.55		<1	230	ICS Instr.	7453.0		0.03
12/17/13	31.50	53%	27.67	69%	LL13807	12/17/13	5.05		<1	210	ICS Instr.	4019.3		0.04
11/14/13	16.00	89%	18.50	159%	LL13799	11/14/13	5.4		1	66	ICS Instr.	1350.8		0.04
10/14/13	15.50	67%	17.98	86%	LL13791	10/14/13	7.5		1	70	ICS Instr.	1989.8		0.06
9/17/13	6.75	150%	11.01	403%	LL13782	9/1/13	12.5		3	23	ICS Instr.	1089.6		0.03
8/14/13	12.50	83%	15.44	143%	LL13776	8/14/13	11		1	133	ICS Instr.	5544.8		0.02
7/16/13	16.70	152%	15.52	219%	LL13766	7/16/13	7		1	125	ICS Instr.	3316.3		0.01
6/12/13	17.70	77%	15.71	129%	LL13754	6/12/13	8.35		2	105	ICS Instr.	3322.9		0.03
5/14/13	54.50	63%	40.59	65%	LL13746	5/14/13	3.7		<1	331	ICS Instr.	4641.6		0.04
4/23/13	58.00	62%	44.34	84%	LL13734	4/23/13	2.85		<1	425	ICS Instr.	4590.6		0.03
3/22/13	59.00	73%	52.57	86%	LL13726	3/21/13	4.1		<1	350	ICS Instr.	5438.7		0.04
2/25/13	40.00	78%	32.29	88%	LL13718	2/25/13	5.4		<1	215	ICS Instr.	4400.2		0.04
1/18/13	68.00	78%	61.06	88%	LL13710	1/18/13	6.0		<1	370	ICS Instr.	8413.8		0.04
12/13/12	20.40	73%	19.16	95%	LL13702	12/13/12	8.9		<1	95	ICS Instr.	3204.4		0.04
11/15/12	24.00	47%	21.22	78%	LL13694	11/15/12	7.65		<1	92	ICS Instr.	2667.4		0.05
10/9/12	18.20	52%	17.21	65%	LL13686	10/9/12	7.05		<1	147	ICS Instr.	3927.8		0.04
9/12/12	14.40	111%	16.07	181%	LL13678	9/12/12	9.05		1	104	ICS Instr.	3567.1		0.02
8/16/12	3.30	122%	5.28	215%	LL13671	8/16/12	11		<1	18	ICS Instr.	750.4		0.03
7/17/12	4.70	134%	5.07	255%	LL13662	7/17/12	13		2	20	ICS Instr.	985.4		0.02
6/21/12	9.20	164%	9.37	260%	LL13659	6/21/12	14	J	<1	27	ICS Instr.	1432.6		0.03
5/16/12	42.00	100%	26.61	119%	LL13651	5/16/12	9.4		<1	210	ICS Instr.	7481.5		0.02
4/18/12	54.40	63%	32.22	65%	LL13643	4/18/12	7.6	J	<1	288	ICS Instr.	8295.6		0.03
3/15/12	27.80	59%	19.36	64%	LL13635	3/15/12	3.65	J	1	175	ICS Instr.	2420.9		0.04
2/15/12	33.00	77%	21.79	84%	LL13627	2/15/12	6.7		<1	201	ICS Instr.	5104.0		0.03
1/31/12	65.50	66%	33.67	63%	LL13619	1/31/12	3.3		<1	360	ICS Instr.	4502.5		0.03
12/9/11	45.10	42%	30.69	45%	LL13610	12/9/11	3.5		1	390	ICS Instr.	5173.4		0.04
11/17/11	26.10	82%	21.84	120%	LL13603	11/17/11	6.7		<1	150	ICS Instr.	3809.0		0.03
10/17/11	10.10	32%	13.09	67%	LL13596	10/17/11	11		<1	30	ICS Instr.	1250.7		0.08
9/22/11	11.60	36%	16.19	79%	LL13589	9/22/11	12.5		3	27	ICS Instr.	1279.1		0.09
8/23/11	7.40	37%	12.61	54%	LL13582	8/23/11	16.5		7	21	ICS Instr.	1313.2		0.15
7/20/11	8.10	21%	5.45	23%	LL13575	7/20/11	13.5		2	66	ICS Instr.	3376.9		0.06
6/23/11	60.00	65%	45.40	92%	LL13568	6/23/11	9.3	J	2	204	ICS Instr.	7190.4		0.04
5/12/11	45.30	42%	32.06	47%	LL13559	5/12/11	14.5		1	232	ICS Instr.	12749.6		0.05
4/15/11	70.40	44%	39.42	46%	LL13472	4/15/11	3.5		< 1	442	ICS Instr.	5863.1		0.04
3/23/11	39.00	56%	36.80	53%	LL13464	3/23/11	7.05		< 1	265	ICS Instr.	7080.7		0.05
2/18/11	33.20	95%	33.75	212%	LL13452	2/18/11	6.5		< 1	143	ICS Instr.	3522.8		0.02
1/25/11	16.80	58%	12.93	66%	LL13443	1/25/11	7.5		< 1	78	ICS Instr.	2217.2		0.05
12/17/10	20.00	83%	20.51	133%	LL13435	12/17/10	9.55		< 1	65	ICS Instr.	2352.6		0.05
11/19/10	17.80	127%	21.00	264%	LL13424	11/19/10	12.5		< 1	21	ICS Instr.	994.9		0.06

Table 8
Lemon Lane Landfill
Fish Tissue Sampling Data
October and November 2014

Sample ID	Sample Date	Location	Sample Type	Feeding Guild	Species	PCB Aroclors (ppb)		PCB Congeners (ppb)		Lipids (%)	
CC-001	10/15/2014	CC-1	W Comp	Omnivore	Creek Chub	250	J			0.32	
CC-001D	10/15/2014	CC-1	W Comp	Omnivore	Creek Chub	620	J			N/A	
CC-002	10/15/2014	CC-1	W Comp	Omnivore	Creek Chub	390		1,215	C,J,J-	0.99	
CC-003	10/15/2014	CC-1	W Comp	Omnivore	Creek Chub	540				0.62	
CC-004	10/15/2014	CC-1	W Comp	Omnivore	Creek Chub	730	J			1.2	
CC-005	10/15/2014	CC-1	W Comp	Omnivore	Creek Chub	350				0.65	
CC-006	10/15/2014	CC-1	W	Bottom Feeder	White Sucker	530	J			1.1	
CC-006D	10/15/2014	CC-1	W	Bottom Feeder	White Sucker	1,300	J			N/A	
CC-007	10/15/2014	CC-1	W Comp	Bottom Feeder	White Sucker	720	J			0.81	
CC-008	10/15/2014	CC-1	W	Bottom Feeder	White Sucker	530				0.75	
CC-009	10/15/2014	CC-1	W Comp	Bottom Feeder	White Sucker	500				0.78	
CC-010	10/15/2014	CC-2	W	Bottom Feeder	White Sucker	122	J			0.71	
CC-011	10/15/2014	CC-2	W Comp	Bottom Feeder	White Sucker	157	J			1.5	
CC-012	10/15/2014	CC-2	W	Omnivore	Creek Chub	176	J			0.36	
CC-013	10/15/2014	CC-2	W	Omnivore	Creek Chub	103	J			0.94	
CC-014	10/15/2014	CC-2	W Comp	Omnivore	Creek Chub	190	J			0.82	
CC-015	10/15/2014	CC-2	W Comp	Omnivore	Creek Chub	154	J			0.62	
CC-015D	10/15/2014	CC-2	W Comp	Omnivore	Creek Chub	414	J			N/A	
CC-016	10/15/2014	CC-2	F Comp	Top Predator	Green Sunfish	50	J			0.17	
CC-017	10/15/2014	CC-2	F Comp	Top Predator	Longear Sunfish	23	J	157	B,C,J,Q	0.14	J
CC-018	10/16/2014	CC-3	W	Bottom Feeder	White Sucker	78	J			1.7	
CC-018D	10/16/2014	CC-3	W	Bottom Feeder	White Sucker	81	J			N/A	
CC-019	10/16/2014	CC-3	W	Bottom Feeder	White Sucker	144	J	530	B,C,J,Q	0.55	
CC-020	10/16/2014	CC-3	W	Bottom Feeder	White Sucker	47	J			0.26	
CC-021	10/16/2014	CC-3	W	Bottom Feeder	Hogsucker	606	J			0.92	
CC-022	10/16/2014	CC-3	W	Bottom Feeder	Hogsucker	383	J			2.0	
CC-023	10/16/2014	CC-3	W	Omnivore	Striped Shiner	100	J			0.64	
CC-024	10/16/2014	CC-3	W	Omnivore	Striped Shiner	359				1.0	
CC-025	10/16/2014	CC-3	W	Omnivore	Striped Shiner	528				0.95	
CC-026	10/16/2014	CC-3	W Comp	Omnivore	Striped Shiner	271				0.63	
CC-027	10/16/2014	CC-3	W Comp	Omnivore	Striped Shiner	280		529	B,C,J	1.2	
CC-028	10/16/2014	CC-3	F	Top Predator	Rock Bass	16	J			0.058	J
CC-029	10/16/2014	CC-3	F	Top Predator	Rock Bass	12	J			0.052	J
CC-030	10/16/2014	CC-3	F	Top Predator	Rock Bass	24				0.065	J
CC-031	10/16/2014	CC-3	F Comp	Top Predator	Rock Bass	32				0.060	J
CC-032	10/16/2014	Gore Road	W	Bottom Feeder	Hogsucker	818				1.5	
CC-033	10/16/2014	Gore Road	W	Bottom Feeder	Hogsucker	391	J			0.52	
CC-033D	10/16/2014	Gore Road	W	Bottom Feeder	Hogsucker	723				N/A	
CC-034	10/16/2014	Gore Road	W	Bottom Feeder	Hogsucker	698	J			1.9	
CC-035	10/16/2014	Gore Road	W	Bottom Feeder	Hogsucker	759				1.6	
CC-036	10/16/2014	Gore Road	F	Bottom Feeder	Hogsucker	240				0.15	
CC-037	10/16/2014	Gore Road	F	Bottom Feeder	Hogsucker	100		505	B,C,J,Q	0.14	
CC-038	10/16/2014	Gore Road	F	Bottom Feeder	Hogsucker	120				0.12	
CC-038D	10/16/2014	Gore Road	F	Bottom Feeder	Hogsucker	120				N/A	
CC-039	10/16/2014	Gore Road	F	Bottom Feeder	Hogsucker	140				0.46	
CC-040	10/16/2014	Gore Road	F	Bottom Feeder	Hogsucker	78				0.31	
CC-041	10/16/2014	Gore Road	F Comp	Top Predator	Longear Sunfish	36				0.074	J
CC-042	10/16/2014	Gore Road	F Comp	Top Predator	Longear Sunfish	32				0.10	
CC-043	10/16/2014	Gore Road	F	Top Predator	Rock Bass	44				0.059	J
CC-044	10/16/2014	Gore Road	F	Top Predator	Rock Bass	17	U			0.051	J
CC-045	11/19/2014	CC-2	F Comp	Top Predator	Longear Sunfish	53				0.22	
CC-046	11/19/2014	CC-2	F (Big Fish)	Top Predator	Longear Sunfish	69				0.094	J
CC-047	11/19/2014	CC-2	F (Big Fish)	Top Predator	Longear Sunfish	30				0.16	
CC-048	11/19/2014	CC-2	W Comp	Bottom Feeder	White Sucker	270				0.57	
CC-048D	11/19/2014	CC-2	W Comp	Bottom Feeder	White Sucker	230	J			N/A	
CC-049	11/19/2014	CC-2	W Comp	Bottom Feeder	White Sucker	190	J			0.51	
CC-050	11/19/2014	CC-2	F (Big Fish)	Bottom Feeder	Northern Hogsucker	150				0.30	
CC-051	11/19/2014	CC-2	F Comp	Top Predator	Bluegill	16	U			0.10	
CC-052	11/19/2014	CC-2	F Comp	Top Predator	Bluegill	17	U			0.15	

Notes:

B	Method Blank contamination. The associated method blank contains the target analyte at a reportable leve
C	Co-eluting isomer
Comp	Composite sample
D	Field duplicate sample
F	Fillet sample
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sampl
J-	The result is an estimated quantity, but the result may be biased low
N/A	Not analyzed
ppb	Part per billion
Q	Estimated maximum possible concentration (EMPC)
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limi
UJ	The analyte was analyzed for, but was not detected. The reported sample quantitation limit is approximate and may be innaccurate or imprecis
W	Whole fish sample

Table 9
Lemon Lane Landfill
Percent Reductions in Fish Tissue (Aroclor)
Locations CC-1 (Allen Street) and CC-2 (Country Club Road)

Location	CC-1			CC-2											
Species	Creek Chub			Creek Chub			Green Sunfish			Longear Sunfish			White Sucker		
Spl. Type	Whole			Whole			Whole			Fillet			Whole		
Date	ug/Kg	Spls.-Fish	%	ug/Kg	Spls.-Fish	%	ug/Kg	Spls.-Fish	%	ug/Kg	Spls.-Fish	%	ug/Kg	Spls.-Fish	%
1993				3300	2-22*		4400	1-15*							
1996	19222	9-9*		2038	8-8	38%	3556	9-9	19%						
2000										540	3-3*		1833	3-3*	
2002	7739	11-18	60%	1010	8-31	69%	1438	4-4	67%						
2004	1819	8-8	91%	1180	6-6	64%	1843	7-7	58%	358	6-6	34%	1957	7-7	-7%
2007							2600	1-8	41%						
2012							710	1-9	84%						
2014	480	6-14	98%	207	5-10	94%				44	4-7	92%	194	5-18	89%

Notes:
* = Baseline year for comparison prior to initiation of water treatment in 2000 (varies by location / species).
Spls.-Fish = Number of samples / number of fish comprising sample.

APPENDIX A
EXISTING SITE INFORMATION

A. SITE CHRONOLOGY

Event	Date
The Lemon Lane Landfill was used as a disposal facility by Westinghouse for capacitors and capacitor production by-products	1958 - 1964
United States files civil action against Westinghouse Electric under CERCLA	January 4, 1983
Lemon Lane placed on National Priorities List	October 1982
Enforcement Decision Document Signed	August 3, 1984
Consent Decree signed for the incineration of PCB contaminated material from six sites in or near Bloomington, Indiana (Lemon Lane one of six)	August 22, 1985
Interim remedial measures implemented including removing capacitors and placing an interim cap over the landfill.	1987
State of Indiana passes law forbidding the review of the incinerator permit, preventing implementation of incineration remedy	1991
The Consent Decree parties (Westinghouse, EPA, State of Indiana, Monroe County, and City of Bloomington) agree to explore other remedies for the five Consent Decree sites through the operating principals (Anderson Road Landfill not included since the work was completed)	February 4, 1994
Due to a lack of progress on developing new remedies, Federal Judge S. Hugh Dillin issues judicial order stating that all source control for the five sites must be completed by December 31, 1999. Assigns Special Master (Magistrate Judge Kennard Foster) to oversee progress.	November 1997
Consent Decree parties make progress in negotiations for the cleanup of the six sites and Federal Judge S. Hugh Dillin agrees to extend deadline to December 31, 2000.	February 1999
ROD Amendment signed for the source control operable unit of the Lemon Lane Landfill.	May 12, 2000
Approval of the RD/RA Work Plan and Commencement of Excavation Activities	May 18, 2000
Source control operable unit construction completed	December 6, 2000
Cap Inspection And Maintenance Plan approved	June 18, 2001
Approval of the Final Report for the Remediation and Closure of the Lemon Lane Landfill	June 18, 2001
Long-Term Groundwater Monitoring Plan approved	April 22, 2002
First Five-year Review	June 23, 2005
Proposed Plan for OU2 and OU3	June 14, 2006
ROD Amendment for OU2 and OU3	September 29, 2006
DOJ Lodges Consent Decree	February 26, 2008
Federal Court Enters Consent Decree – Begins RD/RA for OU2 and OU3	July 24, 2009
CBS Takes Over Operation and Maintenance of Water Treatment Plant	August 14, 2009
Second Five-year Review	May 24, 2010
Completion of Remedial Action	September 26, 2012

Event	Date
Implementation of Institutional Controls	August 25, 2014
Revised Long-term Groundwater Monitoring Plan Approved	May 15, 2015

B. BACKGROUND

Physical Characteristics

The Lemon Lane Site, located in the City of Bloomington, Indiana, is a former 10-acre municipal landfill that accepted both municipal and industrial waste material. The Site is surrounded by residential properties on the north and east, railroad tracks on the south, and undeveloped property on the west. See Figure A1.

Land and Resource Use

The Lemon Lane Site, located in the City of Bloomington, Indiana, is a former 10-acre municipal landfill that accepted both municipal and industrial waste material. The Site is surrounded by residential properties on the north and east, railroad tracks on the south, and undeveloped property on the west.

History of Contamination

CBS Corporation (formerly known as Viacom and prior to that known as Westinghouse Electric Corporation) owned and operated a capacitor production facility in Bloomington. The insulating fluid used in the manufacture of the capacitors contained PCBs. The Lemon Lane Landfill was operated as a sanitary landfill from the late 1930s to 1964. From 1958 until the fall of 1964, PCB-filled capacitors, PCB-contaminated rags, and PCB-contaminated sawdust and filter clay were disposed of at the Lemon Lane Site. Extensive salvaging of capacitors, along with large scale burning of landfill material, occurred during the landfill operation. In addition, evidence indicates other industrial wastes were disposed of in the landfill. The landfill is situated over two sinkholes that were filled with landfill material prior to PCB disposal. The total volume of landfill material was approximately 200,000 cubic yards based on landfill borings completed in 1996.

The Lemon Lane Site lies on the eastern margin of the Mitchell Plain and the topography is typified by numerous karst features such as sinkholes, karst valleys, and springs. The Site is near the watershed divide between Clear Creek to the south and Stout's Creek to the north. The landfill is underlain by 70 to 80 feet of the St. Louis Limestone and the soil cover over the St. Louis Limestone ranges in thickness from 5 to 20 feet at the Lemon Lane Site. The Salem Limestone (70 to 80 feet thick) underlies the St. Louis Limestone and the Harrodsburg Limestone underlies the Salem. The St. Louis limestone in the vicinity of the landfill is thinly bedded and contains limestone, dolomite, and shale. Solution cavities, joints, and other fractures serve as routes for groundwater movement.

Water studies, including dye trace studies, have shown that a majority of low flow and storm water drainage from the Lemon Lane Site discharges at ICS, located about 2,500 feet southeast of the Site. ICS is the headwater of Clear Creek, which runs through the City of Bloomington and joins Salt Creek near the Monroe Dam. Other springs located near the landfill are also connected to the Site. Sampling has shown PCB contamination from the Lemon Lane Site in the following springs:

- Illinois Central Spring
- Quarry A Spring
- Quarry B Spring
- Slaughterhouse Spring
- Rinker Spring

Figure A2 shows the location of spring, sink, and surface water locations.

In addition, monitoring wells surrounding the Lemon Lane Site also have shown PCB contamination. Between September 1995 and June 1996, CBS completed the sampling of 29 residential wells within a one mile radius of the Lemon Lane Site. The results showed those wells were not contaminated with PCBs. These wells are not currently used by residents for drinking water.

The information gathered from the Site investigations show that PCB contamination has migrated from the Site and deep into the rock under and around the Site prior to the implementation of the source control OU. This material will continue to migrate from the Site to ICS and possibly other springs in the area. ICS (which has been investigated more extensively, because it receives the majority of groundwater flow from areas around Lemon Lane) contains between 5 and 20 parts per billion (ppb) PCBs at low flow (20 to 200 gpm). During storm events, flows at ICS may approach 5,000 gpm and PCB concentrations in excess of 500 ppb may occur as a well-defined concentration peak. These peaks appear to represent "flushes" of PCBs from the karst conduits. Additional springs near ICS, including Rinker Spring, Quarry A Spring and Quarry B Spring show low levels of PCB contamination. The release and continuing release of PCBs from these springs will affect Clear Creek and provide exposure pathways for both humans and ecological receptors. Soils and sediments surrounding ICS, swallowhole area near the ICSTF, and the quarry spring area show unacceptable levels of PCBs and could migrate downstream into Clear Creek. Clear Creek currently has a Level 5 fish advisory (do not eat any fish) set by the State of Indiana due to PCB and mercury contamination.

Initial Response

The Lemon Lane Site was placed on the National Priorities List in October 1982 and was one of the six Sites included in the Consent Decree that was entered by the court on August 22, 1985. The Consent Decree called for the construction of a permitted, TSCA-approved, dedicated, municipal solid waste-fired incinerator to be used to destroy PCB contaminated soils and materials excavated from the six Sites

Public opposition to the incinerator arose before and after entry of the Consent Decree. Applications for the necessary permits to design and build the incinerator were submitted by CBS in 1991. Beginning in 1991, the Indiana State Legislature passed several laws which ultimately prevented construction of the incinerator required in the 1985 Consent Decree. In February 1994, the parties agreed to jointly explore alternatives to the incineration remedy.

Interim measures have been implemented by CBS and the EPA at and near the Lemon Lane Site. In 1987, CBS removed, and incinerated off-site, 404 capacitors from the landfill surface. In addition, CBS placed a flexible membrane liner over the landfill surface to prevent water from infiltrating into the waste material. A sediment removal was completed in Clear Creek for approximately 2,770 feet near the Winston Thomas Site. EPA funded the construction of a 1000 gpm water treatment plant, along with storage for 1.2 million gallons of storm water for the ICS, which is hydraulically connected to Lemon Lane, through a time-critical removal action. The water treatment plant went online in May 2000 and the operation and maintenance was funded for three years by IDEM. A number of cost-sharing agreements among EPA, CBS, the City of Bloomington, and IDEM were employed to fund the operation and maintenance of the treatment plant for a period until 20 days after entry of the Consent Decree. As agreed in the Consent Decree, CBS now is fully-funding the operation and maintenance of the Illinois Central Spring water treatment plant.

Basis for Taking Action

PCBs are the main contaminant of concern at the Lemon Lane Site. PCBs have been discovered in soil, groundwater, and sediment. Other contaminants, such as volatile organic compounds, have also been discovered in the landfill and in groundwater, but only at low concentrations and are not the main contaminant of concern. Prior to the source control OU, unacceptable risk existed in soils surrounding the Site and a temporary cap was placed over the landfill in the 1987 interim action. Contaminated soils surrounding the landfill were remediated to the cleanup standards described previously. Principal threat material from within the landfill was also removed for off-site disposal. The remaining landfill material was capped with a RCRA subtitle C compliant cap.

Due to the karst hydrology, groundwater comes into contact with PCBs near and under the landfill, and that groundwater then discharges at springs near the Site. PCBs continue to be released from ICS, Rinker Spring, and Quarry Spring. The PCB contaminated spring water has contaminated soils/sediment near those springs and sediment in Clear Creek. Evaluating the risk associated with PCB contamination shows that soils/sediments near the ICS emergence, the swallowhole area, and the quarry springs area all produce unacceptable risk. Sediments within Clear Creek do not show elevated levels of PCBs and do not require remediation. The release of PCBs from ICS and other contaminated springs show that unacceptable risk is caused by these releases and, therefore, these releases need to be addressed.

C. REMEDIAL ACTIONS

Remedy Selection

Two ROD Amendments have been signed for the Lemon Lane Site. The source control OU ROD Amendment to address the landfill was signed on May 12, 2000. On September 29, 2006, a ROD Amendment was signed for the water and sediment OUs.

Source Control OU

The RAOs as described in the May 12, 2000, ROD Amendment for the source control operable unit were as follows:

- Reduce or eliminate the direct contact threat associated with contaminated soil/landfill material.
- Minimize contaminant migration within the karst topography and to groundwater and surface water to levels that ensure the beneficial reuse of these resources.
- Minimize future migration of groundwater contamination to surface water.

The remedy for the source control OU that was chosen in the 2000 ROD Amendment included the following:

- Excavation and removal of selected areas of contamination (hot spots) with greater than 50 parts per million PCBs on average, and disposal of the excavated soils and materials in a commercial, permitted chemical waste landfill.
- PCB capacitors discovered during the excavation were incinerated off-site in a permitted, commercial incinerator capable of meeting a destruction and removal efficiency of 99.99999%.
- Construction of a Resource Conservation Recovery Act (RCRA) Subtitle C compliant cap meeting the permeability requirements of 1×10^{-7} centimeters per second over the landfill surface to address the low level threat remaining. To limit surface water from migrating into the landfill, lined drainage ditches surround the landfill to control surface water run-on and surface water run-off from the Site.
- Areas outside the landfill cap to the north, east and west side of the Site and outside the fence line were remediated to high occupancy/residential standard of 2 ppm PCBs on average. Areas within the fence line not covered by the landfill cap were remediated to a low occupancy/industrial standard of 10 ppm on average with 10 inches of clean soil cover. Areas on the south side of the Site that are outside the limit of the cap, including the railroad berm, were remediated to 20 ppm PCBs on average.
- A long-term inspection and maintenance plan for the landfill cap.
- A long-term groundwater, springs and surface water monitoring program was implemented.
- Fencing of the landfill with posting of signs at the perimeter and the implementation of ICs to prevent the use of the capped area.

Water and Sediment OU

The RAOs for the water and sediment OUs as described in the 2006 ROD Amendment were as follows:

- Reduce the amount of PCBs released from groundwater to Clear Creek through mass reduction.
- Reduce PCB levels in fish for beneficial reuse by reducing PCBs released to Clear Creek.
- Reduce the amount of PCB mass in sediments that may be available to fish by reducing PCBs released to Clear Creek.

The major components of the water and sediment OUs consist of the following:

- Continue to treat ICS with the 1,000 gpm water treatment plant with 1.2 million gallons of stormwater storage.
- Expand the current water treatment plant by treating water which bypasses the 1,000 gpm treatment plant during large storm events by implementing a stormwater storage tank treatment system capable of treating 5,000 gpm. The system would consist of 8 Calgon Model 12 or their equivalent carbon adsorption vessels each with 20,000 pounds of GAC. Based upon a treatability study, the stormwater storage system is expected to remove about 95% of the PCBs from the storage tanks. During the design phase, it may be determined that a different configuration may be an improvement to the 8 carbon adsorption vessels proposed and the storage tank overflow treatment system may be modified. The combined treatment systems will treat nearly 100% of the ICS water and treat 99.9% of the PCB mass from ICS.
- Install a new effluent line to handle all treated water and stormwater.
- Capture and treat Quarry B Spring and Rinker Spring at the ICSTF.
- Develop an Operations and Maintenance Plan will be developed for the collection and treatment system and a monitoring program to monitor the effectiveness of the remedy.
- Implement a soil/sediment cleanup at the ICS emergence, swallowhole area and Quarry Springs area. The cleanup criteria is 1 ppm PCBs on average in drainage ways and 5 ppm PCBs in non-drainage ways. The amount of PCB contaminated material is 3,000 cubic yards and this will be disposed of in an off-site permitted landfill. Final volumes will be determined based upon a pre-design sampling event.
- Establish ICs /deed restrictions which will be required to prevent development on the landfill cap and prevent development within the drainage ways.

Remedy Implementation

In the Consent Decree, CBS agreed to build a municipal waste fired incinerator dedicated for the destruction of PCB contaminated material from six Sites located in the Bloomington, Indiana area. Beginning in 1991, the Indiana State legislature passed several laws which ultimately prevented construction of the incinerator required in the Consent Decree. In February 1994, the parties agreed to jointly explore alternatives to the incineration remedy for the five remaining Sites. Anderson Road Landfill was previously remediated by CBS.

In November 1997, Judge S. Hugh Dillin issued an Order stating that the six Consent Decree Sites were to be remediated by December 1999. Judge Dillin also assigned Special Master Kennard Foster to oversee the progress of the parties toward meeting the December 1999 deadline. On February 1, 1999, Judge Dillin issued another Order approving and adopting Report and Recommendations of Special Master Kennard Foster which extended the deadline for completion of the source control at the remaining five Sites to December 31, 2000. The source control remedies were completed by the December 31, 2000 deadline.

The Remedial Design/Remedial Action (RD/RA) Work Plan for the Lemon Lane Site source control OU was approved on May 18, 2000. Mobilization began in April 2000 and excavation activities began immediately after approval of the RD/RA Work Plan. Excluding the vegetative layer over the cap and the installation of a permanent fence, construction of the source control OU was completed on December 6, 2000. The Remedial Action Final Report was approved on June 18, 2001. The source control OU involved the following:

- Excavation and disposal of 80,087 tons of PCB contaminated material containing greater than or equal to 50 ppm PCBs at Environmental Quality Company's Wayne Disposal Landfill.

- Excavation and transporting a total of 4,402 capacitors to Onyx Environmental in Port Arthur, Texas for incineration.

- Consolidation of 40,000 cubic yards of landfill material to shrink the size of the landfill to approximately 9 acres.

- Installing a Resource Conservation Recovery Act Subtitle C compliant cap over the remaining landfill material. The cap consists of 6-inches of topsoil, 18-inches clean granular fill, a geocomposite drainage layer, 40 millimeter thick geomembrane, geosynthetic clay layer and perimeter drainage/stormwater retention pond.

- Installing 4 piezometers into the landfill to determine if the landfill waste is becoming backflooded (i.e. wet).

- Excavating soils outside the landfill cap to cleanup criteria.

- Implementing a Groundwater Monitoring Plan and Cap Inspection Plan

EPA, the State of Indiana, the City of Bloomington, Monroe County, and CBS continued to negotiate (under the direction of Magistrate Foster) the water and sediment OUs after the completion of the source control remedy. CBS completed both water and sediment investigations and a ROD Amendment was signed on September 29, 2006 for the water and sediment OUs. Negotiations between the governmental parties and CBS to amend the Consent Decree and implement the final remedies for Bennett's Dump, Neal's Landfill and Lemon Lane Landfill were completed on February 4, 2008. The United States Department of Justice (DOJ) Lodged the Consent Decree with the Federal Court on February 26, 2008. The Lodging of the Consent Decree began the 30-day public comment period, which was extended 15 days, on the decree. The Consent Decree was entered by the Federal Court on July 24, 2009 which triggered the start of cleanup activities.

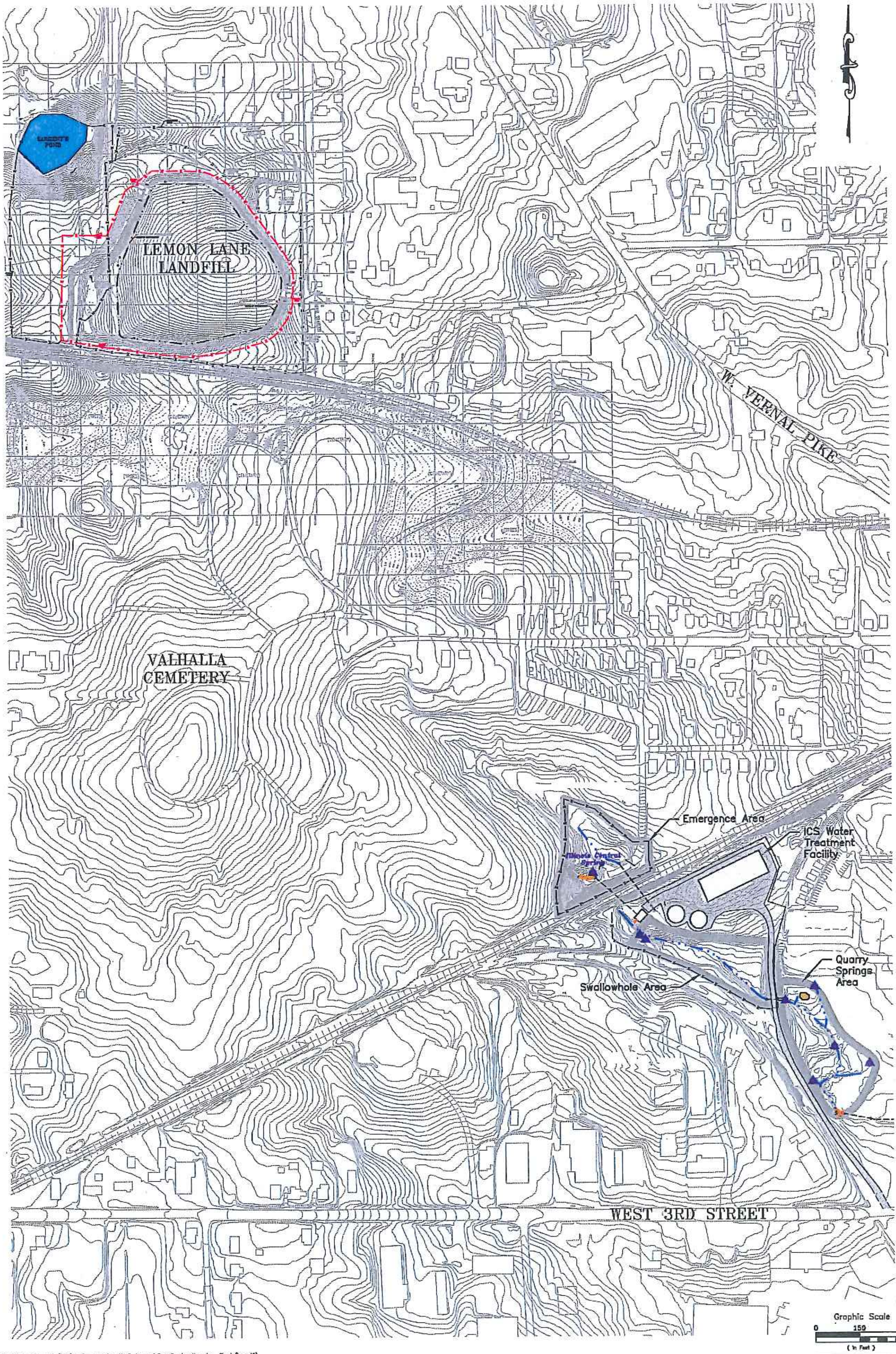
System Operation/Operation and Maintenance

<u>Source Control OU</u>

For the source control OU, a cap inspection and maintenance plan has been put in place by CBS in addition to implementing a long-term groundwater monitoring plan.

The Lemon Lane RCRA Cap Inspection and Maintenance Plan was approved in June 2001. The following activities are performed by CBS under this plan:

- Routine Site inspections are completed quarterly to determine if damage has occurred to the landfill cap and repairs made as needed.
- Quarterly Inspection and Maintenance Reports are submitted to EPA and the other governmental parties by CBS.
- Mowing is completed as needed.
- Application of herbicide at the fence line and rip rap drainage ways completed annually.
- Subsidence is evaluated every quarter during the inspection.



30500.48 – C88 – LL (PRM) – Figure 1-1 – Monitoring and Sampling Locations.dwg Sheet (Layout1)

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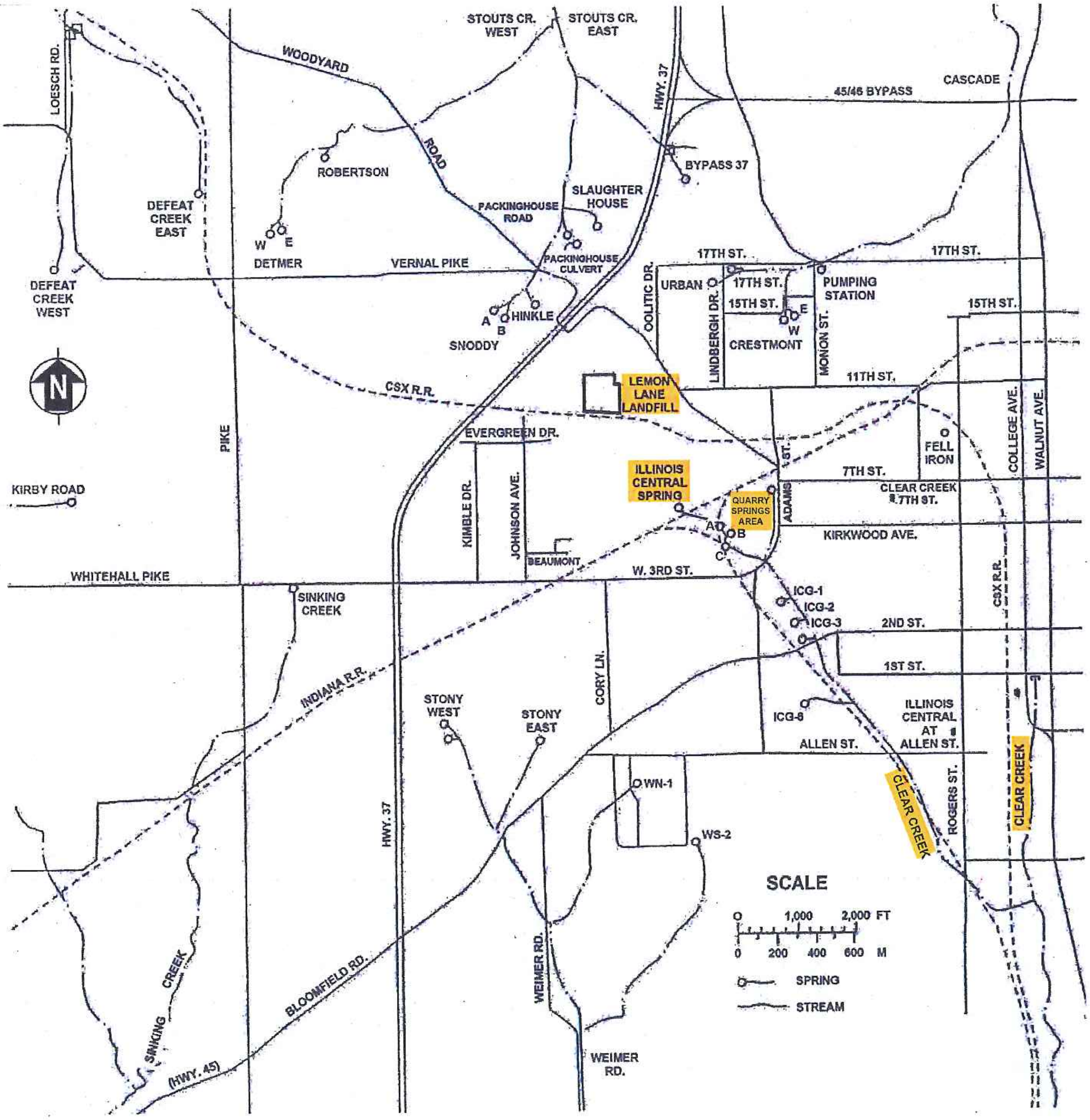
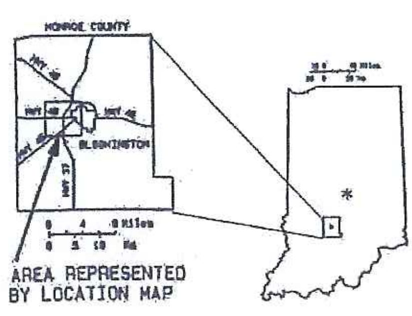
QUARRY SPRING — Spring
Landfill Perimeter Fence
Chain Link Fence

Figure A-1
Lemon Lane Landfill and Quarry Springs Area Site Location Map

Drawn By:	Date:	Scale:
RLR	3/14/11	1"=300'



Source: Modified from Fitch 1994

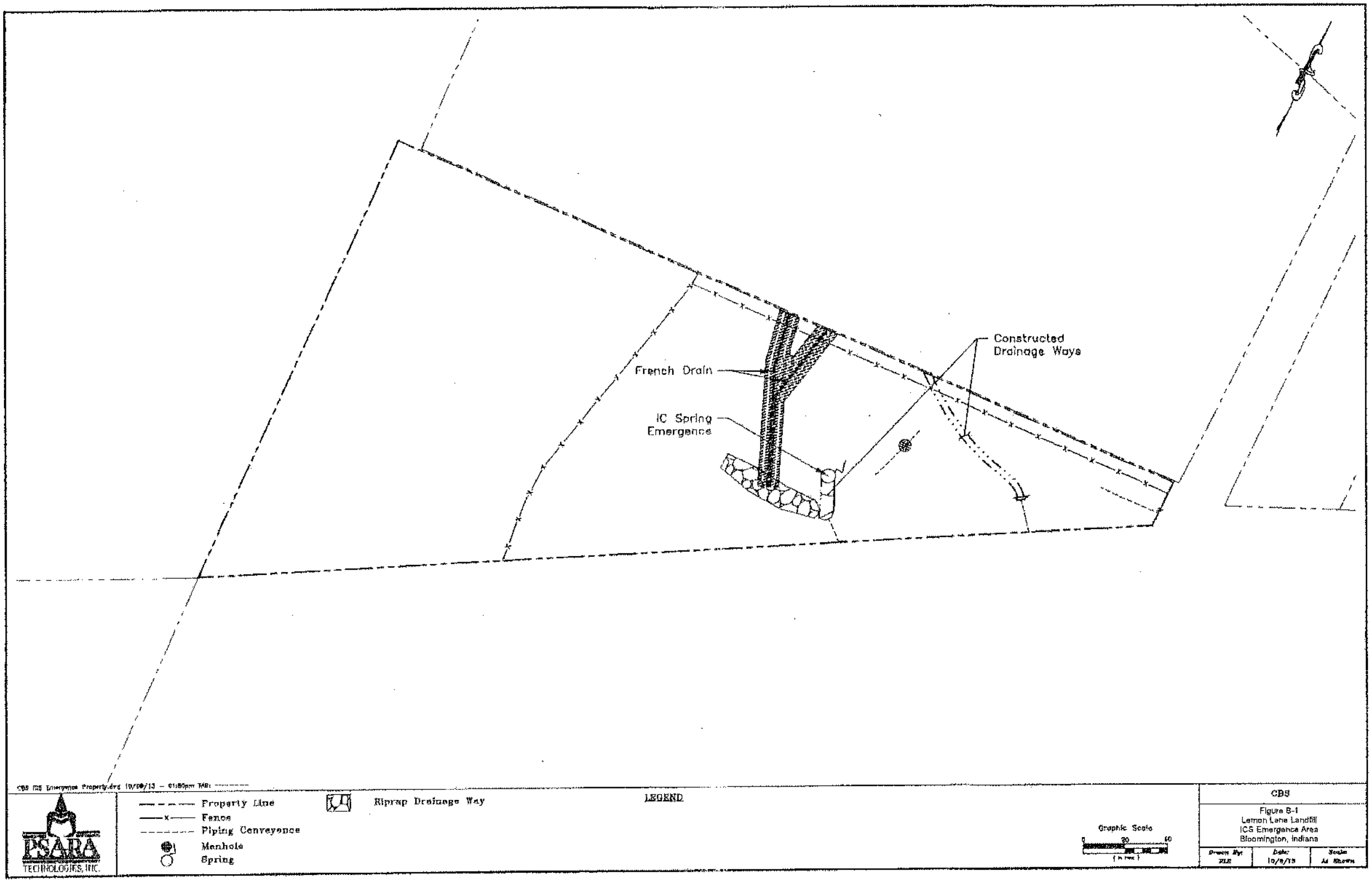


LEMON LANE LANDFILL
BLOOMINGTON, INDIANA

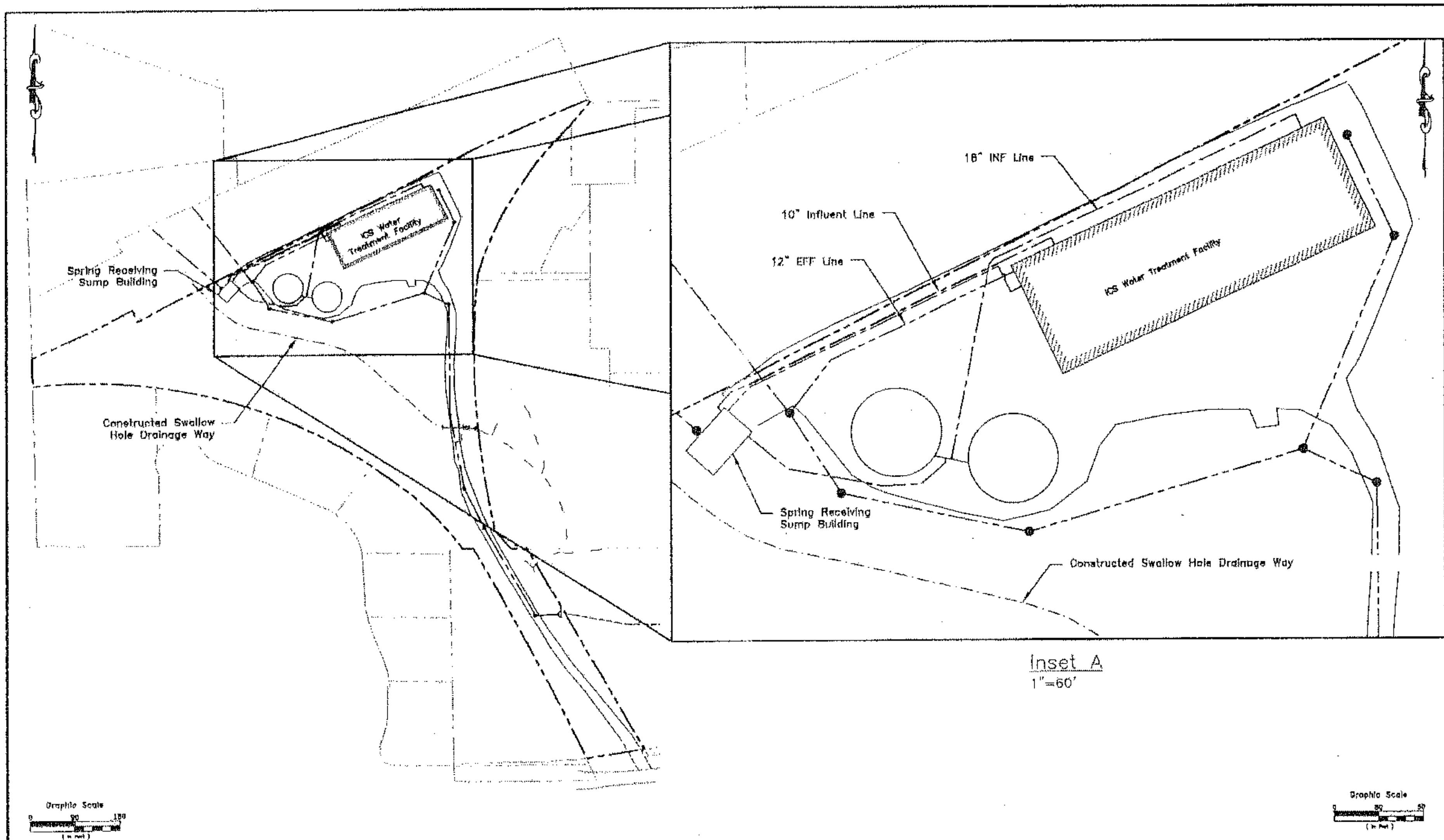
FIGURE A2
LOCATIONS OF LEMON LANE LANDFILL, ILLINOIS CENTRAL SPRING, QUARRY SPRINGS AREA, AND CLEAR CREEK

ST SulTRAC

APPENDIX B
ENVIRONMENTAL RESTRICTIVE CONVENANTS
FIGURES



Constructed Drainage Ways
French Drain
IC Spring Emergence
LEGEND
Property Line
Fence
Piping Conveyance
Manhole
Spring
Riprap Drainage Way
Graphic Scale
0
20
40
PSARA TECHNOLOGIES, INC.
CBS
Figure B-1
Lemon Lane Landfill
ICS Emergence Area
Bloomington, Indiana
Date:
10/8/13
Scale:
As Shown



City Water Treatment Property.dwg 10/09/13 – 01:00pm

LEGEND

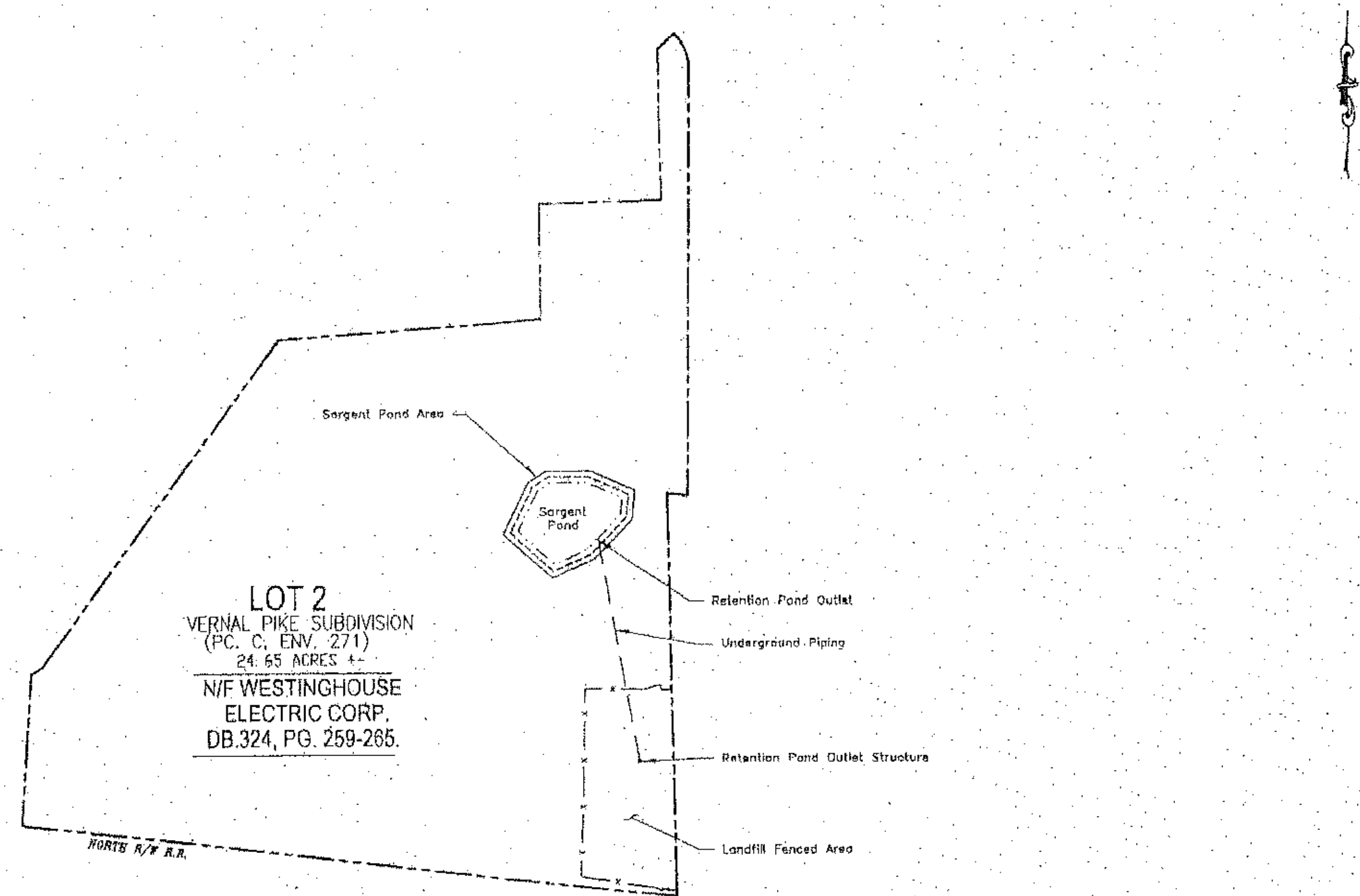
- Property Line
- Influent Lines
- Effluent Lines
- Constructed Swallow Hole Drainage Way
- Manhole

PSARA TECHNOLOGIES, INC.

CBS

Figure B-2
Lemon Lane Landfill
ICS Water Treatment Plant Property
Bloomington, Indiana

Drawn By:	Date:	Scale:
RLR	10/8/13	As Shown



Note: Property boundaries taken from Figure 1, Lemon Lane Landfill Boundary and Topographic Survey, dated January 21, 2000 by Smith Neubecker & Associates, Inc.
SARGENT POND.dwg

PSARA TECHNOLOGIES, INC.

LEGEND

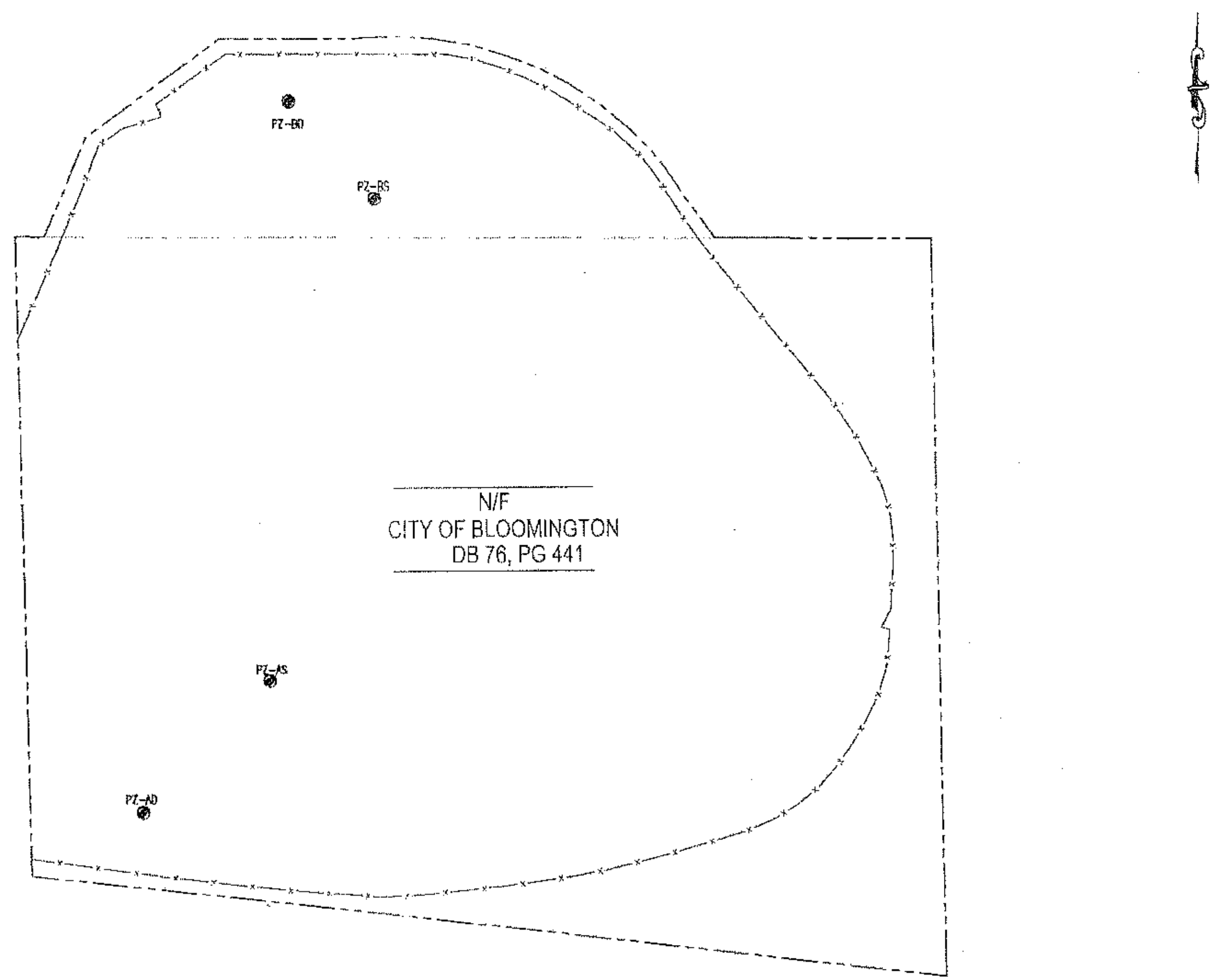
Property Line
Fence
Pond

Graphic Scale
0 100 200
(in feet)

CBS

Figure B-3
Lemon Lane Landfill
CBS Portion of the Lemon Lane Property
Bloomington, Indiana

Drawn By	Date	Scale
MLR	10/8/13	As Shown



CITY OF BLOOMINGTON.dwg

PSARA TECHNOLOGIES, INC.

LEGEND

- Property Line
- Fence
- Piezometer (Installed in Bedrock)

Graphic Scale
0 40 80
(In Feet)

CBS

Figure B-4
Lemon Lane Landfill
City of Bloomington Portion of the Lemon Lane Property
Bloomington, Indiana

Drawn By:	Date:	Scale:
RLR	10/8/13	As Shown