May 26, 2011

Mr. Chris Jung, P.G.
Kentucky Department for Environmental Protection
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

RE: Risk Assessment Work Plan Comment Responses
Federal-Mogul Products, Inc., Scottsville, KY
I.D. No. KYD 005 456 401, Agency Interest #17

Dear Mr. Jung:

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy, LLC has provided below responses to the Kentucky Department for Environmental Protection (KDEP) Hazardous Waste Branch (KHWB) comments regarding the Risk Assessment Work Plan (RAWP) for Federal-Mogul's facility located in Scottsville, Kentucky. The RAWP was included as Appendix A of the Corrective Measures Study Work Plan (CMS WP), which was submitted to the KHWB on August 5, 2010. Federal-Mogul and WSP received KHWB comments on the RAWP in a letter dated January 18, 2011.

The agency comments and our responses are provided below, and the revised RAWP is enclosed. The revised RAWP includes revisions based on the KHWB's comments, but also on recent data obtained during performance of the KHWB-approved Offsite Exposure Pathway Evaluation Work Plan. As we previously notified the KHWB, a groundwater sample from one offsite abandoned water well contained two chemicals similar to those detected onsite. The information provided by the offsite sampling activities has been incorporated in the revised RAWP as additional potential offsite exposure pathways.

General Comment:

We have reviewed Appendix A - Risk Assessment Work Plan of the Corrective Measures Study Work Plan for Federal-Mogul Products, Inc., prepared by WSP Environment & Energy, Pittsburgh, PA. The document generally follows acceptable risk assessment protocol, but we disagree with some exposure parameters, and additional exposure pathways may be needed. In addition, although USEPA allows a risk range of 1.0E-04 to 1.0E-06, de minimis risk is defined in Kentucky as at or below 1.0E-06. These and related issues are noted in the following comments.

WSP Response

WSP will address the comments regarding exposure parameters, potential additional exposure pathways, and the *de minimis* risk level in the responses presented below. WSP understands that the use of the exposure parameters and pathways outlined in the Kentucky Risk Assessment Guidance, dated June 8, 2002, allows for a standard comparison of potential risks across contaminated sites in Kentucky. However, WSP also recognizes that new federal and state guidance and toxicological studies that have been established and developed since 2002

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Docket No. 703972

provides the current state of risk assessment science, and the evaluation of potential risks. Therefore, WSP will evaluate, discuss, and apply, if applicable, any new guidance that may be appropriate in the uncertainty section of the risk assessment.

Specific Comments:

Comment 1

It is stated in the next to last paragraph in this section that "[u]sing the CalEPA toxicity value for TCE, the study concluded that potential exposure to VOC concentrations reported in the May 2006 surface water samples collected from Ramble Creek are 'without noncancer health risks and are without significant cancer health risks' to the local population, including small children (WSP Environment and Energy and Toxicology Excellence for Risk Assessment 2006c)." However, in our review of the 2006 document referenced, we concluded the following:

> *We agree that short-term exposure (by drinking or dermal contact with creek water) by humans, including very small children, is highly unlikely to cause any adverse health risks, even at the highest TCE level (144 µg/liter) found in Ramble Creek. However, we believe there is potential for risk above de minimis (IE-06) with long-term exposure.*

Our complete review is attached as an appendix.

<u>WSP Response</u>

WSP acknowledges the March 5, 2007, comments by KDEP's Division of Waste Management, Superfund Branch, Risk Assessment Section to the Trichloroethylene Risk Assessment for Ramble Creek, prepared by Toxicology Excellence for Risk Assessment (TERA) and submitted to KDEP in 2006. WSP would like to note that Federal-Mogul Corporation and WSP did not receive these comments until receipt of a KDEP electronic communication received on January 20, 2011. WSP understands that KDEP's comments regarding certain long-term exposures are based upon an internal KDEP guidance document (dated June 8, 2002) on risk assessment and a *de minimis* threshold screening value of 1E-06 for such long-term exposures. WSP understands that TERA's risk assessment was based upon then-existing site-specific data and long-term risk values for trichloroethene (TCE) from multiple agencies (Agency for Toxic Substances and Disease Registry, Health Canada, World Health Organization, RIVM, California Environmental Protection Agency [CalEPA], U.S. Environmental Protection Agency [EPA]) and especially the CalEPA cancer slope factor. WSP acknowledges that more recent site-specific data and more recent human health risk assessment information has become available since the 2002 Kentucky guidance and the 2006 TERA report and believes this information must be considered in the upcoming, current human health risk assessment.

WSP concurs with KDEP's conclusion regarding short-term exposure, as noted in its 2007 comments. As the TERA report was generated by a third party, WSP will not specifically address the KHWB comments presented in Appendix A of the January 18, 2011, comments letter; however, WSP will incorporate KHWB comments on the TERA report in the RAWP, as applicable, to address agency comments on the RAWP.

WSP also notes that in 2008, Federal Mogul implemented a KDEP-approved Interim Remedial Measure (IRM) to treat impacted groundwater. The IRM has significantly reduced TCE concentrations in Ramble Creek.

Comment 2

Unless a dig restriction will be part of the risk management plan, via an Environmental Covenant, the construction worker scenario should be evaluated.

WSP Response

The risk assessment will include the construction worker scenario. If potential unacceptable risks are identified, then restricted access areas will be addressed by an institutional control in the Environmental Covenant (EC) to eliminate potential exposures of concern. Should future construction activities occur at the site in restricted access zones, a soil management plan (SMP) will be developed by the contractor or property owner to address potential exposures to affected soil.

Comment 3

Although we define surface soil as ground surface to one foot below ground surface (1 ft-bgs), we will accept historical data from ground surface to 2 ft-bgs as surface soil. Any future sampling, however, should use only 1 ft-bgs as surface soil for purposes of risk assessment.

WSP Response

Future surface soil sampling will follow KHWB protocol of 0 to 1 foot below ground surface (ft-bgs) for evaluation of potential exposures to surface soil in the risk assessment.

Comment 4

"Deep subsurface soil (3 ft-bgs and below)" should be included in the database and used in the risk assessment for construction workers. Also see Specific Comment #1.

WSP Response

As discussed in WSP's response to Comment 2, the construction worker scenario will be evaluated in the risk assessment. As such, data from deep subsurface soil (greater than 2 ft-bgs to 15 ft-bgs) will be included in the database to develop an exposure point concentration for the construction/utility worker exposure scenario.

Comment 5

Only as long as the risk management plan, via an Environmental Covenant, restricts the property use to industrial, is it acceptable to compare the soil data to industrial soil screening levels.

WSP Response

An institutional control will be included in the EC that will restrict future property use to industrial.

Comment 6

In addition to comparing groundwater data to the OSWER draft guidance (USEPA, 2002), we also require comparison to maximum contaminant levels (MCLs).

WSP Response

WSP will compare the groundwater data to federal MCLs in addition to the generic screening levels in the OSWER draft vapor intrusion guidance (i.e., target groundwater concentrations corresponding to target indoor air concentrations, assuming a risk of 1×10^{-6}).

Comment 7

There is inherent uncertainty in modeling trench air concentrations for construction and utility workers, and we are not familiar with the Virginia Department of Environmental Quality's model for estimating exposure of these workers to volatile COPCs from groundwater. Please provide additional information on this model, including all parameters to be used.

WSP Response

The revised RAWP (Enclosure A) includes additional information requested on the Virginia Department of Environmental Quality's trench model and parameters used in the trench model.

Comment 8

It is stated in this section that "[a] summary of the total site cancer risks for each receptor groups will be presented in the HHRA and compared to EPA's target risk range of 1 x 10-4 to 1 X 10-6," Although USEPA allows a risk range of 1.0E-04 to 1.0E-06, de minimis *risk is defined in Kentucky as at or below 1.0 E-06.*

WSP Response

As requested by the KDEP, a risk characterization will be conducted based on the *de minimis* level of 1×10^{-6}. In addition, in the uncertainty section of the risk assessment, WSP will also compare the total site cancer risk for each receptor group to the EPA's acceptable risk range of 1E-04 to 1E-06.

Comment 9

For all parameters with a "rationale/reference" of BPJ (best professional judgment) please provide documentation of the rationale used to derive these values.

WSP Response

Where there are default exposure parameters in the Kentucky Risk Assessment Guidance (June 8, 2002) for the parameters that were listed as BPJ for the rationale/reference, the default exposure parameters will be used. If there are no default parameters, documentation of the rationale used to derive these values will be provided.

Comment 10

We recommend a soil ingestion rate of 480 mg/day for outdoor and utility workers (KDEP, 2002).

WSP Response

As requested by the KDEP, WSP will use the default exposure assumption of a soil ingestion rate of 480 mg/day for outdoor and utility workers from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the risk assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 11

We recommend a dermal surface area for contact of 4700 cm2/day for outdoor and utility workers exposures to soil (arms, hands, and head) (KDEP, 2002).

WSP Response

As requested by the KDEP, WSP will use the default exposure assumption of a dermal surface area for contact of 4,700 cm^2/day for outdoor and utility workers from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the risk assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 12

We recommend a dermal adherence factor of 1.0 mg/cm2 for all receptors (KDEP, 2002).

WSP Response

As requested by the KDEP, WSP will use the default exposure assumption of a dermal adherence factor of 1.0 mg/cm^2 for all receptors from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the risk assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 13

In the absence of chemical-specific values, such as those in RAGS, Part E (USEPA, 2004), we recommend a dermal absorption factor of 0.25 for volatile organics, 0.1 for semi-volatiles, and 0.05 for inorganics (KDEP, 2002).

WSP Response

WSP will use the dermal absorption factor of 0.25 for volatile organics, 0.1 for semi-volatiles, and 0.05 for inorganics in the absence of chemical-specific values in the RAGS, Part E guidance (EPA 2004).

Comment 14

Please provide additional rationale for the proposed exposure frequency (20 days/year) and duration (1 year) for a utility worker for exposure to soil. The reference (EPA 1991) does not address this issue directly.

WSP Response

The exposure duration of 1 year is inferred from the discussion of construction worker/landscaper exposure scenarios in which the EPA (1991) states that an exposure duration of less than 1 year is appropriate as construction/landscaping work is often short-term and dictated by weather. WSP believes that the utility worker would have a similar, if not shorter, exposure duration as the construction worker because utility projects are often short-term as well. A more specific reference to the proposed exposure duration of 1 year is from the VADEQ's *Voluntary Remediation Program Risk Assessment Guidance*, which is available at http://www.deq.state.va.us/vrprisk/raguide.html. The exposure duration of 1 year is VADEQ's default value for construction/utility workers. The exposure frequency of 20 days/year will not be used in the revised RAWP. Instead, WSP will assume an exposure frequency of 125 days/year, which is VADEQ's default exposure frequency for the construction/utility worker scenario.

Comment 15

For the surface water exposure pathway, we recommend an incidental ingestion rate of 0.050 liter/hour, an exposure frequency of 45 days/year, and an exposure time of 2.6 hours/day (KDEP, 2002).

WSP Response

As discussed with the KDEP during a conference call on February 11, 2011, Ramble Creek is not of sufficient depth for swimming; therefore, WSP will not use the default exposure assumptions of the swimmer as recommended in Comment 15. Instead, the wading scenario will be evaluated. WSP will use the default incidental ingestion rate of 0.05 liter/hour, the exposure frequency of 140 days/year for a child and 52 days/year for an adult in the wading scenario, and an exposure time of 2.6 hours/day from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the Risk Assessment, WSP will calculate

potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 15

In addition, we recommend a dermal surface area for contact of 1.815 m^2/day for an adult swimmer, and 0.65 m3/day for a child (3-6 years old) swimmer (KDEP, 2002).

WSP Response

As discussed with the KDEP on a February 11, 2011 conference call, Ramble Creek is not of sufficient depth for swimming; therefore, WSP will not use the default exposure assumptions of the swimmer as recommended in Comment 15. Instead, the wading scenario will be evaluated. WSP will use the default surface areas for an adult and child (1.06 m^2/day and 0.33 m^2/day) for the wading scenario from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the risk assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 16

For the sediment exposure pathway, we recommend a dermal surface area for contact of 1.06 m^2/day for an adult wader, and 0.33 m2/day for a child (0-6 years old) wader (KDEP, 2002).

WSP Response

As requested by the KDEP, WSP will use the default exposure assumption of surface areas for contact for the adult and child waders (1.06 m^2/day and 0.33 m^2/day) from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the risk assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 17

In addition, we recommend an exposure frequency of 52 days/year for a residential adult and 140 days/year for a residential child (KDEP, 2002).

WSP Response

As requested by the KDEP, WSP will use the default exposure assumptions of an exposure frequency for an adult wader (52 days/year) and a child wader (140 days/year) from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the risk assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

Comment 18

For the sediment exposure pathway, we recommend an incidental ingestion rate of 200 mg/day for the child resident (KDEP, 2002).

WSP Response

As requested by the KDEP, WSP will use the default exposure assumption of an ingestion rate for the child wader of 200 mg/day from the 2002 Kentucky Risk Assessment Guidance. In addition, in the uncertainty section of the Risk Assessment, WSP will calculate potential risks from the site by using exposure assumptions that are based on more recent EPA and other state guidance documents and toxicological information.

The revised RAWP is enclosed and addresses the responses provided in this document.

Should you have any questions regarding our comments or the revised RAWP, please do not hesitate to contact me at 412-604-1040.

Sincerely,

E. Michael Riggins

Michael Riggins, P.G.
Project Manager

EMR:paw
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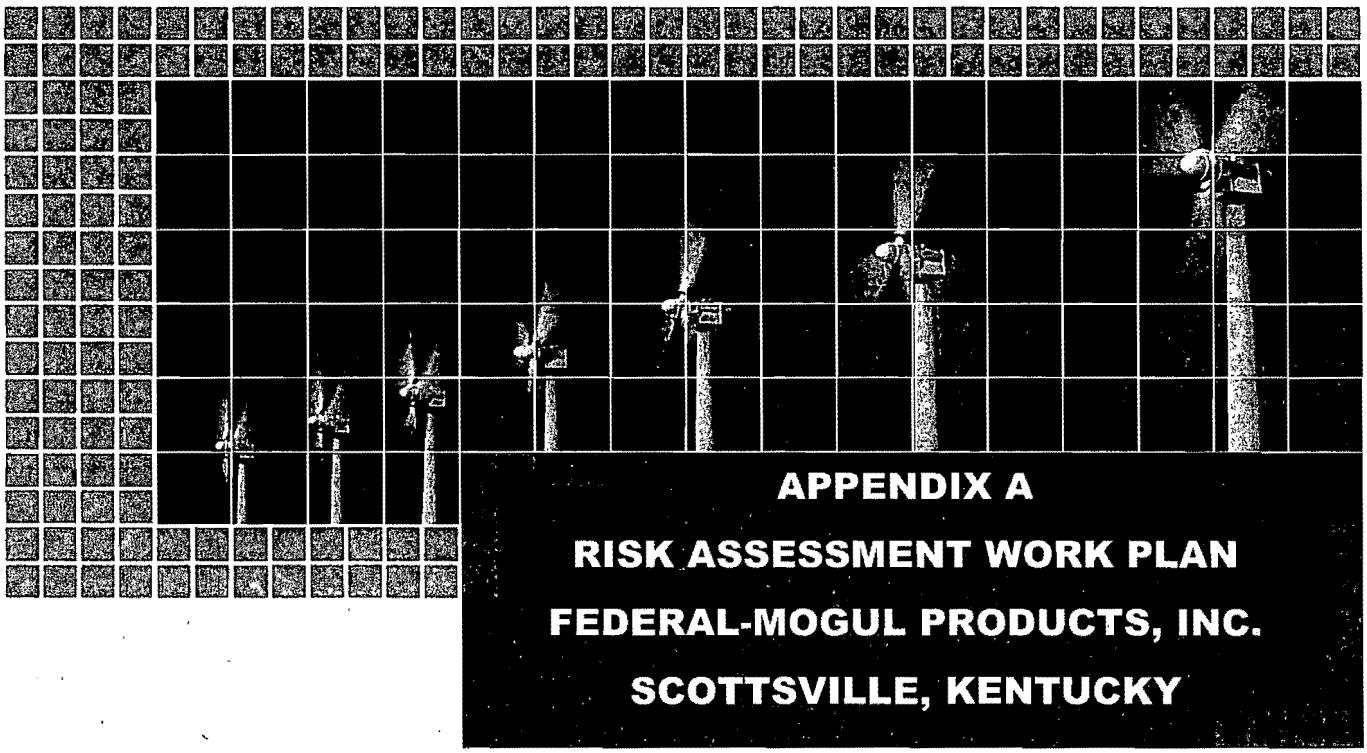
Enclosures

cc/encl.: Ms. April J. Webb, P.E., Kentucky Hazardous Waste Branch, Frankfort, KY
Ms. Jerri Martin, Kentucky Hazardous Waste branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

Enclosure

Revised Risk Assessment Work Plan

May 26, 2011



APPENDIX A
RISK ASSESSMENT WORK PLAN
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

May 26, 2011

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WSP

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1 Introduction

WSP Environment and Energy, LLC, has prepared this Risk Assessment Work Plan (RAWP) for the Federal-Mogul Products, Inc., facility (Facility) in Scottsville, Kentucky (Figure 1). The purpose of the risk assessment is to determine whether there are potential unacceptable human health and ecological risks associated with future exposures to chemicals of potential concern (COPCs) from the Facility. The risk assessment for the Facility is being conducted as part of the Corrective Measures Study (CMS) Work Plan (401 Kentucky Administrative Regulations [KAR] 100:030) in fulfillment of the Resource Conservation and Recovery Act (RCRA) process. The technical approach for the risk assessment in this work plan is based on previous investigations, analyses, and modeling conducted at the site, including previous reports and discussions with the Kentucky Department for Environmental Protection (KDEP), Division of Land, Hazardous Waste Branch (KHWB) as provided under 401 KAR 100:030 Section 7(2)(c) 1 and 2 and Section 8(3)(c). Per discussions with the KDEP, the risk characterization will be performed using the KDEP default screening-level exposure parameters (KDEP 2002); however, the uncertainty section will include a quantitative calculation of risk using more recent federal and state guidance and toxicological information.

Part of the CMS is to conduct human health and ecological risk assessments to determine potential unacceptable risks from existing Facility conditions and to identify matters that potentially need to be addressed. This work plan presents the complete conceptual site model (CSM), discusses the selection of media-specific COPCs, identifies current and future potential receptors, characterizes potentially complete exposure pathways, and presents the sources of toxicological criteria for the identified COPCs for the human health risk assessment (HHRA). In addition, this work plan presents equations that will be used to calculate potential risks to receptors via complete exposure pathways and the exposure assumptions for the equations. For the ecological risk assessment (ERA), this work plan presents the screening level ERA (SLERA) that will be conducted to determine if a more detailed baseline ERA is necessary.

The risk assessment will be conducted in accordance with KDEP remediation requirements, KDEP risk assessment guidance, and U.S. Environmental Protection Agency (EPA) guidance:

- Remediation requirements outlined in 401 KAR 100:030
- Kentucky Risk Assessment Guidance (KDEP 2002)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part A (RAGS Part A; EPA 1989)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments (RAGS Part D; EPA 2001a)
- Guidance for Data Usability in Risk Assessment (EPA 1992)
- Regions 3, 6, and 9 Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (EPA 2010)
- EPA Office of Solid Waste and Emergency Response (OSWER) draft vapor intrusion guidance (EPA 2002a)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part F, Supplemental Guidance for Inhalation Risk Assessment (RAGS Part F; EPA 2009a)
- EPA Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final (EPA 1997a)

- EPA Ecological Risk Assessment Guidance: Guidelines for Ecological Risk Assessment (EPA 1998)

1.1 SITE DESCRIPTION AND HISTORY

The Facility consists of approximately 29 acres (Figure 2). The Facility was used for the manufacture of different products by multiple companies; on August 30, 2006, Federal-Mogul ceased Facility manufacturing and reconditioning of brake products at the site. The Facility is currently inactive. The area surrounding the Facility consists of a mixed-use neighborhood that includes light industrial, residential, and agricultural properties. Properties immediately adjacent to the Facility include farmland and pastureland to the north and east; the Sumitomo Electric Wiring Systems, Inc. facility, residences, and small businesses to the west along State Route 31E/231; and residences and agricultural property to the south.

The Facility, as shown on the topographic map (Figure 1), consists of land that gently slopes from the east-southeast to the west-northwest. Topographic elevations range between approximately 760 feet above mean sea level (ft-AMSL) to 820 ft-AMSL. Unconsolidated material is present from the surface to depths ranging from 6 to 29 feet below ground surface (ft-bgs). Bedrock consisting of limestone, shale, and siltstone horizons is encountered from 6 to 29 ft-bgs. Small non-interconnected cavities or vugs filled with calcite, chert, or gypsum deposits were observed in portions of recovered bedrock cores during installation of onsite bedrock wells. During borehole advancement into the local bedrock horizons, no large scale solution cavities or conduits were encountered in the penetrated bedrock horizons. Groundwater occurrence and flow in the bedrock aquifer is controlled by fractures, joints, and bedding planes within the bedrock horizons. In addition, more impermeable shale horizons in the local stratigraphy will impede vertical groundwater movement. Where the vertical migration of groundwater is impeded, groundwater flow will occur along the upper contact of the low permeability horizon and result in a spring or seep where groundwater intersects the local land surface.

Groundwater in the unconsolidated aquifer ranges in depth from approximately 15 to 26 ft-bgs. The flow direction of the unconsolidated groundwater is towards the north-northwest. Depth to the bedrock aquifer ranges from 12 to approximately 40 ft-bgs across the site. Groundwater elevations recorded from bedrock wells indicate that groundwater flows to the west-northwest. However, given the karstic development of the bedrock horizons, there is the potential that groundwater could migrate offsite in other directions via interconnected and solution enhanced fractures.

Surface runoff flows via a drainage swale on the west side of the property north to Ramble Creek, which flows from east to west and is a tributary to Trammel Creek. According to 401 KAR 10:026, Section 5(2)(a), the designated uses for Ramble Creek are warm water aquatic habitat, primary and secondary contact recreation (swimming, boating, and fishing), and domestic water supply; Ramble Creek is categorized as a high quality water (401 KAR 10:030, Section 1(3)). The designated uses for Trammel Creek are similar (warm water aquatic habitat, fish consumption, and primary and secondary contact recreation; Kentucky Environmental and Public Protection Cabinet 2008). Trammel Creek is further categorized as an outstanding state resource water (401 KAR 10:026, Section 5, Table C), as well as an exceptional water (401 KAR 10:030, Section 1, Table 2).

A small pond (approximately 1 acre), fed by surface runoff from the site and the surrounding pastureland, is located adjacent to the southwest corner of the Facility. A section of Ramble Creek was dammed by the property owner creating an approximately 13-acre private lake, which is located approximately 3,500 feet downstream of the Facility (Figure 1).

1.1.1 Site History

The Facility has conducted RCRA corrective action (i.e., Site Characterization under 401 KAR 100:030 Section 7) under Agreed Order DWM 89098 (Item C. #11 through #14), executed during July 1991, between the Kentucky Natural Resources and Environmental Protection Cabinet and Cooper Industries.

Several investigations were conducted from 1998 through 2008 as part of the RCRA Facility Investigation (RFI) Site Characterization. A summary of previous investigations is provided in Section 2.0 of the CMS Work Plan. Findings of the investigations indicate that disposal of wastewater treatment sludge and chemicals by previous owners (Kirsch and Scottscraft) in onsite disposal areas (Figure 2) occurred between 1972 and 1979, which have affected site soils and groundwater.

1.1.1.1 Soil

Elevated concentrations of metals, cyanide, and chlorinated volatile organic compounds (VOCs) were detected in soil samples from within and adjacent to the former disposal areas. Chlorinated VOCs were also detected at elevated concentrations in soil samples collected beneath the Facility in the vicinity of the former alleyway, which is now within the current building footprint and the former cyanide treatment system area (Figure 3).

In 2005, a soil Interim Remedial Measure (IRM) was conducted to excavate material from a former disposal area where reported trichloroethene (TCE) concentrations in soils exceeded regulatory levels and to evaluate subsurface anomalies identified during a geophysical survey conducted during a source area investigation (Environmental Strategies Corporation 2003). A former disposal area (Figure 2) was excavated to bedrock (ranging in depth from 14 ft-bgs to 16 ft-bgs), five test trenches were completed to investigate the anomalies, and approximately 55 drums were removed from the disposal area and trenches. Excavated materials were disposed of offsite and the disposal pit and trenches were backfilled with clean fill.

1.1.1.2 Groundwater and Surface Water

Cyanide, VOC, and total metals concentrations have been detected in unconsolidated aquifer monitoring wells installed in the vicinity of the former disposal area. VOC and metals concentrations have been reported in onsite bedrock monitoring wells. With KDEP approval, a bedrock groundwater pump and treatment system was installed at the Facility in 2008 as a groundwater IRM to address elevated concentrations of VOCs in onsite groundwater. Groundwater is extracted from monitoring wells MW-12B (EW-2) and MW-14B (EW-1) and is transferred via underground piping to the treatment building where the recovered groundwater is treated using air strippers and granulated activated carbon units. The treated groundwater is discharged to the drainage swale in the northwestern corner of the property under Kentucky Pollutant Discharge Elimination System Permit No. KY0106585. The groundwater IRM has significantly reduced TCE concentrations in Ramble Creek.

Several investigations were conducted to determine the potential fate and transport of onsite COPCs in groundwater to offsite receptors and surface water. A ground penetrating radar survey identified several anomalies onsite that might be indicative of immature karst development in the bedrock (WSP Environmental Strategies 2007). Karst survey activities were conducted from 2004 through 2006 to identify private water supply wells, seeps, springs, and karst features (i.e., sinkholes) in the vicinity of the Facility (Environmental Strategies Consulting 2004 and 2006a). Based on these survey evaluations, 17 water supply wells and 10 springs were identified in the area (up to approximately 3 miles) of the Facility. The wells and springs are used as domestic, agriculture, or livestock water sources. These water supplies are located north, west, southwest, and south of the Facility.

During Karst Survey investigation activities, groundwater samples were collected for VOC analysis from water supply wells and springs used as domestic water sources to evaluate whether VOCs in the onsite bedrock aquifer were affecting local water supplies. VOCs were detected in two offsite water supply wells. One well is approximately 6,000 feet southwest (downgradient) and the second water well is approximately 3,000 feet north-northeast (upgradient) of the Facility. In addition, VOC concentrations were detected in surface water samples collected from Ramble Creek (Environmental Strategies Consulting 2006b).

To determine the migration of site groundwater to potential offsite exposure points, a Dye Trace Study was conducted in 2006. Three distinct tracer dyes were injected at three specific onsite locations; two bedrock monitoring wells MW-12B and MW-14B, and the formal disposal area from which soil was excavated during the 2005 soil IRM (Figure 2). During the dye trace, springs, seeps, private water wells, onsite monitoring wells, and local streams were monitored for 6 months to determine where dye injected in the bedrock aquifer resurged in surface water. The Dye Trace Report identified potential offsite exposure pathways (to Ramble Creek, Casey Branch, and Trammel Creek) and endpoints of site groundwater that migrates from the Facility (WSP Environment & Energy, Crawford Hydrology Laboratory [CHL], and Hoffman Environmental Research Institute [HERI] 2009). Results of the Dye Trace Study indicated that the three tracer dyes injected at the Facility were not recovered or detected in either of the two monitored domestic water supply wells noted above. VOC concentrations reported in these two domestic water wells appear to be from unknown sources not associated with the Facility. The dye trace study concluded that the major groundwater flow pathway was from the Facility to Ramble Creek.

Federal-Mogul engaged an independent risk assessment firm, Toxicology Excellence for Risk Assessment (TERA), to evaluate short-term and long-term risks associated with Ramble Creek surface water. TERA evaluated existing data and based its work on long-term risk values for TCE from multiple U.S. and international agencies (EPA, Agency for Toxic Substances and Disease Registry, Health Canada, World Health Organization, National Institute for Public Health and the Environment, California Environmental Protection Agency [CalEPA]). Relying especially on the 2006 CalEPA toxicity value for TCE, TERA concluded that potential exposure to VOC concentrations reported in the May 2006 surface water samples collected from Ramble Creek are "without noncancer health risks and are without significant cancer health risks" to the local population, including small children (WSP Environmental Strategies and TERA 2006). KDEP provided comments on the TERA report to Federal-Mogul and WSP in January 2011. KDEP's risk reviewer agreed with the findings of the TERA report for the short-term child scenario; however, by using the KDEP screening-level default exposure assumptions and a KDEP toxicity value for TCE, KDEP's risk reviewer indicated "a potential for risk above *de minimis* (1E-06) with long-term exposure."

During the Karst Survey investigation activities, an abandoned water well (designated W12) was identified approximately 200 feet west of the Facility at a local residence. According to the property owner, this water well has not been used since the mid 1960'swhen municipal water service became available to the residence and other nearby properties (including construction of the original Facility). During performance of the KHWB-approved Offsite Exposure Pathway Evaluation Work Plan field activities, groundwater samples were collected on March 2011 from W12 for analysis of VOCs. This abandoned water well was inspected, and the total well depth measured to be approximately 50 ft-bgs, and the static water-level approximately 30 ft-bgs. The groundwater sample and its duplicate contained 5.3 micrograms per liter (µg/l) and 5.4 µg/l of cis-1,2-dichloroethene and 9.1 µg/l and 9.5 µg/l of TCE. The sampling results from this abandoned well indicate that offsite groundwater near the Facility has been impacted, potentially by historic Facility-related activities.

1.1.1.3 Indoor Air

In 2006, indoor air samples were collected at the Facility to evaluate potential impacts to Facility workers as a result of elevated concentrations of chlorinated VOCs in soil and groundwater. As part of the indoor air sampling event, a survey of chemicals used in the Facility was conducted to determine if VOCs detected in soil or groundwater were currently in use. Several VOCs were detected in the indoor air samples; however, they were not site-related COPCs, and the concentrations detected in the outdoor ambient sample were for the most part, greater than concentrations detected in the indoor samples of the Facility. The constituents detected in the indoor air and ambient air samples were identified as occupational in origin during the site inspections and materials inventory conducted concurrently with the sample event. In accordance with the EPA Draft Guidance on Vapor Intrusion (EPA 2002a), the potential

exposure to facility workers was determined to be an occupational exposure. Further discussion and the results of the indoor air survey are presented in Appendix A-1.

2 Human Health Risk Assessment

The HHRA process involves four components: hazard identification, exposure assessment, toxicity assessment, and risk characterization.

- The hazard identification includes the statistical evaluation of the environmental media data, and the selection of COPCs to be used in the remainder of the risk assessment.
- In the exposure assessment, the potential for exposure to COPCs for the potential human receptors identified in the CSM is characterized. Potential exposure pathways are evaluated to determine which, if any, are potentially complete. Next, the exposure point concentrations (EPCs) of COPCs in each affected medium are calculated, and are used in conjunction with exposure assumptions to determine systemic doses for the applicable potential receptors. Finally, the magnitude, frequency, and duration of these potential exposures are integrated to calculate estimates of daily intakes over a specified exposure period of time.
- The relationship between the potential extent of exposure and the toxicological effects of the exposure is estimated for each COPC in the toxicity assessment. The COPC-specific toxicity criteria are presented, including cancer slope factors (CSFs) or unit risk factors (URFs) for carcinogens and reference doses (RfDs) or reference concentrations (RfCs) for non-carcinogens.
- Integration of the results of the toxicity assessment and the exposure assessment to derive quantitative estimates of human health risks is accomplished in the risk characterization for carcinogens and non-carcinogens. This component also includes a discussion of the uncertainties and limitations inherent in the estimation of the potential risks, and the potential risks associated with background concentrations.

2.1 CONCEPTUAL SITE MODEL

As discussed in Section 1.1, the Facility is a former light industrial facility, which is currently inactive. The property is in a mixed-use area and neighbors include residential, commercial, and light industrial properties. The property is not secured by a fence so trespassers have access to the property. However, the building is locked at all times and an alarm system is in place. The Facility is vacant, and no chemicals for manufacturing are stored at the Facility. The planned future use of the Facility is industrial, and the surrounding area will likely remain a mixed-use area that includes residential, industrial, and commercial uses. The HHRA evaluates onsite and offsite receptors associated with these current and future uses. The HHRA will also evaluate potential exposures of construction and utility workers to COPCs on the property in the event of future construction or utility work on the property.

Ramble Creek and Casey Branch are tributaries to Trammel Creek. Ramble Creek and Casey Branch are classified as high quality waters; Trammel Creek is classified as exceptional water. The following use designations apply to the surface water bodies in the vicinity of the site: warm water aquatic habitat, fish consumption, primary contact recreation (swimming), and secondary contact recreation (boating and fishing). The surface water bodies are also used for agricultural purposes (water for livestock) when they pass through pastures. A man-made lake formed by a dam on Ramble Creek is used for recreation (i.e., boating, swimming, and fishing).

Affected soils are found in the identified source areas onsite: the former waste disposal area (Figure 2), the former cyanide treatment area, and beneath the building (i.e., the former alleyway, Figure 3). No affected soils were identified offsite.

Based on previous investigations, groundwater in the unconsolidated material flows along the bedrock interface towards the northwest and discharges to Ramble Creek; bedrock groundwater flows to the

west-northwest discharges to Ramble Creek which eventually discharges to Trammel Creek. The Dye Trace Report (WSP, CHL, and HERI 2009) concluded that the major groundwater flow pathway is to Ramble Creek with potential minor flow pathways to the south (Casey Branch and Trammel Creek) and southwest (Trammel Creek). These potential offsite exposure pathways will be further evaluated during performance of a pre-design investigation as described in Appendix B of the CMS Work Plan.

Currently, potable water is supplied to the Facility and the residential, industrial, and commercial facilities in the vicinity of the Facility by the Allen County Water District. Two karst surveys were conducted that evaluated potable water supplies in the vicinity of the Facility (Environmental Strategies Consulting 2004 and 2006a). Several springs and private water wells were identified in the Karst Survey Report and its addendum. The wells and springs are used as domestic, agriculture, or livestock water sources. During Karst Survey investigation activities, groundwater samples were collected for VOC analysis from water supply wells and springs used as domestic water sources to evaluate whether VOCs in the onsite bedrock aquifer may be affecting local water supplies. VOCs were detected in two offsite water supply wells. However, based on the Dye Trace Study results, VOC concentrations reported in these domestic water wells appear to be from unknown sources not associated with the Facility.

During the Karst Survey investigation activities, an abandoned water well (designated W12) was identified approximately 200 feet west of the Facility at a local residence. Groundwater samples were collected on March 2011 from W12 for analysis of VOCs. VOCs were detected in this abandoned well. Therefore, the HHRA will evaluate the potential for future offsite receptors to be exposed to COPCs in groundwater via ingestion of tap water, dermal contact by bathing or showering, or inhalation of vapors during a shower.

The HHRA will evaluate the current and future soil exposure pathways based on the current Facility layout. The majority of the property is covered by buildings, hardscape (e.g., asphalt or concrete), or vegetation. Surface soils have not been affected or are beneath the building or areas of hardscape, with the exception of a small area north of the Facility, adjacent to an asphalt driveway. Arsenic was detected at an elevated concentration (282 milligrams/kilogram [mg/kg]) in sample SB-68 from 0 to 1 ft-bgs collected as part of the RFI Phase V activities. At this time, delineation of the affected surface soil area is outlined in the Surface Soil Evaluation Work Plan (Appendix D of the CMS Work Plan). Based on the results of the delineation, the presence of affected surface soils will be reevaluated. Affected subsurface soils are present in the identified source areas. The KDEP defines surface soil as soil found at ground surface to 1 ft-bgs. For the purpose of the HHRA, affected surface soil will include data from future surface soil samples collected from 0 to 1 ft-bgs and historical data from 0 to 2 ft-bgs. Affected subsurface soil will include soil at depths greater than 2 ft-bgs to 15 ft-bgs, which is the minimum depth where groundwater is encountered at the site.

The indoor vapor intrusion pathway will be evaluated as part of the HHRA. Indoor air samples were collected at the Facility in August 2006; however, as discussed previously, the compounds detected in the indoor air samples were determined to be from the site operations at the time and not from vapor intrusion of VOCs from affected soil and groundwater. Therefore, the EPA (2002a) OSWER draft vapor intrusion guidance will be used to evaluate potential onsite and offsite exposures. The OSWER draft guidance is primarily geared towards residential scenarios, and it is not intended for use in evaluating primarily occupational settings; however, if potential exposures are a result of environmental exposures, this guidance may be applicable. The KHWB currently does not have vapor intrusion guidance, but has established the Vapor Intrusion Workgroup in 2008 to address the issue. KHWB currently follows the OSWER draft guidance as the Workgroup is still in the process of identifying a state guidance (KDEP 2010).

The potential for offsite receptors to be exposed to COPCs in groundwater migrating offsite to surface water will also be evaluated in the HHRA. Metals and cyanide have the potential to precipitate out of surface water and accumulate in stream sediments. No sediment samples have been collected in

Ramble Creek, the primary receiving water of affected groundwater from the site. To determine whether elevated concentrations of metals or cyanide are present in the sediment, samples will be collected from Ramble Creek as described in the Offsite Exposure Pathway Evaluation Work Plan (Appendix B of the CMS Work Plan). This pathway may be evaluated based on the results of these sediment samples.

The above described CSM is subject to revision based on groundwater, surface water, and sediment results collected as part of the pre-design investigations. Any potentially complete exposure pathway will be evaluated during preparation of the HHRA.

2.1.1 Potential Receptors

Potential receptors are selected from all current and foreseeable land uses based on the potential frequency and duration of exposure and potentially complete exposure pathways identified in the CSM. Typical receptors evaluated include adult and child residents, facility employees, maintenance workers, utility and construction workers, trespassers, and recreational users. The following sections identify potential onsite and offsite receptors and exposure pathways (Tables 1 and 2).

2.1.1.1 Potential Onsite Receptors and Exposure Pathways

Based on the current land use as discussed above, the potential onsite receptors include outdoor maintenance or lawn service personnel. Employees were not selected as potential current receptors because the Facility is currently vacant, and no security personnel are onsite. A trespasser was not selected as a potential receptor because their exposure would be less than the maintenance or lawn service personnel (i.e., longer exposure duration, greater exposure frequency). Potable water is supplied to the Facility, and the building is locked and secured by an alarm system; there are no surface water bodies on the property. Therefore, the potential current onsite receptors and complete exposure pathways are:

- Outdoor maintenance/lawn service personnel exposed to COPCs in surface soil via incidental ingestion and dermal contact

The potential future receptors are the same as the current potential receptors with the addition of the facility employee, construction worker, and utility worker. Future visitors, trespassers, and facility maintenance workers will not be evaluated because the facility employee risks are more conservative than the visitors, trespassers, and facility maintenance workers (i.e., longer exposure duration, greater exposure frequency). Residents were not selected because the current use and development of the property is expected to remain industrial via an environmental covenant, and it is unlikely that the Facility building will be demolished and residential units constructed on the property.

The potential future onsite receptors and complete exposure pathways are:

- Outdoor maintenance/lawn service personnel exposed to COPCs in surface soil via incidental ingestion and dermal contact
- Facility employee exposed to COPCs in surface soil via dermal contact and incidental ingestion during outside activities and exposed to volatile COPCs in groundwater by inhalation of volatiles in indoor air as a result of vapor intrusion
- Construction and utility workers exposed to COPCs in subsurface soils via dermal contact and incidental ingestion when working in an excavation or construction trench and exposed to volatile COPCs in groundwater by inhalation of volatiles as a result of vapor intrusion in trenches and excavations

2.1.1.2 Potential Offsite Receptors and Exposure Pathways

As a result of the mixed land uses (residential, industrial, and commercial) surrounding the Facility, current and future potential offsite receptors are identical. Resident adults and children, utility workers,

and construction workers are identified as potential residential land use receptors. Receptors associated with commercial and industrial land uses (employees, maintenance workers, and visitors) will not be evaluated because the residential land use receptors provide a more conservative estimate of potential risk. The complete exposure pathways are the same for current and future receptors with the exception of the potential for exposure to COPCs in groundwater via domestic water use. There are no current exposures to affected groundwater through domestic water use because potable water is supplied by the Allen County Water District. However, because VOCs were detected in an abandoned residential well near the Facility, there is the potential that future residents could be directly exposed to COPCs in groundwater if they installed a water well on their property. In order to address and eliminate exposure pathways associated with this abandoned water well and property, Federal-Mogul may seek and obtain an Environmental Covenant under KRS Chapter 224.80, or other enforceable deed restriction, prohibiting future use of property groundwater. If such an Environmental Covenant is recorded for a property, the HHRA will eliminate the relevant pathway for that property.

The potential offsite receptors and exposure pathways are:

- Current and future residents (adults and children) exposed to volatile COPCs in groundwater by inhalation of volatiles in indoor air as a result of vapor intrusion and exposed to COPCs in groundwater that have migrated to offsite surface water and sediments through incidental ingestion and dermal contact of surface water during recreational use (i.e., wading).
- Current and future construction and utility workers exposed to volatile COPCs in the groundwater by inhalation of volatiles as a result of vapor intrusion into trenches or excavations.
- Future residents (adults and children) exposed to COPCs in groundwater via ingestion of tap water, dermal contact by bathing or showering, or inhalation of vapors during a shower and general household water use. This exposure pathway would not be applicable in an Environmental Covenant or deed restriction is recorded, as referenced in this section above.

2.2 HAZARD IDENTIFICATION

The purpose of the hazard identification process is to summarize the environmental media data, and to screen the data to determine the COPCs that will be evaluated further in the risk assessment process.

2.2.1 Data Management

The environmental media data to be used in the HHRA will be managed in an electronic database, and will be compiled by constituent, medium, sample location, and sample depth, if applicable. All descriptive and statistical analysis of the data will be performed using the most recent version of ProUCL that was developed for the EPA.

Surface soil data (historical data from the ground surface to 2 ft-bgs; data collected as part of the CMS activities from the ground surface to 1 ft-bgs) and subsurface (greater than 2 ft-bgs to 15 ft-bgs) data collected during previous investigations will be included in the electronic database. As noted in discussions with the KHWB on August 24, 2009, the historical surface soil data from the Phase I (1998), Phase II (2000), Phase III (2001), Phase IV (2002), and additional source area investigations (2005, 2006, and 2008) will be included in the risk assessment to evaluate exposures to surface soil. Soil samples located in excavation areas will not be included in the database.

The onsite groundwater database will include the monthly sampling results from onsite bedrock wells collected during the 12 months preceding the start of the HHRA. The offsite groundwater database will include all groundwater results from the abandoned well W12 and the monthly sampling results from the headwaters of Ramble Creek (location S47) collected during the 12 months preceding the start of the HHRA.

Surface water data collected from Ramble Creek from 2008 to present as part of ongoing monthly performance monitoring activities will be included in the database. Based on the findings of the Dye Trace Report, additional offsite surface water, sediment, and groundwater samples will be collected and evaluated to address potential offsite exposure pathways and data gaps (Appendix B of the CMS Work Plan).

2.2.2 Selection of COPCs

Identification of COPCs is based on comparing maximum measured constituent concentrations with toxicity-based screening concentrations. Constituents selected as COPCs will be evaluated further in the HHRA.

Per discussion with KDEP (2011), the most recent EPA RSLs will be used as screening criteria. Additionally, the Kentucky Risk Based Screening Values for TCE will be used for all environmental media (KDEP 2004). Surface soil and subsurface soil data will be compared to the EPA RSLs for industrial soil. Groundwater data will be compared to the federal maximum contaminant levels, the EPA RSLs for residential tap water, and the generic screening levels in the OSWER draft vapor intrusion guidance (i.e., target groundwater concentrations corresponding to target indoor air concentrations, which assume a risk of 1×10^{-6}).

Surface water data will be compared to the Kentucky Surface Water Standards (401 KAR 10:031, Section 6). Standards for use of surface water as a potential drinking water source use are available: Kentucky Surface Water Standards for Drinking Water Source (DWS) Use (401 KAR 10:031, Section 6). However, according to 401 KAR 10:031, Section 5, the DWS use standards are applicable at the point of withdrawal. No DWS use intakes were identified along Ramble Creek or Trammel Creek in the vicinity of the Facility; however, as a conservative measure, the DWS standards will also be used for selection of COPCs. Sediment data will be compared to the EPA RSLs for residential soil.

3 Exposure Assessment

The purpose of the exposure assessment is to predict the magnitude and frequency of potential human exposure to each identified COPC as a result of the hazard identification. The CSM describes the potential receptors and media of concern.

3.1 EXPOSURE POINT CONCENTRATION

Medium-specific EPCs will be a reasonable maximum exposure (RME) statistic. The RME, which is based on the 95-percent upper confidence level of the mean will be calculated using the most recent version of the EPA's ProUCL and will be dependent on the distribution of the data. If the RME exceeds the maximum detected concentration of a COPC, then the maximum detected concentration will be used as the RME for that EPC. Sample results that are qualified as being below the detection level (non-detect) will be evaluated based on recommendations from the ProUCL software.

Future onsite facility employees and current and future offsite residents could potentially be exposed to COPCs in groundwater as a result of vapor intrusion to indoor air. Thus, an EPC for COPCs for the indoor air exposure pathway will need to be derived. Currently, there are no models available to estimate concentrations of volatiles migrating to indoor air from groundwater within a fractured or karstic bedrock system. The Johnson and Ettinger (J&E; 1991) model, Version 3.1, estimates indoor air concentrations from affected soils, groundwater, or soil gas within a homogeneous soil mixture. Conservatively, the potential EPC for exposures to onsite and offsite receptors to VOCs migrating to indoor air from groundwater will be modeled using the J&E model and the corresponding user's guide (EPA 2004a) by assuming that groundwater concentrations in the bedrock wells occurs at the bedrock/unconsolidated material interface or an average of 14 ft-bgs. This is a highly conservative assumption and will likely overestimate potential onsite and offsite exposures because degradation of the COPCs and potential attenuation of the vapor through the bedrock are not considered. Assumptions used in the J&E models will be based on site-specific data.

In addition to the potential for vapor intrusion of VOCs, future offsite residents could be exposed to VOCs in indoor air as a result of water use, such as showering, washing dishes, bathing, washing clothes, and cooking. However, as noted in Section 2.1.1.2, this pathway may be eliminated if an Environmental Covenant or deed restriction is in place. If the pathway is not eliminated, this text would apply. The equation for calculating an air concentration as a result of water use throughout the house is based on the Schaum et al. (1994) Whole House Exposure Model. The formula and KDEP (2002) default values for each parameter are as follows:

$$CA = \frac{WHF \times CW \times f}{HV \times ER \times MC}$$

Where:

CA = concentration in air (milligrams/cubic meter [mg/m^3])

WHF = water flow rate in whole house (890 liters/day)

CW = concentration in water (EPC of COPC in groundwater in milligrams per liter [mg/l])

f = fraction of contaminant that volatilizes (0.5 unitless)

HV = house volume (450 m^3)

ER = exchange rate (10 air changes/day)

MC = mixing coefficient (0.5 unitess)

An EPC for the construction and utility worker exposed to VOCs in the groundwater during excavation activities will be estimated using the model for exposure of workers to volatile COPCs in a construction or utility trench developed by the Virginia Department of Environmental Quality (VDEQ) for the Virginia Voluntary Remediation Program risk assessment guidance (VDEQ 2010). To estimate the migration of VOCs in groundwater to air in a construction trench, the model uses a combination of a vadose zone model to estimate volatilization of gases from contaminated groundwater into a trench, and a box model to estimate dispersion of the contaminants from the air inside the trench into the aboveground atmosphere. The general equation for calculating the air concentration in the trench is:

C_{trench} = $C_{groundwater}$ x VF

Where:

C_{trench} = concentration of the COPC in air within the trench (µg/m^3)

$C_{groundwater}$= EPC of COPC in groundwater (µg/l)

VF = volatilization factor (liters/m^3)

Studies suggest that if the ratio of trench width (relative to wind direction) to trench depth is less than or equal to 1, circulation cells will be set up within the trench that limit the degree of gas exchange with the atmosphere. VDEQ has assumed an air exchange in this case of 2 per hour. If the ratio of trench width to trench depth is greater than 1, air exchange between the trench and aboveground atmosphere is not restricted, thus air exchange is assumed to be 360 per hour, which is based upon the ratio of trench depth to the average wind speed. Exposure assumptions for this model are outlined in the VDEQ guidance and included in Appendix A-2.

3.2 EXPOSURE ASSUMPTIONS

Tables 3 through 15 present the applicable exposure assumptions for potential future receptors identified in the CSM. The exposure assumptions used in the HHRA are based on site-specific conditions or default exposure assumptions presented in the following guidance documents:

- Kentucky Risk Assessment Guidance (KDEP 2002)
- RAGS Part A (EPA 1989)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (RAGS Part E; EPA 2004b)
- RAGS Part F (EPA 2009a)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Supplemental Guidance – "Standard Default Exposure Factors" (EPA 1991)
- Exposure Factors Handbook, Volumes I, II, and III (EPA 1997b)Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002b)
- Regions 3, 6, and 9 RSLs for Chemical Contaminants at Superfund Sites (EPA 2010)
- VDEQ's Voluntary Remediation Program risk assessment guidance (VDEQ 2010)

3.3 EXPOSURE EQUATIONS AND MODELS

The following are the equations for calculating the intake of COPCs:

Inhalation of air:

Intake (mg/m^3) = (CA x ET x EF x ED x CF) / (AT)

Incidental ingestion of soil or sediments:

Intake (mg/kg-day) = (CS x IR x CF x FI x EF x ED) / (BW x AT)

Dermal contact with soil or sediments:

Absorbed dose (mg/kg-day) = (CS x SA x AF x ABS x EF x ED x CF) / (BW x AT)

Incidental ingestion of surface water or ingestion of groundwater:

Intake (mg/kg-day) = (CW x IR X ET x EF X ED) / (BW x AT)

Dermal contact with surface water:

Absorbed dose (mg/kg-day) = (CW x SA x PC x ET x EF x ED x CF) / (BW x AT)

Dermal contact with groundwater:

Absorbed dose (mg/kg-day) = (DA_{event} x EV x ED x EF x SA) / (BW x AT)

Where:

CA = concentration in air ($\mu g/m^3$ or mg/m^3)

ET = exposure time (hours/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)

CF = conversion factor (1×10^{-6} kg/mg, 1×10^{-3} liters/cubic centimeters [cm^3], or 1×10^{-3} mg/µg)

AT = averaging time (days or hours)

CS = concentration in soil or sediment (mg/kg)

CW = concentration in water (mg/l)

IR = ingestion rate (mg/day, liters/hour, or liters/day)

FI = fraction ingested from site source (unitless)

BW = body weight (kg)

SA = skin surface area available for contact (square centimeters [cm^2] or cm^2/day)

AF = soil to skin adherence factor (mg/cm^2)

ABS = chemical-specific absorption factor (unitless)

PC = chemical-specific permeability constant (cm/hour)

DA_{event} = absorbed dose per event (mg/cm^2–event)

EV = event frequency (events/day)

4 Toxicity Assessment

The purpose of the toxicity assessment is to determine the relationship between the dose of a constituent taken into the body and the probability that an adverse effect will result from that dose. The hierarchy of toxicity values (EPA 2003a) includes: the Tier 1 Integrated Risk Information System (EPA 2011) toxicity values; Tier 2 toxicity values include the Provisional Peer Reviewed Toxicity Values from the National Center for Environmental Assessment/Superfund Health Risk Technical Support Center; and Tier 3 toxicity values include other EPA and non-EPA values including CalEPA toxicity values, the Agency for Toxic Substances and Disease Registry Minimal Risk Levels, and the EPA Health Effects Assessment Summary Tables (EPA 1997c). The KDEP (2004) published cancer slope factor for TCE is 3.22E-01 per mg/kg-day. Constituents with dermal adsorption factors will be evaluated for dermal soil exposure in accordance with RAGS Part E, Exhibit 4-1 (EPA 2004b).

Quantitative estimates of the potency of COPCs include two sets of toxicity values, one for carcinogenic effects and one for non-carcinogenic effects. For carcinogenic effects, EPA assumes a non-threshold toxicological mechanism that assumes there is no level of exposure that does not pose a probability that an adverse effect will result from that dose. Toxicity criteria for non-carcinogens assume that there is a threshold effects level, below which adverse health effects are not expected to occur.

4.1 CARCINOGENIC EFFECTS

For carcinogenic effects, EPA (2005) assigns a weight-of-evidence descriptor to each constituent and then, if applicable, a CSF or URF is calculated. The weight-of-evidence descriptor is based on the likelihood that the constituent is a human carcinogen. The following are the weight-of-evidence descriptors:

- Carcinogenic to humans – convincing epidemiologic evidence demonstrating causality between human exposure and cancer, or exceptionally when there is strong epidemiological evidence, extensive animal evidence, knowledge of the mode of action, and information that the mode of action is anticipated to occur in humans and progress to tumors
- Likely to be carcinogenic to humans – available tumor effects and other key data are adequate to demonstrate carcinogenic potential to humans, but does not reach the weight-of-evidence for the descriptor of carcinogenic to humans
- Suggestive evidence of carcinogenic potential – evidence from human or animal data is suggestive of carcinogenicity, which raises a concern for carcinogenic effects but is judged not sufficient for a stronger conclusion
- Inadequate information to assess carcinogenic potential – available data are judged inadequate to perform an assessment
- Not likely to be carcinogenic to humans – available data are robust for deciding that there is no basis for human hazard concern

EPA determines CSFs for oral exposure and URFs for inhalation exposure for those chemicals that are known or likely human carcinogens. The CSFs and URFs are upper-bound estimates of the excess cancer risk due to continuous exposure to a constituent averaged throughout the course of a 70-year lifetime. A CSF has units of 1/(mg of constituent/kg of body weight/day), or $(\text{mg/kg-day})^{-1}$. A URF is expressed in units of 1/μg of constituent/m^3 of air, or $(\mu g/m^3)^{-1}$. The basis of CSFs and URFs are data from lifetime animal bioassays, although human data are used when available. The carcinogenic dose-response values, as well as their sources and health effects of concern, will be included in the HHRA in the RAGS Part D format.

The EPA-recommended procedure for addressing chemicals that have been determined to cause cancer by a mutagenic mode of action (MOA) will be incorporated in the HHRA. A cancer caused by a mutagenic MOA is thought to pose higher risks to early life than other non-mutagenic MOA chemicals. In evaluating carcinogens with mutagenic MOAs, age dependent adjustment factors are used to calculate risks associated with early-life exposures (EPA 2005).

4.2 NON-CARCINOGENIC EFFECTS

Non-carcinogenic effects, such as organ damage or reproductive effects are evaluated by RfDs for oral exposure or RfCs for inhalation exposure. The basis of a chronic RfD or RfC calculation is usually the highest dose that results in a no observed adverse effect level (NOAEL) after chronic (usually lifetime) exposure in animal experiments. The NOAEL is then divided by an uncertainty factor, and occasionally an additional modifying factor, to obtain the RfD or RfC. Uncertainty and modifying factors are typically factors of 10 that account for interspecies variation and sensitive human populations. Additional factors of 10 are included in the uncertainty factor if the RfD or RfC is based on the lowest observed adverse effect level instead of the NOAEL, or an experiment that includes a less-than-lifetime exposure. An RfD has units of mg/kg-day. An RfC is expressed in units of mg/m^3. The non-carcinogenic dose-response values, as well as the source and primary target organ, which is the organ that is most affected and experiences critical organ effects, will be included in the HHRA in the RAGS Part D format.

5 Risk Characterization

The purpose of the risk characterization is to provide a conservative estimate of the potential risk resulting from exposure to COPCs identified in the environmental media of the Federal-Mogul Facility. Included in this section is a quantitative estimate of potential carcinogenic and non-carcinogenic risks for each complete exposure pathway for each receptor using the default KDEP screening level exposure assumptions and toxicity information. Per discussions with the KDEP, recent federal and state guidance and toxicity information will be used to develop a more site-specific risk characterization in the uncertainty section of the HHRA.

Risks will be summed across pathways and media for each receptor under current and future site use conditions. A summary of the total site cancer risks for each receptor group will be in presented the HHRA and compared to KDEP's screening level *de minimis* risk level of 1×10^{-6}. For non-carcinogens, the individual hazard quotients (HQs) will be summed for an overall hazard index (HI). If the HI is less than 1.0, then no adverse health effects are likely associated with exposures to COPCs. However, if the total HI is greater than 1.0, separate endpoint-specific HIs will be calculated based on target organs (e.g., HQs for neurotoxins are summed separately from HQs for renal toxins). Only if a target-organ-specific HI is greater than 1.0 is there a reason for concern about potential health effects for that target organ.

5.1 UNCERTAINTY ANALYSIS

The procedures and inputs used to assess potential human health risks in this and similar HHRAs are subject to a wide variety of uncertainties. In general, there are five main sources of uncertainty and variability in risk assessments of well-characterized sites:

- environmental chemistry sampling and analysis
- environmental parameter measurements
- fate and transport modeling
- toxicological data and dose-response extrapolations
- combinations of the above

These sources of uncertainty as they pertain to this HHRA will be discussed. In addition to discussing the uncertainties outlined above in a qualitative manner, WSP will also perform a quantitative risk characterization using recent toxicity and exposure information developed and updated by the EPA and other state programs. The risk characterization will include comparing the total site cancer risk for each receptor group to the EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}.

6 Ecological Risk Assessment

To estimate the potential for adverse ecological effects both on and offsite, an ERA will be conducted. As discussed in the CSM, the Federal-Mogul Facility is a former industrial facility with large sections covered with either a building, concrete, or asphalt. Groundwater seepage and springs are used for agricultural purposes (water for livestock) in the vicinity of the site; therefore, there is the potential for aquatic life and livestock to be exposed to COPCs in groundwater via migration from the site to offsite water wells, springs, or groundwater discharge areas (streams).

Surface water data collected from Ramble Creek from 2008 to present as part of ongoing monthly performance monitoring activities will be included in the database with respect to offsite ecological receptors. Additional surface water and groundwater samples will be collected based on the results of the Dye Trace Report to evaluate potential offsite exposure pathways (Appendix B of the CMS Work Plan). Sediment samples will be collected in Ramble Creek to evaluate potential offsite exposure to site-related constituents.

In accordance with 401 KAR 100:030, Section 7 (2)(c)2., the ERA will be conducted in accordance with the following EPA guidance:

- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA 1997a)
- Guidelines for Ecological Risk Assessment (EPA 1998)

As outlined in the EPA guidance, a SLERA will be performed. The Kentucky Water Quality Criteria for warm water aquatic habitat and, where Kentucky Water Quality Criteria are not available, the EPA Region 4 Ecological Risk Assessment Bulletin for Surface Water (EPA 2001b) or the EPA Region 5 Ecological Screening Values (EPA 2003b) for surface water and sediment will be used for the screening evaluation.

If a more detailed ERA is necessary as a result of the SLERA, the EPA guidance discussed above will be used to evaluate potential ecological risk.

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8 Acronyms

CalEPA	California Environmental Protection Agency
CHL	Crawford Hydrology Laboratory
CMS	Corrective Measures Study
COPCs	chemicals of potential concern
CSFs	cancer slope factors
CSM	conceptual site model
DWS	Drinking Water Source
EPA	U.S. Environmental Protection Agency
EPCs	exposure point concentrations
ERA	ecological risk assessment
ft-AMSL	feet above mean sea level
ft-bgs	feet below ground surface
HERI	Hoffman Environmental Research Institute
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IRM	Interim Remedial Measure
J&E	Johnson and Ettinger
KAR	Kentucky Administrative Regulations
KDEP	Kentucky Department for Environmental Protection
KHWB	Kentucky Hazardous Waste Branch
MOA	mutagenic mode of action
NOAEL	no observed adverse effect level
OSWER	Office of Solid Waste and Emergency Response
RAGS	Risk Assessment Guidance for Superfund
RAWP	Risk Assessment Work Plan
RCRA	Resource Conservation and Recovery Act
RfCs	reference concentrations
RfDs	reference doses
RFI	RCRA Facility Investigation
RME	reasonable maximum exposure
RSLs	Regional Screening Levels
SLERA	screening level ecological risk assessment

TCE	trichloroethene
TERA	Toxicology Excellence for Risk Assessment
URFs	unit risk factors
VDEQ	Virginia Department of Environmental Quality
VOCs	volatile organic compounds

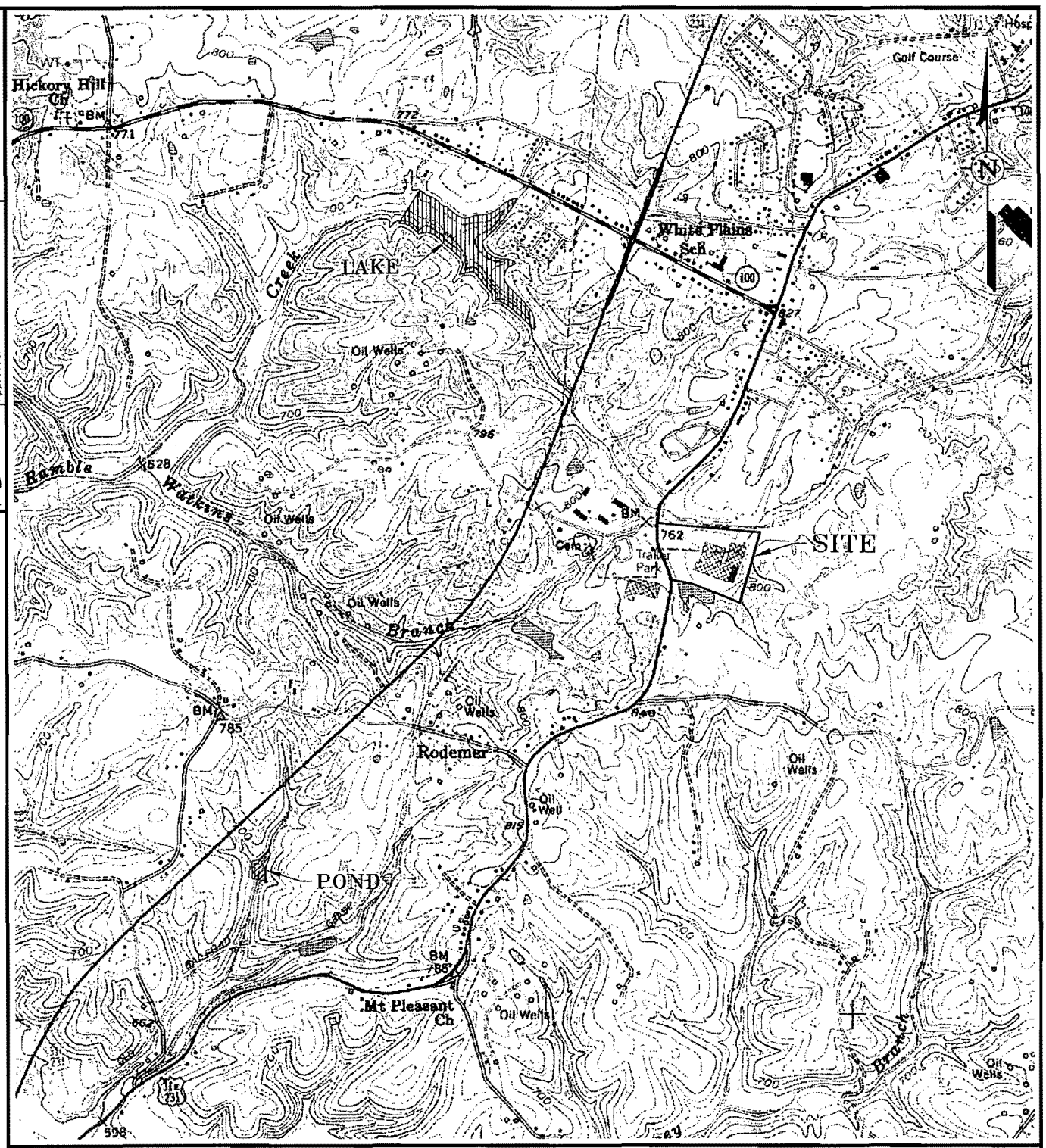
Figures

DWG Name: 138055-A21

Checked:

Approved:

Drawn By: 121808



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KENTUCKY

QUADRANGLE LOCATION

SCALE, FEET

0 1000 2000 4000

WSP

WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, Pennsylvania 15220
(412) 604-1040

FIGURE 1

SITE LOCATION

FEDERAL–MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL–MOGUL PRODUCTS, INC.
SOUTHFIELD, KENTUCKY

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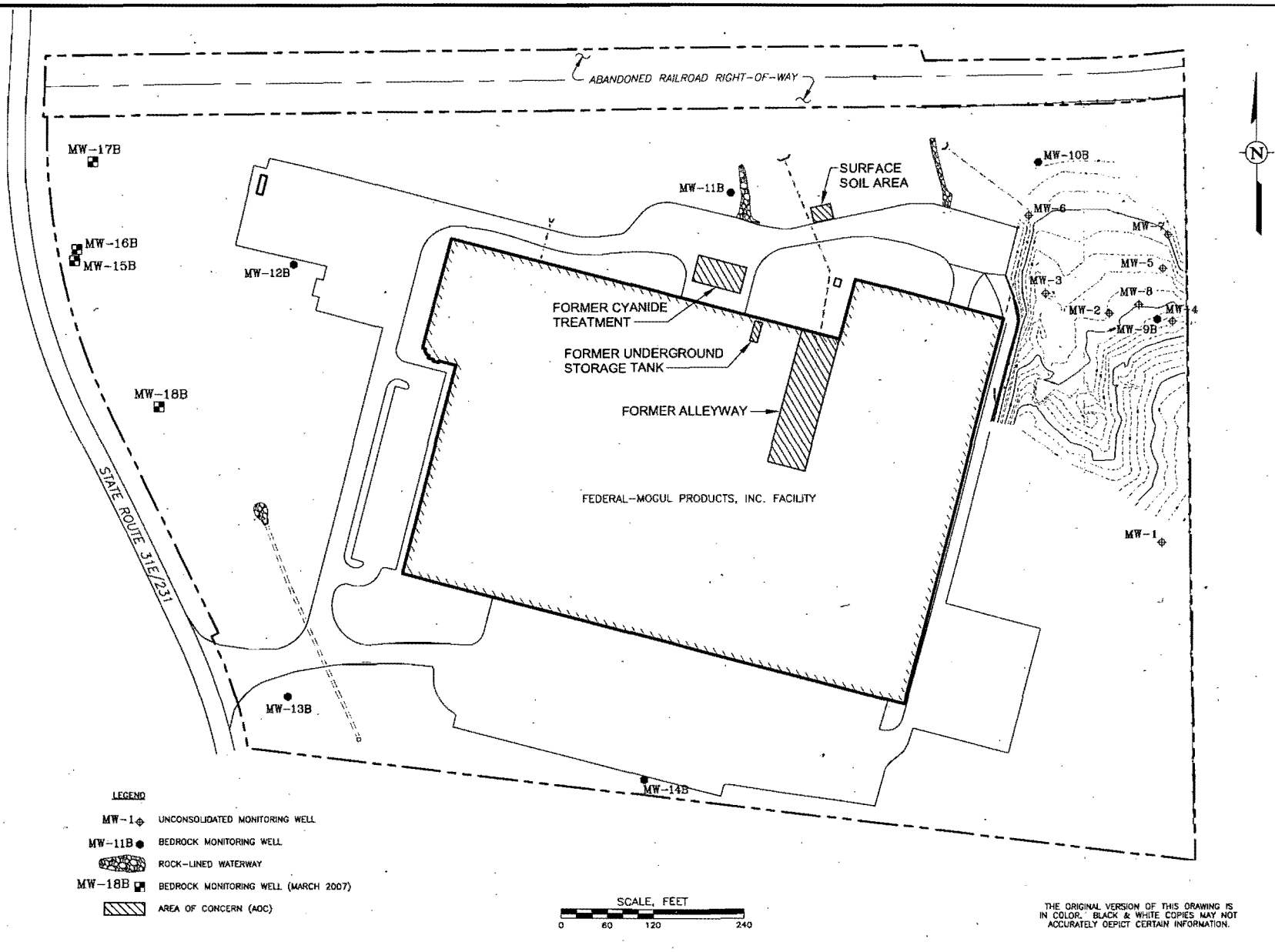

Drawn By: RA 04/09/10
Checked:
Approved:
DWG Name: 138055-B47

FEDERAL-MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 3

SITE LAYOUT AND LOCATION OF AREAS OF CONCERN (AOCs)

WSP
WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, PA 15220 (412) 604-1040

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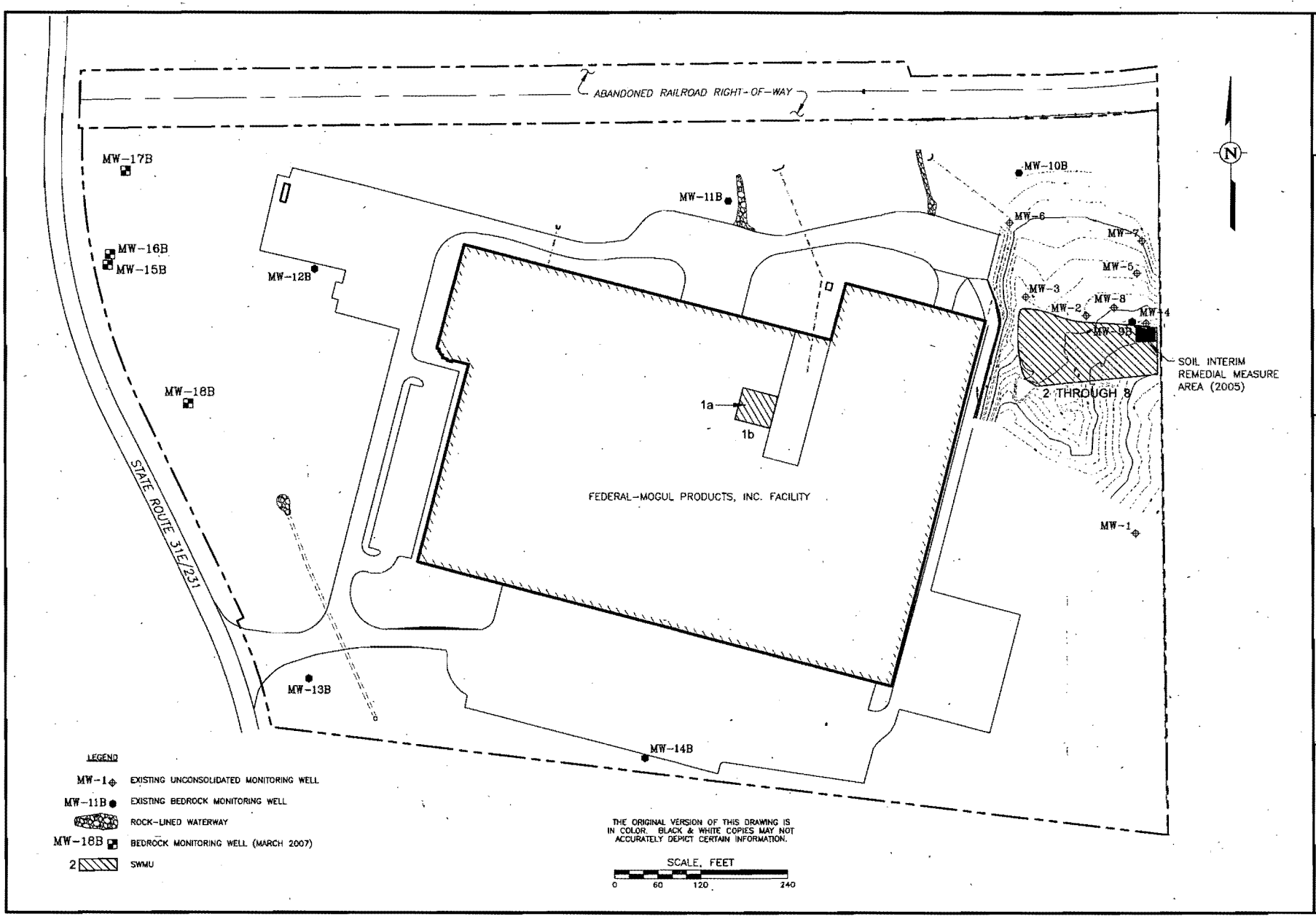

Drawn By: RAZ 04/16/10
Checked:
Approved:
DWG Name: 138055-B46

FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 2

SITE LAYOUT AND LOCATION OF SOLID WASTE MANAGEMENT UNITS (SWMUs)

WSP
WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, PA 15220 (412) 604-1040

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Tables

Table 1

Potential Onsite Receptors and Exposure Pathways
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route (b)	Exposure Assumptions (c)	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Surface soil	Resident	Adult	D Ig		None	Current land use industrial
				Resident	Child	D Ig		None	Current land use industrial
				Employee	Adult	D Ig		None	Facility currently vacant
				Outdoor maintenance worker	Adult	D Ig	3	Quantitative	Potential for COPCs in surface soil
				Visitor	Adult	D Ig		None	Other receptors greater potential risk
		Air	Indoor air	Resident	Adult	I		None	Current land use industrial
				Resident	Child	I		None	Current land use industrial
				Employee	Adult	I		None	Facility currently vacant
				Outdoor maintenance worker	Adult	I		None	Outdoor maintenance worker not expected to enter building
				Visitor	Adult	I		None	Other receptors greater potential risk
		Soil	Subsurface soil	Construction/Utility worker	Adult	D Ig		None	No current construction/utility work
Current	Groundwater	Groundwater	Tap water	Resident	Adult	Ig		None	Current land use industrial
				Resident	Child	Ig		None	Current land use industrial
				Employee	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
				Outdoor maintenance worker	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
				Visitor	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
		Groundwater/ Air	Shower/Bath	Resident	Adult	I D		None	Current land use industrial
				Resident	Child	D		None	Current land use industrial
				Employee	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
				Outdoor maintenance worker	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
				Visitor	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
		Air	Indoor air	Resident	Adult	I		None	Current land use industrial
				Resident	Child	I		None	Current land use industrial
				Employee	Adult	I		None	Facility currently vacant
				Outdoor maintenance worker	Adult	I		None	Outdoor maintenance worker not expected to enter building
				Visitor	Adult	I		None	Facility currently vacant
		Air	Ambient air	Construction/Utility worker	Adult	D Ig		None	No current construction/utility work
Future	Soil	Soil	Surface soil	Resident	Adult	D Ig		None	Future land use industrial
				Resident	Child	D Ig		None	Future land use industrial
				Employee	Adult	D Ig	4	Quantitative	Potential for COPCs in surface soil
				Outdoor maintenance worker	Adult	D Ig	3	Quantitative	Potential for COPCs in surface soil
				Visitor	Adult	D Ig		None	Other receptors greater potential risk
		Air	Indoor air	Resident	Adult	I		None	Future land use industrial
				Resident	Child	I		None	Future land use industrial
				Employee	Adult	I		None	Migration of volatiles from groundwater pathway more significant
				Outdoor maintenance worker	Adult	I		None	Other receptors greater potential risk
				Visitor	Adult	I		None	Other receptors greater potential risk
		Soil	Subsurface soil	Construction/Utility worker	Adult	D Ig	6	Quantitative	Potential for future construction/utility work

Table 1

Potential Onsite Receptors and Exposure Pathways
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route (b)	Exposure Assumptions (c)	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Tap water	Resident	Adult	Ig		None	Future land use industrial
				Resident	Child	Ig		None	Future land use industrial
				Employee	Adult	Ig		None	Potable water supplied by Allen County Water District
				Outdoor maintenance worker	Adult	Ig		None	Potable water supplied by Allen County Water District
				Visitor	Adult	Ig		None	Potable water supplied by Allen County Water District
		Groundwater/ Air	Shower/Bath	Resident	Adult	I D		None	Future land use industrial
				Resident	Child	D		None	Future land use industrial
				Employee	Adult	I D		None	Potable water supplied by Mecklenburg County
				Outdoor maintenance worker	Adult	I D		None	Potable water supplied by Allen County Water District
				Visitor	Adult	I D		None	Potable water supplied by Allen County Water District
		Air	Indoor air	Resident	Adult	I		None	Future land use industrial
				Resident	Child	I		None	Future land use industrial
				Employee	Adult	I	5	Quantitative	COPCs present in onsite groundwater
				Outdoor maintenance worker	Adult	I		None	Other receptors greater potential risk
				Visitor	Adult	I		None	Other receptors greater potential risk
		Air	Ambient air	Construction/Utility worker	Adult	I	7	Quantitative	Potential for vapor from affected groundwater to migrate into trench

a/ Refer to text for additional discussion.
b/ I = inhalation; D = dermal; Ig = ingestion.
c/ Number refers to exposure assumption tables; same current and future exposure assumptions have same table number.

Table 2

Potential Offsite Receptors and Exposure Pathways
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route (b)	Exposure Assumptions (c)	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Tap water	Resident	Adult	Ig		None	No COPCs identified in offsite domestic use wells/springs
				Resident	Child	Ig		None	No COPCs identified in offsite domestic use wells/springs
				Employee	Adult	Ig		None	Other receptors protective of risk
				Maintenance worker	Adult	Ig		None	Other receptors protective of risk
				Visitor	Adult	Ig		None	Other receptors protective of risk
		Groundwater/ Air	Shower/Bath	Resident	Adult	I D		None	No COPCs identified in offsite domestic use wells/springs
				Resident	Child	D		None	No COPCs identified in offsite domestic use wells/springs
				Employee	Adult	I D		None	Other receptors protective of risk
				Maintenance worker	Adult	I D		None	Other receptors protective of risk
				Visitor	Adult	I D		None	Other receptors protective of risk
		Air	Indoor air	Resident	Adult	I	8	Quantitative	Potential for affected vapor from groundwater to migrate indoors
				Resident	Child	I	12	Quantitative	Potential for affected vapor from groundwater to migrate indoors
				Employee	Adult	I		None	Other receptors protective of risk
				Maintenance worker	Adult	I		None	Other receptors protective of risk
				Visitor	Adult	I		None	Other receptors protective of risk
		Air	Ambient air	Construction/Utility worker	Adult	I	7	Quantitative	Potential for vapor from affected groundwater to migrate into trench
		Surface water	Surface water	Resident	Adult	D Ig	10	Quantitative	Potential for affected groundwater to migrate to surface water
				Resident	Child	D Ig	14	Quantitative	Potential for affected groundwater to migrate to surface water
		Sediment	Sediment	Resident	Adult	D Ig	11	Quantitative	Potential for affected groundwater to impact sediments
				Resident	Child	D Ig	15	Quantitative	Potential for affected groundwater to impact sediments
Future	Groundwater	Groundwater	Tap water	Resident	Adult	Ig	9	Quantitative	COPCs identified in offsite abandoned well (d)
				Resident	Child	Ig	13	Quantitative	COPCs identified in offsite abandoned well (d)
				Employee	Adult	Ig		None	Other receptors protective of risk
				Maintenance worker	Adult	Ig		None	Other receptors protective of risk
				Visitor	Adult	Ig		None	Other receptors protective of risk
		Groundwater/ Air	Shower/Bath	Resident	Adult	I D	9	Quantitative	COPCs identified in offsite abandoned well (d)
				Resident	Child	D	13	Quantitative	COPCs identified in offsite abandoned well (d)
				Employee	Adult	I D		None	Other receptors protective of risk
				Maintenance worker	Adult	I D		None	Other receptors protective of risk
				Visitor	Adult	I D		None	Other receptors protective of risk
		Air	Indoor air	Resident	Adult	I	8	Quantitative	Potential for affected vapor from groundwater to migrate indoors
				Resident	Child	I	12	Quantitative	Potential for affected vapor from groundwater to migrate indoors
				Employee	Adult	I		None	Other receptors protective of risk
				Maintenance worker	Adult	I		None	Other receptors protective of risk
				Visitor	Adult	I		None	Other receptors protective of risk
		Air	Ambient air	Construction/Utility worker	Adult	I	7	Quantitative	Potential for vapor from affected groundwater to migrate into trench
		Surface water	Surface water	Resident	Adult	D Ig	10	Quantitative	Potential for affected groundwater to migrate to surface water
				Resident	Child	D Ig	14	Quantitative	Potential for affected groundwater to migrate to surface water
		Sediment	Sediment	Resident	Adult	D Ig	11	Quantitative	Potential for affected groundwater to impact sediments
				Resident	Child	D Ig	15	Quantitative	Potential for affected groundwater to impact sediments

a/ Refer to text for additional discussion.
b/ I = inhalation; D = dermal; Ig = ingestion.
c/ Number refers to exposure assumption tables; same current and future exposure assumptions have same table number.
d/ As noted in Section 2.1.1.2 of the Risk Assessment Work Plan, this pathway may be eliminated if an Environmental Covenant or deed restriction is in place.

Table 3

Exposure Assumptions: Outdoor Maintenance Worker
(Soil, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion Rate	mg/day	480	KDEP 2002
	EF	Exposure frequency	day/yr	185	KDEP 2002
	ED	Exposure duration	yr	25	KDEP 2002, EPA 1991
	BW	Body Weight	kg	70	KDEP 2002, EPA 1989
	AT-NC	Averaging time - non-cancer	days	9,125	KDEP 2002, EPA 1991
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1991
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1991
	FI	Fraction ingested	unitless	1.0	KDEP 2002
Dermal	SA	Surface area for contact	cm^2/day	4,700	KDEP 2002
	AF	Adherence factor	mg/cm^2	1.0	KDEP 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004b, KDEP 2002
	EF	Exposure frequency	day/yr	185	KDEP 2002
	ED	Exposure duration	yr	25	KDEP 2002, EPA 1991
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	9,125	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 4

Exposure Assumptions: Facility Worker
(Soil, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Facility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion Rate	mg/day	50	KDEP 2002, EPA 2002b
	EF	Exposure frequency	day/yr	250	KDEP 2002, EPA 1991
	ED	Exposure duration	yr	25	KDEP 2002, EPA 1991
	BW	Body Weight	kg	70	KDEP 2002, EPA 1989
	AT-NC	Averaging time - non-cancer	days	9,125	KDEP 2002
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1991
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1991
	FI	Fraction ingested	unitless	1.0	KDEP 2002
Dermal	SA	Surface area for contact	cm^2/day	3,300	KDEP 2002, EPA 1997b
	AF	Adherence factor	mg/cm^2	1.0	KDEP 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004b, KDEP 2002
	EF	Exposure frequency	day/yr	250	KDEP 2002, EPA 1991
	ED	Exposure duration	yr	25	KDEP 2002, EPA 1991
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	9,125	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 5

Exposure Assumptions: Facility Worker
(Groundwater, Vapor Intrusion)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor air
Receptor Population: Facility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Inhalation	ET	Exposure time	hr/day	8	KDEP 2002, EPA 1997b
	EF	Exposure frequency	day/yr	250	KDEP 2002, EPA 1991
	ED	Exposure duration	yr	25	KDEP 2002, EPA 1991
	CF	Conversion factor	mg/µg	1.0E-03	EPA 2009a
	AT-NC	Averaging time - non-cancer	hours	219,000	EPA 2009a
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 6

Exposure Assumptions: Construction/Utility Worker
(Soil, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Subsurface Soil
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion Rate	mg/day	480	KDEP 2002
	EF	Exposure frequency	day/yr	125	VADEQ 2010
	ED	Exposure duration	yr	1	EPA 1991, VADEQ 2010
	BW	Body Weight	kg	70	KDEP 2002, EPA 1989
	AT-NC	Averaging time - non-cancer	days	365	EPA 1991, VADEQ 2010
	AT-C	Averaging time - cancer	days	25,550	EPA 1991, VADEQ 2010
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1991
	FI	Fraction ingested	unitless	0.5	VADEQ 2010
Dermal	SA	Surface area for contact	cm^2/day	4,700	KDEP 2002
	AF	Adherence factor	mg/cm^2	1.0	KDEP 2010
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004b, KDEP 2002
	EF	Exposure frequency	day/yr	125	VADEQ 2010
	ED	Exposure duration	yr	1	EPA 1991, EPA 2002b
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	365	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency; VADEQ = Virginia Department of Environmental Quality.

Table 7

Exposure Assumptions: Construction/Utility Worker
(Groundwater, Vapor Intrusion)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in Trench
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	4	VADEQ 2010
	EF	Exposure frequency	day/yr	125	VADEQ 2010
	ED	Exposure duration	yr	1	EPA 1991, EPA 2002b
	CF	Conversion factor	mg/µg	1.0E-03	EPA 2009a
	AT-NC	Averaging time - noncancer	hours	8,760	EPA 2009a
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency; VADEQ = Virginia Department of Environmental Quality.

Table 8

Exposure Assumptions: Resident Adult
(Groundwater, Vapor Intrusion)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Inhalation	ET	Exposure time	hr/day	24	EPA 2009a
	EF	Exposure frequency	day/yr	350	KDEP 2002, EPA 2009a
	ED	Exposure duration	yr	24	KDEP 2002
	CF	Conversion factor	mg/µg	1.0E-03	EPA 2009a
	AT-NC	Averaging time - noncancer	hours	210,240	KDEP 2002
	AT-C	Averaging time - cancer	hours	613,200	KDEP 2002, EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 9

Exposure Assumptions: Resident Adult
(Groundwater, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater/Air
Exposure Point: Tap water/Shower/Bath
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Ingestion	IR	Ingestion rate	l/day	2	KDEP 2002, EPA 2010
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	ABS	Absorption Factor	unitless	1	KDEP 2002
	BW	Body weight	kg	70	KDEP 2002
	AT-NC	Averaging time - noncancer	days	8,760	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
Dermal	DA event	Absorbed dose per event	mg/cm^2-event	Chemical-specific	EPA 2004b
	SA	Surface area for contact	cm^2	18,150	KDEP 2002
	EV	Event frequency	events/day	1	EPA 2004b
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	8,760	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
Inhalation (During Showering)	ET	Exposure time	hr/day	0.2	KDEP 2002
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	AT-NC	Averaging time - noncancer	hours	1,752	KDEP 2002, EPA 2009a
	AT-C	Averaging time - cancer	hours	5,110	KDEP 2002, EPA 2009a
Inhalation (During General Home Use)	ET	Exposure time	hr/day	24	KDEP 2002
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	AT-NC	Averaging time - noncancer	hours	210,240	KDEP 2002, EPA 2009a
	AT-C	Averaging time - cancer	hours	613,200	KDEP 2002, EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 10

Exposure Assumptions: Resident Adult
(Surface Water, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion rate	l/hour	0.05	KDEP 2002
	EF	Exposure frequency	day/yr	52	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	ET	Exposure time	hr/day	2.6	KDEP 2002
	BW	Body weight	kg	70	KDEP 2002, EPA 1989
	AT-NC	Averaging time - noncancer	days	8,760	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
Dermal	SA	Surface area for contact	cm^2	10,600	KDEP 2002
	PC	Permeability coefficient	cm/hr	chemical-specific	KDEP 2002, EPA 2004b
	ET	Event time	hr/day	2.6	KDEP 2002
	EF	Exposure frequency	day/yr	52	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	8,760	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	l/cm^3	1.0E-03	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 11

Exposure Assumptions: Resident Adult
(Sediment, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion Rate	mg/day	50	KDEP 2002, EPA 2002b
	EF	Exposure frequency	day/yr	52	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	BW	Body Weight	kg	70	KDEP 2002, EPA 1989
	AT-NC	Averaging time - non-cancer	days	8,760	KDEP 2002, EPA 1991
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1991
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1991
	FI	Fraction ingested	unitless	0.11	Represents 2.6 hr/day in contact with affected sediment
Dermal	SA	Surface area for contact	cm^2/day	10,600	KDEP 2002
	AF	Adherence factor	mg/cm^2	1.0	KDEP 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004b, KDEP 2002
	EF	Exposure frequency	day/yr	52	KDEP 2002
	ED	Exposure duration	yr	24	KDEP 2002
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	8,760	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 12

Exposure Assumptions: Resident Child
(Groundwater, Vapor Intrusion)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Inhalation	ET	Exposure time	hr/day	24	EPA 2009a
	EF	Exposure frequency	day/yr	350	KDEP 2002, EPA 2009a
	ED	Exposure duration	yr	6	KDEP 2002, EPA 2009a
	CF	Conversion factor	mg/µg	1.0E-03	EPA 2009a
	AT-NC	Averaging time - noncancer	hours	52,560	KDEP 2002, EPA 2009a
	AT-C	Averaging time - cancer	hours	613,200	KDEP 2002, EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 13

Exposure Assumptions: Resident Child
(Groundwater, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater/Air
Exposure Point: Tap water/Shower/Bath
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Ingestion	IR	Ingestion rate	l/day	1	KDEP 2002, EPA 2010
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002
	ABS	Absorption Factor	unitless	1	KDEP 2002
	BW	Body weight	kg	15	KDEP 2002
	AT-NC	Averaging time - noncancer	days	2,190	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
Dermal	DA event	Absorbed dose per event	mg/cm^2-event	Chemical-specific	EPA 2004b
	SA	Surface area for contact	cm^2	18,150	KDEP 2002
	EV	Event frequency	events/day	1	EPA 2004b
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002
	BW	Body weight	kg	15	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	2,190	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
Inhalation (During Showering)	ET	Exposure time	hr/day	0.2	KDEP 2002
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002
	AT-NC	Averaging time - noncancer	hours	438	KDEP 2002, EPA 2009a
	AT-C	Averaging time - cancer	hours	5,110	KDEP 2002, EPA 2009a
Inhalation (During General Home Use)	ET	Exposure time	hr/day	24	KDEP 2002
	EF	Exposure frequency	day/yr	350	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002
	AT-NC	Averaging time - noncancer	hours	52,560	KDEP 2002, EPA 2009a
	AT-C	Averaging time - cancer	hours	613,200	KDEP 2002, EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 14

Exposure Assumptions: Resident Child
(Surface Water, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	CR	Ingestion rate	l/hour	0.05	KDEP 2002
	EF	Exposure frequency	day/yr	140	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002, EPA 1991
	ET	Exposure time	hrs/day	2.6	KDEP 2002
	BW	Body weight	kg	15	KDEP 2002, EPA 1989
	AT-NC	Averaging time - noncancer	days	2,190	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
Dermal	SA	Surface area for contact	cm^2	3,300	KDEP 2002
	PC	Permeability coefficient	cm/hr	chemical-specific	KDEP 2002, EPA 2004b
	ET	Event time	hr/day	2.6	KDEP 2002
	EF	Exposure frequency	day/yr	140	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002, EPA 1991
	BW	Body weight	kg	15	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	2,190	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	l/cm^3	1.0E-03	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 15

Exposure Assumptions: Resident Child
(Sediment, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion Rate	mg/day	200	KDEP 2002
	EF	Exposure frequency	day/yr	140	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002, EPA 1991
	BW	Body Weight	kg	15	KDEP 2002, EPA 1989
	AT-NC	Averaging time - non-cancer	days	2,190	KDEP 2002, EPA 1991
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1991
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1991
	FI	Fraction ingested	unitless	0.11	Represents 2.6 hr/day in contact with affected sediment
Dermal	SA	Surface area for contact	cm^2/day	3,300	KDEP 2002
	AF	Adherence factor	mg/cm^2	1.0	KDEP 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004b, KDEP 2002
	EF	Exposure frequency	day/yr	140	KDEP 2002
	ED	Exposure duration	yr	6	KDEP 2002, EPA 1991
	BW	Body weight	kg	15	EPA 1991
	AT-NC	Averaging time - noncancer	days	2,190	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Appendix A-1 – Indoor Air Survey Report

WSP
ENVIRONMENTAL STRATEGIES

300 Corporate Center Drive, Suite 200 · Moon Twp, Pennsylvania 15108 · (412) 604-1040 · Fax (412) 604-1055

February 7, 2007

Mr. Mark T. Bauer, P.E.
c/o Federal-Mogul Corporation
Legal Department
26555 Northwestern Highway
Southfield, MI 48033

Re: Indoor Air Survey Report
Federal-Mogul Products, Inc., Scottsville, Kentucky

Dear Mark:

This letter summarizes the results of an indoor air survey conducted by WSP Environmental Strategies LLC at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky. Currently, the facility is closed and Federal-Mogul is considering future industrial use or the sale of the facility. Federal-Mogul requested that WSP Environmental Strategies perform an indoor air survey at the Scottsville facility during a conference call on July 18, 2006, to evaluate the possible vapor intrusion from volatile organic compounds (VOCs) in the groundwater and soils underlying the facility. Federal-Mogul requested that the indoor air survey be conducted while the facility was in operation to provide an assessment of indoor air quality during typical plant conditions. During performance of this indoor air survey, there was an active workforce employed at the facility, and the heating, ventilation, and air conditioning system (HVAC) was operating in a capacity similar to historical conditions at the facility.

The objective of the indoor air survey was to evaluate the affect historical chemical releases may have on the current indoor air quality of the facility. Previous subsurface investigations performed inside the facility, including the vicinity of the former alleyway, indicate that VOCs related to historical site hazardous materials and waste handling and disposal activities are present in soils beneath the facility building. In addition, VOCs related to these historical waste disposal activities are found in groundwater beneath the facility building. Based on the analytical soil results from the subsurface investigations, the existing site groundwater analytical results, and Federal-Mogul's request, the indoor air sampling was performed on August 22 and 23, 2006. Although some operations were curtailed before the indoor air sampling was performed, the current operations were assumed to be representative of typical operational conditions, including the handling and disposal of hazardous materials and wastes, and the operation of the HVAC system.

Background

During February 2005 and August 2006, WSP Environmental Strategies conducted site inspections and materials inventory at the Scottsville facility in preparation of performing an indoor air survey. The site visits included interviewing facility personnel, a material inventory, and the inspection of the building for potential vapor migration pathways into the building. Based on the February 2005 site visit, the facility consists of slab on grade construction with no assumed voids or cavities beneath the concrete floor.

Indoor Air Survey

The indoor air survey was conducted in accordance with the U.S. Environmental Protection Agency's (EPA) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) dated November 2002.

Indoor Air Sampling

The indoor air survey performed at the Scottsville facility consisted of collecting indoor air samples for VOC analysis from six locations in the office and production areas of the facility. In addition, one ambient outdoor air sample was collected from an upwind location during performance of the indoor air survey. The indoor air sampling locations are presented on Figure 1.

Two indoor air samples were collected from confined areas within the building, one in the office area and the second in the worker cafeteria area located in the northeast corner of the facility. The remaining four indoor air samples and a duplicate sample were collected at open locations throughout the production area of the facility. One indoor air sample and a duplicate sample were collected in the vicinity of the former alleyway where analysis of soil samples collected from beneath the concrete floor indicate the presence of VOCs in soils.

Each air canister was positioned approximately five feet above the facility floor for collection of the vapor sample. The elevated canister positions were used to better reflect potential worker exposure (breathing zone) to indoor vapors within the production area. The canister placed in the facility office area was positioned on a desk to reflect potential worker exposure.

Discrete indoor air samples for VOC analysis were collected using evacuated 6-liter SUMMA™ canisters and dedicated flow controllers pre-set by the analytical laboratory to collect the VOC sample over a 24-hour period. Each canister was placed in the sampling location and the valve opened to initiate the vapor collection process. After 24 hours, the valve on each canister was closed and the canisters labeled with the sample name, location, time and date of collection, and the analytical method. The VOC samples were shipped under ambient conditions to Pace Analytical Services, Inc. (Pace) located in Minneapolis, Minnesota, under strict chain of custody protocols for analysis. The collected vapor samples were analyzed by EPA Method TO-15 for VOCs., including site specific VOCs (trichloroethene [TCE], tetrachloroethene [PCE], and relative breakdown compounds), based on VOC concentrations reported in soil samples collected from beneath the building during the two Source Area Investigations (SAIs).

Outdoor Air Sampling

During the August 2006 indoor air survey, WSP Environmental Strategies placed one air canister in an upwind location for the collection of ambient air outside the Scottsville facility. Based on the prevailing wind direction, the ambient air sample canister was located in the vicinity of the facility guard building in the southwest corner of the property. The ambient air sample was collected over a 24-hour period in accordance with the protocols used for collection of the indoor air samples. On completion of the air survey, the ambient air sample was forwarded to Pace for VOC analysis using EPA Method TO-15.

Quality Assurance/Quality Control

The SUMMA™ canisters used to perform the August 2006 indoor air survey were certified-clean by the analytical laboratory. This certification involves analyzing the ambient air inside a clean canister by EPA Method TO-15. If no target compounds are detected at concentrations above reporting limits (RLs), the canister is evacuated again and all canisters from the lot are available for air sampling. If target compounds are detected at concentrations above the RLs, then all canisters from that lot are re-cleaned and a single canister re-analyzed for the target compounds.

During the August 2006 indoor air survey performed at the Scottsville facility, one indoor air sample duplicate was collected to satisfy quality assurance/quality control (QA/QC) protocols. The duplicate sample was collected in the former alleyway area because constituent concentrations have been reported in soil samples collected from beneath the facility floor.

On receipt of the indoor air analytical results, the analytical data were forwarded to an independent contractor for data validation.

Results

During indoor air survey activities performed at the Scottsville facility, six locations were selected for collection of vapors inside the facility. The indoor air sampling locations are presented on Figure 1. Five of the indoor air samples (AS-1 through AS-5) plus a duplicate sample (AS-8) were collected from the production area and one sample (AS-6) was collected in the office area. Outdoor ambient air quality was determined by collecting one outdoor air sample (AS-7). A discussion and evaluation of the indoor air survey results follows.

Several compounds were detected in the indoor air samples; a summary of the detected results is presented in Table 1 (Enclosure). The EPA Region 9 Preliminary Remediation Goals (PRG)[1] and the Occupational Health and Safety Administration (OSHA) Permissible Exposure Limits (PELs) were used to evaluate the indoor air sampling results. Based on the PRG guidance methodology, the residential ambient air PRGs were modified to represent an industrial/commercial worker exposure scenario to indoor air (industrial indoor air modified-PRG). According to the EPA Subsurface Vapor Intrusion Guidance, in occupational settings in

[1] www.epa.gov/region09/waste/sfund/prg; October 2004

which handling of hazardous materials occurs and where an OSHA approved Hazardous Communication Program is implemented, OSHA is the regulating agency for occupational-related air exposures. Hazardous materials and wastes are handled and stored at the Scottsville facility, and the facility implements an OSHA Hazardous Communication Program to address the occupational exposure from hazardous materials and wastes that are used in the operational activities. Therefore, the OSHA PELs are applicable criteria to evaluate the air survey data for those constituents that are currently used in the facility operations. If no PEL was established, the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) were used, if available. For those constituents that are not currently used in the occupational setting (operational activities), and that are not included in the facility's OSHA Hazardous Communalizations Program, the industrial indoor air modified-PRGs are the applicable criteria to be used in the evaluation of the air survey data.

The vapor data were evaluated by an independent data validation contractor and results qualified as discussed below. According to the data validation report, the laboratory did not spike samples with system monitoring compounds. Therefore, it was not possible for the validator to determine the impact of interferences on the analytical system. If system monitoring compounds were detected in a sample, the validator qualified the result as rejected or "R."

Four constituents exceeded the carcinogenic industrial indoor air modified-PRG including benzene, 1,4-dichlorobenzene, methylene chloride, and tetrahydrofuran. Three constituents were detected at concentrations greater than the non-carcinogenic industrial indoor air modified-PRG including naphthalene, toluene, and 1,2,4-trichlorobenzene. Methylene chloride and tetrahydrofuran were only detected in sample AS-1. Concentrations of benzene, naphthalene, and toluene also exceeded the industrial indoor air modified-PRGs in the outdoor sample (AS-7). Naphthalene was detected in samples AS-3 through AS-5 and in sample AS-8 at concentrations greater than the industrial indoor air modified-PRG, but the concentrations were less than the concentration in the outdoor sample AS-7. Toluene was also detected in sample AS-2. It is noted that system monitoring compounds were detected at low levels by the validator, and the data were flagged as rejected. Benzene, 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene were detected in sample AS-4 at concentrations above their respective industrial indoor air modified-PRG. The detected constituents with concentrations greater than the industrial indoor air modified-PRG were all currently being used as part of facility industrial activities (occupational setting), and were included in the OSHA Hazardous Communications Program. Therefore, these constituents were further evaluated using the OSHA PELs or NIOSH RELs. None of these detected constituents had concentrations that exceeded the OSHA PELs or NIOSH RELs.

The results of the indoor air survey indicate that there are no unacceptable concentrations of detected constituents that were related to the current industrial activities in the Scottsville facility. Site-specific VOCs (TCE and PCE) and their breakdown products that are considered as non-occupational exposures (no longer used in the operational activities) were not detected in the indoor air survey.

Summary and Recommendations

Based on the evaluation of the air sampling results analyzed for the indoor air survey conducted at the Scottsville facility in April 2006, the site-related VOCs (associated with historical hazardous materials and waste handling and disposal activities) identified in the subsurface soils and groundwater under the facility were not detected in the indoor air survey. Thus, these VOCs are not adversely affecting the indoor air quality of the facility. Constituents that are not related to the above conditions, and that are related to an occupational exposure from current facility operations, were detected in the indoor air survey. The concentrations of these detected constituents were less than the applicable OSHA PELs or NIOSH RELs.

Since performance of the indoor air survey, the facility has ceased operational activities, and there is no longer an active workforce employed. In addition, the HVAC system is operating at a reduced capacity. Therefore, the current vapor intrusion pathway is influenced by different environmental and operational conditions than were present during the indoor air survey. In the future, Federal-Mogul expects to lease the Scottsville facility to another business entity that is assumed will conduct similar operational activities (industrial manufacturing), with similar HVAC requirements. Because the August 2006 indoor air survey only detected constituents that were related to operational activities (occupational exposure) and not from historical site activities (environmental exposure), it is not recommended that a second indoor air survey be conducted at this time.

Should you have any questions or comments regarding the indoor air survey, please do not hesitate to contact us.

Sincerely yours.

E. Michael Riggins

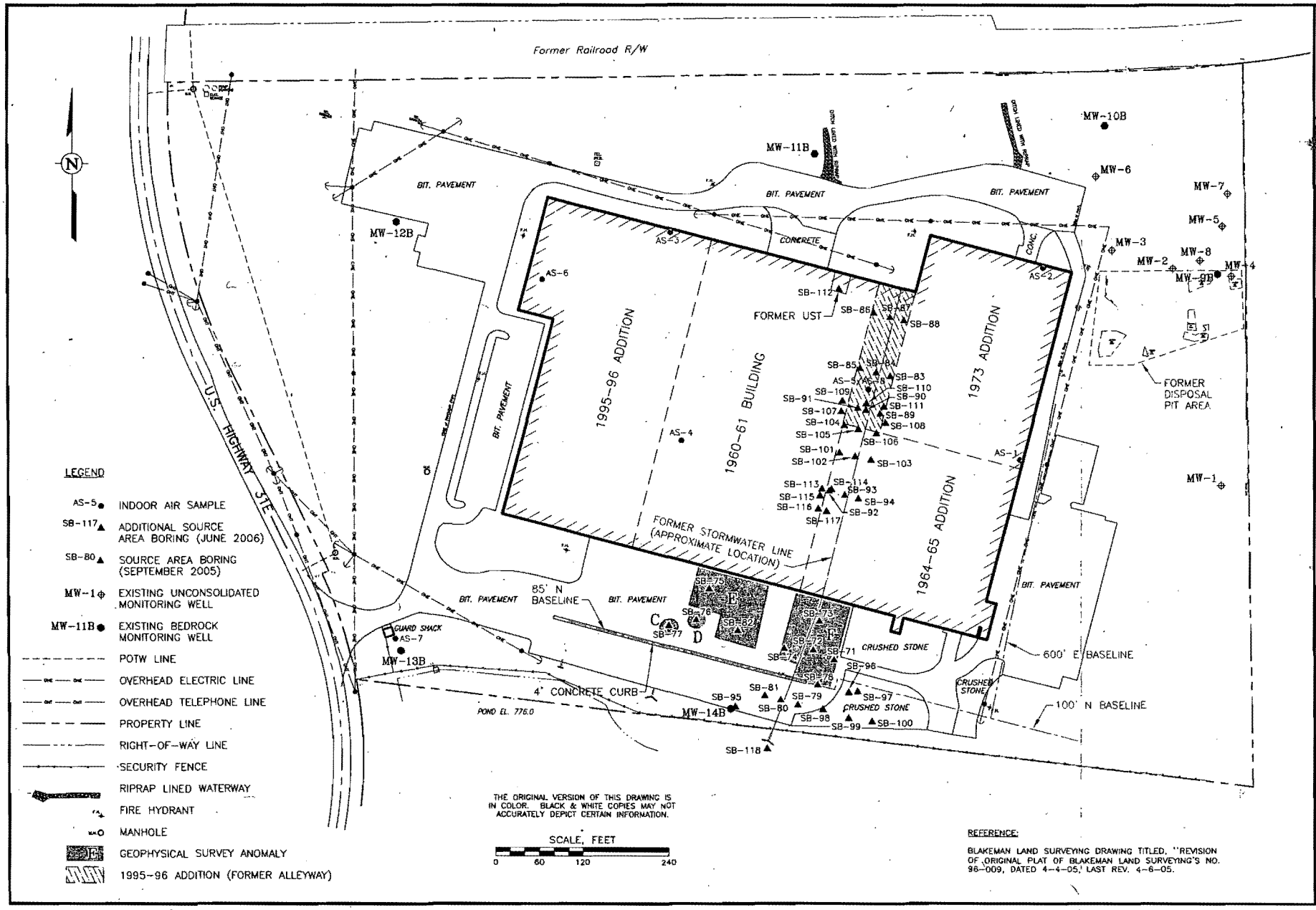
E. Michael Riggins, P.G.
Project Manager

EMR:eal
G:\$Client\Federal-Mogul\138055\Indoor Air rept.doc

Enclosures

cc: Mr. Roger Strelow, Federal-Mogul Corporation, Southfield, MI
Mark Norman, Esquire, Vorys, Sater, Seymour and Pease LLP, Cincinnati, OH
Mr. Bill Rush, Federal-Mogul Corporation, Cookeville, TN
Mr. Mike Stanger, Federal-Mogul Corporation, Smithville, TN
Mr. Jeff Hassen, WSP Environmental Strategies LLC, Moon Township, PA

Enclosures



Drawn By: RA 10.06.06
Checked:
Approved:
DWG Name: 138055-B38

FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 1
INDOOR AIR SAMPLING LOCATIONS

WSP
ENVIRONMENTAL STRATEGIES
300 CORPORATE CENTER DRIVE, SUITE 300
MOON TOWNSHIP, PA 15108 412-604-1040

U:\AutoCAD DWGs\130\138055 Scottsville\138055B38.dwg, 11/13/2006 2:38:08 PM

Table I

Indoor Air Sampling Results
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

Parameters	Region 9 PRGs for Indoor Air Industrial Scenario (c) Non-Cancer	Region 9 PRGs for Indoor Air Industrial Scenario (c) Cancer	OSHA PEL (d)	AS-1	AS-2	AS-3	AS-4	AS-5	AS-8	AS-6	AS-7
Sample Date:				08/23/06	08/23/06	08/23/06	08/23/06	08/23/06	08/23/06 (b)	08/23/06	08/23/06
Volatile Organic Compounds (μg/m³)											
Acetone	4,599	-	2,400,000	64.6	62.6	22.7	41.7	25.1	30.6	35.1	3.4 U
Benzene	43.9	0.53	3,190	17.9 U	4.4 U	0.9 U	1.7	0.96 U	0.87 U	0.87 U	10.2
2-Butanone	7,154	-	590,000	66.8	4 U	33.5	56.1	56	94.8	4.5	113
Carbon disulfide	1,022	-	62,200	17.4 U	4.2 U	0.87 U	5.6	5.8	2	0.84 U	12.6
1,4-Dichlorobenzene	1,175	0.65	450,000	33.1 U	8 U	1.7 U	2	1.8 U	1.6 U	1.6 U	8.6 U
Dichlorodifluoromethane	292	-	4,950,000	27.6 U	6.7 U	2.5	3	2.8	1.3 U	2.5	7.2 U
Ethyl acetate	4,599	-	1,400,000	20.1 U	4.9 U	1 U	3.3	5.7	0.98 U	0.98 U	43.1
Ethylbenzene	1,482	-	435,000	24.3 U	11.3	1.2 U	1.2 U	1.9	1.2 U	1.2 U	6.3 U
n-Hexane	292	-	1,800,000	19.9 U	4.8 U	3	1.1	1.1 U	0.99	0.96 U	11.8
2-Hexanone	-	-	410,000	22.9 U	5.6 U	1.1 U	3.4	1.2 U	1.1 U	1.1 U	5.9 U
Methylene chloride	4,380	8.7	86,750	43.3	4.8 U	0.98 U	0.98 U	1.1 U	0.95 U	0.95 U	5.1 U
4-Methyl-2-pentanone	4,395	-	410,000	22.9 U	5.6 U	1.1 U	3.1	3	1.1 U	1.1 U	14
Naphthalene	4	-	50,000	74.5 U	18.1 U	6.4	10.7	7.6	6.8	3.6 U	36.1
Propylene	-	-	-	10.9	2.7	0.48 U	0.48 U	0.52 U	0.47 U	0.47 U	126
Styrene	1,482	-	426,000	48.1	5.8 U	1.2 U	2.6	2.6	1.2 U	1.2 U	6.2 U
Tetrahydrofuran	438	2.1	590,000	62.1	4 U	0.83 U	0.83 U	0.89 U	0.8 U	0.8 U	4.3 U
Toluene	562	-	754,000	182	1,740 R	3.4	47.8	91.4	19.4	3.2	1,530
1,2,4-Trichlorobenzene	5.11	-	40,000 (e)	27.3 U	6.6 U	1.4 U	9	1.5 U	1.3 U	1.3 U	7.1 U
Trichlorotrifluoromethane	1,022	-	-	30.4 U	7.4 U	2.3	10.5	6.3	1.6	1.5 U	18
1,2,4-Trimethylbenzene	-	-	125,000 (e)	69 U	16.8 U	3.4	4.5 U	3.9	3.4	3.4 U	17.9 U
m&p-Xylene	148	-	435,000	48.6 U	36	2.4 U	3.8	4.7	2.4 U	2.4 U	12.6 U
o-Xylene	148	-	435,000	24.3 U	6.5	1.2 U	1.4	1.3 U	1.2 U	1.2 U	6.3 U

a/ I.D. = identification; PRG = preliminary remediation goal; OSHA = Occupational Safety and Health Adminstration; PEL = permissable exposure limit; μg/m3 = micrograms per cubic meter; U = constituent not detected at reported detection limit; R = result rejected based on data validation.
Shaded value indicates concentration exceeds the non-cancer PRG.
Boxed value indicates concentration exceeds the cancer PRG.
b/ Duplicate sample collected at AS-5.
c/ Region 9 PRGs calculated according to guidance (2004; available online at http://www.epa.gov/region09/waste/sfund/prg/#prgtable).
d/ OSHA PEL is the time weighted average reported in the National Institute for Occupational Safety and Health (NIOSH) Pocketguide (available online at http://www.cdc.gov/niosh/npg/).
e/ NIOSH reasonable exposure limit reported.

Appendix A-2 – VDEQ Trench Model Exposure Assumptions

Input Values for the Virginia Department of Environmental Quality Trench Model

For Effective Diffusion Coefficients			For Emission Flux and Concentration in Trench			Trench dimensions		
Hv	0	cm	CF1	1.00E-03	L/cm3	Length	8	ft
ACvad	0.25	cm3/cm3	CF2	1.00E+04	cm2/m2		2.44	m
PorVad	0.44	cm3/cm3	CF3	3600	s/hr	Width	3	ft
T	58.2	F	Lgw	15	ft		0.91	m
T	288	K	Lgw	457	cm	Depth	15	ft
R	8.20E-05	atm-m3/mol-K	F	1			4.57	m
			ACH	2	hr-1	Width/Depth	0.20	

Input Values for the Virginia Department of Environmental Quality Trench Model

Table 3.7 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater greater than 15 feet deep	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Diffusion Coefficient in Air Dair cm2/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3	Concentration of Contaminant in Trench Ctrench mg/m3
TAL Metals								
Aluminum	7429-90-5	26.98						
Antimony	7440-36-0	121.76						
Arsenic	7440-38-2	74.92						
Barium	7440-39-3	137.33						
Beryllium	7440-41-7	9.01						
Cadmium	7440-43-9	112.41						
Calcium	7440-70-2	40.08						
Chromium	7440-47-3	52.00						
Cobalt	7440-48-4	58.93						
Copper	7440-50-8	63.55						
Cyanide	57-12-5	26.02						
Iron	7439-89-6	55.85						
Lead	7439-92-1	207.20						
Magnesium	7439-95-4	24.31						
Manganese	7439-96-5	54.94						
Mercuric chloride	7487-94-7	271.50						
Mercury	7439-97-6	200.59	1.14E-02	7.15E-02				
Methylmercury	22967-92-6	215.63						
Nickel	7440-02-0	58.69						
Potassium	7440-09-7	39.10						
Selenium	7782-49-2	78.96						
Silver	7440-22-4	107.87						
Sodium	7440-23-5	22.99						
Thallium	7440-28-0	204.38						
Vanadium	7440-62-2	50.94						
Zinc	7440-66-6	65.39						
Other Inorganics								
Perchlorate								
TCL Volatile Organic Compounds (VOCs)								
Acetone	67-64-1	58.08	3.88E-05	1.24E-01				
Benzene	71-43-2	78.11	5.55E-03	8.80E-02				
Bromochloromethane	74-97-5	139.38	1.46E-03	7.14E-02				
Bromodichloromethane	75-27-4	163.83	1.60E-03	5.63E-02				
Bromoform	75-25-2	252.73	5.35E-04	1.49E-02				
Bromomethane	74-83-9	94.94	6.24E-03	7.26E-02				
2-Butanone (methyl ethyl ketone)	78-93-3	72.11	5.59E-05	8.08E-02				
Carbon disulfide	75-15-0	76.14	3.03E-02	1.04E-01				
Carbon tetrachloride	56-23-5	153.82	3.04E-02	7.80E-02				
Chlorobenzene	108-90-7	112.56	3.70E-03	7.30E-02				
Chloroethane	75-00-3	64.51	8.82E-03	2.71E-01				
Chloroform	67-66-3	119.38	3.67E-03	1.04E-01				
Chloromethane	74-87-3	50.49	8.82E-03	1.26E-01				
Cyclohexane	110-82-7	84.16	1.95E-01	8.39E-02				
1,2-Dibromo-3-chloropropane	96-12-8	236.33	1.47E-04	3.21E-02				
Dibromochloromethane	124-48-1	208.28	7.63E-04	3.65E-02				
1,2-Dibromoethane	106-93-4	187.86	7.43E-04	4.31E-02				
1,2-Dichlorobenzene (ortho)	95-50-1	147.00	1.90E-03	6.90E-02				
1,3-Dichlorobenzene (meta)	541-73-1	147.00	3.10E-03	6.92E-02				
1,4-Dichlorobenzene (para)	106-46-7	147.00	2.43E-03	6.90E-02				
Dichlorodifluoromethane	75-71-8	120.91	3.43E-01	7.22E-02				
1,1-Dichloroethane	75-34-3	98.96	5.62E-03	7.42E-02				
1,2-Dichloroethane	107-06-2	98.96	9.79E-04	1.04E-01				
1,1-Dichloroethene	75-35-4	96.94	2.61E-02	9.00E-02				
1,2-Dichloroethene (total)	540-59-0	96.94	4.51E-03	8.80E-02				
cis-1,2-Dichloroethene	156-59-2	96.94	4.08E-03	8.84E-02				
trans-1,2-Dichloroethene	156-60-5	96.94	9.38E-03	7.03E-02				
1,2-Dichloropropane	78-87-5	112.99	2.80E-03	7.82E-02				
1,3-Dichloropropene (total)	542-75-6	110.97	1.77E-02	6.26E-02				
cis-1,3-Dichloropropene	10061-01-5	110.97	1.20E-03	7.65E-02				
trans-1,3-Dichloropropene	10061-02-6	110.97	8.00E-04	7.63E-02				
1,4-dioxane	123-91-1							
Ethylbenzene	100-41-4	106.17	7.88E-03	7.50E-02				
Hexane	110-54-3	86.18	1.69E+00	2.00E-01				
2-Hexanone	591-78-6	100.16	9.32E-05	7.04E-02				
Isopropylbenzene	98-82-8	120.19	1.16E+00	6.50E-02				
4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1	100.16	1.38E-04	7.50E-02				
Methyl acetate	79-20-9	74.08	1.15E-04	1.04E-01				
Methyl tert-butyl ether	1634-04-4	88.15	5.87E-04	1.02E-01				
Methylcyclohexane	108-87-2	98.19	4.30E-01	7.00E-02				
Methylene chloride	75-09-2	84.93	2.19E-03	1.01E-01				
Styrene	100-42-5	104.15	2.75E-03	7.10E-02				
1,1,2,2-Tetrachloroethane	79-34-5	167.85	3.45E-04	7.10E-02				
Tetrachloroethene	127-18-4	165.83	1.84E-02	7.20E-02				
Toluene	108-88-3	92.14	6.64E-03	8.70E-02				
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	187.37	4.81E-01	3.76E-02				
1,2,3-Trichlorobenzene	87-61-6	181.45	1.25E-03	3.87E-02				
1,2,4-Trichlorobenzene	120-82-1	181.45	1.42E-03	3.00E-02				
1,1,1-Trichloroethane	71-55-6	133.40	1.72E-02	7.80E-02				
1,1,2-Trichloroethane	79-00-5	133.40	9.13E-04	7.80E-02				
Trichloroethene	79-01-6	131.39	1.03E-02	7.90E-02				
Trichlorofluoromethane	75-69-4	137.37	9.70E-02	8.70E-02				
Vinyl Chloride	75-01-4	62.50	2.70E-02	1.06E-01				
Total Xylenes	1330-20-7	106.16	5.18E-03	6.85E-02				
Other VOCs								
n-butylbenzene	104-51-8	134.22	1.59E-02	5.31E-02				
sec-butylbenzene	135-98-8	134.22	1.75E-02	5.27E-02				
tert-butylbenzene	98-06-6	134.22	1.32E-02	5.26E-02				
isopropyltoluene	99-87-6	134.22	1.10E-02	5.60E-02				
n-propylbenzene	103-65-1	120.19	1.05E-02	6.03E-02				
1,1,1,2-tetrachloroethane	630-20-6	167.85	2.42E-03	7.10E-02				
1,2,4-trimethylbenzene	95-63-6	120.19	6.16E-03	6.05E-02				

Input Values for the Virginia Department of Environmental Quality Trench Model

Table 3.7 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater greater than 15 feet deep	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Diffusion Coefficient in Air Dair cm2/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3	Concentration of Contaminant in Trench Ctrench mg/m3
1,3,5-trimethylbenzene	108-67-8	120.19	8.77E-03	6.02E-02				
m-xylene	108-38-3	106.17	7.34E-03	7.00E-02				
o-xylene	95-47-6	106.17	5.19E-03	8.70E-02				
p-xylene	106-42-3	106.17	7.66E-03	7.69E-02				
TCL Semivolatile Organic Compounds (SVOCs)								
Acenaphthene	83-32-9	154.21	1.55E-04	4.67E-02				
Acenaphthylene	208-96-8	152.19	1.13E-04	4.50E-02				
Acetophenone	98-86-2	120.15	1.07E-05	6.00E-02				
Anthracene	120-12-7	178.23	6.50E-05	3.90E-02				
Atrazine	1912-24-9	215.68	2.36E-09	2.66E-02				
Benzaldehyde	100-52-7	106.12	2.67E-05	7.64E-02				
Benzo(a)anthracene	56-55-3	228.29	3.35E-08	5.10E-02				
Benzo(a)pyrene	50-32-8	252.31	1.13E-06	4.30E-02				
Benzo(b)fluoranthene	205-99-2	252.31	1.11E-04	2.50E-02				
Benzo(g,h,i)perylene	191-24-2	276.33	1.41E-07	2.45E-02				
Benzo(k)fluoranthene	207-08-9	252.31	8.29E-07	2.50E-02				
1,1'-Biphenyl	92-52-4	154.21	3.00E-04	4.04E-02				
bis(2-Chloroethoxy)methane	111-91-1	173.04	1.70E-07	4.17E-02				
bis(2-chloroethyl)ether	111-44-4	143.01	1.80E-05	6.92E-02				
bis-(2-Ethylhexyl)phthalate	117-81-7	390.56	1.02E-07	3.51E-02				
4-Bromophenyl-phenylether	101-55-3	249.10	1.17E-04	2.78E-02				
Butylbenzylphthalate	85-68-7	312.36	1.26E-06	2.23E-02				
Caprolactam	105-60-2	113.16	2.53E-08	6.81E-02				
Carbazole	86-74-8	167.21	1.54E-08	4.38E-02				
4-Chloro-3-methylphenol	59-50-7	142.58	2.45E-06	5.67E-02				
4-Chloroaniline	106-47-8	127.57	3.31E-07	7.04E-02				
2-Chloronaphthalene	91-58-7	162.62	3.14E-04	4.47E-02				
2-Chlorophenol	95-57-8	128.56	3.91E-04	6.61E-02				
4-Chlorophenyl-phenylether	7005-72-3	204.65	9.00E-05	2.69E-02				
Chrysene	218-01-9	228.29	9.46E-05	2.61E-02				
Di-n-butylphthalate	84-74-2	278.34	9.38E-10	4.38E-02				
Di-n-octylphthalate	117-84-0	390.56	6.68E-05	1.73E-02				
Dibenzo(a,h)anthracene	53-70-3	278.35	1.47E-08	2.36E-02				
Dibenzofuran	132-64-9	168.19	1.26E-05	4.11E-02				
3,3'-Dichlorobenzidine	91-94-1	253.13	4.00E-09	2.54E-02				
2,4-Dichlorophenol	120-83-2	163.00	3.16E-06	4.86E-02				
Diethylphthalate	84-66-2	222.24	4.50E-07	2.61E-02				
2,4-Dimethylphenol	105-67-9	122.16	2.00E-06	6.23E-02				
Dimethylphthalate	131-11-3	194.18	1.05E-07	5.68E-02				
4,6-Dintro-2-methylphenol	534-52-1	198.13	4.27E-07	3.00E-02				
2,4-Dinitrophenol	51-28-5	184.11	4.43E-07	2.73E-02				
2,4-Dinitrotoluene	121-14-2	182.13	9.26E-08	2.03E-01				
2,6-Dinitrotoluene	606-20-2	182.13	7.47E-07	3.70E-02				
Fluoranthene	206-44-0	202.25	1.61E-05	2.76E-02				
Fluorene	86-73-7	166.22	6.36E-05	4.40E-02				
Hexachlorobenzene	118-74-1	284.78	1.32E-03	5.42E-02				
Hexachlorobutadiene	87-68-3	260.76	8.15E-03	5.61E-02				
Hexachlorocyclopentadiene	77-47-4	272.77	2.70E-02	2.72E-02				
Hexachloroethane	67-72-1	236.74	3.89E-03	2.50E-03				
Indeno(1,2,3-cd)pyrene	193-39-5	276.33	1.60E-06	2.45E-02				
Isophorone	78-59-1	138.21	6.84E-06	6.23E-02				
2-Methylnaphthalene	91-57-6	142.20	5.18E-04	5.24E-02				
2-Methylphenol	95-48-7	108.14	1.20E-06	7.40E-02				
3-Methylphenol	108-39-4	108.14	8.65E-07	7.40E-02				
4-Methylphenol	106-44-5	108.14	7.92E-07	7.40E-02				
N-Nitroso-di-n-propylamine	621-64-7	130.19	2.25E-06	5.64E-02				
N-Nitrosodiphenylamine	86-30-6	198.22	5.00E-05	2.84E-02				
Naphthalene	91-20-3	128.17	4.83E-04	5.90E-02				
2-Nitroaniline	88-74-4	138.12	1.09E-07	7.30E-02				
3-Nitroaniline	99-09-2	138.12	1.44E-07	5.42E-02				
4-Nitroaniline	100-01-6	138.12	2.07E-09	6.37E-02				
Nitrobenzene	98-95-3	123.11	2.40E-05	7.60E-02				
2-Nitrophenol	88-75-5	139.11	9.47E-06	6.05E-02				
4-Nitrophenol	100-02-7	139.11	4.15E-10	6.41E-02				
2,2'-Oxybis(1-chloropropane)	108-60-1	171.06	1.17E-04	6.02E-02				
Pentachlorophenol	87-86-5	266.34	2.44E-08	5.60E-02				
Phenanthrene	85-01-8	178.23	2.33E-05	3.45E-02				
Phenol	108-95-2	94.11	3.97E-07	8.20E-02				
Pyrene	129-00-0	202.25	1.10E-05	2.78E-02				
1,2,4,5-Tetrachlorobenzene	95-94-3	215.89	2.58E-03	3.19E-02				
2,4,5-Trichlorophenol	95-95-4	197.45	4.33E-06	2.91E-02				
2,4,6-Trichlorophenol	88-06-2	197.45	7.79E-06	3.14E-02				
Other SVOCs								
Benzoic acid	65-85-0	122.12	3.81E-08	7.02E-02				
TCL Polychlorinated Biphenyls (PCBs)								
Aroclor-1016	12674-11-2	257.90	2.90E-04	2.54E-02				
Aroclor-1221	11104-28-2	200.70	3.50E-03	2.70E-02				
Aroclor-1232	11141-16-5	232.20	7.36E-04	2.58E-02				
Aroclor-1242	53469-21-9	266.50	5.20E-04	2.50E-02				
Aroclor-1248	12672-29-6	299.50	2.80E-03	2.40E-02				
Aroclor-1254	11097-69-1	328.00	2.00E-03	2.37E-02				
Aroclor-1260	11096-82-5	375.70	4.60E-03	2.26E-02				
TCL Pesticides								
Aldrin	309-00-2	364.91	1.70E-04	2.28E-02				
alpha-BHC	319-84-6	290.83	1.06E-05	2.75E-02				
beta-BHC	319-85-7	290.83	7.43E-07	2.77E-02				
delta-BHC	319-86-8	290.83	4.29E-07	2.60E-02				
gamma-BHC (lindane)	58-89-9	290.83	1.40E-05	2.77E-02				
Chlordane	57-74-9	409.78	4.86E-05	2.15E-02				
alpha-Chlordane	5103-71-9	409.76	4.86E-05	2.16E-02				

Input Values for the Virginia Department of Environmental Quality Trench Model

Table 3.7 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater greater than 15 feet deep	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Diffusion Coefficient in Air Dair cm2/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3	Concentration of Contaminant in Trench Ctrench mg/m3
gamma-Chlordane	5103-74-2	409.76	4.86E-05	2.16E-02				
4,4'-DDD	72-54-8	320.04	4.00E-06	2.28E-02				
4,4'-DDE	72-55-9	318.02	2.10E-05	2.34E-02				
4,4'-DDT	50-29-3	354.48	8.10E-06	1.83E-02				
Dieldrin	60-57-1	380.91	1.51E-05	2.33E-02				
Endosulfan	115-29-7	406.92	1.12E-05	2.25E-02				
Endosulfan I	959-98-8	406.92	6.50E-05	2.29E-02				
Endosulfan II	33213-65-9	406.92	6.50E-05	2.29E-02				
Endosulfan Sulfate	1031-07-8	422.92	3.25E-07	2.24E-02				
Endrin	72-20-8	380.91	7.52E-06	2.37E-02				
Endrin Aldehyde	7421-93-4	380.91	4.18E-06	2.37E-02				
Endrin Ketone	53494-70-5	380.90	1.25E-05	2.40E-02				
Heptachlor	76-44-8	373.32	1.09E-03	2.23E-02				
Heptachlor epoxide	1024-57-3	389.32	9.50E-06	2.38E-02				
Methoxychlor	72-43-5	345.65	1.58E-05	2.21E-02				
Toxaphene	8001-35-2	414.00	6.00E-06	2.17E-02				

August 4, 2011

Mr. Chris Jung, P.G.
Kentucky Department for Environmental Protection
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: Revised Risk Assessment Work Plan Comment Responses
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 4546 401, Agency Interest #17

Dear Mr. Jung:

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy, LLC has provided below responses to the Kentucky Department for Environmental Protection (KDEP) Hazardous Waste Branch (KHWB) comments regarding the Revised Risk Assessment Work Plan (RAWP) for Federal-Mogul's facility located in Scottsville, Kentucky. The Revised RAWP was submitted to the KHWB under cover dated May 26, 2011. The RAWP was included as Appendix A of the Corrective Measures Study Work Plan (CMS WP), which was submitted to the KHWB on August 5, 2010. Federal-Mogul and WSP received the KHWB comments on the RAWP in a letter or electronic message dated June 14, 2011.

The agency comments and our responses are provided below and replacement pages for the revised RAWP are enclosed. We would request that the KHWB remove the subject (changed) pages from the revised RAWP, dated May 26, 2011, and return the attached pages to the appropriate location within the revised document as indicated.

General Comment

We have reviewed the Responses to Comments and the Revised Appendix A – Risk Assessment Work Plan of the Corrective Measures Study Work Plan for Federal-Mogul Products, Inc., prepared by WSP Environment & Energy, Pittsburgh, PA. Most of our original comments have been adequately addressed. However, a few exposure parameters and model inputs still need to. These are noted in the following comments.

Responses to Response to Specific Comments:

1. ***The responses to Specific Comments #1 -- #13 are adequate to resolve our comments.***

   Table 6 -- Exposure Assumptions: Utility Worker (Soil)

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Docket No. 703972

Specific Comment #14 Please provide additional rationale for the proposed exposure frequency (20 days/year) and duration (1 year) for a utility worker for exposure to soil. The reference (EPA 1991) does not address this issue directly.

WSP Response
The exposure duration of 1 year is inferred from the discussion of construction worker/landscaper exposure scenarios in the EPA (1991) document which states that an exposure duration of less than 1 year is appropriate as construction/landscaping work is often short-term and dictated by weather. WSP believes that the utility worker would have a similar, if not shorter, exposure duration as the construction worker because utility projects are often short-term as well. A more specific reference to the proposed exposure duration of 1 year is from VADEQ's *Voluntary Remediation Program Risk Assessment Guidance,* which is available at http://www.deq.state.va.us/vrprisk/raguide.html. The exposure duration of 1 year is VADEQ's default value for construction/utility workers. The exposure frequency of 20 days/year will not be used in the revised RAWP. Instead, WSP will assume an exposure frequency of 125 days/year, which is VADEQ's default exposure frequency for the construction/utility worker scenario.

2. **KDEP Response to WSP**
Although we recognize that construction/utility work is often short-term and dictated by weather. However, if it is possible that a future construction or utility project is likely to continue for more than a year, a soil management plan (SMP) should be developed to address potential exposures. In addition, we recommend an exposure frequency (EF) of 185 days, an exposure time (ET) of 8 hours/day, and a fraction ingested (FI) of 1.0, which are the KDEP default value for outdoor workers.

WSP Response
As requested by the KDEP, WSP will use the KDEP default exposure assumptions of an exposure frequency (EF) of 185 days, an exposure time (ET) of 8 hours/day, and a fraction ingested (FI) of 1.0 in the construction/utility worker scenario. Attached Tables 6 and 7 have been revised to include the KDEP default exposure assumptions and are included in the Enclosure. Please remove Tables 6 & 7 from the May 26, 2011 Revised RAWP and replace with the enclosed Tables 6 & 7.

To ensure health and safety of the construction/utility workers during future trenching or excavation activities, a Soil Management Plan (SMP) will be prepared by the appropriate party on an as needed basis, which will address recorded vapor concentration measurements during the initial excavation activities.

3. ***The responses to Specific Comments #15 -- #18 are adequate to resolve our concerns.***

Revised Risk Assessment Work Plan
Table 6 – Exposure Assumptions: Construction/Utility Work – Soil, Direct Contact
Table 7 – Exposure Assumptions: Construction/Utility Worker – Groundwater, Vapor Intrusion

4. ***Based on recommendations in the KDEP response above, these tables should be revised.***

WSP Response
As requested by the KDEP and described above, the KDEP default exposure assumptions for exposure frequency (EF), exposure time (ET), and fraction ingested (FI) have been inserted in Tables 6 & 7. Revised Tables 6 & 7 are provided as enclosures. The enclosed revised Tables 6 & 7 should be placed in the May 26, 2011 Revised RAWP where appropriate.

Appendix A-2 – VDEQ Trench Model Exposure Assumptions

5. ***The input values for the Virginia Department of Environmental Quality Trench Model includes a value of 0 cm for the parameter labeled H_v (presumably the height of the vadose zone, since it is based the difference between the depth to groundwater and the depth of the trench). However, this table (Table 3.7 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater greater than 15 feet deep) is based on the assumption that the depth to groundwater is greater than the depth of the trench, which no longer holds true in this case. Furthermore, using $H_v = 0$ results in division by 0, and the model cannot calculate air or groundwater screening levels. Therefore, the alternate table (Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep) should be used. This results in the use of mass transfer coefficients rather that diffusion coefficients.***

In addition, please provide a reference for the input temperature (58.2^0F) that differs from the default value (77^0F).

Finally, due to the inherent uncertainty in modeling trench air concentrations, we would prefer that volatiles be measured during the initial excavation within trenches, to ensure the health and safety of the utility workers. If these measured values are near or below the modeled concentrations, monitoring could be discontinued.

WSP Response
As discussed by the KDEP, WSP agrees that Table 3.7 included in the revised May 26, 2011 Revised RAWP is not appropriate where depth to groundwater is less than or equal to the trench depth of 15 feet. As requested by the KDEP, WSP has enclosed Table 3.8 of the VDEQ Trench Model Exposure Assumptions which indicates a depth to groundwater less than 15 feet. In addition, the input temperature reference has been added on Table 3.8, as a footnote, to explain the temperature value. Finally, to ensure health and safety of the construction/utility workers during trench excavation, a Soil Management Plan (SMP), will be prepared on an as needed basis, which will address recorded vapor concentration measurements during the initial excavation. If measured vapor values are below the modeled concentrations, monitoring could be discontinued. Please remove Table 3.7 from Appendix A-2 – VDEQ Trench Model Exposure Assumptions and insert the enclosed Table 3.8 in Appendix A-2 of the May 26, 2011 revised RAWP document.

In addition, the U.S. Environmental Protection Agency (EPA) Region 3 updated their Regional Screening Levels (RSLs) during June 2011. To conform with the June 2011 RSLs, revisions to the following pages (1, 12, and 20) of the May 26, 2011 revised RAWP are necessary. Revised pages 1, 12, and 20 reflecting the recent RSL changes are provided in the Enclosure. Federal-Mogul and WSP request that the KHWB replace pages 1, 12, and 20 and Tables 6 & 7 in the May 26, 2011 document with pages 1, 12, and 20, and Tables 6 & 7 as provided in the Enclosure. In addition, remove Table 3.7 in Appendix A-2 – VDEQ Trench Model Exposure and replace with enclosed Table 3.8. Changes to the RAWP tables did not result in changes to the revised RAWP text. We respectfully request approval of the Revised RAWP.

Should you have any questions regarding our responses or the revised tables, please do not hesitate to contact me at 412-604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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Enclosures

cc: Ms. April J. Webb, P.E., Kentucky Hazardous Waste Branch, Frankfort, KY
Ms. Jerri Martin, Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

Enclosure
Revised Risk Assessment Work Plan
Revised Text Pages, 1, 12, and 20
Table 6 and Table 7
Appendix A—2 –VDEQ Trench Model Exposure Assumptions – Table 3.8

1 Introduction

WSP Environment and Energy, LLC, has prepared this Risk Assessment Work Plan (RAWP) for the Federal-Mogul Products, Inc., facility (Facility) in Scottsville, Kentucky (Figure 1). The purpose of the risk assessment is to determine whether there are potential unacceptable human health and ecological risks associated with future exposures to chemicals of potential concern (COPCs) from the Facility. The risk assessment for the Facility is being conducted as part of the Corrective Measures Study (CMS) Work Plan (401 Kentucky Administrative Regulations [KAR] 100:030) in fulfillment of the Resource Conservation and Recovery Act (RCRA) process. The technical approach for the risk assessment in this work plan is based on previous investigations, analyses, and modeling conducted at the site, including previous reports and discussions with the Kentucky Department for Environmental Protection (KDEP), Division of Land, Hazardous Waste Branch (KHWB) as provided under 401 KAR 100:030 Section 7(2)(c) 1 and 2 and Section 8(3)(c). Per discussions with the KDEP, the risk characterization will be performed using the KDEP default screening-level exposure parameters (KDEP 2002); however, the uncertainty section will include a quantitative calculation of risk using more recent federal and state guidance and toxicological information.

Part of the CMS is to conduct human health and ecological risk assessments to determine potential unacceptable risks from existing Facility conditions and to identify matters that potentially need to be addressed. This work plan presents the complete conceptual site model (CSM), discusses the selection of media-specific COPCs, identifies current and future potential receptors, characterizes potentially complete exposure pathways, and presents the sources of toxicological criteria for the identified COPCs for the human health risk assessment (HHRA). In addition, this work plan presents equations that will be used to calculate potential risks to receptors via complete exposure pathways and the exposure assumptions for the equations. For the ecological risk assessment (ERA), this work plan presents the screening level ERA (SLERA) that will be conducted to determine if a more detailed baseline ERA is necessary.

The risk assessment will be conducted in accordance with KDEP remediation requirements, KDEP risk assessment guidance, and U.S. Environmental Protection Agency (EPA) guidance:

- Remediation requirements outlined in 401 KAR 100:030
- Kentucky Risk Assessment Guidance (KDEP 2002)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part A (RAGS Part A; EPA 1989)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments (RAGS Part D; EPA 2001a)
- Guidance for Data Usability in Risk Assessment (EPA 1992)
- Regions 3, 6, and 9 Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (EPA 2011b)
- EPA Office of Solid Waste and Emergency Response (OSWER) draft vapor intrusion guidance (EPA 2002a)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part F, Supplemental Guidance for Inhalation Risk Assessment (RAGS Part F; EPA 2009a)
- EPA Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final (EPA 1997a)

MC = mixing coefficient (0.5 unitess)

An EPC for the construction and utility worker exposed to VOCs in the groundwater during excavation activities will be estimated using the model for exposure of workers to volatile COPCs in a construction or utility trench developed by the Virginia Department of Environmental Quality (VDEQ) for the Virginia Voluntary Remediation Program risk assessment guidance (VDEQ 2010). To estimate the migration of VOCs in groundwater to air in a construction trench, the model uses a combination of a vadose zone model to estimate volatilization of gases from contaminated groundwater into a trench, and a box model to estimate dispersion of the contaminants from the air inside the trench into the aboveground atmosphere. The general equation for calculating the air concentration in the trench is:

C_{trench} = $C_{groundwater}$ x VF

Where:

C_{trench} = concentration of the COPC in air within the trench (µg/m^3)

$C_{groundwater}$= EPC of COPC in groundwater (µg/l)

VF = volatilization factor (liters/m^3)

Studies suggest that if the ratio of trench width (relative to wind direction) to trench depth is less than or equal to 1, circulation cells will be set up within the trench that limit the degree of gas exchange with the atmosphere. VDEQ has assumed an air exchange in this case of 2 per hour. If the ratio of trench width to trench depth is greater than 1, air exchange between the trench and aboveground atmosphere is not restricted, thus air exchange is assumed to be 360 per hour, which is based upon the ratio of trench depth to the average wind speed. Exposure assumptions for this model are outlined in the VDEQ guidance and included in Appendix A-2.

3.2 EXPOSURE ASSUMPTIONS

Tables 3 through 15 present the applicable exposure assumptions for potential future receptors identified in the CSM. The exposure assumptions used in the HHRA are based on site-specific conditions or default exposure assumptions presented in the following guidance documents:

- Kentucky Risk Assessment Guidance (KDEP 2002)
- RAGS Part A (EPA 1989)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (RAGS Part E; EPA 2004b)
- RAGS Part F (EPA 2009a)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Supplemental Guidance – "Standard Default Exposure Factors" (EPA 1991)
- Exposure Factors Handbook, Volumes I, II, and III (EPA 1997b)Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002b)
- Regions 3, 6, and 9 RSLs for Chemical Contaminants at Superfund Sites (EPA 2011b)
- VDEQ's Voluntary Remediation Program risk assessment guidance (VDEQ 2010)

3.3 EXPOSURE EQUATIONS AND MODELS

The following are the equations for calculating the intake of COPCs:

U.S. Environmental Protection Agency. 2001a. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) Final. Office of Solid Waste and Emergency Response, Washington, D.C. EPA 540-R-97-003 OSWER 9285.7-47.

U.S. Environmental Protection Agency. 2001b. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. November 30. http://www.epa.gov/region4/waste/ots/ecolbul.htm

U.S. Environmental Protection Agency. 2002a. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater to Soils (Subsurface Vapor Intrusion Guidance). Office of Solid Waste and Emergency Response. Washington, D.C. EPA 530-D-02-004. November.

U.S. Environmental Protection Agency. 2002b. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

U.S. Environmental Protection Agency. 2003a. Human Health Toxicity Values in Superfund Risk Assessments. Office of Superfund Remediation and Technology Innovation. OSWER Directive 9285.7-53. December 5.

U.S. Environmental Protection Agency. 2003b. Region 5. Ecological Screening Levels. August 23. http://www.epa.gov/reg5rcra/ca/edql.htm

U. S. Environmental Protection Agency. 2004a. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Office of Emergency and Remedial Response. Revised February 22.

U.S. Environmental Protection Agency. 2004b. Risk Assessment Guidance for Superfund : Volume I Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R/99/005 OSWER 9285.7-02EP.

U.S. Environmental Protection Agency. 2005. Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001B. Risk Assessment Forum, Washington, D.C.

U.S. Environmental Protection Agency. 2009a: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) (Final 2009); EPA-540-R-070-002 OSWER 9285.7-82, January 2009.

U.S. Environmental Protection Agency. 2011a. Integrated Risk Information System. Environmental Criteria and Assessment Office, Cincinnati, Ohio.

U.S. Environmental Protection Agency. 2011b. Regions 3, 6, and 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites. Update June 2011. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

Virginia Department of Environmental Quality. 2010. Voluntary Remediation Program Risk Assessment Guidance. Available at: http://www.deq.state.va.us/vrprisk/ Accessed July 30, 2010.

WSP Environmental Strategies LLC and Toxicology Excellence for Risk Assessment. 2006. Offsite Surface Water Sampling Results and Trichloroethene Risk Assessment for Ramble Creek. December 4.

WSP Environmental Strategies LLC. 2007. Subsurface Characterization Activities Report. October 17.

WSP Environment & Energy, Crawford Hydrology Laboratory, and Hoffman Environmental Research Institute. 2009. Dye Trace Investigation of Federal-Mogul Products, Inc. in Scottsville, Kentucky. October 12.

Table 6

Exposure Assumptions: Construction/Utility Worker
(Soil, Direct Contact)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Subsurface Soil
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference (a)
Incidental Ingestion	IR	Ingestion Rate	mg/day	480	KDEP 2002
	EF	Exposure frequency	day/yr	185	KDEP 2002
	ED	Exposure duration	yr	1	EPA 1991
	BW	Body Weight	kg	70	KDEP 2002, EPA 1989
	AT-NC	Averaging time - non-cancer	days	365	EPA 1991
	AT-C	Averaging time - cancer	days	25,550	EPA 1991
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1991
	FI	Fraction ingested	unitless	1.0	KDEP 2002
Dermal	SA	Surface area for contact	cm^2/day	4,700	KDEP 2002
	AF	Adherence factor	mg/cm^2	1.0	KDEP 2010
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004b, KDEP 2002
	EF	Exposure frequency	day/yr	185	KDEP 2002
	ED	Exposure duration	yr	1	EPA 1991, EPA 2002b
	BW	Body weight	kg	70	KDEP 2002, EPA 1991
	AT-NC	Averaging time - noncancer	days	365	KDEP 2002, EPA 1989
	AT-C	Averaging time - cancer	days	25,550	KDEP 2002, EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency.

Table 7

Exposure Assumptions: Construction/Utility Worker
(Groundwater, Vapor Intrusion)
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in Trench
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	8	KDEP 2002
	EF	Exposure frequency	day/yr	185	KDEP 2002
	ED	Exposure duration	yr	1	EPA 1991, EPA 2002b
	CF	Conversion factor	mg/µg	1.0E-03	EPA 2009a
	AT-NC	Averaging time - noncancer	hours	8,760	EPA 2009a
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009a

a/ See work plan for full reference. KDEP = Kentucky Department of Environmental Protection; EPA = U.S. Environmental Protection Agency

Input Values for the Virginia Department of Environmental Quality Trench Model (a)

For Mass-Transfer Coefficients			For Emission Flux and Concentration in Trench			Trench dimensions		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	8	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		2.44	m
Kl,O2	0.002	cm/s	CF3	3600	s/hr	Width	3	ft
MWO2	32		F	1			0.91	m
T	58.2	F	ACH	2	hr-1	Depth	15	ft
T	288	K					4.57	m
R	8.20E-05	atm-m3/mol-K				Width/Depth	0.20	

a/ The temperature is the average annual temperature for Scottsville, Kentucky.
Available online at: http://countrystudies.us/united-states/weather/Kentucky/scottsville.htm

Input Values for the Virginia Department of Environmental Quality Trench Model

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Herry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KIG cm/s	Liquid-Phase Mass Transfer Coefficient KIL cm/s	Overall Mass Transfer Coefficient KI cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
TAL Inorganics									
Aluminum	7429-90-5	26.98							
Antimony	7440-36-0	121.76							
Arsenic	7440-38-2	74.92							
Barium	7440-39-3	137.33							
Beryllium	7440-41-7	9.01							
Cadmium (water)	7440-43-9	112.41							
Calcium	7440-70-2	40.08							
Chromium	7440-47-3	52.00							
Cobalt	7440-48-4	58.93							
Copper	7440-50-8	63.55							
Cyanide	57-12-5	26.02							
Iron	7439-89-6	55.85							
Lead	7439-92-1	207.20							
Magnesium	7439-95-4	24.31							
Manganese (nonfood)	7439-96-5	54.94							
Mercuric chloride	7487-94-7	271.50							
Mercury	7439-97-6	200.59	1.14E-02	3.59E-01	7.72E-04	7.69E-04			
Methylmercury	22967-92-6	215.63							
Nickel	7440-02-0	58.69							
Potassium	7440-09-7	39.10							
Selenium	7782-49-2	78.96							
Silver	7440-22-4	107.87							
Sodium	7440-23-5	22.99							
Thallium	7440-28-0	204.38							
Vanadium	7440-62-2	50.94							
Zinc	7440-66-6	65.39							
Other Inorganics									
Perchlorate									
TCL Volatile Organic Compounds (VOCs)									
Acetone	67-64-1	58.08	3.88E-05	5.44E-01	1.43E-03	5.50E-04			
Benzene	71-43-2	78.11	5.55E-03	4.92E-01	1.24E-03	1.22E-03			
Bromochloromethane	74-97-5	139.38	1.46E-03	4.05E-01	9.26E-04	8.93E-04			
Bromodichloromethane	75-27-4	163.83	1.60E-03	3.84E-01	8.54E-04	8.27E-04			
Bromoform	75-25-2	252.73	6.35E-04	3.32E-01	6.88E-04	6.30E-04			
Bromomethane	74-83-9	94.94	8.24E-03	4.61E-01	1.12E-03	1.11E-03			
2-Butanone (methyl ethyl ketone)	78-93-3	72.11	5.59E-05	5.06E-01	1.29E-03	6.20E-04			
Carbon disulfide	75-15-0	76.14	3.03E-02	4.97E-01	1.25E-03	1.25E-03			
Carbon tetrachloride	56-23-5	153.82	3.04E-02	3.92E-01	8.82E-04	8.80E-04			
Chlorobenzene	108-90-7	112.56	3.70E-03	4.36E-01	1.03E-03	1.02E-03			
Chloroethane	75-00-3	64.51	8.82E-03	5.25E-01	1.36E-03	1.35E-03			
Chloroform	67-66-3	119.38	3.67E-03	4.27E-01	1.00E-03	9.86E-04			
Chloromethane	74-87-3	50.49	8.82E-03	5.70E-01	1.54E-03	1.53E-03			
Cyclohexane	110-82-7	84.16	1.95E-01	4.80E-01	1.19E-03	1.19E-03			
1,2-Dibromo-3-chloropropane	96-12-8	236.33	1.47E-04	3.40E-01	7.11E-04	5.32E-04			
Dibromochloromethane	124-48-1	208.28	7.83E-04	3.54E-01	7.58E-04	7.12E-04			
1,2-Dibromoethane	106-93-4	187.86	7.43E-04	3.67E-01	7.98E-04	7.46E-04			
1,2-Dichlorobenzene (ortho)	95-50-1	147.00	1.90E-03	3.98E-01	9.02E-04	8.77E-04			
1,3-Dichlorobenzene (meta)	541-73-1	147.00	3.10E-03	3.98E-01	9.02E-04	8.87E-04			
1,4-Dichlorobenzene (para)	106-46-7	147.00	2.43E-03	3.98E-01	9.02E-04	8.82E-04			
Dichlorodifluoromethane	75-71-8	120.91	3.43E-01	4.25E-01	9.94E-04	9.94E-04			
1,1-Dichloroethane	75-34-3	98.96	5.62E-03	4.55E-01	1.10E-03	1.09E-03			
1,2-Dichloroethane	107-06-2	98.96	9.79E-04	4.55E-01	1.10E-03	1.04E-03			
1,1-Dichloroethene	75-35-4	96.94	2.61E-02	4.58E-01	1.11E-03	1.11E-03			
1,2-Dichloroethene (total)	540-59-0	96.94	4.51E-03	4.58E-01	1.11E-03	1.10E-03			
cis-1,2-Dichloroethene	156-59-2	96.94	4.08E-03	4.58E-01	1.11E-03	1.10E-03			
trans-1,2-Dichloroethene	156-60-5	96.94	9.38E-03	4.58E-01	1.11E-03	1.10E-03			
1,2-Dichloropropane	78-87-5	112.99	2.80E-03	4.35E-01	1.03E-03	1.01E-03			
1,3-Dichloropropene (total)	542-75-6	110.97	1.77E-02	4.38E-01	1.04E-03	1.03E-03			
cis-1,3-Dichloropropene	10061-01-5	110.97	1.20E-03	4.38E-01	1.04E-03	9.92E-04			
trans-1,3-Dichloropropene	10061-02-6	110.97	8.00E-04	4.38E-01	1.04E-03	9.70E-04			
1,4-dioxane	123-91-1	88.11	4.80E-06	4.73E-01	1.16E-03	8.88E-05			
Ethylbenzene	100-41-4	106.17	7.88E-03	4.44E-01	1.06E-03	1.05E-03			
Hexane	110-54-3	86.18	1.69E+00	4.76E-01	1.18E-03	1.18E-03			
2-Hexanone	591-78-6	100.16	9.32E-05	4.53E-01	1.09E-03	6.78E-04			
Isopropylbenzene	98-82-8	120.19	1.16E+00	4.26E-01	9.97E-04	9.97E-04			
4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1	100.16	1.38E-04	4.53E-01	1.09E-03	7.73E-04			
Methyl acetate	79-20-9	74.08	1.15E-04	5.01E-01	1.27E-03	8.35E-04			
Methyl tert-butyl ether	1634-04-4	88.15	5.67E-04	4.73E-01	1.16E-03	1.06E-03			
Methylcyclohexane	108-87-2	98.19	4.30E-01	4.56E-01	1.10E-03	1.10E-03			
Methylene chloride	75-09-2	84.93	2.19E-03	4.79E-01	1.19E-03	1.16E-03			
Styrene	100-42-5	104.15	2.75E-03	4.47E-01	1.07E-03	1.05E-03			
1,1,2,2-Tetrachloroethane	79-34-5	167.85	3.45E-04	3.81E-01	8.44E-04	7.33E-04			
Tetrachloroethene	127-18-4	165.83	1.84E-02	3.83E-01	8.49E-04	8.47E-04			
Toluene	108-88-3	92.14	6.64E-03	4.66E-01	1.14E-03	1.13E-03			
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	187.37	4.81E-01	3.67E-01	7.99E-04	7.99E-04			
1,2,3-Trichlorobenzene	87-61-6	181.45	1.25E-03	3.71E-01	8.12E-04	7.80E-04			
1,2,4-Trichlorobenzene	120-82-1	181.45	1.42E-03	3.71E-01	8.12E-04	7.83E-04			
1,1,1-Trichloroethane	71-55-6	133.40	1.72E-02	4.11E-01	9.47E-04	9.44E-04			
1,1,2-Trichloroethane	79-00-5	133.40	9.13E-04	4.11E-01	9.47E-04	6.94E-04			
Trichloroethene	79-01-6	131.39	1.03E-02	4.14E-01	9.54E-04	9.49E-04			
Trichlorofluoromethane	75-69-4	137.37	9.70E-02	4.07E-01	9.33E-04	9.32E-04			
Vinyl Chloride	75-01-4	62.50	2.70E-02	5.30E-01	1.38E-03	1.38E-03			
Total Xylenes	1330-20-7	106.16	5.18E-03	4.44E-01	1.06E-03	1.05E-03			
Other VOCs									
n-butylbenzene	104-51-8	134.22	1.59E-02	4.11E-01	9.44E-04	9.41E-04			
sec-butylbenzene	135-98-8	134.22	1.76E-02	4.11E-01	9.44E-04	9.41E-04			
tert-butylbenzene	98-06-6	134.22	1.32E-02	4.11E-01	9.44E-04	9.40E-04			
isopropyltoluene	99-87-6	134.22	1.10E-02	4.11E-01	9.44E-04	9.39E-04			
n-propylbenzene	103-65-1	120.19	1.05E-02	4.26E-01	9.97E-04	9.92E-04			
1,1,1,2-tetrachloroethane	630-20-6	167.85	2.42E-03	3.81E-01	8.44E-04	8.26E-04			
1,2,4-trimethylbenzene	95-63-6	120.19	6.16E-03	4.26E-01	9.97E-04	9.88E-04			
1,3,5-trimethylbenzene	108-67-8	120.19	8.77E-03	4.26E-01	9.97E-04	9.91E-04			
m-xylene	108-38-3	106.17	7.34E-03	4.44E-01	1.06E-03	1.05E-03			

Input Values for the Virginia Department of Environmental Quality Trench Model

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
o-xylene	95-47-6	106.17	5.19E-03	4.44E-01	1.06E-03	1.05E-03			
p-xylene	106-42-3	106.17	7.66E-03	4.44E-01	1.06E-03	1.05E-03			
TCL Semivolatile Organic Compounds (SVOCs)									
Acenaphthene	83-32-9	154.21	1.55E-04	3.92E-01	8.80E-04	6.56E-04			
Acenaphthylene	208-96-8	152.19	1.13E-04	3.94E-01	8.86E-04	6.03E-04			
Acetophenone	98-86-2	120.15	1.07E-05	4.26E-01	9.98E-04	1.62E-04			
Anthracene	120-12-7	178.23	6.50E-05	3.73E-01	8.19E-04	4.56E-04			
Atrazine	1912-24-9	215.68	2.36E-09	3.50E-01	7.45E-04	3.50E-08			
Benzaldehyde	100-52-7	106.12	2.67E-05	4.44E-01	1.06E-03	3.41E-04			
Benzo(a)anthracene	56-55-3	228.29	3.35E-06	3.44E-01	7.24E-04	4.57E-05			
Benzo(a)pyrene	50-32-8	252.31	1.13E-06	3.32E-01	6.88E-04	1.55E-05			
Benzo(b)fluoranthene	205-99-2	252.31	1.11E-04	3.32E-01	6.88E-04	4.78E-04			
Benzo(g,h,i)perylene	191-24-2	276.33	1.41E-07	3.22E-01	6.58E-04	1.92E-06			
Benzo(k)fluoranthene	207-08-9	252.31	8.29E-07	3.32E-01	6.88E-04	1.15E-05			
1,1'-Biphenyl	92-52-4	154.21	3.00E-04	3.92E-01	8.80E-04	7.48E-04			
bis(2-Chloroethoxy)methane	111-91-1	173.04	1.70E-07	3.77E-01	8.31E-04	2.71E-06			
bis(2-chloroethyl)ether	111-44-4	143.01	1.80E-05	4.02E-01	9.14E-04	2.29E-04			
bis-(2-Ethylhexyl)phthalate	117-81-7	390.56	1.02E-07	2.87E-01	5.53E-04	1.24E-06			
4-Bromophenyl-phenylether	101-55-3	249.10	1.17E-04	3.34E-01	6.93E-04	4.88E-04			
Butylbenzylphthalate	85-68-7	312.36	1.26E-06	3.09E-01	6.19E-04	1.61E-05			
Caprolactam	105-60-2	113.16	2.53E-08	4.35E-01	1.03E-03	4.66E-07			
Carbazole	86-74-8	167.21	1.54E-08	3.81E-01	8.46E-04	2.49E-07			
4-Chloro-3-methylphenol	59-50-7	142.58	2.45E-06	4.02E-01	9.16E-04	3.99E-05			
4-Chloroaniline	106-47-8	127.57	3.31E-07	4.18E-01	9.68E-04	5.62E-06			
2-Chloronaphthalene	91-58-7	162.62	3.14E-04	3.85E-01	8.57E-04	7.34E-04			
2-Chlorophenol	95-57-8	128.56	3.91E-04	4.17E-01	9.64E-04	8.46E-04			
4-Chlorophenyl-phenylether	7005-72-3	204.65	9.00E-05	3.57E-01	7.64E-04	4.89E-04			
Chrysene	218-01-9	228.29	9.48E-05	3.44E-01	7.24E-04	4.74E-04			
Di-n-butylphthalate	84-74-2	278.34	9.38E-10	3.22E-01	6.55E-04	1.28E-08			
Di-n-octylphthalate	117-84-0	390.56	6.68E-05	2.87E-01	5.53E-04	3.29E-04			
Dibenzo(a,h)anthracene	53-70-3	278.35	1.47E-08	3.22E-01	6.55E-04	2.00E-07			
Dibenzofuran	132-64-9	168.19	1.26E-05	3.81E-01	8.43E-04	1.64E-04			
3,3'-Dichlorobenzidine	91-94-1	253.13	4.00E-09	3.32E-01	6.87E-04	5.62E-08			
2,4-Dichlorophenol	120-83-2	163.00	3.16E-06	3.85E-01	8.56E-04	4.86E-05			
Diethylphthalate	84-66-2	222.24	4.50E-07	3.47E-01	7.33E-04	6.55E-06			
2,4-Dimethylphenol	105-67-9	122.16	2.00E-06	4.24E-01	9.89E-04	3.46E-05			
Dimethylphthalate	131-11-3	194.18	1.05E-07	3.63E-01	7.85E-04	1.61E-06			
4,6-Dinitro-2-methylphenol	534-52-1	198.13	4.27E-07	3.60E-01	7.77E-04	6.46E-06			
2,4-Dinitrophenol	51-28-5	184.11	4.43E-07	3.69E-01	8.06E-04	6.87E-06			
2,4-Dinitrotoluene	121-14-2	182.13	9.26E-08	3.71E-01	8.10E-04	1.45E-06			
2,6-Dinitrotoluene	606-20-2	182.13	7.47E-07	3.71E-01	8.10E-04	1.16E-05			
Fluoranthene	206-44-0	202.25	1.61E-05	3.58E-01	7.69E-04	1.85E-04			
Fluorene	86-73-7	166.22	6.36E-05	3.82E-01	8.48E-04	4.65E-04			
Hexachlorobenzene	118-74-1	284.78	1.32E-03	3.19E-01	6.48E-04	6.25E-04			
Hexachlorobutadiene	87-68-3	260.76	8.15E-03	3.29E-01	6.77E-04	6.73E-04			
Hexachlorocyclopentadiene	77-47-4	272.77	2.70E-02	3.24E-01	6.62E-04	6.61E-04			
Hexachloroethane	67-72-1	236.74	3.89E-03	3.40E-01	7.11E-04	7.02E-04			
Indeno(1,2,3-cd)pyrene	193-39-5	276.33	1.60E-06	3.22E-01	6.58E-04	2.11E-05			
Isophorone	78-59-1	138.21	6.64E-06	4.07E-01	9.30E-04	1.02E-04			
2-Methylnaphthalene	91-57-6	142.20	5.18E-04	4.03E-01	9.17E-04	8.31E-04			
2-Methylphenol	95-48-7	108.14	1.20E-06	4.41E-01	1.05E-03	2.20E-05			
3-Methylphenol	108-39-4	108.14	8.65E-07	4.41E-01	1.05E-03	1.59E-05			
4-Methylphenol	106-44-5	108.14	7.92E-07	4.41E-01	1.05E-03	1.46E-05			
N-Nitroso-di-n-propylamine	621-64-7	130.19	2.25E-06	4.15E-01	9.58E-04	3.80E-05			
N-Nitrosodiphenylamine	86-30-6	198.22	5.00E-06	3.60E-01	7.77E-04	6.95E-05			
Naphthalene	91-20-3	128.17	4.83E-04	4.17E-01	9.66E-04	8.68E-04			
2-Nitroaniline	88-74-4	138.12	1.09E-07	4.07E-01	9.30E-04	1.87E-06			
3-Nitroaniline	99-09-2	138.12	1.44E-07	4.07E-01	9.30E-04	2.47E-06			
4-Nitroaniline	100-01-6	138.12	2.07E-09	4.07E-01	9.30E-04	3.56E-08			
Nitrobenzene	98-95-3	123.11	2.40E-05	4.23E-01	9.85E-04	2.99E-04			
2-Nitrophenol	88-75-5	139.11	9.47E-06	4.06E-01	9.27E-04	1.38E-04			
4-Nitrophenol	100-02-7	139.11	4.15E-10	4.06E-01	9.27E-04	7.13E-09			
2,2'-Oxybis(1-chloropropane)	108-60-1	171.06	1.17E-04	3.79E-01	8.36E-04	5.78E-04			
Pentachlorophenol	87-86-5	266.34	2.44E-08	3.26E-01	6.70E-04	3.37E-07			
Phenanthrene	85-01-8	178.23	2.33E-05	3.73E-01	8.19E-04	2.54E-04			
Phenol	108-95-2	94.11	3.97E-07	4.62E-01	1.13E-03	7.72E-06			
Pyrene	129-00-0	202.25	1.10E-05	3.58E-01	7.69E-04	1.37E-04			
1,2,4,5-Tetrachlorobenzene	95-94-3	215.89	2.58E-03	3.50E-01	7.44E-04	7.30E-04			
2,3,4,6-Tetrachlorophenol	58-90-2	231.89	4.39E-06	3.42E-01	7.18E-04	5.84E-05			
2,4,5-Trichlorophenol	95-95-4	197.45	4.33E-06	3.61E-01	7.78E-04	6.10E-05			
2,4,6-Trichlorophenol	88-06-2	197.45	7.79E-06	3.61E-01	7.78E-04	1.03E-04			
Other SVOCs									
Benzoic acid	65-85-0	122.12	3.81E-08	4.24E-01	9.89E-04	6.83E-07			
TCL Polychlorinated Biphenyls (PCBs)									
Aroclor-1016	12674-11-2	257.90	2.90E-04	3.30E-01	6.81E-04	5.83E-04			
Aroclor-1221	11104-28-2	200.70	3.50E-03	3.59E-01	7.72E-04	7.51E-04			
Aroclor-1232	11141-16-5	232.20	7.36E-04	3.42E-01	7.18E-04	6.72E-04			
Aroclor-1242	53469-21-9	266.50	5.20E-04	3.26E-01	6.70E-04	6.13E-04			
Aroclor-1248	12672-29-6	299.50	2.80E-03	3.14E-01	6.32E-04	6.21E-04			
Aroclor-1254	11097-69-1	328.00	2.00E-03	3.04E-01	6.04E-04	5.90E-04			
Aroclor-1260	11096-82-5	375.70	4.60E-03	2.91E-01	5.64E-04	5.59E-04			
Aroclor-1262	37324-23-5	389.00	4.60E-03	2.87E-01	5.54E-04	5.49E-04			
Aroclor-1268	11100-14-4	453.00	4.60E-03	2.73E-01	5.14E-04	5.09E-04			
Total PCBs	1336-36-3								
TCL Pesticides									
Aldrin	309-00-2	364.91	1.70E-04	2.94E-01	5.72E-04	4.50E-04			
alpha-BHC	319-84-6	290.83	1.06E-05	3.17E-01	6.41E-04	1.16E-04			
beta-BHC	319-85-7	290.83	7.43E-07	3.17E-01	6.41E-04	9.82E-06			
delta-BHC	319-86-8	290.83	4.29E-07	3.17E-01	6.41E-04	5.71E-06			
gamma-BHC (lindane)	58-89-9	290.83	1.40E-05	3.17E-01	6.41E-04	1.45E-04			
Chlordane	57-74-9	409.78	4.86E-05	2.83E-01	5.40E-04	2.80E-04			
alpha-Chlordane	5103-71-9	409.76	4.86E-05	2.83E-01	5.40E-04	2.80E-04			
gamma-Chlordane	5103-74-2	409.76	4.86E-05	2.83E-01	5.40E-04	2.80E-04			
4,4'-DDD	72-54-8	320.04	4.00E-06	3.07E-01	6.11E-04	4.79E-05			

Input Values for the Virginia Department of Environmental Quality Trench Model

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
4,4'-DDE	72-55-9	318.02	2.10E-05	3.08E-01	6.13E-04	1.89E-04			
4,4'-DDT	50-29-3	354.48	8.10E-06	2.97E-01	5.81E-04	8.66E-05			
Dieldrin	60-57-1	380.91	1.51E-05	2.90E-01	5.60E-04	1.39E-04			
Endosulfan	115-29-7	406.92	1.12E-05	2.83E-01	5.42E-04	1.08E-04			
Endosulfan I	959-98-8	406.92	6.50E-05	2.83E-01	5.42E-04	3.20E-04			
Endosulfan II	33213-65-9	406.92	6.50E-05	2.83E-01	5.42E-04	3.20E-04			
Endosulfan Sulfate	1031-07-8	422.92	3.25E-07	2.80E-01	5.32E-04	3.82E-06			
Endrin	72-20-8	380.91	7.52E-06	2.90E-01	5.60E-04	7.92E-05			
Endrin Aldehyde	7421-93-4	380.91	4.18E-06	2.90E-01	5.60E-04	4.70E-05			
Endrin Ketone	53494-70-5	380.90	1.25E-05	2.90E-01	5.60E-04	1.20E-04			
Heptachlor	76-44-8	373.32	1.09E-03	2.91E-01	5.66E-04	5.43E-04			
Heptachlor epoxide	1024-57-3	389.32	9.50E-06	2.87E-01	5.54E-04	9.57E-05			
Methoxychlor	72-43-5	345.65	1.56E-05	2.99E-01	5.88E-04	1.49E-04			
Toxaphene	8001-35-2	414.00	6.00E-06	2.82E-01	5.37E-04	6.31E-05			

WSP

September 1, 2011

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

2011 SEP -7 A 10:55
RECEIVED

Re: April through June 2011 CM Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the second quarter of 2011 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C, #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted the Corrective Measures Study Work Plan (CMS WP) to the KHWB on August 9, 2010. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

Corrective measures activities performed by WSP Environment & Energy, LLC, on behalf of Federal-Mogul, during the second quarter of 2011 included:

- preparation and submittal of a first quarter 2011 CM progress report
- preparation of responses to KHWB comments on the Risk Assessment Work Plan (RAWP)
- preparation and submittal of monthly Discharge Monthly Reports (DMRs) for the operating bedrock groundwater interim remedial measure (IRM) treatment system
- collection and analysis of groundwater samples from an offsite abandoned water well with KHWB representative
- continued operation and monitoring of the groundwater IRM treatment system

Agency Meetings and Contacts

During the second quarter of 2011, WSP provided periodic project updates to Christopher Jung, KHWB project manager, with regards to CM activities performed by Federal-Mogul and WSP. These updates included information regarding implementation of the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan field activities, KHWB review of the CMS WP, and responding to KHWB comments on the RAWP.

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Docket No. 703970

On May 12, 2011, Christopher Jung visited the Scottsville facility during WSP's performance of monthly monitoring activities with regards to the operating groundwater IRM treatment system. In addition, KHWB and WSP collected and split groundwater samples from an abandoned offsite water well which WSP sampled during performance of the Offsite Exposure Pathway Evaluation pre-design field activities. Groundwater samples collected by WSP from this offsite abandoned water well during the first quarter of 2011, were reported with concentrations of site constituents of concern.

During the second quarter of 2011, WSP participated in telephone conference calls with KHWB risk assessors regarding KHWB comments on the RAWP. In response to these conversations, WSP submitted responses to comments and a revised RAWP to the KHWB on May 26, 2011. On June 14, 2011, WSP received via electronic message, additional KHWB comments on the May 26, 2011, revised RAWP. WSP anticipates preparation of response's to the KHWB June 14, 2011, RAWP comments to be submitted during the third quarter of 2011.

On June 6, 2011, Federal-Mogul and WSP received KHWB correspondence approving the Dye Trace Investigation Report which was submitted to the agency during October 2009. Receipt of KHWB approval of this report formally closes the RFI phase of work associated with the Scottsville facility.

Document Submission

On April 12, 2011, WSP submitted a CM progress report for the period of January 1 through March 31, 2011 (first quarter of 2011) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

On May 26, 2011, WSP submitted responses to KHWB January 2011 comments and a revised RAWP to the KHWB. The RAWP was submitted to the KHWB as part of the CMS WP.

The following RFI or IRM related documents were submitted to the KDEP during the reporting period:

- On April 19, May 25, and June 27, 2011, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, March, April, and May 2011 DMRs. The DMRs were submitted in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated water from the operating bedrock groundwater IRM treatment system.

Field or Pilot Testing Activities

On April 14, May 12, and June 23, 2011, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the onsite operating groundwater IRM treatment system. Monthly monitoring activities included collection of groundwater samples from onsite bedrock extraction and monitoring wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

On May 12, 2011, WSP and the KHWB split groundwater samples for volatile organic compound (VOC) analysis from an offsite abandoned water well. Concentrations of site

constituents of concern were reported in groundwater samples collected from this water well by WSP during the first quarter of 2011. The groundwater samples were collected during performance of the Offsite Exposure Pathway Evaluation pre-design investigation field activities.

Work Planned

During the third quarter of 2011, the following CM activities are anticipated to be completed with regards to the Scottsville facility:

- preparation of a second quarter 2011 CM progress report
- preparation and submittal of responses to KHWB comments on the May 26, 2011 revised RAWP
- implementation of the site-wide RA on KHWB approval of the revised RAWP
- preparation and submittal to the KHWB of an offsite sub-slab vapor sampling work plan which on approval will be performed to evaluate potential exposure pathways at offsite residential and commercial properties

Third quarter 2011 activities to be performed with regards to continued implementation of the groundwater IRM treatment system will include:

- preparation and submittal of monthly DMRs in accordance with Federal-Mogul's KPDES permit
- monthly collection and analysis of treated effluent water samples in accordance with the KPDES permit
- monthly collection and analysis of performance monitoring water samples from onsite bedrock monitoring wells, the groundwater treatment system, and Ramble Creek
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system
- preparation and submittal of an Annual O&M Report

Difficulties Encountered

No difficulties were encountered by Federal-Mogul, WSP, or our Subcontractors during the second quarter of 2011.

Schedule

WSP anticipates that the following corrective measure activities and deliverables may be submitted to the KHWB during the third quarter of 2011:

- preparation and submittal of a second quarter 2011 CM progress report
- submittal of responses to KHWB comments on the revised May 26, 2011 RAWP
- on receipt of KHWB approval, the revised RAWP will be implemented
- evaluation of background and onsite arsenic concentrations in surface soil, offsite surface water, groundwater, and sediment results with regards to potential offsite exposure pathway analysis to support preparation of the site-wide RA
- preparation and submittal of a sub-slab vapor work plan to investigate soil gas at offsite residential and commercial properties

The following RFI and IRM activities and deliverables are anticipated during the third quarter of 2011:

- preparation and submittal of an Annual O&M Report with regards to the operating groundwater IRM treatment system
- collection and analysis of monthly treated effluent water samples in accordance with KPDES Permit No. KY 0106585
- preparation and submittal of monthly DMRs as required by the KPDES permit
- monthly performance monitoring and evaluation of water quality results from the groundwater treatment system, bedrock monitoring wells, and Ramble Creek
- O&M contractor will exchange liquid-phase granular activated carbon (GAC) in the groundwater IRM treatment system. The groundwater treatment system will be upgraded to a wireless telemetry system and semi-annual O&M activities will be performed.

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this progress report and CM or RFI-IRM activities performed during the second quarter of 2011, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
K:\Federal-Mogul\138055 Scottsville\Progress Reports\2nd qtr 2011 CM PR.docx

cc: Mr. Christopher Jung, P.G., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

April 12, 2011

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: January through March 2011 CM Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the first quarter of 2011 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C, #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted the Corrective Measures Study Work Plan (CMS WP) to the KHWB on August 9, 2010. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

Corrective measures activities performed by WSP Environment & Energy LLC, on behalf of Federal-Mogul, during the first quarter of 2011 included:

- preparation and submittal of a fourth quarter 2010 CM progress report
- performance of additional surface soil sampling in accordance with the KHWB-approved Surface Soil Evaluation pre-design work plan
- contacting property owners and securing access agreements
- completion of the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan
- preparation of responses to KHWB comments on the Risk Assessment Work Plan (RAWP)

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Docket No. 703970

- continued operation and monitoring of the groundwater interim remedial measure (IRM) treatment system

Agency Meetings and Contacts

During the first quarter of 2011, WSP provided periodic project updates to Christopher Jung, KHWB project manager, with regards to CM activities performed by Federal-Mogul and WSP. These updates included information regarding implementation of the KHWB-approved Surface Soil Evaluation and Offsite Exposure Pathway Evaluation pre-design work plan field activities, KHWB review of the CMS WP, and RAWP comments.

On January 20, 2011, WSP received via electronic message, KHWB approval of Federal-Mogul's 90-day extension request for completion of the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan. This time extension was necessary to secure property owner access agreements so the KHWB-approved offsite field activities could be performed. The extension request was submitted to the KHWB on December 13, 2010.

On January 20, 2011, WSP also received KHWB comments on the RAWP which was submitted to the KHWB as part of the CMS WP (August 2010). The RAWP comments were attached to the KHWB approval of the 90-day extension request noted above. Included with the RAWP comments were KHWB comments dated March 5, 2007 regarding the *Trichloroethene Risk Assessment for Ramble Creek* report prepared by Toxicology Excellence for Risk Assessment (TERA). The TERA report was submitted to the KHWB during December 2006. KHWB comments on the RAWP and the TERA report will be addressed in a revised RAWP which will be submitted to the agency during the second quarter of 2011.

Document Submission

On January 19, 2011, WSP submitted a CM progress report for the period of October 1 through December 31, 2010 (fourth quarter of 2010) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

The following RFI or IRM related documents were submitted to the KDEP during the reporting period:

- On January 20, February 23, and March 16, 2011, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, December 2010 and January and February 2011 Discharge Monitoring Reports (DMRs). The DMRs were submitted in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated water from the operating bedrock groundwater IRM treatment system.

Field or Pilot Testing Activities

During January and February 2011, WSP continued efforts to contact and secure offsite property owner access agreements so the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan field activities could be performed. One property owner would not grant permission for Federal-Mogul contractors to enter their property after several telephone calls and face-to-face meetings.

On February 24, 2011, WSP implemented and completed soil sampling activities in accordance with the KHWB-approved Surface Soil Evaluation pre-design work plan. Twenty-five additional soil samples were collected to further delineate arsenic concentrations in surface soil. Validated surface soil sample results will be evaluated during performance of the risk assessment (RA) and provided in a future CM progress report, the RA, and or the CMS Report.

On March 8 and 9, 2011, WSP implemented and completed the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan field activities. Water and sediment samples were collected from offsite streams and groundwater samples were collected from an abandoned water well and a spring for laboratory analysis. The collected water samples were analyzed for volatile organic compounds (VOCs) and the sediment samples for total zinc and total amenable cyanide. The validated water and sediment sample results will be evaluated during performance of the RA to determine potential offsite exposure. Validated water and sediment results will be provided in a future CM progress report, the RA, and or the CMS Report.

On January 27 and February 16, 2011, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the operating groundwater IRM treatment system. March 2011 monthly monitoring activities were not performed because the groundwater IRM system was shutdown by the operation and maintenance (O&M) contractor for maintenance and system repairs. Monthly monitoring activities included collection of groundwater samples from onsite bedrock extraction and monitoring wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

<u>Work Planned</u>

During the second quarter of 2011, the following CM activities are anticipated to be completed with regards to the Scottsville facility:

- preparation of a first quarter 2011 CM progress report
- preparation and submittal of responses to KHWB comments on the RAWP
- preparation and submittal of a revised RAWP
- implementation of the site-wide RA on KHWB approval of the revised RAWP

Second quarter 2011 activities to be performed with regards to continued implementation of the groundwater IRM treatment system will include:

- monthly collection and analysis of treated effluent water samples in accordance with Federal-Mogul's KPDES permit
- preparation and submittal of monthly DMRs in accordance with the KPDES permit
- monthly collection and analysis of performance monitoring water samples from onsite bedrock monitoring wells, the groundwater treatment system, and Ramble Creek
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system

Difficulties Encountered

One property owner would not grant access to their property to Federal-Mogul and their contractors for completion of the Offsite Exposure Pathway Evaluation pre-design work plan field activities, despite several telephone calls and face-to-face meetings.

No other difficulties were encountered by Federal-Mogul, WSP, or our subcontractors during the first quarter of 2011.

Schedule

WSP anticipates that the following corrective measure activities and deliverables may be submitted to the KHWB during the second quarter of 2011:

- preparation and submittal of a first quarter 2011 CM progress report
- evaluation of background and onsite arsenic concentrations in surface soil, offsite surface water, groundwater, and sediment results with regards to potential offsite exposure pathway analysis
- implementation of the revised RAWP on receipt of KHWB approval of the revised RAWP

The following RFI and IRM activities and deliverables will or may be performed or prepared during the second quarter of 2011:

- collection and analysis of monthly treated effluent water samples in accordance with KPDES Permit No. KY 0106585
- preparation and submittal of monthly DMRs as required by the KPDES permit
- monthly O&M activities and inspections of the groundwater IRM treatment system
- monthly performance monitoring and evaluation of water quality results from the groundwater treatment system, bedrock monitoring wells, and Ramble Creek
- maintenance of the IRM system extraction well pumps and recovery wells to eliminate bacteria fouling

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this progress report and CM or RFI/IRM activities performed during the first quarter of 2011, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

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cc: Mr. Christopher Jung, P.G., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

August 9, 2010

Mr. Christopher Jung, P.G.
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: Corrective Measures Study Work Plan
Federal-Mogul Products, Inc., Scottsville, Kentucky (Facility)
I.D. No. KYD 005 456 401, Agency Interest #17

Dear Mr. Jung:

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy, LLC submits the Facility Corrective Measures Study Work Plan (CMS WP) for review and approval by the Kentucky Department for Environmental Protection (KDEP). The CMS WP is submitted in accordance with (a) the 1991 Agreed Order (AO) DWM 89098 between the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) and Cooper Industries, Inc. and (b) KDEP regulations at 401 KAR 100:030. This CMS WP (i.e., Corrective Action Plan [CAP]) is prepared in response to Kentucky Hazardous Waste Branch (KHWB) correspondence dated January 6, 2010, indicating concurrence of the streamlined corrective measures approach described in our December 16, 2009 submittal.

The purpose of the CMS WP (CAP) is to present rationale and procedures for screening and evaluating potential corrective measures alternatives applicable to the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) identified solid waste management units (SWMUs) and Areas of Concern (AOCs) identified during the RCRA Facility Investigation (RFI). The Corrective Measures Study Report will recommend remedial alternatives to address environmental conditions at the identified SWMUs and AOCs to further protect human health and the environment.

The enclosed CMS WP (CAP) includes:

- a brief summary of site background information
- soil and groundwater interim remedial measures (IRMs) completed under the RFI
- a Risk Assessment Work Plan (RAWP)
- pre-design investigations to address data gaps
  - offsite exposure pathway evaluation
  - former cyanide treatment area
  - surface soil evaluation
- a preliminary screening of potential corrective measure alternatives
- a schedule for implementation of the CMS WP, RAWP, and the pre-design investigations
- preparation and submittal of quarterly corrective measures progress reports
- preparation and submittal of the CMS report

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Docket No. 689503

Should you have any questions or comments with regards to this CMS WP (CAP), the RAWP, or the pre-design investigation work plans, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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Enclosure

cc: Ms. April J. Webb, P.E., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. John Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

CORRECTIVE MEASURES STUDY WORK PLAN
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
I.D. No. 005 458 401

August 9, 2010

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WSP

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1 Introduction

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy, LLC has prepared this Resource Conservation and Recovery Act (RCRA) Corrective Measures Study Work Plan (CMS WP) for the Federal-Mogul facility located in Scottsville, Allen County, Kentucky (Figure 1). This CMS WP has been prepared to comply with 401 KAR 100:030 Section 8 Corrective Action Plan (CAP) regulations. On July 24, 1991, the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) and Cooper Industries, Inc., signed Agreed Order (AO) No. DWM 89098, which described environmental conditions at the Scottsville facility. Subsequently, during 1998, Federal-Mogul acquired the Cooper Industries business and has fulfilled the obligations of the AO. This CMS WP further fulfills requirement Item C. #15 of the 1991 AO.

Between May and July 1991, the KNREPC conducted a RCRA Facility Assessment (RFA) at the Scottsville facility. The purpose of the RFA was to:

- identify and collect information on potential releases to the environment
- evaluate solid waste management units (SWMUs) and other areas of concern (AOCs) for releases to all environmental media
- evaluate preliminary determinations about releases and the need for additional investigations, interim measures, and corrective measures
- screen from further action those SWMUs and AOCs that did not pose a threat to human health and the environment

Nine SWMUs were identified during the 1991 RFA (KNREPC 1991) process. Table 1 provides a summary of each SWMU identified during the RFA. The SWMU locations are provided on Figure 2. SWMU #9 was located across State Route 31E/231 on a non-contiguous property at a building currently owned and operated by another company. Federal-Mogul never occupied or conducted operations in the facility where SWMU #9 was identified. The U.S. Environmental Protection Agency (EPA) and the Kentucky Department for Environmental Protection (KDEP) finalized the RFA during June 1993.

Following completion of the RFA, the KDEP determined that SWMUs #1a and #1b required no further assessment, SWMU #9 required RFA Phase II confirmation sampling, and seven SWMUs (#2 through #8), consisting of onsite former waste disposal areas, would require additional investigation under a RCRA Facility Investigation (RFI).

A RFA Phase II sampling program was performed at SWMU #9 after the RFA was finalized. The SWMU #9 sampling results indicated that no further action was required at SWMU #9. On April 30, 1998, the KDEP approved closure of SWMU #9 (i.e., no further action warranted). Therefore, the remaining seven SWMUs, #2 through #8 (i.e., former waste disposal areas) would require investigation during an RFI.

The RFI Phase I Work Plan (i.e., Site Characterization; 401 KAR 100:030 Sections 6 and 7) was prepared by Cooper Industries during 1998. Based on the soil and groundwater results from the Phase I investigation, KDEP requested Federal-Mogul prepare a RFI Phase II Work Plan for SWMUs #2 through #8. A RFI Phase II Work Plan was prepared by Environmental Strategies Corporation (ESC 2000a) to investigate the identified former waste disposal areas (SWMUs #2 through #8). Between 1998 and 2008, several phases of the RFI (i.e., Site Characterization) were conducted which investigated, delineated, and evaluated chemicals of concern (COCs) in onsite soil and groundwater. In addition, a dye trace study was performed during 2006 (ESC and Crawford Hydrology Laboratory [CHL] 2006c) to evaluate potential offsite exposure pathways with regards to groundwater. The dye trace study resulted in identification of potential offsite groundwater migration pathways to local receptors.

Activities performed during each phase of the RFI were approved by the KDEP Hazardous Waste Branch (KHWB) before the activities were implemented in the field. Report of Findings were prepared and submitted to the KHWB at the conclusion of each investigation. The KHWB approved completion of the RFI (i.e., Site Characterization) in correspondence dated April 20, 2009, and requested Federal-Mogul begin a corrective measure study (CMS) at the site as required by 401 KAR 100:030 Section 8.

This CMS WP (i.e., CAP) presents the rationale and procedures for screening and evaluating CM which may be applicable to SWMUs (#2 through #8) and the AOCs identified during the RFI which resulted in releases to the environment.

RFI activities performed at the Scottsville facility resulted in the identification of four additional potential onsite source areas where COCs could have been released to the environment and have affected soil and groundwater. These AOCs include:

- the former alleyway area
- the former cyanide treatment area
- the former underground storage tank (UST)
- surface soil area

The location of the RFI identified AOCs are provided on Figure 2 and are addressed by this CMS WP.

1.1 CMS APPROACH

This CMS WP complies with Item C. #15 of the 1991 AO, current KDEP RCRA regulations (401 KAR 100:030), and EPA guidance documents incorporated into KDEP rules and regulations by reference. Site data obtained during the RFI (i.e., quantity, location, toxicity, mobility of affected media, and current site use) were used as the basis for selecting preliminary remedial alternatives as described in 401 KAR 100:030 Section 8 (3). The CMS process for the Scottsville site will be streamlined to the extent possible, and performed using a phased approach as described in our December 16, 2009, correspondence (WSP Environment & Energy 2009g). This phased approach will initially include completing a Risk Assessment (RA) and pre-design investigations to acquire technical data to close identified data gaps. The analytical results will then be compared to risk-based criteria, applicable EPA Region 9 Preliminary Remediation Goals (PRGs, 2002), and appropriate regulatory criteria as described in the Risk Assessment Work Plan (RAWP, Appendix A). KDEP utilizes EPA Region 9 PRGs as default criteria for establishing cleanup standards. The risk-based criteria will be used to evaluate potential remedial alternatives against screening criteria including effectiveness, implementability, and relative cost. Alternatives that satisfy the screening criteria will then be further evaluated before selection of a preferred remedy and development a remedial conceptual design.

After the pre-design investigations work plans are implemented, the acquired supplemental data will be used to further screen and evaluate potential remedial alternatives for the Scottsville facility. Final remedial alternatives will be selected, developed, and evaluated in detail. The results of the screening process and presentation of a detailed evaluation of the selected remedial alternatives will be provided in the Corrective Measures Study (CMS) Report which complies with Item C #18 of the AO.

1.2 CMS Objectives

The objective of the CMS (CAP) is to identify, screen, and select potential remedial alternatives for SWMUs #2 through #8 and the four AOCs. The procedures described in this CMS WP will provide a summary of the regulatory, operational, and technical site-specific criteria to supplement the RFI generated data and allow for assessment of CM, if any, required at the Scottsville facility. Supplemental data collected during the pre-design investigations will be adequate to recommend a remedy or remedies for soil, groundwater, surface water, sediment, and indoor air, as necessary, to develop a conceptual

design for the site. The analytical data shall be suitable for developing a Corrective Measures Implementation Work Plan (CMI WP) for the facility. The remedy or remedies to be evaluated in detail during the CMS shall:

- be protective of human health and the environment
- attain applicable remedial targets for affected media
- control sources of releases to reduce or eliminate, to the maximum extent practicable, future releases that might pose a threat to human health and the environment
- comply will applicable standards for management of wastes

In addition, the following criteria will be considered and evaluated to balance the selection of the recommended corrective measures:

- degree of reduction of toxicity, mobility or waste volume
- short-term effectiveness (including energy consumption)
- long-term reliability and effectiveness (including sustainable remediation practices)
- implementability
- cost

The selected alternative(s) for each SWMU and AOC will be screened and evaluated with respect to the above referenced objectives in compliance with 401 KAR 100:030 Section 8 (3) (a) through (d).

2 Site Background Information

This section provides a general description of the site, specific descriptions of the SWMUs and AOCs, a description of site geology and hydrogeology, and a brief summary of findings presented in the various RFI (Site Characterization) report documents. The SWMU and AOC locations are provided in Figure 2.

2.1 SITE DESCRIPTION AND LAND USE

The Scottsville facility is located along the east side of State Route 31E/231, at 2640 Old Gallatin Road, approximately two miles southwest of Scottsville, Allen County, Kentucky. The site is located in southwestern Kentucky and appears on the U.S. Geological Survey (USGS) Petroleum, Kentucky 7.5 minute topographic map (Figure 1). The site (formerly operated by Scottscraft, a division of the Kirsch Company, Cooper Industries, and Wagner Brake) is located in a rural setting within part of the Scottsville Industrial Park.

The area surrounding the Scottsville facility consists of a mixed-use neighborhood which includes residential, agricultural, and light industrial properties. Properties immediately adjacent to the facility include farmland and pastureland to the north and east, an abandoned railroad right of way to the north; the Sumitomo Electric Wiring Systems, Inc. facility (identified as Plant #2 in the RFA), residences, and small industrial and commercial businesses along the west side of State Route 31E/231; and residences, agricultural property, and a farm pond immediately to the south.

The facility is situated on approximately 29 acres of land and is improved with a 320,000 square-foot (ft^2) manufacturing and office building which occupies the central portion of the property. The facility is serviced with municipal drinking water and sewerage services provided by the local municipality, Scottsville. A sewer pump station is located in the northwestern corner of the site. There are no drinking water wells or septic fields located on the Federal-Mogul property. Electricity, telephone, and natural gas services are provided to the facility by local utilities.

2.2 SWMU DESCRIPTIONS

Historically, eight of the nine RFA identified SWMUs required additional assessment. One SWMU (#1a and #1b) listed in the AO and RFA was investigated and remedial activities completed before the AO was finalized by the EPA and the KDEP in 1993. Therefore, no further investigation of SWMU #1a and #1b was required under the RFI. Individual SWMUs addressed by this CMS WP, (SWMUs #2 through #8) and the four AOCs are briefly described in the following sections. A detailed description of each SWMU and AOC is provided on Table 2.

2.2.1 SWMUs #2 through #8

As depicted on Figure 2, the former waste disposal area is located east/northeast of the facility manufacturing and office building. The RFA indicated that past operations (1972 through 1979) resulted in the deposal of wastewater treatment sludge in subsurface pits or trenches. The sludge materials were generated from a plating process and were reported to contain elevated zinc and cyanide concentrations. Between 1979 through 1982, the wastewater treatment sludge was manifested and shipped offsite for disposal as a F008 listed hazardous waste. During the RFI, chlorinated volatile organic compounds (VOCs) were also detected in sludge material within some of the pits and trenches.

2.2.2 SWMU #9

During performance of the RFA, SWMU #9 was described as a satellite accumulation area which was operated between 1971 and 1990. This SWMU is located on a non-contiguous property which is currently operated and owned by another company (Figure 2). Federal-Mogul never occupied or

performed operations at this facility. The RFA required a RFA Phase II be performed with respect to SWMU #9 to assess potential environmental conditions. The RFA Phase II was performed between 1991 and 1997 by Cooper Industries. The KHWB approved closure of this SWMU on April 30, 1998, indicating that no further action was required. Therefore, based on the KHWB closure approval, SWMU #9 was not investigated during the RFI (i.e., Site Characterization) and will not require evaluation during the corrective measures process.

2.3 AREAS OF CONCERN

During the RFI (i.e., Site Characterization), three additional AOCs were identified and investigated as potential source areas for chemicals detected in onsite soil and groundwater. These areas include the former alleyway and UST areas which are currently covered by a section of the facility building and the former cyanide treatment area located north of the facility. The locations of these AOCs are provided on Figure 2. A fourth AOC regarding surface soil containing elevated arsenic concentrations was identified during the RFI Phase V (ESC 2004d). The following sections include a brief description of these AOCs.

2.3.1 Former Alleyway Area

Interviews of facility employees conducted during the RFI resulted in the discovery of affected soil in the former alleyway area. Reports indicated that small quantities of chlorinated VOCs were infrequently released to the ground surface in the former alleyway area. The releases occurred before the facility building was expanded in 1973 and 1996. Analytical results of soil samples collected during investigations of the former alleyway (ESC 2005g, 2005i, WSP Environmental Strategies 2006f, and WSP 2009a) indicate that residual VOC concentrations are present in soil directly overlying local bedrock. These residual concentrations represent a potential source for VOC concentrations identified in bedrock groundwater.

2.3.2 Former Cyanide Treatment Area

During 2008, the KHWB requested Federal-Mogul investigate the former cyanide treatment area as a potential source area for constituents detected in soil and the bedrock aquifer. Analytical results of soil samples collected from this potential source area indicate the presence of residual VOC concentrations in soil directly overlying local bedrock (WSP 2009a). Based on the analytical results, the former cyanide treatment area may represent a potential source area for VOC concentrations reported in the bedrock aquifer. The former cyanide treatment area will be further investigated and the horizontal and vertical extent of VOCs and cyanide in soil determined during a pre-design investigation (Appendix C).

2.3.3 Former Underground Storage Tank Area

During the 2006 additional source area investigation (WSP 2006a), a boring was completed in the former UST AOC (Figure 2) to determine if this potential source could have released COCs to subsurface soil. The UST was removed from beneath the building during 1988 and the UST cavity backfilled with native soil material. The 2006 boring was advanced through the facility floor into the former UST cavity to a depth of 11 feet where bedrock was encountered. No organic vapor readings were indicated in soil material recovered from the borehole. One soil sample was collected from the boring near the unconsolidated material bedrock interface for laboratory analysis. No COCs were reported in the soil sample above Region 9 PRG criteria with the exception of arsenic. The reported arsenic concentration is within the range of arsenic values determined during the 2004 background investigation (ESC 2004d) and is therefore, related to natural background conditions. Based on the analytical results, this potential AOC required no further investigation under the RFI and will not be further evaluated during the CMS.

2.3.4 Surface Soil Area

Between 1999 and 2005, onsite surface and subsurface soil samples were collected and analyzed for total metals (antimony, arsenic, cadmium, chromium, copper, lead, nickel, and zinc) as the KHWB

identified these metals as potential COCs. During the RFI Phase V, an assessment of arsenic concentrations in soil was performed to determine a site-wide background concentration and to identify which arsenic species are represented in the Scottsville soils (ESC 2003a, 2004a, and 2004d). These investigations were performed to determine whether the reported arsenic concentrations in soil are elevated due to previous waste disposal practices or represent naturally occurring background values.

Arsenic concentrations in the background surface soil samples (local grade to a depth of one foot) were reported to range from 8.09 milligrams per kilogram (mg/kg) to 23.8 mg/kg. Subsurface arsenic concentrations (soil samples collected from a depth greater than one foot) range from 9.47 mg/kg to 52.8 mg/kg (ESC 2004d). The background onsite arsenic concentrations are similar to concentrations reported in soil samples collected during the RFI and appear to be representative of naturally occurring arsenic concentrations. None of the RFI reported arsenic concentrations exceed EPA Region 9 PRGs with the exception of the arsenic concentration (282 mg/kg) reported in a sample collected from SB-68 (0 to 1 foot). The reported arsenic concentration exceeds the noncarcinogenic Region 9 PRG of 260 mg/kg for industrial soils.

In addition, during the Phase V investigation, 11 soil samples, from the designated onsite background area and the former disposal area, were analyzed by the Battelle Pacific Northwest National Laboratory (BPNNL) in Richland, Washington, for arsenic III and arsenic V concentrations by EPA method 1632 Revision A (EPA 2001). The speciation analysis indicated that the arsenic valence state in Scottsville soils is representative of arsenic V (the noncarcinogenic species). BPNNL further stated that the total arsenic concentrations reported in the analyzed soil samples were typical of concentrations reported in naturally occurring soils. Based on the results of the speciation analysis, the reported arsenic concentrations in the Scottsville soils are considered as naturally occurring and should not warrant additional consideration during the RA process.

Based on the arsenic concentration reported in the SB-68 surface soil sample, Federal-Mogul will further delineate the horizontal and vertical extent of arsenic in soil in the vicinity of SB-68. This delineation will be completed as a pre-design investigation (Appendix B). Analytical results of surface soil samples collected during the pre-design investigation will be evaluated during the proposed site-wide RA and the CMS (CAP) to determine appropriate remedial alternatives, if necessary, to address or eliminate potential future risk to human health and the environment. Federal-Mogul and previous facility owners did not utilize arsenic in the manufacturing processes performed at the facility.

2.4 ENVIRONMENTAL SETTING

This section describes existing topographic, geologic, and hydrogeologic conditions at the Scottsville site.

2.4.1 Topography and Surface Drainage

The Federal-Mogul facility, as shown on the topographic map (Figure 1), consists of land which gently slopes from the east-southeast to the west-northwest. The topography of the Scottsville area can be described as undulating to rough, reflecting a deeply to moderately dissected plateau underlain by horizontal or slightly dipping bedrock horizons. The local bedrock horizons are affected by immature karstic development of the carbonate horizons. Topographic elevations range from approximately 760 feet above mean sea level (ft-AMSL) to 820 ft-AMSL across the site. Surface runoff from the facility flows to the north and west to topographic low areas which are tributary to Ramble Creek and to the south entering an adjacent farm pond.

The drainage pattern throughout Allen County is that of stream-cut topography. Trammel Creek represents the main stream which drains the site vicinity and represents groundwater base flow conditions. The ephemeral section of Ramble Creek flows approximately 300 to 400 feet north of the Scottsville facility in an east to west direction. Discharging groundwater constitutes the headwaters of

Ramble Creek at a location approximately 200 to 300 feet northwest of the facility property. Ramble Creek flows west and to the southwest until it discharges to Trammel Creek.

Storm water is collected in parking lot and roof drains and discharged to a surface water conveyance located in the western portion of the site. Storm water on the north side of the facility is channeled north by rip-rap channels into a forested area that separates the facility and a former railroad right of way. Storm water from the south side of the facility, which is not intercepted by storm water drains, flows south draining into an adjacent farm pond.

2.4.2 Water Use

Groundwater and surface water at the Federal-Mogul facility are not used for any purpose. In order to ensure that onsite groundwater and surface water are not used in the future, Federal-Mogul anticipates recording an enforceable restrictive environmental covenant (401 KAR 100:030 Section 8 (3) (b) 3 c) for the Scottsville property restricting onsite water usage. The covenant will further ensure that the subject property is used in an industrial/commercial capacity.

During performance of karst survey field activities (ESC 2004c and 2006b), 17 water supply wells and 10 springs were identified in the vicinity (up to approximately 3 miles) of the facility which are utilized as domestic, agriculture, or livestock water sources. These water supplies are located north, west, southwest, and south of the facility. Groundwater quality samples were collected for VOC analysis from water supply wells and springs, utilized as domestic water sources during performance of the karst survey activities (ESC 2004c and 2006b) to evaluate whether VOCs reported in the onsite bedrock aquifer may be affecting local water supplies. VOC concentrations were reported in two offsite water supply wells. One well is located approximately 6,000 feet southwest (downgradient) while the second water well is positioned approximately 3,000 feet north-northeast (upgradient) of the Scottsville facility. Based on the detection of VOCs in these water supply wells, these water wells were monitored during performance of the 2006 dye trace (ESC and CHL 2006c). Results of the dye trace (WSP, CHL, and Hoffman Environmental Research Institute [HERI] 2009e) indicated that the three tracer dyes injected at the facility were not recovered or detected in either of the monitored water supply wells. Therefore, based on the dye trace results, VOC concentrations reported in these domestic water wells appear to be from unknown sources not associated with the Federal-Mogul facility.

2.4.3 Terrestrial Habitat

The major portion of the Scottsville site consists of a large industrial manufacturing building surrounded with paved driveway and parking areas. The eastern section of the site consists of a mixed species woodland and grass and scrub covered areas. A portion of the grass covered area in the northeast section of the site is underlain by the former disposal areas where wastewater treatment sludge and chemicals were deposited during the 1970s.

The northern boundary of the site consists of a mixed species woodland area which adjoins an abandoned railroad right of way. The southern property boundary consists of grass, woodland, and shrub covered areas. Immediately south and bordering the southern property boundary is a farm pond used as a livestock water source.

The western section of the facility includes a grass covered valley which adjoins State Route 31E/231. This topographic low channels surface water runoff north to the intermittent section of Ramble Creek. In the northwest corner of the property are a municipal pump station and the outfall for treated water discharged by the operating groundwater pump and treatment system.

2.4.4 Site Geology and Hydrogeology

RFI activities regarding onsite soil and groundwater resources have been performed at the site since 1998. The following paragraphs provide a brief summary of the site geology as determined during the RFI (Site Characterization).

The Scottsville facility is located in the interior-low plateau sub-region of the Appalachian Plateau and Valley and Ridge Province. The area is situated between the Appalachian Plateau and the Valley and Ridge physiographic provinces.

The Soil Survey of Allen County, Kentucky (U.S. Department of Agriculture [USDA] Soil Conservation Service [SCS] 1989) has indentified onsite soils that consist of Trimble gravelly silt loam. Trimble soils are characterized as deep, gentle sloping, well-drained soils located on upland side slopes and ridge tops. Depth to the seasonal high water table in Trimble soils is greater than six feet. Bedrock is generally encountered at depths greater than five feet.

Subsurface investigations conducted at the facility have identified the unconsolidated material as moderate to highly plastic clay to silty clay material which ranges in thickness from 9 to 25 feet and persists from local grade to the local bedrock surface. These soil types typically have low permeability and high porosity due to the enriched clay content. These soils are derived from the weathering of the underlying limestone and siltstone formations.

USGS geologic mapping of the Petroleum, Kentucky 7.5-minute quadrangle (Myers 1964) indicates that the facility is underlain by the Mississippian-aged Salem and Warsaw Limestone Formation. This formation is comprised of interbedded limestone and siltstone horizons which range from 75 to 95 feet in thickness. The Salem Limestone is characterized as a gray to dark gray, coarse-grained, bioclastic, thick to massive bedded limestone which weathers a brownish-gray color. Residuum and soils which form on the Salem Formation are brick red in color. The Warsaw Limestone is comprised of interbedded limestone and siltstone horizons. The limestone beds are thin-bedded to massive, coarse-grained, and bioclastic in nature. The siltstone units are generally thick bedded, dolomitic, and weather to a grayish brown. The Salem and Warsaw Limestone Formation overlies the Lower Mississippian-aged Fort Payne Formation.

The Lower Mississippian-aged Fort Payne Formation, which underlies the Salem and Warsaw Limestone Formation, consists of interbedded limestone, siltstone, and shales horizons which range from 160 to 195 feet thick in the Scottsville area. Fort Payne limestone beds are gray to greenish-white, massive, and thin to thick bedded. Siltstones horizons are dolomitic, fine-grained with massive to thick beds. Fort Payne shale horizons are generally bluish-green to green and may be comprised of soft clay or silty shale. The Fort Payne Formation exhibits immature karstic development where groundwater migration is enhanced by solution enlarged conduits along fractures, joints, and bedding planes. Small-scale karst features are identified on the Petroleum, Kentucky quadrangle map approximately two miles east, northeast, and northwest of the facility. The Fort Payne overlies the Devonian-aged impervious Chattanooga Shale. The Fort Payne and Chattanooga Shale contact is considered representative of groundwater base flow conditions (Trammel Creek area) in the vicinity of the site.

Structurally, the Scottsville area lies on the northeastern limb of the very broad Nashville Dome (Ketner 1962 and Nelson 1964). According to USGS and Kentucky Geological Survey (KGS) literature (Hopkins 1963, Myer 1964, and Branson 1966), the bedrock horizons underlying the Scottsville area dip approximately one degree (i.e., approximately 30 to 40 feet per mile) to the north-northwest while the bedrock horizons strike to the northeast-southwest.

The uppermost onsite hydrostratigraphic unit consists of clay to silty clay unconsolidated material overlying the local bedrock surface. The quantity of groundwater within this horizon varies seasonally across the site based on precipitation and recharge. Eight groundwater monitoring wells were installed in the unconsolidated material horizon in the former disposal area during the RFI (Figure 2). Several of these monitoring wells have been observed to be "dry" during groundwater sampling events. Groundwater elevations recorded during June 2010 in wells completed in the unconsolidated aquifer ranged from approximately 795 ft-AMSL to 771 ft-AMSL. Groundwater elevations in the unconsolidated material monitoring wells indicate that groundwater flow is to the northwest.

The second hydrostratigraphic horizon identified at the facility consists of the bedrock aquifer located within the Fort Payne Formation. During the RFI, 10 monitoring wells and six piezometers (Figure 2) were installed in the bedrock aquifer from which groundwater quality samples have been collected and groundwater elevations recorded. Groundwater elevations in the bedrock aquifer recorded during June 2010 ranged from 769 ft-AMSL to 720 ft-AMSL. Based on groundwater elevations recorded from the bedrock monitoring wells, bedrock groundwater migrates to the west-northwest.

The site-specific hydraulic conductivity (K) of the bedrock aquifer was determined from in-situ permeability (slug) tests performed at four bedrock wells during November 2005. The calculated bedrock aquifer K values ranged from 0.4 to 1.14 feet per day (ft/day, WSP 2007c). During April 2006, a short-term pumping test was performed on one monitoring well installed in the bedrock aquifer. Monitoring well (MW-14B/EW-1, Figure 2) is currently used as a groundwater extraction well for the interim remedial measures (IRM) groundwater pump and treatment system (WSP 2009c). The pumping test data indicated K values, in the vicinity of MW-14B/EW-1, ranged from 8.5 ft/day to 104.4 ft/day, transmissivity (T) of approximately 195 ft/day, with an estimated long-term sustainable yield of approximately three gallons per minute (gpm; WSP 2007a).

Groundwater occurrence and flow in the limestone horizons is controlled by solution enhanced openings, fractures, joints, and bedding planes. Interbedded and low permeable shale horizons within the local stratigraphy will impede vertical groundwater migration. Where vertical migration of groundwater is restricted, groundwater will flow along the upper contact of the impermeable horizon and result in a discharge (i.e., spring or seep) where the confining horizon and migrating groundwater intersect the land surface.

Between 2004 and 2006, WSP performed karst survey field activities in the site vicinity to identify, locate, and provide background information on karst features and private water supplies (i.e., wells or springs). Information collected during these extensive field surveys were provided to the KHWB in the Karst Survey Report (KSR, ESC 2004c) and the Karst Survey Report Addendum (KSRA, ESC 2006b). Thirty-two stream locations, 17 water supply wells used for domestic or non-domestic purposes, 40 abandoned water supply wells, and 105 spring (10 used for potable water) or seep sources were identified within a radius of approximately 3 to 3.5 miles of the Scottsville facility. The majority of the identified water sources (i.e., water wells or springs) are located south-southwest of the facility. Several of the identified water wells and springs were monitored during the 2006 dye trace (ESC and CHL 2006c).

During June 2006, three distinct tracer dyes were injected at the Scottsville facility by the CHL (ESC and CHL 2006c) to evaluate offsite exposure pathways for affected bedrock groundwater. Two dyes were injected via bedrock monitoring wells MW-12B and MW-14B (Figure 2) while the third dye was injected in a former disposal area from which source material was remediated during June 2005 as part of a soil IRM (ESC 2005h). The three injected dyes were detected in Ramble Creek surface water one day after injection. The recovered of dyes in Ramble Creek from the injection sites indicate that groundwater migrates through the karstic bedrock horizons at rates between approximately 400 to 800 ft/day.

Results of the dye trace were provided to the KHWB in the Dye Trace Investigation (DTI) report (WSP, CHL, and HERI 2009e). The dye trace concluded that the major flow path for onsite bedrock groundwater is to the west/northwest where groundwater resurges into the upper reach of Ramble Creek. Dyes injected into the bedrock aquifer underlying the site were not detected in private water supply wells and spring sources monitored during the dye trace with two exceptions. One spring located approximately three miles southwest of the facility indicated a positive detection of a dye approximately five months after the June 2006 injection. No site constituents were detected in groundwater samples collected from this water supply spring during the KSRA field activities (ESC 2006b). The second (and former) offsite water supply where dye(s) were detected is an abandoned water well located directly west of the facility across State Route 31E/231. This abandoned water well has been out of use since 1970 and the property owner has informed WSP that it has no intention of using this water well as a future

water source. The property is served by municipal water from the City of Scottsville. Offsite water sources identified during the dye trace as potential offsite exposure pathways and resurgent locations for onsite groundwater will be further investigated during a pre-design study (Appendix B).

2.5 INTERIM REMEDIAL MEASURES

Between 2005 and April 2010, Federal-Mogul proactively addressed environmental conditions at the site through voluntary IRMs focused to remediate soil and bedrock groundwater. The IRMs performed included:

- approximately 105 cubic yards (yd^3) of soil excavated from a former disposal area
- 67.5 yd^3 of soil excavated from five trenches through the former disposal area
- recovery of 52 buried drums and drum remnants
- installation of a bedrock groundwater pump and treatment system consisting of two groundwater extraction wells (MW-12B and MW-14B) and six monitoring piezometers (PZ-1 through PZ-6) to capture and remediate affected groundwater
- recovery and treatment of approximately 4.8 million gallons of affected groundwater (through July 2010)
- recovery of approximately 133 pounds of trichloroethene (TCE) and 139 pounds of total dissolved phase VOCs from the bedrock aquifer (through July 2010)

2.5.1 Soil Interim Remedial Measure

Federal-Mogul performed the soil IRM as a voluntary response action to address specific site conditions encountered during performance of the RFI in the former waste disposal area (SWMUs #2 through #8). One former disposal area (Figure 2) contained chemical concentrations characteristic of a hazardous waste based on Toxicity Characteristic Leaching Procedures (TCLP) test results for TCE and represented a major potential source area for TCE concentrations reported in the unconsolidated and bedrock aquifers. Former facility employees allege that between 1972 and 1979 wastes (wastewater sludge and chemicals) were stored in drums and subsequently disposed of in the RFA identified SWMUs #2 through #8. Geophysical surveys (ESC 2005f) conducted across the former disposal area indicated that metallic objects (i.e., drums) were buried in the former disposal area.

The primary objectives of the soil IRM were to:

- excavate and remove source material from a former disposal area where TCE concentrations exceed TCLP regulatory criteria
- evaluate whether metallic objects (drums) were disposed of in the former disposal area
- recovery and removal of buried drums containing sludge and chemicals

During June 2005, approximately 105 yd^3 of soil and a mixture or sludge and soil material were excavated from one former disposal area (Figure 2). The excavated material was loaded into lined roll off boxes and subsequently transported to a permitted offsite disposal area. During the excavation activities, approximately 12 metallic drums were encountered at depths of approximately six to nine feet below ground surface (bgs). Field screening of soil surrounding the encountered drums indicated the presence of chlorinated VOC vapors. The encountered drums were lying on their sides and were partially or totally crushed or degraded.

Based on RFI characterization data, soil material (approximately 42.6 yd^3) excavated from the former disposal area from ground surface to a depth of six feet bgs was manifested for disposal as a listed F008 hazardous waste (wastewater treatment sludge containing cyanide). Material (soil/sludge/chemical

mixture) excavated from six feet bgs to the bedrock surface (approximately 62.3 yd^3) was manifested with the F008 and D040 (characteristic for TCE) waste codes.

The excavated former disposal area was backfilled with approximately 46 tons of coarse aggregate and 140 tons of clean soil material from an offsite source area. A slotted polyvinyl chloride (PVC) pipe was placed in the coarse aggregate material, directly overlying the bedrock surface, across the base of the excavation and connection to a PVC riser pipe which extended above local grade. This PVC piping system was subsequently used to deliver tracer dye to the base of the former disposal area during the 2006 dye trace investigation. After placement of the backfill material, the former disposal area was re-vegetated and mulched.

Additional detailed information regarding the completed soil IRM is provided in the Soil Interim Remedial Measures Report (ESC 2005h).

2.5.2 Former Disposal Area Trenches

During June 2005, as part of the KHWB-approved soil IRM, five exploratory test trenches were excavated across the former disposal area where geophysical survey results indicated the potential presence of buried metallic objects. Each trench was excavated to the local bedrock surface which was encountered at depths ranging form 11 ft-bgs to 15.5 ft-bgs. Material excavated from RFA identified SWMUs (#2 through #8) was managed as an F008 listed hazardous waste (wastewater treatment sludge). Soil excavated outside the boundaries of the RFA/RFI identified disposal areas was returned to the excavated trenches as backfill material if wastewater treatment sludge or chemicals were not encountered during the excavation process.

Approximately 40 metallic drums were recovered from three of the exploratory trenches. Soils surrounding the degraded and crushed drums was field screened and determined that organic vapors were not present. Drums encountered in the trenches contained wastewater treatment sludge, metal scrap, and general rubbish and trash. The recovered drums and surrounding soil material (approximately 67.5 yd^3) were placed in roll off boxes and manifested for offsite disposal as a listed F008 hazardous waste.

Following recovery of the encountered wastewater treatment sludge, drums, and affected soil, approximately 148 tons of common fill was placed in the exploratory trenches to return the trench areas to original grade. After completion of the backfilling process, the backfilled trench areas were re-vegetated and mulched.

Additional detailed information regarding the exploratory trenching and recovery of waste and buried drums is provided in the Soil Interim Remedial Measures Report (ESC 2005h).

2.5.3 Bedrock Groundwater Interim Remedial Measure

The purpose of the bedrock groundwater IRM is to proactively initiate hydraulic containment and recovery of dissolved phase VOCs in bedrock groundwater. In addition to achieving the primary objective, this IRM has expedited remediation of affected groundwater migrating to offsite receptors (i.e., Ramble Creek) and to facilitate future corrective measures that may be implemented in accordance with the RCRA process.

During 2005, elevated VOC concentrations were reported in groundwater samples collected from three bedrock monitoring wells (MW-11B, MW-12B, and MW-14B, Figure 4, ESC 2005d). Prior to 2005, three bedrock monitoring wells (MW-9B, MW-10B, and MW-11B, Figure 4) were installed in the north and northeast portion of the facility during investigation of the former wastewater disposal area (SWMUs #2 through #8). VOC concentrations were not detected in groundwater samples collected from bedrock monitoring wells MW-9B and MW-10B. However, VOC concentrations were reported in groundwater samples collected from MW-11B (ESC 2004d).

In addition during 2006, analytical results of surface water samples collected from the Ramble Creek headwater area (ESC 2006e) indicated the presence of VOCs (most notably TCE and cis-1,2-Dichloroethene [cis-1,2-DCE]) in surface water several hundred feet northwest of the facility. The 2006 dye trace investigation concluded (WSP, CHL, and HERI, 2009e) that dyes injected in bedrock monitoring wells MW-12B and MW-14B and the former disposal area excavated during the 2005 soil IRM, resurge in the headwater area of Ramble Creek. The dye trace results indicate that bedrock groundwater pathways exist between the Scottsville facility and Ramble Creek.

Based on the 2004 analytical data from onsite bedrock monitoring wells (ESC 2004d) and 2006 surface water analytical results (ESC 2006e), Federal-Mogul and WSP proceeded to design a groundwater IRM to address VOC concentrations reported in onsite bedrock groundwater. Several potential remedial alternatives were evaluated during the process. Federal-Mogul and WSP determined that the most cost effective interim measure to address offsite migration of affected bedrock groundwater in a karstic environment which discharges to surface water was a groundwater pump and treatment system.

The implemented groundwater IRM consists of a groundwater extraction and treatment system that recovers affected groundwater from two wells (MW-12B and MW-14B) installed in the bedrock aquifer. The extraction component of the system provides hydraulic containment of the dissolved VOC plume by creating drawdown and dewatering the bedrock aquifer thus, remediating the bedrock aquifer by removing dissolved phase VOCs via groundwater recovery. Following extraction, the treatment component of the system removes dissolved phase VOCs from the recovered bedrock groundwater and discharges the treated water (effluent) in accordance with a Kentucky Pollution Discharge Elimination System (KPDES) permit to a surface water conveyance (ESC 2006d) located in the northwest corner of the Scottsville facility.

The groundwater IRM system consists of two extraction wells, underground transfer piping, and the treatment system. The treatment system consists of an equalization tank, two 30 gpm tray air strippers, bag filters, two liquid-phase granular activated carbon (GAC) units, and two vapor-phase GAC vessels. The liquid- and vapor-phase GAC units act as polishing components for water and emissions generated during the treatment process.

The KHWB-approved bedrock groundwater IRM was constructed at the Scottsville facility during May and June 2008 and was placed into operation on July 9, 2008. VOC concentrations in the Ramble Creek headwater area have decreased one order of magnitude since start-up of the groundwater pump and treatment system. Based on analytical results of water quality samples collected during the initial two years of operation, the groundwater treatment system is operating as designed by creating hydraulic containment and the recovery of dissolved phase VOCs from the affected bedrock aquifer.

Through July 8, 2010, the groundwater treatment system has recovered and treated approximately 4.8 million gallons of groundwater from the bedrock aquifer. Approximately 133 pounds of TCE and 139 pounds of total VOCs have been recovered from the bedrock aquifer by the operating remedial system.

Additional detailed information regarding implementation of the bedrock groundwater IRM system is provided in the Groundwater Interim Remedial Measure Completion Report (WSP 2009c) and the Groundwater Interim Remedial Measure Annual Operation and Maintenance (O&M) Report (WSP 2009f).

3 Preliminary Screening of Corrective Measures

To focus the CMS (CAP) on the most relevant and feasible remedial options, a preliminary screening of corrective measures technologies is included in this Work Plan. The preliminary screening is based on the ability to protect human health and the environment, ability to attain expected remedial goals, control releases from the source areas, long-term effectiveness and reliability, implementability, and finally cost in accordance with 401 KAR 100:030. While compliance with applicable standards, reduction of mobility, toxicity and volume, and short-term effectiveness are not considered during the preliminary screening, these factors will be evaluated in detail during the final screening process. From this preliminary screening, preferred remedial technologies have been selected, additional data requirements identified (i.e., data gaps), if necessary, and with KHWB concurrence of the pre-design investigations (Appendices A through D), the additional information can be collected to further evaluate the selected remedial alternatives.

3.1 RISK ASSESSMENT

WSP proposes to identify COCs and generate risk-based cleanup criteria for all affected environmental media based on site-specific data and KHWB and federal guidance and regulations. The risk assessment will be conducted in accordance with the Risk Assessment Work Plan (RAWP) provided in Appendix A. The proposed risk assessment will be implemented on KHWB approval of the RAWP. Risk-based cleanup criteria will be calculated in accordance with applicable KDEP (401 KAR 100:030 Section 7 (c) 1. and 2.), EPA, and American Society of Testing Materials (ASTM) procedures and will be proposed to the KHWB for approval. The approved cleanup standards will provide the basis for determination of the need for corrective measures in SWMUs #2 through #8, the former alleyway and the former cyanide treatment areas, and any offsite exposure pathway.

At this time, WSP anticipates calculating risk-based cleanup criteria for the following COCs:

- Soil
  - VOCs
  - metals (arsenic, cadmium, chromium, lead, and zinc)
  - cyanide
- Groundwater
  - VOCs
  - metals (arsenic, cadmium, chromium, lead, zinc)
  - cyanide
- Surface Water
  - VOCs
  - zinc
  - cyanide
- Sediment
  - zinc
  - Cyanide

- Indoor Air
  - VOCs

3.2 PRE-DESIGN INVESTIGATIONS

WSP has prepared pre-design Work Plans, for the collection of additional data to facilitate the selection of remedial alternatives. To streamline the CMS process, Work Plans for the proposed pre-design investigations are included in Appendix B, C, and D. After KHWB approval of this CMS WP and the pre-design work plans, the proposed field activities will be implemented in accordance with the schedule described in Section 4.2. Federal-Mogul and WSP wish to request that KHWB expedite review and approval of the pre-design work plans so the field activities can be implemented during 2010 in order that the additional onsite and offsite data can be incorporated into the RA. At a minimum, the Pre-Design Investigation Work Plans (Appendices B, C, and D) will include:

- sampling and analysis of an offsite water well, springs, and streams to evaluate potential offsite exposure pathways identified during the dye trace study
- soil sampling to delineate the horizontal and vertical extent of VOCs in soil that may exceed risk-based criteria in the former cyanide treatment area
- soil sampling to delineate extent of arsenic concentrations in surface soil
- surface water and sediment sampling from Ramble Creek to evaluate potential offsite exposure pathways

Implementation of the pre-design work plans, as described in Appendices B, C, and D, will commence on KHWB approval of this CMS WP (CAP). This approach is necessary in order that groundwater and surface water quality and sediment data with respect to potential offsite exposure pathways and onsite soils can be collected, evaluated, and these potential pathways completed as part of the RA process. A summary of the pre-design activities completed and analytical results of samples collected will be reported in a subsequent quarterly CM progress report. The analytical results of the pre-design investigations will be included in the RA and the draft CMS report, as necessary.

3.2.1 Offsite Exposure Pathway Evaluation

The 2006 dye trace concluded that bedrock groundwater migrates from the Scottsville facility to offsite discharge points including Ramble Creek, springs, and surface water bodies. VOC concentrations have been detected in Ramble Creek surface water samples collected since 2006. However, other potential offsite exposure pathways to groundwater and surface water were identified during the dye trace. These potential offsite pathways will be investigated during a pre-design investigation (Appendix B). In addition, surface water and sediment samples will be collected from Ramble Creek, between the facility and the man-made lake. These media represent potential offsite exposure pathways that may have been affected by bedrock groundwater which historically discharged to Ramble Creek before implementation of the bedrock groundwater IRM. Therefore, to complete evaluation of these potential pathways, surface water and sediment samples will be collected from Ramble Creek during the proposed offsite investigation (Appendix B). The results of the offsite water and sediment sampling will be evaluated during completion of the proposed RA (Appendix A). On KHWB approval of this CMS WP and the proposed offsite exposure pathway pre-design investigation (Appendix B), the collection and analysis of groundwater, surface water, and sediment samples will be performed as described in the work plan.

3.2.2 Former Cyanide Treatment Area

This proposed pre-design investigation will focus on delineating VOCs in soil in the vicinity of the former cyanide treatment area (Figure 2). During the November 2008 additional source area investigation, a soil boring completed near the former cyanide treatment area indicated the presence of residual VOC

concentrations near the soil bedrock interface (WSP 2009a). The horizontal extent of VOC concentrations was not completely defined during the 2008 source area investigation. Therefore, to complete the delineation of VOCs in soil near the former cyanide treatment area, a pre-design investigation, as described in Appendix C, will be performed. Analytical results will be used to evaluate potential remedial alternatives for the former cyanide treatment area during the corrective measures process. On KHWB approval of this CMS WP and the proposed former cyanide treatment area pre-design investigation (Appendix C), Federal-Mogul and WSP will implement field activities to delineate residual VOC concentrations in subsurface soil in this potential AOC.

3.2.3 Surface Soil Evaluation

This proposed pre-design investigation will focus on delineating arsenic concentrations in the surface soil area shown on Figure 2. During the RFI Phase V activities (ESC 2004a), a soil sample collected at boring SB-68 from the surface to one foot bgs, was reported with an arsenic concentration which exceed Region 9 PRG criteria for industrial soil. Therefore, the proposed pre-design study, described in Appendix D, will delineate arsenic concentrations in soil in the SB-68 area. The soil analytical results will be used to evaluate potential remedial alternatives. Federal-Mogul and WSP anticipate excavating the affected soil to eliminate any potential exposure before the RA is completed.

On KHWB approval of this CMS WP and the proposed Surface Soil Evaluation Work Plan (Appendix D), Federal-Mogul will implement field activities to delineate arsenic concentrations in surface soil.

3.3 SOIL

To determine if corrective measures with respect to onsite soils are necessary, a comparison of the risk-based cleanup criteria developed during the RA to COCs concentrations in soils will be performed for SWMUs #2 through #8, the former alleyway and former cyanide treatment areas, and the designated surface soil area.

The selection of a remedial technology will be dependent on:

- which, if any, COCs exceed the risk-based cleanup standards
- the range of concentrations above cleanup standards
- the volume of soil involved
- properties of soil which exceed criteria
- configuration of the affected soils
- presence of obstructions (i.e., buildings, utilities, natural features)

The following remedial technologies have been preliminarily screened within the CMS WP, in accordance with 401 KAR 100:030 Section 8 (3) (a) through (d) regulations, as summarized in Table 3:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineering Controls
- Restoration
  - Excavation
  - Soil Vapor Extraction

- In-Situ Bioremediation
- Chemical Oxidation

- Combination of Options

Restoration technologies including soil vapor extraction, in-situ bioremediation, and chemical oxidation are excluded from further consideration due to existing soil conditions. Based on the experience of WSP remedial design engineers, these three technologies are not suited to clay or clayey type soils which exist in the subsurface. These technologies are not practicable because introduced air, chemicals, or biological enhancements can not be effectively delivered into the subsurface environment and if they are delivered, the amendments would not migrate any distance from the injection point. These technologies require permeable materials (i.e., sands and gravels) into which amendments can be delivered or air or vapor recovered. The following remedial alternatives should be carried forward and included for further evaluation during the CMS:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineered Controls
- Restoration
  - Excavation
- Combination of Options

3.4 GROUNDWATER

Groundwater sample results from unconsolidated material and bedrock monitoring wells have been reported with VOC concentrations above selected regulatory criteria (WSP 2009d). Conclusions based on the dye trace results, indicate that potential offsite exposure pathways exist to a water well (abandoned) and locations where groundwater discharges to surface water (i.e., Ramble Creek and springs). A pre-design study (Appendix B) will be performed during which groundwater and surface water samples will be collected from potential offsite exposure locations (i.e., water well, springs, and surface water resources) for laboratory analysis of VOCs. The groundwater and surface water analytical results will be evaluated during completion of the RA (Appendix A) to complete the potential offsite exposure pathway analysis.

The need for corrective measures in groundwater within the unconsolidated material and bedrock aquifers will be based on a comparison of risk-based cleanup standards to current concentrations reported in existing unconsolidated material (former disposal area) and bedrock (site-wide) monitoring wells. The distribution and concentrations of each COC in groundwater will be compared to the risk-based cleanup standards.

The overall objective of a selected groundwater remedy would be to demonstrate:

- site conditions do not constitute a threat to human health or the environment once the remedy is complete, or
- natural attenuation processes may be occurring, such that target COCs concentrations can be achieved within a reasonable distance from the source area(s) and within a reasonable time period.

For purposes of the preliminary screening, the following technologies, in accordance with 401 KAR 100:030 Section 8 (3) (a) through (d) regulations, have been screened as shown in Table 3:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Containment/Engineered Barrier
  - Monitored Natural Attentuation (MNA)
- Restoration
  - Enhanced In-Situ Bioremediation
  - In-Situ Chemical Oxidation
  - In-Situ Reduction
  - Extraction and Treatment
- Combination of Options

Based on the karstic nature of the bedrock aquifer and groundwater migration and flow rates within this aquifer and the properties of the clay-based unconsolidated aquifer material, the following restoration technologies (enhanced in-situ bioremediation, in-situ chemical oxidation, or in-situ reduction) are not suitable as potential remedial alternatives and will not be carried forward for further evaluation. The management in place MNA option will not be carried forward as MNA processes if currently active within the unconsolidated and bedrock aquifers will not eliminate potential offsite exposure to COCs. The preliminary screening of potential remedial technologies for the unconsolidated and bedrock aquifers is shown in Table 3 which indicates that the following technologies should be carried forward and included for further evaluation during the CMS:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Containment/Engineered Barrier
- Restoration
  - Extraction and Treatment
- Combination of Options

3.5 SURFACE WATER

Ramble Creek surface water samples collected between 2006 and 2010 indicate the presence of VOCs, namely TCE and cis-1,2-DCE. Based on the reported 2006 VOC concentrations (ESC 2006e), a TCE risk assessment was performed (WSP and Toxicology Excellence for Risk Assessment [TERA] 2006c) to determine if the reported TCE levels represent a potential threat to human health and the environment. The TERA risk assessment concluded that the reported TCE concentrations in surface water did not pose a risk to humans including small children. Potential risks associated with Ramble Creek surface water will be further evaluated during performance of the proposed RA (Appendix A).

The 2006 dye trace investigation (WSP, CHL, and HERI 2009e) concluded that the major discharge point for onsite groundwater was to Ramble Creek. The proposed pre-design study of potential offsite exposure pathways (Appendix B) will be completed for evaluation of potential exposure to COCs in offsite surface water. Surface water quality samples will be collected from potential offsite exposure points and

analyzed for VOCs. Surface water samples collected from Ramble Creek will be analyzed for VOCs, total zinc, and cyanide. Analytical results from water samples collected during the proposed offsite exposure pathway analysis will be evaluated during the proposed RA (Appendix A.). The need for corrective measures will be based on a comparison of risk-based cleanup standards to current constituent concentrations in surface water. The distribution and concentration of each COC in surface water will be compared to the risk-based cleanup standards.

The overall objective of a selected surface water remedy, if necessary, would be to demonstrate:

- offsite conditions do not constitute a threat to human health (especially small children) or the environment
- natural attenuation can occur in surface water, such that target COCs concentrations can be achieved within a reasonable distance from the source area(s) and within a reasonable time period
- completion and operation of onsite corrective measure remedies with respect to onsite soil and groundwater have resulted in decreasing offsite impacts to surface water

For purposes of the preliminary screening, the following technologies, in accordance with 401 KAR 100:030 Section 8 (3) (a) through (d) regulations, have been screened as shown in Table 3:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineered Barrier
- Restoration
  - Collection and Treatment
- Combination of Options

Based on the preliminary screening of potential remedial technologies shown in Table 3, the following remedial technologies shall be carried forward and included for detailed screening during the CMS:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineered Barrier
- Combination of Options

3.6 SEDIMENT

The dye trace study concluded that the major flow path for onsite groundwater is to Ramble Creek surface water. Sediment from Ramble Creek was not investigated during the RFI and therefore, represents a data gap with respect to completing the RA. To obtain the technical data necessary to complete this data gap, sediment samples will be collected from the Ramble Creek headwater area and the area immediately above the man-made lake during a pre-design investigation to evaluate potential offsite exposure pathways (Appendix B). The sediment samples will be analyzed for total zinc and total cyanide (free). Sediment samples for VOC analysis will not be collected during the proposed pre-design investigation as VOC concentrations are unlikely to accumulate in sediment. To evaluate whether

corrective measures for offsite sediments in Ramble Creek are necessary, a comparison of the risk-based cleanup criteria to current COC concentrations in sediment will be performed.

The overall objective of a selected sediment remedy, if necessary, would be to demonstrate:

- offsite conditions do not constitute a threat to human health (especially small children) or the environment

For purposes of the preliminary screening, the following technologies, in accordance with 401 KAR 100:030 Section 8 (3) (a) through (d) regulations, have been screened as shown in Table 3:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineered Barrier
- Restoration
  - Excavation
- Combination of Options

Based on the preliminary screening of potential remedial technologies shown in Table 3, the following remedial technologies shall be carried forward and included for detailed screening during the CMS:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineered Barrier
- Restoration
  - Excavation
- Combination of Options

3.7 INDOOR AIR

During 2005, Federal-Mogul requested Environmental Strategies Consulting (which later merged with WSP) perform an indoor air evaluation due to reported VOC concentrations in soil beneath and adjacent to the former alleyway area. Residual VOC concentrations were reported at the soil bedrock interface, at depths ranging from 8 to 15 feet below the building floor. Indoor air quality samples were collected from the operating facility manufacturing and office areas and analyzed for VOCs (notably TCE) reported in soil samples collected from the former alleyway area. The air quality results indicated that COCs detected in soil and groundwater were not detected in indoor air samples (see Attachment A-1 of the proposed RAWP). Concentrations of compounds utilized in the facility manufacturing area were reported in the indoor air quality samples. Therefore, the indoor air investigation concluded that exposure to VOCs within the operating and office areas of the facility were occupational and not environmental in nature.

The overall objective of the indoor air investigation was to determine and evaluate whether:

- concentrations of VOCs reported in subsurface soil constitute a threat to human health (onsite employees) or the environment

- existing onsite (occupational) conditions eliminate this potential exposure pathway

For purposes of the preliminary screening, the following technologies have been screened as shown in Table 3:

- No Action Necessary
- Management in Place
  - Institutional Controls
  - Engineered Barrier
- Restoration
  - Vapor Mitigation
- Combination of Options

The need for corrective measures with regards to the indoor air pathway is not required as the pathway is not complete, as indicated by the indoor air study results. Therefore, remedial alternatives are not required for this potential pathway and the indoor air pathway will not be further evaluated during the CMS process.

3.8 APPROACH TO INVESTIGATING AND EVALUATING POTENTIAL CORRECTIVE MEASURES

Potential corrective measure technologies which may be or are applicable to site COCs and site-specific geologic, hydrogeologic, and site conditions, have been identified and preliminary screening completed in accordance with 401 KAR 100:030 Section 8 (3) (a) through (8) regulations.

Following the calculation of risk based standards (Appendix A), and the focused pre-design investigations (Appendices B through D), technologies will be screened based on the following "threshold" criteria:

3.8.1 Protect Human Health and the Environment

The selected corrective measure alternative must be protective of human health and the environment. This includes not only an evaluation of the proposed remedy to attain cleanup standards but any necessary institutional or engineering controls necessary to ensure short-term attainment of human health and environmental protection.

3.8.2 Attain Applicable Media Cleanup Standards

The selected corrective measure alternative must have the ability to attain applicable and appropriate media cleanup standards. The evaluation of this criterion will consider the effect that site specific factors have on the selected remedial alternative. The evaluation of this criterion will further include an estimated life cycle for attainment of the media cleanup standards for each technology screened.

3.8.3 Control Source Area Releases

Each potential corrective measure alternative will be screened based on its ability to control future releases of source material to enable any other combined remedial technologies to achieve their media cleanup objectives. Source control may include COCs removal, containment, isolation, or stabilization. In some cases, the complete control of source materials may be technically impracticable based on site improvements and site-specific geologic or hydrogeologic factors. If source control in not practicable, plume management or exposure controls must be demonstrated.

3.8.4 Comply with Applicable Standards for Waste Management

An evaluation of how the potential corrective measure technology will comply with federal and state regulations with regard to waste management activities will be completed. No technology will be considered that violates discharge or disposal requirements for generated wastes, effluent, or liquid discharges.

3.8.5 Balancing Criteria

Technologies that can satisfy the threshold criteria listed above will be evaluated against the following six balancing criteria for selection of the most appropriate technologies for consideration as components of the corrective measures.

3.8.5.1 Long-Term Reliability and Effectiveness

This criterion considers the ability of the technology to perform over the life of the proposed corrective measures. Maintenance and energy requirements, likelihood of component failure, potential effects of a component failure, and the sustainability of the technology are all considered. The evaluation of this criterion also includes an estimate of the "useful life" of the system components and probably schedule for replacement of components.

Consideration of effectiveness evaluates how the media react to the technology over time. Of particular importance is the ratio of change in the natural systems relative to the time required, and desired, to achieve the cleanup standards.

3.8.5.2 Reduction in the Toxicity, Mobility, or Volume of Wastes

In most cases, a remedy that reduces toxicity, mobility, or volume of wastes is preferred over those that simply contain the mass at the site, because the potential for future releases from the affected area is eliminated or reduced. However, in some cases, the reduction in toxicity, mobility, or volume of wastes may be technically impracticable based on site improvements and site specific conditions or the impact of the remediation on the environment is less desirable than containing the mass in place. The evaluation of this criterion will require an estimate of post-corrective measure toxicity, mobility, and volume of wastes compared to baseline conditions for each technology being considered.

3.8.5.3 Short-Term Effectiveness

Evaluation of this criterion will consider the priority for short-term effectiveness with respect to potential current exposure scenarios. The evaluation will also consider potential threats associated with treatment, excavation, transportation, and re-disposal or containment of the waste material.

3.8.5.4 Implementability

The evaluation of this criterion will consider:

- administrative needs, which may include permits and access requirements
- constructability, and time for implementation
- availability of adequate off-site treatment, storage capacity, disposal services, and needed technical services and materials
- availability of the potential technology for the implementation of a corrective measure alternative and the timeline associated with meeting these requirements

3.8.5.5 Cost

The evaluation of the cost criterion is an important factor when more than one corrective measure alternative is deemed appropriate for selection. Relative cost estimates will be prepared for the

corrective measure alternatives that qualify through the above described criteria. The cost estimates will include all costs for planning through site closure.

3.8.5.6 Community Acceptance of the Remedy

The evaluation of the community acceptance is important when corrective measure alternative(s) are deemed appropriate. The community should be aware and informed as to potential environmental dangers which the site may pose after cornpletion of the corrective measures. The selected remedial alternative(s) will allow the Facility to return to a useful state within the vicinity of the City of Scottsville which will promote future employment and opportunities to the Scottsville community.

4 Implementation

Implementation of the CMS (CAP) consists of four phases:

1. Preliminary Screening of Alternatives (See Section 3)
2. Risk Assessment (Appendix A)
3. Pre-Design Investigations (Appendices B, C, and D)
4. Corrective Measures Study

4.1 CMS PROGRESS REPORTS

In accordance with Item C #19 of the 1991 AO, quarterly progress reports will be prepared and submitted to the KHWB during the CMS process. The progress reports will be based on the yearly calendar (i.e., first quarter representing January, February, and March) effective January 2010, and submitted during the subsequent calendar quarter. Each quarterly progress report will describe work accomplished, contacts with agency representatives, document submission during previous quarter, findings of field activities, testing and analysis of environmental media, work planned during the subsequent calendar quarter, and difficulties encountered during performance of the corrective measure activities.

4.2 SCHEDULE

In accordance with Item #15 of the 1991 AO and 401 KAR 100:030 Section 8 (1), a detailed schedule for performance of the CMS is provided in Table 4. As indicated in this CMS WP, a phased approach will be undertaken during the CMS activities (WSP Environment & Energy 2009g). Approval of this CMS WP by the KHWB will initiate implementation of the pre-design investigations (Appendices B, C, and D) in order that data gaps identified in this CMS WP are addressed and technical data required for completion of the RA and to evaluate potential remedial alternatives are completed. The pre-design investigations include:

- sampling and analysis of select offsite water well(s), springs, and streams to evaluate potential offsite exposure pathways
- sampling and analysis of offsite sediment from Ramble Creek to evaluate potential offsite exposure pathways
- soil sampling to delineate the horizontal and vertical extent of soils exceeding EPA Region 9 PRG industrial soil criteria (arsenic)

The pre-design investigations will commence on KHWB approval of this CMS WP and the pre-design work plans (Appendices B, C, and D). The pre-design field activities and evaluation of data collected during the pre-design investigations will be completed within 80 days after KHWB approval to the CMS and pre-design work plans. The results of the pre-design investigations will be evaluated in the final screening process and will be included in the draft CMS Report.

Approximately 90 days after completion of the pre-design investigations, a RA Report for the facility will be submitted to the KHWB for approval and concurrence of the developed risk-based criteria. The Draft CMS Report will be prepared and submitted within 90 days after KHWB approval of the RA risk-based cleanup criteria.

4.3 CMS REPORT

The CMS report will include the following:

- discussion of the corrective measure objectives
- description of the proposed cleanup standards
- screening and development of remedial alternatives
- evaluation and interpretation of the pre-design investigations
- evaluation of remedial technologies
- detailed analysis of the selected remedial alternatives
- justification for the recommendation
- proposed schedule for preparation and submittal of the CMI WP (or CAP)

5 Project Management

The principle organizations to be involved in the CMS (CAP) process include Federal-Mogul Products, Inc., WSP Environment & Energy, Mid-Atlantic Environmental Equipment (MAE2, O&M subcontractor), and EnSafe, Inc. (monitoring subcontractor). The specific responsibilities and authority assigned during design, implementation, and operation of the selected remedial alternatives are delineated in the following sections.

5.1 FEDERAL-MOGUL PRODUCTS, INC.

Federal-Mogul is conducting implementation and completion of selected corrective measures to address the identified environmental conditions. Federal-Mogul has retained WSP as the project manager and engineer. Mark T. Bauer, P.E., is Federal-Mogul's project manager.

5.2 WSP ENVIRONMENT & ENERGY

WSP will serve as the project manager and project engineer during the CMS (CAP) process. WSP responsibilities under these functions will be as follows.

5.2.1 Project Manager

As the project manager, WSP will provide day to day management of the corrective measures process and activities being performed at the Scottsville facility. Jeff Hassen, Senior Project Director and Michael Riggins, Senior Technical Manager, represent the WSP management team responsible for activities performed at the facility. Mr. Riggins furthers interacts and communicates with appropriate regulatory agencies, Federal-Mogul, and subcontractors and will be responsible for implementation of corrective measure activities.

5.2.2 Project Engineer

As the project engineer, WSP will provide engineering and technical support for Federal-Mogul. In this capacity, WSP will be responsible for development of engineering design of the selected remedial alternative(s), implementation of the selected remedy, and management of O&M performed to ensure that the remedial alternative(s) perform as design. In addition, WSP will be responsible for identifying, documenting, and approving any modification(s) to the selected alternatives.

5.2.3 Data Management

WSP will be responsible for data management of analytical laboratory results generated during implementation and performance of the corrective measures. The data management team will provide and secure laboratory coordination and prepare analytical data tables summarizing analytical results of performance monitoring samples collected during the corrective measures process.

5.2.4 Operation and Maintenance

WSP will provide O&M services during operation of the selected remedial alternatives. WSP will subcontract monthly O&M services with regards to the operating groundwater treatment system to MAE2. MAE2 will provide monthly and emergency O&M services to ensure efficient and effective operation of the implemented groundwater treatment system equipment. WSP and EnSafe technical staff will assist MAE2 during performance of O&M activities, as necessary.

5.2.5 Performance Monitoring

Monitoring activities for the implemented remedial alternatives will be provided by WSP and EnSafe. WSP will subcontract with EnSafe for providing monthly monitoring services with regards to the implemented and operating corrective measures. WSP technical staff will assist EnSafe during monitoring activities, as necessary. In addition, EnSafe may provide technical staff to assist MAE2 and WSP during performance of monthly or emergency O&M activities.

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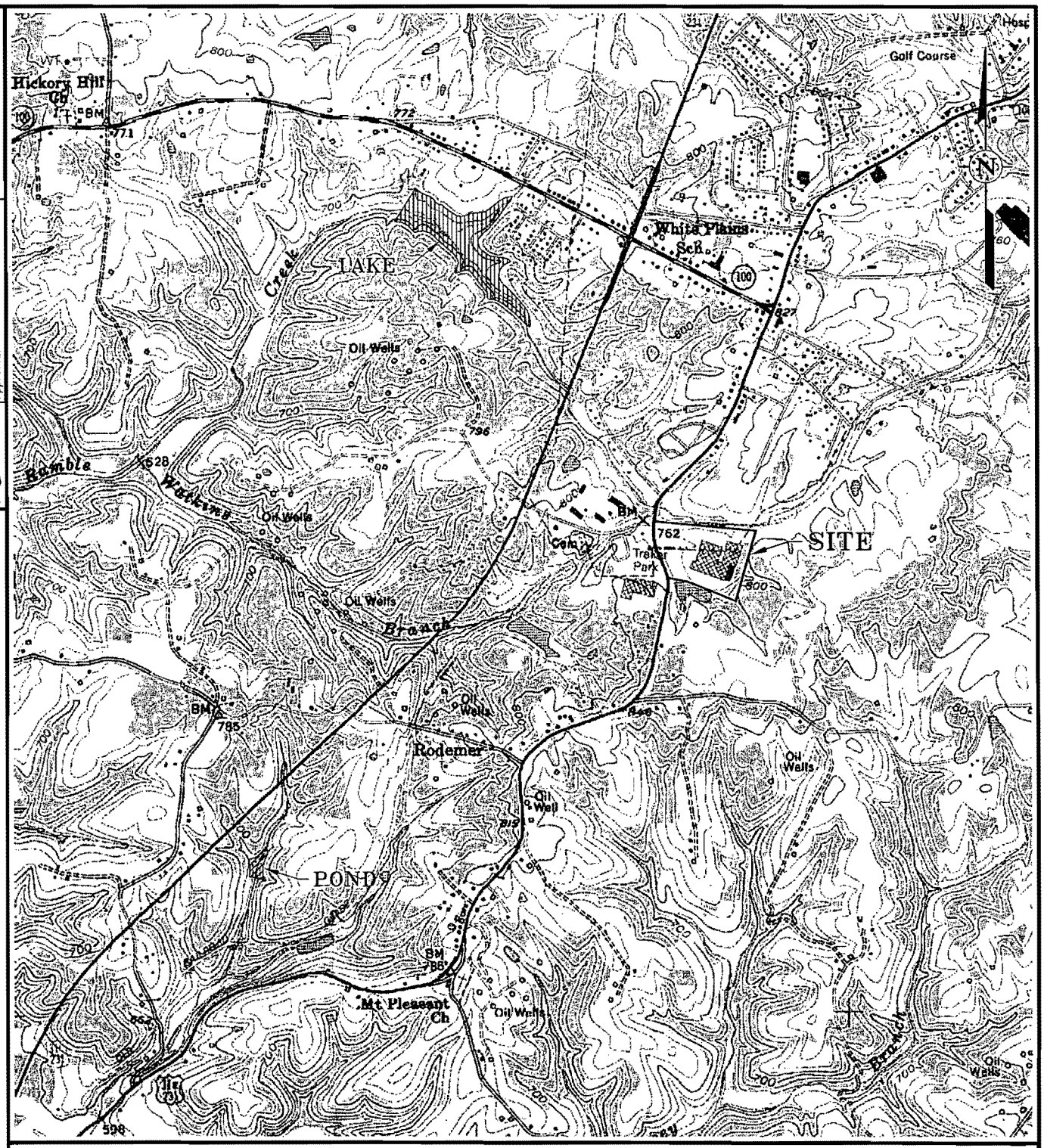
7 Acronyms

AO	Agreed Order
AOC	Area of Concern
ASTM	American Society of Testing Materials
bgs	below ground surface
BPNNL	Battelle Pacific Northwest National Laboratory
CAP	Corrective Action Plan
CHL	Crawford Hydrology Laboratory
cis-1,2-DCE	cis-1,2-Dichloroethene
CM	Corrective Measures
CMI WP	Corrective Measures Implementation Work Plan
CMS	Corrective Measures Study
CMS WP	Corrective Measures Study Work Plan
COCs	Chemicals of Concern
DTI	Dye Trace Investigation
EPA	United States Environment Protection Agency
ESC	Environmental Strategies Corporation or Environmental Strategies Consulting
ft^2	square feet
ft-AMSL	feet Above Mean Sea Level
ft/day	feet per day
GAC	Granular activated carbon
gpm	gallons per day
HERI	Hoffman Environmental Research Institute
IRM	Interim Remedial Measure
K	Hydraulic conductivity
KAR	Kentucky Administrative Regulations
KDEP	Kentucky Department for Environmental Protection
KGS	Kentucky Geological Survey
KHWB	Kentucky Hazardous Waste Branch
KNREPC	Kentucky Natural Resources and Environmental Protection Cabinet
KPDES	Kentucky Pollution Discharge Elimination System
KSR	Karst Survey Report
KSRA	Karst Survey Report Addendum
MAE2	Mid-Atlantic Environmental Equipment

mg/kg	Milligrams per Kilogram
MNA	Monitored Natural Attentuation
O&M	Operation and Maintenance
PRGs	Preliminary Remediation Goals
PVC	polyvinyl chloride
RA	Risk Assessment
RAWP	Risk Assessment Work Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SCS	Soil Conservation Service
SWMU	Solid Waste Management Unit
T	Transmissivity
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TERA	Toxicology Excellence for Risk Assessment
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile organic compounds
WSP	WSP Environment & Energy
yd^3	cubic yards

Figures



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KENTUCKY

QUADRANGLE LOCATION

SCALE, FEET

0 1000 2000 4000

WSP

WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, Pennsylvania 15220
(412) 604-1040

FIGURE 1

SITE LOCATION

FEDERAL–MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL–MOGUL PRODUCTS, INC.
SOUTHFIELD, KENTUCKY

DWG Name: 138055–A21

Drawn By: 121808

Checked:

Approved:

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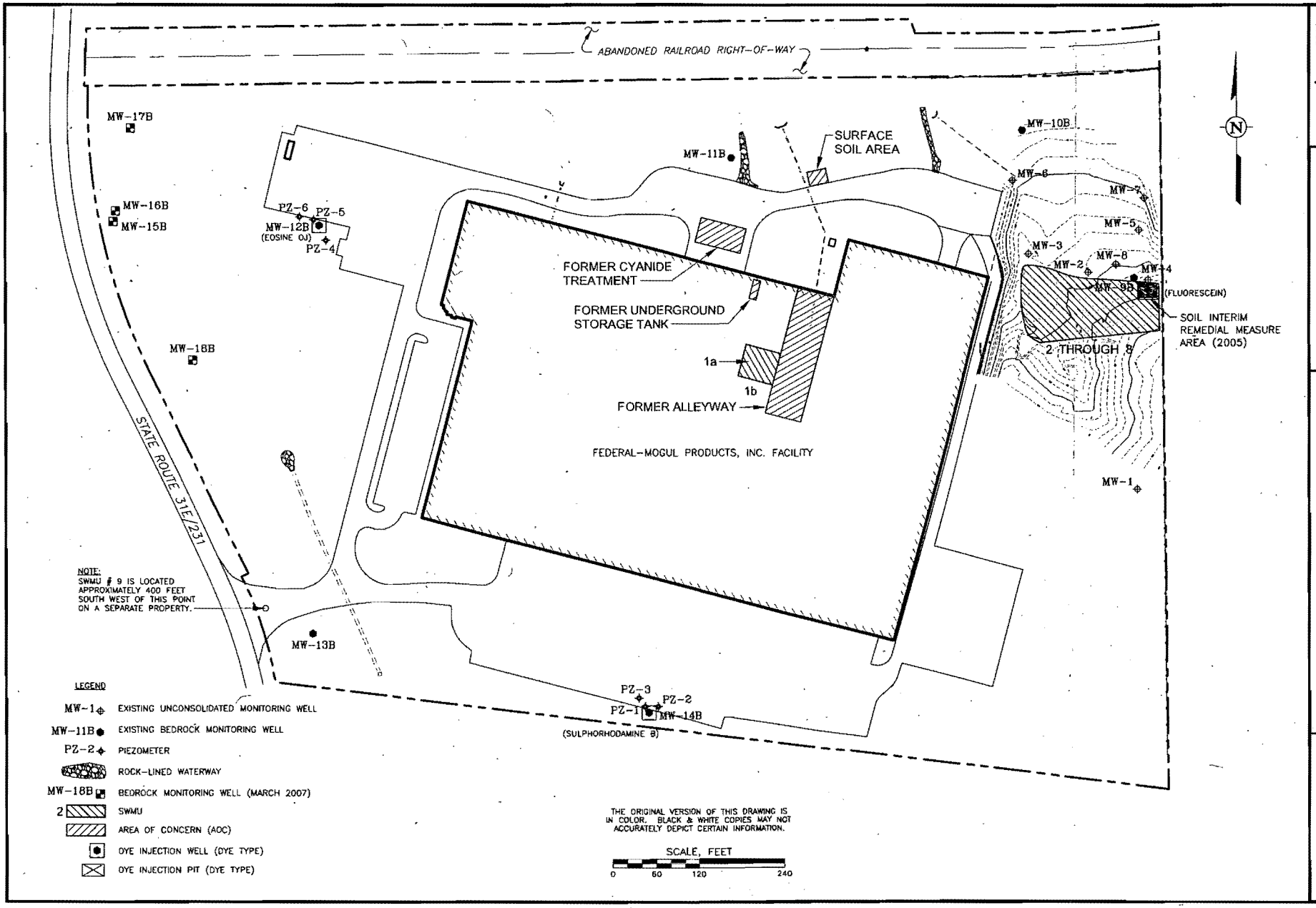

Drawn By: RAZ 05/23/10
Checked:
Approved:
DWG Name: 138055-B51

FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 2

SITE LAYOUT AND LOCATION OF SOLID WASTE MANAGEMENT UNITS (SWMUs), AREAS OF CONCERN (AOCs), MONITORING WELLS, PIEZOMETERS, AND DYE TRACE INJECTION POINTS

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Tables

Table 1

SWMUs Identified in 1993 RFA and AOCs Identified During RFI
Federal-Mogul Products,Inc.
Scottsville, Kentucky (a)

SWMU		Unit Name
1a		Container Storage Area
1b		Container Storage Area
2		Former Disposal Area
3		Former Disposal Area
4		Former Disposal Area
5		Former Disposal Area
6		Former Disposal Area
7		Former Disposal Area
8		Former Disposal Area
9		Satellite Accumulation Area
AOC		Unit Name
1		Former Alleyway Area
2		Former Underground Storage Tank
3		Former Cyanide Treatment Area
4		Arsenic Concentrations in Surface Soil

a\ SWMU = solid waste management unit; AOC = area of concern; RFA=Resource Conservation and Recovery Act (RCRA) Facility Assessment; RFI=RCRA Facility Investigation.

Table 2

Description of Identified SWMUs (1993 RFA) and AOCs Identified During RFI
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

SWMU	Type	Period of Use	Location	1995 RFA SWMU Description	Type or waste/chemical of concern	Potential exposure pathways	Evidence of releases	Comments	Current Status (b)
1a	Indoor Container Storage Area - Primary Drum Storage	1961 through 1990	Along west side of the former alleyway area in the original manufacturing building. Area is indicated on Figure 2 of Corrective Measures Study Work Plan.	Room (approximately 14 feet by 28 feet) underlain by a concrete floor. Rows of drums, two deep against longest walls. The floor was intact and without floor drains. All drums have been removed from site; trichloroethene (TCE) before 1985; and dichloromethane during 1988.	Waste dichloromethane (methylene chloride) listed as F002 waste and waste trichloroethene (TCE) stored in drums in this area during the past	This SWMU is enclosed within a building, so there is no proximity to soil, sediments, surface water nor groundwater since the concrete flooring is in good condition with no floor drains. If spill would occur some contamination could be released to the air, however, this would be minimal as drums are covered and sealed. This SWMU was checked regularly by employees.	No evidence of release was observed during the 1991 RFA inspection process. No signs of spills were observed on floor. Company records indicated no spills or releases.	Closure Plan submitted for this area during 1990. No additional comments.	Indoor storage area recommended for No Further Action during 1991 RFA inspection. Approved Closure Plan completed during early 1990s.
1b	Auxiliary Indoor Container Storage Area	1961 through 1990	Along west side of the former alleyway area in the original manufacturing building adjacent to SWMU 1a. Area is indicated on Figure 2 of Corrective Measures Study Work Plan.	Storage of drummed wastes adjacent to primary storage area described in SWMU 1a. Area underlain by concrete floor in good condition without floor drains.	Waste dichloromethane (methylene chloride) listed as F002 waste and waste trichloroethene (TCE) stored in drums in this area.	This SWMU is enclosed within a building, so there is no proximity to soil, sediments, surface water nor groundwater since the concrete flooring is in good condition with no floor drains. If spill would occur some contamination could be released to the air, however this would be minimal as drums are covered and sealed. This SWMU was checked regularly by employees.	No evidence of release was observed during the 1991 RFA inspection process. No signs of spills were observed on floor. Company records indicated no spills or releases.	Closure Plan submitted for this area during 1990. No additional comments.	Indoor storage area recommended for No Further Action during 1991 RFA inspection. Approved Closure Plan completed during early 1990s.
2 through 8	Sludge Burial Area	1972 through 1979	Disposal area located east/northeast of main manufacturing building in edge of wooded area. Area indicated on Figure 2 of Corrective Measures Study Work Plan.	Between 1972 and 1979, facility buried plating wastes potentially high in zinc and cyanide in this area. Pits or trenches excavated for waste disposal and reported to be approximately 6 feet wide, 4 feet in depth, and 10 to 12 feet in length. Buried wastes covered with native soil. Areas currently covered with grass and scrub.	Waste sludge material excavated during RFI soil interim remedial measure (IRM) manifested for offsite disposal as F008 listed waste. Sludge potentially high in zinc and cyanide. A quantity of F008 waste further listed with D040 as charactertic for trichloroethene (TCE).	High probability of release to onsite soil and groundwater. Low probability if release to air due to sludge contents although small risk to air due to TCE concentrations.	Ground surface in former disposal area is depressed and vegetation is slightly stressed. No observed releases noted during inspection of area. Subsurface RFI analytical data indicates wastewater sludge and chemicals contained in former disposal area. Disposal area covered by vegetation.	Recommended completion of RFI to determine horizontal and vertical extent of contamination from disposal area.	SWMUs investigated during RFI process (1998 through 2005). Soil IRM completed in 2005 recovered source material (sludge and drummed TCE wastes) from one former disposal area. IRM activities recovered approximately 52 drums of wastes from former disposal areas.
9	Satellite Accumulation Area	1971 through 1990	Along north side of former Cooper Industries Plant #2. Facility located southwest of Plant #1. Area is indicated on Figure II-3 of 1993 RFA.	Satellite accumulation area located in a room (approximately 16 feet by 18 feet) underlain by a concrete floor in Plant #2. A floor drain located down the center of the room led directly to outside of the building.	F005 materials stored included paints (nitrocellulose lacquers) and thinners containing contaminants including; mineral spirits; cellosolve acetate; isobutanol; zylene; lactol spirits; toluene; isopropanol; 2-heptanone; methyl alcohol; MEK; ethyl acetate; isobutyl acetate; isobutyl isobutyrate; VM and P naphtha; and methyl isobutyl ketone.	This SWMU is enclosed within a building, underlain by a concrete floor with a floor drain that leads outside the building. Moderate probability of contamination to soil and groundwater where floor drain exists building. If a spill occurs, minimal risk to air or surface water. Materials stored in small-sized containers.	Floors and walls appeared stained with paint products during RFA inspection. No evidence of release outside building observed during the 1991 RFA site inspection.	RFA recommended Phase II sampling to evaluate if hazardous constituents on floor and walls. Additional soil sampling performed outside building where floor drain leads from the storage area to the outside environment. This facility was not owned or operated by Federal-Mogul.	RFA Phase II sampling performed between 1991 and 1993. Closure of this SWMU occurred before the 1993 RFA was finalized by the EPA and the KHWB. No Further Action required based on formal closure. This SWMU is not located at Federal-Mogul's facility and Federal-Mogul never conducted operations at this facility.

Table 2

Description of Identified SWMUs (1993 RFA) and AOCs Identified During RFI
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

AOC	Type	Period of Use	Location	1995 RFA SWMU Description	Type or waste/chemical of concern	Potential exposure pathways	Evidence of releases	Comments	Current Status (b)
1	Former Alleyway Area	1961 through 1985	Former alleyway is located between the original building (1961) and 1973 and facility expansions. Area enclosed during 1996 building expansion.	Former alleyway represents an area where former employees indicated that chemicals were potentially disposed of on native soils between 1970 and 1985. This AOC not referenced in 1993 RFA. Area covered in 1996 by facility expansion.	Potentially waste trichloroethene (TCE) and dichloromethane (methylene chloride).	Soil, groundwater, and surface water runoff.	This unit is regarded as a potential contaminant source based on information from former facility employees. No observed releases since area covered by building. RFI data indicates concentrations of VOCs in soil at unconsolidated material bedrock interfce.	Alleyway area currently covered by 1996 facility expansion (building).	This potential AOC investigated between 2004 and 2008 as part of RFI process. Area is currently capped by an existing facility building.
2	Former Underground Storage Tank Area	Between 1961 and 1988	Former UST located along north wall of 1961 (original) facility building. UST removed from beneath building floor during 1988.	UST consisted of a process tank which collected over flow from the former plating solution process. Plating solution collected by UST pumped back into the system process. UST capacity was 4,000 gallons.	Zinc and cyanide.	Groundwater and soil.	None as UST was located beneath facility building.	None. Former UST area investigated during RFI. No COCs reported in soil sample results.	Tank removed from facility during 1988. Former tank area investigated between 2004 and 2008 as part of RFI process. No further investigation or remediation required.
3	Former Cyanide Treatment Area	1961 through 1982	Former treatment facility area located approximately 40 feet north of facility building. Area covered by asphalt or concrete materials.	Treatment system/process included 4 underground tanks or troughs through which plating sloution was processed before being discharge to local Pubicly Owned Treatment Works (POTW). Treatment process ended during 1982; treatment equipment removed from facility after 1991.	Zinc, cyanide, and TCE.	Soil and groundwater	Former unit regarded as a potential contaminant source based on information from former facility employees. This unit produced sludge material which was disposed of in SWMUs #2 through #8.	Area to undergo further delineation of COCs in soil during pre-design investigation.	Treatment equipment and tanks removed after 1991. Impacts to soil and groundwater investigated during 2007 and 2008 RFI. Additional delineation of chemicals in soil will be performed as pre-design study during CMS process.
4	Surface Soil	NA	North side of driveway area on north side of facility. Area near soil boring SB-68.	Area not described in the 1993 RFA. Source of contamination is unknown as arsenic was not used in facility processes or during operation.	Arsenic	Soil and groundwater	None	Reported concentration could represent a data outlier. Elevated arsenic concentrations in onsite soil are naturally occurring.	Surface soil in SB-68 area will be investigated as pre-design study during CMS. Anticipated area is very limited in extent. Soil material most likely will be removed before completion of risk assessment to eliminate potential exposure pathway.

a\ Information provided in table recovered from 1993 RCRA Facility Assessment (RFA). Potential AOC information identified during the 1998 through 2008 RFI. Numerous reports completed regarding potential former alleyway AOC during RFI process. SWMU=solid waste management unit; AOC=area of concern; COC=chemical of concern; NA=not applicable; RFA=RCRA Facility Assessment; RFI=RCRA Facility Investigation.

b\ Period of Use indicates possible time frame SWMU or AOC was used for disposal or in operation.

Table 3

Preliminary Screening of Remedial Technologies
Corrective Measures Study Work Plan
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

	Applicable to COCs	Ability to Protect Human Health and the Environment	Ability to Attain Expected Remedial Targets	Ability to Control the Sources	Long-Term Reliability and Effectiveness	Implementability	Relative Cost	Relative Score
Soils								
No Action	All	1	1	1	1	4	4	12
Institutional Controls	All	3	1	1	2	4	3	14
Engineered Controls	All	4	2	2	4	3	2	17
Excavation	All	4	4	4	4	2	1	19
Soil Vapor Extraction	Organic Compounds	1	1	1	1	1	1	6
In-Situ Bioremediation	Organic Compounds	1	1	1	1	1	1	6
Chemical Oxidation	Organic Compounds	1	1	1	1	1	1	6
Groundwater								
No Action	All	1	1	1	1	4	4	12
Institutional Controls	All	3	1	1	3	3	3	14
Monitored Natural Attenuation	Organic Compounds	1	1	1	1	3	3	10
Enhanced In-Situ Bioremediation	Organic Compounds	1	1	1	1	1	1	6
In-Situ Chemical Oxidation	Organic Compounds	1	1	1	1	1	1	6
In-Situ Reduction	Organic Compounds	1	1	1	1	1	1	6
Extraction and Treatment	All	4	4	1	4	4	2	19
Containment or Engineered Barrier	All	4	4	1	4	4	2	19
Surface Water								
No Action	All	2	2	1	1	4	4	14
Institutional Controls	All	3	2	1	2	3	3	14
Collection and Treatment	All	4	4	1	4	1	1	15
Engineered Barrier	All	3	2	1	2	1	1	10

Table 3

Preliminary Screening of Remedial Technologies
Corrective Measures Study Work Plan
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

	Applicable to COCs	Ability to Protect Human Health and the Environment	Ability to Attain Expected Remedial Targets	Ability to Control the Sources	Long-Term Reliability and Effectiveness	Implementability	Relative Cost	Relative Score
Sediment								
No Action	Inorganic Compounds	1	1	1	2	4	4	13
Institutional Controls	Inorganic Compounds	2	2	1	2	3	3	13
Excavation	Inorganic Compounds	4	3	1	4	1	1	14
Engineered Barrier	Inorganic Compounds	2	1	1	2	1	1	8
Indoor Air								
No Action	Organic Compounds	3	4	1	3	4	4	19
Institutional Controls	Organic Compounds	4	2	1	3	3	2	15
Engineered Barrier	Organic Compounds	4	2	1	3	1	1	12
Vapor Mitigation	Organic Compounds	4	3	3	3	1	1	15

a/ Screening range is from 1 to 4; high relative scores indicate potential remedy; COCs=chemicals of concern.

Table 4

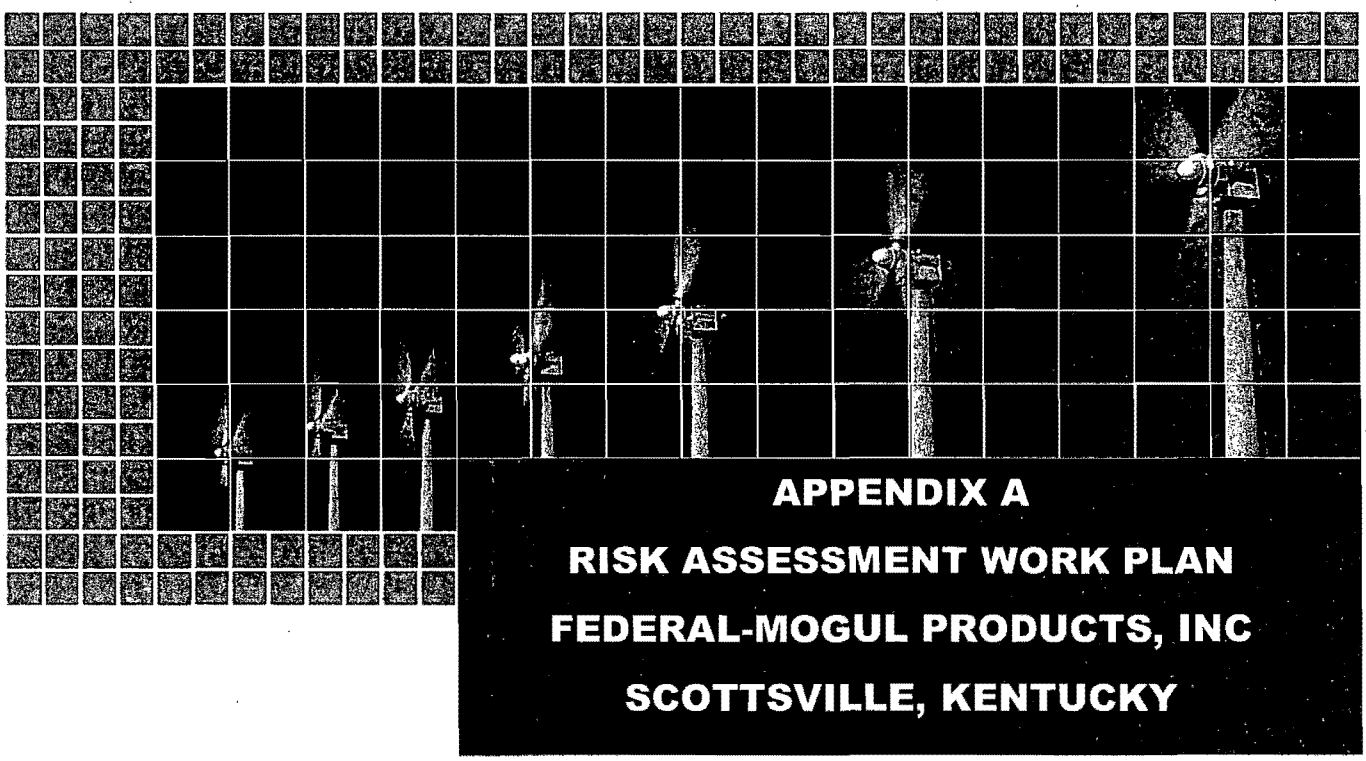
Corrective Measures Study Schedule
Federal-Mogul Products,Inc.
Scottsville, Kentucky (a)

Event or Action	Time Period (Days)
Submit CMS WP to KHWB	
KHWB review of CMS WP completed and comments received by FMP	(b)
Submit responses to KHWB comments on CMS WP	30 days after receipt of KHWB comments on CMS WP
KHWB approval of CMS WP received by FMP	(b)
Commence pre-designs investigations	20 days after KHWB approval of CMS WP
Complete pre-design investigations (offsite exposure pathway evaluation, former cyanide treatment area, and surface soil evaluation)	80 days after initiation of pre-design investigation activities
Commence site-wide RA	10 days after completion of pre-design investigations
Submit RA to KHWB	90 days after completion of pre-design investigations
KHWB review of RA completed and comments received by FMP	(b)
Submit responses to KHWB comments on RA	40 days after receipt of KHWB comments on RA
KHWB approval of RA received by FMP	(b)
Commence preparation of Draft CMS Report	10 days after KHWB approval of RA
Submit Draft CMS Report to the KHWB	90 days after KHWB approval of RA
KHWB review of Draft CMS Report completed and comments received by FMP	(b)
Submit Final CMS Report	30 days after receipt of KHWB comments on Draft CMS Report
KHWB approval of Final CMS Report received by FMP	(b)
Commence and prepare CMI WP	30 days after KHWB approval of Final CMS Report

a/ CMS WP=Corrective Measures Study Work Plan; KHWB=Kentucky Hazardous Waste Branch; RA=Risk Assessment; CMI WP=Corrective Measures Implementation Work Plan; FMP=Federal-Mogul Products, Inc.

b/ Agency review and approval time periods are not estimated. Agency review periods will impact related FMP activities as detailed in schedule.

Appendix A – Risk Assessment Work Plan



APPENDIX A
RISK ASSESSMENT WORK PLAN
FEDERAL-MOGUL PRODUCTS, INC
SCOTTSVILLE, KENTUCKY

August 9, 2010

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WSP

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Appendices

Appendix A-1 – Indoor Air Survey Report

1 Introduction

WSP Environment and Energy, LLC has prepared this Risk Assessment Work Plan (RAWP) for the Federal-Mogul Products, Inc facility (Facility) in Scottsville, Kentucky (Figure 1). The purpose of the risk assessment is to determine whether there are potential unacceptable human health and ecological risks associated with future exposures to chemicals of potential concern (COPCs) from the Facility. The risk assessment for the Facility is being conducted as part of the Corrective Measures Study (CMS) Work Plan (401 KAR 1`00:030) in fulfillment of the Resource Conservation and Recovery Act (RCRA) process. The technical approach for the risk assessment in this work plan is based on previous investigations, analyses, and modeling conducted at the site, including previous reports and discussions with the Kentucky Department for Environmental Protection (KDEP), Division of Land, Hazardous Waste Branch (KHWB) as afforded under 401 KAR 100:030 Section 7 (2)(c) 1 and 2 and Section 8 (3)(c).

Part of the CMS is to conduct human health and ecological risk assessments to determine potential unacceptable risks from existing Facility conditions and to identify matters that potentially need to be addressed. This work plan presents the complete conceptual site model (CSM), discusses the selection of media-specific COPCs, identifies current and future potential receptors, characterizes potentially complete exposure pathways, and presents the sources of toxicological criteria for the identified COPCs for the human health risk assessment (HHRA). In addition, this work plan presents equations that will be used to calculate potential risks to receptors via complete exposure pathways and the exposure assumptions for the equations. For the ecological risk assessment (ERA), this work plan presents the screening level ERA (SLERA) that will be conducted to determine if a more detailed baseline ERA is necessary.

The risk assessment will be conducted in accordance with the Kentucky Department for Environmental Protection (KDEP) 401 KAR 100:030 regulations and U.S. Environmental Protection Agency (EPA) guidance:

- Remediation requirements outlined in the Kentucky Administrative Regulation (KAR: 401 KAR 100:030)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part A (RAGS, EPA 1989)
- Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments (EPA 2001a)
- Guidance for Data Usability in Risk Assessment (EPA 1992)
- Region 9, Preliminary Remediation Goals (PRGs; EPA 2002a)
- Regions 3, 6, and 9 Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (EPA 2010a)
- EPA OSWER draft vapour intrusion guidance (EPA 2002b)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Part F, Supplemental Guidance for Inhalation Risk Assessment (EPA 2009a)
- EPA Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final (1997a)
- EPA Ecological Risk Assessment Guidance: Guidelines for Ecological Risk Assessment (1998)

1.1 SITE DESCRIPTION AND HISTORY

The Facility consists of approximately 29 acres (Figure 2). The Facility was used for the manufacture of multiple different products by multiple different companies; on August 30, 2006, Federal-Mogul ceased Facility manufacturing and reconditioning of brake products at the site. The facility is currently inactive. The area surrounding the facility consists of a mixed-use neighborhood that includes light industrial, residential, and agricultural properties. Properties immediately adjacent to the facility include farmland and pastureland to the north and east; the Sumitomo Electric Wiring Systems, Inc. facility, residences, and small businesses to the west along State Route 31E/231; and residences and agricultural property to the south.

The Facility, as shown on the topographic map (Figure 1), consists of land that gently slopes from the east-southeast to the west-northwest. Topographic elevations range between approximately 760 feet above mean sea level (ft-AMSL) to 820 ft-AMSL. Unconsolidated material is present from the surface to depths ranging from 6 to 29 feet below ground surface (ft-bgs). Bedrock consisting of limestone, shale, and siltstone horizons is encountered from 6 to 29 feet below ground surface (ft-bgs). Small non-interconnected cavities or vugs filled with calcite, chert, or gypsum deposits were observed in portions of recovered bedrock cores during installation of onsite bedrock wells. During borehole advancement into the local bedrock horizons, no large scale solution cavities or conduits were encountered in the penetrated bedrock horizons. Groundwater occurrence and flow in the bedrock aquifer is controlled by fractures, joints, and bedding planes within the bedrock horizons. In addition, more impermeable shale horizons in the local stratigraphy will impede vertical groundwater movement. Where the vertical migration of ground water is impeded, groundwater flow will occur along the upper contact of the low permeability horizon and result a spring or seep where groundwater intersects the local land surface.

Groundwater in the unconsolidated aquifer ranges in depth from approximately 5 to 26 ft-bgs. The flow direction of the unconsolidated groundwater is towards the north-northwest. Depth to the bedrock aquifer ranges from 12 to approximately 40 ft-bgs across the site. Groundwater elevations recorded from bedrock wells indicates that groundwater flows to the west-northwest. However, given the karstic development of the bedrock horizons, there is the potential groundwater could migrate offsite in other directions via interconnected and solution enhanced fractures.

Surface runoff flows via a drainage swale on the west side of the property north to Ramble Creek, which flows from east to west and is a tributary to Trammel Creek. According to 401 KAR 10:026, Section 5(2)(a), the designated uses for Ramble Creek are warm water aquatic habitat, primary and secondary contact recreation (swimming, boating, and fishing), and domestic water supply; Ramble Creek is categorized as a high quality water (401 KAR 10:030, Section 1(3)). The designated uses for Trammel Creek are similar (warm water aquatic habitat, fish consumption, and primary and secondary contact recreation; Kentucky Environmental and Public Protection Cabinet 2008). Trammel Creek is further categorized as an outstanding state resource water (401 KAR 10:026, Section 5, Table C), as well as an exceptional water (401 KAR 10:030, Section 1, Table 2).

A small pond (approximately one acre), fed by surface runoff from the site and the surrounding pastureland is located adjacent to the southwest corner of the facility. A section of Ramble Creek was dammed by the property owner creating an approximately 13-acre private lake which is located approximately 3,500 feet downstream of the Facility (Figure 1).

1.1.1 Site History

The Facility has conducted RCRA corrective action (i.e., Site Characterization under 401 KAR 100:030 Section 7) under Agreed Order (AO) DWM 89098 (Item C. #11 through #14), executed during July 1991, between the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) and Cooper Industries. Several investigations were conducted from 1998 through 2008 as part of the RCRA Facility Investigation (RFI, Site Characterization). A summary of previous investigations is provided in Section

2.0 of the CMS Work Plan. Findings of the investigations indicate that disposal of wastewater treatment sludge and chemicals by previous owners (Kirsch and Scottscraft) in onsite disposal areas (Figure 2) occurred between 1972 and 1979, which have affected site soils and groundwater.

1.1.1.1 Soil

Elevated concentrations of metals, cyanide, and chlorinated volatile organic compounds (VOCs) were detected in soil samples from within and adjacent to the former disposal areas. Chlorinated VOCs were also detected at elevated concentrations in soil samples collected beneath the Facility in the vicinity of the former alleyway, which is now within the current building footprint and the former cyanide treatment system area (Figure 3).

In 2005, a Soil Interim Remedial Measure (IRM) was conducted to excavate material from a former disposal area where reported trichloroethene (TCE) concentrations in soils exceeded regulatory levels and to evaluate subsurface anomalies identified during a geophysical survey conducted during a source area investigation (ESC 2003). A former disposal area (Figure 2) was excavated to bedrock (ranging in depth from 14 ft-bgs to 16 ft-bgs), five test trenches were completed to investigate the anomalies, and approximately 55 drums were removed from the disposal area and trenches. Excavated materials were disposed of off-site and the disposal pit and trenches were backfilled with clean fill.

1.1.1.2 Groundwater and Surface Water

Cyanide, VOC, and total metals concentrations have been detected in unconsolidated aquifer monitoring wells installed in the vicinity of the former disposal area. VOC and metals concentrations have been reported in onsite bedrock monitoring wells. During 2008, a bedrock groundwater pump and treatment system was installed at the Facility as an IRM to address elevated concentrations of VOCs in onsite groundwater. Groundwater is extracted from monitoring wells MW-12B (EW-2) and MW-14B (EW-1) and is transferred via underground piping to the treatment building where the recovered groundwater is treated using air strippers and granulated activated carbon (GAC) units. The treated groundwater is discharged to the drainage swale in the northwestern corner of the property under Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY0106585.

Several investigations were conducted to determine the potential fate and transport of onsite COPCs in groundwater to offsite receptors and surface water. A ground penetrating radar (GPR) survey identified several anomalies onsite that might be indicative of immature karst development in the bedrock (WSP Environmental Strategies 2007). Karst Survey activities were conducted from 2004 through 2006 to identify private water supply wells, seeps, springs, and karst features (i.e., sinkholes) in the vicinity of the Facility (approximately 4.2 square miles of land; Environmental Strategies Consulting 2004 and 2006a). As discussed in Section 2.1 of the CMS Work Plan, the following uses for springs or private water wells were identified in the Karst Survey Report (KSR) and its addendum: five springs are used as domestic water supplies; seven wells were used as domestic drinking water sources; however, one of these domestic wells has since been abandoned; numerous springs and seven water wells are used for watering livestock, and one well is used for lawn and garden watering.

VOC concentrations were detected in surface water samples collected from Ramble Creek as well as groundwater samples from two domestic private water wells (Environmental Strategies Consulting 2006c). To determine the migration of site groundwater to potential offsite exposure points, a Dye Trace Study was conducted in 2006. Three distinct tracer dyes were injected at three specific onsite locations; two bedrock monitoring wells MW-12B and MW-14B, and the formal disposal area from which soil was excavated during the 2005 soil IRM (Figure 2). During the dye trace, springs, seeps, private water wells, onsite monitoring wells, and local streams were monitored for a period of six months to determine where dye injected in the bedrock aquifer resurged in surface water. The Dye Trace Report identified potential offsite exposure pathways (to Ramble Creek, Casey Branch, and Trammel Creek) and endpoints of site

groundwater that migrates from the Facility (WSP Environment & Energy, Crawford Hydrology Laboratory [CHL], and Hoffman Environmental Research Institute [HERI] 2009c).

Based on the reported VOC concentrations in surface water, Federal-Mogul decided to evaluate whether the concentrations detected in the Ramble Creek surface water samples (2006) presented potential risks to children playing in the creek, values protective of this exposure pathway were determined. Using the CalEPA toxicity value for TCE, the study concluded that potential exposure to VOC concentrations reported in the May 2006 surface water samples collected from Ramble Creek are "without noncancer health risks and are without significant cancer health risks" to the local population, including small children (WSP Environment and Energy and Toxicology Excellence for Risk Assessment 2006c).

In 2006, indoor air samples were collected at the Facility to evaluate potential impacts to facility workers as a result of elevated concentrations of chlorinated VOCs in soil and groundwater. As part of the indoor air sampling event, a survey of chemicals used in the facility was conducted to determine if VOCs detected in soil or groundwater were currently in use. Several VOCs were detected in the air samples; however, they were not site-related COPCs and the concentrations detected in the outdoor ambient sample were for the most part, greater than concentrations detected in the indoor samples of the facility. The constituents detected in the indoor air and ambient air samples were identified as occupational in origin during the site inspections and materials inventory conducted concurrently with the sample event. In accordance with the EPA Draft Guidance on Vapor Intrusion (EPA 2002), the potential exposure to facility workers was determined to be an occupational exposure. Further discussion and the results of the indoor air survey are presented in Appendix A-1.

2 Human Health Risk Assessment

The HHRA process involves four components: hazard identification, exposure assessment, toxicity assessment, and risk characterization.

- The hazard identification includes the statistical evaluation of the environmental media data, and the selection of COPCs to be used in the remainder of the risk assessment.
- In the exposure assessment, the potential for exposure to COPCs for the potential human receptors identified in the CSM is characterized. Potential exposure pathways are evaluated to determine which, if any, are potentially complete. Next, the exposure point concentrations of COPCs in each affected medium are calculated, and are used in conjunction with exposure assumptions to determine systemic doses for the applicable potential receptors. Finally, the magnitude, frequency, and duration of these potential exposures are integrated to calculate estimates of daily intakes over a specified exposure period of time.
- The relationship between the potential extent of exposure and the toxicological effects of the exposure is estimated for each COPC in the toxicity assessment. The COPC-specific toxicity criteria are presented, including cancer slope factors (CSFs) or unit risk factors (URFs) for carcinogens and reference doses (RfDs) or reference concentrations (RfCs) for non-carcinogens.
- Integration of the results of the toxicity assessment and the exposure assessment to derive quantitative estimates of human health risks is accomplished in the risk characterization for carcinogens and non-carcinogens. This component also includes a discussion of the uncertainties and limitations inherent in the estimation of the potential risks, and the potential risks associated with background concentrations.

2.1 CONCEPTUAL SITE MODEL

As discussed in Section 1.1, the Facility is a light industrial facility, which is currently inactive. The property is in a mixed-use area and neighbors include residential, commercial, and light industrial properties. The property is not secured by a fence so trespassers have access to the property. However, the building is locked at all times and an alarm system is in place. The Facility is vacant and no chemicals for manufacturing are stored at the Facility. The planned future use of the facility is industrial or commercial and the surrounding area will likely remain a mixed-use area that includes residential, industrial, and commercial uses. The HHRA evaluates onsite and offsite receptors associated with these current and future uses. No future construction work is planned at the property. The HHRA will also evaluate potential exposure of utility workers to COPCs on the property.

Ramble Creek and Casey Branch are tributaries to Trammel Creek. Ramble Creek and Casey Branch are classified as high quality waters; Trammel Creek is classified as exceptional water. The following use designations apply to the surface water bodies in the vicinity of the site: warm water aquatic habitat, fish consumption, primary contact recreation (swimming), and secondary contact recreation (boating and fishing). The surface water bodies are also used for agricultural purposes (water for livestock) when they pass through pastures. A man-made lake formed by a dam on Ramble Creek is used for recreation (i.e. boating, swimming, and fishing).

Affected soils are found in the identified source areas onsite: the former waste disposal area (Figure 2), the former cyanide treatment area, and beneath the building (i.e. the former alleyway, Figure 3). No affected soils were identified offsite.

Based on previous investigations, groundwater in the unconsolidated material flows along the bedrock interface towards the northwest and discharges to Ramble Creek; bedrock groundwater flows to the

west-northwest discharges to Ramble Creek which eventually discharges to Trammel Creek. The Dye Trace Report (WSP, CHL, HERI 2009) concluded that the major groundwater flow pathway is to Ramble Creek with potential minor flow pathways to the south (Casey Branch and Trammel Creek) and southwest (Trammel Creek). These potential offsite exposure pathways will be further evaluated during performance of a pre-design investigation as described in Appendix B of the CMS Work Plan.

Currently, potable water is supplied to the Facility and the residential, industrial, and commercial facilities in the vicinity of the Facility by the Allen County Water District (ACWD). Potable water is available in the vicinity of the site; however, several domestic use water wells and springs were identified in the KSR (Environmental Strategies Consulting 2004 and 2006a). Groundwater is also used for agricultural purposes such as providing water for livestock (either from a water well, spring, or groundwater seepage point) or watering lawn or gardens.

The HHRA will evaluate the current and future soil exposure pathways based on the current facility layout. The majority of the property is covered by buildings, hardscape (e.g. asphalt or concrete), or vegetation. Surface soils have not been affected or are beneath the building or areas of hardscape, with the exception of a small area north of the facility, adjacent to an asphalt driveway. Arsenic was detected at an elevated concentration (282 mg/kg) in sample SB-68 from 0 ft-bgs to 1 ft-bgs collected as part of the RFI Phase V activities. At this time, delineation of the affected surface soil area is outlined in the Surface Soil Evaluation Work Plan (Appendix D). Based on the results of the delineation, the presence of affect surface soils will be reevaluated. Affected subsurface soils are present in the identified source areas. As indicated above, the foreseeable future use of the site consists of a light industrial or commercial facility.

The indoor vapor intrusion pathway will be evaluated as part of the HHRA. Indoor air samples were collected at the Facility in August 2006. The data will be compared to applicable risk-based criteria to determine if this pathway is potentially complete. The EPA Office of Solid Waste and Emergency Response (OSWER; EPA 2002b) draft vapor intrusion guidance will be used to evaluate potential offsite exposures. The OSWER draft guidance is primarily geared towards residential scenarios, and it is not intended for use in evaluating primarily occupational settings; however, if potential exposures are a result of environmental exposures, this guidance may be applicable. The KHWB currently does not have vapor intrusion guidance, but has established the Vapor Intrusion Workgroup in 2008 to address the issue. KHWB currently follows the OSWER draft guidance as the Workgroup is still in the process of identifying a state guidance (personal communication, Jeri Higginbotham, KDWM).

The potential for offsite receptors to be exposed to COPCs in groundwater migrating offsite to surface water will also be evaluated in the HHRA. Metals and cyanide have the potential to precipitate out of surface water and accumulate in stream sediments. No sediment samples have been collected in Ramble Creek, the primary receiving water of affected groundwater from the site. To determine whether elevated concentrations of metals or cyanide are present in the sediment, samples will be collected from Ramble Creek as described in the Offsite Exposure Pathway Evaluation Work Plan (Appendix B). This pathway may be evaluated based on the results of these sediment samples.

2.1.1 Potential Receptors

Potential receptors are selected from all current and foreseeable land uses based on the potential frequency and duration of exposure and potentially complete exposure pathways identified in the CSM. Typical receptors evaluated include adult and child residents, facility employees, maintenance workers, utility and construction workers, trespassers, and recreators. The following sections identify onsite and offsite potential receptors (Tables 1 and 2).

2.1.1.1 Potential Onsite Receptors

Based on the current land use as discussed above, the potential onsite receptors include outdoor maintenance or lawn service personnel. Employees were not selected as potential current receptors

because the facility is currently vacant and no security personnel are onsite. A trespasser was not selected as a potential receptor because their exposure would be less than the maintenance or lawn service personnel (i.e. longer exposure duration, greater exposure frequency). Potable water is supplied to the Facility and the building is locked and secured by an alarm system; there are no surface water bodies on the property. Therefore, the potentially complete current onsite receptors and exposure pathways are:

- Outdoor maintenance/lawn service personnel exposed to COPCs in surface soil via incidental ingestion and direct contact

The potentially future receptors are the same as the current potential receptors with the addition of the facility employee and utility worker. Future visitors, trespassers, and facility maintenance workers are not evaluated because the facility employee risks are more conservative than the visitors, trespassers, and facility maintenance workers (i.e. longer exposure duration, greater exposure frequency). Construction workers were not selected as potential future receptors because there is no construction planned for the facility. Residents were not selected because the current use and development of the property is expected to remain industrial via an environmental covenant, and it is unlikely that the facility building will be demolished and residential units constructed on the property. The potentially complete exposure pathways for the additional receptors are:

- Facility employee exposed to COPCs in surface soil via direct contact and incidental ingestion during outside activities, and exposed to COPCs in indoor air via inhalation during inside activities.
- Utility workers exposed to COPCs in surface soil and subsurface soil (surface to 3 ft-bgs) via direct contact and incidental ingestion when working in a utility trench

Historically, the surface and subsurface (within 3 ft-bgs) soil pathway has not presented a potential for exposure based on previous screening of the data, with the exception of the previously discussed occurrence of arsenic above. However, the surface soil data will be screened with updated screening values as indicated in Section 2.2 Hazard Identification to confirm the previous evaluation.

2.1.1.2 Potential Offsite Receptors

As a result of the mixed land uses (residential, industrial, and commercial) surrounding the Facility, current and future potential offsite receptors are identical. Resident adults and children, utility workers, and construction workers are identified as potential residential land use receptors. Receptors associated with commercial and industrial land uses (employees, maintenance workers, and visitors) will not be evaluated because the residential land use receptors provide a more conservative estimate of potential risk. Based on the KSR and associated addendum, groundwater is currently used as a potable resource (from a water well or a spring) for domestic use or lawn or garden watering by several residents within two to three miles of the Facility. Potable water for residential, industrial, and commercial use is provided by the City of Scottsville public water system.

As discussed above, the major groundwater flow pathways from the Facility is to the headwater area of Ramble Creek upstream of the man-made lake (Figure 1). Potential minor flow pathways may exist to Casey Branch, Trammel Creek, and an unnamed tributary of Trammel Creek as indicated by the dye trace results. These potential exposure pathways will be evaluated during a pre-design investigation as described in Appendix B of the CMS Work Plan. Several residences, farms, and light industrial facilities border Ramble Creek; additionally, Ramble Creek flows into a man-made lake approximately 3,500 feet from the Facility before continuing to Trammel Creek approximately 3.8 miles from the Facility.

The current and future potential offsite receptors and exposure pathways include:

- residents (adults and children) exposed to volatile COPCs in groundwater via vapor intrusion; exposure to COPCs in groundwater that have migrated to offsite surface water and sediments through incidental ingestion and dermal contact during recreational use

- utility workers and construction workers exposed to volatile COPCs in the groundwater via vapor intrusion into trenches or excavations.

Two Karst Surveys were conducted that evaluated potable water supplies relevant to this matter. The initial survey was conducted of properties near the Facility (approximately within 1 to 1.5 miles [approximately 2.6 square miles]); this evaluation determined that all except three properties in this area were served by the City of Scottsville's public water supply. Three properties were identified that use groundwater from a well as their potable water source. The City of Scottsville public water distribution lines are available to these three properties should the landowner wish to connect to the municipal water system.

Second, an evaluation was conducted as part of the Karst Survey of properties located a substantial distance beyond the initial survey area (between 1.5 to 3 miles [4.2 square miles] from the Facility); this evaluation determined that approximately 12 properties in this more distant area were served by groundwater (five springs and seven water wells) for some or all of the specific property's potable water use, with the vast majority of the more distant properties, however, served by the City of Scottsville's public water supply. The municipal public water distribution lines are available to all of the 12 properties.

Water quality samples were collected from the above referenced potable water supply springs or wells during the Karst Survey. The samples were analyzed for VOCs. Sample results from two locations contained site-related VOCs (no VOCs detected in the remaining water samples collected from water wells or springs); however, these locations were not identified as positive traces during the dye trace. Groundwater used as a potable water supply, whether from a spring or well, in the vicinity of the Facility has not been documented to be affected by site-related activities. Therefore, potential exposure to groundwater via ingestion of tap water or inhalation of vapors during a shower will not be evaluated.

2.2 HAZARD IDENTIFICATION

The purpose of the hazard identification process is to summarize the environmental media data, and to screen the data to determine the COPCs that will be evaluated further in the risk assessment process.

2.2.1 Data Management

The environmental media data to be used in the HHRA will be managed in an electronic database, and will be compiled by constituent, medium, sample location, and sample depth, if applicable. All descriptive and statistical analysis of the data will be performed using ProUCL Version 4.0 that was developed for the EPA (2009b). Surface soil data (ground surface to 2 ft-bgs) and shallow subsurface (2 ft-bgs to 4 ft-bgs) data collected during previous investigations will be included in the electronic database. As noted in discussions with the KHWB on August 24, 2009, the historical surface soil data from the Phase I (1998), Phase II (2000), Phase III (2001), Phase IV (2002), and additional source area investigations (2005, 2006, and 2008) will be included in the risk assessment to evaluate exposures to surface soil. Deep subsurface soil (3 ft-bgs and below) data will not be included in the electronic database as there are no complete exposure pathways. Soil samples located in excavation areas will not be included in the database.

Groundwater data from the monthly KPDES sampling activities will be included in the database for potential exposures to groundwater.

Surface water data collected from Ramble Creek from 2008 to present as part of ongoing monthly performance monitoring activities will be included in the database. Based on the findings of the Dye Trace Report, additional offsite surface water, sediment, and groundwater samples will be collected and evaluated to address potential offsite exposure pathways and data gaps (Appendix B of the CMS Work Plan).

2.2.2 Selection of COPCs

Identification of COPCs is based on comparing maximum measured constituent concentrations with toxicity-based screening concentrations. Constituents selected as COPCs will be evaluated further in the HHRA.

In accordance with 400 KAR 100.030, Section 7, (2)(a)1, the October 2002 Region 9 PRGs should be used as the risk-based screening criteria. However, based on discussions with KDEP, the most recent EPA RSLs will be used as screening criteria because risk-based screening criteria may have changed based on updates to toxicity data. Additionally, per discussions with KDEP, the Kentucky Risk Based Screening Values for TCE will be used for all environmental media (KDEP 2004).

Surface soil and shallow subsurface soil data will be compared to the RSLs for Industrial Soil. Groundwater data will be compared to the OSWER draft guidance. Indoor air samples will be compared to the RSLs for Industrial Air.

Surface water data will be compared to the Kentucky Surface Water Standards (401 KAR 10:031, Section 6). Standards for use of surface water as a potential drinking water source use are available: Kentucky Surface Water standards for Drinking Water Source (DWS) Use (401 KAR 10:031, Section 6). However, according to 401 KAR 10:031, Section 5, the DWS use standards are applicable at the point of withdrawal. No DWS use intakes were identified along Ramble Creek or Trammel Creek in the vicinity of the Facility; however, as a conservative measure, the DWS standards will also be used for selection of COPCs. The primary and secondary recreation water standards are for pH and bacteria (i.e. fecal coliform or *Escherichia coli* content). Bacteria data were not collected as they are not site-related constituents; field pH measurements collected during performance of the karst survey activities, between 2004 and 2006, will be compared to the standards. Sediment data will be compared to the RSLs for Residential Soil.

3 Exposure Assessment

The purpose of the exposure assessment is to predict the magnitude and frequency of potential human exposure to each identified COPC as a result of the hazard identification. The conceptual site model describes the potential receptors and media of concern.

3.1 EXPOSURE POINT CONCENTRATION

Medium specific exposure point concentrations (EPCs) will be a reasonable maximum exposure (RME) statistic. The RME, which is based on the 95-percent upper confidence level of the mean will be calculated using ProUCL Version 4.0 (EPA 2009b), and will be dependent on the distribution of the data. If the RME exceeds the maximum detected concentration of a COPC, then the maximum detected concentration will be used as the RME for that EPC. All COPCs detected at least once within a medium will be included as an EPC. Sample results that are qualified as being below the detection level (non-detect) will be evaluated based on recommendations from the ProUCL software.

If the analytical results from surface water and groundwater samples collected during the offsite exposure pathways evaluation investigation indicates a potential risk to offsite residential receptors, this will require a development of an EPC for COPCs for the indoor air exposure pathway. Currently, there are no models available to estimate concentrations of volatiles migrating to indoor air from groundwater within a fractured or karstic bedrock system. The Johnson and Ettinger (Johnson and Ettinger; 1991) model, Version 3.1, estimates indoor air concentrations from affected soils, groundwater, or soil gas within a homogeneous soil mixture. Conservatively, the potential EPC for exposures to offsite receptors to VOCs migrating to indoor air from groundwater will be modeled using the Johnson and Ettinger model and the corresponding user's guide (EPA 2004b) by assuming that groundwater concentrations in the bedrock wells occurs at the bedrock/unconsolidated material interface or an average of 14 ft-bgs. This is a highly conservative assumption and will likely overestimate potential offsite exposures because degradation of the COPCs and potential attenuation of the vapor through the bedrock are not considered. Assumptions used in the Johnson and Ettinger models will be based on site-specific data. An EPC for the construction and utility worker exposed to VOCs in the groundwater during excavation activities will be estimated using the model for exposure of workers to volatile COPCs in a construction or utility trench developed by the Virginia Department of Environmental Quality (VDEQ) for the Virginia Voluntary Remediation Program risk assessment guidance (VDEQ 2010).

3.2 EXPOSURE ASSUMPTIONS

Tables 3 through 14 present the applicable exposure assumptions for potential future receptors identified in the SCM presented above. The exposure assumptions used in the HHRA are based on site-specific conditions or default exposure assumptions presented in the following guidance documents:

- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Supplemental Guidance – "Standard Default Exposure Factors" (EPA 1991b)
- Exposure Factors Handbook, Volumes I, II, and III (EPA 1997b)
- Child-Specific Exposure Factors Handbook (EPA 2008)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A) (Interim Final) (EPA 1989)
- EPA RSLs Table (EPA 2010a)

- EPA Region 3 Technical Guidance Manual, Risk Assessment, Updated Dermal Exposure Assessment Guidance (EPA 2003b)
- Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F) (Final) (EPA 2009a)

3.3 EXPOSURE EQUATIONS AND MODELS

The following are the equations for calculating the intake of COPCs:

Inhalation of air:

Intake (mg/m^3) = (CA x ET x EF x ED x CF) / (AT)

Incidental ingestion of soil or sediments:

Intake (mg/kg-day) = (CS x IR x CF x FI x EF x ED) / (BW x AT)

Dermal contact with soil or sediments:

Absorbed dose (mg/kg-day) = (CS x SA x AF x ABS x EF x ED x CF) / (BW x AT)

Incidental ingestion of water:

Intake (mg/kg-day) = (CW x IR X EF X ED) / (BW x AT)

Dermal contact with water:

Absorbed dose (mg/kg-day) = (CW x SA x PC x ET x EF x ED x CF) / (BW x AT)

Where:

CA = concentration in air ($\mu g/m^3$)

ET = exposure time (hours/day)

EF = exposure frequency (day/year)

ED = exposure duration (years)

CF = correction factor (1×10^{-6} kg/mg, 1×10^{-3} liters/cm^3, or 1×10^{-3} mg/µg)

AT = averaging time (days)

CS = concentration in soil or sediment (mg/kg)

CW = concentration in water (mg/liters)

IR = ingestion rate (mg/day or liters/day)

FI = fraction ingested from site source (unit less)

BW = body weight (kg)

SA = skin surface area available for contact (cm^2 or cm^2/day)

AF = soil to skin adherence factor (mg/cm^2)

ABS = chemical-specific absorption factor (unit less)

PC = chemical-specific permeability constant (cm/hour)

4 Toxicity Assessment

The purpose of the toxicity assessment is to determine the relationship between the dose of a constituent taken into the body, and the probability that an adverse effect will result from that dose. The hierarchy of toxicity values (EPA 2003a) includes: the Tier 1 Integrated Risk Information System (IRIS - EPA 2010b) toxicity values; Tier 2 toxicity values include the Provisional Peer Reviewed Toxicity Values (PPRTVs) from the National Center for Environmental Assessment/Superfund Health Risk Technical Support Center (NCEA/STSC); and, Tier 3 toxicity values include other EPA and non-EPA values including California Environmental Protection Agency (Cal EPA) toxicity values, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the EPA Health Effects Assessment Summary Tables (EPA 1999). Based on discussions with KDEP, the published toxicity value (KDEP 2004) used for TCE is 3.22^{-1} milligram [mg] of constituent/kilogram [kg] of body weight/day) [$(mg/kg\text{-}d)^{-1}$]. Constituents with dermal adsorption factors will be evaluated for dermal soil exposure in accordance with RAGS Part E Exhibit 4-1 (EPA 2004).

Quantitative estimates of the potency of COPCs include two sets of toxicity values, one for carcinogenic effects and one for non-carcinogenic effects. For carcinogenic effects, EPA assumes a non-threshold toxicological mechanism that assumes there is no level of exposure that does not pose a probability that an adverse effect will result from that dose. Toxicity criteria for non-carcinogens assume that there is a threshold effects level, below which adverse health effects are not expected to occur.

4.1 CARCINOGENIC EFFECTS

For carcinogenic effects, EPA (2005) assigns a weight-of-evidence descriptor to each constituent and then, if applicable, a CSF or URF is calculated. The weight-of-evidence descriptor is based on the likelihood that the constituent is a human carcinogen. The following are the weight-of-evidence descriptors:

- Carcinogenic to humans – convincing epidemiologic evidence demonstrating causality between human exposure and cancer, or exceptionally when there is strong epidemiological evidence, extensive animal evidence, knowledge of the mode of action, and information that the mode of action is anticipated to occur in humans and progress to tumors
- Likely to be carcinogenic to humans – available tumor effects and other key data are adequate to demonstrate carcinogenic potential to humans, but does not reach the weight-of-evidence for the descriptor of carcinogenic to humans
- Suggestive evidence of carcinogenic potential – evidence from human or animal data is suggestive of carcinogenicity, which raises a concern for carcinogenic effects but is judged not sufficient for a stronger conclusion
- Inadequate information to assess carcinogenic potential – available data are judged inadequate to perform an assessment
- Not likely to be carcinogenic to humans – available data are robust for deciding that there is no basis for human hazard concern

EPA determines CSFs for oral exposure and URFs for inhalation exposure for those chemicals that are known or likely human carcinogens. The CSFs and URFs are upper-bound estimates of the excess cancer risk due to continuous exposure to a constituent averaged throughout the course of a 70-year lifetime. A CSF has units of $1 mg/kg\text{-}day^{-1}$. A URF is expressed in units of 1/microgram (μg) of constituent/cubic meter (m^3) air or $(\mu g/ m^3)^{-1}$. The basis of CSFs and URFs are data from lifetime animal bioassays, although human data are used when available. The carcinogenic dose-response values, as

well as their sources and health effects of concern, will be included in the HHRA in the RAGS Part D format.

The EPA-recommended procedure for addressing chemicals that have been determined to cause cancer by a mutagenic mode of action (MOA) will be incorporated in the HHRA. A cancer caused by a mutagenic MOA is thought to pose higher risks to early life than other non-mutagenic MOA chemicals. In evaluating carcinogens with mutagenic MOAs, age dependent adjustment factors are used to calculate risks associated with early-life exposures (EPA 2005).

4.2 NON-CARCINOGENIC EFFECTS

Non-carcinogenic effects, such as organ damage or reproductive effects are evaluated by RfDs for oral exposure or RfCs for inhalation exposure. The basis of a chronic RfD or RfC calculation is usually the highest dose that results in a no observed adverse effect level (NOAEL) after chronic (usually lifetime) exposure in animal experiments. The NOAEL is then divided by an uncertainty factor, and occasionally an additional modifying factor, to obtain the RfD or RfC. Uncertainty and modifying factors are typically factors of 10 that account for interspecies variation and sensitive human populations. Additional factors of 10 are included in the uncertainty factor if the RfD or RfC is based on the lowest observed adverse effect level instead of the NOAEL, or an experiment that includes a less-than-lifetime exposure. A RfD has units of 1mg/kg-day. A RfC is expressed in units of 1mg/ m^3. The non-carcinogenic dose-response values, as well as the source and primary target organ, which is the organ that is most affected and experiences critical organ effects, will be included in the HHRA in the RAGS Part D format.

5 Risk Characterization

The purpose of the risk characterization is to provide a conservative estimate of the potential risk resulting from exposure to COPCs identified in the environmental media of the Federal-Mogul facility. Included in this section is a quantitative estimate of potential carcinogenic and non-carcinogenic risks for each complete exposure pathway for each receptor.

Risks will be summed across pathways and media for each receptor under current and future site use conditions. A summary of the total site cancer risks for each receptor group will be presented in the HHRA and compared to EPA's target risk range of 1×10^{-4} to 1×10^{-6}. For non-carcinogens, the individual hazard quotients (HQs) will be summed for an overall hazard index (HI). If the HI is less than 1.0, then no adverse health effects are likely associated with exposures at the individual parcels. However, if the total HI is greater than 1.0, separate endpoint-specific HIs will be calculated based on target organs (e.g., HQs for neurotoxins are summed separately from HQs for renal toxins). Only if a target-organ-specific HI is greater than 1.0 is there a reason for concern about potential health effects for that target organ.

5.1 UNCERTAINTY ANALYSIS

The procedures and inputs used to assess potential human health risks in this and similar HHRA are subject to a wide variety of uncertainties. In general, there are five main sources of uncertainty and variability in risk assessments of well-characterized sites:

- environmental chemistry sampling and analysis
- environmental parameter measurements
- fate and transport modeling
- toxicological data and dose-response extrapolations
- combinations of the above

These sources of uncertainty as they pertain to this HHRA will be discussed.

6 Ecological Risk Assessment

To estimate the potential for adverse ecological effects both on and offsite, an ERA will be conducted. As discussed in the SCM, the Federal-Mogul facility is an industrial facility with large sections covered with either a building, concrete, or asphalt. Groundwater seepage and springs are used for agricultural purposes (water for livestock) in the vicinity of the site; therefore, there is the potential for aquatic life and livestock to be exposed to COPCs in groundwater via migration from the site to offsite water wells, springs, or groundwater discharge areas (streams).

Surface water data collected from Ramble Creek from 2008 to present as part of ongoing monthly performance monitoring activities will be included in the database with respect to offsite ecological receptors. Additional surface water and groundwater samples will be collected based on the results of the Dye Trace Report to evaluate potential offsite exposure pathways (Appendix B of the CMS Work Plan). Sediment samples will be collected in Ramble Creek to evaluate potential offsite exposure to site-related constituents.

In accordance with 401 KAR 100:030, Section 7(2)(c)2., the ERA will be conducted in accordance with the following EPA guidance:

- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA 1997a)
- Guidelines for Ecological Risk Assessment (EPA 1998)

As outlined in the EPA guidance, a SLERA will be performed. The Kentucky Water Quality Criteria for warm water aquatic habitat and, where Kentucky Water Quality Criteria are not available, the U.S. EPA Region 4 Ecological Risk Assessment Bulletin for Surface Water (EPA 2001b) or the U.S. EPA Region 5 Ecological Screening Values (EPA 2003) for surface water and sediment will be used for the screening evaluation.

If a more detailed ERA is necessary as a result of the SLERA, the EPA guidance discussed above will be used to evaluate potential ecological risk.

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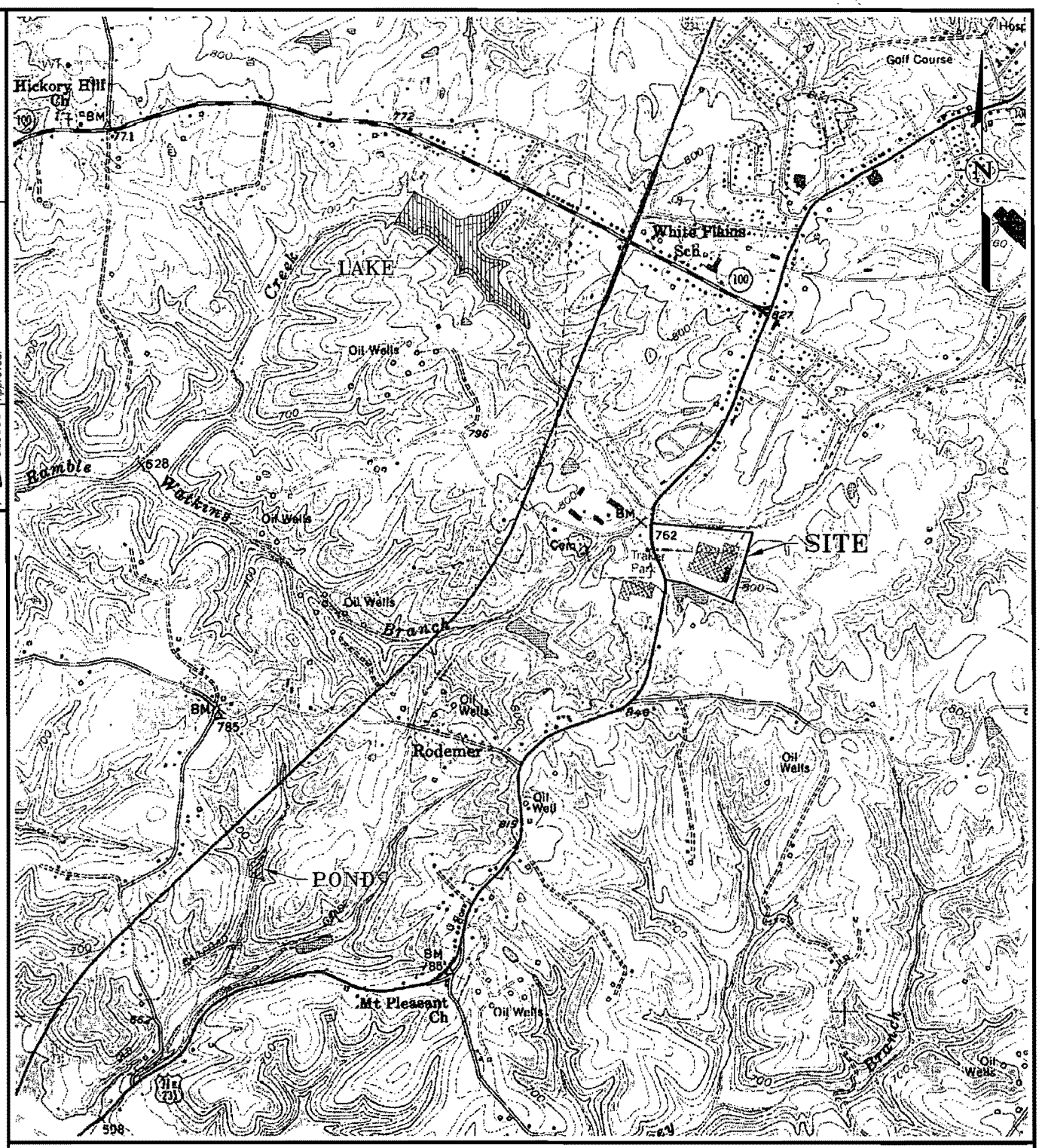
8 Acronyms

ACWD	Allen County Water District
AO	Agreed Order
bgs	Below ground surface
CHL	Crawford Hydrology Laboratory
CMS	Corrective Measure Study
COPCs	Constituents of Potential Concern
CSFs	Cancer Slope Factors
CSM	Conceptual Site Model
CT	Central Tendency
DWS	Drinking Water Standards
EPA	U.S. Environmental Protection Agency
EPCs	Exposure Point Concentration
ERA	Ecological Risk Assessment
ft-AMSL	Feet Above Mean Sea Level
GAC	Granulated Activated Carbon
GPR	Ground Penetrating Radar
HERI	Hoffman Environmental Research Institute
HHRA	Human Health Risk Assessment
IRM	Interim Remedial Measure
K	Volatilization Factor
KAR	Kentucky Administration Regulations
KDEP	Kentucky Department for Environmental Protection
KHWB	Kentucky Hazardous Waste Branch
KNREPC	Kentucky Natural Resources and Environmental Protection Cabinet
KPDES	Kentucky Pollution Discharge Elimination System
KSR	Karst Survey Report
KSRA	Karst Survey Report Addendum
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PRGs	Preliminary Remediation Goals
ProUCL	U.S. EPA statistical software program
RCRA	Resource Conservation and Recovery Act

RFA	RCRA Facility Assessment
RfCs	Reference Concentrations
RfDs	Reference Doses
RFI	RCRA Facility Investigation
RME	Reasonable Maximum Exposure
RSLs	Regional Screening Levels
SLERA	Screening Level Ecological Risk Assessment
TCE	Trichloroethene
TERA	Toxicology Excellence for Risk Assessment
URFs	Unit Risk Factors
VOCs	Volatile Organic Compounds
WSP	WSP Environment & Energy

Figures



REFERENCE:

USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, PETROLEUM, KY-TN, DATED 1954, REVISED 1994. SCALE 1:24000.

KENTUCKY

QUADRANGLE LOCATION

SCALE, FEET

0 1000 2000 4000

WSP

WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, Pennsylvania 15220
(412) 604-1040

FIGURE 1

SITE LOCATION

FEDERAL-MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SOUTHFIELD, KENTUCKY

DWG Name: 138055-A21
Checked:
Approved:
Drawn By: 121808

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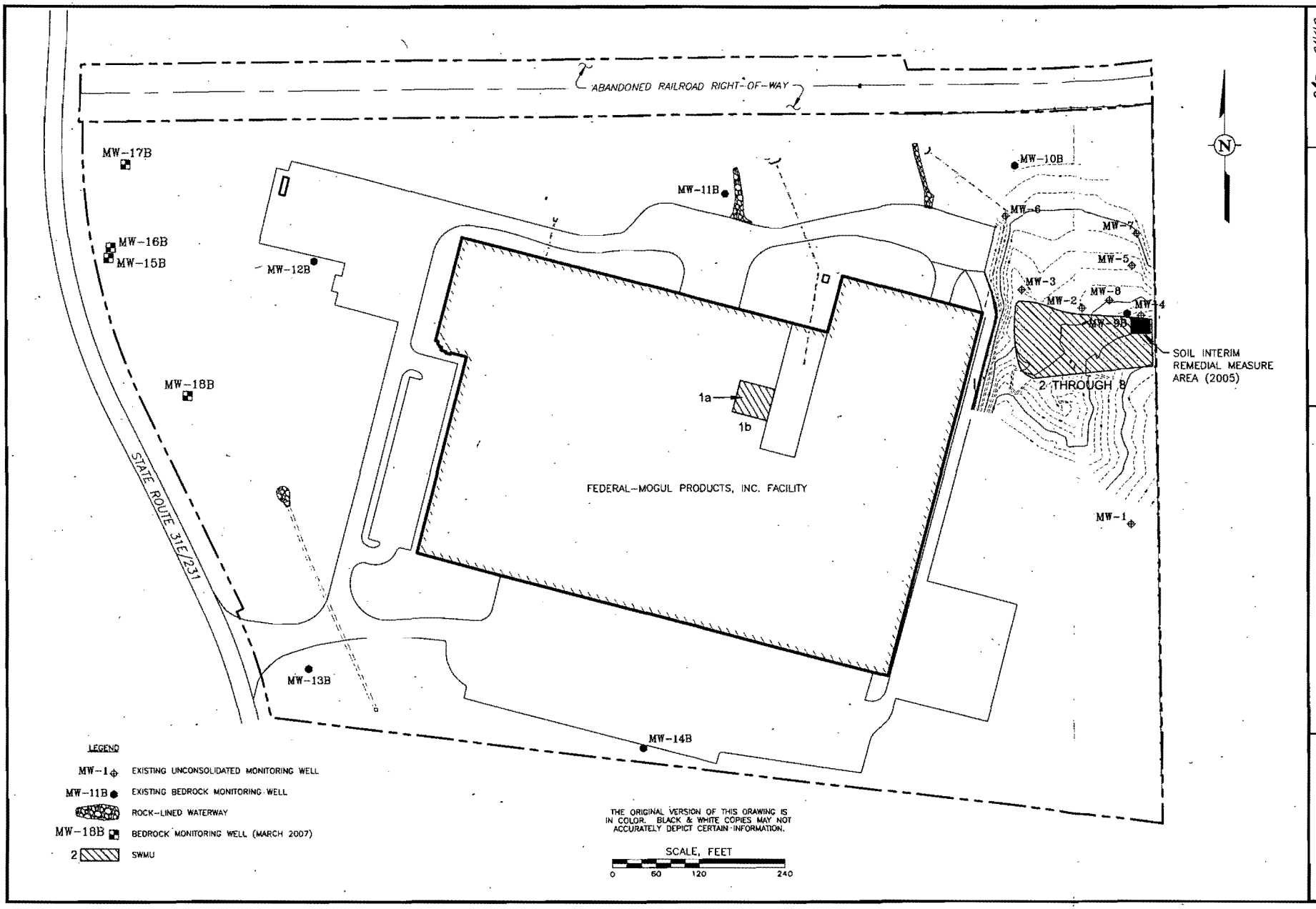

Drawn By: RB 04/19/10
Checked:
Approved:
DWG Name: 138055-B46

FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 2

SITE LAYOUT AND LOCATION OF SOLID WASTE MANAGEMENT UNITS (SWMUs)

WSP
WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, PA 15220 (412) 604-1040

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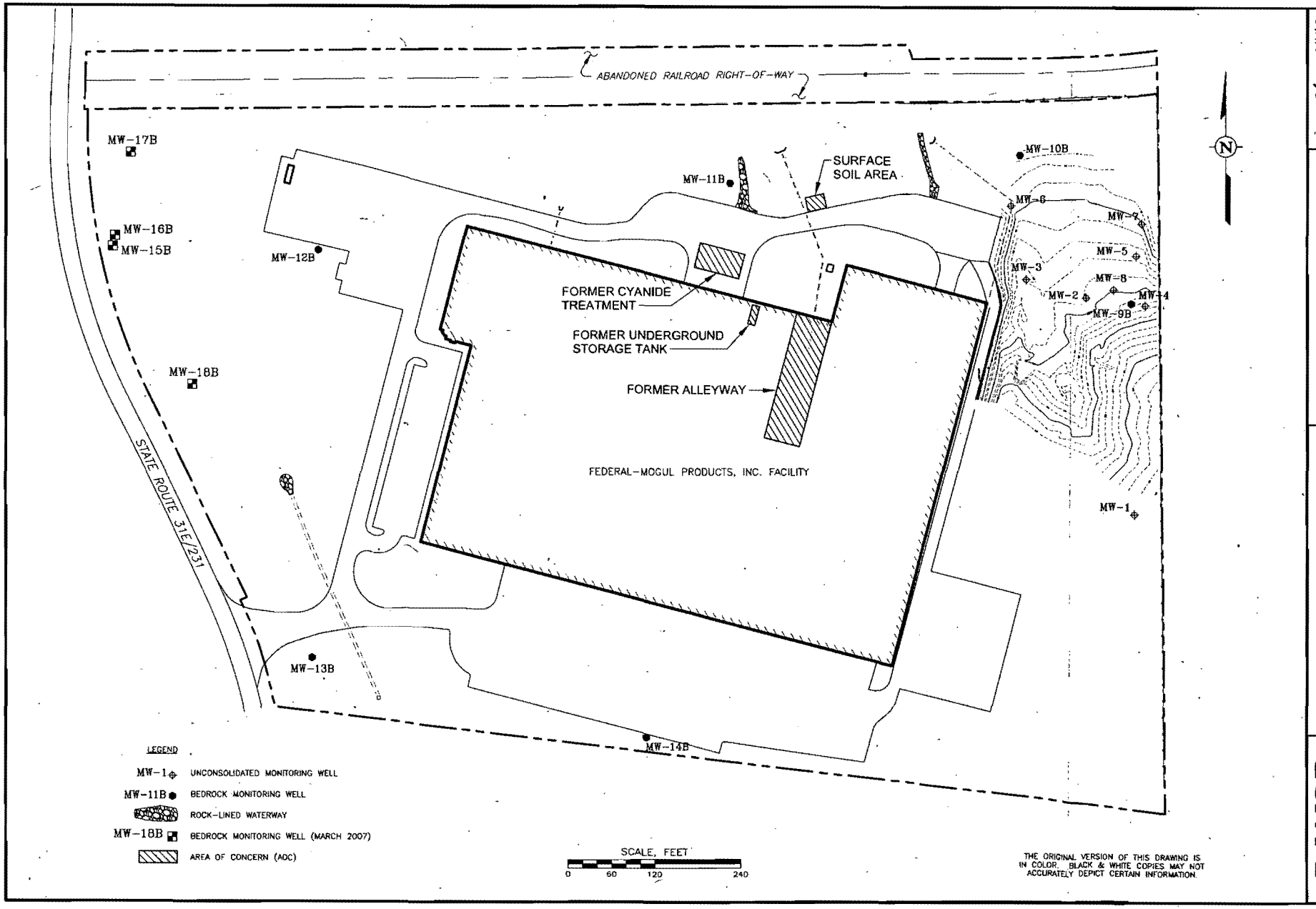

Drawn By: RKZ 04/14/10
Checked:
Approved:
DWG Name: 138055-B47

FEDERAL-MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY
PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 3

SITE LAYOUT AND LOCATION OF AREAS OF CONCERN (AOCs)

WSP
WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, PA 15220 (412) 604-1040

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Tables

Table 1

Potential Onsite Expsoure Pathways
Federal-Mogul, Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route (b)	Exposure Assumptions (c)	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Surface soil	Resident	Adult	D Ig		None	Current land use industrial
				Resident	Child	D Ig		None	Current land use industrial
				Employee	Adult	D Ig		None	Facility currently vacant
				Outdoor maintenance worker	Adult	D Ig	3	Quantitative	Potential for COPCs in shallow soil
				Visitor	Adult	D Ig		None	Other receptors greater potential risk
		Air	Indoor air	Resident	Adult	I		None	Current land use industrial
				Resident	Child	I		None	Current land use industrial
				Employee	Adult	I		None	Facility currently vacant
				Outdoor maintenance worker	Adult	I		None	Outdoor maintenance worker not expected to enter building
				Visitor	Adult	I		None	Other receptors greater potential risk
				Utility worker	Adult	I		None	No current utility work
		Soil	Subsurface soil	Construction worker	Adult	D Ig		None	No current construction work
				Utility Worker	Adult	D Ig		None	No current utility work
Current	Groundwater	Groundwater	Tap water	Resident	Adult	Ig		None	Current land use industrial
				Resident	Child	Ig		None	Current land use industrial
				Employee	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
				Outdoor maintenance worker	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
				Visitor	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
				Utility worker	Adult	Ig		None	Potable water supplied by Allen County Water District; facility vacant
			Shower/Bath	Resident	Adult	I D		None	Current land use industrial
				Resident	Child	D		None	Current land use industrial
				Employee	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
				Outdoor maintenance worker	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
				Visitor	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
				Utility worker	Adult	I D		None	Potable water supplied by Allen County Water District; facility vacant
			Indoor air	Resident	Adult	I		None	Current land use industrial
				Resident	Child	I		None	Current land use industrial
				Employee	Adult	I		None	Facility currently vacant
				Outdoor maintenance worker	Adult	I		None	Outdoor maintenance worker not expected to enter building
				Visitor	Adult	I		None	Facility currently vacant
				Utility worker	Adult	I		None	Facility currently vacant
			Groundwater	Construction worker	Adult	D Ig		None	No current construction work
				Utility Worker	Adult	D Ig		None	No current utility work
Future	Soil	Soil	Surface soil	Resident	Adult	D Ig		None	Future land use industrial; no off-site exposure
				Resident	Child	D Ig		None	Future land use industrial; no off-site exposure
				Employee	Adult	D Ig	4	Quantitative	Potential for COPCs in shallow soil
				Outdoor maintenance worker	Adult	D Ig	3	Quantitative	Potential for COPCs in shallow soil
				Visitor	Adult	D Ig		None	Other receptors greater potential risk
		Air	Indoor air	Resident	Adult	I		None	No COPCs in off site soil
				Resident	Child	I		None	No COPCs in off site soil
				Employee	Adult	I		None	Migration of volatiles from groundwater pathway more significant
				Outdoor maintenance worker	Adult	I		None	Other receptors greater potential risk
				Visitor	Adult	I		None	Other receptors greater potential risk
				Utility worker	Adult	I		None	Not applicable to the facility
		Soil	Subsurface soil	Construction worker	Adult	D Ig		None	Future construction work not excepcted
				Utility Worker	Adult	D Ig	6	Quantitative	Potential for future utility work

Table 1

Potential Onsite Expsoure Pathways
Federal-Mogul, Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route (b)	Exposure Assumptions (c)	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Tap water	Resident	Adult	Ig		None	Future land use industrial
				Resident	Child	Ig		None	Future land use industrial
				Employee	Adult	Ig		None	Potable water supplied by Allen County Water District
				Outdoor maintenance worker	Adult	Ig		None	Potable water supplied by Allen County Water District
				Visitor	Adult	Ig		None	Potable water supplied by Allen County Water District
				Utility worker	Adult	Ig		None	Potable water supplied by Allen County Water District
			Shower/Bath	Resident	Adult	I D		None	Future land use industrial
				Resident	Child	D		None	Future land use industrial
				Employee	Adult	I D		None	Potable water supplied by Mecklenburg County
				Outdoor maintenance worker	Adult	I D		None	Potable water supplied by Allen County Water District
				Visitor	Adult	I D		None	Potable water supplied by Allen County Water District
				Utility worker	Adult	I D		None	Potable water supplied by Allen County Water District
			Indoor air	Resident	Adult	I		None	Future land use industrial
				Resident	Child	I		None	Future land use industrial
				Employee	Adult	I	5	Quantitative	COPCs present in on-site groundwater
				Outdoor maintenance worker	Adult	I		None	Other receptors greater potential risk
				Visitor	Adult	I		None	Other receptors greater potential risk
				Utility worker	Adult	I		None	Not applicable to the facility
			Groundwater	Construction worker	Adult	D Ig		None	No future construction work expected
				Utility Worker	Adult	D Ig		None	Other receptors greater potential risk

a/ Refer to text for additional discussion
b/ I = inhalation, D = dermal, and Ig = ingestion
c/ Number refers to exposure assumption tables; same current and future exposure assumptions have same table number

Table 2

Potential Offsite Expsoure Pathways
Federal-Mogul, Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route (b)	Exposure Assumptions (c)	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Groundwater	Groundwater	Tap water	Resident	Adult	Ig		None	No COPCs identified in offsite domestic use wells/springs
				Resident	Child	Ig		None	No COPCs identified in offsite domestic use wells/springs
				Employee	Adult	Ig		None	Other receptors protective of risk
				Maintenance worker	Adult	Ig		None	Other receptors protective of risk
				Visitor	Adult	Ig		None	Other receptors protective of risk
				Utility worker	Adult	Ig		None	Other receptors protective of risk
			Shower/Bath	Resident	Adult	I D		None	No COPCs identified in offsite domestic use wells/springs
				Resident	Child	D		None	No COPCs identified in offsite domestic use wells/springs
				Employee	Adult	I D		None	Other receptors protective of risk
				Maintenance worker	Adult	I D		None	Other receptors protective of risk
				Visitor	Adult	I D		None	Other receptors protective of risk
				Utility worker	Adult	I D		None	Other receptors protective of risk
			Indoor air	Resident	Adult	I	9	Quantitative	Potential for affected groundwater to migrate beneath residential dwellings
				Resident	Child	I	13	Quantitative	Potential for affected groundwater to migrate beneath residential dwellings
				Employee	Adult	I		None	Other receptors protective of risk
				Maintenance worker	Adult	I		None	Other receptors protective of risk
				Visitor	Adult	I		None	Other receptors protective of risk
				Utility worker	Adult	I		None	Other receptors protective of risk
			Groundwater	Construction worker	Adult	I	7	Quantitative	Potential for affected groundwater to migrate into excavations
				Utility Worker	Adult	I	8	Quantitative	Potential for affected groundwater to migrate into trenches
			Surface water	Resident	Adult	D Ig	10	Quantitative	Potential for affected groundwater to migrate to surface water
				Resident	Child	D Ig	14	Quantitative	Potential for affected groundwater to migrate to surface water
			Sediment	Resident	Adult	D Ig	11	Quantitative	Potential for affected groundwater to migrate to surface water sediments
				Resident	Child	D Ig	12	Quantitative	Potential for affected groundwater to migrate to surface water sediments

a/ Refer to text for additional discussion

b/ I = inhalation, D = dermal, and Ig = ingestion

c/ Number refers to exposure assumption tables; same current and future exposure assumptions have same table number

Table 3

Exposure Assumptions: Outdoor Worker
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Outdoor Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Incidental Ingestion	IR	Ingestion Rate	mg/day	50	EPA 2002 (a)
	EF	Exposure frequency	day/yr	140	BPJ (b)
	ED	Exposure duration	yr	25	EPA 1991 (c)
	BW	Body Weight	kg	70	EPA 1989 (d)
	AT-NC	Averaging time - non-cancer	days	9,125	EPA 1991
	AT-C	Averaging time - cancer	days	25,550	EPA 1991
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1991
Dermal	SA	Surface area for contact	cm^2/day	3,300	EPA 1997 (e)
	AF	Adherence factor	mg/cm^2	0.2	EPA 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004 (f)
	EF	Exposure frequency	day/yr	140	BPJ
	ED-NC	Exposure duration	yr	25	EPA 1991
	BW	Body weight	kg	70	EPA 1991
	AT-NC	Averaging time - noncancer	days	9,125	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ EPA 2002:
U.S. Environmental Protection Agency. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

b/ Best professional judgement.

c/ EPA 1991:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

d/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA 540/1-89/002

e/ EPA 1997:
U.S. Environmental Protection Agency. 1997. Exposure Factors Handbook. Volumes I, II, and III. Office of Research and Development. Washington, D.C. EPA/600/P-95/002Fabc

f/ EPA 2004
U.S. Enviornmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final Office of Emergency and Remedial Response, Washington, D.C. OSWER 9285.7-02EP.July 2004.

Table 4

Exposure Assumptions: Facility Worker
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Facility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Incidental Ingestion	IR	Ingestion Rate	mg/day	50	EPA 2002 (a)
	EF	Exposure frequency	day/yr	250	EPA 1991 (b)
	ED	Exposure duration	yr	25	EPA 1991
	BW	Body Weight	kg	70	EPA 1989 (c)
	AT-NC	Averaging time - non-cancer	days	9,125	EPA 1991
	AT-C	Averaging time - cancer	days	25,550	EPA 1991
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1991
Dermal	SA	Surface area for contact	cm^2/day	3,300	EPA 1997 (d)
	AF	Adherence factor	mg/cm^2	0.2	EPA 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004 (e)
	EF	Exposure frequency	day/yr	250	EPA 1991
	ED-NC	Exposure duration	yr	25	EPA 1991
	BW	Body weight	kg	70	EPA 1991
	AT-NC	Averaging time - noncancer	days	9,125	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ EPA 2002:
U.S. Environmental Protection Agency. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

b/ EPA 1991:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

c/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA 540/1-89/002

d/ EPA 1997:
U.S. Environmental Protection Agency. 1997. Exposure Factors Handbook. Volumes I, II, and III. Office of Research and Development. Washington, D.C. EPA/600/P-95/002Fabc

e/ EPA 2004
U.S. Enviormmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final Office of Emergency and Remedial Response, Washington, D.C. OSWER 9285.7-02EP.July 2004.

Table 5

Exposure Assumptions: Facility Worker
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor air
Receptor Population: Facility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	8	EPA 1997 (a)
	EF	Exposure frequency	day/yr	250	EPA 1991 (b)
	ED	Exposure duration	yr	25	EPA 1991
	CF	Conversion factor	mg/µg	1.E-03	EPA 2009 (c)
	AT-NC	Averaging time - non-cancer	hours	219,000	EPA 2009
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009

a/ EPA 1997:
U.S. Environmental Protection Agency. 1997. Exposure Factors Handbook. Volumes I, II, and III. Office of Research and Development. Washington, D.C. EPA/600/P-95/002Fabc

b/ EPA 1991:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

c/ EPA 2009:
U.S. Environmental Protection Agency. 2009. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA-540-R-070-002.

Table 6

Exposure Assumptions: Utility Worker
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Ingestion	IR	Ingestion rate	mg/day	330	EPA 2002 (a)
	EF	Exposure frequency	day/yr	20	EPA 1991 (b)
	ED	Exposure duration	yr	1	EPA 1991
	BW	Body weight	kg	70	EPA 1989 (c)
	AT-NC	Averaging time - noncancer	days	365	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1989
Dermal	SA	Surface area for contact	cm^2/day	3,300	EPA 2002
	AF	Adherence factor	mg/cm^2	0.2	EPA 2002
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004 (d)
	EF	Exposure frequency	day/yr	20	EPA 1991
	ED-NC	Exposure duration	yr	1	EPA 1991
	BW	Body weight	kg	70	EPA 1991
	AT-NC	Averaging time - noncancer	days	365	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ EPA 2002:
U.S. Environmental Protection Agency. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

b/ EPA 1991:
U.S. Environmental Protection Agency. 1991. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

c/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA 540/1-89/002

d/EPA 2004
U.S. Enviornmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final Office of Emergency and Remedial Response, Washington, D.C. OSWER 9285.7-02EP.July 2004.

Table 7

Exposure Assumptions: Construction Worker
(Groundwater, Vapor Intrusion)
Federal-Mogul, Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Vapors in Trench
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	8	BPJ (a)
	EF	Exposure frequency	day/yr	250	BPJ
	ED	Exposure duration	yr	1	BPJ
	CF	Conversion factor	mg/µg	1.E-03	EPA 2009 (b)
	AT-NC	Averaging time - noncancer	hours	8,760	EPA 2009
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009

a/ BPJ = Best Professional Judgement

b/ EPA 2009:

U.S. Environmental Protection Agency. 2009. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA-540-R-070-002.

Table 8

Exposure Assumptions: Utility Worker
(Groundwater, Vapor Intrusion)
Federal-Mogul, Products, Inc.
Scottsville, Kentucky (a)

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Vapors in Trench
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	8	BPJ (a)
	EF	Exposure frequency	day/yr	20	BPJ
	ED	Exposure duration	yr	1	BPJ
	CF	Conversion factor	mg/µg	1.E-03	EPA 2009 (b)
	AT-NC	Averaging time - noncancer	hours	8,760	EPA 2009
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009

a/ BPJ = Best Professional Judgement

b/ EPA 2009:

U.S. Environmental Protection Agency. 2009. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA-540-R-070-002.

Table 9

Exposure Assumptions: Resident Adult
(Groundwater, Vapor Intrusion)
Federal-Mogul, Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	24	EPA 2009 (a)
	EF	Exposure frequency	day/yr	350	EPA 2009
	ED	Exposure duration	yr	24	EPA 2009
	CF	Conversion factor	mg/µg	1.00E-03	EPA 2009
	AT-NC	Averaging time - noncancer	hours	210240	EPA 2009
	AT-C	Averaging time - cancer	hours	613200	EPA 2009

a/ EPA 2009:
U.S. Environmental Protection Agency. 2009. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA-540-R-070-002.

Table 10

Exposure Assumptions: Resident Adult
(Surface Water, Direct Contact)
Federal-Mogul, Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference
Incidental Ingestion	IR	Ingestion rate	l/day	0.016	EPA 2009c (a)
	EF	Exposure frequency	day/yr	10	BPJ
	ED	Exposure duration	yr	24	EPA 1991b (b)
	BW	Body weight	kg	70	EPA 1989 (c)
	AT-NC	Averaging time - noncancer	days	8760	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
Dermal	SA	Surface area for contact	cm^2	2,920	EPA 2009c
	PC	Permeability coefficient	cm/hr	chemical-specific	EPA 2009c
	ET	Event time	hr/day	0.5	BPJ
	EF	Exposure frequency	day/yr	10	BPJ
	ED-NC	Exposure duration	yr	24	EPA 1991b
	BW	Body weight	kg	70	EPA 1991b
	AT-NC	Averaging time - noncancer	days	8,760	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	l/cm^3	1.0E-03	EPA 1989

a/ EPA 2009c:
U.S. Environmental Protection Agency. 2009c. Exposure Factors Handbook:
2009 Update. External Review Draft. EPA 600/R-09/052A.

b/ EPA 1991b:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund:
Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors.
Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

c/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund:
Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and
Remedial Response, Washington, D.C. EPA 540/1-89/002

d/ EPA 2004:
U.S. Environmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual .
(Part E, Supplemental Guidance for Dermal Risk Assessment) Final.
Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R/99/005 OSWER 9285.7-02EP

Table 11

Exposure Assumptions: Resident Adult
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Incidental Ingestion	IR	Ingestion Rate	mg/day	50	2002 (a)
	EF	Exposure frequency	day/yr	10	BPJ (b)
	ED	Exposure duration	yr	24	EPA 1991 (c)
	BW	Body Weight	kg	70	EPA 1989 (d)
	AT-NC	Averaging time - non-cancer	days	8,760	EPA 1991
	AT-C	Averaging time - cancer	days	25,550	EPA 1991
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1991
Dermal	SA	Surface area for contact	cm^2/day	2,920	EPA 2009c (e)
	AF	Adherence factor	mg/cm^2	0.2	EPA 2004 (f)
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004
	EF	Exposure frequency	day/yr	10	BPJ
	ED-NC	Exposure duration	yr	24	EPA 1991
	BW	Body weight	kg	70	EPA 1991
	AT-NC	Averaging time - noncancer	days	8,760	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ EPA 2002:
U.S. Environmental Protection Agency. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

b/ Best professional judgement.

c/ EPA 1991:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

d/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA 540/1-89/002

e/ EPA 2009c:
U.S. Environmental Protection Agency. 2009c. Exposure Factors Handbook: 2009 Update. External Review Draft. EPA 600/R-09/052A.

f/ EPA 2004
U.S. Enviornmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final Office of Emergency and Remedial Response, Washington, D.C. OSWER 9285.7-02EP.July 2004.

Table 12

Exposure Assumptions: Resident Child
Federal-Mogul Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	Parameter Value	Rationale/ Reference
Incidental Ingestion	IR	Ingestion Rate	mg/day	100	2002 (a)
	EF	Exposure frequency	day/yr	52	BPJ (b)
	ED	Exposure duration	yr	6	EPA 1991 (c)
	BW	Body Weight	kg	15	EPA 1989 (d)
	AT-NC	Averaging time - non-cancer	days	2,190	EPA 1991
	AT-C	Averaging time - cancer	days	25,550	EPA 1991
	CF	Conversion factor	kg/mg	1.00E-06	EPA 1991
Dermal	SA	Surface area for contact	cm^2/day	1,810	EPA 2009c (e)
	AF	Adherence factor	mg/cm^2	0.2	EPA 2004 (f)
	ABS	Absorption factor	unitless	chemical-specific	EPA 2004
	EF	Exposure frequency	day/yr	52	BPJ
	ED-NC	Exposure duration	yr	6	EPA 1991
	BW	Body weight	kg	15	EPA 1991
	AT-NC	Averaging time - noncancer	days	2,190	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	kg/mg	1.0E-06	EPA 1989

a/ EPA 2002:
U.S. Environmental Protection Agency. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

b/ Best professional judgement.

c/ EPA 1991:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

d/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA 540/1-89/002

e/ EPA 2009c:
U.S. Environmental Protection Agency. 2009c. Exposure Factors Handbook: 2009 Update. External Review Draft. EPA 600/R-09/052A.

f/ EPA 2004
U.S. Enviornmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final Office of Emergency and Remedial Response, Washington, D.C. OSWER 9285.7-02EP.July 2004.

Table 13

Exposure Assumptions: Resident Child
(Groundwater, Vapor Intrusion)
Federal-Mogul, Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference
Inhalation	ET	Exposure time	hr/day	24	EPA 2009 (a)
	EF	Exposure frequency	day/yr	350	EPA 2009
	ED	Exposure duration	yr	6	EPA 2009
	CF	Conversion factor	mg/µg	1.00E-03	EPA 2009
	AT-NC	Averaging time - noncancer	hours	52,560	EPA 2009
	AT-C	Averaging time - cancer	hours	613,200	EPA 2009

a/ EPA 2009:
U.S. Environmental Protection Agency. 2009. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA-540-R-070-002.

Table 14

Exposure Assumptions: Resident Child
(Surface Water, Direct Contact)
Federal-Mogul, Products, Inc.
Scottsville, Kentucky

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference
Incidental Ingestion	CR	Ingestion rate	l/day	0.037	EPA 2009c (a)
	EF	Exposure frequency	day/yr	52	BPJ
	ED	Exposure duration	yr	6	EPA 1991b (b)
	BW	Body weight	kg	15	EPA 1989 (c)
	AT-NC	Averaging time - noncancer	days	2190	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
Dermal	SA	Surface area for contact	cm^2	1,810	EPA 2009c
	PC	Permeability coefficient	cm/hr	chemical-specific	EPA 2009c
	ET	Event time	hr/day	1	BPJ
	EF	Exposure frequency	day/yr	52	BPJ
	ED-NC	Exposure duration	yr	6	EPA 1991b
	BW	Body weight	kg	15	EPA 1991b
	AT-NC	Averaging time - noncancer	days	2,190	EPA 1989
	AT-C	Averaging time - cancer	days	25,550	EPA 1989
	CF	Conversion factor	l/cm^3	1.0E-03	EPA 1989

a/ EPA 2009c:
U.S. Environmental Protection Agency. 2009c. Exposure Factors Handbook:
2009 Update. External Review Draft. EPA 600/R-09/052A.

b/ EPA 1991b:
U.S. Environmental Protection Agency. 1991b. Risk Assessment Guidance for Superfund:
Volume I. Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors.
Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.6-03

c/ EPA 1989:
U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund:
Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and
Remedial Response, Washington, D.C. EPA 540/1-89/002

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U.S. Environmental Protection Agency. 2004. Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual .
(Part E, Supplemental Guidance for Dermal Risk Assessment) Final.
Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R/99/005 OSWER 9285.7-02EP

Appendix A-1 – Indoor Air Survey Report

WSP
ENVIRONMENTAL STRATEGIES

300 Corporate Center Drive, Suite 200 · Moon Twp, Pennsylvania 15108 · (412) 604-1040 · Fax (412) 604-1055

February 7, 2007

Mr. Mark T. Bauer, P.E.
c/o Federal-Mogul Corporation
Legal Department
26555 Northwestern Highway
Southfield, MI 48033

Re: Indoor Air Survey Report
Federal-Mogul Products, Inc., Scottsville, Kentucky

Dear Mark:

This letter summarizes the results of an indoor air survey conducted by WSP Environmental Strategies LLC at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky. Currently, the facility is closed and Federal-Mogul is considering future industrial use or the sale of the facility. Federal-Mogul requested that WSP Environmental Strategies perform an indoor air survey at the Scottsville facility during a conference call on July 18, 2006, to evaluate the possible vapor intrusion from volatile organic compounds (VOCs) in the groundwater and soils underlying the facility. Federal-Mogul requested that the indoor air survey be conducted while the facility was in operation to provide an assessment of indoor air quality during typical plant conditions. During performance of this indoor air survey, there was an active workforce employed at the facility, and the heating, ventilation, and air conditioning system (HVAC) was operating in a capacity similar to historical conditions at the facility.

The objective of the indoor air survey was to evaluate the affect historical chemical releases may have on the current indoor air quality of the facility. Previous subsurface investigations performed inside the facility, including the vicinity of the former alleyway, indicate that VOCs related to historical site hazardous materials and waste handling and disposal activities are present in soils beneath the facility building. In addition, VOCs related to these historical waste disposal activities are found in groundwater beneath the facility building. Based on the analytical soil results from the subsurface investigations, the existing site groundwater analytical results, and Federal-Mogul's request, the indoor air sampling was performed on August 22 and 23, 2006. Although some operations were curtailed before the indoor air sampling was performed, the current operations were assumed to be representative of typical operational conditions, including the handling and disposal of hazardous materials and wastes, and the operation of the HVAC system.

Background

During February 2005 and August 2006, WSP Environmental Strategies conducted site inspections and materials inventory at the Scottsville facility in preparation of performing an indoor air survey. The site visits included interviewing facility personnel, a material inventory, and the inspection of the building for potential vapor migration pathways into the building. Based on the February 2005 site visit, the facility consists of slab on grade construction with no assumed voids or cavities beneath the concrete floor.

Indoor Air Survey

The indoor air survey was conducted in accordance with the U.S. Environmental Protection Agency's (EPA) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) dated November 2002.

Indoor Air Sampling

The indoor air survey performed at the Scottsville facility consisted of collecting indoor air samples for VOC analysis from six locations in the office and production areas of the facility. In addition, one ambient outdoor air sample was collected from an upwind location during performance of the indoor air survey. The indoor air sampling locations are presented on Figure 1.

Two indoor air samples were collected from confined areas within the building, one in the office area and the second in the worker cafeteria area located in the northeast corner of the facility. The remaining four indoor air samples and a duplicate sample were collected at open locations throughout the production area of the facility. One indoor air sample and a duplicate sample were collected in the vicinity of the former alleyway where analysis of soil samples collected from beneath the concrete floor indicate the presence of VOCs in soils.

Each air canister was positioned approximately five feet above the facility floor for collection of the vapor sample. The elevated canister positions were used to better reflect potential worker exposure (breathing zone) to indoor vapors within the production area. The canister placed in the facility office area was positioned on a desk to reflect potential worker exposure.

Discrete indoor air samples for VOC analysis were collected using evacuated 6-liter SUMMA™ canisters and dedicated flow controllers pre-set by the analytical laboratory to collect the VOC sample over a 24-hour period. Each canister was placed in the sampling location and the valve opened to initiate the vapor collection process. After 24 hours, the valve on each canister was closed and the canisters labeled with the sample name, location, time and date of collection, and the analytical method. The VOC samples were shipped under ambient conditions to Pace Analytical Services, Inc. (Pace) located in Minneapolis, Minnesota, under strict chain of custody protocols for analysis. The collected vapor samples were analyzed by EPA Method TO-15 for VOCs., including site specific VOCs (trichloroethene [TCE], tetrachloroethene [PCE], and relative breakdown compounds), based on VOC concentrations reported in soil samples collected from beneath the building during the two Source Area Investigations (SAIs).

Outdoor Air Sampling

During the August 2006 indoor air survey, WSP Environmental Strategies placed one air canister in an upwind location for the collection of ambient air outside the Scottsville facility. Based on the prevailing wind direction, the ambient air sample canister was located in the vicinity of the facility guard building in the southwest corner of the property. The ambient air sample was collected over a 24-hour period in accordance with the protocols used for collection of the indoor air samples. On completion of the air survey, the ambient air sample was forwarded to Pace for VOC analysis using EPA Method TO-15.

Quality Assurance/Quality Control

The SUMMA™ canisters used to perform the August 2006 indoor air survey were certified-clean by the analytical laboratory. This certification involves analyzing the ambient air inside a clean canister by EPA Method TO-15. If no target compounds are detected at concentrations above reporting limits (RLs), the canister is evacuated again and all canisters from the lot are available for air sampling. If target compounds are detected at concentrations above the RLs, then all canisters from that lot are re-cleaned and a single canister re-analyzed for the target compounds.

During the August 2006 indoor air survey performed at the Scottsville facility, one indoor air sample duplicate was collected to satisfy quality assurance/quality control (QA/QC) protocols. The duplicate sample was collected in the former alleyway area because constituent concentrations have been reported in soil samples collected from beneath the facility floor.

On receipt of the indoor air analytical results, the analytical data were forwarded to an independent contractor for data validation.

Results

During indoor air survey activities performed at the Scottsville facility, six locations were selected for collection of vapors inside the facility. The indoor air sampling locations are presented on Figure 1. Five of the indoor air samples (AS-1 through AS-5) plus a duplicate sample (AS-8) were collected from the production area and one sample (AS-6) was collected in the office area. Outdoor ambient air quality was determined by collecting one outdoor air sample (AS-7). A discussion and evaluation of the indoor air survey results follows.

Several compounds were detected in the indoor air samples; a summary of the detected results is presented in Table 1 (Enclosure). The EPA Region 9 Preliminary Remediation Goals (PRG)[1] and the Occupational Health and Safety Administration (OSHA) Permissible Exposure Limits (PELs) were used to evaluate the indoor air sampling results. Based on the PRG guidance methodology, the residential ambient air PRGs were modified to represent an industrial/commercial worker exposure scenario to indoor air (industrial indoor air modified-PRG). According to the EPA Subsurface Vapor Intrusion Guidance, in occupational settings in

[1] www.epa.gov/region09/waste/sfund/prg; October 2004

which handling of hazardous materials occurs and where an OSHA approved Hazardous Communication Program is implemented, OSHA is the regulating agency for occupational-related air exposures. Hazardous materials and wastes are handled and stored at the Scottsville facility, and the facility implements an OSHA Hazardous Communication Program to address the occupational exposure from hazardous materials and wastes that are used in the operational activities. Therefore, the OSHA PELs are applicable criteria to evaluate the air survey data for those constituents that are currently used in the facility operations. If no PEL was established, the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) were used, if available. For those constituents that are not currently used in the occupational setting (operational activities), and that are not included in the facility's OSHA Hazardous Communalizations Program, the industrial indoor air modified-PRGs are the applicable criteria to be used in the evaluation of the air survey data.

The vapor data were evaluated by an independent data validation contractor and results qualified as discussed below. According to the data validation report, the laboratory did not spike samples with system monitoring compounds. Therefore, it was not possible for the validator to determine the impact of interferences on the analytical system. If system monitoring compounds were detected in a sample, the validator qualified the result as rejected or "R."

Four constituents exceeded the carcinogenic industrial indoor air modified-PRG including benzene, 1,4-dichlorobenzene, methylene chloride, and tetrahydrofuran. Three constituents were detected at concentrations greater than the non-carcinogenic industrial indoor air modified-PRG including naphthalene, toluene, and 1,2,4-trichlorobenzene. Methylene chloride and tetrahydrofuran were only detected in sample AS-1. Concentrations of benzene, naphthalene, and toluene also exceeded the industrial indoor air modified-PRGs in the outdoor sample (AS-7). Naphthalene was detected in samples AS-3 through AS-5 and in sample AS-8 at concentrations greater than the industrial indoor air modified-PRG, but the concentrations were less than the concentration in the outdoor sample AS-7. Toluene was also detected in sample AS-2. It is noted that system monitoring compounds were detected at low levels by the validator, and the data were flagged as rejected. Benzene, 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene were detected in sample AS-4 at concentrations above their respective industrial indoor air modified-PRG. The detected constituents with concentrations greater than the industrial indoor air modified-PRG were all currently being used as part of facility industrial activities (occupational setting), and were included in the OSHA Hazardous Communications Program. Therefore, these constituents were further evaluated using the OSHA PELs or NIOSH RELs. None of these detected constituents had concentrations that exceeded the OSHA PELs or NIOSH RELs.

The results of the indoor air survey indicate that there are no unacceptable concentrations of detected constituents that were related to the current industrial activities in the Scottsville facility. Site-specific VOCs (TCE and PCE) and their breakdown products that are considered as non-occupational exposures (no longer used in the operational activities) were not detected in the indoor air survey.

Summary and Recommendations

Based on the evaluation of the air sampling results analyzed for the indoor air survey conducted at the Scottsville facility in April 2006, the site-related VOCs (associated with historical hazardous materials and waste handling and disposal activities) identified in the subsurface soils and groundwater under the facility were not detected in the indoor air survey. Thus, these VOCs are not adversely affecting the indoor air quality of the facility. Constituents that are not related to the above conditions, and that are related to an occupational exposure from current facility operations, were detected in the indoor air survey. The concentrations of these detected constituents were less than the applicable OSHA PELs or NIOSH RELs.

Since performance of the indoor air survey, the facility has ceased operational activities, and there is no longer an active workforce employed. In addition, the HVAC system is operating at a reduced capacity. Therefore, the current vapor intrusion pathway is influenced by different environmental and operational conditions than were present during the indoor air survey. In the future, Federal-Mogul expects to lease the Scottsville facility to another business entity that is assumed will conduct similar operational activities (industrial manufacturing), with similar HVAC requirements. Because the August 2006 indoor air survey only detected constituents that were related to operational activities (occupational exposure) and not from historical site activities (environmental exposure), it is not recommended that a second indoor air survey be conducted at this time.

Should you have any questions or comments regarding the indoor air survey, please do not hesitate to contact us.

Sincerely yours.

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:eal
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Enclosures

cc: Mr. Roger Strelow, Federal-Mogul Corporation, Southfield, MI
Mark Norman, Esquire, Vorys, Sater, Seymour and Pease LLP, Cincinnati, OH
Mr. Bill Rush, Federal-Mogul Corporation, Cookeville, TN
Mr. Mike Stanger, Federal-Mogul Corporation, Smithville, TN
Mr. Jeff Hassen, WSP Environmental Strategies LLC, Moon Township, PA

Enclosures

Table 1

Indoor Air Sampling Results
Federal-Mogul Products, Inc.
Scottsville, Kentucky (a)

Parameters	Region 9 PRGs for Indoor Air Industrial Scenario (c) Non-Cancer	Region 9 PRGs for Indoor Air Industrial Scenario (c) Cancer	OSHA PEL (d)	AS-1	AS-2	AS-3	AS-4	AS-5	AS-8	AS-6	AS-7
Sample Date:				08/23/06	08/23/06	08/23/06	08/23/06	08/23/06	08/23/06 (b)	08/23/06	08/23/06
Volatile Organic Compounds (µg/m³)											
Acetone	4,599	-	2,400,000	64.6	62.6	22.7	41.7	25.1	30.6	35.1	3.4 U
Benzene	43.9	0.53	3,190	17.9 U	4.4 U	0.9 U	1.7	0.96 U	0.87 U	0.87 U	10.2
2-Butanone	7,154	-	590,000	66.8	4 U	33.5	56.1	56	94.8	4.5	113
Carbon disulfide	1,022	-	62,200	17.4 U	4.2 U	0.87 U	5.6	5.8	2	0.84 U	12.6
1,4-Dichlorobenzene	1,175	0.65	450,000	33.1 U	8 U	1.7 U	2	1.8 U	1.6 U	1.6 U	8.6 U
Dichlorodifluoromethane	292	-	4,950,000	27.6 U	6.7 U	2.5	3	2.8	1.3 U	2.5	7.2 U
Ethyl acetate	4,599	-	1,400,000	20.1 U	4.9 U	1 U	3.3	5.7	0.98 U	0.98 U	43.1
Ethylbenzene	1,482	-	435,000	24.3 U	11.3	1.2 U	1.2 U	1.9	1.2 U	1.2 U	6.3 U
n-Hexane	292	-	1,800,000	19.9 U	4.8 U	3	1.1	1.1 U	0.99	0.96 U	11.8
2-Hexanone	-	-	410,000	22.9 U	5.6 U	1.1 U	3.4	1.2 U	1.1 U	1.1 U	5.9 U
Methylene chloride	4,380	8.7	86,750	43.3	4.8 U	0.98 U	0.98 U	1.1 U	0.95 U	0.95 U	5.1 U
4-Methyl-2-pentanone	4,395	-	410,000	22.9 U	5.6 U	1.1 U	3.1	3	1.1 U	1.1 U	14
Naphthalene	4	-	50,000	74.5 U	18.1 U	6.4	10.7	7.6	6.8	3.6 U	36.1
Propylene	-	-	-	10.9	2.7	0.48 U	0.48 U	0.52 U	0.47 U	0.47 U	126
Styrene	1,482	-	426,000	48.1	5.8 U	1.2 U	2.6	2.6	1.2 U	1.2 U	6.2 U
Tetrahydrofuran	438	2.1	590,000	62.1	4 U	0.83 U	0.83 U	0.89 U	0.8 U	0.8 U	4.3 U
Toluene	562	-	754,000	182	1,740 R	3.4	47.8	91.4	19.4	3.2	1,530
1,2,4-Trichlorobenzene	5.11	-	40,000 (e)	27.3 U	6.6 U	1.4 U	9	1.5 U	1.3 U	1.3 U	7.1 U
Trichlorotrifluoromethane	1,022	-	-	30.4 U	7.4 U	2.3	10.5	6.3	1.6	1.5 U	18
1,2,4-Trimethylbenzene	-	-	125,000 (e)	69 U	16.8 U	3.4	4.5 U	3.9	3.4	3.4 U	17.9 U
m&p-Xylene	148	-	435,000	48.6 U	36	2.4 U	3.8	4.7	2.4 U	2.4 U	12.6 U
o-Xylene	148	-	435,000	24.3 U	6.5	1.2 U	1.4	1.3 U	1.2 U	1.2 U	6.3 U

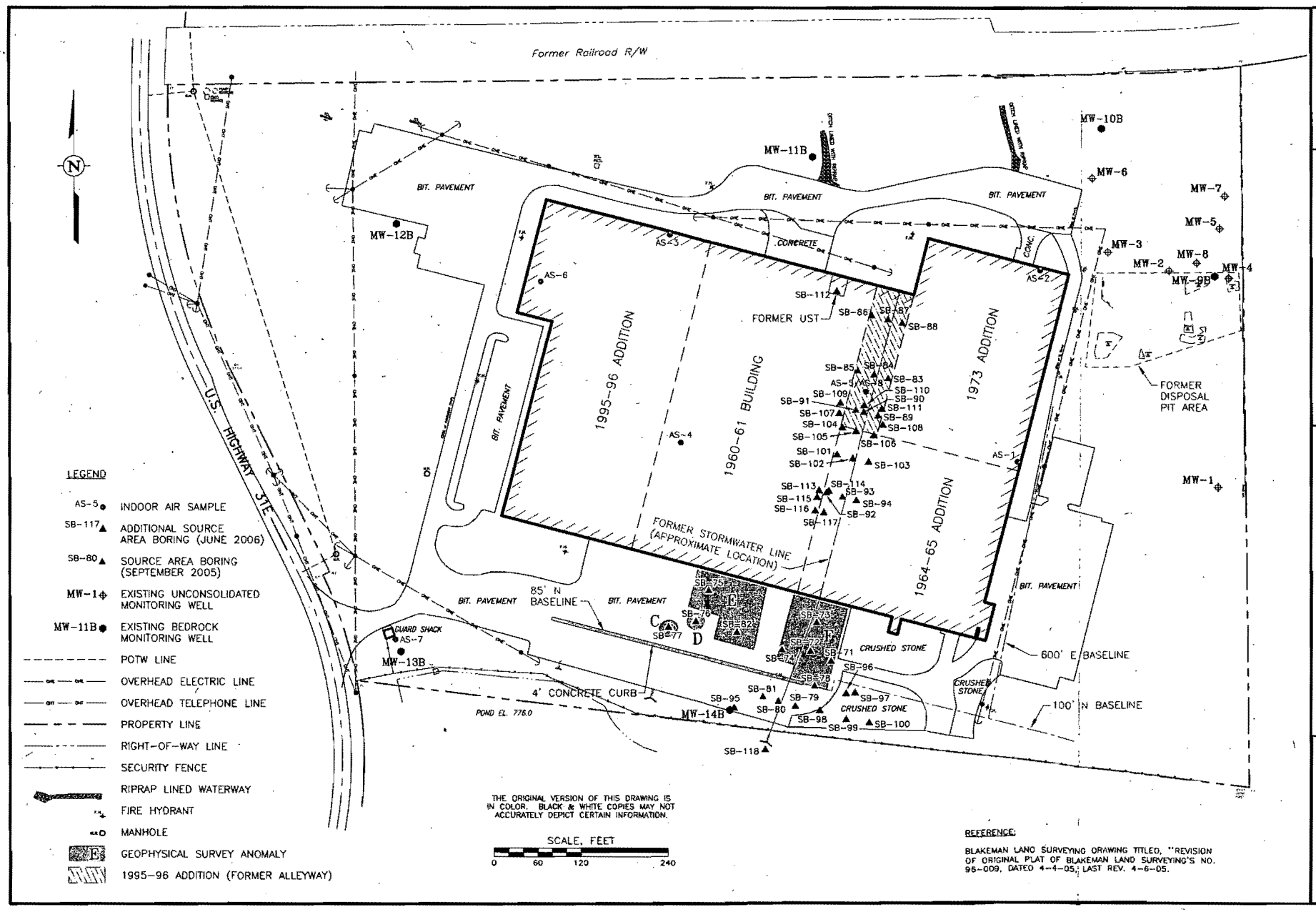
a/ I.D. = identification; PRG = preliminary remediation goal; OSHA = Occupational Safety and Health Adminstration; PEL = permissable exposure limit; µg/m3 = micrograms per cubic meter; U = constituent not detected at reported detection limit; R = result rejected based on data validation.
Shaded value indicates concentration exceeds the non-cancer PRG.
Boxed value indicates concentration exceeds the cancer PRG.

b/ Duplicate sample collected at AS-5.

c/ Region 9 PRGs calculated according to guidance (2004; available online at http://www.epa.gov/region09/waste/sfund/prg/#prgtable).

d/ OSHA PEL is the time weighted average reported in the National Institute for Occupational Safety and Health (NIOSH) Pocketguide (available online at http://www.cdc.gov/niosh/npg/).

e/ NIOSH reasonable exposure limit reported.



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Checked:
Approved:
DWG Name: 138055-B38

FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY

FIGURE 1
INDOOR AIR SAMPLING LOCATIONS

WSP
ENVIRONMENTAL STRATEGIES
300 CORPORATE CENTER DRIVE, SUITE 200
MOON TOWNSHIP, PA 15108 412-604-1040

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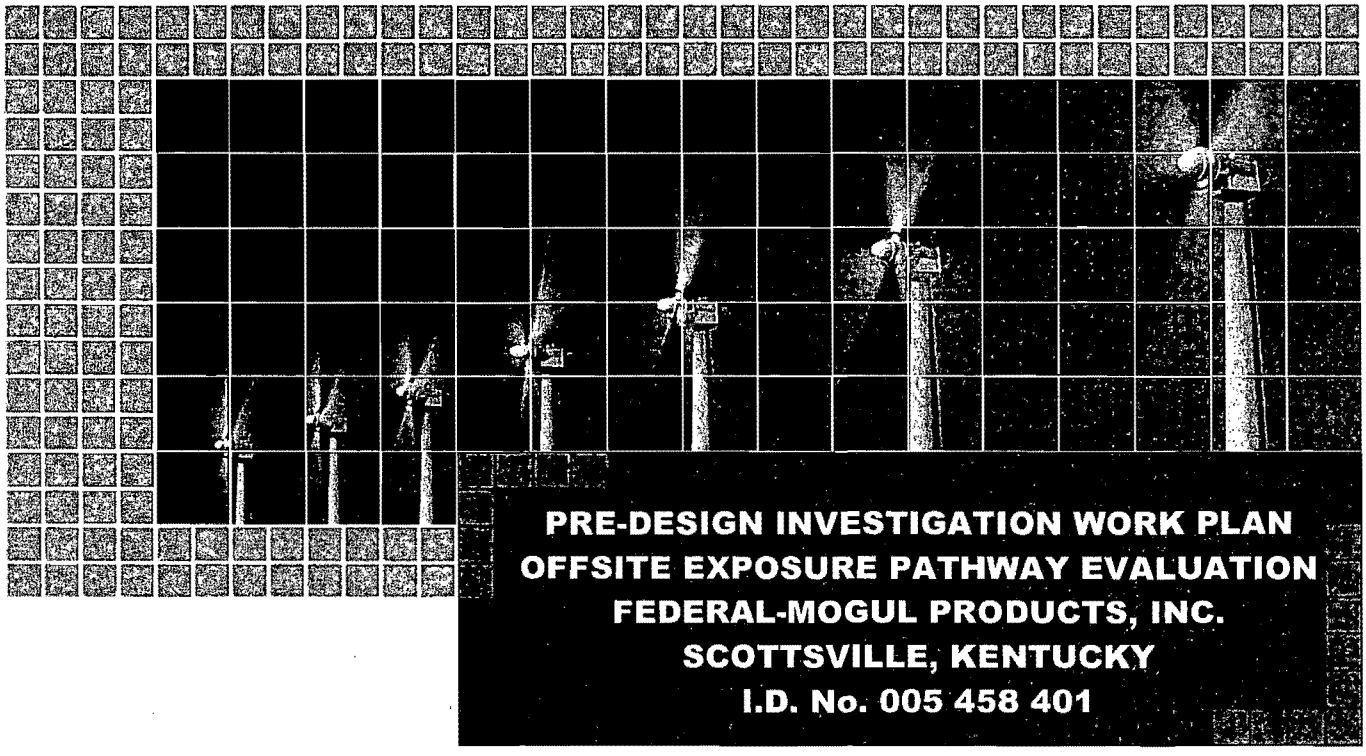
Appendix B – Pre-Design Investigation Work Plan -- Offsite Exposure Pathway Evaluation



PRE-DESIGN INVESTIGATION WORK PLAN
OFFSITE EXPOSURE PATHWAY EVALUATION
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
I.D. No. 005 458 401

August 9, 2010

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Figure 1 – Proposed Offsite Exposure Pathway Sampling Locations

1 Introduction

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy, LLC has prepared this Offsite Exposure Pathway Evaluation Work Plan to evaluate potential offsite groundwater, surface water, and sediment receptors in the vicinity of the Federal-Mogul facility located in Scottsville, Allen County, Kentucky (site). The results of this evaluation will be used to complete the site Risk Assessment (RA). The RA findings will be used to determine what, if any, onsite corrective measures should be considered during the ongoing Corrective Measures Study (CMS) to control offsite exposure to groundwater, surface water, and sediment. The exposure pathway analysis scope of work includes:

- collection and analysis of offsite surface water and groundwater quality samples
- evaluation of water quality at positive dye detection sampling locations from the 2006 dye trace investigation
- collection and analysis of offsite sediment samples from Ramble Creek
- evaluation of offsite pathways to sediment

The following sections include a description of the field activities to be performed during implementation of this offsite exposure pathway work plan.

2 Site Background Information

Between 2004 and 2006, Federal-Mogul, WSP, and the Crawford Hydrology Laboratory (CHL) performed karst survey activities and a dye trace investigation in the vicinity of the Scottsville facility. The karst survey effort identified offsite water wells, springs, stream resources and potential monitoring locations used during performance of the dye trace. The karst survey information was provided to the Kentucky Hazardous Waste Branch (KHWB) as part of the Karst Survey Report (KSR, Environmental Strategies Consulting 2004b) and the KSR Addendum (KSRA, Environmental Strategies Consulting 2006a). Based on information collected during the karst survey, stream, spring, and water well locations were selected for monitoring in the Dye Trace Investigation Work Plan (DTIWP, Environmental Strategies Consulting and Crawford Hydrology Laboratory 2006b).

On June 20, 2006, CHL injected three distinct tracer dyes (i.e., Eosine OJ, Fluorescein, and Sulphorhodamine B [SRB]) at three separate locations at the Scottsville site. The dye injection locations included two onsite bedrock monitoring wells (MW-12B and MW-14B) and a former disposal area. Soil and waste materials were excavated from the former disposal area as part of a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) soil Interim Remedial Measure (IRM) performed during 2005 (Environmental Strategies Consulting 2005b and 2005d). Over 50 dye receptor locations were monitored weekly or bi-weekly during the 2006 dye trace. After six months of continuous monitoring, CHL concluded the dye trace in late December 2006.

The Dye Trace Investigation Report (DTR, WSP, CHL, and Hoffman Environmental Research Institute [HERI] 2009b) concluded that the major preferential groundwater flow pathways from the Federal-Mogul facility are to the west/northwest where groundwater resurges to Ramble Creek surface water. However, during the dye trace monitoring, positive and potential positive dye detections were reported in a spring, an abandoned water well, and surface water resources located south, southwest, and west of the facility. Although dye detection south and southwest differ from the preferential groundwater flow pathways, these dye detections represent potential offsite exposure pathways for site chemicals of concern (COCs) reported in onsite soil and the unconsolidated material and bedrock aquifers. In order to complete the offsite exposure pathway analysis as a part of the proposed RA, Federal-Mogul proposes to investigate further and to evaluate if site-related COCs are present at the potential offsite exposure locations identified during the dye trace investigation.

CHL injected eosine OJ in onsite bedrock monitoring well MW-12B. Trace results indicate that eosine OJ was detected in dye receptors placed in onsite bedrock monitoring well MW-11B, the Ramble Creek headwater area and immediately downstream of the headwater area, and immediately upstream of the man-made lake located on Ramble Creek. In addition, potential (questionable) dye positives were reported in an abandoned water well W12 located west of the facility.

During the 2006 dye trace, CHL injected SRB into onsite bedrock monitoring well MW-14B. The dye trace report indicates that positive SRB detections were reported in onsite bedrock monitoring well MW-13B, Ramble Creek immediately upstream of the man-made lake, Ramble Creek below the man-made lake, and at the Ramble Creek-Trammel Creek confluence.

The third dye injected at the Scottsville facility was fluorescein. CHL injected fluorescein into a former disposal area located on the northeastern portion of the facility. Fluorescein was detected in the Ramble Creek headwater area, immediately upstream of the man-made lake, the Ramble Creek-Trammel Creek confluence, an abandoned water well (W12) located west of the facility, and a spring used as a domestic and livestock water supply. Water quality samples were collected from the private spring source during the 2006 karst survey activities. No volatile organic compound (VOC) concentrations were reported in water samples collected from this private spring.

In addition, potential positive (although questionable) dye detections were reported in an unnamed tributary to Trammel Creek and Casey Branch (a tributary to Trammel Creek) located south of the Scottsville facility. CHL and HERI concluded that these dye detections were most likely related to an unknown fluorescence source in the upgradient tributary catchment basins. CHL and HERI further concluded that for positive fluorescein detections to appear south and southwest of the facility, the dye would have to migrate through multiple flowpaths associated with small fractures and along impervious strata within the Fort Payne Formation or at the contact with the underlying impervious Chattanooga Shale; this would be unlikely.

Based on the reported VOC concentrations in the bedrock aquifer, Federal-Mogul and WSP designed a hydraulic containment pump and treatment system as an RFI IRM for the Scottsville facility (Environmental Strategies Consulting 2005c). The KHWB-approved bedrock groundwater IRM was implemented and began operation during July 2008 (WSP Environment & Energy 2009a). The groundwater IRM actively captures bedrock groundwater from bedrock wells MW-12B and MW-14B, which the dye trace confirmed discharges to Ramble Creek.

The segment of Ramble Creek upstream of the man-made lake was identified by the dye trace as the major resurgent location for groundwater migrating from the Scottsville facility. Surface water sample results confirmed that groundwater discharging in this portion of Ramble Creek contained VOC concentrations that likely originate on the Scottsville facility (Environmental Strategies Consulting 2006c). Based on the 2006 surface water results, Federal-Mogul contracted with Toxicology Excellence for Risk Assessment (TERA) to perform an assessment of short and long-term risks for the upper reach of Ramble Creek to determine potential risks associated with receptor exposures to the VOC concentrations reported in the 2006 stream samples. The TERA-prepared RA, "Trichloroethene Risk Assessment for Ramble Creek" (WSP Environmental Strategies and Toxicology Excellence for Risk Assessment 2006d), was submitted to the KHWB on December 4, 2006. TERA concluded that potential exposure to VOC concentrations reported in the May 2006 surface water samples collected from Ramble Creek are "without non-cancer health risks and are without significant cancer health risks" to the local population, including small children.

This Work Plan will investigate and determine whether COCs identified in soil and groundwater at the Scottville facility are present in groundwater and surface water resources at the dye trace detection locations. In addition, sediment samples will be collected from the segment of Ramble Creek where major groundwater pathways discharge to surface water. Groundwater, surface water, and sediment sample results obtained during implementation of this Work Plan will be evaluated as part of the RA to complete the potential offsite exposure pathway analysis.

3 Scope of Work

Surface water, groundwater, and sediment sampling activities to be performed during this proposed offsite exposure pathway evaluation will be conducted in accordance with the previously KHWB-approved RCRA RFI work plan procedures and WSP Standard Operating Procedures (SOPs).

Implementation of this Work Plan will consist of one round of surface water or groundwater quality samples collected from those locations where positive or potential positive dye detections were identified during the 2006 dye trace (WSP, CHL, and HERI 2009b). In addition, sediment samples will be collected from the upper reach of Ramble Creek.

3.1 WATER QUALITY SAMPLING LOCATIONS

Based on the results of the 2006 dye trace investigation, groundwater and surface water quality samples will be collected for laboratory analysis from the following locations:

- SP-43 (005-0) — spring used as domestic and livestock water supply
- S12 (003-0) — Ramble Creek upstream of confluence with Trammel Creek
- S19 (010-0) — Casey Branch upstream of confluence with Trammel Creek
- S17 (002-0) — unnamed tributary to Trammel Creek near tributary mouth
- (002-u) — unnamed tributary approximately 75 feet upstream of S17 (002-0)
- W12 (055-0/055-b) — abandoned water well located west of facility
- S33 (029-0) — Ramble Creek immediately upstream of man-made lake
- S47 (035-0) — Ramble Creek headwater area

The proposed surface water and groundwater offsite sampling locations are provided on Figure 1.

3.2 WATER QUALITY SAMPLING PROCEDURES

During water quality sample collection, field parameters, including pH, specific conductance, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity will be measured by the field team and recorded in a field log book. In the case of a spring or stream sample, a visible estimate of flow will be determined. The field team will mark the surface water or groundwater sampling locations in the field (i.e., surveyor tape), in the event that additional water quality samples are required to be collected for completing the offsite pathway evaluation process.

Federal-Mogul and WSP will contact the abandoned water well (W12) property owner to secure permission to access and collect groundwater samples from the water well. In the unlikely event the property owner does not allow permission to access the water well, Federal-Mogul and WSP will notify the KHWB and groundwater quality samples will not be collected from this dye detection location until permission is granted.

Sampling activities at offsite water well W12 will include measurement of the depth to groundwater and total well depth to calculate the volume of static groundwater in the abandoned water well. The offsite well will be purged using a submersible pump or bailer to remove a minimum of three well volumes in preparation of collecting the groundwater quality samples. Field parameters (as referenced above) will be recorded after each well volume is recovered from the water well and recorded in the field log book. The purge water will be placed in containers and transported to the onsite groundwater treatment system

where the recovered purge water will be disposed. Once the purge volume has been removed, a disposable Teflon bailer will be used to collect the VOC samples for laboratory analysis.

Groundwater and surface water quality samples collected during the exposure pathway evaluation will be placed in an iced cooler and forwarded to the analytical laboratory via overnight delivery service.

Based on the proposed number of water quality samples to be collected during this offsite exposure pathways investigation, one duplicate water sample will be collected to satisfy quality assurance/quality control (QA/QC) protocols. In addition, a trip blank sample(s) will be forwarded to the laboratory and analyzed for VOCs with each shipment of water quality samples.

3.3 SEDIMENT SAMPLING LOCATIONS

During this pre-design investigation, Federal-Mogul proposes to collected sediment samples from three locations within the segment of Ramble Creek above the man-made lake. Previous inspections of Ramble Creek have revealed that Ramble Creek flows over exposed bedrock with minimal accumulation of sediment. Ramble Creek will be inspected to locate potential sediment sampling locations. Due to current stream conditions, the sediment sampling locations can not be pre-determined and are not provided on Figure 1. The locations where sediment is collected from Ramble Creek will be placed on a topographic map for future reference.

Two of the proposed sediment sampling locations will be located upstream of the point where State Route 31E crosses Ramble Creek as this segment of Ramble Creek flows through a residential area where adult and children receptors could contact sediment. The third sediment sample will be collected from Ramble Creek immediately above the man-made lake as this segment of the stream flows through pastureland.

3.4 SEDIMENT SAMPLING PROCEDURES

The field team will survey the Ramble Creek stream channel to identify areas where sediment has accumulated. After identification of the sediment sampling areas, WSP will collect representative sediment from the locations for laboratory analysis. Surface water quality parameters including pH, specific conductance, temperature, DO, ORP, turbidity, and a visual estimate of stream flow will be recorded in the vicinity of each sediment sampling location.

The field team will approach the sediment sampling location from the downstream direction to reduce disturbance of the sediment material. A dedicated trowel or spoon will be used to recover the sediment from the stream bed. The recovered sediment will be placed in appropriate laboratory supplied sampling containers and placed in an iced cooler. The sediment samples will be forwarded to the analytical laboratory via overnight delivery service.

Based on the proposed number of sediment samples (three) to be collected during this offsite exposure pathways investigation, one duplicate sediment sample will be collected to satisfy QA/QC protocols established during the RFI.

3.5 ANALYTICAL PARAMETERS

The groundwater, surface water quality samples, and the sediment samples will be collected in laboratory supplied containers, preserved if necessary, and forwarded via overnight delivery service to the TestAmerica (TA) laboratory in North Canton, Ohio, for analysis. The groundwater and surface water samples will be analyzed for VOCs using U.S. Environmental Protection Agency (EPA) Method 8260B.

One surface water sample collected from Ramble Creek will be analyzed for hardness using EPA Method 130.2. The reported hardness value will be used during the RA to calculate and determine risk-based

criteria for the metal constituents in accordance with appropriate regulations. In addition, surface water samples collected from Ramble Creek will be analyzed for total zinc and total cyanide using EPA Methods 6010B and 335.4, respectively.

The collected sediment samples will be analyzed for total zinc and total (amenable) cyanide using EPA Methods 6010B and 9012, respectively. Sediment samples will not be collected for VOC analysis as VOCs are not expected to accumulate in the stream sediment.

On receipt of the final laboratory data package, the surface water, groundwater, and sediment sample results will be forwarded to an independent contractor for data validation. The validated water quality and sediment sample results will be provided to the KHWB in a report of findings on completion of the data validation process. In addition, Federal-Mogul will provide the water quality results to the appropriate property representatives, as necessary.

3.6 INVESTIGATION FINDINGS

Findings from this pre-design investigation, including a description of the field activities performed and a summary of the validated analytical results, will be incorporated in subsequent corrective measures quarterly progress reports. Additional technical information (i.e., sample location map and analytical tables) will be included in the RA or the CMS report, as appropriate.

The surface water quality results from samples collected during this pre-design investigation and the analytical results referenced by TERA will be further evaluated during the proposed RA. The proposed offsite water quality sample results and TERA data will be included in the RA Report, as necessary. In addition, the sediment sampling results will be evaluated during the RA to determine potential exposure to offsite receptors.

3.7 EXPOSURE PATHWAY EVALUATION SCHEDULE

Federal-Mogul and WSP will implement this pre-design investigation on KHWB approval of the CMS Work Plan (WP) of which this work plan is a part. The pre-design investigation field activities will be completed within 80 days after KHWB approval of this work plan, pending favorable weather conditions. KHWB personnel will be notified approximately two weeks before initiation of the approved pre-design field activities. Federal-Mogul and WSP anticipate the proposed offsite field activities will be completed in approximately two to three days. Groundwater, surface water and sediment samples collected during this proposed investigation will be analyzed by the laboratory under standard turnaround protocols (15 business days). Data validation of the analytical results will require approximately two to three weeks after receipt of the final laboratory data package. The investigation findings will be forwarded to the KHWB in subsequent corrective measures progress reports, the RA, or the CMS report, as appropriate.

4 References

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WSP Environment & Energy LLC. 2009a. Groundwater Interim Remedial Measures Completion Report, Federal-Mogul Products, Inc., Scottsville, Kentucky. April 6, 2009.

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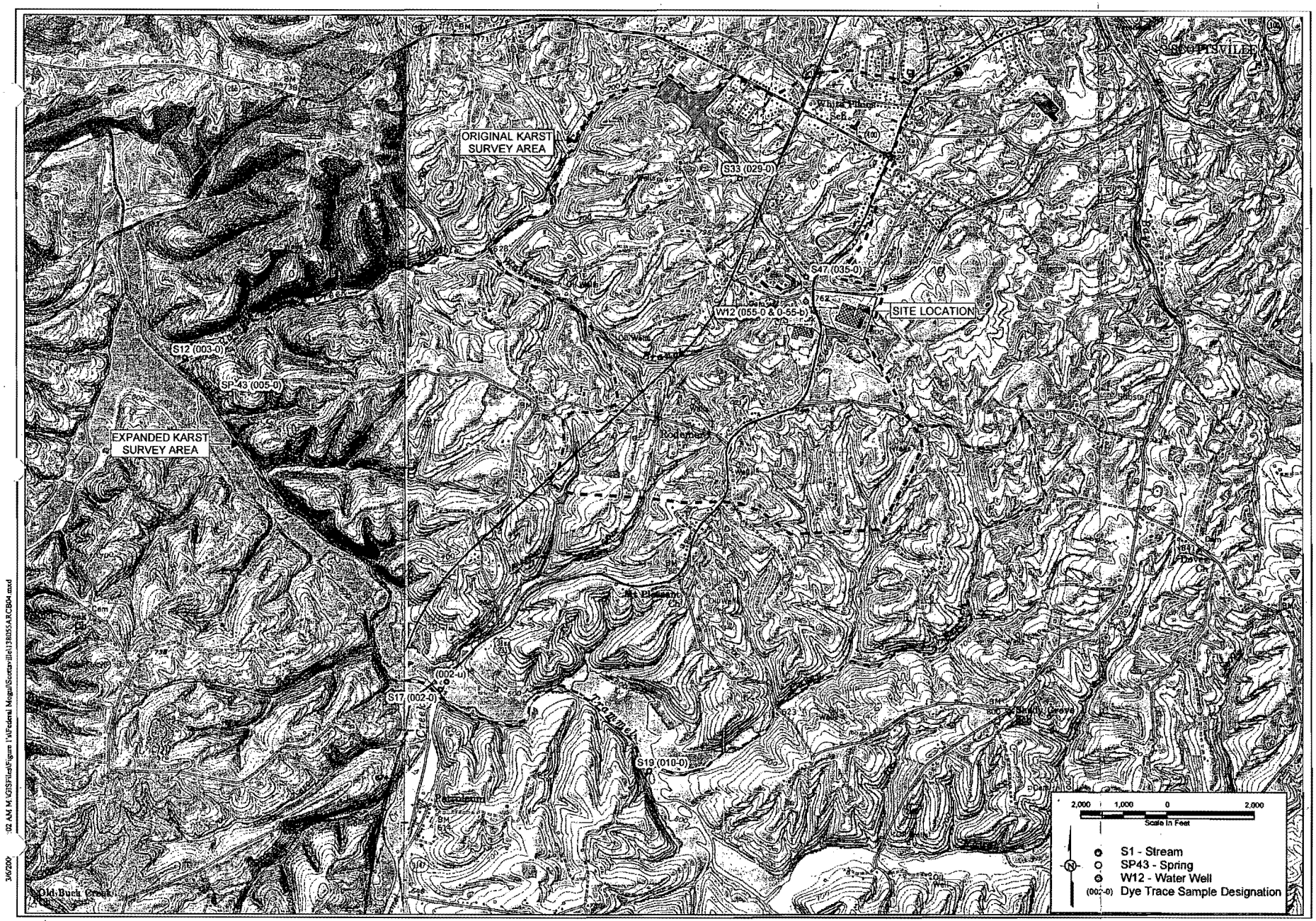
5 Acronyms

CHL	Crawford Hydrology Laboratory
CMS	Corrective Measures Study
CMS WP	Corrective Measures Study Work Plan
COCs	Chemicals of Concern
DO	Dissolved Oxygen
DTR	Dye Trace Investigation Report
DTIWP	Dye Trace Investigation Work Plan
EPA	U.S. Environmental Protection Agency
HERI	Hoffman Environmental Research Institute
IRM	Interim Remedial Measure
KHWB	Kentucky Hazardous Waste Branch
KSR	Karst Survey Report
KSRA	Karst Survey Report Addendum
ORP	Oxidation Reduction Potential
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SOP	Standard Operating Procedures
SRB	Sulphorhodamine B
TA	TestAmerica
TERA	Toxicology Excellence for Risk Assessment
VOCs	Volatile Organic Compounds
WSP	WSP Environment & Energy, LLC

Figure



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DRAWN BY
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APPROVED
SEAL
DATE

PROPOSED
OFFSITE EXPOSURE PATHWAY
SAMPLING LOCATIONS

FEDERAL-MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL MOGUL PRODUCTS, INC. - SCOTTSVILLE, KENTUCKY

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Figure 1
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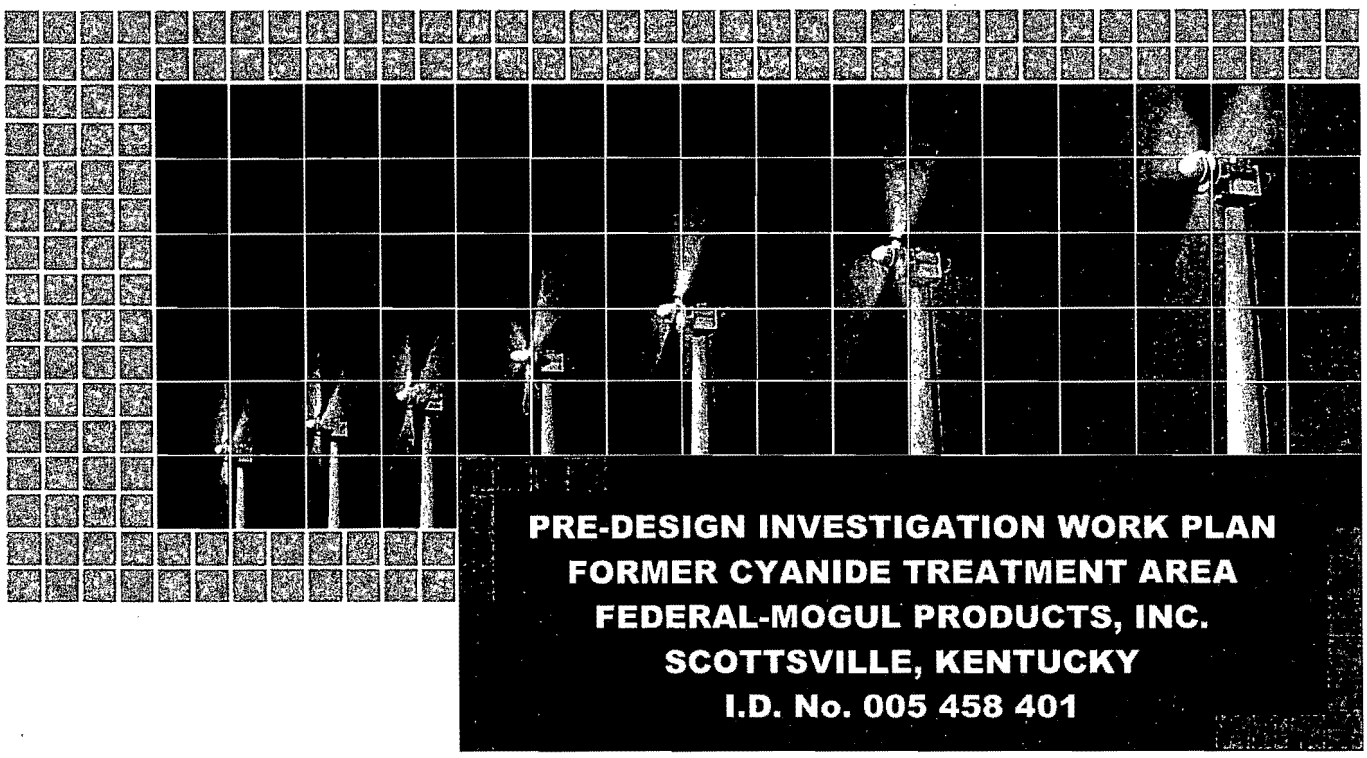
Appendix C – Pre-Design Investigation Work Plan -- Former Cyanide Treatment Area



PRE-DESIGN INVESTIGATION WORK PLAN
FORMER CYANIDE TREATMENT AREA
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
I.D. No. 005 458 401

August 9, 2010

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Figure

Figure 1 – Proposed Soil Boring Locations

1 Introduction

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy has prepared this Pre-design Investigation Work Plan for the former cyanide treatment area to evaluate chemicals of concern (COCs) in soil in this area at the Federal-Mogul facility located in Scottsville, Allen County, Kentucky. The reported soil data will be used to delineate COCs in subsurface soils and to evaluate potential remedial alternatives for the former cyanide treatment area during the site Corrective Measures Study (CMS). The Work Plan scope of work includes:

- installation of soil borings to delineate the horizontal extent of volatile organic compounds (VOCs) in subsurface soil
- collection and analysis of soil samples for laboratory analysis
- evaluation of soil data with respect to the sitewide Risk Assessment (RA)

The following sections include a description of the field activities to be performed during implementation of this Work Plan.

2 Site Background Information

Between 2005 and 2008, source area investigation activities were performed in the former alleyway and former underground storage tank (UST) areas identified at the Scottsville facility. During completion of the 2008 source area investigation activities, the Kentucky Hazardous Waste Branch (KHWB) requested Federal-Mogul evaluate the former cyanide treatment area as a potential source area for COCs reported in onsite soil and groundwater. The former cyanide treatment area is located approximately 40 feet north of the facility building as shown on Figure 1.

The former cyanide treatment facility was used to pre-treat wastewater generated from a zinc plating line which reportedly was operated between 1971 and 1982 by a previous facility operator at the Scottsville facility. Wastewater sludge generated by this treatment process was disposed of (by a previous facility operator) in an onsite disposal area between 1971 through 1978. The former disposal area is located in the northeastern portion of the facility and was investigated during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) process. The wastewater sludge was reported to contain cyanide and zinc. The former disposal areas were identified as solid waste management units (SWMUs) during the RCRA Facility Assessment (RFA) performed during 1991.

The company which previously operated the Scottsville facility during the 1960s through the 1980s, is reported to have conducted sludge disposal from the former pre-treatment system through 1984. Additional documents indicate that closure of the former cyanide pre-treatment system was approved by the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) during 1984. However, historical site photographs indicated that the former cyanide treatment building was present during performance of the 1991 RFA.

Based on the historical photographic findings, the KHWB requested investigation of the former cyanide treatment area as a potential source area for COCs reported in onsite soils and groundwater as part of the November 2008 Additional Source Area Investigation (ASAI) investigation. To address the KHWB request, WSP submitted an Addendum to the ASAI Work Plan (October 28, 2008) to the KHWB describing proposed activities to investigate the former cyanide treatment area. The KHWB approved the ASAI Work Plan and soil borings were completed in the vicinity of the former cyanide treatment area during November 2008.

The November 2008 investigation included completion of four soil borings SB-128 through SB-131 (Figure 1) in the former cyanide treatment area using direct push technology. Soil samples were collected from borings SB-129 and SB-131 for laboratory analysis of VOCs, total metals, and total cyanide. Saturated soil material (weathered bedrock) was recovered in SB-131 at a depth of approximately 14 feet bgs. Bedrock was encountered in borings SB-129 and SB-131 at 13.7 feet and 13.9 feet below ground surface (bgs), respectively.

Concentrations of cis-1,2-Dichloroethene (cis-1,2-DCE), tetrachloroethene (PCE), and trichloroethene (TCE) were reported in soil samples collected from the borings completed in the former cyanide treatment area. TCE concentrations in soil samples collected from SB-131 were reported to range from 3.8 milligrams per kilogram (mg/kg) to 9.9 mg/kg (Figure 1). The reported SB-131 TCE concentrations exceed U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goal (PRG) criteria. Total cyanide concentrations reported in soil samples collected from SB-131 ranged from 299 mg/kg to 1,250 mg/kg (Figure 1); the reported total cyanide concentrations do not exceed EPA Region 9 PRG criteria.

Based on the reported TCE concentrations in soil samples collected from SB-131, the KHWB requested that Federal-Mogul further delineate the horizontal extent of VOC concentrations in soil in the vicinity of the former cyanide treatment area. The KHWB indicated that the requested additional COC delineation could be completed as a pre-design investigation performed during the CMS. This Work Plan addresses

the KHWB request for additional delineation of COCs in this area. Analytical results of soil samples collected during the pre-design investigation will be evaluated during the proposed sitewide RA and the CMS to determine appropriate remedial alternatives, if necessary, to address COCs in the former cyanide treatment area.

3 Scope of Work

Installation of soil borings and soil sampling activities performed during implementation of this Work Plan will be conducted in accordance with KHWB-approved RCRA RFI work plan procedures and WSP Standard Operating Procedures (SOPs).

3.1 SOIL BORING INSTALLATION PROCEDURES

The proposed soil borings will be advanced using direct push technology (e.g., Geoprobe). Five soil borings will be completed to further delineate VOC concentrations across the former cyanide treatment area. The proposed boring locations are provided on Figure 1. Additional step-out borings will be completed based on subsurface conditions encountered during this investigation, if necessary, to delineate VOC concentrations in subsurface soil.

3.2 SOIL SAMPLE COLLECTION

During implementation of this Work Plan, soil samples will be collected continuously from the ground surface to probe refusal or the bedrock surface. The recovered soil material will be presented to the WSP geologist for lithologic logging and sample collection. Recovered soil material will be field-screened with a photoionization detector (PID) to identify the presence of organic vapors. Soil material that indicates the highest organic vapor measurement, during the field-screening process, will be collected for laboratory analysis. In addition, if stained soil material is observed in the recovered soil material, soil samples will be collected for laboratory analysis.

At a minimum, if organic vapors are not recorded from the recovered soil material, two soil samples will be collected from the boring for laboratory analysis. The first sample will be collected from the interval between 8 to 10 feet bgs (immediately below the base of the treatment pit) and the second soil sample collected from the 1-foot interval directly overlying bedrock or probe refusal. Based on field screening measurements, a decision will be made during the proposed field investigation, on whether additional step-out borings will be advanced to further delineate COCs in soil.

On completion of each soil boring, the direct push sampling equipment will be removed from the borehole and borehole backfilled with bentonite material to near local grade. Each boring will be capped by the placement of appropriate surface material (i.e., soil, asphalt, etc.). Each boring location (including step-out borings) will be placed on a site base map for future reference.

3.3 ANALYTICAL PARAMETERS

Soil samples collected for laboratory analysis will be forwarded to TestAmerica (TA) laboratories in North Canton, Ohio or Pittsburgh, Pennsylvania and analyzed for VOCs using EPA Method 8260B. Total metals and total cyanide concentrations reported in soil samples collected and analyzed during the 2005, 2006, and 2008 source area investigations have not exceeded EPA Region 9 PRGs. Therefore, total metals and total cyanide samples will not be collected for laboratory analysis during this proposed subsurface investigation.

3.4 QUALITY ASSURANCE/QUALITY CONTROL

Duplicate soil samples, equipment or field blanks, and trip blanks will be forwarded to the analytical laboratory in accordance with the methods, protocols, and techniques described in the KHWB-approved RFI Work Plans. One duplicate soil sample and equipment or field blank samples will be collected for every 20 soil samples collected for laboratory analysis. Laboratory prepared trip blanks will be submitted

to the laboratory with each sample shipment. All duplicate, equipment, field, and trip blank samples will be recorded in the field logbook or on appropriate chain of custody forms, in accordance with the quality assurance/quality control (QA/QC) protocols described in the approved RFI work plans.

On receipt of the final laboratory data package, the analytical results will be forwarded to an independent contractor for data validation. The validated soil sample results will be forwarded to the KHWB in a summary letter.

3.5 DECONTAMINATION PROCEDURES

All non-disposable soil sampling equipment used during the proposed pre-design investigation field activities will be decontaminated after each use in accordance with procedures described in the KHWB-approved RFI work plans. Downhole direct-push equipment will be decontaminated by scrubbing with a Liquinox (or similar solution) water solution, followed by a potable water rinse before initiation of field activities, between each soil boring or sampling location, and before the drilling subcontractor exists the Scottsville facility at the conclusion of the investigation.

3.6 INVESTIGATION DERIVED WASTES

Soil cuttings and decontamination liquids generated during the proposed pre-design field investigation activities will be handled in accordance with the protocols, methods, and techniques described in the KHWB-approved RFI work plans. The generated soil and liquid wastes will be placed in Department of Transportation (DOT) approved open or closed top 55-gallon metal containers. The generated investigation derived wastes (IDW) will be sampled and analyzed for appropriate profiling constituents, if necessary. Historical analytical results of soil and liquid IDW generated during performance of previous subsurface RFI activities indicate that generated IDW has been non-hazardous in nature. Federal-Mogul will dispose of the generated IDW at an appropriate offsite disposal facility on completion of the pre-design investigation field activities.

3.7 INVESTIGATION FINDINGS

Findings from this pre-design investigation, including a description of the field activities performed and a summary of the validated analytical results, will be incorporated in subsequent corrective measures quarterly progress reports. Additional technical information (i.e., sample location map and analytical data tables) will be included in the RA or the CMS report.

3.8 PRE-DESIGN SCHEDULE

Federal-Mogul and WSP will implement this pre-design investigation on KHWB approval of the CMS Work Plan (WP) of which this work plan is a part. This pre-design investigation will be completed within 80 days after KHWB approval of this work plan, pending favorable weather conditions. KHWB personnel will be notified approximately two weeks before initiation of the approved pre-design field activities. Federal-Mogul and WSP anticipate the proposed field activities will be completed in one day. Soil samples collected during this proposed investigation will be analyzed by the laboratory under standard turnaround protocols (15 business days). Data validation of analytical results will require approximately two to three weeks after receipt of the final laboratory data package. The investigation findings will be forwarded to the KHWB in subsequent corrective measures progress report, the RA, or the CMS report, as appropriate.

4 References

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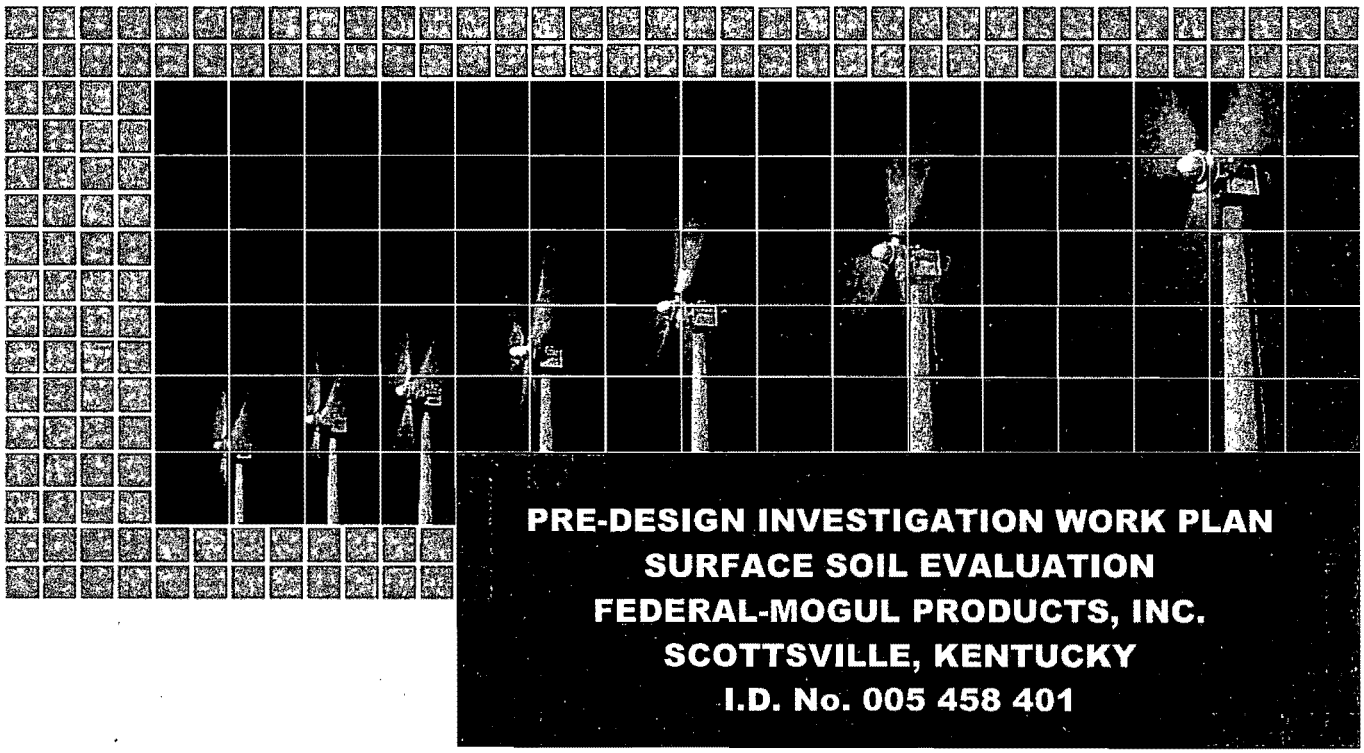
5 Acronyms

ASAI	Additional Source Area Investigation
bgs	Below Ground Surface
cis-1,2-DCE	cis-1,2-Dichloroethene
CMS	Corrective Measures Study
CMS WP	Corrective Measures Study Work Plan
COCs	Chemicals of Concern
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
IDW	Investigation Derived Wastes
KHWB	Kentucky Hazardous Waste Branch
KNREPC	Kentucky Natural Resource and Environmental Protection Cabinet
mg/kg	Milligrams per Kilogram
PCE	Tetrachloroethene
PID	Photoionization Detector
PRG	Preliminary Remediation Goals
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SOPs	Standard Operating Procedures
SWMUs	Solid Waste Management Units
TA	TestAmerica
TCE	Trichloroethene
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
WSP	WSP Environment & Energy, LLC

Figure

Appendix D – Pre-Design Investigation Work Plan – Surface Soil Evaluation



PRE-DESIGN INVESTIGATION WORK PLAN
SURFACE SOIL EVALUATION
FEDERAL-MOGUL PRODUCTS, INC.
SCOTTSVILLE, KENTUCKY
I.D. No. 005 458 401

August 9, 2010

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WSP

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Figure

Figure 1 – Proposed Surface Soil Sampling Locations

1 Introduction

On behalf of Federal-Mogul Products, Inc., WSP Environment & Energy, LLC has prepared this Pre-design Investigation Work Plan for delineation of arsenic-affected surface soil at the Federal-Mogul Products facility located in Scottsville, Allen County, Kentucky, where arsenic concentrations have been reported above U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRGs). The surface soil data to be collected during this investigation will be used to delineate total arsenic concentrations in surface soils and to evaluate potential remedial alternatives for the designated area during the site Corrective Measures Study (CMS). The Work Plan scope of work includes:

- soil sampling locations to delineate the horizontal and vertical extent of arsenic in surface soil
- collection and analysis of soil samples for laboratory analysis
- evaluation of soil data with respect to the site-wide Risk Assessment (RA)
- reporting of investigation findings

The following sections include a description of the field activities to be performed during implementation of this Work Plan.

2 Site Background Information

During performance of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) conducted at the Scottsville facility, the Kentucky Hazardous Waste Branch (KHWB) indicated that arsenic was a potential constituent of concern (COC) based on the deposition of wastewater treatment sludge in the onsite disposal area. However, arsenic was not a component of waste streams historically managed at the Scottsville facility by Federal-Mogul or previous operators. Total arsenic concentrations reported in soil samples collected during the RFI (1999 through 2005) indicated arsenic levels above state-wide background concentrations. To address this issue, Federal-Mogul and WSP performed an assessment of the presence of arsenic in surface and subsurface soils within a designated background (i.e., undisturbed) area and across the site during the RFI Phase V (Environmental Strategies Consulting 2003, 2004a, and 2005b). Arsenic concentrations reported during previous soil sampling events were found to be consistent with background soil conditions. The source of the arsenic is likely weathered bedrock (i.e. limestone) that formed the native soils in the Scottsville area. The soil series occurring on the Scottsville property are represented by Bedford silt loam and Trimble gravelly silt loam both of which are formed from limestone parent material (Soil Conservation Service [SCS] 1989). Gomez-Caminero et. al. (2001) reported that limestone horizons are typically associated with soils which have elevated inorganic arsenic concentrations.

The toxicity of inorganic arsenic depends on its valence state with arsenic III compounds being more toxic (carcinogenic) than arsenic V compounds (Agency for Toxic Substance and Disease Registry [ATSDR] 2000, Opresko 1992). The risk-based PRG of 1.6 milligrams per kilogram (mg/kg) for industrial soil are based on the more toxic (carcinogenic) arsenic III compounds, and is conservatively used when evaluating chemicals of concern at a site when the species of arsenic is unknown. However, arsenic V compounds represent the typical species of arsenic found in naturally occurring soil. Based on current knowledge, arsenic was not a component of any waste stream managed at the Scottsville facility. Therefore, by identifying the arsenic species present in onsite soils at Scottsville, justification for using the non-cancer PRG based on arsenic V compounds can be evaluated during the RA.

During the RFI Phase V, 16 surface and 13 subsurface soil samples were collected from the onsite background area and analyzed for total arsenic. Reported arsenic concentrations in the background surface soil samples (local grade to a depth of one foot) ranged from 8.09 mg/kg to 23.8 mg/kg. Subsurface arsenic concentrations (soil samples collected from a depth greater than one foot) ranged from 9.47 mg/kg to 52.8 mg/kg (Environmental Strategies Consulting 2004b). The reported arsenic concentrations are similar to concentrations reported in soil samples collected during previous RFI phases and are representative of naturally occurring arsenic concentrations. None of the RFI reported arsenic concentrations exceed EPA Region 9 PRGs with the exception of the arsenic concentration (282 mg/kg) in SB-68 (0 to 1 foot) which exceeds the noncarcinogenic Region 9 PRG of 260 mg/kg for industrial soils.

In addition, during the Phase V investigation, 11 soil samples, from the designated background area and the former disposal area, were analyzed by the Battelle Pacific Northwest National Laboratory (BPNNL) in Richland, Washington, for arsenic III and arsenic V by EPA method 1632 Revision A (EPA 2001). The speciation analysis indicated that the arsenic valence state in Scottsville soils is representative of arsenic V (the noncarcinogenic species). BPNNL further stated that the inorganic arsenic concentrations reported in the analyzed soil samples were typical of concentrations reported in naturally occurring soils. Based on the speciation analysis, arsenic concentrations reported in the Scottsville soil are considered to be a naturally occurring constituent and should not warrant additional consideration during the RA process. Furthermore, it is should be noted that the arsenic concentrations in surface and subsurface soil samples are consistently below the non-cancer industrial soil PRG of 260 mg/kg, with the exception of soil material collected from the surface to a depth of one foot in boring SB-68.

The SB-68 boring is located approximately 125 feet from the north side of the facility building along the north side of a facility driveway (Figure 1). Federal-Mogul anticipates that the arsenic concentration (282 mg/kg) reported in the SB-68 surface soil sample, is localized in extent and can be remediated, if necessary, with minimal effort to eliminate or reduce any potential risk.

Based on the reported arsenic concentration in the SB-68 surface soil sample, Federal-Mogul will further delineate the horizontal and vertical extent of arsenic concentrations in soil in the SB-68 area. This delineation will be completed as a pre-design investigation performed during the CMS. Analytical results of surface soil samples collected during the pre-design investigation will be evaluated during the proposed site-wide RA and the CMS to determine appropriate remedial alternatives, and if necessary, to address or eliminate potential future risk to human health and the environment.

3 Scope of Work

Performance of soil sampling activities during implementation of this Work Plan will be conducted in accordance with KHWB-approved RCRA RFI work plan procedures and WSP Standard Operating Procedures (SOPs). A description of the activities to be performed during implementation of this Work Plan, are provided in the following sections.

3.1 SOIL SAMPLING LOCATIONS

The proposed surface soil sampling locations will be determined in the field and distributed around the original SB-68 boring. Six soil samples will be collected from the surface (i.e., below the root zone) to a depth of one foot to further delineate arsenic concentrations in the SB-68 vicinity. One soil sample will be collected along the edge of the driveway to evaluate whether elevated arsenic concentrations may extend under the driveway. The proposed soil sampling locations are provided on Figure 1. Additional step-out soil sampling locations (including beneath the existing driveway), may be completed after evaluation of the analytical results, if necessary, to fully delineate arsenic concentrations in surface soil if the initial sample results exceed the Region 9 PRG industrial soil criteria.

3.2 SOIL SAMPLE COLLECTION

During implementation of this Work Plan, soil samples will be collected from six locations in the vicinity of the SB-68 boring. The surface soil samples will be collected and represent material from the surface (below the root zone) to a depth of one foot to coincide with the RFI Phase V sampling scheme. The soil material will be collected using dedicated trowels from each proposed sampling location. Soil material will be placed in an aluminum pan and homogenized before collection of the soil sample. The soil material will be placed in laboratory supplied sampling containers. The remaining soil material will be returned to the sampling location.

The collected soil samples will be placed in an iced cooler and transported via overnight delivery service to the analytical laboratory for total arsenic analysis. Each soil sampling location (including step-out sampling locations) will be determined in the field and placed on a site base map for future reference.

3.3 ANALYTICAL PARAMETERS

Soil samples collected for laboratory analysis during implementation of this Work Plan will be forwarded to TestAmerica (TA) laboratories in Pittsburgh, Pennsylvania. The collected soil samples will be analyzed for total arsenic using EPA Method 6010B. The soil samples will be analyzed under standard turnaround time (15 business days) protocols by the analytical laboratory. On receipt of the final laboratory data package, the analytical results will be forwarded to an independent contractor for data validation. The validated laboratory results will be evaluated with respect to the EPA Region 9 industrial soil PRG during the proposed RA.

3.4 QUALITY ASSURANCE/QUALITY CONTROL

One duplicate soil sample (collected for every 20 soil samples) and an equipment blank, if necessary, will be forwarded to the analytical laboratory for analysis in accordance with the methods, protocols, and techniques described in the KHWB-approved RFI Work Plans. An equipment blank sample will be collected if non-dedicated sampling equipment is used during the proposed surface soil sampling activities. WSP anticipates that dedicated sampling equipment will be used to perform the soil sampling activities. All duplicate and equipment blank samples will be recorded in the field logbook or on an

appropriate chain of custody form, in accordance with the quality assurance/quality control (QA/QC) protocols described in the KHWB-approved RFI work plans.

On receipt of the final laboratory data package, the analytical results will be forwarded to an independent contractor for data validation. The validated soil sample results will be forwarded to the KHWB in a summary letter.

3.5 DECONTAMINATION PROCEDURES

All non-disposable soil sampling equipment used during the proposed pre-design investigation field activities will be decontaminated in accordance with procedures described in the KHWB-approved RFI work plans. Sampling equipment will be decontaminated by scrubbing with a Liquinox (or similar solution) water solution, followed by a potable or distilled water rinse after each use and between soil sampling locations, if necessary. Federal-Mogul and WSP anticipate that dedicated soil sampling equipment (i.e., trowels) will be used during the proposed sampling activities to eliminate the generation and disposal of decontamination fluids.

3.6 INVESTIGATION DERIVED WASTES

Soil material generated during the proposed pre-design field investigation activities will be returned to the sampling location after placement of the soil in the laboratory supplied sampling containers. Therefore, investigation derived wastes (IDW) are not anticipated to be generated during the field activities.

3.7 INVESTIGATION FINDINGS

Findings from this pre-design investigation, including a description of the field activities performed and a summary of the validated analytical results, will be incorporated in subsequent corrective measures quarterly progress reports. Additional technical information (i.e., sample location map and analytical data tables) will be included in the RA or the CMS report, as appropriate.

3.8 PRE-DESIGN SCHEDULE

Federal-Mogul and WSP will implement this pre-design investigation on KHWB approval of the CMS Work Plan (WP) of which this work plan is a part. The pre-design investigation field activities will be completed within 80 days after KHWB approval of this work plan, pending favorable weather conditions. KHWB personnel will be notified approximately two weeks before initiation of the approved pre-design field activities. Federal-Mogul and WSP anticipate the proposed field activities will be completed in one day. Soil samples collected during this proposed investigation will be analyzed by the laboratory under standard turnaround protocols (15 business days). Data validation of analytical results will require approximately two to three weeks after receipt of the final laboratory data package. The investigation findings will be forwarded to the KHWB in subsequent corrective measures progress reports, the RA, or the CMS report, as appropriate.

4 References

Agency for Toxic Substances and Disease Registry. 2000. Toxicological Profile for Arsenic. Update. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Environmental Strategies Consulting, LLC. 2003. RFI Phase IV Soil and Groundwater Investigation Report, Federal-Mogul Corporation, Scottsville, Kentucky. January 10, 2003.

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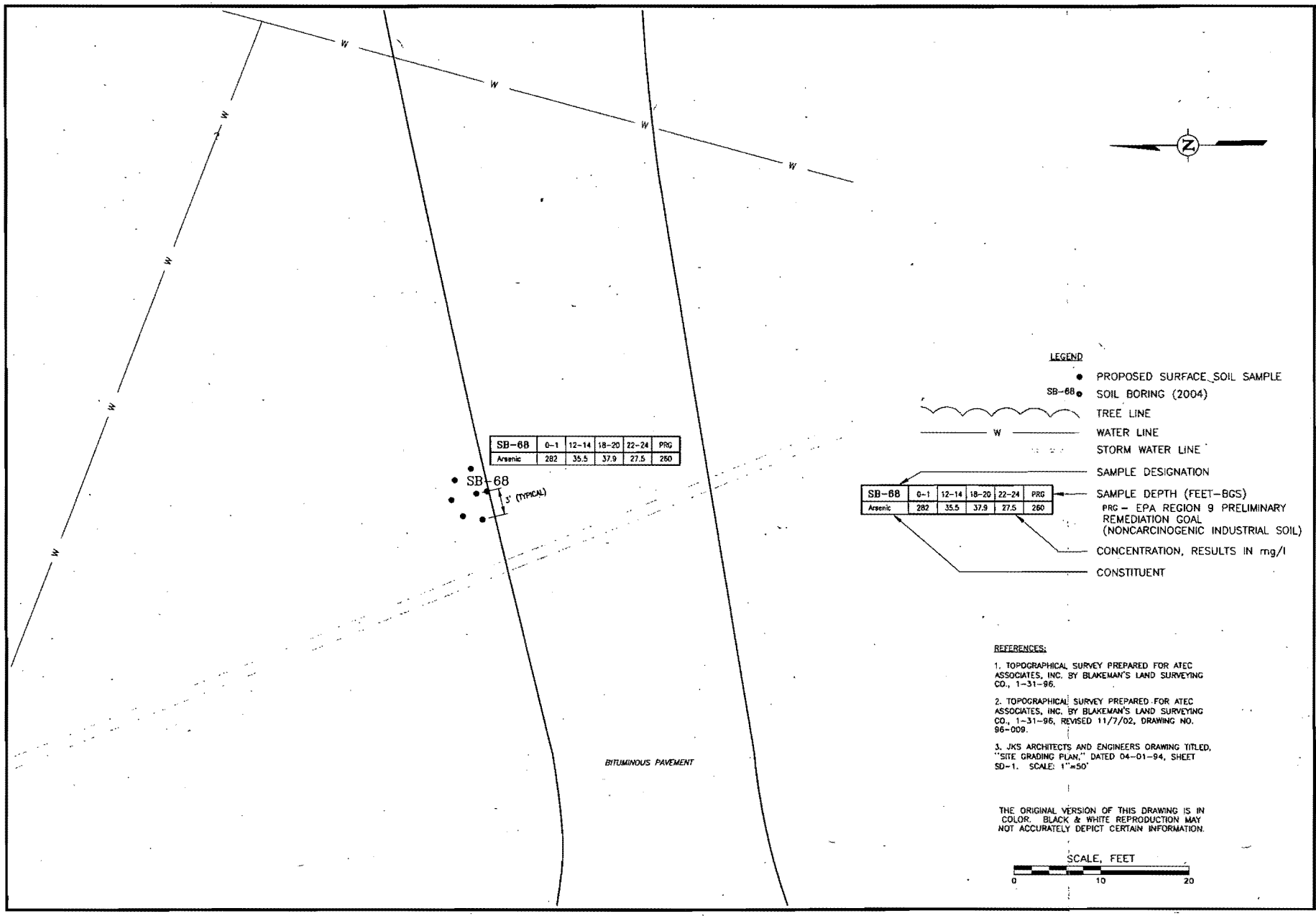
http://www.epa.gov/region4/waste/ots/healtbul.htm

5 Acronyms

CMS	Corrective Measures Study
CMS WP	Corrective Measures Study Work Plan
COC	Constituent of Concern
EPA	U.S. Environmental Protection Agency
IDW	Investigation Derived Wastes
KHWB	Kentucky Hazardous Waste Branch
mg/kg	Milligrams per Kilogram
PRG	Preliminary Remediation Goal
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SOPs	Standard Operating Procedures
TA	TestAmerica
WSP	WSP Environment & Energy, LLC

Figure



SB-68	0-1	12-14	18-20	22-24	PRG
Arsenic	282	35.5	37.9	27.5	260

REFERENCES:

1. TOPOGRAPHICAL SURVEY PREPARED FOR ATEC ASSOCIATES, INC. BY BLAKEMAN'S LAND SURVEYING CO., 1-31-96.

2. TOPOGRAPHICAL SURVEY PREPARED FOR ATEC ASSOCIATES, INC. BY BLAKEMAN'S LAND SURVEYING CO., 1-31-96, REVISED 11/7/02, DRAWING NO. 96-009.

3. JKS ARCHITECTS AND ENGINEERS DRAWING TITLED, "SITE GRADING PLAN," DATED 04-01-94, SHEET SD-1. SCALE: 1"=50'

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK & WHITE REPRODUCTION MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

Drawn By: RP 5/16/10
Checked: /
Approved:
DWG Name: 138055-B50

FEDERAL-MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY
PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SOUTHFIELD, MICHIGAN

FIGURE 1

PROPOSED SURFACE SOIL SAMPLING LOCATIONS

WSP
WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, PA 15220 (412) 604-1040

R:\AutoCAD\DWGs\130\138055 Scottsville\138055B50.dwg, 5/16/2010 2:38:47 PM, USRZ01165

WSP

November 3, 2010

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: July through September 2010 CM Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the third quarter of 2010 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C, #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted the Corrective Measures Study Work Plan (CMS WP) to the KHWB on August 9, 2010. As described in the CMS WP quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

Corrective measures activities performed by WSP Environment & Energy LLC, on behalf of Federal-Mogul, during the third quarter of 2010 included:

- submittal of a draft CMS WP (i.e., Corrective Action Plan [CAP] in accordance with 401 KAR 100:030)
- preparation and submittal of a draft Risk Assessment Work Plan (RAMP) and pre-design investigation work plans (included as Appendices in CMS WP)
- initial scheduling for performing KHWB-approved pre-design investigations
- continued operation of the groundwater interim remedial measure (IRM) treatment system

Agency Meetings and Contacts

During the third quarter of 2010, WSP provided project updates to Christopher Jung, KHWB project manager, with regards to corrective measures activities performed by Federal-Mogul and WSP. These updates included discussions regarding preparation of the CMS WP, the RAWP, the pre-design investigation work plans, and determination of statistical values with

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regards to background and onsite arsenic concentrations in soil. In addition, the KHWB requested that groundwater quality samples be collected from four bedrock monitoring wells, located along the downgradient facility boundary. The groundwater results will be incorporated into preparation of the CA 750 evaluation for the Scottsville facility which is scheduled to be completed during 2011 as requested by the KHWB.

On May 26, 2010, Federal-Mogul received correspondence from the Kentucky Division of Air Quality (KDAQ) approving our request to rescind the existing air registration and remove (disconnect) the vapor-phase treatment train from the groundwater IRM treatment system. Based on air quality sample results collected over the initial 18 months of operation, emission results indicated that emissions were below KDAQ thresholds for single hazardous air pollutant (HAP) and combined HAPs criteria. The vapor-phase treatment train was disconnected from the groundwater treatment system on September 28, 2010 during the granular activated carbon (GAC) material change-out activities. The spent vapor-phase GAC material will be characterized and transported offsite for disposal.

Document Submission

On August 5, 2010, WSP submitted a CM progress report for the period of April 1 through June 30, 2010 (second quarter 2010) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

On August 9, 2010, WSP submitted the CMS WP to the KHWB and the EPA. The CMS WP included the RAWP and the Offsite Exposure Pathway Evaluation, Former Cyanide Treatment Area, and the Surface Soil Evaluation pre-design work plans. The CMS WP included a detailed schedule for completion of the CMS activities. The pre-design work plans were subsequently approved by the KHWB in correspondence dated August 18, 2010.

The following RFI or IRM related documents were submitted to the KDEP during the reporting period:

- On July 7, August 27, and September 13, 2010, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, June, July, and August 2010 Discharge Monitoring Reports (DMRs) in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated groundwater from the operating bedrock groundwater IRM treatment system.

Field or Pilot Testing Activities

No CMS field or pilot testing activities were performed during the third quarter of 2010. WSP initiated scheduling the KHWB-approved pre-design investigation work plan field activities which will be completed during the fourth quarter 2010.

On July 8, August 3, and September 2, 2010, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the operating groundwater IRM treatment system. Field activities included collection of system performance monitoring data, groundwater from onsite bedrock extraction and monitoring wells, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

During the third quarter of 2010, WSP and Mid-Atlantic Environmental Equipment (MAE2, operation and maintenance [O&M] contractor) visited the Scottsville facility monthly to inspect and evaluate operation of the implemented groundwater IRM treatment system. Activities performed included inspection and equipment cleaning, calibration of water treatment equipment, replacement of bag filters, and cleaning of the system flow meters and well pumps. Monthly inspection and O&M activities will continue to be performed on the groundwater recovery and treatment system during CM activities.

On September 28, 2010, WSP and MAE2 removed spent GAC material from the liquid- and vapor-phase vessels associated with the groundwater treatment system. The spent GAC material was placed in appropriately labeled 55-gallon drums and temporarily stored near the groundwater treatment building. New GAC material was placed in the liquid-phase vessels. The vapor-phase treatment train was disconnected from the groundwater treatment system in accordance with the KDAQ rescinding (May 26, 2010 correspondence) the existing air registration. Samples of the spent liquid- and vapor-phase GAC material were collected for characterization. Upon receipt of laboratory results, WSP will arrange for transportation and offsite disposal of the spent bag filters and GAC material at an appropriate facility.

Results of Sampling and Testing

On July 7, August 27, and September 13, 2010, WSP submitted validated analytical results of treated effluent discharged, for June, July, and August respectively, from the groundwater IRM treatment system to the KDOW in accordance with Federal-Mogul's KPDES permit. The analytical results of treated effluent samples indicated compliance with the KPDES permit discharge limits.

During the third quarter of 2010, WSP received analytical results of groundwater quality samples collected during monthly performance monitoring of the groundwater IRM treatment system. WSP design engineers and MAE2 evaluated the water quality analytical results to ensure effective operation of the groundwater IRM treatment system.

Work Planned

During the fourth quarter of 2010, the following CM activities may be completed with regards to the Scottsville facility:

- preparation of a third quarter 2010 CM progress report
- identification and contacting offsite property owners to secure property access for collecting groundwater or surface water samples in accordance with the Offsite Exposure Pathway Evaluation work plan
- performance of the KHWB-approved Offsite Exposure Pathway Evaluation, Former Cyanide Treatment Area, and Surface Soil Evaluation pre-design work plans
- collection and analysis of groundwater quality samples from bedrock wells located along the downgradient boundary of the facility

Activities to be performed regarding the implemented groundwater IRM treatment system will include:

- preparation and submittal of monthly DMRs in accordance with the KPDES permit

- monthly collection and analysis of treated effluent water samples in accordance with Federal-Mogul's KPDES permit
- monthly collection and analysis of performance monitoring water samples from onsite bedrock monitoring wells, the groundwater treatment system, and Ramble Creek
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system which Federal-Mogul anticipates will become a part of the final site remedy
- characterization, and offsite disposal of spent liquid- and vapor-phase GAC material and bag filters
- preparation of an annual O&M report with regards to the operating groundwater IRM

Difficulties Encountered

On September 28, 2010 when WSP and MAE2 arrived at the Scottsville facility, the O&M personnel noticed no influent water flow to the treatment system equalization tank indicating that the extraction wells were temporarily not recovering groundwater. WSP and MAE2 proceeded to remove the extraction well pumps for cleaning and inspection. The EW-1 well pump was found to be inoperable due to bacterial fouling. This pump was cleaned, inspected, and re-inserted in the extraction well. However, the EW-1 pump would not operate. Bacterial fouling of the EW-1 well pump and well screen appears to have caused the well pump to fail.

WSP and MAE2 proceeded to remove, inspect, and test the EW-2 extraction well pump to determine why groundwater was not being recovered by this pump. O&M personnel observed that the groundwater level in the EW-2 extraction well had temporarily decreased below the well pump intake, which resulted in the pump cycling periodically to recover groundwater from the extraction well. The pump was cleaned, tested and found to be operating properly and was re-inserted in the extraction well. However, the groundwater level remained below the level which would activate the well pump. Once the groundwater level recovered sufficiently, the extraction well pump turned on and recovered a minimal quantity of groundwater before shutting off as designed when groundwater is not available for proper pump operation.

Based on the bacteria fouling observed at EW-1 and lack of recoverable groundwater at EW-2, WSP and MAE2 shutdown the EW-1 extraction well until repairs can be performed. The repairs include securing a new well pump, hiring a subcontractor to clean the well screen in extraction well EW-1 to eliminate the bacteria fouling, and installing the new well pump in EW-1. WSP is actively securing a new well pump and scheduling a subcontractor to perform rehabilitation activities to eliminate the bacterial fouling. WSP anticipates that the rehabilitation of EW-1 and installation of a new well pump will be completed during October 2010 in order that the groundwater treatment system can be brought back online to recover bedrock groundwater as designed. Groundwater will continue to be recovered intermittently by extraction well EW-2, but based on groundwater levels observed on September 28, 2010, the well EW-2 well will operate intermittently until groundwater levels rebound during the fall and winter. Based on current conditions, the groundwater IRM treatment system will likely treat one batch of groundwater once every few days.

No other difficulties were encountered during the third quarter of 2010.

Schedule

WSP anticipates that the following corrective measure activities and deliverables may be submitted to the KHWB during the fourth quarter of 2010:

- preparation and submittal of a third quarter 2010 CM progress report
- implementation and completion of the KHWB-approved Offsite Exposure Pathway Evaluation, Former Cyanide Treatment Area field activities, and Surface Soil Evaluation pre-design field activities
- evaluation of background and onsite arsenic concentrations in soil
- collection of groundwater quality samples from bedrock monitoring wells located along the facility downgradient property boundary

The following RFI and IRM activities and deliverables will be performed or prepared during the fourth quarter of 2010:

- preparation and submittal of monthly DMRs
- collection and analysis of monthly treated effluent water samples in accordance with KPDES Permit No. KY 0106585
- monthly performance monitoring and evaluation of water quality results from the groundwater treatment system, bedrock monitoring wells, and Ramble Creek
- monthly O&M activities and inspections of the groundwater IRM treatment system
- preparation of the annual O&M report
- maintenance of extraction well EW-1 to eliminate bacteria fouling and installation of a new pump

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this CM progress report and corrective measures or RFI activities performed during the third quarter of 2010, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

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cc: Mr. Christopher Jung, P.G., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

January 19, 2011

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: October through December 2010 CM Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the fourth quarter of 2010 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C, #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted the Corrective Measures Study Work Plan (CMS WP) to the KHWB on August 9, 2010. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

Corrective measures activities performed by WSP Environment & Energy, on behalf of Federal-Mogul, during the fourth quarter of 2010 included:

- implementation and completion of the KHWB-approved Former Cyanide Treatment Area pre-design work plan field activities
- implementation of the KHWB-approved Surface Soil Evaluation pre-design work plan field activities
- preparation and submittal of the third quarter 2010 CM progress report
- collection and analysis of groundwater quality samples from onsite bedrock monitoring wells
- submittal of extension request for completing the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan

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Docket No. 689511

- preparation and submittal of an Annual Operations and Maintenance (O&M) Report with regards to operation of the bedrock groundwater interim remedial measure (IRM) treatment system
- continued operation of the groundwater IRM treatment system

Agency Meetings and Contacts

During the fourth quarter 2010, WSP provided project updates to Christopher Jung, KHWB project manager, with regards to corrective measures activities performed by Federal-Mogul and WSP. These updates included discussions regarding implementation of the KHWB-approved Former Cyanide Treatment Area and Surface Soil Evaluation pre-design work plan field activities, information regarding KHWB review of the CMS WP and the Risk Assessment Work Plan (RAWP), and collection of groundwater samples from onsite bedrock monitoring wells, as requested by the KHWB, to support preparation during 2011 of the CA 750 evaluation for the Scottsville facility during 2011.

Document Submission

On November 2, 2010, WSP submitted a CM progress report for the period of July 1 through September 30, 2010 (third quarter 2010) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

On December 13, 2010, WSP submitted a 90 day extension request (March 10, 2010) to the KHWB for implementation and completion of the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan activities. This request was necessary because Federal-Mogul was experiencing difficulty obtaining access agreements from property owners to perform the approved offsite field activities.

The following RFI or IRM related documents were submitted to the KDEP during the reporting period:

- On October 12, November 19, and December 15, 2010, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, September, October, and November 2010 Discharge Monitoring Reports (DMRs). The DMRs were submitted in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated groundwater from the operating bedrock groundwater IRM treatment system.

- On December 15, 2010, WSP submitted the 2009-2010 Annual Operations and Maintenance (O&M) Report for the operating groundwater treatment system to the KHWB. This report was submitted to comply with the KHWB-approved bedrock groundwater IRM work plan.

Field or Pilot Testing Activities

Between October 26 and 27, 2010, WSP implemented and completed the KHWB-approved Former Cyanide Treatment Area pre-design work plan field activities at the Scottsville facility to further delineate volatile organic compound (VOC) concentrations in soil from this potential source area. Collected and validated soil sample results will be included in a future CM progress report, the site-wide Risk Assessment (RA), and or the CMS Report, as necessary.

On October 27, 2010, WSP implemented the KHWB-approved Surface Soil Evaluation pre-design work plan field activities to further delineate arsenic concentrations in surface soil. Preliminary laboratory results indicate that additional step-out surface soil samples are necessary to adequately delineate this area. Federal-Mogul and WSP anticipate that the additional soil sampling activities will be performed during the first quarter of 2011. Validated surface soil sample results will in evaluated during performance of the RA. The validated surface soil results will be provided in a future CM progress report, the RA, and or the CMS Report.

On November 10 and December 7, 2010, WSP and Ensafe (performance monitoring contractor) conducted monthly monitoring activities at the operating groundwater IRM treatment system. October 2010 monthly monitoring activities were not performed because the groundwater IRM system was shutdown for annual O&M activities, extraction well pump failure, and bacteria fouling in an extraction well. Monthly monitoring field activities included collection of groundwater from onsite bedrock extraction and monitoring wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

Between October 25 and 26, 2010, WSP and a drilling contractor performed well rehabilitation activities on extraction well EW-1 to eliminate observed bacteria fouling. The bacteria fouling resulted in failure of the EW-1 extraction well pump and shutdown of the groundwater IRM treatment system until the bacteria fouling conditions could be addressed and a new extraction well pump installed in EW-1.

On October 28, 2010, Mid-Atlantic Environmental Equipment (MAE2), the site O&M contractor, installed a new extraction well pump in EW-1 after completion of the well rehabilitation activities. MAE2 performed, serviced, and evaluated the groundwater IRM system during this event. Since performance of the October 2010 O&M activities, the groundwater IRM treatment system has operated in an efficient and effective manner.

During November and December 2010, MAE2 visited the Scottsville facility monthly to inspect and evaluate operation of the implemented groundwater IRM treatment system. Activities performed included inspection and equipment cleaning, replacement of bag filters, calibration of water treatment equipment, and cleaning of system flow meters and extraction well pumps, as necessary. Monthly inspection and O&M activities will continue to be performed on the groundwater recovery and treatment system during the CM process.

On December 7, 2010, WSP collected groundwater quality samples, for VOC analysis, from four bedrock monitoring wells located along the facility western property boundary as requested by the KHWB. The VOC results will be used to support the 2011 preparation of the KHWB requested CA 750 evaluation for the Scottsville facility.

On December 7, 2010, spent liquid- and vapor-phase granular activated carbon (GAC) and bag filters were transported from the Scottsville facility for disposal at an appropriate offsite facility. The spent GAC material was recovered from the liquid- and vapor-phase polishing vessels and replaced with new GAC material during September 2010. Analytical results of the spent GAC and bag filter samples indicated these materials were non-hazardous.

Work Planned

During the first quarter of 2011, the following CM activities are anticipated to be completed with regards to the Scottsville facility:

- preparation of a fourth quarter 2010 CM progress report
- additional delineation of surface soil arsenic concentrations in accordance with the KHWB-approved Surface Soil Evaluation pre-design work plan
- contacting offsite property owners to secure property access for collecting groundwater and surface water samples in accordance with the Offsite Exposure Pathway Evaluation pre-design work plan

First quarter 2011 activities to be performed related to continued implementation of the groundwater IRM treatment system include:

- monthly collection and analysis of treated effluent water samples in accordance with Federal-Mogul's KPDES permit
- preparation and submittal of monthly DMRs in accordance with the KPDES permit
- monthly collection and analysis of performance monitoring water samples from onsite bedrock monitoring wells, the groundwater treatment system, and Ramble Creek
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system
- cleaning and rehabilitation of system extraction wells and well pumps to eliminate bacteria fouling

Difficulties Encountered

No difficulties were encountered by Federal-Mogul, WSP, or our subcontractors during the fourth quarter of 2010.

Schedule

WSP anticipates that the following corrective measure activities and deliverables may be submitted to the KHWB during the first quarter of 2011:

- preparation and submittal of a fourth quarter 2010 CM progress report
- further delineation and completion of the KHWB-approved Surface Soil Evaluation pre-design work plan activities
- evaluation of background and onsite arsenic concentrations in soil
- securing appropriate agreements for offsite property access
- implementation and completion of the KHWB-approved Offsite Exposure Pathway Evaluation pre-design work plan field activities

The following RFI and IRM activities and deliverables will be performed or prepared during the first quarter of 2011:

- collection and analysis of monthly treated effluent water samples in accordance with KPDES Permit No. KY 0106585
- preparation and submittal of monthly DMRs as required by the KPDES permit

- monthly O&M activities and inspections of the groundwater IRM treatment system
- monthly performance monitoring and evaluation of water quality results from the groundwater treatment system, bedrock monitoring wells, and Ramble Creek
- maintenance of preparation and submittal of monthly DMRs as required by the KPDES permit
- maintenance of the IRM system extraction well pumps and recovery wells to eliminate bacteria fouling

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this CM progress report and corrective measures or RFI activities performed during the fourth quarter of 2010, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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cc: Mr. Christopher Jung, P.G., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

January 19, 2010

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Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

RESTORATION & UNDERGROUND STORAGE TANK BRANCH

Re: July through December 2009 CM Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the third and fourth quarters of 2009 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky. This report is being submitted in accordance with Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and has requested that Federal-Mogul transition the Scottsville facility to the RCRA CM phase. This progress report represents the initial progress report prepared by Federal-Mogul during CM activities. Subsequent quarterly progress reports (based on the calendar year) will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

CM activities performed by WSP Environment & Energy, on behalf of Federal-Mogul, during the third and fourth quarters of 2009 included:

- preparation of a CM Technical Approach for KHWB review
- preparation of a draft Corrective Measures Study Work Plan (CMSWP)
- continued operation of the groundwater interim remedial measure (IRM) treatment system

Agency Meetings and Contacts

WSP provided project updates to Christopher Jung, KHWB project manager, with regards to CM activities performed by Federal-Mogul and WSP. These updates included discussions regarding the overall CM Approach, plans for performance of a Risk Assessment (RA), and development of requirements for a streamlined CM approach.

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Docket No. 689511

On August 24, 2009, the KHWB and WSP participated in a conference call to discuss requirements for performing a RA for the Scottsville facility. During this call, current groundwater quality results, anticipated screening levels, current KDEP slope factors for specific volatile organic compounds (VOCs), potential exposure pathways, and potential use of an environmental covenant to restrict future onsite exposure pathways were discussed. A RA Work Plan (RAWP) will be prepared and included in the CMSWP for KHWB review and approval.

Document Submission

On December 16, 2009, Federal-Mogul and WSP submitted a CM Approach document to the KHWB for concurrence. The CM Approach includes a brief summary of RFI activities performed at the Scottsville site and our proposed streamlined approach for completing CM.

The following RFI related documents were submitted to the KHWB during the reporting period:

- On July 27, August 21, September 21, October 27, November 18, and December 18, 2009, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, June, July, August, September, October, and November 2009 Discharge Monitoring Reports (DMRs) in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated groundwater from the KHWB-approved bedrock groundwater IRM treatment system.

- On July 23, 2009, WSP submitted a RFI progress report for the period of April 1 through June 30, 2009 (second quarter 2009) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO and KHWB-approved RFI work plans.

- On October 12, 2009, WSP submitted the Crawford Hydrology Laboratory (CHL) and Hoffman Environmental Research Institute (HERI) prepared Dye Trace Report (DTR) to the KHWB and EPA.

- On November 18, 2009, WSP submitted an Annual Operations and Maintenance (O&M) Report to the KHWB and EPA associated with the IRM groundwater treatment system. This report included operational data and performance monitoring results covering the July 2008 through July 2009 period.

Field or Pilot Testing Activities

Federal-Mogul and WSP performed no field or pilot testing activities associated with CM during the reporting period. Federal-Mogul and WSP anticipate the preparation and submittal of pre-design work plans as part of the CMSWP. These pre-design work plans, will provide supplemental data needed to evaluate and select potential remedial alternatives. The pre-design work plans will be implemented on KHWB approval.

On July 15, August 8, September 10, October 7, November 4, and December 2, 2009, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the operating groundwater IRM treatment system. Field activities included collection of system performance monitoring, groundwater from onsite bedrock monitoring wells, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface

water samples were collected from Ramble Creek. Groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

During the third and fourth quarters of 2009, WSP and Mid-Atlantic Environmental Equipment (MAE2, O&M contractor) visited the Scottsville facility monthly to inspect and evaluate operation of the implemented groundwater IRM treatment system. Activities performed included inspection and equipment cleaning, calibration of water treatment system equipment, replacement of bag filters, and cleaning of system flow meters. Monthly inspection and O&M activities will continue to be performed on the groundwater recovery and treatment system during CM activities.

Results of Sampling and Testing

On July 27, August 21, September 21, October 27, November 18, and December 18, 2009, WSP submitted validated analytical results of treated effluent discharged from the groundwater IRM treatment system to the KDOW in accordance with Federal-Mogul's KPDES permit. Results of treated effluent samples collected during the third and fourth quarters of 2009 indicated compliance with the KPDES permit discharge criteria.

During the reporting period, WSP received analytical results of groundwater quality samples collected during performance monitoring of the groundwater IRM treatment system. WSP design engineers and MAE2 evaluated the water quality analytical results to ensure effective operation of the groundwater IRM treatment system.

Work Planned

During the first quarter 2010, the following CM activities may be completed with regards to the Scottsville facility:

- preparation of a third and fourth quarter CM progress report
- continued preparation and submittal of the CMSWP and pre-design work plans
- RA work plan and evaluation of soil and groundwater data
- initial evaluation of potential CM alternatives for onsite soil and bedrock groundwater

Activities to be performed regarding the implemented groundwater IRM treatment system will include:

- monthly collection and analysis of treated effluent water samples in accordance with Federal-Mogul's KPDES permit
- preparation and submittal of monthly DMRs in accordance with the KPDES permit
- monthly collection and analysis of performance monitoring water samples from onsite bedrock monitoring wells, the groundwater treatment system, and Ramble Creek
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system which Federal-Mogul anticipates will become a part of the final site CM remedy

Difficulties Encountered

No difficulties were encountered by Federal-Mogul, WSP, or our subcontractors during the third or fourth quarters of 2009.

Schedule

Federal-Mogul and WSP anticipate that the following CM activities and deliverables may be submitted to the KHWB during the first quarter 2010:

- preparation and submittal of a third and fourth quarters 2009 CM progress report
- preparation, submittal, and discussion with KHWB representatives with regards to our streamlined CM Approach
- preparation of the CMSWP

The following RFI and IRM activities and deliverables will be performed or prepared during the first quarter of 2010:

- monthly O&M activities and inspections of the groundwater IRM treatment system
- collection and analysis of monthly treated effluent water samples in accordance with KPDES Permit No. KY 0106585
- preparation and submittal of monthly DMRs
- performance monitoring and evaluation of water quality results from the groundwater treatment system, bedrock monitoring wells, and Rarnble Creek

Project Management

No changes are anticipated to the Federal-Mogul and WSP project management team during the CM phase.

Should you have any questions or comments regarding this CM progress report or RFI activities performed during the third and fourth quarters of 2009, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

cc: Mr. Christopher Jung, P.G., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

May 7, 2010

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: January through March 2010 CM Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the first quarter of 2010 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc., facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and has requested that Federal-Mogul initiate a RCRA CM study at the Scottsville site. Subsequent quarterly progress reports (based on the calendar year) will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

CM activities performed by WSP Environment & Energy, on behalf of Federal-Mogul, during the first quarter of 2010 included:

- continued preparation of a draft Corrective Measures Study Work Plan (CMS WP)
- preparation of a draft Risk Assessment Work Plan (RAWP)
- preparation of pre-design investigation work plans
- continued operation of the groundwater interim remedial measure (IRM) treatment system

Agency Meetings and Contacts

WSP provided project updates to Christopher Jung, KHWB project manager, with regards to CM activities performed by Federal-Mogul and WSP. These updates included discussions regarding preparation of the CMSWP, RAWP, and the pre-design investigation work plans.

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Docket No. 689511
689511

On January 6, 2010, Federal-Mogul and WSP received KHWB concurrence of Federal-Mogul's CM Approach as outlined in our December 16, 2009 submittal. The CM Approach submittal included a proposed approach for streamlining and completing CM at the Scottsville facility.

Document Submission

On January 19, 2010, Federal-Mogul and WSP submitted a CM progress report for the period of July 1 through December 31, 2009 (third and fourth quarters 2009) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

The following RFI or IRM related documents were submitted to the KHWB during the reporting period:

> On January 25, February 19, and March 17, 2010, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, December 2009 and January and February 2010 Discharge Monitoring Reports (DMRs) in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated groundwater from the bedrock groundwater IRM treatment system.
>
> On February 22, 2010, WSP submitted the 2009 Hazardous Waste Activity Report regarding Federal-Mogul's Scottsville facility. This submittal included a request for continued designation as a large-scale generator effective for fiscal year 2010.

Field or Pilot Testing Activities

Federal-Mogul and WSP performed no field or pilot testing activities associated with CM study during the reporting period. Federal-Mogul and WSP anticipate the preparation and submittal of a RAWP and pre-design work plans as part of the CMS WP. These pre-design work plans, will provide supplement data needed to evaluate and select potential remedial alternatives. The pre-design work plans will be implemented on KHWB approval.

On January 6, February 3, and March 2, 2010, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the operating groundwater IRM treatment system. Field activities included collection of system performance monitoring data, groundwater from onsite bedrock extraction and monitoring wells, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

During the first quarter of 2010, WSP and Mid-Atlantic Environmental Equipment (MAE2, operation and maintenance [O&M] contractor) visited the Scottsville facility monthly to inspect and evaluate operation of the implemented groundwater IRM treatment system. Activities performed included inspection and equipment cleaning, calibration of water treatment system equipment, replacement of bag filters, and cleaning of system flow meters. Monthly inspection and O&M activities will continue to be performed on the groundwater recovery and treatment system during CM activities.

Results of Sampling and Testing

On January 25, February 19, and March 17, 2010, WSP submitted validated analytical results of treated effluent discharged from the groundwater IRM treatment system to the KDOW in accordance with Federal-Mogul's KPDES permit. The analytical results of treated effluent samples indicated compliance with the KPDES permit discharge criteria.

During the first quarter of 2010, WSP received analytical results of groundwater quality samples collected during monthly performance monitoring of the groundwater IRM treatment system. WSP design engineers and MAE2 evaluated the water quality analytical results to ensure effective operation of the groundwater IRM treatment system.

Work Planned

During the second quarter of 2010, the following CM activities may be completed with regards to the Scottsville facility:

- preparation of a first quarter 2010 CM progress report
- continued preparation and submittal of the CMS WP and pre-design work plans
- preparation of the RAWP and evaluation of soil and groundwater data
- initial evaluation of potential CM alternatives for onsite soil and bedrock groundwater

Activities to be performed regarding the implemented groundwater IRM treatment system will include:

- monthly collection and analysis of treated effluent water samples in accordance with Federal-Mogul's KPDES permit
- preparation and submittal of monthly DMRs in accordance with the KPDES permit
- monthly collection and analysis of performance monitoring water samples from onsite bedrock monitoring wells, the groundwater treatment system, and Ramble Creek
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system which Federal-Mogul anticipates will become a part of the final site remedy

Difficulties Encountered

No difficulties were encountered by Federal-Mogul, WSP, or our subcontractors during the first quarter of 2010.

Schedule

Federal-Mogul and WSP anticipate that the following CM activities and deliverables may be submitted to the KHWB during the second quarter of 2010:

- preparation and submittal of a first quarter 2010 CM progress report
- preparation and submittal of the CMS WP, RAWP, and pre-design work plans

The following RFI and IRM activities and deliverables will be performed or prepared during the second quarter of 2010:

- collection and analysis of monthly treated effluent water samples in accordance with KPDES Permit No. KY 0106585
- preparation and submittal of monthly DMRs
- performance monitoring and evaluation of water quality results from the groundwater treatment system, bedrock monitoring wells, and Ramble Creek
- monthly O&M activities and inspections of the groundwater IRM treatment system

Project Management

No changes are anticipated to the Federal-Mogul and WSP project management team during the CM phase.

Should you have any questions or comments regarding this CM progress report and corrective measures or RFI activities performed during the first quarter of 2010, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

cc: Mr. Christopher Jung, P.G., Kentucky Hazardous Waste Branch, Frankfort, KY
✓ Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

April 7, 2008

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601-1190

Re: January through March 2008 RFI Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the first quarter of 2008 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Products, Inc. facility in Scottsville, Kentucky. This report is being submitted in response to Agreed Order (AO) DMW 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. Subsequent quarterly progress reports will be submitted to the KDEP Hazardous Waste Branch (KHWB) during July and October 2008 and January 2009, if necessary. Each progress report will describe RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed by Federal-Mogul or WSP Environment & Energy and the Center for Cave and Karst Studies (CC&KS) on behalf of Federal-Mogul, during the first quarter of 2008 included:

- preparation and submittal of a fourth quarter 2007 RFI progress report
- submittal of Discharge Monitoring Reports (DMRs) with respect to Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 to KDEP Division of Water, KPDES Branch
- submittal of Ramble Creek surface water quality results to the KHWB, the U.S. Environmental Protection Agency (EPA), Allen County Health Department (ACHD), local government officials, and the property owner
- preparation and submittal of a Soil Interim Remedial Measure (IRM) Semi-Annual Performance Monitoring Report (SAPMR)
- contracting with an equipment vendor and remedial contractor for implementation of the KHWB-approved bedrock groundwater IRM system
- installation of the MW-12B pumping well and three piezometer in accordance with the groundwater IRM work plan
- analysis of dye trace sample results and continued preparation of the Dye Trace Report (DTR) by the CC&KS

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Agency Meetings and Contacts

WSP provided project updates to Christopher Jung, KHWB project manager, with regards to onsite installation of the MW-12B pumping well, three piezometers, activities regarding implementation/installation of the groundwater IRM, and preparation of the DTR.

During January and February 2008, WSP contacted the KDEP Division of Air Quality (KDAQ) regarding registration of air emissions from the groundwater pump and treatment system. Federal-Mogul received the KDAQ registration, for the groundwater IRM, during December 2007.

Document Submission

On January 11, February 11, and March 3, 2008, WSP submitted to the KPDES Branch, December 2007 and January and February 2008 DMRs indicating that no discharge occurred during each reporting period. The DMRs were submitted in accordance with Federal-Mogul's KPDES Permit No. KY 0106585.

On January 14, 2008, WSP submitted a RFI progress report for the period October 1 through December 31, 2007 (fourth quarter of 2007) to the KHWB and EPA in accordance with the AO and the KHWB-approved RFI work plans.

On February 5, 2008, WSP forwarded analytical results of surface water samples collected from Ramble Creek during December 2007, to the KHWB, EPA, the ACHD, local government officials, and the property owner.

On February 8, 2008, WSP submitted to the KHWB, the fifth SAPMR in accordance with the KHWB-approved Soil IRM. Groundwater quality samples were collected from unconsolidated material and bedrock monitoring wells to evaluate the effectiveness of source removal activities performed during June 2005 as part of the Soil IRM. The December 2007 groundwater results indicate that groundwater quality in the unconsolidated material and bedrock aquifers appears similar to groundwater results reported during previous semi-annual monitoring events.

Field Activities

Between March 10 and 14, 2008, WSP performed onsite activities including the conversion of existing monitoring well MW-12B to a large diameter pumping well as required by the KHWB-approved bedrock groundwater IRM. In addition, three double-cased piezometers were installed in the vicinity of MW-12B for recording groundwater drawdown measurements after the groundwater IRM system becomes operational. Federal-Mogul anticipates the groundwater IRM system will become operational during June 2008. Field activities for implementation/installation of the groundwater IRM are tentatively scheduled at the Scottsville facility during May and June 2008.

Results of Sampling and Testing

Water quality results from a Ramble Creek surface water sample, collected during December 2007, were submitted to the KHWB, EPA, local governmental officials, and the property owner in correspondence dated February 5, 2008.

During January 2008, WSP received validated groundwater quality results from groundwater samples collected during the December 2007 semi-annual performance monitoring event. On receipt of the validated groundwater sample results, WSP prepared a SAPMR which was forwarded to the KHWB on February 8, 2008. The next semi-annual performance monitoring event will be performed during May or June 2008.

The CC&KS continued to evaluate results from the dye trace data collected in the vicinity of the Scottsville facility. Federal-Mogul and WSP anticipate that the DTR may be submitted to the KHWB during the second quarter of 2008.

Work Planned

The following RFI activities may be completed during the second quarter of 2008:

- preparation and submittal of a RFI first quarter 2008 progress report
- preparation and submittal of the CC&KS prepared DTR
- periodic collection and analysis of Ramble Creek surface water samples to evaluate offsite migration pathways
- implementation/installation of the KHWB-approved groundwater IRM
- collection and analysis of groundwater samples from unconsolidated material and bedrock monitoring wells in accordance with the Soil IRM
- collection and analysis of Ramble Creek surface water, groundwater from onsite monitoring wells, and water samples associated with the groundwater IRM system
- preparation and submittal of work plans to the KHWB for additional investigations at the facility, if necessary

Schedule

Federal-Mogul and WSP anticipate that the groundwater IRM pump and treatment system will be operational during the second quarter (June) 2008. The treated groundwater will be discharged to a surface conveyance in accordance with Federal-Mogul's KPDES Permit No. KY 0106585.

Subsequent RFI progress reports will be submitted to the KHWB in accordance with the AO and RFI work plans. The next quarterly progress report will be submitted during the third quarter of 2008, covering the period of April 1 through June 30, 2008.

Field activities associated with implementation of the KHWB-approved groundwater IRM to be performed during the second quarter of 2008 include:

- construction of groundwater discharge piping from pumping wells MW-12B and MW-14B to the groundwater treatment facility
- installation of the groundwater treatment equipment
- construction of the treated groundwater discharge piping
- start-up and operation of the groundwater IRM system

WSP will perform semi-annual performance monitoring activities, in accordance with the KHWB-approved Soil IRM, during May or June 2008. WSP will notify the KHWB when the field activities schedule is finalized.

Difficulties Encountered

Federal-Mogul and WSP encountered no difficulties or delays during performance of onsite or offsite RFI or IRM activities during the period of January 1 through March 31, 2008.

Federal-Mogul and WSP await finalization of the DTR by the CC&KS. CC&KS is continuing work to complete the DTR associated with Federal-Mogul's Scottsville facility. CC&KS has indicated that the DTR will be completed in order that the DTR may be submitted to the KHWB during the second quarter of 2008.

Project Management

There were no changes in project management at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this RFI progress report, covering activities performed during the first quarter of 2008, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:eal
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cc: Mr. Christopher Jung, Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI

October 30, 2012

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: July through September 2012 Corrective Measures Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the third quarter of 2012 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted a Corrective Measures Study Work Plan (CMS WP) to the KHWB during August 2010 which the KHWB-approved on December 12, 2011. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

Corrective measures activities performed by WSP Environment & Energy LLC, on behalf of Federal-Mogul, during the third quarter of 2012 include:

- preparation and submittal of a second quarter 2012 CM progress report
- meetings and discussions with offsite property owners to request offsite access agreements to conduct soil gas (SG) sampling activities
- preparation and submittal to the Kentucky Transportation Cabinet (KTC) of an Encroachment Permit Application to conduct SG sampling activities in right-of-way of State Highway 3500
- discussions with the KHWB regarding refusal by an offsite property owner to provide access for SG or sub-slab vapor (SSV) sampling activities
- continued preparation of a sample results database for the risk assessment (RA)
- submittal to the KHWB requesting an extension for submittal of the RA

The following RFI or interim remedial measures (IRM) activities were performed during the reporting period:

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Docket No. 775276

- preparation and submittal of monthly Discharge Monitoring Reports (DMRs) to the Kentucky Division of Water (KDOW) KPDES Branch for the operating bedrock groundwater IRM treatment system
- WSP and the Operations & Maintenance (O&M) contractor exchanged granular activated carbon (GAC) in the liquid-phase polishing units of the groundwater treatment system
- continued operation, monitoring, and maintenance of the groundwater IRM treatment system

Agency Meetings and Contacts

During the third quarter of 2012, WSP provided Christopher Jung, KHWB project manager, periodic project updates, electronic messages, and telephone conversations with regards to CM activities being performed by Federal-Mogul and WSP at the Scottsville facility. These updates included discussions regarding securing offsite access to perform SG sampling activities, guidance regarding SG sampling protocols, and information regarding O&M and performance monitoring activities conducted on the groundwater IRM treatment system.

On July 12, 2012, Federal-Mogul and WSP received KHWB-approval to conduct offsite SG sampling activities at two locations within the right-of-way of State Highway 3500 (Old Gallatin Road). The right-of-way sampling activities required submittal and KTC-approval of an Encroachment Permit before the work could be performed. WSP contacted the KTC District Office in Bowling Green, Kentucky to secure the appropriate permit materials and discuss the Encroachment Permit process.

During September 2012, WSP contacted the KDOW KPDES Branch to request an update as to the status of Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit Renewal Application which was submitted to the KDOW during March 2012. The renewal application was submitted in accordance with requirements specified in Federal-Mogul's existing KPDES Permit No. KY 0106585. WSP was informed the renewal application was currently being processed by the KPDES Branch and existing permit conditions would continue in effect until the KPDES renewal permit is issued. Based on the information provided by the KPDES Branch, Federal-Mogul will continue to comply with conditions of existing KPDES Permit No. KY 0106585.

Document Submission

On July 16, August 14, and September 19, 2012, WSP submitted to the KDOW KPDES Branch, June, July, and August 2012 DMRs. The DMRs were submitted in accordance with Federal-Mogul's KPDES Permit No. KY 0106585 for the discharge of treated water from the operating bedrock groundwater IRM treatment system.

On August 9, 2012, WSP submitted a CM progress report for the period of April 1 through June 30, 2012 (second quarter of 2012) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

On August 14, 2012, WSP submitted a request to the KHWB for an extension to submit the RA. This extension was necessary due to continued difficulties Federal-Mogul and WSP encountered securing access to offsite properties to conduct SG sampling activities. The KHWB-approved the extension request so the RA submittal date is currently November 30,

2012. The KHWB-approved offsite work required obtaining a KTC Encroachment Permit which further delayed completion of offsite sampling activities.

On August 22, 2012, on behalf of Federal-Mogul, WSP submitted to the KTC District Office in Bowling Green, Kentucky an Encroachment Permit Application. The KTC permit was necessary to install two borings in the right-of-way of State Highway 3500 (Old Gallatin Road) from which SG samples would be collected to evaluate the offsite vapor intrusion pathway within the RA. On receipt of the KTC permit, WSP proceeded to schedule underground utility locator and drilling contractors to perform the KHWB-approved SG sampling.

Field or Pilot Testing Activities

On July 12, August 24, and September 11, 2012, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the onsite operating groundwater IRM treatment system. Monthly monitoring activities included collection and analysis of groundwater samples from onsite bedrock monitoring wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES Permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events.

On August 15, 2012, the O&M contractor (Mid-Atlantic Environmental Equipment) and WSP removed spent GAC material from the liquid-phase polishing units of the groundwater treatment system. Samples of the spent GAC material were collected by WSP and forwarded to a laboratory for waste characterization. Analytical results of the spent GAC, received during September 2012, indicated the GAC material was non-hazardous.

During late September 2012, WSP contracted with an underground utility locator service and a drilling contractor to schedule activities within the highway right-of-way in accordance with the KTC Encroachment Permit. These activities were required before the KHWB-approved borings could be installed from which SG samples would be collected. WSP anticipates that the offsite SG sampling activities will be performed during early October 2012.

Work Planned and Schedule

During the fourth quarter of 2012, the following CM activities and deliverables may be completed with regards to the Scottsville facility:

- preparation and submittal of a third quarter 2012 CM progress report
- perform SG sampling activities in highway right-of-way to obtain vapor results for evaluation of offsite exposure pathways during the RA
- seek access and conduct SG, SSV, or indoor air sampling at offsite locations
- evaluate historical and pre-design soil, groundwater, surface water, sub-slab (SSV), SG, and sediment concentration results with respect to potential onsite and offsite exposure pathways during performance of the human health and ecological screening RA
- preparation of the RA; continued difficulty gaining offsite property access to evaluate the vapor intrusion pathway may further delay submittal of the RA. The KHWB will be regularly updated.

Third quarter 2012 activities that will be performed with respect to continued implementation of the groundwater IRM treatment system will include:

- preparation and submittal of monthly DMRs in accordance with the existing KPDES permit
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system
- collection and analysis of monthly treated effluent water samples in accordance with the existing KPDES permit
- collection and analysis of monthly performance monitoring water samples from onsite bedrock monitoring wells, the groundwater IRM treatment system, and Ramble Creek
- provide responses to the KDOW KPDES Branch regarding re-issuance of existing KPDES permit (current KPDES Permit expired effective September 30, 2012)
- transportation and disposal of spent GAC material to an offsite disposal facility

Difficulties Encountered

Federal-Mogul and WSP continue to have difficulty securing access to offsite property because the property owner refuses to sign an access agreement for testing purposes. The property access is necessary to perform SSV, SG, or indoor air sampling at two residences and a commercial facility located on the property. This data is needed to complete the RA. Federal-Mogul and WSP will continue attempts to secure access to the offsite property for testing purposes. KDEP or Allen County Health Department (ACHD) assistance is likely needed in order to obtain property access to perform the offsite testing activities.

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this progress report and CM or RFI-IRM activities performed during the third quarter of 2012, please do not hesitate to contact me.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

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cc: Mr. Christopher Jung, Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

August 9, 2012

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

2012 AUG 14 A 10: 59
RESTORATION & UNDERGROUND STORAGE TANK BRANCH

Re: April through June 2012 Corrective Measures Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the second quarter of 2012 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc. facility located in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted a Corrective Measures Study Work Plan (CMS WP) to the KHWB during August 2010 which the KHWB-approved on December 12, 2011. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

Corrective measures activities performed by WSP Environment & Energy, LLC, on behalf of Federal-Mogul, during the second quarter of 2012 include:

- preparation and submittal of a first quarter 2012 CM progress report
- meetings with offsite property owners to seek their approval of access agreements to conduct sub-slab vapor (SSV) sampling activities
- discussions with KDEP legal staff regarding draft Environmental Covenant (EC)
- performance of KHWB-approved offsite SSV Work Plan activities
- ecological assessment of Ramble Creek (site visit and evaluation)
- discussion with KHWB regarding performance of offsite soil vapor (SV) sampling activities and refusal by certain owners of an offsite property to provide access for such activities

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Docket No. 175277

The following RFI or interim remedial measures (IRM) activities were performed during the reporting period:

- preparation and submittal of monthly Discharge Monitoring Reports (DMRs) for the operating bedrock groundwater IRM treatment system
- continued operation, monitoring, and maintenance of the groundwater IRM treatment system

Agency Meetings and Contacts

During the second quarter of 2012, WSP provided Christopher Jung, KHWB project manager, periodic project updates, electronic messages, and telephone conversations with regards to CM activities performed by Federal-Mogul and WSP at the Scottsville facility. These updates included discussions regarding securing offsite access agreements, conducting offsite SSV sampling activities, potential offsite SV sampling procedures as a replacement of SSV sampling at an offsite property where an access agreement could not be obtained, and information regarding operation and maintenance (O&M) and performance monitoring activities conducted on the groundwater IRM treatment system.

Federal-Mogul outside legal counsel and KDEP legal staff discussed and finalized the draft EC provided to the KHWB during December 2011. KDEP legal staff indicated that Federal-Mogul should delay securing ECs as this action was premature because the risk assessment (RA) has not been completed or submitted to the KHWB.

Document Submission

On April 6, May 16, and June 16, 2012, WSP submitted to the Kentucky Division of Water (KDOW), KPDES Branch, March, April, and May 2012 DMRs. The DMRs were submitted in accordance with Federal-Mogul's Kentucky Pollution Discharge Elimination System (KPDES) Permit No. KY 0106585 for the discharge of treated water from the operating bedrock groundwater IRM treatment system.

On May 10, 2012, WSP submitted a letter to the KHWB indicating that Federal-Mogul could not secure an access agreement with owners of offsite property to allow SSV sampling activities to be conducted at two residences and a commercial facility located on their property. A second property owner did sign an access agreement so offsite SSV sampling activities were performed at a second commercial facility during May 2012.

On June 27, 2012, WSP submitted a CM progress report for the period of January 1 through March 31, 2012 (first quarter of 2012) to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the AO.

On June 28, 2012, WSP provided groundwater and SSV sampling results to offsite property owners where groundwater and SSV samples were collected during May 2012. A copy of these

letters (dated June 26, 2012) and the sample results were forwarded to the KHWB and the Allen County Health Department (ACHD).

Field or Pilot Testing Activities

Between 2010 and 2012, Federal-Mogul and WSP conducted KHWB-approved pre-design investigations at offsite locations and the Scottsville facility. The pre-design investigations were performed to collect additional data to be evaluated during the RA pathway analysis. A brief description of the activities conducted during the pre-design investigations and the sample results will be provided in the draft RA. Pre-design investigations completed to date include:

- delineation of arsenic concentrations in onsite surface soil
- delineation of volatile organic compounds (VOCs) and cyanide in soil at the former cyanide treatment area
- collection and analysis of groundwater, surface water, and sediment samples for evaluation of offsite exposure pathways
- offsite SSV sampling for evaluation of the vapor to indoor air pathway

On May 10 and 11, 2012, WSP completed offsite SSV sampling at an offsite commercial property in accordance with the KHWB-approved SSV Work Plan. The collected SSV samples were analyzed for trichloroethene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE). No TCE or cis-1,2-DCE concentrations were detected in the offsite SSV samples collected during this investigation.

On June 28, 2012, WSP conducted an ecological assessment on approximately 4,000 feet of Ramble Creek from the Scottsville facility to a downstream man-made lake. The information and data collected during this assessment will be evaluated and reported in the ecological screening portion of the draft RA. Groundwater, surface water, and sediment sample results collected during pre-design investigations or monthly performance monitoring activities will be evaluated as part of draft RA.

On April 12, May 10, and June 13, 2011, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities at the onsite operating groundwater IRM treatment system. Monthly monitoring activities included collection and analysis of groundwater samples from onsite bedrock monitoring wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during the monthly monitoring events. Lastly, during May 2012, groundwater samples and a groundwater elevation measurement were collected from an offsite abandoned water well (W-12) located on property west of the Scottsville facility.

Work Planned and Schedule

During the third quarter of 2012, the following CM activities and deliverables may be completed with regards to the Scottsville facility:

- preparation and submittal of a second quarter 2012 CM progress report
- obtain Kentucky Department of Highways (KDOH) Encroachment Permit to conduct SV sampling in the right-of-way (ROW) of State Highway 31E/231 (Old Gallatin Road), as requested by the KHWB
- secure abutting property owner consent for KDOH Encroachment Permit activities
- implement KHWB-approved SV sampling activities in highway ROW post receipt of the KDOH permit and consent noted above
- initiate performance of the site-wide RA
- evaluate historical and pre-design soil, groundwater, surface water, SSV, SV, and sediment concentration data with respect to potential onsite and offsite exposure pathways during performance of the human health and ecological screening RA

Third quarter 2012 activities that will be performed with respect to continued implementation of the groundwater IRM treatment system will include:

- preparation and submittal of monthly DMRs in accordance with the existing KPDES permit
- monthly O&M activities to ensure efficient and effective operation of the implemented groundwater IRM treatment system
- collection and analysis of monthly performance monitoring water samples from onsite bedrock monitoring wells, the groundwater IRM treatment system, and Ramble Creek
- collection and analysis of monthly treated effluent water samples in accordance with the existing KPDES permit
- respond to the KDOW KPDES Branch regarding re-issuance of the existing KPDES permit (current KPDES permit expires on September 30, 2012)

Difficulties Encountered

The Director of Global EHS for Federal-Mogul and the Project Manager for WSP met with the owners of offsite properties on April 18, 2012 to seek access for KHWB-approved SSV sampling. Federal-Mogul had previously mailed the landowners copies of a basic access agreement with a cover letter explaining the purpose for the access. Because the property owners did not respond to the letters, the Federal-Mogul and WSP officials visited Scottsville to meet personally with the landowners. As noted above, the owner of one property agreed to grant access. However, during the April meeting with the other offsite property owners, Federal-Mogul and WSP were informed by the land owners that they would not sign an access agreement for Federal-Mogul to perform SSV sampling at their property, which contains two residences and a commercial facility. WSP reported this refusal to the KHWB (May 10, 2012) and requested guidance if the non-collection of these specific SSV samples would affect securing KHWB approval of the draft RA. The KHWB requested Federal-Mogul and WSP perform SV sampling in the highway ROW, which adjoins this specific property for collection of vapor data for evaluation during the RA. At this time, Federal-Mogul and WSP are working to secure land owner consent and a KDOH permit to conduct the requested offsite SV sampling activities.

If land owner consent to work within the highway ROW is not secured, as required by the KDOH Encroachment Permit, WSP will contact the KHWB to discuss the subject further. Federal-Mogul and WSP anticipate that securing KDOH permits and land owner consent for working in the highway ROW to collect SV samples will likely delay submittal of the draft RA to the KHWB. Currently, the draft RA is to be submitted to the KHWB on or before August 30, 2012. WSP will submit a formal written request for an extension of the draft RA submittal on or about August 15, 2012, if this action is necessary.

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this progress report and CM or RFI-IRM activities performed during the second quarter of 2012, please do not hesitate to contact me.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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cc: Mr. Christopher Jung, Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

WSP

April 23, 2013

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: January through March 2013 Corrective Measures Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

WSP Environment & Energy, now a part of WSP USA Corp. (WSP), is submitting this Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) progress report, on behalf of Federal-Mogul Corporation, for activities performed during the first quarter of 2013 at the Federal-Mogul Products, Inc., facility in Scottsville, Kentucky.

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved completion of the RCRA Facility Investigation (RFI) process and requested that Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted a Corrective Measures Study Work Plan (CMS WP) to the KHWB in August 2010, which the KHWB subsequently approved on December 12, 2011. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

WSP performed the following CM activities during the first quarter of 2013:

- prepared and submitted a fourth quarter 2012 CM progress report
- participated in telephone conservations with offsite property owner and KHWB project management regarding performance of offsite air sampling activities
- requested an extension (during fourth quarter of 2012) for submittal of the Risk Assessment (RA), which was subsequently approved by the KHWB on January 4, 2013

Docket No. 781585

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- prepared and submitted to the KHWB a pre-design investigation work plan entitled: "Offsite Indoor Air and Crawl Space Air Sampling Work Plan", which was subsequently approved on March 17, 2013

The following interim remedial measure (IRM) activities were performed during the reporting period:

- prepared and submitted a 2011-2012 Annual Operation and Maintenance (O&M) Report to the KHWB regarding the onsite IRM groundwater pump and treatment system
- prepared and submitted monthly Discharge Monitoring Reports (DMRs) to the Kentucky Division of Water (KDOW) Kentucky Pollution Discharge Elimination System (KPDES) Branch for the groundwater IRM treatment system
- WSP, the O&M contractor (Mid-Atlantic Environmental Equipment; MAE2), and the performance monitoring contractor (EnSafe) performed monthly inspections and maintenance of the groundwater IRM treatment system
- continued monthly monitoring of the groundwater IRM treatment system

Agency Meetings and Contacts

During the first quarter of 2013, WSP provided Christopher Jung, KHWB project manager, with periodic project updates with regards to CM activities being performed by Federal-Mogul and WSP at or near the Scottsville facility. These updates included discussions regarding offsite indoor and crawl space air sampling protocols; determining Regional Screening Levels (RSLs) to which KHWB compares soil, groundwater, and air results; offsite property access for conducting indoor and crawl space air sampling; and information regarding O&M and performance monitoring activities conducted on the groundwater IRM treatment system.

On January 4, 2013, Federal-Mogul received KHWB approval of a time extension for submittal of the RA. The time extension was requested in order to conduct additional offsite air sampling at a private property. Submission date for the RA is now June 28, 2013.

On February 18, 2013, WSP received a message from the KHWB that indicated the KHWB currently uses U.S. Environmental Protection Agency (EPA) Region 3 RSLs (June 2011) as screening levels for chemicals detected in soil, groundwater, and air.

On March 7, 2013, Federal-Mogul received KHWB approval of the pre-design investigation: "Indoor Air and Crawl Space Air Sampling Work Plan". This work plan includes collection and analysis of air samples on a private property located adjacent to the Scottsville facility.

On March 28, 2013, WSP telephoned and left a voice message for Christopher Jung indicating that the proposed offsite air sampling on an adjacent property was postponed due to a medical situation involving the property owner. WSP indicated that Federal-Mogul will maintain contact with the property owner and conduct the proposed offsite air sampling activities as soon as the

property owner returns to Scottsville. WSP prepared and submitted a letter to the KHWB describing the offsite air sampling delay and property access situation.

Document Submission

On January 15, February 5, and March 8, 2013, WSP submitted to the KDOW KPDES Branch, the December 2012 and January and February 2013 DMRs. The DMRs were submitted in accordance with Federal-Mogul's KPDES Permit No. KY 0106585 for the discharge of treated water from the groundwater IRM treatment system. During March 2012, Federal-Mogul submitted a Renewal Application package to the KPDES Branch to renew the existing KPDES Permit. Based on guidance provided by the KPDES Branch during September 2012, Federal-Mogul will continue to comply with conditions of the existing KPDES Permit until a new permit is issued.

On January 23, 2013, WSP submitted the 2011-2012 Annual O&M Report to the KHWB and EPA. This report covers performance monitoring and O&M activities conducted during the period of August 2011 through July 2012 with regards to the onsite operating bedrock IRM groundwater treatment system.

On February 11, 2013, WSP submitted a CM progress report to the KHWB and EPA for the period of October 1 through December 31, 2012 (fourth quarter of 2012).

On February 28, 2013, WSP submitted to the KHWB the pre-design investigation: "Indoor Air and Crawl Space Air Sampling Work Plan". This work plan includes collection and analysis of indoor air and crawl space air samples from an offsite property where two residences and a commercial facility are located. The "Indoor Air and Crawl Space Air Sampling Work Plan" sampling activities were proposed to evaluate the potential for vapor intrusion based on the soil gas results obtained during the fourth quarter of 2012 near the offsite property. The pre-design investigation air results will be evaluated with respect to the potential vapor intrusion pathway during the RA.

Field or Pilot Testing Activities

On January 9, February 6, and March 6, 2013, WSP or EnSafe conducted monthly monitoring activities associated with the groundwater IRM treatment system. Monthly monitoring activities included collection and analysis of groundwater samples from onsite bedrock monitoring and extraction wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES Permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during each monthly monitoring event.

Work Planned and Schedule

During the second quarter of 2013, WSP anticipates completing the following CM activities and deliverables with regards to the Scottsville facility:

- prepare and submit a first quarter 2013 CM progress report
- conduct offsite indoor air and crawl space air sampling activities on an adjacent property
- prepare and submit the site-wide RA

Second quarter 2013 activities that are anticipated to be performed with respect to continued operation of the groundwater IRM treatment system includes:

- collect and analyze monthly treated effluent water samples in accordance with the existing KPDES Permit
- prepare and submit monthly DMRs in accordance with the existing KPDES Permit
- perform monthly O&M activities to ensure efficient and effective operation of the groundwater IRM treatment system
- collect and analyze monthly performance monitoring water samples from onsite bedrock monitoring and extraction wells, the groundwater IRM treatment system, and Ramble Creek
- provide responses, if necessary, to the KDOW KPDES Branch regarding re-issuance of the existing KPDES Permit (current KPDES Permit expired effective September 30, 2012); KPDES renewal application submitted to the KPDES Branch during March 2012

Difficulties Encountered

During February 2013, EnSafe discovered that the EW-1 extraction well pump was not operating properly and there was a break in the water conveyance line inside in the EW-1 well vault. WSP, MAE2, and EnSafe visited the site in late February 2013 and completed repairs on the conveyance line and flow meter, and corrected telemetry issues in the treatment system control panel. MAE2 ordered a new extraction well pump which was installed in EW-1 during March 2013. After installation of the new pump, EW-1 was brought back online.

On March 22, 2013, WSP telephoned an offsite property owner to arrange a meeting and schedule the KHWB-approved offsite indoor and crawl space air sampling activities. WSP was informed that a medical situation with respect to the property owner had arisen and that the property owner would not be returning to the Scottsville area until mid- to late April 2013. WSP asked if another family member or individual in the Scottsville area could act on behalf of the property owner so that the offsite air sampling activities could proceed as planned. The property owner informed WSP that the proposed offsite air sampling would have to be delayed until their return to Scottsville sometime in April 2013. Therefore, this issue has resulted in Federal-Mogul and WSP delaying performance of the offsite air sampling activities. WSP telephoned and provided an update to the KHWB regarding delay of the offsite sampling activities. Federal-Mogul (through WSP or otherwise) will keep in contact with the property owner and re-schedule the offsite air sampling activities on their return to Scottsville.

Project Management

There were no changes in the project management team at Federal-Mogul during the reporting period. However, Brian Silfer has assumed the senior project management role at WSP and will work with WSP's project management team regarding the Scottsville site.
Should you have any questions or comments regarding this progress report and CM or RFI-IRM activities performed during the first quarter of 2013, please do not hesitate to contact me.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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cc: Mr. Christopher Jung, Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

February 11, 2013

Ms. April J. Webb, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: October through December 2012 Corrective Measures Progress Report
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No. KYD 005 458 401, Agency Interest #17

Dear Ms. Webb:

This progress report provides a summary of activities performed during the fourth quarter of 2012 as part of the Resource Conservation and Recovery Act (RCRA) Corrective Measures (CM) being conducted at the Federal-Mogul Products, Inc., located in Scottsville, Kentucky..

This report is being submitted in accordance with Agreed Order (AO) DWM 89098, Item C #19, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries executed on July 24, 1991. The KDEP Hazardous Waste Branch (KHWB) approved the completion of the RCRA Facility Investigation (RFI) process and requested that Federal-Mogul initiate a RCRA CM Study (CMS) at the Scottsville facility. Federal-Mogul submitted a Corrective Measures Study Work Plan (CMS WP) to the KHWB in August 2010, which the KHWB-approved on December 12, 2011. As described in the CMS WP, quarterly progress reports will be prepared and submitted to the KHWB as Federal-Mogul implements CM at the Scottsville facility.

Work Accomplished

CM activities performed by WSP Environment & Energy, now a part of WSP USA Corp., on behalf of Federal-Mogul, during the fourth quarter of 21012 include:

- prepared and submitted a third quarter 2012 CM progress report
- participated in telephone conservations with offsite property owner and KHWB project management regarding securing an access agreement to conduct offsite air sampling activities
- implemented the KHWB-approved offsite soil gas (SG) sampling activities along highway right-of-way
- prepared and submitted a Notice of Completion of Encroachment Work form to the Kentucky Transportation Cabinet (KTC)

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Docket No. 781586

- submitted a request for extension to the KHWB for completion and submittal of the Risk Assessment (RA)

The following interim remedial measures (IRM) activities were performed during the reporting period:

- prepared and submitted monthly Discharge Monitoring Reports (DMRs) to the Kentucky Division of Water (KDOW) Kentucky Pollution Discharge Elimination System (KPDES) Branch for the groundwater IRM treatment system operating at the facility
- WSP and the operation & maintenance (O&M) contractor (Mid-Atlantic Environmental Equipment; MAE2) performed monthly inspections and maintenance of the groundwater IRM treatment system
- continued monthly monitoring of the groundwater IRM treatment system

Agency Meetings and Contacts

During the fourth quarter of 2012, WSP provided Christopher Jung, KHWB project manager, with periodic project updates with regards to CM activities being performed by Federal-Mogul and WSP at and near the Scottsville facility. These updates included discussions regarding completed SG sampling, difficulties in securing access to perform offsite crawl space vapor and indoor air sampling activities, a request for support from the KHWB in discussing the SG sampling results with the offsite property owner, guidance regarding crawl space sampling protocols, and information regarding O&M and performance monitoring activities conducted on the groundwater IRM treatment system.

On October 29, 2012, Federal-Mogul and WSP telephoned Christopher Jung to discuss completed offsite sub-slab vapor (SSV) and SG sampling results, denial of access by the owner of the offsite property where crawl space vapor and indoor air sampling was proposed, and based on the denial of access to conduct the additional offsite sampling activities, a request for extension to complete the RA. Mr. Jung indicated that he would contact the offsite property owner to assist in securing access so that the additional sampling activities could be performed.

On November 8, 2012, WSP received a voicemail message from Mr. Jung indicating that the KHWB had contacted the offsite property owner and discussed the ongoing offsite investigation activities being performed by Federal-Mogul. After receiving the call from KHWB, the property owner contacted Federal-Mogul and an offsite property access agreement was executed, allowing Federal-Mogul to proceed with the crawl space vapor and indoor air sampling in the offsite structures. However, the property owner requested that Federal-Mogul delay the proposed offsite vapor and air sampling efforts until late March or early April 2013.

Document Submission

On October 18, November 2, and December 3, 2012, WSP submitted to the KDOW KPDES Branch, the September, October, and November 2012 DMRs. The DMRs were submitted in

accordance with Federal-Mogul's KPDES Permit No. KY 0106585 for the discharge of treated water from the groundwater IRM treatment system. During March 2012, Federal-Mogul submitted a Renewal Application package to the KPDES Branch to renew the existing KPDES Permit. Based on guidance provided by the KPDES Branch during September 2012, Federal-Mogul will continue to comply with conditions of the existing KPDES Permit until a new permit is issued.

On October 30, 2012, WSP submitted a CM progress report to the KHWB and the U.S. Environmental Protection Agency (EPA) for the period of July 1 through September 30, 2012 (third quarter of 2012).

On November 2, 2012, on behalf of Federal-Mogul, WSP submitted SG sampling results to the KHWB, the Allen County Health Department (ACHD), and the adjacent property owner. The SG sampling was performed on October 2, 2012 in the highway right-of-way adjacent to the offsite property.

On November 5, 2012, WSP provided the offsite property owner groundwater results from the abandoned water well, which was sampled in October 2012. A copy of the groundwater results were forwarded to the KHWB and the ACHD.

On November 13, 2012, WSP on behalf of Federal-Mogul, submitted a Notice of Completion of Encroachment Work to the KTC District Office in Bowling Green, Kentucky. This action concludes work associated with the KTC Encroachment Permit which Federal-Mogul secured to perform SG sampling activities in a highway right-of-way adjacent to the Scottsville facility. The SG sampling activities were performed on October 2, 2012.

On December 12, 2012, WSP requested an extension from the KHWB for completion of the RA. This extension was necessary so that Federal-Mogul can perform crawl space vapor and indoor air sampling activities at offsite structures and include an evaluation of the results in the RA. The proposed offsite vapor and indoor air sampling activities are tentatively scheduled, pending property owner consent, to be performed during late March or early April 2013.

Field or Pilot Testing Activities

On October 2, 2012, WSP performed offsite SG sampling activities in the highway right-of-way which separates the Scottsville facility from the adjacent private properties. A private utility locator cleared the sample locations before drilling activities were initiated. Two SG samples and a duplicate sample were collected during the field activities and analyzed for selected volatile organic compounds (VOCs). Copies of the SG sampling results were forwarded to the property owner, the KHWB, and the ACHD in correspondence dated November 2, 2012.

On October 3, November 8, and December 6, 2012, WSP and EnSafe (performance monitoring contractor) conducted monthly monitoring activities associated with the groundwater IRM

treatment system. Monthly monitoring activities included collection and analysis of groundwater samples from onsite bedrock monitoring and extraction wells, system performance monitoring data, and treated effluent water quality samples in accordance with Federal-Mogul's KPDES Permit. In addition, surface water samples were collected from Ramble Creek and groundwater elevation measurements and IRM system flow meter readings were recorded during each monthly monitoring event. Groundwater samples were collected from an offsite abandoned water well during the October 2012 monitoring event.

Work Planned and Schedule

During the first quarter of 2013, WSP anticipates completing the following CM activities and deliverables with regards to the Scottsville facility:

- prepare and submit a fourth quarter 2012 CM progress report
- prepare an indoor air and crawl space sampling work plan for submittal to the KHWB
- finalize access and conduct crawl space vapor and indoor air sampling activities at offsite structures (late March or early April 2013) upon receiving final property owner consent

First quarter 2013 activities that are anticipated to be performed with respect to continued operation of the groundwater IRM treatment system include:

- prepare and submit monthly DMRs in accordance with the existing KPDES Permit
- perform monthly O&M activities to ensure efficient and effective operation of the groundwater IRM treatment system
- collect and analyze monthly treated effluent water samples in accordance with the existing KPDES Permit
- collect and analyze monthly performance monitoring water samples from onsite bedrock monitoring wells, the groundwater IRM treatment system, and Ramble Creek
- provide responses, if necessary, to the KDOW KPDES Branch regarding re-issuance of existing KPDES permit (current KPDES Permit expired effective September 30, 2012); KPDES renewal application submitted to KPDES Branch during March 2012

Difficulties Encountered

Federal-Mogul and WSP continued to have difficulty securing access to the offsite properties to perform the additional crawl space vapor and indoor air sampling activities. Federal-Mogul and WSP contacted the KHWB for support in obtaining access to the properties. The KHWB contacted the property owner and discussed the October 2012 SG results and why further testing on the property was necessary. The property owner subsequently contacted Federal-Mogul and agreed to provide access to the three structures on the properties for crawl space and indoor air sampling. As noted above, the property owner requested the additional offsite testing activities be delayed until late March or early April 2013. Federal-Mogul agreed to the property owner's request and WSP will contact the landowner in late March 2013 to arrange the proposed crawl space vapor and indoor air sampling activities. WSP will evaluate the indoor air

and crawl space vapor sample results during performance of the site-wide RA to evaluate the potential groundwater to indoor air pathway.

Project Management

There were no changes in the project management team at Federal-Mogul or WSP during the reporting period.

Should you have any questions or comments regarding this progress report and CM or RFI-IRM activities performed during the fourth quarter of 2012, please do not hesitate to contact me.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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cc: Mr. Christopher Jung, Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

February 28, 2013

Mr. Christopher Jung, P.G.
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
200 Fair Oaks Lane
Frankfort, KY 40601-1190

Re: Pre-Design Investigation/Risk Assessment
Offsite Indoor and Crawl Space Air Sampling Work Plan
Federal-Mogul Products, Inc., Scottsville, Kentucky
I.D. No KYD 005 458 401, Agency Interest #17

Docket No. 781584

Dear Mr. Jung:

On behalf of, Federal-Mogul Products, Inc., WSP Environment & Energy, now part of WSP USA Corp. (WSP), has prepared this Offsite Indoor and Crawl Space Air Sampling Work Plan to evaluate the potential for vapor intrusion in the vicinity of Federal-Mogul's facility in Scottsville, Allen County, Kentucky. The air results from this offsite investigation will be used in the site's risk assessment that will be prepared in accordance with the Kentucky Hazardous Waste Branch (KHWB)-approved Risk Assessment Work Plan (RAWP) and revisions, dated May 26 and August 4, 2011, respectively. The offsite air sampling scope of work includes:

- collection and analysis of an indoor air sample from a commercial facility
- collection and analysis of crawl space air samples from two residences
- collection and analysis of an ambient outdoor air quality sample

The following sections provide an overview of the project, a description of the proposed field activities, and the proposed schedule for conducting the field activities.

Background

In October 2012, WSP collected two soil gas samples on the west side of State Highway 3500 at the approximate locations designated OS SV-1 and OS SV-2 on Figure 1. The samples were collected west of the Federal-Mogul Scottsville facility and adjacent to the eastern boundary of a private property (i.e., Lyle Property). Two residential buildings and a commercial building are on the eastern portion of the Lyle Property. The soil gas samples contained concentrations of volatile organic compounds (VOCs), namely trichloroethene (TCE) and cis-1,2-dichloroethene

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(cis-1,2-DCE). In addition, TCE and cis-1,2-DCE were previously detected in groundwater samples collected from an abandoned water well on the Lyle Property, which is designated W12 on Figure 1. The VOC concentrations detected in soil gas and groundwater suggest that additional data should be obtained to evaluate the vapor intrusion pathway for the three buildings west of the Federal-Mogul facility.

During a November 2012 telephone conversation between Federal-Mogul, WSP, and the owner of the Lyle Property, consent was given for the collection of indoor and crawl space air samples at the commercial and two residential structures, respectively. According to guidance from the KHWB Risk Group, the crawl space air samples collected beneath residential living spaces should be evaluated as potential indoor air concentrations in a risk assessment. Federal-Mogul secured an access agreement in December 2012 to perform the work. However, the landowner requested that the offsite sampling activities be delayed until late March or early April 2013. The property owner further requested that Federal-Mogul and WSP not contact the residents or employees of the commercial facility until they have been notified by the property owner of the proposed air sampling activities.

Scope of Work

Currently, the Kentucky Department for Environmental Protection (KDEP) has not developed specific indoor or crawl space air sampling guidance. Therefore, the indoor, crawl space, and outdoor air sampling activities will be conducted in accordance with the U.S. Environmental Protection Agency (EPA) OSWER November 2002 *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*.

Pre-Sampling Interview, Building Inspections and Materials Inventory

On receiving approval from the property owner to proceed with the offsite air sampling activities, WSP will visit the residential and commercial buildings to obtain information on their accessability to assist in project planning and scheduling of the sampling activities. Based on available information, the commercial facility is operated by an upholstery business and is constructed with a slab-on-grade foundation. The two residences are reportedly constructed with crawl spaces beneath the living quarters. However, it is not yet known whether there are basement areas beneath a portion of the living quarters, or if the crawl spaces are accessible. A pre-sampling site inspection and materials inventory will be conducted at each residence and the commercial facility a minimum of 1 day before performing the indoor and crawl space air sampling activities. WSP will confirm the building construction information during the pre-sampling interview, complete the EPA Occupied Dwelling Questionnaire (Enclosure A) with the property owner, and identify any chemicals or equipment stored in the crawl spaces and the commercial building that could potentially interfere with the results of the proposed indoor and crawl space air samples. Volatile ingredients of each material, if available, will be recorded on the questionnaire form and the containers will be monitored with a photoionization detector for

potential vapor emissions. If the contents of a container are not listed on the label, WSP will record the product name and manufacturer's name and address (if available) on the inventory form.

Materials and equipment of potential concern include, but are not limited to, petroleum products, gas-powered equipment, kerosene heaters, petroleum-based finishes, products containing petroleum distillates, solvents, cosmetics, perfumes and colognes, and pesticides.
Based on the findings of the inventories, WSP will request that any materials or equipment that contain the target VOC's (i.e., TCE, cis-1,2-DCE, or degradation compounds) be removed from the structure, or sealed in plastic bags at least 24 hours before the scheduled sampling time. If the owner or building occupants do not comply with this request, WSP will note the presence and location of the material(s) on the sampling log during initiation of the sampling activities. In addition, WSP will provide the property owner and building occupants, if necessary, a list of the activities specified in the New York State Department of Health's *Soil Vapor Intrusion Guidance* (October 2006) that should be avoided within 24 hours of sample collection (Enclosure B).

Sampling Activities

The indoor (IA-1) and crawl space air (CS-1 and CS-2) samples will be collected 1 to 2 days after performing the building inspections and pre-sampling interviews. The proposed sample locations are provided on Figure 1. As discussed below, the ambient outdoor air sample location will be selected on the day of sampling and will be upwind of proposed indoor and crawl space air sample locations.

Indoor and Outdoor Air Sampling

One indoor air (IA-1; Figure 1), one duplicate indoor air samples will be collected in the commercial building to evaluate the potential for vapor intrusion. The indoor air samples will be collected over 24-hours using evacuated, certified clean 1-liter Restek (or similar) canisters, equipped with a flow regulator pre-set by the analytical laboratory to collect the samples over 24 hours. A "T" valve provided by the laboratory will be used to collect the duplicate indoor air sample during collection of IA-1. The indoor air sample canisters will be positioned between 3 and 5 feet above the concrete floor to be representative of the breathing zone. Physical and visual barriers will be placed around each canister, if necessary, so the canisters are not disturbed during sample collection.

An ambient outdoor air sample will be collected on the private property during performance of the indoor and crawl space air sampling activities to evaluate potential background VOC concentrations. An outdoor air sample (OA-1) will be collected upwind of the residences and commercial facility. The outdoor air sample location will be selected in the field based on the prevailing wind direction and other field conditions. The outdoor air sample will be collected over 24-hours using evacuated, certified clean, 1-liter Restek (or similar) canisters, equipped with a flow regulator pre-set by the analytical laboratory to collect the samples over a 24-hour

period. The outdoor air sample canister will be positioned approximately 5 feet above the ground surface and away from wind obstructions, if possible (e.g., trees, brush, wooden fences). Outdoor air sample collection will begin 1 to 2 hours before the indoor or crawl space air sample collection activities are initiated. Physical and visual barriers will be placed around the canister, if necessary, so the canister is not disturbed during sample collection.

Crawl Space Air Sampling

Crawl space air samples (CS-1 and CS-2; Figure 1) will be collected from the two residential structures on the eastern portion of the Lyle Property. A duplicate crawl space air sample will be collected from the proposed CS-2 sample location. A "T" valve provided by the laboratory will be used to collect the duplicate crawl space air sample during collection of CS-2. The crawl space air samples will be collected over 24 hours using evacuated, certified clean, 1-liter Restek (or similar) canisters, equipped with a flow regulator pre-set by the analytical laboratory to collect the samples over a 24-hours.

After 24 hours have elapsed from initiation of the air sampling activities, the flow regulator will be removed from the canister to complete the sample collection, and the canister will be labeled with a unique sample identification number. The sample identification number, location, time and date of sample collection, canister and regulator number, and analytical method will be recorded on the chain-of-custody form or in the field log book. The sample canisters will be shipped by overnight delivery to Centek Laboratories in Syracuse, New York, for analysis of TCE and cis-1,2-DCE using EPA Method TO-15. The air samples will be analyzed on a standard turnaround time (approximately 1 week from receipt). The final analytical data package will be validated by an independent third-party data validator.

During the proposed offsite air sampling activities, meteorological conditions (i.e., wind direction, wind speed, temperature, barometric pressure, and relative humidity) will be obtained at the beginning and end of the air sampling activities from a local National Weather Service location.

Quality Assurance/Quality Control

Field quality assurance/quality control (QA/QC) procedures for the proposed offsite air and vapor sampling activities, will include the collection and analysis of two blind duplicate samples and a trip blank. One blind duplicate will be collected concurrently with the indoor air sample (IA-1) from the commercial facility. A second duplicate sample will be collected at crawl space air sample location CS-2. The blind duplicate samples will be analyzed with the other air samples to evaluate the reproducibility of the sample collection and analytical procedures. The trip blank, which is used to evaluate the potential for cross-contamination during transit, will accompany the sample containers during shipment to the site and from the site to the analytical laboratory. The trip blank sample will be analyzed for TCE and cis-1,2-DCE using EPA Method TO-15.

Project Schedule and Reporting

WSP anticipates that a minimum of two site visits will be necessary to complete the indoor and crawl space air sampling activities outlined in this work plan.

As requested by the property owner, the pre-sampling interview and building inspections will likely be conducted during late March or early April 2013. WSP anticipates that the field sampling activities will be performed approximately 2 days (minimum) after completion of the pre-sampling activities. The sampling schedule will depend on receiving final property owner consent and timing for access to the structures. WSP will notify the KHWB once the pre-sampling interview, building inspection, and sampling activities are scheduled. The air sample results will be provided to the property owner, the KHWB, and the Allen County Health Department within 4 weeks of receiving the validated final data. In addition, the air sample results will be used in the risk assessment prepared for the site.

If this Indoor and Crawl Space Air Sampling Work Plan is acceptable to the KHWB, please provide your written approval so that Federal-Mogul and WSP can proceed with arranging the pre-sampling activities with the property owner at their earliest availability.

Please contact us if you have any questions regarding this scope of work.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:paw
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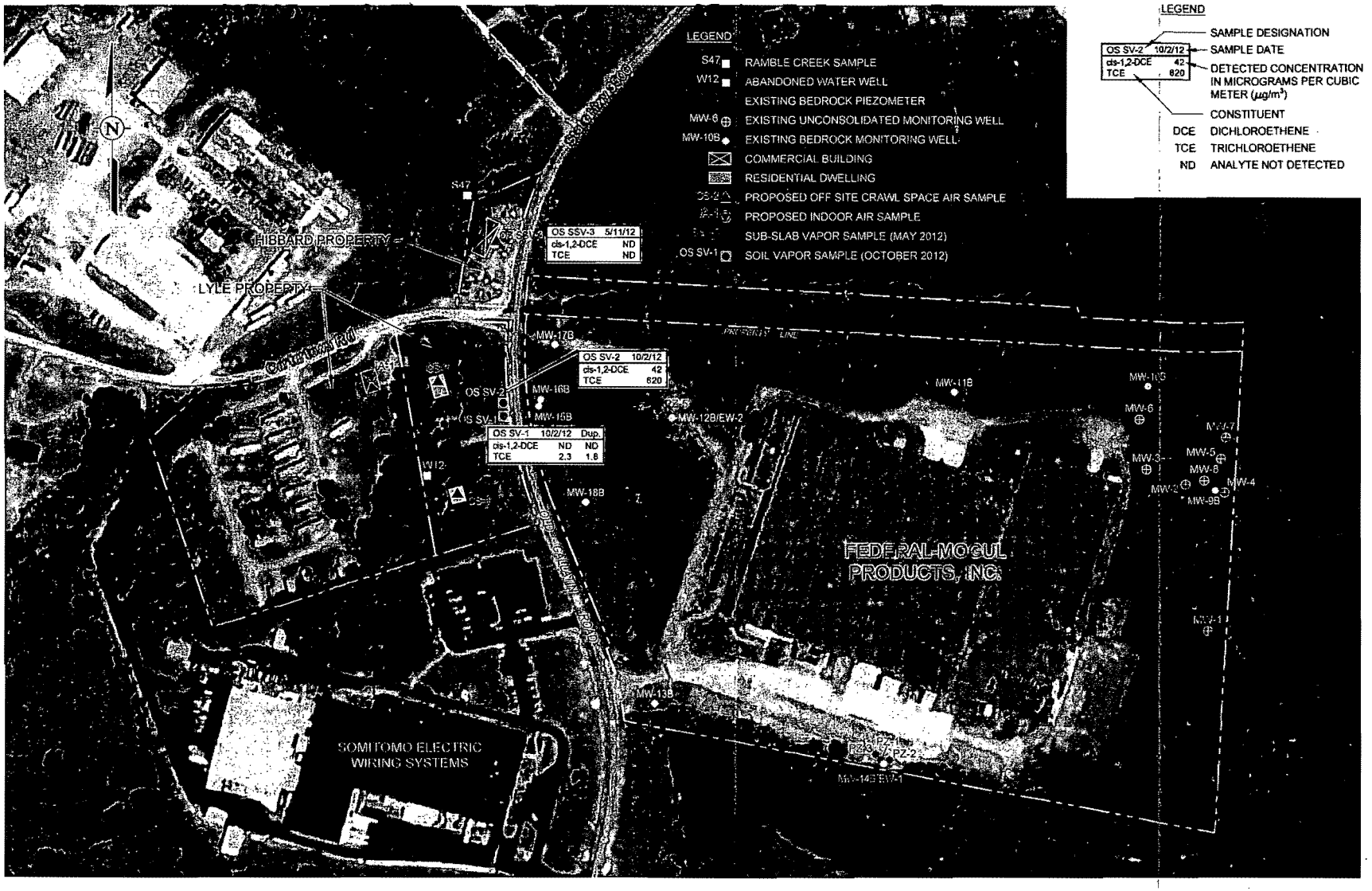
Enclosure

cc: Ms. April J. Webb, P.E., Kentucky Hazardous Waste Branch, Frankfort, KY
Mr. Jon Johnston, U.S. EPA, Region 4, Atlanta, GA
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI

Figure



REFERENCE:

GOOGLE EARTH AERIAL PHOTOGRAPH DATED JUNE 15, 2008.

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK & WHITE REPRODUCTION MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

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FIGURE 1

PROPOSED OFFSITE INDOOR AND CRAWL SPACE AIR SAMPLING LOCATIONS AND OFFSITE VAPOR RESULTS

FEDERAL-MOGUL PRODUCTS, INC. FACILITY
SCOTTSVILLE, KENTUCKY

PREPARED FOR
FEDERAL-MOGUL PRODUCTS, INC.
SOUTHFIELD, MICHIGAN

Drawn By: RC 02/27/13
Checked:
Approved:
DWG Name: 00005620-B17

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Enclosure A
US EPA Occupied Dwelling Questionnaire

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: _____

1. Name:_____

   Address:_____

   _____

   Home Phone:_____ Work Phone:_____

2. What is the best time to call to speak with you?_____ At: Work ❑ or Home ❑?

3. Are you the Owner ❑, Renter ❑, Other ❑ (please specify)_____ of this Home/Structure?

4. Total number of occupants/persons at this location?_____
   Number of children? _____ Ages?_____

5. How long have you lived at this location? _____

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ❑, Duplex ❑, Condominium❑, Townhouse ❑, Other ❑_____

7. Home/Structure Description: number of floors _____
   Basement? Yes ❑ No ❑
   Crawl Space? Yes ❑ No ❑
   If Yes, under how much of the house's area? ____%

8. Age of Home/Structure: _____ years, Not sure/Unknown ❑

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ❑, Brick ❑, Concrete ❑, Cement block ❑, Other ❑_____

10. Foundation Construction (check all that apply):
    Concrete slab ❑
    Fieldstone ❑
    Concrete block ❑

Elevated above ground/grade ❑
Other_____

11. What is the source of your drinking water (check all that apply)?
Public water supply ❑
Private well ❑
Bottled water ❑
Other, please specify _____

12. Do you have a private well for purposes other than drinking?
Yes ❑ No ❑
If yes, please describe what you use the well for:_____
_____

13. Do you have a septic system? Yes ❑ No ❑ Not used ❑ Unknown ❑

14. Do you have standing water outside your home (pond, ditch, swale)? Yes ❑ No ❑

Basement Description, please check appropriate boxes.
<u>If you do not have a basement</u> go to question 23.

15. Is the basement finished ❑ or unfinished ❑?
16. If finished, how many rooms are in the basement?_____
How many are used for more than 2 hours/day?_____
17. Is the basement floor (check all that apply) concrete ❑, tile ❑, carpeted ❑, dirt ❑, other❑(describe)_____?
18. Are the basement walls poured concrete ❑, cement block ❑, stone ❑, wood ❑, brick ❑, other❑_____?
19. Does the basement have a moisture problem (check one only)?
Yes, frequently (3 or more times/yr) ❑
Yes, occasionally (1-2 times/yr) ❑
Yes, rarely (less than 1 time/yr) ❑
No ❑

20. Does the basement ever flood (check one only)?
Yes, frequently (3 or more times/yr) ❑
Yes, occasionally (1-2 times/yr) ❑
Yes, rarely (less than 1 time/yr) ❑
No ❑

21. Does the basement have any of the following? (check all that apply) Floor cracks ❑, Wall cracks ❑, Sump ❑, Floor drain ❑, Other hole/opening in floor ❑ (describe)_____

22. Are any of the following used or stored in the basement (check all that apply)
Paint ❑ Paint stripper/remover ❑ Paint thinner ❑
Metal degreaser/cleaner ❑ Gasoline ❑ Diesel fuel ❑ Solvents ❑ Glue ❑
Laundry spot removers ❑ Drain cleaners ❑ Pesticides ❑

23. Have you recently (within the last six months) done any painting or remodeling in your home? Yes ❑ No ❑
If yes, please specify what was done, where in the home, and what month:
_____
_____

24. Have you installed new carpeting in your home within the last year? Yes ❑ No ❑
If yes, when and where?_____

25. Do you regularly use or work in a dry cleaning service (check only one box)?
Yes, use dry-cleaning regularly (at least weekly)❑
Yes, use dry-cleaning infrequently (monthly or less)❑
Yes, work at a dry cleaning service ❑
No ❑

26. Does anyone in your home use solvents at work?
Yes ❑ If yes, how many persons_____
No ❑ If no, go to question 28

27. If yes for question 26 above, are the work clothes washed at home? Yes ❑ No ❑

28. Where is the washer/dryer located?
Basement ❑
Upstairs utility room ❑
Kitchen ❑
Garage ❑
Use a Laundromat ❑
Other, please specify ❑_____

29. If you have a dryer, is it vented to the outdoors? Yes ❑ No ❑

30. What type(s) of home heating do you have (check all that apply)
Fuel type: Gas ❑, Oil ❑, Electric ❑, Wood ❑, Coal ❑, Other_____
Heat conveyance system: Forced hot air ❑
Forced hot water ❑
Steam ❑
Radiant floor heat ❑
Wood stove ❑
Coal furnace ❑
Fireplace ❑
Other_____

31. Do you have air conditioning? Yes ❑ No ❑. If yes, please check the appropriate type(s)
Central air conditioning ❑
Window air conditioning unit(s)❑
Other ❑, please specify_____

32. Do you use any of the following? Room fans ❑, Ceiling fans ❑, Attic fan ❑
Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ❑ No ❑

33. Has your home had termite or other pesticide treatment: Yes ❑ No ❑ Unknown ❑
If yes, please specify type of pest controlled, _____
and approximate date of service _____

34. Water Heater Type: Gas ❑, Electric ❑, By furnace ❑, Other ❑_____
Water heater location: Basement ❑, Upstairs utility room ❑, Garage ❑, Other ❑ (please describe) _____

35. What type of cooking appliance do you have? Electric ❑, Gas ❑, Other ❑_____

36. Is there a stove exhaust hood present? Yes ❑ No ❑
Does it vent to the outdoors? Yes ❑ No ❑

37. Smoking in Home:
None ❑, Rare (only guests)❑, Moderate (residents light smokers)❑, Heavy (at least one heavy smoker in household)❑

38. If yes to above, what do they smoke?
Cigarettes ❑ Cigars ❑
Pipe ❑ Other ❑

39. Do you regularly use air fresheners? Yes ❑ No ❑

40. Does anyone in the home have indoor home hobbies of crafts involving: None ❑
Heating ❑, soldering ❑, welding ❑, model glues ❑, paint ❑, spray paint, wood finishing ❑, Other ❑ Please specify what type of hobby: _____
_____

41. General family/home use of consumer products (please circle appropriate): Assume that **Never** = never used, **Hardly ever** = less than once/month, **Occasionally** = about once/month, **Regularly** = about once/week, and **Often** = more than once/week.

Product	Frequency of Use				
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often

Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often

(Question 41, continued)

Product	Frequency of Use				
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on oven cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often

42. Please check weekly household cleaning practices:
    Dusting ❑
    Dry sweeping ❑
    Vacuuming ❑
    Polishing (furniture, etc) ❑
    Washing/waxing floors ❑
    Other ❑ _____

43. Other comments: _____

the building inventory form [Appendix B]. When samples are collected, the building's HVAC system should be operating in a manner consistent with normal operating conditions when the building is occupied (e.g., schools, businesses, etc.). Unnecessary building ventilation should be avoided within 24 hours prior to and during sampling. During colder months, heating systems should be operating to maintain normal indoor air temperatures (i.e., 65 – 75 °F) for at least 24 hours prior to and during the scheduled sampling time.

Depending upon the goal of the indoor air sampling, some situations may warrant deviation from the above protocol regarding building ventilation. In such cases, building conditions and sampling efforts should be understood and noted within the framework and scope of the investigation.

To avoid potential interferences and dilution effects, occupants should make a reasonable effort to avoid the following for 24 hours prior to sampling:

a. opening any windows, fireplace dampers, openings or vents;
b. operating ventilation fans unless special arrangements are made;
c. smoking in the building;
d. painting;
e. using a wood stove, fireplace or other auxiliary heating equipment (e.g., kerosene heater);
f. operating or storing automobile in an attached garage;
g. allowing containers of gasoline or oil to remain within the house or garage area, except for fuel oil tanks;
h. cleaning, waxing or polishing furniture, floors or other woodwork with petroleum- or oil-based products;
i. using air fresheners, scented candles or odor eliminators;
j. engaging in any hobbies that use materials containing volatile chemicals;
k. using cosmetics including hairspray, nail polish, nail polish removers, perfume/cologne, etc.;
l. lawn mowing, paving with asphalt, or snow blowing;
m. applying pesticides;
n. using building repair or maintenance products, such as caulk or roofing tar; and
o. bringing freshly dry-cleaned clothing or furnishings into the building.

2.11.2 Product inventory

The primary objective of the product inventory is to identify potential air sampling interference by characterizing the occurrence and use of chemicals and products throughout the building, keeping in mind the goal of the investigation and site-specific contaminants of concern. For example, it is not appropriate to provide detailed information for each individual container of like items. However, it is appropriate to indicate that "20 bottles of perfume" or "12 cans of latex paint" were present with containers in good condition. This information is used to help formulate an indoor environment profile.

Ken LaPierre

ENVIRONMENTAL STRATEGIES CONSULTING LLC
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2004 FEB 25 A 10: 05

February 17, 2004

Mr. Michael V. Welsh, P.E., Manager
Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601-1190

Re: October through December 2003 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welsh:

This progress report provides a summary of activities performed during the fourth quarter of 2003 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility in Scottsville, Kentucky. This report is being submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. Subsequent quarterly progress reports will be submitted to the KDEP's Hazardous Waste Branch (KHWB) during April, July, October 2004, and January 2005, if necessary. Each progress report will describe RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed by Federal-Mogul and Environmental Strategies Consulting LLC during the fourth quarter of 2003 included:

- preparation and submittal of the third quarter 2003 progress report
- preparation and submittal of the Geophysical Survey Report (GSR)
- participation in a telephone conference call, telephone calls, and email correspondence with the KHWB project manager regarding the Geophysical Survey and RFI Phase IV reports
- continuing evaluation of hydrogeologic and water quality results with respect to the Karst Survey Work Plan (KSWP) and a private water supply well survey

 Docket Number _____

Agency Contacts and Meetings

Environmental Strategies participated in several telephone conversations, a conference call, and corresponded via email with Christopher Jung, the KHWB project manager, regarding review of the RFI Phase IV and Geophysical Survey reports and KHWB comments with respect to these reports.

On December 23, 2003, Dale Burton and Christopher Jung of the KHWB's Frankfort office, Federal-Mogul, and Environmental Strategies participated in a telephone conference call to discuss KHWB draft comments on the RFI Phase IV and Geophysical Survey reports. In addition, Federal-Mogul described an action plan and schedule regarding RFI activities to be performed at the Scottsville facility during the first six months of 2004. Future activities include;

- the preparation, submittal, and implementation of a RFI Phase V Work Plan to address KHWB RFI Phase IV and Geophysical Survey report comments
- preparation, submittal, and implementation of the KSWP which will include a private water supply well survey
- pit pre-excavation activities that may be conducted with respect to the alleged onsite drum burial activities

Document Submission

On October 3, 2003, Environmental Strategies submitted the GSR to the KHWB and the U.S. Environmental Protection Agency (EPA) in accordance with the KHWB-approved Geophysical Survey Work Plan (GSWP). The GSWP was approved by the KHWB in correspondence dated May 5, 2003. Geophysical surveys were performed at the Scottsville facility during July 2003.

On November 6, 2003, Environmental Strategies submitted a RFI progress report for the period of July 1 through September 30, 2003 (third quarter of 2003), to the KHWB and the EPA in accordance with the AO and the KHWB-approved RFI Work Plans.

No other documents were submitted to the KHWB during the fourth quarter of 2003.

Field Activities

Federal-Mogul and Environmental Strategies performed no field activities at the Scottsville site during the reporting period.

Results of Sampling and Testing

No sampling of soil or groundwater was conducted during the fourth quarter of 2003 at the Scottsville facility.

Work Planned

The following RFI activities are planned for the first quarter of 2004 pending KHWB approval of associated work plans including:

- fourth quarter 2003 RFI progress report
- RFI Phase V Work Plan
- KSWP
- additional RFI work plans, as necessary
- discussions via telephone calls and email with the KHWB project manager regarding approval and subsequent implementation of the Phase V and the Karst Survey work plans

Schedule

Subsequent RFI progress reports will be submitted to the KHWB in accordance with the AO and the KHWB-approved RFI Work Plans. The next quarterly progress report will be submitted during April 2004, for the period January 1 through March 31, 2004.

Federal-Mogul and Environmental Strategies will implement the RFI Phase V Work Plan activities on KHWB approval of the RFI Phase V Work Plan. The Phase V investigation includes additional delineation of constituents in soil in the former disposal pit areas, the northern field, and background areas. Arsenic speciation, soil profiling, total metals, volatile organic compound (VOC), and cyanide soil samples will be collected for laboratory analysis. In addition, a maximum of five unconsolidated and two bedrock monitoring wells will be installed to further evaluate conditions in the unconsolidated and bedrock aquifers. Federal-Mogul anticipates implementing the Phase V field activities during late February or early March 2004 pending KHWB approval of the Phase V Work Plan.

During the first quarter of 2004, Federal-Mogul and Environmental Strategies will prepare and submit a focused KSWP to the KHWB for approval. The KHWB has indicated that a KSWP was necessary as part of RFI activities being performed at the Scottsville facility. The KSWP will include a focused private water supply well supply survey as requested by the KHWB. Bedrock aquifer hydrologic information obtained during the RFI Phase V investigation will be evaluated to determine the topographic area to be investigated during the karst and private water well supply surveys. Federal-Mogul and Environmental Strategies anticipate implementing the KSWP during Spring 2004 (i.e., April through June) on the KHWB's approval of the KSWP.

Difficulties Encountered

No difficulties were encountered during performance of RFI activities for the period of October 1 through December 31, 2003.

Project Management

There were no changes in project management at Federal-Mogul or Environmental Strategies during the reporting period.

Should you have any questions or comments related to this RFI progress report, covering the fourth quarter of 2003, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmc
docs/Federal Mogul/138055/Progress Reports/4thqtr03pr.doc

cc: Ms. Caron Falconer, U.S. EPA, Region 4, Atlanta, GA
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Christopher Jung, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, c/o Federal-Mogul Corporation, Southfield, MI
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

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2003 JAN 22 A 11:27
HAZARDOUS WASTE BRANCH

January 14, 2003

Ms. Cindy Esterle, P.G.
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: Karst Survey Work Plan
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Ms. Esterle:

As you recall, Federal-Mogul Corporation agreed to prepare a Karst Survey Work Plan (KSWP), which would be implemented pending the results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase IV investigation performed during October 2002[1]. As discussed in the RFI Phase IV report[2], groundwater quality sample results from the recently installed bedrock monitoring well (MW-9) indicated that constituents of interest (i.e., volatile organic compounds [VOCs], metals, and cyanide) were not present above method detection limits (MDLs). A duplicate groundwater sample collected from MW-9 confirmed this result. Based on these results, constituents of interest do not appear to be present in the bedrock aquifer beneath the site. Further, groundwater and potentiometric surface elevations suggest that the bedrock aquifer in this portion of the site is not in hydraulic communication with the unconsolidated aquifer based on water levels recorded from the monitoring wells. October 2002 groundwater elevations indicate the unconsolidated and bedrock potentiometric surfaces in this portion of the site, are separated by 15 to 20 feet.

Federal-Mogul requests that continued preparation and implementation of the KSWP be suspended at this time. Should new developments during our investigation suggest potential

[1] Conference call between KDEP, Federal-Mogul, and Environmental Strategies conducted on September 23, 2002, regarding RFI Phase IV comments and included discussion regarding preparation and submittal of the Karst Survey Work Plan (KSWP).
September 30, 2002, comment response letter submitted to Kentucky Department for Environmental Protection (KDEP), Hazardous Waste Branch, by Environmental Strategies Corporation addressing KDEP's September 18, 2002, comments to the RFI Phase IV Work Plan.
[2] Environmental Strategies, on behalf of Federal-Mogul, forwarded the RFI Phase IV report letter to KDEP under cover dated January 10, 2003.

effects to the bedrock aquifer groundwater quality, continued preparation and implementation of a KSWP will be reconsidered.

Should you wish to schedule a conference call to discuss this request, please contact me at (412) 604-1040. We look forward to hearing from you regarding this request.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal-Mogul/138055/KarstWprequest.doc

cc: Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Michael Welsh, KDEP, Hazardous Waste Branch, Frankfort, KY
Dale Burton, Hazardous Waste Branch, Frankfort, KY
Mark Bauer, Bauer Environmental, L.L.C., Canton, MI
Frank Faulisi, GCS of St. Louis, St. Peters, MO
Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

reviewed
7-24-03

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2003 JAN 16 A 9:16

WASTE MANAGEMENT BRANCH

January 10, 2003

Ms. Cindy Esterle, P.G.
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601

Re: RFI Phase IV Soil and Groundwater Investigation Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Ms. Esterle:

This letter report provides a summary of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase IV soil and groundwater investigation activities performed by Environmental Strategies Corporation at the Federal-Mogul Corporation facility located in Scottsville, Kentucky during October 2002. The RFI Phase IV investigation was conducted in accordance with the Kentucky Department for Environmental Protection (KDEP) approved Work Plans dated December 17, 2001, and September 30, 2002. KDEP approved the December 2001 Phase IV Work Plan in a letter dated September 18, 2002, that included several Phase IV comments. These comments were discussed in a September 23, 2002 conference call, during which KDEP verbally approved the proposed Phase IV revisions. Environmental Strategies on behalf of Federal-Mogul, submitted responses to the September 18, 2002 comments in a letter dated September 30, 2002.

The purpose of the RFI Phase IV soil and groundwater investigation was to:

- further define background arsenic concentrations in surface soil
- install 23 soil borings to further delineate horizontal and vertical extent of volatile organic compounds (VOCs), cyanide, and arsenic concentrations detected in subsurface soil during Phase II and Phase III investigations
- install three monitoring wells to further characterize groundwater quality in the unconsolidated aquifer downgradient of the former disposal pits
- evaluate arsenic and cyanide concentrations in surface soil within the boundaries of the former disposal pits
- install one bedrock monitoring well to characterize groundwater quality in the bedrock aquifer

- evaluate groundwater quality and groundwater elevations within the unconsolidated and bedrock aquifer monitoring wells

The RFI Phase I, II, III, and IV sample locations are depicted on Figure 1.

During the Phase IV investigation, 92 soil samples (including 5 duplicates) were collected for laboratory analysis from 23 soil borings. Selected soil samples were analyzed for VOCs, arsenic, and cyanide. In addition, two soil samples collected from SB-46 were analyzed for ammonia based on conditions encountered during field activities. Nine surface soil samples (including one duplicate) were collected for arsenic and cyanide analysis from within the former disposal pit areas. These data will be further evaluated during the proposed risk assessment. In addition, five soil samples (including one duplicate) were collected to define site-specific, surface soil, background arsenic concentrations.

Three groundwater monitoring wells (Figure 1; MW-6, MW-7, and MW-8) were installed during the Phase IV activities to further delineate constituents of interest in the unconsolidated aquifer. In addition, one monitoring well (Figure 1; MW-9) was installed in the bedrock aquifer. Groundwater quality samples were collected from six of the eight unconsolidated monitoring wells and the bedrock monitoring well in accordance with the approved Phase IV Work Plan. Groundwater quality samples could not be collected from monitoring wells MW-2 and MW-6 because of an insufficient volume of water. Groundwater elevation measurements were collected from the unconsolidated and bedrock monitoring wells and were used to construct a potentiometric contour map for the unconsolidated aquifer.

Surface Soil Background Arsenic Evaluation

Table 1 presents the Phase IV analytical data for total arsenic concentrations from five surface soil samples collected from four background soil sample locations. The surface soil, background, sampling locations are depicted on Figure 1 and prefixed with a BB designation. The surface soil, background arsenic samples were collected from ground surface to a depth of one foot below ground surface (bgs). The surface soil, background soil samples were collected to establish a site-specific background concentration for comparison of arsenic concentrations in shallow soil covering the former disposal pits during performance of the proposed risk assessment.

In accordance with the KDEP approved Phase III Work Plan (December 6, 2000), the highest reported arsenic concentration will represent the surface soil, background concentration. Based on the analytical data reported from the shallow background arsenic samples (Table 1), the site-specific, surface soil, background arsenic concentration is 10.6 milligrams per kilogram (mg/kg).

Former Disposal Pit Area Shallow Soil Evaluation

Nine shallow (0 to 1 foot bgs) soil samples were collected from within the boundaries of the identified former disposal pits for analysis. The sample locations are depicted on Figure 2 and prefixed with the SS designation. Using the established Phase IV surface soil background

arsenic concentration of 10.6 mg/kg, eight surface soil samples (Table 2), were reported with arsenic concentrations that exceed the background concentration. These soil sample locations and the reported arsenic concentrations above the site-specific background concentration are presented on Figure 2. All Phase IV surface soil sample arsenic concentrations, including the five background soil samples, exceeded U.S. Environmental Protection Agency (EPA) Region IX and Kentucky Department of Waste Management (KDWM) Preliminary Remediation Goals (PRGs) of 1.6 mg/kg and 1.2 mg/kg for arsenic (carcinogenic) in commercial/industrial soils. The surface soil arsenic concentrations do not exceed EPA or KDWM noncarcinogenic arsenic PRGs of 260 mg/kg and 200 mg/kg, respectively.

Surface soil samples were collected from within the former disposal pit boundaries and analyzed for cyanide. Cyanide concentrations reported in the nine surface soil samples ranged from not detected in SS-1, SS-2, SS-3, and SS-9 to 79.4 mg/kg reported in SS-4 (Table 2). Surface soil cyanide concentrations in samples collected during the Phase IV investigation do not exceed the EPA Region IX and KDWM PRGs for cyanide (free) of 12,000 mg/kg and 5,100 mg/kg, respectively (Table 2). Cyanide concentrations in soil, above the analytical method detection limit (MDL), are presented on Figure 3.

Former Disposal Pit Area Subsurface Soil Evaluation

Table 3 presents the Phase IV analytical data for the 81 subsurface soil samples, including 4 duplicates, analyzed for arsenic, cyanide, and ammonia. Soil samples collected from SB-41, SB-43, SB-45, SB-59, SB-61, and SB-62 were reported to have arsenic concentrations greater than the Phase III established background concentration of 37.93 mg/kg (Table 3). Soil samples with arsenic concentrations reported above the established site background concentration, are presented in Figure 2. None of the soil samples collected and analyzed for arsenic during the Phase IV investigation had concentrations that exceeded the EPA Region IX or KDWM PRGs of 260 mg/kg and 200 mg/kg (noncarcinogenic endpoint) standards for industrial soils. However, all of the Phase IV reported arsenic concentrations exceeded the EPA Region IX and KDWM industrial soil carcinogenic endpoint standards of 1.6 mg/kg and 1.2 mg/kg, respectively.

Cyanide was detected in three (SB-47-1, SB-50-2, and SB-50-3) of 24 soil samples collected and analyzed during the Phase IV (Table 3). The cyanide concentrations reported in soil samples collected and analyzed during the Phase IV are depicted on Figure 3. None of the reported cyanide concentrations in surface or subsurface soil samples collected during the Phase IV investigation exceeded EPA Region IX or KDWM PRGs for cyanide (free) of 12,000 mg/kg and 5,100 mg/kg, respectively (Table 2 and Table 3).

During the advancement of soil borings SB-45 and SB-46 (Figure 1), ammonia odors were detected in the recovered soil samples. Two soil samples were collected from SB-46 at depths of 10 to 12 feet bgs and 12 to 14 feet bgs for ammonia analysis. The ammonia concentrations were reported to be 15 mg/kg and 166 mg/kg, respectively (Table 3). EPA Region IX has not established a PRG for ammonia; the KDWM ammonia PRG is 100,000 mg/kg for industrial soil. The ammonia concentrations reported in SB-46 do not exceed the KDWM PRG ammonia standard and are depicted on Figure 3.

Eleven soil samples were collected and analyzed for VOCs from four soil borings (Figure 1; SB-45, SB-47, SB-48, and SB-50) in accordance with the KDEP approved work plan to further delineate the horizontal and vertical extent of VOCs in subsurface soil. VOC analytical results are summarized in Table 4. No VOCs were reported with concentrations that exceeded EPA Region IX PRGs with the exception of trichloroethene (TCE). Reported TCE concentrations in soil samples collected and analyzed from SB-47, SB-48, and SB-50, with the exception of the sample collected in SB-47 from a depth of 12 to 14 feet bgs, (Table 4) exceeded the Region IX PRG of 0.11 mg/kg. However, these TCE concentrations do not exceed the KDWM industrial soil PRG of 3.9 mg/kg. The reported vinyl chloride concentration (0.46 mg/kg) in SB-47 (12-14 feet bgs) exceeded the KDWM PRG of 0.11 mg/kg. VOC concentrations detected in the Phase IV soil samples are provided on Figure 4.

Monitoring Well Installation

The Phase IV investigation included the installation of three unconsolidated monitoring wells (MW-6, MW-7, and MW-8), one bedrock monitoring well (MW-9), and the collection of one round of groundwater quality samples and groundwater elevation data. The groundwater monitoring wells were installed in accordance with the KDEP approved Phase III and Phase IV work plans. The monitoring well locations are presented on Figure 1 and Figure 5. The unconsolidated horizon monitoring wells were installed using hollow stem augers and were constructed with 5 feet of 0.010-inch slotted well screen positioned in the saturated material directly overlying bedrock and consistent with the construction of monitoring wells installed during Phase III. The unconsolidated wells were completed with an above grade protective metal casing and a surface pad. The unconsolidated monitoring wells were positioned downgradient of the monitoring wells installed during the Phase III investigation to further delineate the horizontal extent of constituents of interest in the unconsolidated aquifer (Figure 5).

To assess the potential effect on the bedrock aquifer underlying the Scottsville site, one bedrock monitoring well (MW-9) was installed during the Phase IV investigation (Figure 1 and Figure 5). The bedrock monitoring well was constructed as a double-cased well with 6-inch inside diameter (ID) metal conductor casing installed to a depth of approximately 3 feet into the top of competent bedrock. The borehole in which the conductor casing was installed was advanced using 10-inch ID hollow stem augers to the top of bedrock. Bedrock was cored and reamed to a 10-inch diameter, using air rotary drilling methods. The conductor casing was positioned and grouted in the borehole. The borehole was advanced into the bedrock horizon using rock-coring techniques until groundwater was encountered. After encountering groundwater, the borehole was advanced approximately 8 feet to allow installation of the well screen. The borehole was reamed with a nomial 6-inch diameter roller bit to the termination depth before well installation.

The bedrock monitoring well (MW-9) was constructed using 2-inch ID Schedule 40 polyvinyl chloride (PVC) riser casing and 10 feet of 0.010-inch slotted well screen. A filter pack and bentonite seal were installed and the remaining borehole annulus was grouted with a cement-bentonite grout. The bedrock monitoring well was completed with an above grade protective metal casing and surface pad.

A Kentucky licensed and registered surveyor was contracted to determine the horizontal location and elevation of each monitoring well after installation. The elevation of the ground surface, north-side top of the PVC casing, and north-side top of the protective metal casing were determined to the nearest 0.01 foot with respect to U.S. Geological Survey (USGS) control. The horizontal location of each monitoring well installed was determined to the nearest 0.01 foot and referenced to onsite permanent structures.

Approximately two weeks after development of the new monitoring wells, a round of groundwater quality samples was collected and groundwater levels measured in accordance with the KDEP approved Phase IV Work Plan.

Groundwater Elevations and Flow Direction

Depth to groundwater, total well depth, and groundwater elevation data are presented in Table 5. The groundwater elevation data were used to construct the potentiometric surface for the former disposal pit area as shown in Figure 5. Based on the October 2002 groundwater elevation data, groundwater flow in the unconsolidated aquifer is to the northwest.

The October 2002 groundwater elevation in the bedrock monitoring well (766.20 feet above mean sea level [AMSL]) indicates that the potentiometric surface of the bedrock aquifer is approximately 15 to 20 feet lower in elevation than groundwater elevations in the adjacent MW-4 and MW-8 unconsolidated aquifer monitoring wells (Table 5). Therefore, based on the October 2002 groundwater elevation data, the bedrock aquifer does not appear to be in hydraulic communication with the unconsolidated aquifer in the former disposal pit areas. The groundwater elevation data indicate a downward vertical gradient.

Groundwater Quality

On October 23 and 24, 2002, groundwater quality samples were collected from six of the eight unconsolidated monitoring wells and the bedrock monitoring well. Low-flow techniques were used to purge each monitoring well and for sample collection as approved by KDEP in the RFI Phase III Work Plan. Groundwater quality samples could not be collected from two unconsolidated monitoring wells (MW-2 and MW-6) due to an insufficient volume of water. The groundwater quality samples were forwarded to the TestAmerica laboratory, located in Nashville, Tennessee, for VOC, total metals, and cyanide analysis in accordance with the approved Phase IV Work Plan. Because groundwater quality samples could not be collected from MW-2, no ammonia analysis was performed on this well as proposed in the Phase III Work Plan.

VOCs, total metals, and cyanide were detected in groundwater quality samples collected during the Phase IV investigation. Nine VOCs including chloroform, 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), tetrachloroethene (PCE), toluene, 1,1,2-trichloroethane (1,1,2-TCA), TCE, and vinyl chloride were detected (Table 6). In addition, estimated concentrations of acetone, 1,4-dichlorobenzene,

and 1,1-dichloroethane (1,1-DCA) were detected. VOC concentrations detected in water quality samples collected and analyzed during the Phase IV are provided on Table 6.

Groundwater quality data collected during the Phase IV investigation indicate that the concentrations of TCE in MW-3, MW-4, and MW-8 are above the EPA maximum contaminant level (MCL) of 0.005 milligrams per liter (mg/l) (Table 6). Reported concentrations of cis-1,2-DCE in MW-4 and MW-8 are above the MCL of 0.07 mg/l. In addition, the reported PCE concentration in MW-4 and the 1,1-DCE and vinyl chloride concentrations in MW-8 were reported above their respective MCLs (0.005 mg/l, 0.007 mg/l, and 0.002 mg/l). Groundwater concentrations that exceeded MCLs are presented on Figure 5.

Total chromium, lead, and nickel concentrations were detected in the groundwater quality samples collected from MW-3 and MW-8 (Table 6). Arsenic was also reported in the water quality samples collected from MW-3. In addition, copper and zinc concentrations were reported in samples collected from MW-8. None of the reported metal concentrations exceeded EPA MCL or Secondary MCL (SMCL) criteria (Table 6).

Cyanide was detected in groundwater quality samples collected from MW-3, MW-4 and MW-8 (Table 6). The reported cyanide concentration in MW-4 (0.299 mg/l) exceeded the EPA free cyanide MCL of 0.2 mg/l.

No VOC, total metals, or cyanide concentrations were detected in the groundwater quality samples collected from the bedrock monitoring well (MW-9) and the duplicate sample (Table 7). One duplicate groundwater sample (MW-100) collected from MW-9 was submitted to the laboratory to satisfy quality assurance/quality control (QA/QC) protocols. Based on the October 2002 groundwater quality sample results collected from the bedrock monitoring well, it appears that the bedrock aquifer is not affected by constituents detected in the unconsolidated aquifer or by material disposed of in the former disposal pits.

Summary

During October 2002, additional RFI Phase IV activities were performed at the Scottsville facility to further delineate the horizontal and vertical extent of arsenic, cyanide, and VOCs in soil and groundwater. Surface soil samples were analyzed for arsenic and cyanide and subsurface soil samples were analyzed for VOCs, arsenic, and cyanide.

Three unconsolidated monitoring wells and one bedrock monitoring well were installed during the Phase IV investigation from which groundwater samples were collected to evaluate constituents of interest in the water-bearing horizons. Groundwater elevations indicate that groundwater in the unconsolidated aquifer flows to the northwest. Groundwater levels and the absence of constituents of interest in the bedrock well suggest that the bedrock aquifer has not been affected and that the unconsolidated and bedrock aquifers are not in hydraulic communication.

Soil

Surface soil samples were collected and analyzed for arsenic to establish a site-specific background concentration. Based on the soil sample results, the site-specific surface soil background arsenic concentration was determined to be 10.6 mg/kg. Surface soil samples collected from seven of the eight identified former disposal pit areas had arsenic concentrations greater than the established site-specific background arsenic concentration.

Cyanide concentrations in surface soil samples collected from former disposal pit areas did not exceed EPA Region IX or KDWM industrial soil cyanide (free) PRGs of 12,000 mg/kg and 5,100 mg/kg, respectively.

Soil samples collected and analyzed from borings SB-47, SB-48, and SB-50 had TCE concentrations that exceeded the EPA Region IX PRG industrial soil PRG of 0.11 mg/kg. However, the reported TCE concentrations did not exceed the KDWM industrial soil PRG of 3.9 mg/kg.

Arsenic concentrations in subsurface soil samples collected from soil borings SB-41, SB-43, SB-45, SB-59, SB-61, and SB-62 exceeded the site-specific arsenic background level of 37.93 mg/kg.

No subsurface soil samples contained cyanide at concentrations that exceeded EPA Region IX or KDWM industrial soil PRGs (free cyanide) of 12,000 mg/kg and 5,100 mg/kg, respectively.

Relatively low concentrations of ammonia were reported in soil samples collected from soil boring SB-46 at depths of 10 to 12 feet and 12 to 14 feet bgs.

Groundwater

Groundwater quality samples collected and analyzed from MW-3, MW-4, MW-5 and MW-8 during October 2002, contained VOC concentrations (1,1-DCE, cis-1,2-DCE, PCE, TCE, and vinyl chloride) that exceeded MCLs. Cyanide concentrations were reported in groundwater quality samples collected from MW-3, MW-4, and MW-8; the reported cyanide concentration in MW-4 exceeded the cyanide (free) MCL of 0.2 mg/l.

No VOC, metals, or cyanide concentrations were reported in the groundwater quality samples collected from the bedrock monitoring well (MW-9) or the duplicate sample (MW-100) collected from MW-9 during the Phase IV field activities.

Recommendations

Based on the analytical soil and groundwater data collected during performance of the Phase IV investigation, Federal-Mogul will prepare and submit an RFI Phase V Work Plan to KDEP for approval. The proposed Phase V investigation will include site-wide delineation and speciation of arsenic in surface and subsurface soil, installation of an unconsolidated monitoring well

located east of MW-6, and the investigation of reported drum burial activities in the former disposal pit areas. If the existence of buried drums is confirmed, Federal-Mogul will discuss potential remedial alternatives with KDEP. In addition, soil borings may be completed in the vicinity of identified drums, if necessary, to delineate the extent of constituents in soil.

Federal-Mogul will prepare and submit a formal letter to KDEP requesting that the Karst Survey Work Plan (KSWP) effort be suspended because site-specific constituents of interest were not detected in Phase IV groundwater samples collected from the bedrock monitoring well (MW-9). Elevation data further indicate that the bedrock and unconsolidated aquifers do not appear to be in hydraulic communication.

Should you have any questions or comments related to this RFI Phase IV letter report, or wish to schedule a conference call to discuss any of the above referenced items, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/Phase IV-report.doc

Enclosures

cc: Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Michael Welsh, KDEP, Hazardous Waste Branch, Frankfort, KY
Dale Burton, Hazardous Waste Branch, Frankfort, KY
Mark Bauer, Bauer Environmental, L.L.C., Canton, MI
Frank Faulisi, GCS of St. Louis, St. Peters, MO
Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

ENVIRONMENTAL STRATEGIES CORPORATION
300 Corporate Center Drive, Suite 200 • Moon Township, PA 15108 • (412) 604-1040 • Fax (412) 604-1055

January 14, 2003

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: July through December 2002 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

This progress report provides a summary of activities performed during the third and fourth quarters of 2002 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. Subsequent quarterly progress reports will be submitted to KDEP during April and July 2003, describing RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed during the third and fourth quarters of 2002 include preparation and submittal of the RFI second quarter 2002 progress report (April through June), dated July 15, 2002, and implementation and completion of the RFI Phase IV field investigation (October 2002).

Agency Contact and Meetings

Environmental Strategies Corporation on behalf of Federal-Mogul, conducted a telephone call on September 16, 2002, with Bart Schaffer, KDEP's Project Manager, regarding the status of KDEP's review of the RFI Phase IV Work Plan submitted on December 17, 2001. Mr. Schaffer informed Environmental Strategies that he was promoted to a position in the Division of Water and was no longer the project manager for the Federal-Mogul facility. Mr. Schaffer further stated that Cindy Esterle was selected as KDEP's new project manager for the Scottsville facility.

Environmental Strategies and Federal-Mogul participated in several telephone calls with Ms. Esterle during late September 2002 regarding the RFI Phase IV Work Plan. Environmental Strategies briefed Ms. Esterle on the status of the RFI work at the Scottsville facility.

Federal-Mogul received KDEP comments on the RFI Phase IV Work Plan in a letter dated September 10, 2002. On September 23, 2002, Federal-Mogul, Environmental Strategies, and KDEP discussed these comments during a conference call. KDEP verbally approved the RFI Phase IV Work Plan.

On October 8, 2002, Ms. Esterle and Todd Johnston (KDEP, Bowling Green Field Office) visited the Scottsville facility during performance of the Phase IV field activities. Environmental Strategies split several subsurface soil samples with Ms. Esterle during the visit. During the site visit, Mr. Johnston indicated that the Bowling Green office received information, from a former facility employee, that drums of plating sludge, were buried at the Scottsville facility. Mr. Johnston further stated that the Bowling Green office planned to interview the former employee and would likely conduct an investigation to confirm this reported disposal activity.

Document Submission

On July 15, 2002, Environmental Strategies submitted an RFI progress report for the period of April 1 through June 30, 2002 (second quarter of 2002), to KDEP and the U.S. Environmental Protection Agency (EPA) in accordance with the AO and the KDEP approved RFI Work Plans.

On August 29, 2002, Environmental Strategies submitted a letter providing notice to KDEP of Federal-Mogul's intent to implement the proposed RFI Phase IV Work Plan.

On September 30, 2002, Environmental Strategies submitted formal responses to the September 10, 2002, KDEP comment letter regarding the RFI Phase IV Work Plan. The work plan revisions were verbally approved by KDEP during a conference call on September 23, 2002.

Field Activities

From September 30 to October 15, 2002, Environmental Strategies implemented the RFI Phase IV Work Plan. The Phase IV investigation was conducted to delineate constituents of interest (volatile organic compounds [VOCs], arsenic, and cyanide) in surface and subsurface soil and groundwater quality in the unconsolidated aquifer. A bedrock monitoring well was installed to evaluate groundwater quality in the bedrock aquifer. Groundwater samples were collected from the unconsolidated and the bedrock aquifer monitoring wells on October 23 and 24, 2002.

The Phase IV field activities included:

- collection of 5 surface (0 to 1 foot) soil samples to evaluate background arsenic concentrations
- collection of 9 surface (0 to 1 foot) soil samples within the boundaries of the former disposal pits for arsenic and cyanide analysis

- completion of 16 soil borings to evaluate constituents (VOCs, arsenic, and cyanide) in the former disposal pit areas
- 11 subsurface soil samples were collected for VOC analysis
- 55 subsurface soil samples were collected for arsenic analysis
- 24 subsurface soil samples were collected for cyanide analysis
- 2 subsurface soil samples were collected for ammonia analysis
- 3 monitoring wells (MW-6, MW-7, and MW-8) were installed to further evaluate groundwater quality in the unconsolidated aquifer
- 1 monitoring well (MW-9) was installed to evaluate groundwater quality in the bedrock aquifer
- 6 groundwater samples were collected, using low-flow purging techniques, from the 8 unconsolidated monitoring wells
- 1 groundwater sample and a duplicate sample were collected from the bedrock monitoring well using low-flow purging techniques
- groundwater elevation measurements were recorded from the 8 unconsolidated monitoring wells and the bedrock monitoring well

Federal-Mogul and Environmental Strategies performed no other field activities during the third and fourth quarters of 2002.

Results of Sampling and Testing

Analytical results of soil and groundwater samples collected during the RFI Phase IV investigation revealed VOC, arsenic, cyanide, and ammonia concentrations in surface and subsurface soil near the former disposal pits. VOCs, metals, and cyanide were detected in the groundwater samples collected from the unconsolidated monitoring wells. No VOC, metals, or cyanide concentrations were detected in the groundwater samples collected from the bedrock monitoring well (MW-9). The Phase IV soil and groundwater analytical data will be provided to KDEP in January 2003 as part of the RFI Phase IV letter report.

Based on groundwater elevation data collected from the unconsolidated monitoring wells, groundwater in the unconsolidated aquifer flows toward the northwest. Potentiometric surface elevation data indicate that the unconsolidated and bedrock aquifers are not in hydraulic communication in the former disposal pit area.

Work Planned

The following RFI activities are planned for the first quarter of 2003:

- preparation and submittal of the RFI Phase IV letter report, describing activities performed during the Phase IV field investigation and the soil and groundwater analytical results
- investigation of the possible onsite burial of drums
- preparation and submittal of additional RFI work plans, as necessary

Schedule

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly progress report will be submitted during April 2003, for the period January 1 through March 31, 2003.

The investigation of possible drum disposal areas will be initiated following KDEP approval. Environmental Strategies anticipates the drum investigation activities will be performed during the first quarter of 2003.

An RFI Phase V Work Plan will be prepared and submitted to KDEP for approval, if necessary. Additional RFI Phase V field activities will likely be performed during the second quarter of 2003. The Phase V field activities will be conducted in accordance with the schedule contained in the KDEP approved RFI Phase V Work Plan.

Difficulties Encountered

Groundwater samples could not be collected from 2 unconsolidated monitoring wells (MW-2 and MW-6) during the October 2002 RFI Phase IV field activities due to an insufficient water volume.

No other difficulties were encountered during performance of RFI activities during the period July 1 through December 31, 2002.

Project Management

During September 2002, Ms. Esterle was formally introduced as the new KDEP project manager for the Scottsville facility.

There were no changes in project management at Federal-Mogul or Environmental Strategies during the third or fourth quarters of 2002.

Should you have any questions or comments related to this RFI progress report, covering the third and fourth quarters of 2002, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:ckh

cc: Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Ms. Cindy Esterle, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

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ENVIRONMENTAL STRATEGIES CORPORATION
300 Corporate Center Drive, Suite 200 ▪ Moon Township, PA 15108 ▪ (412) 604-1040 ▪ Fax (412) 604-1055

COPY

2003 MAR -5 A 9:50

February 28, 2003

Ms. Cindy Esterle, P.G.
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601

Re: Geophysical Survey Work Plan
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 101

Dear Ms. Esterle:

On behalf of Federal-Mogul Corporation, Environmental Strategies Corporation is submitting this work plan to conduct a geophysical survey to investigate alleged onsite drum and sludge disposal locations at the Federal-Mogul Scottsville, Kentucky facility. This survey will be completed concurrently with the ongoing Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) activities at the Scottsville facility. During an onsite meeting on February 8, 2003, between Kentucky Division of Waste Management (KDWM) Bowling Green Regional Office (BGRO), Federal-Mogul, and Environmental Strategies personnel, a former facility employee tentatively identified several potential onsite drum disposal locations and an area where additional sludge disposal pits may be located.

Background

It is our understanding that allegations of onsite drum disposal activities in the early 1970s were originally brought to the attention of the KDWM during August 1989. However, no further mention of drum disposal activities by KDWM were included in the July 24, 1991, Agreed Order (AO) DWM 89098 between the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) and Cooper Industries or as part of the June 15, 1993 RCRA Facility Assessment (RFA).

During October 2002, KDWM representatives visited the Scottsville facility during performance of the RFI Phase IV field activities and indicated that the BGRO received additional reports from former facility employees of onsite drum disposal activities in the 1970s. Federal-Mogul acquired Cooper Industries, including this facility, in October 1998.

All work will be performed in accordance with the AO, DWM 89098, between the KNREPC and Cooper Industries. The proposed geophysical survey will be completed in accordance with the activities described in the scope of work (SOW) provided below.

Scope of Work

Federal-Mogul and Environmental Strategies will perform a geophysical survey within identified sludge disposal and alleged drum and sludge disposal areas as depicted in Figure 1. A former employee identified an alleged drum disposal area east of the present facility. This location was previously identified as a former sludge disposal area. In addition, the former employee alleged that several former shallow sludge disposal pits exist along the northern tree line.

An electromagnetic (EM) survey will be used to investigate the presence of buried drums and former disposal pit areas at the Scottsville facility. The EM survey will be performed by a geophysicist using an EM-31 or EM-34 induction meter. An EM survey measures the apparent conductivity of subsurface materials using electromagnetic induction principles. Each EM induction meter consists of two horizontal coplanar loops, one acting as a transmitter and the other as a receiver. The transmitter induces eddy currents into the soil material, which in turn produces a secondary field. The receiver intercepts the secondary field and the EM meter measures the terrain conductivity by comparing the strength of the secondary field to that of the primary field.

Based on site conditions identified during the RFI, an EM-31 induction meter will be used to investigate the known former disposal pit areas where the depth to bedrock is less than 20 feet. The EM-31 has an intercoil spacing of 12 feet and when used in the horizontal mode has an effective depth of analysis of approximately 20 feet. This approximately 0.5-acre area is depicted as Area 1 on Figure 1. Before the EM survey is initiated, each geophysical instrument will be calibrated in an onsite background area. After calibration is completed, measurements will be collected along grid lines at 5-foot centers and stations at 2.5-foot centers. Two conductivity readings will be recorded at each measurement station, including both the quadrature-phase and in-phase components. Generally, negative EM values indicate the extent of large, shallow buried metallic objects. The EM displays moderate-sized metallic objects that are buried deep as areas of high conductivity. Therefore, high and negative conductivity values can indicate the presence of metallic objects. Conductivity measurements of undisturbed soil material, former sludge pits, and a metal drum will produce different responses such that these items can be readily identified from one another.

During the February 8, 2003 onsite meeting, the former employee indicated that additional sludge disposal pits may be located in the field area north of the facility (Area 2, Figure 1). This individual indicated that shallow pits were excavated in native soil, sludge was disposed of in the pits, and the pits covered with native soil. This area of the facility was backfilled with soil excavated during expansion of the facility. Therefore, the depth from present ground surface to these potential sludge disposal pits is unknown. We suspect that approximately 10 feet to 15 feet of backfill soil may have been placed over Area 2.

To investigate the presence of potential disposal sites in the 1.8-acre Area 2 (Figure 1), the EM-31 induction meter will be used to first scan the area. The 5-foot and 2.5-foot grid spacing will be used to measure and record the conductivity data across Area 2. In the event that conductivity anomalies are not indicated, or minor conductivity differences are detected across Area 2, the geophysicist will re-survey Area 2 using an EM-34 induction meter. The re-survey of Area 2 will be to define or delineate anomalies detected using the EM-31 meter and to verify that conductivity anomalies do not exist below the level (approximately 20 feet below grade) that the EM-31 can measure.

The EM-34 has an intercoil spacing of 30 feet when used in the horizontal mode and has an effective depth of analysis of approximately 45 feet. Using the EM-34 will allow better resolution of conductivity differences or anomalies and further identify potential sludge disposal pits that may be greater than 20 feet below present grade. Measurements will be recorded on 10-foot centers when using the EM-34 to confirm or further delineate suspected sludge disposal pits or anomalies identified using the EM-31 instrument.

During performance of the geophysical survey, the EM meters will be connected to a data logger that simultaneously records both the quadrature-phase and in-phase components of the conductivity. The quadrature-phase component measures the terrain conductivity of the subsurface and will result in detecting metallic and non-metallic objects that have conductivity values that vary from the surrounding materials. The in-phase component measurements are proportional to an effective, average magnetic susceptibility of the surrounding earth material and are very sensitive to metallic objects.

The geophysical data will be downloaded to a data logger and computer generated EM survey maps produced during the field investigation for inspection. The EM maps will be reviewed and indicated conductivity anomalies will be further surveyed to define or delineate potential buried drums and disposal pits. On completion of the EM survey, areas where conductivity anomalies are indicated will be staked in the field for later verification.

Project Deliverables

Following completion of the EM survey, the geophysical contractor (geophysicist) will prepare and submit a report of findings to Environmental Strategies. Environmental Strategies will prepare a letter report that includes a discussion of the geophysical activities performed at the Scottsville facility. The letter report will include the geophysicist's report and interpretation of the EM survey data. Map(s) will be generated to indicate conductivity anomalies identified during the geophysical field activities. Areas suspected of containing drums or sludge material will be verified by completing test pits; the SOW for the test pits will be described in the Verification Work Plan (VWP).

In addition, EM survey activities will be briefly summarized in RFI quarterly progress reports. The next progress report covering the period of January 2003 through March 2003 will be prepared and submitted to the KDWM during April 2003.

Project Schedule

Federal-Mogul and Environmental Strategies will initiate the described EM survey activities approximately two weeks after receiving KDWM's written approval. KDWM will be notified a minimum of one week before initiation of the approved EM survey field activities, as requested. The test pit SOW (VWP) will be provided to KDWM following submittal of the EM survey letter report.

Should you have any questions or comments regarding this geophysical survey work plan, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/Geophy-SOW-rev1.doc

Enclosures

cc: Mr. Michael Welch, KDWM, Hazardous Waste Branch, Frankfort, KY
Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Mr. Dale Burton, KDWM, Hazardous Waste Branch, Frankfort, KY
Mr. Todd Johnston, KDWM, Bowling Green, KY
Mr. Mark Bauer, P.E., Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

September 12, 2001

Mr. Mark Bauer, P.E.
Federal Mogul Corporation
c/o Bauer Environmental
42342 Jennings Court
Canton MI 48188

RE: RFI Phase 3 Report
Federal Mogul Corporation
Scottsville, Allen County, KY
EPA I.D. #KYD 005 458 101

Dear Mr. Bauer:

Personnel of the Kentucky Division of Waste Management (KDWM) have completed a review of the *RFI Phase 3 Report* submitted on behalf of Federal Mogul Corporation (Federal Mogul) on July 23, 2001. While it appears that the majority of characterization necessary at the site has been completed, several more borings and wells will need to be conducted/installed in order to complete characterization of the extent of contamination at the property. The specific areas which need to undergo additional characterization are identified on the attached page. Federal Mogul should provide the KDWM with a brief work plan which describes where and how additional soil and groundwater samples will be collected to complete characterization efforts on the property. The RFI Phase 4 Work Plan should be submitted within 90 days of receipt of this correspondence. If you have any questions regarding this correspondence, contact Bart Schaffer, P.G., at (502) 564-6716.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS/bs

Attachment

C: Garon Falconer, U.S. EPA, Region 4
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #93-1044

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FEDERAL MOGUL CORPORATION
RFI PHASE 3 REPORT

SOILS

- Because TCE was detected within SB 35 at concentrations near the acceptable Region 9 Preliminary Remedial Goal (PRG) concentration for residential use (2.8 ppm, 2.7 ppm detected in the 12-14 foot interval), borings should be conducted to the north and west of SB 35 to determine if the complete lateral extent of VOC contamination has been delineated.

- Cyanide appears to be present above concentrations of concern in several of the waste pit areas. The Region 9 PRG for cyanide is 11 ppm for residential property use and 35 ppm for industrial property use. Concentrations as high as 370 ppm were detected in the former waste pit areas. Some of the borings in which cyanide was detected at concentrations of concern are already surrounded by other sampling points, however the full extent of contamination has not been determined in several locations. Additional borings should be conducted in the following areas: southeast of B-21, between SB-4 and SB-34, north and south of SB-34, northwest of B-18/SB-35, east of SB-37 and east of SB-9. Have any surficial samples been collected for cyanide analysis during past investigations? If removal of contaminated soils is not eventually conducted, surficial soils will need to be sampled as well to confirm that high concentrations of cyanide are not available for exposure at the surface.

- Of background samples collected at the site, the highest concentration of arsenic detected was 37.93 mg/kg. In accordance with the approved RFI Work Plan, this highest background number can be utilized for evaluation purposes as the "background" standard. Arsenic was found to be present above this background concentration in eight borings. Additional borings to delineate the extent of arsenic contamination should be conducted in the following areas: in all directions around SB-38, north, south and east of SB-21, south and west of SB-33, in all directions surrounding SB-22 and east, north and west of SB-39. As with the cyanide mentioned above, if no removal of contaminated soils is eventually conducted, surficial soils will need to be sampled in the former waste pit areas (assuming they have not been sampled previously) to verify that high concentrations of arsenic are not available for potential exposures at the surface.

GROUNDWATER

- VOCs were detected in MW-4, MW-5 and MW-3. No sample was collected from MW-2 due to lack of water. Federal Mogul should install additional wells downgradient of MW-3 and MW-5. A third well should be installed approximately in the center of a triangle formed by the location of MW-2, MW-4 and MW-5. MW-2 may be installed to a deeper horizon, or Federal Mogul may collect a sample from MW-2 if sufficient water has collected in the well since the investigation earlier this year. A bedrock well should be installed adjacent to MW-4 to assess conditions in the bedrock aquifer. As this is the area with the highest concentration of VOCs, this area can be used to assess bedrock conditions first. If contaminants are found to be present in the bedrock aquifer in this area, more wells should be installed later. If no VOCs are found in the bedrock aquifer in this area, no other bedrock wells should be necessary.

- Because the Federal Mogul facility is within an area underlain by limestone, Federal Mogul should arrange for a karst survey to be performed in the area. Such a survey should include investigating the area around the facility to determine if any karst features exist (sinkholes, springs, etc.). Once these features are located (if present) and mapped, the need for a dye trace can be evaluated.

ESC

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RECEIVED

2001 SEP -6 A 7:07

RCRA PROGRAMS BRANCH

August 9, 2001

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: April through June 2001 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

This progress report provides a summary of activities performed during the second quarter of 2001 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This progress report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department of Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. In accordance with the KDEP approved RFI Work Plans, subsequent quarterly progress reports will be submitted to KDEP during October 2001 and January 2002, describing RFI activities performed during the previous calendar quarter.

Work Accomplished

The activities described below were conducted in accordance with the KDEP approved RFI Phase III Work Plan during the second quarter of 2001.

Summary of RFI activities performed during the second quarter of 2001 include:

- preparation and submittal of RFI first quarter 2001 progress report, dated April 19, 2001
- performance of Phase III soil and groundwater investigation during April and May 2001
- preparation of RFI Phase III report describing the Phase III field investigation activities
- telephone discussions between KDEP, Federal-Mogul, and Environmental Strategies Corporation (ESC) regarding the RFI Phase III additional soil investigation and installation of groundwater monitoring wells.

Agency Contacts and Meetings

ESC on behalf of Federal-Mogul, conducted several telephone discussions with Bart Schaffer, KDEP project manager, regarding proposed Phase III activities and scheduling of the approved field effort. The RFI Phase III investigation included the additional evaluation of, volatile organic compounds (VOCs), metals, cyanide, and ammonia in soil and the unconsolidated groundwater aquifer.

On April 11, 2001, KDEP's project manager, Bart Schaffer, visited the Scottsville facility to observe the ongoing Phase III soil investigation activities. Based on KDEP and ESC field observations and discussions with Mr. Schaffer, ESC installed two additional soil borings in the former disposal pit area to further evaluate soil quality.

Document Submission

On April 19, 2001, ESC on behalf of Federal-Mogul, submitted a RFI progress report for the period of January 1 through March 31, 2001 (first quarter of 2001), to KDEP and the U.S. Environmental Protection Agency (EPA) in accordance with the KDEP approved RFI Work Plans.

Field Activities

Between April 9 and 13, 2001, ESC on behalf of Federal-Mogul, performed the RFI Phase III field investigation. The Phase III investigation was conducted to evaluate soil and groundwater quality in the former disposal pit area. Groundwater quality samples were collected from the monitoring wells installed during Phase III activities on April 30 and May 1, 2001. Phase III activities included:

- completion of 4 background borings from which 8 soil samples were collected to determine site background metal concentrations
- 9 soil borings were completed to evaluate constituents (VOCs total metals, and cyanide) in former disposal pit area soil
- 4 soil borings from which 9 soil samples were completed to evaluate ammonia concentrations in soil near one former disposal pit
- 8 soil samples were collected from the background borings for total metals analysis
- 14 soil samples were collected for VOC analysis
- 34 soil samples were collected for total metals analysis
- 34 soil samples were collected for cyanide analysis
- 5 monitoring wells were installed to evaluate groundwater quality in the unconsolidated aquifer
- 4 groundwater quality samples were collected, using low-flow purging techniques, from the unconsolidated aquifer monitoring wells
- groundwater elevation measurements were recorded from the 5 monitoring wells installed during Phase III activities

Results of Sampling and Testing

Analytical results of soil and groundwater samples collected during the RFI Phase III activities revealed VOCs, metals, cyanide, and minor levels of ammonia in soil near the former disposal pits. VOCs, zinc, and cyanide were also detected in the groundwater quality samples. The Phase III analytical data was submitted to KDEP in a letter report dated July 20, 2001.

Based on groundwater elevation data collected from the Phase III installed monitoring wells, groundwater in the unconsolidated aquifer flows to the northwest.

Work Planned

During the third quarter of 2001, the following RFI activities may be performed:

- preparation and submittal of RFI Phase III letter report describing the completed Phase III field activities and the soil and groundwater sample results
- onsite meeting or conference call between KDEP, Federal-Mogul, and ESC to discuss the Phase III soil and groundwater data
- preparation and submittal of supplemental RFI activities, as necessary

Schedule

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly progress report will be submitted during October 2001, for the period July 1 through September 30, 2001.

A schedule of future RFI activities will be forwarded to KDEP, as necessary, based on the outcome of the proposed site visit or conference call between KDEP, Federal-Mogul, and ESC representatives to discuss the Phase III soil and groundwater results. ESC, on behalf of Federal-Mogul, will prepare an additional Work Plan that describes supplemental RFI activities, as necessary.

Difficulties Encountered and Resolution

Groundwater quality samples could not be collected from groundwater monitoring well MW-2 due to insufficient groundwater quantity.

Project Management

There were no changes in project management at Federal-Mogul or ESC during the second quarter of 2001.

Should you have any questions or comments related to this second quarter 2001 RFI progress report, please do not hesitate to contact me at (412) 787-5100.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/Progress Reports/2ndqtr01pr.doc

cc: Ms. Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Mr. Bart Schaffer, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

ESC

ENVIRONMENTAL STRATEGIES CORPORATION

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COPY

October 19, 2001

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

OCT 26 2001

Re: July through September 2001 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

This progress report provides a summary of activities performed during the third quarter of 2001 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This progress report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department of Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. In accordance with the KDEP approved RFI Work Plans, subsequent quarterly progress reports will be submitted to KDEP during January and April 2002, describing RFI activities performed during the next two calendar quarter.

Work Accomplished

The activities described below were conducted in accordance with the KDEP approved RFI Phase III Work Plans during the third quarter of 2001.

Summary of RFI activities performed during the third quarter of 2001 include:

- preparation and submittal of RFI Phase III soil and groundwater investigation report, dated July 20, 2001
- preparation and submittal of RFI second quarter 2001 progress report, dated August 9, 2001
- telephone discussions between Environmental Strategies Corporation (ESC) and KDEP regarding the RFI Phase III soil and groundwater results and scheduling of an onsite meeting to discuss project progress and the path forward

- onsite meeting between KDEP, Federal-Mogul, and ESC held September 6, 2001, to discuss KDEP comments on RFI Phase III soil and groundwater report and discuss potential RFI Phase IV field activities
- Receipt of KDEP comments, dated September 12, 2001, on the RFI Phase III soil and groundwater report (received by Federal-Mogul on September 19, 2001)
- ESC initiated a background investigation to evaluate the overall setting of the Scottsville facility. This investigation includes the review of historical site information, aerial photographs, local geologic and hydrologic conditions, and potential offsite receptors.

Agency Contacts and Meetings

ESC on behalf of Federal-Mogul, conducted several telephone discussions with Bart Schaffer, KDEP project manager, regarding KDEP comments on the RFI Phase III soil and groundwater investigation report, potential RFI Phase IV soil and groundwater activities, and scheduling of a meeting at Scottsville facility between KDEP, Federal-Mogul, and ESC. The RFI Phase III investigation included the additional evaluation of volatile organic compounds (VOCs), metals, cyanide, and ammonia in soil and the unconsolidated groundwater aquifer.

On September 6, 2001, KDEP, Federal-Mogul, and ESC representatives met at the Scottsville facility to discuss KDEP comments on the completed RFI Phase III soil and groundwater investigation. Based on the meeting discussions, Federal-Mogul will conduct a RFI Phase IV investigation at the facility to further delineate constituents of concern in shallow soil and groundwater. Federal-Mogul and ESC anticipate that the RFI Phase IV activities will include:

- preparation and submittal of a RFI Phase IV Work Plan to KDEP for approval
- the collection and analysis of shallow soil samples in the former disposal pit areas for evaluation through a risk based scenario
- installation of additional downgradient monitoring wells installed in the unconsolidated aquifer
- installation of a bedrock monitoring well in the vicinity of monitoring well MW-4
- collection and analysis of one round of groundwater quality samples from the onsite unconsolidated and bedrock monitoring wells

Based on groundwater results collected from a bedrock monitoring well, a karst survey may be necessary. This survey will evaluate springs, sinkholes, and other karstic features of the local area during Phase V of the RFI.

Document Submission

On July 20, 2001, ESC on behalf of Federal-Mogul submitted the RFI Phase III Soil and Groundwater Investigation report to KDEP in accordance with the KDEP approved RFI Phase III Work Plan. The RFI Phase III report described field activities and soil and groundwater data collected at the Scottsville facility during April and May 2001.

On August 9, 2001, ESC on behalf of Federal-Mogul, submitted a RFI progress report for the period of April 1 through June 30, 2001 (second quarter of 2001), to KDEP and the U.S. Environmental Protection Agency (EPA) in accordance with the KDEP approved RFI Work Plans and the AO.

No other documents were submitted to KDEP regarding the RFI at the Scottsville facility during the period July 1 through September 30, 2001.

Field Activities

Federal-Mogul and ESC performed no other RFI related field activities during the third quarter of 2001.

Results of Sampling and Testing

Analytical results of soil and groundwater samples collected during the RFI Phase III activities were submitted to KDEP in the July 20, 2001, RFI Phase III Soil and Groundwater Investigation report. VOCs, metals, cyanide, and trace levels of ammonia were detected in soil samples collected in and around the former disposal pits. VOCs, zinc, and cyanide concentrations were detected in the groundwater quality samples collected from the unconsolidated horizon monitoring wells.

Based on groundwater elevation data collected from the RFI Phase III installed monitoring wells, groundwater in the unconsolidated aquifer flows to the northwest.

Work Planned

During the fourth quarter of 2001, the following RFI activities will be performed:

- preparation and submittal of a RFI quarterly progress report in accordance with the KDEP approved RFI Work Plans and the AO
- preparation and submittal of a RFI Phase IV Work Plan for additional onsite soil and groundwater activities in accordance with KDEP's September 12, 2001 correspondence

Schedule

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly report will be submitted during January 2002, for the period October 1 through December 31, 2001.

ESC, on behalf of Federal-Mogul, will prepare and submit a RFI Phase IV Work Plan to KDEP on or before December 18, 2001, in accordance with KDEP's September 12, 2001 correspondence. The RFI Phase IV Work Plan will describe supplemental RFI activities as

discussed between KDEP, Federal-Mogul, and ESC during the September 6, 2001 onsite meeting.

Difficulties Encountered and Resolution

Federal-Mogul and ESC encountered no difficulties during performance of RFI activities at the Scottsville facility during the period of July 1 through September 30, 2001.

Project Management

There were no changes in project management at Federal-Mogul or ESC during the third quarter of 2001.

Should you have any questions or comments related to this third quarter 2001 RFI progress report, please do not hesitate to contact me at (412) 787-5100.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/3rdqtr01pr.doc

cc: Ms. Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Mr. Bart Schaffer, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

ESC

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ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West • Suite 315 • Pittsburgh, Pennsylvania 15276 • (412) 787-5100 • Fax (412) 787-8065

April 19, 2001

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: January through March 2001 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 101

Dear Mr. Welch:

This progress report provides a summary of activities performed during the first quarter of 2001 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This progress report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department of Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. In accordance with the KDEP approved RFI Work Plans, subsequent quarterly progress reports will be submitted to KDEP during July and October 2001, describing RFI activities performed during the previous calendar quarter.

Work Accomplished

The activities described below were conducted in accordance with the KDEP approved RFI Phase II Work Plans during the first quarter of 2001.

Summary of RFI activities performed during the first quarter of 2001 include:

- preparation and submittal of RFI fourth quarter 2000 progress report, dated January 26, 2001
- preparation and submittal of final portion of RFI Phase III Work Plan to KDEP under cover dated February 5, 2001
- approval of the RFI Phase III Work Plan on March 7, 2001 (KDEP letter dated February 27, 2001)

- telephone discussions between KDEP, Federal-Mogul, and Environmental Strategies Corporation (ESC) regarding the RFI Phase III Work Plan and the additional soil investigation and installation of groundwater monitoring wells

Agency Contacts and Meetings

Environmental Strategies Corporation (ESC) on behalf of Federal-Mogul, conducted several telephone discussions with Bart Schaffer, KDEP project manager, regarding proposed Phase III activities, background metal concentrations, and installation of monitoring wells. The RFI Phase III investigation will include additional delineation of constituents (including ammonia) in soils and groundwater.

On March 7, 2001, Federal-Mogul received approval of the RFI Phase III Work Plan (KDEP letter dated February 27, 2001).

On March 27 and 28, 2001, ESC discussed the upcoming RFI Phase III field schedule with Bart Schaffer in accordance with the approved RFI Phase III Work Plan. RFI Phase III field activities will be initiated at the Scottsville facility by ESC on April 9, 2001.

Document Submission

On January 26, 2001, ESC on behalf of Federal-Mogul, submitted a RFI progress report covering the period of October 1 through December 31, 2000 (fourth quarter 2000), to KDEP and the U.S. Environmental Protection Agency (EPA) in accordance with the KDEP approved RFI Phase II Work Plan.

On February 5, 2001, ESC on behalf of Federal-Mogul, submitted the final portion of the RFI Phase III Work Plan to KDEP addressing KDEP comments in letters dated September 15, 2000 (groundwater proposal), and December 6, 2000 (additional soil investigation).

Field Activities

No field activities were conducted at the Scottsville facility during the period of January 1 through March 30, 2001. However, preparation for the upcoming RFI Phase III field activities were initiated.

Results of Sampling and Testing

No sampling and testing of soil or groundwater was performed during the period of January 1 through March 30, 2001.

Work Planned

During the second quarter of 2001, the following RFI Phase III activities will be performed:

- submittal of RFI progress report to KDEP covering the period of January 1 through March 30, 2001 (first quarter of 2001)
- implementation of KDEP approved RFI Phase III field activities will be performed during April 2001
- collection of one round of groundwater quality samples and groundwater elevation data from monitoring wells installed in accordance with the KDEP approved RFI Phase III Work Plan
- laboratory analysis of soil and groundwater samples collected in accordance with the approved RFI Phase III Work Plan

Schedule

A schedule of the KDEP approved RFI Phase III activities was included as Figure 2 of the February 5, 2001, submittal to KDEP. Federal-Mogul and ESC will initiate the KDEP approved RFI Phase III field activities during the week of April 9, 2001. The RFI Phase III field investigation will include the installation of additional soil borings to determine background metal concentrations and further delineate constituent concentrations in soil. In addition, monitoring wells will be installed in the unconsolidated horizon. During the RFI Phase III field activities, soil and groundwater samples will be collected for laboratory analysis. Laboratory analysis of soil and groundwater samples will be completed on a 30-day turnaround schedule with final laboratory results received during May 2001. In accordance with the KDEP approved RFI Phase III schedule, the RFI Phase III letter report describing the Phase III field activities and the soil and groundwater analytical data will be submitted to KDEP approximately nine weeks after completion of the Phase III groundwater sampling event.

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly progress report will be submitted during July 2001, for the period April 1 through June 30, 2001.

Difficulties Encountered and Resolution

No difficulties were encountered with respect to RFI activities being conducted at the Scottsville facility during the first quarter of 2001.

Project Management

Mark T. Bauer, P.E. of Bauer Environmental, L.L.C. has replaced Terry Rife as Federal-Mogul's primary contact regarding the Scottsville site. Future correspondence to Federal-Mogul should be addressed to Mr. Bauer at 42342 Jennings Court, Canton, Michigan 48188. There were no changes in project management at ESC during the first quarter of 2001.

Should you have any questions or comments related to this first quarter 2001 RFI progress report, please do not hesitate to contact me at (412) 787-5100.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/Progress Reports/1stQtr01pr.doc

cc: Ms. Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Mr. Bart Schaffer, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul, Scottsville, KY

JAMES E. BICKFORD
SECRETARY

MAR - 7 2001

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

February 27, 2001

Mr. Terry Rife
Federal Mogul Corporation
26555 Northwestern Parkway
Southfield, MI 48034

RE: RFI Phase 3 Work Plan
Federal Mogul
Scottsville, Allen County, KY
EPA I.D. #KYD 005 458 101

Dear Mr. Rife:

Personnel of the Kentucky Division of Waste Management have completed a review of the revised *RCRA Facility Investigation Phase 3 Work Plan* submitted by Environmental Strategies Corporation on February 6, 2001 on behalf of Federal Mogul Corporation (Federal Mogul). The *RCRA Facility Investigation Phase 3 Work Plan* is conditionally approved. The condition which Federal Mogul should adhere to, if necessary, is installing the proposed monitoring wells into bedrock if the proposed soil-bedrock interface wells do not yield sufficient water.

If you have any questions regarding this correspondence, please contact Bart Schaffer, P.G., at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS/bs

c: Caron Falconer, U.S. EPA, Region 4
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #00-0001

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RCRA PROGRAMS BRANCH

July 20, 2001

JUL 23 2001

Mr. Bart Schaffer, P.G.
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: RFI Phase III Soil and Groundwater Investigation
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Schaffer:

This letter report provides a summary of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase III soil and groundwater investigation activities performed by Environmental Strategies Corporation (ESC) at the Federal-Mogul Corporation facility located in Scottsville, Kentucky during April and May 2001. The RFI Phase III Investigation was conducted in accordance with the Kentucky Department of Environmental Protection (KDEP) approved Work Plans dated November 7, 2000, and February 5, 2001. KDEP approved the Phase III Work Plans (i.e., November 2000 and February 2001) by letters dated December 6, 2000, and February 27, 2001, respectively.

The purpose of the RFI Phase III soil and groundwater investigations were to:

- install four soil borings to determine background metal concentrations
- install 10 soil borings in the vicinity of the former disposal pits to further delineate the horizontal and vertical extent of volatile organic compounds (VOCs), metals, and cyanide constituents in soil
- complete four soil borings to further delineate the horizontal and vertical extent of ammonia in soil
- install five monitoring wells to characterize groundwater quality in the unconsolidated aquifer
- collect one round of groundwater quality samples and groundwater elevation data from the monitoring wells installed during Phase III activities

The RFI Phase I, Phase II, and Phase III soil borings and monitoring well locations are depicted on Figure 1.

During the Phase III investigation, 54 soil samples (including 6 field duplicates) were collected from 18 soil borings for laboratory analysis. Selected soil samples were analyzed for VOCs, total metals (antimony, arsenic, chromium, copper, lead, nickel, and zinc), cyanide, and ammonia. Total metal concentrations were analyzed from four background soil borings (BB-1, BB-2, BB-3, and BB-4). In addition, soil samples were collected from SB-26, SB-27, SB-28, and SB-29 for ammonia analysis. The Phase III soil borings were completed to further delineate the concentration of constituents of interest in soils in the vicinity of the former disposal pits. Analytical data for soil samples collected during the April 2001, Phase III investigation are presented in Table 1, Table 3, Table 5, and Table 6.

Five groundwater monitoring wells were installed during the Phase III activities (Figure 1). Groundwater quality samples were collected from four of the five monitoring wells for laboratory analysis of VOCs, total metals, and cyanide. Groundwater quality samples could not be collected from monitoring well MW-2 because of insufficient water volume. Groundwater elevation measurements were collected from the monitoring wells for determining groundwater flow direction in the unconsolidated aquifer.

Background Metals Evaluation

Table 1 presents the Phase III analytical data for total metals from eight soil samples collected from the four background soil borings. The background metal samples were collected from a depth of 6 to 8 feet below ground surface (bgs) and the 2-foot interval directly overlying local bedrock. No detectable concentrations of antimony were detected in the eight background soil samples collected during the Phase III. The background soil borings were completed to establish a site background concentration for each metal constituent as requested by KDEP. In accordance with the KDEP approved work plan (December 6, 2000, letter), the highest metal concentration for each constituent detected in the analyzed background soil samples will represent the background metal concentration to which other RFI soil metals data are to be evaluated. Based on the analytical data reported from the background soil borings, the established background metal concentrations are as follows (in milligrams per kilogram [mg/kg]):

- arsenic - 37.93
- chromium - 49.179
- copper - 16.742
- lead - 22.236
- nickel - 63.037
- zinc - 201.683

Soil Quality

Using the Phase III established background metal concentrations, the following soil samples collected and analyzed as part of the RFI were reported with metal concentrations above background concentrations. Phase I metal concentrations above the established background levels, are presented on Figure 2. During the Phase I RFI, soil samples reported metal concentrations above background include:

- PB-05/TP-08 and Pit-02 (antimony)
- PB-01/TP-04 (nickel)

Six soil samples were reported with arsenic and chromium concentrations above the established background concentrations (Figure 2). The reported Phase II metal concentrations are presented in Table 2. Phase II metal concentrations above the established background concentrations include soil samples collected from:

- SB-8, SB-13, SB-18, SB-21, and SB-22 (arsenic)
- SB-8, SB-13, SB-18, SB-21, and SB-24 (chromium)
- SB-2, SB-8, SB-13, SB-15, and SB-24 (lead)
- SB-18 and SB-22 (nickel)
- SB-4, SB-5, SB-8, SB-9, SB15, SB-18, and SB-22 (zinc)

Concentrations of antimony or copper were not reported in any of the collected and analyzed Phase II soil samples.

Table 3 presents the Phase III analytical data for the 34 soil samples, including two duplicates SB-35 (10 to 12 feet) and SB-37 (10 to 12 feet), analyzed for total metals. Antimony was not detected above the method detection limit (MDL) in any of the 34 collected soil samples. Soil samples collected from SB-33, SB-38, and SB-39 were reported with arsenic concentrations greater than the background concentration (Figure 2). Chromium concentrations were reported above the background concentration in soil samples collected from SB-30, SB-38, and SB-39 (Figure 2). The chromium concentrations were reported as estimated because the matrix spike recovery was outside quality control (QC) limits. Soil samples collected from SB-31, SB-33, and SB-38 were reported with copper concentrations above the background concentration (Figure 2). Soil samples collected from 10 soil borings (SB-30, SB-31, SB-32, SB-33, SB-34, SB-35, SB-36, SB-37, SB-38, and SB-39) were reported with lead concentrations above the background concentration of 22.236 mg/kg (Table 3 and Figure 2). Nickel concentrations above background were reported in soil samples collected from SB-30, SB-31, SB-32, SB-35, SB-38, and SB-39 (Figure 2 and Table 3). Concentrations of zinc above the background concentration of 201.683 mg/kg were reported in soil samples collected and analyzed from 10 soil borings (SB-30, SB-31, SB-32, SB-33, SB-34, SB-35, SB-36, SB-37, SB-38, and SB-39).

None of the Phase I, Phase II, or Phase III reported metal concentrations exceed the U.S. Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goals (PRGs) relative to concentrations in industrial soils (Table 4).

Several VOCs were detected in 14 soil samples collected and analyzed during the Phase III investigation (Table 5). VOCs detected include; acetone; 1,1-Dichloroethene (1,1-DCE); cis-1,2-Dichloroethene (cis-1,2-DCE); trans-1,1-Dichloroethene (trans-1,2-DCE); tetrachloroethene (PCE); toluene; and trichloroethene (TCE). VOC concentrations detected in the Phase I, Phase II, and Phase III soil samples are presented in Figure 3. During the Phase III investigation, acetone was detected in soil samples collected from SB-31, SB-35, SB-38, and SB-39 (Table 5 and Figure 3). 1,1-DCE was detected in two soil samples collected from SB-35. Cis-1,2-DCE was detected in soil samples collected from SB-31, SB-34, SB-35, and SB-37. Trans-1,2-DCE (0.0072 mg/kg) was detected in duplicate soil sample collected from SB-35. PCE was detected in soil samples collected from SB-35. Toluene was detected in soil samples collected from SB-34 and SB-35. TCE was detected in soil samples collected from SB-31, SB-34, SB-35, and SB-37. VOCs concentrations detected in the Phase III soil samples are below EPA Region IX PRGs for industrial soil levels (Table 4).

Cyanide was detected in 14 of 34 soil samples collected and analyzed during the Phase III investigation (Table 3). Reported concentrations of cyanide detected in soil samples collected during the Phase I, Phase II, and Phase III investigations are presented in Figure 4. Cyanide was detected in soil samples collected from SB-30, SB-34, SB-35, SB-36, SB-37, SB-38, and SB-39 (Figure 4). Cyanide concentrations in soil samples collected from Pit-02, B-18, B-19, B-21, B-25, SB-4, SB-6, SB-7, SB-8, SB-9, SB-14, SB-34, SB-35, and SB-37 were reported above the EPA Region IX industrial soil PRG of 35 mg/kg (Table 4).

Due to the presence of ammonia in a surficial soil and shallow water sample collected and analyzed during the Phase II, four additional soil borings (SB-26, SB-27, SB-28, and SB-29) were completed to evaluate ammonia concentrations in onsite soils in accordance with the KDEP approved work plans. During the Phase III activities, eight soil samples and one duplicate sample were collected from the four soil borings at depths of 0 to 2 feet bgs and 6 to 8 feet bgs. Concentrations of ammonia in the Phase III soil samples ranged from 5 mg/kg in SB-28 to 47.9 mg/kg in SB-28 (Table 6). Ammonia concentrations detected during the Phase II and Phase III investigations are presented in Figure 4.

Groundwater Quality

The Phase III investigation involved the installation of one background (MW-1) and four downgradient (MW-2, MW-3, MW-4, and MW-5) groundwater monitoring wells positioned in the unconsolidated horizon, and the collection of one round of groundwater quality samples and groundwater elevation data. The groundwater monitoring wells were installed in accordance with the KDEP approved work plans. Each monitoring well was constructed with 5 feet of 0.010-inch slotted well screen positioned in the saturated material directly overlying local bedrock. After installation, the monitoring wells were developed and a registered Kentucky surveyor determined their horizontal position relative to onsite structures and vertical elevations tied to U.S. Geological Survey (USGS) topographic datum. The groundwater monitoring well locations are presented on Figure 1 and Figure 5.

On April 30 and May 1, 2001, groundwater quality samples were collected from four of the five monitoring wells installed at the Scottsville facility. Low-flow purging techniques were used to purge each monitoring well and for sample collection as approved by KDEP. Groundwater quality samples could not be collected from monitoring well MW-2 due to insufficient water column height. Groundwater quality samples were collected and forwarded to the analytical laboratory for VOCs, metal, and cyanide analysis in accordance with the KDEP approved work plan. Because groundwater quality samples could not be collected from MW-2, no groundwater quality samples were collected for ammonia analysis as proposed in the Phase III Work Plan.

VOCs, zinc, and cyanide were detected in groundwater quality samples (Table 7). Nine VOCs including chloroform, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, methylene chloride, PCE, toluene, TCE, and vinyl chloride were detected in the analyzed groundwater quality samples. Chloroform was detected at MW-3 and MW-4 (Table 7). Concentrations of cis-1,2-DCE, trans-1,2-DCE, PCE, and vinyl chloride were also detected in MW-4. In addition, qualified concentrations of methylene chloride and toluene were detected in well MW-4. TCE was detected in groundwater samples from each sampled monitoring well (Table 7). Zinc was the only metal detected in the groundwater quality samples collected from MW-3. Cyanide was detected in groundwater quality samples collected from MW-3 and MW-4. One duplicate groundwater sample (MW-10) collected from well MW-1 was submitted to the laboratory to satisfy quality assurance/quality control (QA/QC) protocols. No VOCs, metals, or cyanide concentrations were detected above MDLs in the duplicate sample.

Groundwater quality data collected during the Phase III investigation indicates that the concentrations of TCE in MW-3, MW-4, and MW-5 are above the maximum contaminant level (MCL) of 0.005 mg/l (Table 7). In addition, the concentrations of cis-1,2-DCE and PCE reported in the groundwater quality samples collected from MW-4 are above their respective MCLs. The TCE concentration reported in MW-5 is also above the MCL. Groundwater results exceeding MCLs are presented on Figure 5. VOCs above MCLs were detected in groundwater from MW-4, located downgradient of a former disposal pit, and in groundwater from two other downgradient wells (MW-3 and MW-5).

Depth to groundwater, total well depth, and groundwater elevation data are presented in Table 8. The groundwater elevation data were used to construct water table contours for the former disposal pit area as shown in Figure 5. Based on the water table contour data, groundwater flow in the unconsolidated horizon is to the northwest (Figure 5).

Summary

Phase I, Phase II (with the exception of reported TCE and PCE concentrations in SB-8), and Phase III soil sample results revealed concentrations below EPA Region IX industrial PRGs for VOCs and total metals. Soil samples collected from several borings were reported above the industrial soil PRG for cyanide (Figure 4). Ammonia concentrations detected during the Phase II and Phase III appear to be limited in areal extent to the SS/SW-01 sampling location. Three groundwater quality samples (MW-3, MW-4, and MW-5) collected during the Phase III were reported with VOC concentrations (cis-1,2-DCE, PCE, and TCE) above MCLs.

Federal-Mogul and ESC would like to request a conference call or schedule a site visit with KDEP to discuss the RFI Phase III and our path forward.

Should you have any questions or comments related to this RFI Phase III letter report, or wish to schedule a conference call, please do not hesitate to contact me at (412) 787-5100.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:EMH:hsm

Enclosures

cc: Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Michael Welsh, KDEP, Hazardous Waste Branch, Frankfort, KY
Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mark Bauer, Bauer Environmental, L.L.C., Canton, MI
Frank Faulisi, GCS of St. Louis, St. Peters, MO

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Figures

Table 1

Background Metal Concentrations in Soil - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:	**BB-1**	**BB-1**	**BB-2**	**BB-2**
Depth (feet):	**6 to 8**	**14 to 16**	**6 to 8**	**14 to 16**
Date Collected:	**04/10/2001**	**04/10/2001**	**04/09/2001**	**04/09/2001**
Arsenic	14.764	15.684	17.455	16.01
Chromium	29.774	10.931	25.368	14.009
Copper	2.952	11.169	7.68	11.008
Lead	9.104	12.595	14.895	22.014
Nickel	2.952	50.617	29.79	49.532
Zinc	16.24	190.584	86.808	160.854

Soil Boring:	**BB-3**	**BB-3**	**BB-4**	**BB-4**
Depth (feet):	**6 to 8**	**14 to 16**	**6 to 8**	**12 to 14**
Date Collected:	**04/09/2001**	**04/09/2001**	**04/10/2001**	**04/10/2001**
Arsenic	37.93	12.846	26.408	8.47
Chromium	49.179	17.365	23.56	9.844
Copper	16.742	11.18	10.097	5.724
Lead	22.236	15.224	18.381	7.555
Nickel	45.516	63.037	61.619	36.63
Zinc	150.413	170.794	201.683	87.912

a/ Concentrations in milligrams per kilogram (mg/kg).

Table 2

Soil Analytical Data- Total Metals - June 2000
RFI Phase II Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:		**SB-1**			**SB-2**		
Depth (feet bgs):		**to 10**	**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**	**12 to 14**
Date Collected:		**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background (**						
Antimony	ND	NA	NA	NA	NA	NA	NA
Arsenic	37.93	28.3	18.1	15.4	11.5	18.7	27.9
Chromium	49.179	3.39	39.2	20.6	23	37.2	38.7
Copper	16.742	3.96	11.6	4.65	3.84	8.37	12.1
Lead	22.236	10.4	13.1	6.87	7.87	13.2	***46.7***
Nickel	63.037	18.3	45.8	46.9	17.5	30.2	48.5
Zinc	201.683	106	139	111	75	92.6	162

Soil Boring:		**SB-3**			**SB-3(b)**	**SB-4**		
Depth (feet bgs):		**to 10**	**10 to 12**	**12 to 13**	**13 to 14**	**8 to 10**	**10 to 12**	**12 to 14**
Date Collected:		**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	NA	NA	NA	NA	NA	NA	NA
Chromium	49.179	NA	NA	NA	NA	NA	NA	NA
Copper	16.742	NA	NA	NA	NA	NA	NA	NA
Lead	22.236	NA	NA	NA	NA	NA	NA	NA
Nickel	63.037	NA	NA	NA	NA	NA	NA	NA
Zinc	201.683	200	172	161	158	105	***219***	129

Table 2 (continued)

Soil Analytical Data- Total Metals - June 2000
RFI Phase II Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:			**SB-5**			**SB-6**		**SB-7**
Depth (feet bgs):		**to 10**	**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**	**12 to 14**	**8 to 10**
Date Collected:		**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	NA	NA	NA	NA	NA	NA	NA
Chromium	49.179	NA	NA	NA	NA	NA	NA	NA
Copper	16.742	NA	NA	NA	NA	NA	NA	NA
Lead	22.236	NA	NA	NA	NA	NA	NA	NA
Nickel	63.037	NA	NA	NA	NA	NA	NA	NA
Zinc	201.683	132	***217***	124	118	67.1	129	61.9

Soil Boring:		**7 (cont.)**	**SB-8**		**SB-9**			
Depth (feet bgs):		**to 12**	**6 to 8**	**8 to 10**	**10 to 12**	**8 to 10**	**10 to 12**	**12 to 13**
Date Collected:		**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	NA	***41.3***	29.6	12.6	NA	NA	NA
Chromium	49.179	NA	***66.7***	***56.9***	38.1	NA	NA	NA
Copper	16.742	NA	12.1	9.42	8.76	NA	NA	NA
Lead	22.236	NA	19.8	***26.7***	11.3	NA	NA	NA
Nickel	63.037	NA	26.4	26.7	49.6	NA	NA	NA
Zinc	201.683	61.4	190	***2330***	***267***	***1090***	***249***	***428***

Table 2 (continued)

Soil Analytical Data- Total Metals - June 2000
RFI Phase II Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:		**SB-10**			**SB-10(c)**	**SB-11**		
Depth (feet bgs):		**to 10**	**10 to 12**	**12 to 14**	**14 to 16**	**8 to 10**	**10 to 12**	**12 to 14**
Date Collected:		**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	15	23.2	12.2	11	NA	NA	NA
Chromium	49.179	37.7	25.1	14.7	14.1	NA	NA	NA
Copper	16.742	7.43	8.96	6.74	2.67	NA	NA	NA
Lead	22.236	8	11.8	6.33	5.14	NA	NA	NA
Nickel	63.037	21.1	24.4	23.5	26.9	NA	NA	NA
Zinc	201.683	61	89.2	81.2	102	104	151	113

Soil Boring:		**SB-12**		**SB-13**				
Average Depth (feet bgs):		**to 10**	**10 to 12**	**6 to 8**	**8 to 10**	**10 to 12**	**12 to 14**	**14 to 16**
Date Collected:		**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	NA	NA	***48.3***	35.1	27.2	16.6	20
Chromium	49.179	NA	NA	***52.1***	28	28.2	15	16.8
Copper	16.742	NA	NA	11.7	10	11	5.52	3.8
Lead	22.236	NA	NA	***27***	12.9	13.7	8.19	8.6
Nickel	63.037	NA	NA	23.9	22.6	40.4	21	26
Zinc	201.683	117	77.1	93.6	75.1	117	71.2	66

Table 2 (continued)

Soil Analytical Data- Total Metals - June 2000
RFI Phase II Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:		SB-14				SB-15		
Depth (feet bgs):		to 2	6 to 8	8 to 10	10 to 12	8 to 10	10 to 12	12 to 13
Date Collected:		5/00	6/00	6/00	6/00	6/00	6/00	6/00
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	NA	NA	NA	NA	21	23.6	19.4
Chromium	49.179	NA	NA	NA	NA	33.2	24.2	30.9
Copper	16.742	NA	NA	NA	NA	11.6	8.95	10.2
Lead	22.236	NA	NA	NA	NA	16.4	17.5	***23.2***
Nickel	63.037	NA	NA	NA	NA	34.4	36	38.7
Zinc	201.683	NA	NA	NA	NA	***432***	198	***562***

Soil Boring:		-15(c)	SB-16			SB-17	
Depth (feet bgs):		to 14	8 to 10	10 to 12	12 to 14	8 to 10	10 to 12
Date Collected:		6/00	6/00	6/00	6/00	6/00	6/00
Total Metals	**Background**						
Antimony	ND	NA	NA	NA	NA	NA	NA
Arsenic	37.93	10.2	31.3	14.5	3.03	10.3	13.3
Chromium	49.179	22	22.8	15.5	11.9	19.8	29.1
Copper	16.742	5.4	10.5	6.18	3.84	5.34	7.33
Lead	22.236	8.4	15	15.9	5.25	21.9	10.3
Nickel	63.037	24.8	23.3	31.1	19.4	46.6	24.6
Zinc	201.683	***226***	77.8	104	37.6	94.1	101

Table 2 (continued)

Soil Analytical Data- Total Metals - June 2000
RFI Phase II Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:		**SB-18**				**SB-19**	**SB-19(d)**
Depth (feet bgs):		**to 8**	**8 to 10**	**10 to 12**	**12 to 13**	**10 to 12**	**12 to 14**
Date Collected:		**5/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**						
Antimony	ND	NA	NA	NA	NA	NA	NA
Arsenic	37.93	***70.5***	21.3	9.39	29.3	9.32	10.4
Chromium	49.179	***55.4***	28.2	21.1	19.3	12.3	11.6
Copper	16.742	13.7	12.6	4.41	8.43	2.78	3.53
Lead	22.236	20.4	20.3	6.32	10.2	5.36	5.88
Nickel	63.037	***73***	46	33.7	61.2	33.3	26.1
Zinc	201.683	***238***	156	62	***261***	72.6	82.7

Soil Boring:		**SB-20**				**SB-21**		
Depth (feet bgs):		**to 8**	**8 to 10**	**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**	**12 to 14**
Date Collected:		**5/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**							
Antimony	ND	NA	NA	NA	NA	NA	NA	NA
Arsenic	37.93	11.9	15.3	10.3	14.6	23.3	***66.7***	11
Chromium	49.179	23.7	41.1	27.7	28.6	20.6	***55.9***	29
Copper	16.742	7.44	7.94	3.16	4.46	8.37	13.4	3.8
Lead	22.236	7.85	8.73	6.52	10.8	12.9	20	7.6
Nickel	63.037	57.3	36.7	39.7	27	26.1	42.1	23.2
Zinc	201.683	102	89.3	145	92.5	89	144	112

Table 2 (continued)

Soil Analytical Data- Total Metals - June 2000
RFI Phase II Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:		**SB-22**		**SB-23**	**SB-24**		
Depth (feet bgs):		**to 10**	**10 to 12**	**8 to 10**	**6 to 8**	**8 to 10**	**10 to 12**
Date Collected:		**5/00**	**6/00**	**6/00**	**6/00**	**6/00**	**6/00**
Total Metals	**Background**						
Antimony	ND	NA	NA	NA	NA	NA	NA
Arsenic	37.93	***53.9***	***60.2***	21.4	18.3	17.5	15.6
Chromium	49.179	26.5	39.4	28.6	***50.7***	26	30.9
Copper	16.742	3.16	5.8	7.14	8.11	9.76	9.18
Lead	22.236	15.5	13.2	9.59	11.4	16.3	14.1
Nickel	63.037	33.1	***66.8***	39.4	24.7	28.9	36.6
Zinc	201.683	38.8	***202***	108	74.2	132	134

Soil Boring:		**SB-24 (cont.)**		**SB-25(e)**
Depth (feet bgs):		**to 14**	**14 to 16**	**6 to 8**
Date Collected:		**5/00**	**6/00**	**6/00**
Total Metals	**Background**			
Antimony	ND	NA	NA	NA
Arsenic	37.93	22.5	27.4	10.8
Chromium	49.179	25.7	28.8	40.3
Copper	16.742	10.3	8.4	7.13
Lead	22.236	***23.4***	12	8.86
Nickel	63.037	35	21.2	22.5
Zinc	201.683	121	68.6	68.2

a/ Soil samples above site specific background va italics.
Concentrations in milligrams per kilogram (mg
NA = not analyzed.
ND = not detected.
bgs = below ground surface.
b/ SB-3 (13-14) is a duplicate sample of SB-3 (12
c/ SB-15 (13-14) is a duplicate sample of SB-15 (
d/ SB-19 (12-14) is a duplicate sample of SB-19 (
e/ SB-25 (6-8) is a duplicate sample of SB-24 (6-

Table 3

Soil Analytical Data - Total Metals and Cyanide - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:				**SB-30**			**SB-31**	
Depth (feet bgs):			**8 to**	**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**	**12 to 14**
Date Collected:			**4/12/**	**4/12/01**	**4/12/01**	**4/11/01**	**4/11/01**	**4/11/01**
Total Metals	**Background**							
Arsenic	37.93		18.0	26.775	28.942	32.274	23.474	33.268
Chromium	49.179		29.3	45.792 J	***51.485*** J	27.698	25.26	20.348
Copper	16.742		12.7	13.012	11.272	15.174	***19.391***	11.628
Lead	22.236		19.5	***30.778***	15.232	***26.252***	***56.643***	***22.61***
Nickel	63.037		***66.4***	***117.358***	***72.811***	40.944	***64.042***	***88.178***
Zinc	201.683		175.7	***255.236***	***208.683***	152.939	***247.494***	***219.638***
Cyanide	35	(b)	N	ND	9.4	ND	ND	ND

Soil Boring:			**SB-31 (**	**SB-32**			**SB-33**	
Depth (feet bgs):			**14 to**	**8 to 10**	**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**
Date Collected:			**4/11/**	**4/11/01**	**4/11/01**	**4/11/01**	**4/11/01**	**4/11/01**
Total Metals	**Background**							
Arsenic	37.93		18.4	16.983	21.593	19.084	18.856	***45.249***
Chromium	49.179		23.3	22.977	15.994	47.848	47.14	45.751
Copper	16.742		11.9	9.74	9.064	10.787	12.795	***19.859***
Lead	22.236		14.6	14.486	***31.19***	12.723	12.795	***35.194***
Nickel	63.037		***90.9***	38.961	50.65	***66.103***	42.201	42.986
Zinc	201.683		***374.5***	124.626	***234.058***	***268.558***	145.686	184.263
Cyanide	35	(b)	N	ND	ND	ND	ND	ND

Table 3 (continued)

ioil Analytical Data - Total Metals and Cyanide - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:					SB-34			
Depth (feet bgs):			12 to	14 to 16	8 to 10	10 to 12	12 to 14	(Dup 10 to 12)
Date Collected:			4/11/	4/11/01	4/11/01	4/11/01	4/11/01	36992
Total Metals	**Background**							
Arsenic	37.93		16.	22.945	17.163	24.955	22.624	NA
Chromium	49.179		39.8	33.24	22.624	22.686	30.849	NA
Copper	16.742		10.4	11.178	5.461	9.075	12.34	NA
Lead	22.236		18.3	13.237	14.303	21.174	***24.387***	NA
Nickel	63.037		51.6	54.126	14.822	22.686	***88.73***	NA
Zinc	201.683		197.2	***276.511***	***1102.56***	***819.217***	181.866	NA
Cyanide	35	(b)	N	ND	9.1	***159***	2.25	***168***

Soil Boring:				SB-35				SB-36
Depth (feet bgs):			8 to 1	10 to 12	(Dup 10 to 12)	12 to 14	(Dup 12 to 14)	8 to 10
Date Collected:			4/12/	4/12/01	4/12/01	4/12/01	4/12/01	4/11/01
Total Metals	**Background**							
Arsenic	37.93		7.3	22.651	NA	19.896	21.488	36.806
Chromium	49.179		22.1	45.817 J	NA	44.982 J	33.975	35.572
Copper	16.742		7.6	12.355	NA	8.65	10.454	12.845
Lead	22.236		10.8	***23.939***	NA	9.228	12.196	***22.973***
Nickel	63.037		27.8	***68.725***	NA	52.768	***100.761***	40.018
Zinc	201.683		68.4	***216.473***	NA	***325.837***	***345.549***	***313.719***
Cyanide	35	(b)		***178***	***102***	ND	NA	4.55

Table 3 (continued)

Soil Analytical Data - Total Metals and Cyanide - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:				nt.)	SB-37			
Depth (feet bgs):			10 to	12 to 14	8 to 10	10 to 12	(Dup 10 to 12)	12 to 14
Date Collected:			4/11/	4/11/01	4/11/01	4/11/01	36992	4/11/01
Total Metals	**Background**							
Arsenic	37.93		25.	19.871	30.114	16.256	20.769	11.674
Chromium	49.179		28.1	41.849	23.292	12.75	14.876	13.667
Copper	16.742		14.4	9.935	10.352	5.737	9.543	8.257
Lead	22.236		*26.*	12.343	*22.821*	*40.163*	*38.17*	8.542
Nickel	63.037		41.5	55.095	34.35	38.889	33.399	32.459
Zinc	201.683		*229.4*	*352.251*	153.868	*231.098*	*275.049*	200.735
Cyanide	35	(b)	N	ND	*131*	*48.5*	NA	2.94

Soil Boring:				SB-38			SB-39	
Depth (feet bgs):			8 to	10 to 12	12 to 14	14 to 16	8 to 10	10 to 12
Date Collected:			4/12/	4/12/01	4/12/01	4/12/01	4/12/01	4/12/01
Total Metals	**Background**							
Arsenic	37.93		*59.8*	*85.282*	31.068	16.431	35.368	*41.061*
Chromium	49.179		65.3	63.352 J	32.849 J	21.702 J	*69.681* J	*60.901* J
Copper	16.742		12.5	*19.492*	13.496	8.061	15.837	15.157
Lead	22.236		*25.5*	*39.23*	*29.284*	10.85	*22.963*	20.943
Nickel	63.037		32.5	*73.1*	*68.754*	62.934	56.484	*132.826*
Zinc	201.683		145.9	*285.088*	*214.922*	*372.023*	185.815	*333.443*
Cyanide	35	(b)	3	ND	ND	ND	ND	10.7

a/ Soil samples above site specific background concer old italics.
Concentrations in milligrams per kilograms (mg/k
NA = not analayzed.
bgs = below ground surface.
ND = not detected.
J = estimated concentrations.
b/ U.S. EPA Region IX Industrial Soil Preliminary R Goal (PRG).

Table 4

U.S. EPA Region IX Preliminary Remediation Goals (PRGs)
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a) (mg/kg)

Analyte	**Industrial Soils**	
Volatile Organic Compounds		
1,1-Dichloroethene	0.120	(c)
cis-1,2-dichloroethene	150	(b)
trans-1,2-dichloroethene	210	(b)
1,1,1-Trichloroethane	1,400	(b)
Trichloroethene	6.1	(c)
Tetrachloroethene	19	(c)
Vinyl Chloride	0.83	(c)
Acetone	6,200	(b)
Naphthalene	190	(b)
Toluene	520	(b)
Carbon Disulfide	720	(b)
2-Butanone	28,000	(b)
Methylene Chloride	21	(c)
1,4-Dichlorobenzene	8.1	(c)
Hexachlorobutadiene	32	(c)
1,2,4-Trimethylbenzene	170	(b)
1,3,5-Trimethylbenzene	70	(b)
n-Butylbenzene	240	(b)
1,2,3-Trichloropropane	0.0031	(c)
4-Isopropyltoluene	NA	(c)
RCRA Metals		
Arsenic	440	(b)
Chromium	450	(c)
Copper	76,000	(b)
Total Cyanide (as HCN)	35	(b)
Ammonia	NA	

a/ U.S. EPA Region IX in Industrial Soil PRGs .
NA indicates analyte was not listed.
b/ Non-cancer PRG is listed.
c/ Cancer PRG is listed.

Table 5

Analytical Data- Volatile Organic Compounds - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:		**SB-31**			**SB-34**		**SB-35**	
Depth (feet bgs):		**8 to 10**	**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**	**8 to 10**	**8 to 10 (b)**
Date Collected:		**4/11/01**	**4/11/01**	**4/11/01**	**4/11/01**	**4/11/01**	**4/12/01**	**4/12/01**
Volatile Organic Compounds:	**PRGs (a)**							
Acetone	6,200	6.238	ND	ND	ND	ND	0.1628	ND
1,1-Dichloroethene	0.120	ND	ND	ND	ND	ND	ND	0.0024
cis-1,2-Dichloroethene	150	0.0246	0.0055	0.1263	0.1855	0.0896	0.0406	0.9559
trans-1,2-Dichloroethene	210	ND	ND	ND	ND	ND	ND	0.0072
Tetrachloroethene	19	ND	ND	ND	ND	ND	ND	0.0346
Toluene	520	ND	ND	ND	0.0326	ND	0.0123	0.029
Trichloroethene	6.1	ND	ND	0.0025	0.0162	0.0163	0.106	2.132

Soil Boring:		**SB-35 (continued)**		**SB-37**			**SB-38**	**SB-39**
Depth (feet):		**10 to 12**	**12 to 14**	**8 to 10**	**10 to 12**	**12 to 14**	**12 to 14**	**10 to 12**
Date Collected:		**4/12/01**	**4/12/01**	**4/11/01**	**4/11/01**	**4/11/01**	**4/12/01**	**4/12/01**
Volatile Organic Compounds:	**PRGs**							
Acetone	6,200	ND	ND	ND	ND	ND	0.044	0.1212
1,1-Dichloroethene	0.120	ND	0.0031	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	150	0.0679	0.2794	ND	0.0027	0.0032	ND	ND
trans-1,2-Dichloroethene	210	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	19	ND	0.0412	ND	ND	ND	ND	ND
Toluene	520	0.0257	0.0056	ND	ND	ND	ND	ND
Trichloroethene	6.1	0.2093	2.779	0.0071	0.0218	0.0396	ND	ND

a\ U.S. EPA Region IX Industrial Soil PRGs.
Soil samples above the Preliminary Remediati ›RGs) are in bold italics.
Concentrations in milligrams per kilogram (m
ND = not detected.
bgs. = below ground surface.
b\ Duplicate sample collected from SB-35, 8 to 1

Table 6

Soil Analytical Data - Ammonia - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Soil Boring:	**SB-26**		**SB-27**	
Depth (feet bgs):	**0 to 2**	**6 to 8**	**0 to 2**	**6 to 8**
Date Collected:	**04/10/2001**	**04/10/2001**	**04/10/2001**	**04/10/2001**
Ammonia as N	32.4	31.5	46.1	30.6

Soil Boring:	**SB-28**		**SB-29**		
Depth (feet):	**0 to 2**	**6 to 8**	**0 to 2**	**6 to 8**	**6 to 8 (b)**
Date Collected:	**04/10/2001**	**04/10/2001**	**04/11/2001**	**04/11/2001**	**04/11/2001**
Ammonia as N	47.9	5	47.3	19.2	8.8

a/ Concentrations in milligrams per kilograms (mg/kg).
bgs = below ground surface.
b/ Duplicate sample collected from SB-29 (6 to 8 feet bgs).

Table 7

Groundwater Analytical Data - April - May 2001
RFI Phase III Investigation
Federal-Mogul Friction Product Facility
Scottsville, Kentucky (a)

Well ID:		MW-1		MW-3	MW-4		MW-5
Date Collected:		05/01/2001		05/01/2001	04/30/2001		04/30/2001
Volatile Organic Compounds:	(b)						
Chloroform		ND		0.0036	0.0011	J	ND
1,1-Dichloroethene	7	ND		ND	0.0028		ND
cis-1,2-Dichloroethene	'	ND		0.0069	***1.26***		ND
trans-1,2-Dichloroethene		ND		ND	0.0027		ND
Methylene chloride		ND		ND	0.011	B	ND
Tetrachloroethene	5	ND		ND	***0.0309***		ND
Toluene		ND		ND	0.0012	J	ND
Trichlororethene	5	0.001	J	***0.0203***	***12.2***		***0.0081***
Vinyl chloride	2	ND		ND	***0.0114***		ND
Metals:							
Zinc, Total		ND		0.061	ND		ND
Miscellaneous:							
Cyanide		ND		0.011	0.085		ND

a\ Concentrations in milligrams per liter (mg/l)
b\ MCLs = Maximum contaminant levels
Concentrations greater than the MCL are in s
ND = Not detected
J= Estimated concentration
B= Probable blank contamination
NS= No standard

Table 8

Groundwater Elevation Data - April 2001
RFI Phase III Investigation
Federal-Mogul Friction Products Facility
Scottsville, Kentucky (a)

Monitoring Well No.	Top of PVC Elevation (AMSL)	Depth to Water (feet from TPVC)	Total Well Depth (feet)	Groundwater Elevation (feet AMSL)
MW-1	812.35	17.30	20.62	795.05
MW-2	797.91	15.75	15.95	782.16
MW-3	798.38	26.99	27.49	771.39
MW-4	801.94	15.38	16.68	786.56
MW-5	796.76	23.17	25.01	773.59

a\ AMSL=Above mean sea level
TPVC=Top of polyvinyl chloride casing

Tables

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

March 14, 2003

Mr. Mark Bauer, P.E.
Federal Mogul Corporation
c/o Bauer Environmental
42342 Jennings Court
Canton, MI 48188

RE: Geophysical Survey Work Plan
Federal Mogul Corporation
Scottsville, Allen County, Kentucky
EPA I.D. # KYD-005-458-401

Dear Mr. Bauer:

Personnel of the Kentucky Division of Waste Management (KDWM) have completed a review of the *Geophysical Survey Work Plan* (GSWP) submitted on behalf of Federal Mogul by Environmental Strategies Corporation (ESC) on March 3, 2003.

Based on this review, KDWM believes that the proposal for an electromagnetic survey may be effective in determining if buried drums are present at the above-mentioned site. In addition, the proposed survey area appears to be adequate in covering the suspected drum burial areas as well as the possible additional sludge pits which were identified during a site visit conducted on February 8, 2003. However, KDWM provides the following comments regarding the scope of the geophysical survey. These comments should be considered prior to the implementation of the work plan.

1. As was indicated in the GSWP, the EM-31 induction meter can be an effective tool for locating buried metal objects at depths ranging from approximately 0 - 20' below ground surface. However, objects buried at 20' would be at the maximum range of detection of this instrument (under ideal subsurface conditions.) Because it has been indicated that the drums could potentially be buried as deep as 20', KDWM has concerns that the exclusive use of EM-31 in Area 1 may not be sufficient to detect any isolated buried drums at this depth. Therefore, in order to ensure that the geophysical survey is as effective as possible, KDWM suggests that Federal Mogul consider utilizing a magnetometer in conjunction with the EM-31 for the survey of Area 1.

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2. Because the clay and silty-clay soil types present at the site can be expected to contribute to background readings with high electromagnetic conductivity, KDWM is concerned that this property of the soil could obscure subsurface electromagnetic anomalies which may indicate the presence of plating sludge pits in Area 2. KDWM proposes that test borings be used to aid in identifying the source of anomalies which are discovered with the EM-31 in the Area 2 investigation. The use of test borings along with the E-31 readings may be more effective than an additional survey of Area 2 using the EM-34 induction meter, as the readings from the EM-34 will represent a weighted average of a larger subsurface profile (because of the greater depth capability of the EM-34.) Since the purported additional sludge pits (not previously identified as SWMUs) most likely extend to a relatively shallow depth, KDWM believes that this approach may be more effective in determining if these pits exist.

As was specified in the GSWP, the report of the investigation should include a discussion of the geophysical survey, as well as a copy of the geophysicist's report. Please provide notice of the date of commencement of field activities at least one week in advance by contacting Cindy Esterle of my staff. Additionally, please provide notification to Todd Johnston of the KDWM Bowling Green Regional Office at (270) 746-7475.

If you have any questions or wish to discuss any of the comments provided in this correspondence, please contact Cindy Esterle, P.G. at (502) 564-6716, extension 323.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/cpe

c: Caron Falconer, U.S. EPA, Region 4
Dale Burton, Cindy Esterle; Hazardous Waste Branch
Tim Harrod, Enforcement Branch
Todd Johnston, Bowling Green Regional Office
Pending File #93-1044

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300 Corporate Center Drive, Suite 200 • Moon Township, PA 15108 • (412) 604-1040 • Fax (412) 604-1056

RECEIVED
2003 MAY 5 P 1:07
WASTE MGMT BRANCH

April 28, 2003

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: January through March 2003 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

This progress report provides a summary of activities performed during the first quarter of 2003 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. Subsequent quarterly progress reports will be submitted to KDEP during July and October 2003, describing RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed by Federal-Mogul and Environmental Strategies during the first quarter of 2003 included:

- preparation and submittal of the third and fourth quarters 2002 progress report
- submittal of the RFI Phase IV letter report
- participation in an onsite meeting with Kentucky Hazardous Waste Branch (KHWB) representatives and a former facility employee to locate potential drum burial sites
- preparation and submittal of a Geophysical Survey Work Plan (GSWP)
- participation in several conference calls with KHWB representatives regarding the alleged onsite burial of drums

Agency Contact and Meetings

Federal-Mogul and Environmental Strategies conducted telephone conference calls on January 9 and February 20, 2003, regarding the alleged onsite burial of drums and future RFI activities. In addition, during the February 20, 2003 conference call, the KHWB indicated that a Karst Survey Work Plan (KSWP) would be necessary as part of ongoing investigations being performed at the Scottsville facility. Environmental Strategies prepared and submitted letters to the KHWB summarizing the conference calls and activities planned for the Scottsville facility.

On February 8, 2003, Environmental Strategies visited the Scottsville facility and met with representatives of the KHWB's Bowling Green Regional Office (BGRO) and a former employee to discuss onsite drum disposal activities conducted during the late 1970s and to locate alleged drum burial sites. The former employee was interviewed and indicated that potential drum burial sites exist in the vicinity of the former disposal pits being investigated under the RFI process. The alleged drum burial sites were staked in the field for future reference. The former employee also indicated that additional sludge disposal pits may be located in the field area north of the current facility.

Document Submission

On January 10, 2003, Environmental Strategies submitted the RFI Phase IV Soil and Groundwater Investigation letter report to the KHWB in accordance with the KHWB-approved RFI Phase IV Work Plan. The KHWB verbally approved the Phase IV work plan during a conference call on September 23, 2003. Phase IV field activities were conducted by Environmental Strategies during October 2002. Numerous soil borings were completed and soil samples collected for analysis of volatile organic compounds (VOCs), metals, cyanide, and ammonia. In addition, three unconsolidated material monitoring wells and a bedrock monitoring well were installed. Constituents of concern, at concentrations above U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs), were reported in groundwater quality samples collected from monitoring wells installed in the unconsolidated aquifer. No constituents of concern were detected in groundwater quality samples collected from the new bedrock monitoring well.

On January 14, 2003, Environmental Strategies submitted an RFI progress report for the period of July 1 through December 31, 2002 (third and fourth quarters of 2002), to KHWB and EPA in accordance with the AO and the KHWB-approved RFI Work Plans. In addition, Environmental Strategies and Federal-Mogul submitted a letter, dated January 14, 2003, to the KHWB requesting that the Karst Survey Work Plan (KSWP), requested by the KHWB during the September 23, 2002, conference call, be suspended. Based on analytical results from groundwater samples collected from the Phase IV installed bedrock monitoring well, no VOC, metals, or cyanide concentrations were detected in the bedrock aquifer. Therefore, Federal-Mogul and Environmental Strategies suggested that the requested KSWP be suspended.

On January 27, 2003, Environmental Strategies submitted correspondence regarding the investigation of alleged drum burial activities at the Scottsville facility to the KHWB. The major points of this letter were discussed with the KHWB and Federal-Mogul during a January 9, 2003, conference call. This letter described the process and procedures Federal-Mogul will implement to address the alleged onsite burial of drums.

On February 28, 2003, Federal-Mogul and Environmental Strategies submitted the GSWP to the KHWB for review and approval. The GSWP included the geophysical techniques and methods to be employed at the Scottsville facility to investigate the alleged drum disposal sites. Environmental Strategies will implement the GSWP on formal approval of the GSWP by the KHWB.

On March 7, 2003, Environmental Strategies submitted a letter and attachments to KHWB as requested by Cindy Esterle (KHWB project manager) during a conference call on February 20, 2003. The requested items included:

- RFI installed monitoring well boring logs
- monitoring well as-built construction diagrams
- Phase IV soil boring logs
- laboratory analytical data sheets and chain of custody forms for soil samples collected during the Phase IV

In addition, on March 7, 2003, Environmental Strategies submitted to the KHWB a letter summarizing the points discussed during a February 20, 2003, conference call with KHWB and Federal-Mogul representatives. During the February 20, 2003 conference call, participants discussed activities to be performed to investigate the alleged drum burial at the Scottsville facility.

Field Activities

On February 8, 2003, KHWB representatives, a former employee, and Environmental Strategies visited the Scottsville facility to discuss former onsite waste handling and disposal practices and to locate alleged drum burial sites. The alleged drum burial sites, indicated by the former employee, were staked in the field and will be investigated under the ongoing RFI process. Federal-Mogul and Environmental Strategies will use geophysical techniques to investigate the alleged drum burial areas.

Results of Sampling and Testing

Analytical results of soil and groundwater samples, collected during the RFI Phase IV investigation, were submitted to the KHWB in a letter report dated January 10, 2003. The Phase IV field activities were conducted by Environmental Strategies during October 2002. VOCs, metals, cyanide, and ammonia concentrations were detected in subsurface soil samples near the former disposal pits. VOCs, metals, and cyanide concentrations were detected in groundwater

samples collected from the unconsolidated monitoring wells. No VOC, metals, or cyanide concentrations were detected in groundwater samples collected from the bedrock monitoring well installed during the Phase IV investigation.

Based on groundwater elevation data collected from the unconsolidated monitoring wells, groundwater in the unconsolidated aquifer flows toward the northwest. Potentiometric surface elevation data indicate that the unconsolidated and bedrock aquifers are not in hydraulic communication in the former disposal pit area.

Work Planned

The following RFI activities are planned for the second quarter of 2003:

- preparation and submittal of the first quarter 2003 RFI progress report
- completion of a geophysical survey of potential drum burial and sludge disposal sites following KHWB-approval of the GSWP
- preparation and submittal of the Geophysical Survey report, if geophysical survey field activities are conducted during May 2003
- preparation and submittal of additional RFI work plans, as necessary
- preparation and submittal of a KSWP

Schedule

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly progress report will be submitted during July 2003, for the period April 1 through June 30, 2003.

The investigation of alleged drum disposal areas will be initiated following KHWB approval of the GSWP. Environmental Strategies anticipates the KHWB-approved geophysical survey will be performed during May 2003.

Federal-Mogul and Environmental Strategies will prepare and submit to the KHWB for approval, a KSWP during the second quarter of 2003. The KHWB indicated during the February 20, 2003 conference call that a KSWP would be necessary as part of the RFI activities being conducted at the Scottsville facility. Federal-Mogul indicated that information regarding spring sampling performed by the BGRO during January and February 2003 (i.e., analytical data and a spring location map) would be useful in preparing the KSWP. Based on the current schedule, the KHWB-approved KSWP will most likely be implemented during the third or fourth quarters of 2003.

Difficulties Encountered

No difficulties were encountered during performance of RFI activities during the period January 1 through March 31, 2003.

Project Management

There were no changes in project management at Federal-Mogul or Environmental Strategies during the first quarter of 2003.

Should you have any questions or comments related to this RFI progress report, covering the first quarter of 2003, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:ckh

cc: Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Ms. Cindy Esterle, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

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2003 MAY -5 P 1:03

April 30, 2003

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: Responses to KHWB Geophysical Survey Work Plan Comments
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

On behalf of Federal-Mogul Corporation, Environmental Strategies Corporation has prepared responses to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Geophysical Survey Work Plan (GSWP) comments received from the Kentucky Division of Waste Management (KDWM) in correspondence dated March 14, 2003. The purpose of the GSWP is to further investigate the alleged onsite disposal of drummed wastewater treatment sludge at the Scottsville facility. Our responses are included in Enclosure A of this letter. These responses reflect our discussions with Kentucky Hazardous Waste Branch (KHWB) personnel regarding the type of geophysical surveys to be performed at the facility to adequately address the issue of the alleged onsite burial of drummed sludge material.

Federal-Mogul and Environmental Strategies will implement the geophysical activities following receipt of written approval by the KHWB. In accordance with the GSWP, Environmental Strategies will provide the KHWB a minimum one week notice before implementing the approved GSWP. On completion of the GSWP field activities, a report will be prepared and submitted to the KHWB documenting the results of the geophysical survey.

Should you have any questions or comments regarding our responses to KHWB comments, please do not hesitate to contact us at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/GSWPresponses-rev.doc

Enclosure

cc: Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Ms. Cindy Esterle, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

Enclosure A

Federal-Mogul Corporation Responses to
Kentucky Department for Environmental Protection's
March 14, 2003, Comments on the
Geophysical Survey Work Plan
Federal-Mogul Corporation, Scottsville, Kentucky

Comment No. 1:

1. As was indicated in the GSWP, the EM-31 induction meter can be an effective tool for locating buried metal objects at depths ranging from approximately 0 – 20' below ground surface. However, objects buried at 20' would be at the maximum range of detection of this instrument (under ideal subsurface conditions). Because it has been indicated that the drums could potentially be buried as deep as 20', KDWM has concerns that the exclusive use of EM-31 in Area 1 may not be sufficient to detect any isolated buried drums at this depth. Therefore, in order to ensure that the geophysical survey is as effective as possible, KDWM suggests that Federal Mogul consider utilizing a magnetometer in conjunction with the EM-31 for the survey of Area 1.

Federal-Mogul's Response to Comment No. 1:

Federal-Mogul will perform a magnetometer survey of Area 1, as suggested by the KHWB, to assist in identifying whether drums are present in the former disposal pits. The magnetometer survey will be conducted in conjunction with the EM-31 electromagnetic conduction survey to identify metallic objects in the subsurface at depths greater than 15 feet (the anticipated maximum depth of the EM-31) and to verify conductivity anomalies identified by the EM-31 at shallower depths.

Comment No. 2:

Because the clay and silty-clay soil types at the site can be expected to contribute to background readings with high electromagnetic conductivity, KDWM is concerned that this property of the soil could obscure subsurface electromagnetic anomalies which may indicate the presence of plating sludge pits in Area 2. KDWM proposes that test borings be used to aid in identifying the source of anomalies which are discovered with the EM-31 in the Area 2 investigation. The use of soil borings along with the EM-31 readings may be more effective than an additional survey of Area 2 using the EM-34 induction meter, as the readings from the EM-34 will represent a weighted average of a larger subsurface profile (because of the greater depth capability of the EM-34). Since the purported additional sludge pits (not previously identified as SWMUs) most likely extend to a relatively shallow depth, KDWM believes that this approach may be more effective in determining if these pits exist.

Federal-Mogul's Response to Comment No. 2:

As described in the GSWP, a former employee indicated that small sludge disposal pits may be located in Area 2 north of the present Scottsville plant building. During expansion of the plant building in the 1980s, an unknown thickness of excavated material was placed over the former ground surface in Area 2. An EM-34 induction meter will be used to survey Area 2 because the depth to the alleged disposal pits could potentially be greater than 20 feet below the ground surface and the depth to bedrock is unknown. Conductivity anomalies identified using the EM-34 will be further investigated using the EM-31 induction meter if the anomalies are less than 20 feet below present grade. By surveying the EM-34 conductivity anomalies with the EM-31, better resolution will be possible to evaluate the subsurface for potential disposal pits.

As discussed with KHWB personnel, Federal-Mogul will advance soil borings or test pits, as necessary, within Area 2 to verify the geophysical survey results. The proposed verification program in Area 2 may include either test borings or test pits depending on the depth at which the subsurface conductivity anomalies are observed.

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

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NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

May 5, 2003

Mr. Mark Bauer, P.E.
Federal Mogul Corporation
c/o Bauer Environmental
42342 Jennings Court
Canton, MI 48188

RE: Geophysical Survey Work Plan – Response to Comments
Federal Mogul Corporation
Scottsville, Allen County, Kentucky
EPA I.D. # KYD-005-458-401

Dear Mr. Bauer:

Personnel of the Kentucky Division of Waste Management (KDWM) have completed a review of the *Response to KHWB Geophysical Survey Work Plan Comments* submitted on behalf of Federal Mogul by Environmental Strategies Corporation (ESC) on May 1, 2003. Based on the additional information provided by Federal Mogul, the Geophysical Survey Work Plan (GSWP) is approved.

Please provide notice of the date of commencement of field activities at least one week in advance by contacting Cindy Esterle or Dale Burton of my staff. Additionally, please provide notification to Todd Johnston of the KDWM Bowling Green Regional Office at (270) 746-7475.

If you have any questions, please contact Cindy Esterle, P.G. at (502) 564-6716, ext. 323.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

c: Caron Falconer, U.S. EPA, Region 4
Dale Burton, Cindy Esterle; Hazardous Waste Branch
Tim Harrod, Enforcement Branch
Todd Johnston, Bowling Green R. O.
Pending File #93-1044

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April 22, 2002

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: January through March 2002 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

This progress report provides a summary of activities performed during the first quarter of 2002 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This progress report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department of Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. In accordance with the KDEP approved RFI Work Plans, subsequent quarterly progress reports will be submitted to KDEP during July and October 2002, and January 2003, describing RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed during the first quarter of 2002 include preparation and submittal of RFI fourth quarter 2001 progress report (October through December), dated January 11, 2002

Agency Contact and Meetings

Environmental Strategies Corporation on behalf of Federal-Mogul, conducted a telephone call with Bart Schaffer, KDEP project manager, regarding the status of KDEP's review of the RFI Phase IV Work Plan. The RFI Phase IV Work Plan was submitted to KDEP under cover dated December 17, 2001. Mr. Schaffer informed Environmental Strategies that he is currently on special assignment until May or June 2002 and that review of the RFI Phase IV Work Plan will likely not be performed until after he completes the current assignment.

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No other agency meetings or contacts were held between Federal-Mogul, Environmental Strategies, and KDEP during the first quarter of 2002.

Document Submission

On January 11, 2002, Environmental Strategies on behalf of Federal-Mogul, submitted a RFI progress report for the period of October 1 through December 31, 2001 (fourth quarter of 2001), to KDEP and the U.S. Environmental Protection Agency (EPA) in accordance with the AO and the KDEP approved RFI Work Plans.

No other documents were submitted to KDEP regarding the RFI being performed at the Scottsville facility during the period January 1 through March 31, 2002.

Field Activities

No RFI related field activities were performed during the first quarter of 2002.

Results of Sampling and Testing

No soil or groundwater samples were collected during the first quarter of 2002.

Work Planned

During the second quarter of 2002, the following RFI activities may be performed:

- preparation and submittal of a RFI quarterly progress report in accordance with the AO and the KDEP approved RFI work plans
- preparation and submittal of responses to KDEP comments on the RFI Phase IV Work Plan, if KDEP comments are received
- initiate the RFI Phase IV field activities after KDEP approval of the Phase IV work plan

Schedule

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly progress report will be submitted July 2002, for the period April 1 through June 30, 2002.

Environmental Strategies, on behalf of Federal-Mogul, will respond to KDEP comments on the December 17, 2001, RFI Phase IV Work Plan on receipt of KDEP comments. The KDEP project manager is currently on special assignment and review of the RFI Phase IV Work Plan has been delayed until Mr. Schaffer returns to the Hazardous Waste Branch.

The RFI Phase IV field activities will be initiated on receipt of KDEP approval of the work plan.

Difficulties Encountered and Resolution

No difficulties were encountered during performance of RFI activities during the period of January 1 through March 31, 2002.

Project Management

There were no changes in project management at Federal-Mogul or Environmental Strategies during the first quarter of 2002.

Should you have any questions or comments related to this first quarter 2002 RFI progress report, please do not hesitate to contact me at (412) 787-5100.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/Progress Reports/April02Flpr.doc

cc: Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Mr. Bart Schaffer, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

ESC

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2001 DEC 26 P 1:43

RCRA PROGRAMS BRANCH

December 17, 2001

Mr. Bart Schaffer, P.G.
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: RFI Phase IV Soil and Groundwater Investigation
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 101

Dear Mr Schaffer:

On behalf of Federal-Mogul Corporation, Environmental Strategies Corporation (ESC) is submitting this Phase IV Work Plan to conduct a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase IV investigation at the Federal-Mogul Scottsville, Kentucky facility. ESC has prepared the Phase IV Work Plan in accordance with the discussions during the September 6, 2001 site meeting, and the subsequent Kentucky Department of Environmental Protection (KDEP) September 12, 2001, Phase III Investigation comment letter. The purpose of the RFI Phase IV investigation is to further delineate constituents of concern in surface and subsurface soils, and further characterize groundwater quality in the unconsolidated and bedrock aquifers at the facility.

Overview

The Phase IV investigation will be performed to determine the extent of constituents of concern (volatile organic compounds [VOCs], cyanide, and arsenic) in soils within and in the vicinity of borings completed during the Phase II or Phase III investigations. The Phase IV investigation will also further delineate the extent of constituents of concerns in the unconsolidated aquifer downgradient of monitoring wells installed during the Phase III investigation. In addition, the Phase IV investigation will determine whether constituents of concern have migrated from the unconsolidated aquifer to the bedrock aquifer in the vicinity of the former disposal pits.

Docket Number _____

All work will be performed in accordance with the Agreed Order (AO) DWM 89098, executed July 24, 1991, between the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) and Cooper Industries (Cooper), the previous owner of the Scottsville facility. Soil investigation efforts will be completed according to ESC's Standard Operating Procedures (SOPs) included in the KDEP approved Phase II and Phase III Work Plans with respect to soil and groundwater. Sampling protocols to be employed during the Phase IV investigation will adhere to those outlined in the Project Management Plan (PMP), Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and the Data Management Plan (DMP) approved by KDEP as part of the RFI Phase II Work Plan.

The proposed scope of work provided below is consistent with the U.S. Environmental Protection Agency (EPA) RFI guidelines provided in Interim Final RFI Guidance Document (May 1989). All site background information, including facility description, operational history, environmental setting, and source area characteristics, are provided in the KDEP approved Phase II Work Plan and will not be further discussed in this work plan.

Phase IV Soil and Groundwater Investigation Scope of Work

Soil Boring Installation and Sampling Procedures

Soil borings and sampling during the proposed Phase IV RFI activities will be conducted consistent with the approved procedures provided in the Phase II and Phase III Work Plans, ESC's SOPs, the approved SAP, and EPA Region IV Environmental Investigative Standard Operating Procedures and Quality Assurance Manual (EISOPQAM).

The Phase IV investigation will include further delineation of VOCs, cyanide and arsenic in deep soils in the vicinity of approximately 11 soil borings completed during previous RFI investigations. Each soil boring will be installed to bedrock using hollow stem auger drilling techniques. Each boring will be advanced using a drill rig and minimum 3.25-inch inside diameter (ID) hollow stem augers. Split spoon samplers will be advanced ahead of the augers into the undisturbed soil material for soil sample retrieval. The collected soil samples will be immediately placed into sample containers supplied by the analytical laboratory to minimize volatilization of the VOCs.

A total of two soil borings will be completed to bedrock, using hollow stem auger drilling techniques, to further delineate VOC concentrations in soil north and west of boring SB-35. Seven borings will be completed to further delineate cyanide affected soil including southeast of B-21; between SB-4 and SB-34; north and south of SB-34; northwest of B-18/SB-35; and east of SB-9 and SB-37. Approximately 15 soil borings will be completed to address arsenic concentrations in soil. These borings will be located north, south, east, and west of SB-38 and SB-22; north, south, and east of SB-21; south and west of SB-33; and north, east, and west of SB-39. The proposed soil boring locations are shown on Figure 1.

Soil samples will be collected from the soil borings starting at 8 feet below ground surface (bgs) in 2-foot intervals until bedrock is encountered at approximately 14 feet bgs. The samples will be analyzed for VOCs, cyanide, and arsenic using EPA Methods specified in the KDEP approved Phase II and Phase III Work Plans.

During the proposed Phase IV investigation effort, surficial soil samples will be collected from eight soil borings located within the limits of the former disposal pit areas (Figure 1). These samples will be collected from the ground surface to a depth of 12 inches bgs. The samples will be analyzed for cyanide and arsenic using approved EPA Methods. The surficial soil samples will be collected using either split spoon samplers or hand augers, depending on accessibility of the selected sampling location. In addition, surficial soil samples will be collected from four background locations (Figure 1) and analyzed for arsenic. The surficial arsenic samples collected from the former disposal pits will be evaluated with respect to the surficial arsenic background data.

ESC's onsite hydrogeolgist will describe the lithology of the recovered sample and record the description in the field logbook. Geologic logs for borings completed during the Phase IV activities will include subsurface lithology, depth to bedrock, and PID values.

Soil Characterization

The Phase IV soil quality data will be used along with data collected during the RFI Phase II and Phase III investigations to evaluate the vertical and horizontal extent of affected soil at the facility. The Phase IV data will further characterize surface and subsurface soils associated with the former disposal pits and assist in evaluating potential remedial technologies, if necessary.

A map illustrating the analytical data will be prepared and submitted with the Phase IV report.

Groundwater Monitoring Well Installation and Sampling

A Phase IV groundwater investigation will be performed to further evaluate the extent of VOCs, metals, cyanide, and ammonia in the unconsolidated aquifer downgradient of the former disposal pits.

Monitoring wells MW-6 and MW-7 will be installed in the vicinity of the facility's northern property boundary, downgradient of four existing monitoring wells (Figure 1). In addition, a third unconsolidated monitoring well (MW-8) will be installed in the unconsolidated aquifer approximately 40 feet directly downgradient of monitoring well MW-4 (Figure 1).

These Phase IV unconsolidated aquifer monitoring wells will be installed to monitor the saturated unconsolidated horizon directly above bedrock. The monitoring well borings will be advanced to the local bedrock surface using minimum 4.25-inch ID hollow stem augers. The monitoring well casing and well screen will be installed the through hollow stem augers. The unconsolidated monitoring wells will be constructed of 2-inch ID

Schedule 40 polyvinyl chloride (PVC) riser casing and 0.010-inch slotted Schedule 40 PVC well screen. Based on information obtained during the installation of the Phase III monitoring wells, the Phase IV well screens will be 5 feet in length. Installation of the proposed Phase IV unconsolidated aquifer monitoring wells will adhere to the procedures described in Federal-Mogul's February 5, 2001, approved groundwater investigation work plan. To complete the Phase IV monitoring well installation process, an above grade protective metal casing and concrete surface pad will be placed around each well. Groundwater monitoring well construction diagrams and lithologic boring logs will be generated for each well and included in the Phase IV report.

To assess the potential impact to the local bedrock aquifer underlying the Scottsville facility, one bedrock monitoring well will be installed during the Phase IV activities. The bedrock monitoring well MW-9 will be installed in the vicinity of existing monitoring well MW-4 (Figure 1). Groundwater quality samples collected and analyzed from MW-4 during the Phase III investigation indicate that the unconsolidated aquifer in this area appears to be affected by VOCs. Therefore, the proposed bedrock monitoring well will be installed to assess whether constituents identified in the local soil and unconsolidated aquifer have affected the local bedrock aquifer.

The bedrock monitoring well will be constructed of a 6-inch ID metal conductor casing installed to a depth of approximately three feet into the top of competent bedrock. The conductor casing borehole will be advanced using either minimum 10-inch ID hollow stem augers or air rotary drilling techniques. After encountering the local bedrock surface, bedrock cores will be collected to determine the competency of the bedrock horizon. The conductor casing will be placed in the borehole after competent bedrock is encountered, and grouted in place.

After the conductor casing grout seal has cured for a minimum of 24 hours, a falling head pressure test will be performed to determine the integrity of the conductor casing seal. To perform the falling head test, potable water will be placed in the conductor casing and the water level will be monitored for a period of one hour. If the water level inside the conductor casing does not fall more than 3-inches over the one hour period, the conductor casing seal will be considered acceptable and the borehole will be advanced into the bedrock horizon using bedrock coring techniques. Bedrock coring will be advanced approximately 10-feet beyond first encountered groundwater in the bedrock horizon. On reaching the termination depth, the borehole will be reamed using a minimum 5.75-inch roller bit in preparation of installation of the bedrock monitoring well. The borehole will be cleaned of drill cuttings before the monitoring well is installed. ESC's onsite hydrogeologist will describe the lithology of the recovered bedrock core and overlying soil material. The bedrock monitoring well boring log will be included in the Phase IV report submitted to KDEP.

The bedrock monitoring well will be constructed of 2-inch ID Schedule 40 PVC riser casing and 0.010-inch slotted well screen. The well screen will be 10-feet in total length. After the PVC well casing and screen are installed in the borehole, the bedrock

monitoring well will be completed in the same manner as the unconsolidated monitoring wells described above. Casing centralizers will be placed approximately every 20 feet on the riser casing and well screen to ensure vertical alignment of the bedrock monitoring well within the borehole. The bedrock monitoring well will be completed with an above grade protective locking metal casing and surface pad.

All monitoring wells installed during the Phase IV activities will be developed to remove sediments and ensure effective communication between the well screen and surrounding water-bearing horizon. Each monitoring well will be developed using the methods and techniques described and approved by KDEP in the Phase III work plan. Groundwater from each monitoring well will be purged using bailers or a pump. Turbidity, pH, specific conductance, and temperature will be periodically monitored during the development process to ensure groundwater representative of the screened portion of the aquifer is entering the well. Development will continue until the discharge of suspended sediments has been sufficiently reduced and the monitored field parameters have stabilized. Development will be conducted in accordance with ESC's SOP that was included and approved by KDEP as part of the Phase III work plan.

A Kentucky licensed and registered surveyor will determine the horizontal location, with respect to onsite structures, and elevation of each monitoring well installed during the Phase IV. The elevation of the ground surface and the top of the PVC well casing and the protective metal casing will be surveyed to the nearest 0.01 foot with respect to U.S. Geological Survey (USGS) control. The horizontal location of each new well will be determined to the nearest 0.01 foot and referenced to onsite permanent structures.

Approximately 2 weeks after development of the groundwater monitoring wells, groundwater quality samples will be collected from each well for laboratory analysis. The groundwater quality samples, designated with a MW prefix, will be obtained using low-flow purging techniques, as requested by KDEP during completion of the Phase III investigation. The groundwater quality samples will be collected directly from the discharge line of a peristaltic, bladder, or other type of low flow pump. In addition, depth to groundwater and total depth measurements will be recorded to evaluate groundwater flow direction in the unconsolidated aquifer.

The groundwater quality samples will be analyzed for total metals, including zinc, cyanide, and VOCs by EPA Methods 6010, 9010, and 8260, respectively. In addition, if groundwater quality samples are collected from MW-2, ammonia will also be analyzed using EPA Method 350.2. The collected groundwater quality samples will be analyzed on a 30-day turnaround time. The appropriate groundwater analytes, sampling container size and types, preservatives, and holding times will adhere to Table 8-1, included as Enclosure B in the KDEP approved Phase III Work Plan.

ESC's SOPs pertaining to the installation, development, and sampling of groundwater monitoring wells were included as Enclosure A of the KDEP approved Phase III Work Plan. Geologic boring logs for the Phase IV installed monitoring wells and well

construction diagrams for each well installed during the Phase IV activities will be included in the Phase IV report.

Decontamination Procedures

All soil and well installation equipment used during completion of the Phase IV activities will be decontaminated after each use in accordance with the procedures described in the KDEP approved Phase II SAP and the Phase III Work Plan. Drill rigs and all downhole equipment will be decontaminated using a steam cleaner before initiation of field activities, between each borehole or sampling location, and before the drilling contractor exits the Scottsville facility. Split spoon samplers used during the Phase IV investigation will be decontaminated in accordance with the KDEP approved SAP.

Investigation Derived Wastes

Soil and bedrock cuttings and development, purge, and decontamination liquids generated during the proposed Phase IV investigation will be handled in accordance with the protocols, methods, and techniques described in the KDEP approved Phase III Work Plan. The generated soil and liquid wastes will be placed in Department of Transportation (DOT) approved open top or closed top 55-gallon metal containers. The generated investigation derived wastes will be sampled and analyzed for the parameters described in the approved Phase III Work Plan.

Quality Assurance/Quality Control

During the Phase IV investigation, duplicate soil and groundwater samples, equipment or field blanks, and trip blanks will be forwarded to the analytical laboratory in accordance with the methods and protocols described in the KDEP approved Phase II and Phase III work plans and the SAP. The duplicate, equipment or field blank samples will be collected for every 20 samples collected (a rate of 5 percent). Laboratory prepared trip blanks will be submitted to the laboratory whenever VOC soil or groundwater samples are collected. All duplicate, equipment or field blanks, and trip blank samples will be recorded in the field logbook in accordance with the quality assurance/quality control (QA/QC) protocols described in the KDEP approved work plans.

Project Deliverables

During implementation of the Phase IV Work Plan, quarterly progress reports and any necessary technical memorandums will be prepared for submittal to KDEP and EPA in accordance with the 1991 AO. These quarterly reports and memorandums will be submitted to document site activities and to obtain regulatory approval for specific RFI activities, as necessary. Details concerning the quarterly reports and technical memorandums are outlined in the KDEP approved Phase II Work Plan. Progress reports with respect to RFI activities being performed at the Scottsville facility will be submitted during January, April, July, and October, if necessary, to KDEP and EPA.

Following completion and data validation of the soil and groundwater results and the Phase IV investigation activities, a letter report will be submitted to KDEP. The letter report will include geologic boring logs, monitoring well construction diagrams, soil and groundwater quality results, a soil boring and monitoring well location map, and groundwater contours for the unconsolidated aquifer developed from groundwater elevation data collected during the Phase IV monitoring event.

Project Schedule

The schedule to complete the proposed Phase IV investigation is attached as Figure 2. Federal-Mogul and ESC will initiate the RFI Phase IV work activities discussed above in accordance with the attached schedule after written approval of the Phase IV scope of work is received. KDEP personnel will be notified 2 weeks before initiation of the approved Phase IV field activities.

Should you have any questions or comments regarding this Phase IV Work Plan, please do not hesitate to contact Frank Faulisi at (636) 379-8075 or me at (412) 787-5100.

Sincerely yours,

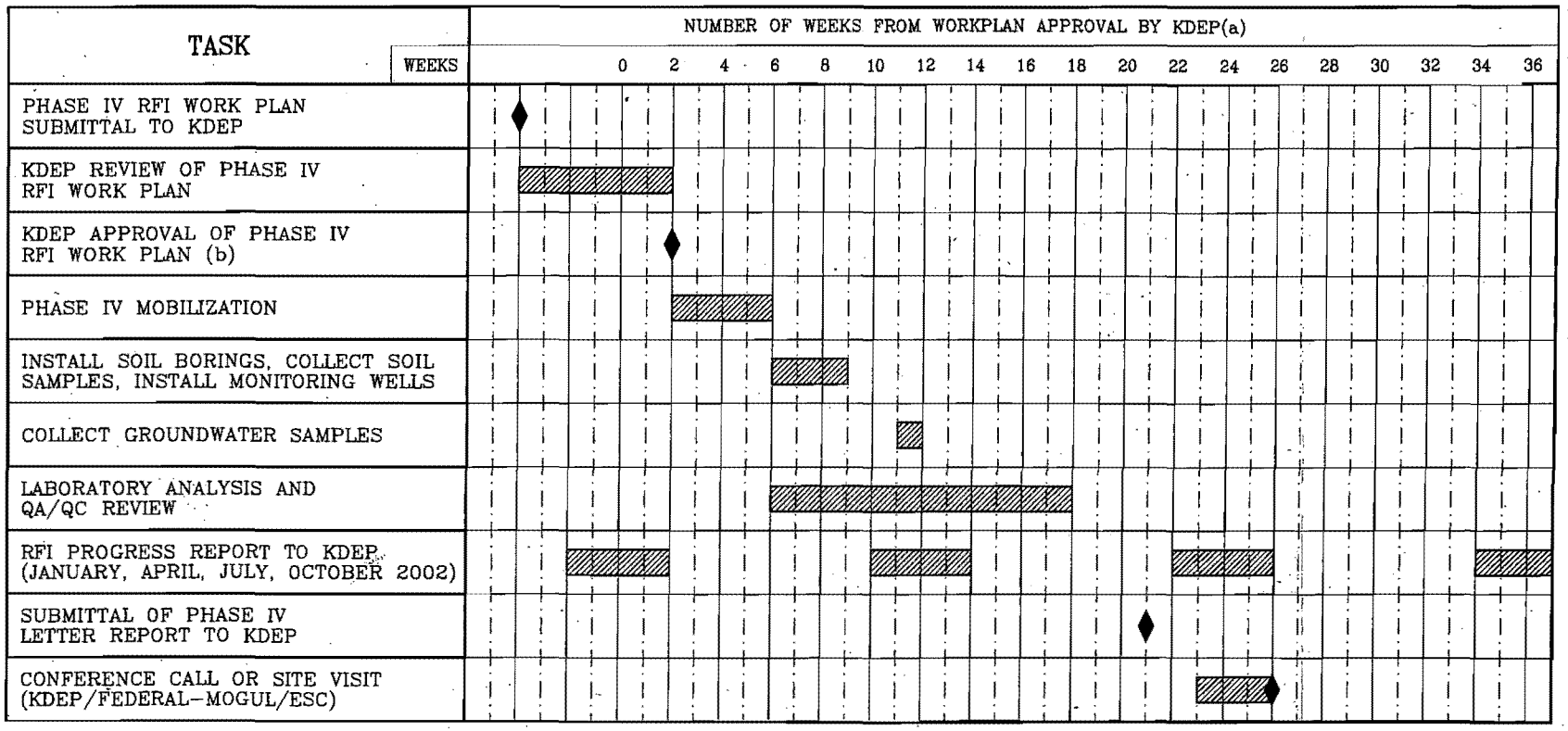
E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:lmk

Enclosures
docs/Federal Mogul/138055/ScottsvillePHIVWP.doc

cc: Michael Welch, KDEP, Hazardous Waste Branch, Frankfort, KY
Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, GA
Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mark Bauer, P.E., Bauer Environmental, Canton, MI
Frank Faulisi, GCS or St. Louis, St. Peters, MO



(a) *SCHEDULE IS CONTINGENT ON AGENCY APPROVAL, SUBCONTRACTOR AVAILABILITY, AND WEATHER CONDITIONS.*

(b) *TIME ZERO BEGINS WITH AGENCY APPROVAL OF PHASE IV RFI WORK PLAN.*

Drawn By: PAT 120701
Checked:
Approved:
dwg No.: 138055-B04

FEDERAL-MOGUL FACILITY
SCOTTSVILLE, KENTUCKY
PREPARED FOR
FEDERAL-MOGUL CORPORATION
SOUTHFIELD, MICHIGAN

Figure 2
PHASE IV RFI
PROJECT SCHEDULE

ENVIRONMENTAL STRATEGIES CORPORATION
ESC
Four Penn Center West, Suite 315
Pittsburgh, Pennsylvania 15276
(412) 787-5100

D:\DWG\130\138055 Scotts\138055B04.dwg, 12/07/2001 11:16:03 AM, rax

Jim

ENVIRONMENTAL STRATEGIES CORPORATION
300 Corporate Center Drive, Suite 200 ▪ Moon Township, PA 15108 ▪ (412) 604-1040 ▪ Fax (412) 604-1055

July 15, 2002

Mr. Michael V. Welch, P.E., Manager
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: April through June 2002 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welch:

This progress report provides a summary of activities performed during the second quarter of 2002 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. Subsequent quarterly progress reports will be submitted to KDEP during October 2002 and January 2003, describing RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed during the second quarter of 2002 include preparation and submittal of the RFI first quarter 2002 progress report (January through March), dated April 22, 2002.

Agency Contact and Meetings

Environmental Strategies Corporation conducted a telephone call on April 23, 2002, with Bart Schaffer, KDEP project manager, regarding the status of KDEP's review of the RFI Phase IV Work Plan submitted on December 17, 2001. Mr. Schaffer informed Environmental Strategies that he is on special assignment until July or August 2002 and that review of the RFI Phase IV Work Plan will likely not be performed until he completes this assignment.

No other agency meetings or contacts were held between Federal-Mogul, Environmental Strategies, and KDEP during the second quarter of 2002.

Document Submission

On April 22, 2002, Environmental Strategies, submitted an RFI progress report for the period of January 1 through March 31, 2002 (first quarter of 2002), to KDEP and the U.S. Environmental Protection Agency (EPA) in accordance with the AO and the KDEP approved RFI Work Plans.

No other documents were submitted to KDEP regarding the RFI being performed at the Scottsville facility during the period April 1 through June 30, 2002.

Field Activities

No RFI related field activities were performed during the second quarter of 2002. Federal-Mogul and Environmental Strategies are awaiting KDEP approval of the RFI Phase IV Work Plan.

Results of Sampling and Testing

No samples were collected during the second quarter of 2002.

Work Planned

During the third quarter of 2002, the following RFI activities will be performed:

- preparation and submittal of an RFI quarterly progress report in accordance with the AO and the KDEP approved RFI work plans
- preparation and submittal of responses to KDEP comments on the RFI Phase IV Work Plan

Schedule

Subsequent RFI progress reports will be submitted to KDEP in accordance with the AO and the approved RFI Work Plans. The next quarterly progress report will be submitted during October 2002, for the period July 1 through September 30, 2002. Environmental Strategies will respond to KDEP comments on the RFI Phase IV Work Plan on receipt. The RFI Phase IV field activities will be initiated on receipt of KDEP approval of the work plan.

Environmental Strategies anticipates the proposed Phase IV field activities will be performed during August and September 2002. The Phase IV field activities will be conducted in accordance with the schedule contained in the RFI Phase IV Work Plan. Environmental Strategies believes that completion of the Phase IV activities will allow Federal-Mogul to define and evaluate potential remedial alternatives, as warranted.

Difficulties Encountered and Resolution

No difficulties were encountered during performance of RFI activities during the period of April 1 through June 30, 2002.

Project Management

There were no changes in project management at Federal-Mogul or Environmental Strategies during the second quarter of 2002.

Should you have any questions or comments related to this second quarter RFI progress report, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:hsm

cc: Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Mr. Bart Schaffer, KDEP. Hazardous Waste Branch, Frankfort, KY
Mr. Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY

Federal-Mogul/138055/Progress Reports/2ndqtr02pr.doc

Jim Smith

DuPont Fluoroproducts
4200 Camp Ground Road
Louisville, KY 40216

RECEIVED
2002 NOV 29 P 2:11
RCRA PROGRAMS BRANCH

DuPont Fluoroproducts

Via: Federal Express

November 27, 2002

Mr. Robert H. Daniell
Director
Kentucky Natural Resources and
Environmental Protection Cabinet
Division of Waste Management
Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601

Subject: Notification of Discovery of Area of Environmental Concern
Well Field Area
DuPont Louisville Works
EPA ID No. KYD003924198

Dear Mr. Daniell:

This letter serves to notify both the Kentucky Natural Resources and Environmental Protection Cabinet Division of Waste Management (KDWM) and USEPA of the discovery of an area of environmental concern (AOC) in the Well Field Area of DuPont Louisville Works. This notification is in accordance with requirements found in Part IV.B.2 of the plant's Hazardous Waste Management Permit.

Environmental impact due to the chloroform spill at the adjacent Rohm and Haas site was detected during the investigation of the subject spill. Chloroform has been detected in the aquifer substrate as well as in groundwater on the DuPont site. Currently, the distribution of chloroform is being mapped on both the DuPont and Rohm and Haas sites. Groundwater monitoring wells are being installed on both sites to further define any impact to groundwater. These findings were verbally communicated to Mr. Ahad Chowdhury of KDWM on November 14, 2002.

DuPont intends to continue characterization of the chloroform release to soil and groundwater. Interim measures will be planned and executed, as appropriate.

E. I. du Pont de Nemours and Company
Printed on Recycled Paper
CH-3871 Rev. 10/95

A16/8A7/10

Please feel free to contact Brad Nave at (502) 569-2148 or me at (502) 775-3173 if you have any questions regarding this notification or if you require any additional information.

Sincerely,

Cheryl S. Fisher
Area Manager-Environmental

CSF:bds

cc: James Smith (USEPA)
Ahad Chowdhury (KDWM)
Dale Burton (KDWM)
Bradley Nave (DuPont)
Guy Johnson (DuPont)

C. FALCONER

RECEIVED

ENVIRONMENTAL STRATEGIES CORPORATION
300 Corporate Center Drive, Suite 200 • Moon Township, PA 15108 • (412) 604-6030 • Fax (412) 604-1055

2003 AUG 13 PM 10

August 4, 2003

Mr. Michael V. Welsh, P.E., Manager
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

ORIGINAL

Re: April through June 2003 RFI Progress Report
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 401

Dear Mr. Welsh:

This progress report provides a summary of activities performed during the second quarter of 2003 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at the Federal-Mogul Corporation facility located in Scottsville, Kentucky. This report is submitted in response to Agreed Order (AO) DWM 89098, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries (Federal-Mogul's predecessor) executed on July 24, 1991. Subsequent quarterly progress reports will be submitted to KDEP during October 2003 and January 2004, if necessary. Each progress report will describe RFI activities performed during the preceding calendar quarter.

Work Accomplished

RFI activities performed by Federal-Mogul and Environmental Strategies Corporation during the second quarter of 2003 included:

- preparation and submittal of the first quarter 2003 progress report
- participation in several conference calls with Kentucky Hazardous Waste Branch (KHWB) representatives regarding the alleged onsite burial of drums and the Geophysical Survey Work Plan (GSWP)
- preparation and submittal of responses to KHWB comments on the GSWP
- contracting a geophysical specialist to perform the GSWP field activities
- review and evaluation of hydrogeologic data necessary to prepare the Karst Survey Work Plan (KSWP)
- initial preparation of the KSWP

R4179803

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

ORIGINAL

AUG 6 - 2003

4WD-RPB

Mike Welch, Manager
Hazardous Waste Branch
Kentucky Department for Environmental
Protection
Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601

SUBJ: Phase IV RFI Soil and Groundwater Investigation Report
Federal-Mogul Corporation, Scottsville, Kentucky
EPA ID No. KYD 005 458 401

Dear Mr. Welch:

The Environmental Protection Agency (EPA) has completed review of the above referenced Phase IV RFI Report dated January 10, 2003 and have the following comments.

The facility concluded that because the shallow water table in the unconsolidated aquifer did not merge with the deeper bed rock aquifer there is likely no communication between the two aquifers. Furthermore, bedrock well monitoring well 9, located down hill from soil boring SB8, did not yield significant groundwater contamination. The facility stated that based on the aforementioned rationale that a karst spring study is not warranted and they shall request from the state that they not be required to conduct a spring survey.

First of all, it is our opinion that a karst spring survey should be conducted because there is likely communication between the unconsolidated aquifer and the bedrock aquifer. It is typical of karst areas to have a perched aquifer in the clay overlying the bedrock. Often wells in the perched aquifer dry up in the drier summer and fall seasons. This is the case for MW-2 and MW-6. While the clay perches water over a vadose zone in the bedrock the unconsolidated aquifer is a leaky aquifer. It is the nature of chlorinated solvents, due to their higher specific gravity than that of water, to migrate vertically through clays. Clays have a lattice molecular structure which allows the molecules of VOCs to pass through. Water on the other hand has a tendency to collect in the lattice structure of the clay. Monitoring well #9 may be down hill from the waste disposal site but may not be down gradient hydrologically from the waste disposal site at the location of SB-8. Since there are no other groundwater monitoring wells in the bedrock, the direction of groundwater flow is not realized. In addition, groundwater and hazardous constituents from the overburden aquifer will most likely migrate vertically by stair-stepping along a system of joints and bedding planes to the bedrock aquifer. Groundwater flow in limestone can be preferential and water in one set of fractures may not be related to the water in an adjacent fracture . The rock

R480174

between the fractures for the most part is typically not porous and virtually impermeable. Dense nonaqueous phase (DNAPL) chlorinated solvents will typically collect on top of the bedrock and follow the slope of the bedrock surface until a fracture is intersected. The top of the bedrock in karst limestone typically exhibits solutionally enlarged erosional features along fractures. Significant solution features beneath a source area of chlorinated solvents may capture the DNAPL and funnel the solvents into the bedrock aquifer. The DNAPL will migrate through the solutionally enlarged fractures into the vadose zone of the bedrock aquifer and into the phreatic zone of the karst bedrock aquifer. Water percolating through the overburden aquifer is one of the recharge mechanisms to the karst aquifer and percolation water facilitates the migration of dissolved phase chlorinated solvents.

Significant concentrations of chlorinated solvents have been identified in disposal pits at the facility. Soil analysis of soil boring SB-8 detected trichloroethene (TCE) at 4,575 and 6,700 mg/kg at depths of 8 and 10 feet depth respectively. Groundwater monitoring of the unconsolidated aquifer in the vicinity of SB-8 at MW-4 detected TCE at 15.2 mg/L, Cis 1,2 DCE at 1,26 mg/L, perchloroethene at .062 mg/L. MW-4 is in the soil aquifer and it is 15 feet to the water table. The down gradient/side gradient well, MW-8, has detected cyanide at a concentration of .299 mg/L, TCE at .340 mg/L, vinyl chloride at .322 mg/L, cis 1,2 DCE at 3.94 mg/l, and 1,1 DCE at .008 mg/L. MW-8 is side gradient to groundwater flow path of the disposal area at SB-8.

It is our recommendation that Federal-Mogul Corporation conduct a spring survey investigation and identify all springs that may receive discharge from the facility. Upon identifying the springs the facility should inject dye into the bedrock aquifer from a well drilled through the unconsolidated aquifer into the water bearing zone of the bedrock aquifer. The facility should inject a dye into the aquifer and recover the dye on coconut grade charcoal receptors. The dye should be analyzed to determine a positive result. The springs(s) identified should be used as monitoring locations. The facility should utilize the services of a qualified karst hydrologist to conduct the spring survey and dye trace study.

Sincerely,

N. M. Kumar

Narindar M. Kumar, Chief
RCRA Programs Branch
Waste Management Division

EPA (Grant 03')

FY 2000 HAZARDOUS WASTE COMPLIANCE AND ENFORCEMENT LOG

1. I.D. Number KYD005458401

2. Facility Type:
- ☐ TRANSPORTER
- ☐ GEN MKTR HW
- ☐ UO MKTR BURNER
- ☐ SPEC OIL FUEL MKTR
- ☐ NON-HANDLER
- ☐ LAND DISPOSAL
- ☐ TREAT/STORE
- ☐ OT HW MKTR
- ☐ UO FUEL BURNER
- ☐ RECYCLER
- ☐ CLOSED
- ☑ LQG
- ☐ SQG
- ☐ HW BURNER
- ☐ NON-NOTIFIER
- ☐ COMBUSTION
- ☐ CEG

3. County Name Allen

4. Handler Name Federal-Mogul Friction Products

5. Location Address 2640 Old Gallatin Rd., Scottsville, KY 42164

6. Evaluation — Add ✓ Change ☐ Delete ☐

Date of Evaluation	Sequence Number	Agency	Type of Evaluation	Reason	Responsible Person	Branch
03/14/2003 (MM/DD/YYYY)	___	S	CEI	___	RDE	BG

Comments:

Areas of Violation

GGR	GPT	GMW	DIA	DOP	DMI	DMC	DMC	DGW	BRR	HWM	CAS	UOM
GLQ	GTR	TGR	DMR	DCP	DLT	DPS	DPP	DTR	BPS	HWB	REC	UOB
GLB	GRR	TWD	DCL	DLF	DFR	DLB	DGS	DRR	BIS	HWG	FEA	
GMR	*GOR	TMR	DCH	DSI	DMW	DWP	DTT	DPB	BCE	CSS	SFM	

7. Violation — Add ☐ Change ☐ On-Going Violation ☐ Delete ☐

Agency	Sequence Number	Area of Violation	Class of Violation	Regulation Cited	Regulation Type
S	___	___	___	___	___

Priority	Date Determined	Scheduled Date	Return to Compliance Actual Resolve Date
___	___/___/___ (MM/DD/YYYY)	___/___/___ (MM/DD/YYYY)	___/___/___ (MM/DD/YYYY)

Comments:

7a. Violation — Add ☐ Change ☐ On-Going Violation ☐ Delete ☐

Agency	Sequence Number	Area of Violation	Class of Violation	Regulation Cited	Regulation Type
S	___	___	___	___	___

Priority	Date Determined	Scheduled Date	Return to Compliance Actual Resolve Date
___	___/___/___ (MM/DD/YYYY)	___/___/___ (MM/DD/YYYY)	___/___/___ (MM/DD/YYYY)

Comments:

R4178090

Natural Resources and Environmental Protection Cabinet
Department for Environmental Protection
Division of Waste Management

Large Quantity Generator Inspection Report

Site/Permit ID: **KYD 005 458 401**			Regional Office: **B.G.**
Site Name: **Federal-Mogul Friction Products**			Program: Hazardous Waste
Site Address: 2640 Old Gallatin Road			
City: Scottsville	State: Kentucky	Zip: 42164	County: **Allen**
Site Contact: Mike Stanger	Title: Env. Health & Safety		Phone #: 270 237 3900
Inspection Type: Routine	Purpose: Comprehensive		Not/Com #:
Inspection Date: 3/14/03	Time: Start 10:25 a.m. End p.m.		
Latitude: 36° 43′ 39.4″	Longitude: 86° 12′ 55.3″		
Coordinate Collection Method: GPS Point Average +/- 40 Meters			
Type of Site: auto brake manufacturer/rebuilder		Registration Expires: 06/30/2003	
Drum Accumulation ☒	Tank Accumulation ☐	Other Activities	

I. Administrative Requirements

1. Operations consistent with registration	32:010 § 3	No Violations Observed
a. All generated wastes on Notification Form	32:010 § 3(4)	No Violations Observed
b. Status correctly identified	32:010 § 3(4)	No Violations Observed
c. Notification form data correct	32:010 § 3(4)	No Violations Observed
d. Up to date registration	32:010 § 3(1)	No Violations Observed

Comments:
Federal-Mogul has two hazardous wastestreams. Their registration expires 6/30/03.
Compliance Status - No Violations Observed

II. Operator Certification/Accreditation Requirements

Comments:
Compliance Status - Not Applicable

III. Record Keeping Requirements

1. Hazardous waste determination/analysis record	32:010 § 2	No Violations Observed
2. Generator annual report submitted/maintained	32:040 § 1, 2	No Violations Observed
a. Correct information submitted	32:040 § 2(1)	No Violations Observed
b. Copy sent to County Judge/Executive	32:040 § 2(3)	No Violations Observed
c. Last 3 years on file	32:040 § 1(2)	No Violations Observed
3. Inspection requirements	32:040 § 1(4)	No Violations Observed
a. Adequate schedule developed/kept	35:020 § 6(1, 2)	No Violations Observed
b. Inspection log details	35:020 § 6(4)	No Violations Observed
1. Date of inspection	35:020 § 6(4)	No Violations Observed
2. Time of inspection	35:020 § 6(4)	No Violations Observed
3. Inspector's name	35:020 § 6(4)	No Violations Observed
4. Notation of observations	35:020 § 6(4)	No Violations Observed

5. Date & nature of remedial actions	35:020 § 6(4)	No Violations Observed
c. Records maintained at least 3 years	35:020 § 6(4)	No Violations Observed
d. Inspections recorded as required	35:020 § 6(2, 4)	No Violations Observed
e. Remedial actions taken and recorded	35:020 § 6(3)	No Violations Observed
4. Personnel training requirements	32:030 § 5(1)(d)	No Violations Observed
a. Adequate training program developed	35:020 § 7(1)	No Violations Observed
b. Training conducted by qualified person	35:020 § 7(1)	No Violations Observed
c. Appropriate/required employees trained	35:020 § 7(2)	No Violations Observed
d. New employees within 6 months	35:020 § 7(2)	No Violations Observed
e. Annual retraining	35:020 § 7(3)	No Violations Observed
f. Required personnel records	35:020 § 7(4)	No Violations Observed
1. Name and job title	35:020 § 7(4)	No Violations Observed
2. Detailed, written job description, duties	35:020 § 7(4)	No Violations Observed
3. Written skill, education & qualifications	35:020 § 7(4)	No Violations Observed
g. All training records maintained on-site	35:020 § 7(5)	No Violations Observed
5. Contingency Plan & emergency requirements	32:030 § 5(1)(d)	No Violations Observed
a. Response actions described as required	35:040 § 3(1)	No Violations Observed
1. 35:040 § 2 - Implementation	35:040 § 2(1)	No Violations Observed
2. 35:040 § 7 - Emergency procedures	35:040 § 7	No Violations Observed
b. SPCC Plan amended for 35:040 provisions	35:040 § 3(2)	No Violations Observed
c. Arrangements described	35:040 § 3(3)	No Violations Observed
d. Emergency coordinator information	35:040 § 3(4)	No Violations Observed
e. List of emergency equipment	35:040 § 3(5)	No Violations Observed
f. Copy of contingency plan on-site	35:040 § 4(1)	No Violations Observed
g. Distribution of contingency plan	35:040 § 4(2)	No Violations Observed
h. Amendment of contingency plan	35:040 § 5	No Violations Observed
i. Coordinators' knowledge and authority	35:040 § 6	No Violations Observed
1. Operations, records & waste locations	35:040 § 6	No Violations Observed
2. Authority to commit resources	35:040 § 6	No Violations Observed
j. Implementation Reports maintained	35:040 § 7(4)	No Violations Observed
6. Arrangements with local authorities	32:030 § 5(1)(d)	No Violations Observed
a. Police/fire/hospital/ER teams	35:030 § 7(1,2)	No Violations Observed
b. Refusals maintained	35:030 § 7(1,2)	No Violations Observed
7. International shipments	32:050 § 1 – 9	No Violations Observed
8. Generator manifests	32:020, 32:100	No Violations Observed
a. Manifests contain all required information	32:100	No Violations Observed
b. Manifests properly executed	32:020 § 3, 4	No Violations Observed
c. Manifests maintained	32:040 § 1	No Violations Observed
d. Exception report maintained	32:040 § 3	No Violations Observed
9. Land disposal restricted wastes	Chapter 37	No Violations Observed
a. Determination/analysis	37:010 § 7	No Violations Observed
b. Dilution prohibited in lieu of treatment	37:010 § 3	No Violations Observed
c. Notice/certification with each shipment	37:010 § 7	No Violations Observed
1. All required information	37:010 § 7	No Violations Observed
2. Correct treatment standard	37:010 § 7	No Violations Observed
3. Waste analysis sent, if available	37:010 § 7	No Violations Observed

Comments:

Process and materials unchanged since 4/18/02 inspection. 2002 annual report of hazardous waste activities was on file. Certified mail receipts were retained to verify the report had been sent to the division and the

Allen County Judge-Executive. Weekly inspections are conducted by Mike Stanger. Inspection items include satellite and accumulation areas, stormwater discharge, and used oil. Inspection date and times are documented and signed by Stanger. Federal- Mogul conducts monthly in-house safety training for employees. Documented training in 2002 includes spill containment and response, dust collection, contingency plan implementation, and hazardous materials handling. The site has a contingency plan that is called an emergency action plan by Federal-Mogul. The plan describes the location and description of hazardous materials, location of fire equipment, maps, and evacuation routes. Each phone has a call down list. Comstar Security is contracted to notify all agencies in the event of an emergency event. The plan did not have copies of call down list. Stanger was asked to add the call down list to the plan. Federal-Mogul had five shipments of hazardous waste in 2002. Armor Environmental transport hazardous waste to Omni (Southeastern Chemical and Solvent) in South Carolina. Used oil is picked up by Safety-Kleen. LDR certificates were attached to each hazardous waste manifest.

Compliance Status - No Violations Observed

IV. Reporting Requirements

1. Contingency Plan - Notification of Release and Implementation Report		
a. Notification of release as required	35:040 § 7(4)	No Violations Observed
1. Local fire & police, state police	35:040 § 7(4)	No Violations Observed
2. Local/state/federal ER groups	35:040 § 7(4)	No Violations Observed
b. Implementation Report Prepared	35:040 § 7	No Violations Observed
1. Date, Time, & details in report	35:040 § 7	No Violations Observed
2. Submitted within 15 days	35:040 § 7	No Violations Observed
2. Manifest Requirements	32:040 § 3	No Violations Observed
a. Exception report submitted	32:040 § 3, 1	No Violations Observed
3. Universal Waste Requirements	43:030 § 3	No Violations Observed
a. Written notification submitted	43:030 § 3	No Violations Observed

Comments:

The contingency plan has not been implemented in the last year. No exception reporting for manifested shipments was required.

Compliance Status - No Violations Observed

V. Operation & Maintenance/Performance Requirements

1. Satellite accumulation areas:	32:030 § 5(3)	No Violations Observed
a. Maximum of 55 gallons	32:030 § 5(3)(a)	No Violations Observed
b. One quart maximum if acutely hazardous	32:030 § 5(3)(a)	No Violations Observed
c. At or near generation point	32:030 § 5(3)(a)	No Violations Observed
d. Container under operator control	32:030 § 5(3)(a)	No Violations Observed
e. Complies with 35:180 § 2, 3, and 4(1)	32:030 § 5(3)(a)(1)	No Violations Observed
1. Condition of containers	35:180 § 2	No Violations Observed
2. Compatibility of waste with containers	35:180 § 3	No Violations Observed
3. Closed except for adding/removing	35:180 § 4(1)	No Violations Observed
f. "Hazardous Waste" label or marking	32:030 §5(3)(a)(2)	No Violations Observed
2. Prevention and preparedness:	32:030 § 5(1)(d)	No Violations Observed
a. Maintained/operated to prevent releases	35:030 § 2	No Violations Observed
b. Required equipment	35:030 § 3	No Violations Observed
1. All Contingency Plan equipment	35:040 § 3(5)	No Violations Observed
2. Internal communication or alarm system	35:030 § 3(1)	No Violations Observed
3. Telephone or 2-way radio	35:030 § 3(2)	No Violations Observed
4. Fire extinguishers, if applicable	35:030 § 3(3)	No Violations Observed

5. Absorbent material, if applicable	35:030 § 3	No Violations Observed
c. Required equipment maintained/operated	35:030 § 4	No Violations Observed
d. Access to communications or alarm	35:030 § 5	No Violations Observed
e. Adequate aisle space maintained	35:030 § 6	No Violations Observed
3. Accumulation in containers:	32:030 § 5(1)(a)	No Violations Observed
a. D.O.T. packaging	32:030 § 1	No Violations Observed
b. Accumulation start date	32:030 § 5(1)(b)	No Violations Observed
1. Date clearly marked	32:030 § 5(1)(b)	No Violations Observed
2. Date visible for inspection	32:030 § 5(1)(b)	No Violations Observed
c. Each container clearly marked "Hazardous Waste"	32:030 § 5(1)(c)	No Violations Observed
d. Condition of containers	35:180 § 2	No Violations Observed
e. Compatibility of waste with containers	35:180 § 3	No Violations Observed
f. Management of containers:	35:180 § 4	No Violations Observed
1. Drums closed (except adding/removing)	35:180 § 4(1)	No Violations Observed
2. Operated to prevent leaks or ruptures	35:180 § 4(2)	No Violations Observed
g. Accumulation areas inspected weekly	35:180 § 5	No Violations Observed
1. Inspected for leaks	35:180 § 5	No Violations Observed
2. Container condition evaluated	35:180 § 5	No Violations Observed
3. Remedial actions taken	35:020 § 6(3)	No Violations Observed
h. Ignitable or reactive waste management	35:180 § 6	No Violations Observed
1. 50 feet from property line	35:180 § 6	No Violations Observed
i. Incompatible waste management	35:180 § 7	No Violations Observed
4. 90-day accumulation period not exceeded	32:030 § 5(1)	No Violations Observed
5. Universal Waste requirements	Chapter 43	No Violations Observed
a. Treatment and disposal not permitted	43:020 § 2	No Violations Observed
b. Universal Wastes managed as required	43:020 § 4	No Violations Observed
c. Wastes marked/labeled as required	43:020 § 5	No Violations Observed
d. Accumulation period not exceeded	43:020 § 6	No Violations Observed
e. Employee training	43:020 § 7	No Violations Observed
f. Response to releases	43:020 § 8	No Violations Observed
g. Off-site shipments managed as required	43:020 § 9	No Violations Observed

Comments:

Federal-Mogul operates one satellite accumulation drum in the adhesive apply section. The drum, which was closed with an undated hazardous waste label on the side, is used to store rags for glue clean up from the adhesive applicator. There were no drums in accumulation at the time of inspection. The hazardous waste accumulation area is a fenced area in the plant that is also used for raw material storage. There was no universal waste in accumulation at the time of inspection. Spent lamps are recycled. Empty adhesive drums are used to accumulate rags and waste solvent. Armor Environmental disposes of excess empty drums.

Compliance Status - No Violations Observed

VI. Discharge/Emission Compliance

Comments:

Compliance Status - Not Applicable

VII. Monitoring/Analyses Evaluation

Comments:

Compliance Status - Not Applicable

VIII. Environmental/Human Health Impact

Comments:

Compliance Status - Not Applicable

IX. Documentation

- ☐ Photos taken
- ☐ Record of visual determination of opacity
- ☐ Documents Obtained From Facility
- ☐ Samples taken by DEP
- ☐ Samples taken by outside source
- ☐ Regional Office instrument readings taken
- ☐ Other documentation
- ☒ Site Hazard Assessment completed and attached

Comments:

Inspector: Richard Denton	Title: Environmental Inspector III	Date: 03/14/2003

Overall Compliance Status
☒ **No violations observed**
☐ **No violations observed but impending violation trends observed** – Advisory Action Taken
☐ **Out of Compliance. Non-recurrent deficiency noted** – Verbal notice given or violation corrected at time of inspection.
☐ **Out of Compliance. Non-recurrent administrative or O & M deficiency noted** – Warning Notice issued
☐ **Out of Compliance** – NOV issued

Received By:	Title:	Date:
Delivery Method:		

Worksite Hazard Assessment

Part A
Site ID: KYD 005 458 401

NOT/COM #:
GPS: N36° 43' 39.4", W86° 12' 55.3'

Part B
Circle Hazard/s Located at the Site being Assessed Sufficient to Require PPE. Comment in Part C.

I. HEAD
POTENTIAL INJURY/HAZARD
1. Struck By
2. Struck Against
3. Electrical
4. Temperature
5. Other _____

II. EYES/FACE
POTENTIAL INJURY/HAZARD
1. Airborne
2. Chemical
3. Flash/Light/UV
4. Other _____

III. RESPIRATORY
POTENTIAL INJURY/HAZARD
1. Oxygen Deficiency
2. Airborne Particles
   a. Dusts
   b. Fumes
   c. Mists
3. Airborne Contaminants
   a. Gases
   b. Vapors
4. Combinations
5. Temperature
6. Other _____

IV. HAND/ARM
POTENTIAL INJURY/HAZARD
1. Cut/Abrasion/Puncture/Crush
2. Electrical
3. Chemical
4. Biological
5. Temperature
6. Body Fluids
7. Cumulative
8. Strain
9. Other _____

V. FOOT/LEG
POTENTIAL INJURY/HAZARD
1. Cut/Abrasion/Puncture/Crush
2. Electrical
3. Chemical
4. Biological
5. Temperature
6. Struck by/Against
7. Strain
8. Other _____

VI. TORSO/WHOLE BODY
POTENTIAL INJURY/HAZARD
1. Cut/Abrasion/Puncture
2. Electrical
3. Chemical
4. Biological
5. Temperature
6. Struck By/Against
7. Body Fluids
8. Strain
9. Cumulative
10. Slip/Trip/Fall
    a. Same Level
    b. Different Level
11. Entrapment
12. Immersion/Submersion/Water
13. Other _____

VII. AUDITORY
NOISE LEVEL
1. Ambient Level Above 85 dBa
2. Impact Level Above 85 dBa

PART C GO/NO GO
COMMENTS
1. Steel Toe Boots

No production on day of inspection.

PART D
CERTIFICATION
I certify this WORKSITE HAZARD ASSESSMENT was conducted and/or current files reviewed. Appropriate Personal Protective Equipment was utilized per hazards noted or anticipated.

Signature _____ Date 3/14/03

Facility Lat/Long Collection Form

When collecting the facility lat/long, the following hierarchy should be used to determine where to obtain the reading:

First Choice: Near the front door of the facility's on-property, main office;

Second Choice: If there is not a main office on the property, then at the facility's front entrance (gate);

Last Choice: If there is not a main office on the facility's property or an identifiable front entrance, then the lat/long should be collected at the approximate center of all of the DEP regulated activities occurring at the facility (determined by using best judgement).

Lat/long readings should be recorded in degrees, minutes, and seconds to at least one decimal place (dd° mm' ss.s") for handheld GPS collected locations, and to two decimal places (dd° mm' ss.ss") for mapping grade GPS collected locations. The GPS Map Datum setting should be NAD83.

In addition to the lat/long, it is also important to document the accuracy of the reading. This is done with MAD Codes. MAD codes describe the method that was used to collect the data and the accuracy of the collection. The appropriate MAD code should be selected from the following table based on the type of receiver used by the collector.

Use this MAD Code	When the lat/long is collected with a:
GP0	Mapping grade receiver with differential correction
G40	Mapping grade receiver without differential correction
G40	Handheld receiver

Upon completion, a paper or electronic copy of this form should be submitted to Linda Carrier of the Commissioner's Office Data Management Section for entry into the Kentucky Facility Index.

Lat/Long Collector: RD **Collection Date:** 03/14/2003

Location Name: Federal-Mogul Friction Products

Location Address: 2640 Old Gallatin Rd.

Scottsville, KY 42164

County: Allen

Latitude: 36 43 39.4 **Longitude:** 86 12 55.3 **MAD Code:** G40

ENVIRONMENTAL STRATEGIES CORPORATION
300 Corporate Center Drive, Suite 200 ▪ Moon Township, PA 15108 ▪ (412) 604-1040 ▪ Fax (412) 604-1055

March 7, 2003

Ms. Cindy Esterle, P.G.
Commonwealth of Kentucky
Department for Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601

Re: RFI Phase IV Monitoring Wells, Boring Logs, and Analytical Data
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458 101

Dear Ms. Esterle:

On behalf of Federal-Mogul Corporation, Environmental Strategies Corporation is submitting the following documents as requested by the Kentucky Hazardous Waste Branch (KHWB) during our conference call on February 20, 2003. The documents include the following:

- monitoring well boring logs and as-built construction diagrams for the nine monitoring wells installed during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) process
- soil boring logs from borings completed during October 2002, as part of the RFI Phase IV activities
- analytical laboratory data sheets and chain of custody documents for soil samples collected and analyzed during the October 2002 RFI Phase IV

Should you require additional information regarding the October 2002 RFI Phase IV activities, please do not hesitate to contact me at (412) 604-1040.

Sincerely yours,

E. Michael Riggins

E. Michael Riggins, P.G.
Project Manager

EMR:hsm

Enclosures

Federal-Mogul/138055/Addl=PhIV-data.doc

A4-180811

cc: Mr. Michael Welch, KHWB, Frankfort, KY (without enclosures)
Ms. Caron Falconer, U.S. EPA, Region IV, Atlanta, GA
Mr. Dale Burton, KHWB, Frankfort, KY (without enclosures)
Mr. Mark Bauer, Federal-Mogul Corporation, Southfield, MI
Mr. Frank Faulisi, GCS of St. Louis, St. Peters, MO (without enclosures)
Mr. Kyle Whetstone, Federal-Mogul Corporation, Scottsville, KY (without enclosures)

RFI Monitoring Well Boring Logs and Construction Diagrams

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-1/ BB-1 — ***Completion Date:*** 4/10/2001

Project No.: 138055-7 — ***Surface Elevation (feet AMSL*):*** 809.80 — ***Northing:*** NA

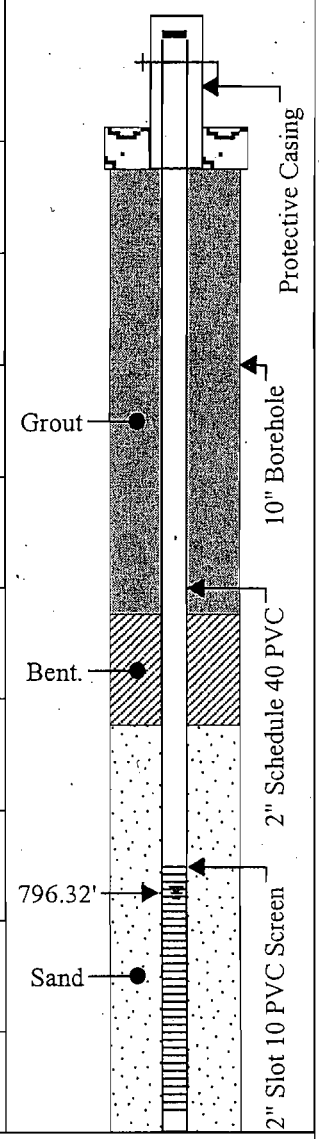
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 812.35 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 10 — ***Total Depth (feet):*** 18

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	809.8					
0		***SILT (ML)*** Dark brown, slightly plastic, soft/stiff, root zone, moist	808.8	1	4 4 3 4		100	42
2		***CLAY (CL)*** Yellow-brown, plastic, organics, rock fragments, moist; Gray clay seams/lenses at 3 feet bgs; Becoming more silty and orange with depth	805.8	2	4 6 10 18		100	28
4		***Silty CLAY (CL)*** Yellowish-brown/ orange, hard, dry, rock fragments; Becoming reddish-brown	803.3	3	4 7 15 22		100	29
6		***CLAY (CL)*** Reddish with yellowish-brown and gray mottling, plastic, stiff to hard, rock fragments, moist; Gritty at 9.5 feet bgs, coarse to medium sand sized rock fragments; 4 inch calcite gravel seam at 10 feet bgs; More gray clay		4	6 11 11 19		100	29
8				5	7 9 13 16		100	0
10			797.8	6	5 10 15 32		100	0
12		Yellowish- brown, plastic, hard to very hard, sand to gravel sized rock fragments, sandy zones, moist; Organics and calcite gravel between 14 and 16 feet bgs		7	6 16 22 29		100	1.1
14				8	9 10 16 22		100	0
16				9	8 9 7 10		100	0

Well Completion Details



Logged By: Michael Riggins & Erin Huntley — ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-1/ BB-1 | ***Completion Date:*** 4/10/2001

Project No.: 138055-7 | ***Surface Elevation (feet AMSL*):*** 809.80 | ***Northing:*** NA

Project: Federal-Mogul Corp. | ***TOC Elevation (feet AMSL*):*** 812.35 | ***Easting:*** NA

Location: Scottsville, KY | ***Borehole Diameter (inches):*** 10 | ***Total Depth (feet):*** 18

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)	Well Completion Details
			791.8						
		Weathered BEDROCK	791.3						
19		Refusal							
21									
23									
25									
27									
29									
31									
33									
35									
37									

Logged By: Michael Riggins & Erin Huntley | ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. | ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko | ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-2 — ***Completion Date:*** 4/12/2001

Project No.: 138055-7 — ***Surface Elevation (feet AMSL*):*** 795.40 — ***Northing:*** NA

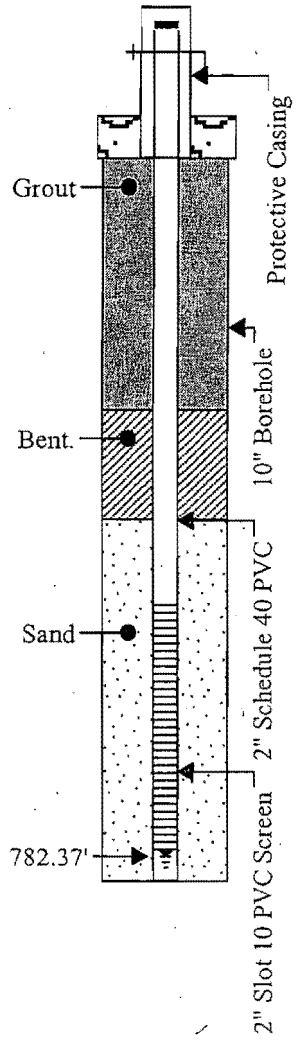
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 797.91 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 10 — ***Total Depth (feet):*** 13.5

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	795.4					
		TOPSOIL						
		Silty CLAY/Clayey SILT (CL/ML) Yellow-orange-brown, plastic, roots, rock fragments	793.4	1	4 4 5 7		100	0
		Grading to medium to dark brown at 1.8 feet		2	6 8 14 12		100	0
		CLAY (CL) Yellow-brown, silty layer at 3.5 feet, plastic, stiff, roots, damp	791.4	3	9 10 13 16		100	0
		Silty CLAY/Clayey SILT (CL/ML) Reddish-orange, gray clay lenses with sand sized rock fragments, plastic, hard, organics, damp		4	9 14 21 28		100	0
		Calcite seam at 7.5 and 9 feet; Black organic staining at 9.2 and 11.5 feet; Becoming more yellow at 11 feet; Wet with sandy zones at 12 feet		5	8 11 18 33		100	
				6	13 16 17 20		100	
			781.9	7	6 7 50\3		100	
		Weathered BEDROCK						
		Refusal						

Well Completion Details



Logged By: Michael Riggins — ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-3 — **Completion Date:** 4/10/2001

Project No.: 138055-7 — **Surface Elevation (feet AMSL*):** 795.70 — **Northing:** NA

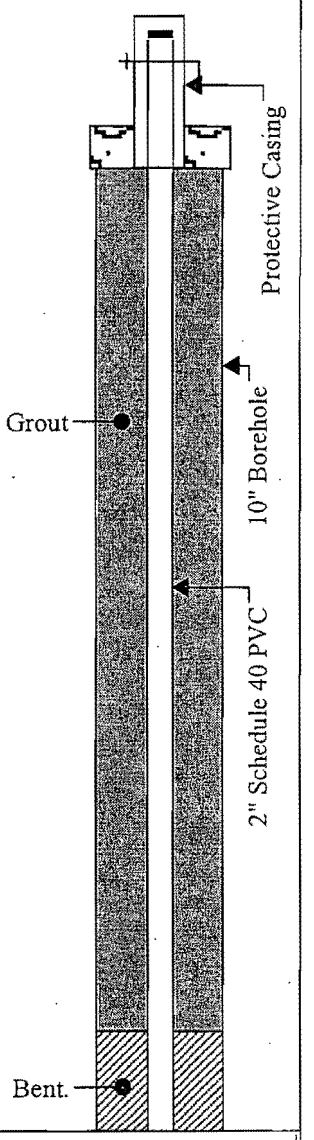
Project: Federal-Mogul Corp. — **TOC Elevation (feet AMSL*):** 798.38 — **Easting:** NA

Location: Scottsville, KY — **Borehole Diameter (inches):** 10 — **Total Depth (feet):** 25

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	0.0					
0		***SILT (ML)*** Dark brown, slightly plastic, root zone	-0.5	1	3 5 5 8		100	0
2		***CLAY (CL)*** Yellowish-brown/ orange, trace silt, plastic, stiff, rock fragments, gray mottling Becoming red at 2 feet		2	10 11 11 12		30	0
4		More silt at 6 feet, sand sized rock fragments in gray clay		3	6 5 6 10		100	0
6				4	10 6 10 9		30	0
8			-9.0	5	7 9 11 15		100	0
10		***Silty CLAY (CL)*** Reddish-orange, plastic, hard, organics, moist	-11.0	6	7 10 10 19		60	0
12		***CLAY (CL)*** Olive-gray, trace sand and silt, plastic, rock fragments, calcite, organics	-12.0	7	19 17 19 31		100	0
14		***Silty CLAY/ Clayey SILT (CL/ML)*** Yellowish-brown clayey silt, gravel sized rock fragments, calcite Grading to a reddish-orange silty clay, slightly plastic, hard, trace organics		8	13 21 28 43		100	0
16		Grading back to yellowish-brown clayey silt at 16 feet, non-plastic, hard, calcite crystals, rock fragments, moist/damp		9	14 21 28 43		100	0

Well Completion Details



Logged By: Michael Riggins & Erin Huntley — **Method:** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — **HSA** ☑ **Direct Push** ☐ **Rotosonic** ☐ **Cable Tool** ☐

Driller/ Operator: Chris Lacko — **Rotary:** **Air** ☐ **Water** ☐ **Air Hammer** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-3 — ***Completion Date:*** 4/10/2001

Project No.: 138055-7 — ***Surface Elevation (feet AMSL*):*** 795.70 — ***Northing:*** NA

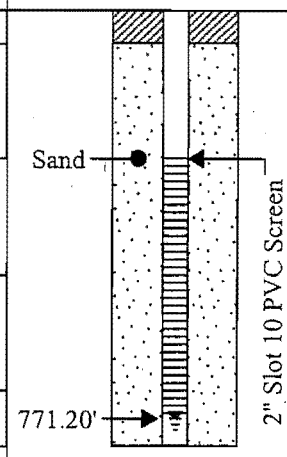
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 798.38 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 10 — ***Total Depth (feet):*** 25

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
			-18.0					
19		***CLAY (CL)*** Yellowish-brown, trace silt, plastic, sticky, some gray, calcite gravel seam at 18.5 feet. Wet at 19 feet. Black organic staining		10	13 13 12 15		100	0
21				11	9 6 9 12		100	0
23			-24.0	12	8 7 9 9		100	0
25		***Weathered BEDROCK*** Medium gray clay with weathered rock	-25.0	13	7 50\5		100	0
		Refusal						
27								
29								
31								
33								
35								
37								

Well Completion Details



Logged By: Michael Riggins & Erin Huntley — ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-4/SB-35 — ***Completion Date:*** 4/12/2001

Project No.: 138055-7 — ***Surface Elevation (feet AMSL*):*** 799.30 — ***Northing:*** NA

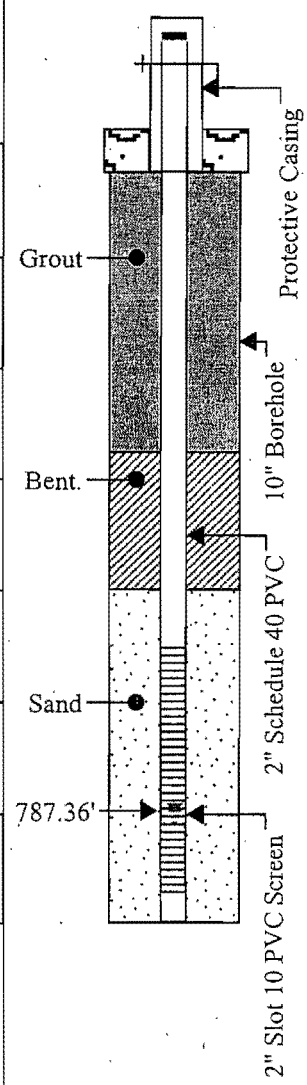
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 801.94 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 10 — ***Total Depth (feet):*** 14

**AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	799.3					
0		***TOPSOIL***	798.4					
		CLAY (CL) Reddish-yellow-brown, rock fragments		1	3 3 5 8		100	3.5
2		***SILT (ML)*** Brown, slightly plastic, organics		2	10 12 14 18		100	28.6
4		***CLAY (CL)*** Reddish-yellow-brown, little to some silt, silty and sandy interbeds, plastic to slightly plastic, stiff, rock fragments, calcite seams between 8.5 and 9.5 feet		3	8 13 19 28		100	36.4
6				4	10 10 13 23		100	96
8				5	7 17 18 2.3		100	899
10			788.3	6	8 13 15 18		100	654
12		***Sandy CLAY (SC)*** Light yellow-brown	787.3					
		CLAY (CL) Yellow-brown, some silt and sand, plastic, rock fragments, saturated	785.3	7	10 9 8 12		100	50
14		***Weathered BEDROCK*** Refusal						
16								

Well Completion Details



Logged By: Michael Riggins & Erin Huntley — ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-5 — ***Completion Date:*** 4/13/2001

Project No.: 138055-7 — ***Surface Elevation (feet AMSL*):*** 794.30 — ***Northing:*** NA

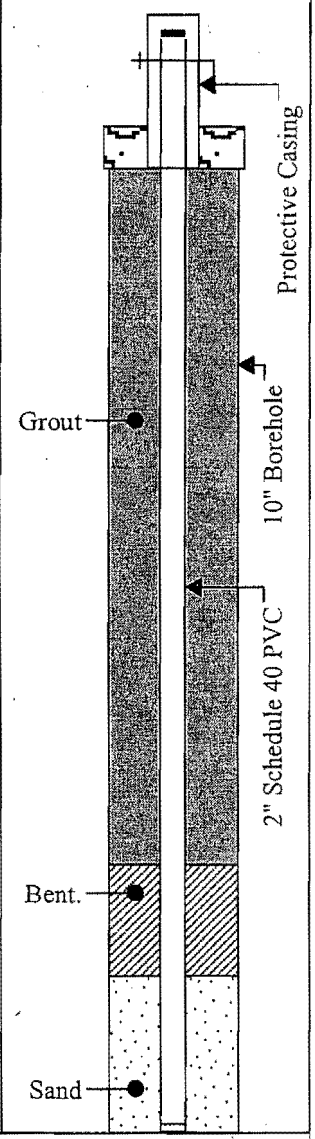
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 796.76 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 10 — ***Total Depth (feet):*** 22.5

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	0.0					
0		***TOPSOIL***						
		CLAY (CL) Yellow-brown, plastic, rock fragments, damp		1	4 3 7 8		100	
2		***Silty CLAY (CL)*** Reddish-orange, brown clay streaks, plastic, organics,black staining, damp/ moist		2	2 3 4 5		0	
4		Grading to yellow-brown at 6 feet,stiff, rock fragments, calcite, silty zones		3	10 6 8 11		30	
6		Red weathered zone at 8 feet; Grading to red-yellow-brown at 10 feet, hard, dense		4	7 8 11 17		100	
8		Becoming more yellow at 14 feet		5	8 9 13 24		100	
10				6	19 25 35 50\1		100	
12				7	18 14 17 25		100	
14				8	13 15 11 17		100	
16			-16.0					
		Sandy to Silty CLAY (CL) Yellow-brown, wet at 17 feet	-17.5	9	12 8 10 14		100	

Well Completion Details



Logged By: Michael Riggins & Erin Huntley — ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-5 — ***Completion Date:*** 4/13/2001

Project No.: 138055-7 — ***Surface Elevation (feet AMSL*):*** 794.30 — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 796.76 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 10 — ***Total Depth (feet):*** 22.5

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)	Well Completion Details
		CLAY (CL) Yellow-brown, structure apparent, trace gray clay, plastic, stiff, dense							
19		Grading to a light brown clay with trace silt, plastic, saturated at 19 feet		10	12 14 9 9		100		
21		Becomming dark orange-brown with dark red staining with coarse sand or fine gravel zones at 20 feet		11	5 5 6 9		100		773.91' 2" Slot 10 PVC Screen
			-22.5						
23		***Weathered BEDROCK*** Refusal		12	7 50\1		100		
25									
27									
29									
31									
33									
35									
37									

Logged By: Michael Riggins & Erin Huntley — ***Method:*** 6.25-inch

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Chris Lacko — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-6 — ***Completion Date:*** 10/01/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 790.80 — ***Northing:*** 5728.37362

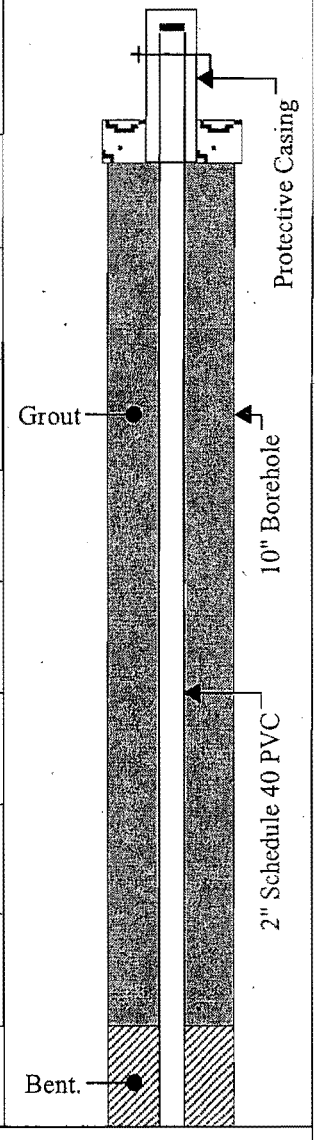
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 793.17 — ***Easting:*** 5783.49768

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11 — ***Total Depth (feet):*** 25

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	790.8					
0		***Silty CLAY (CL)*** Reddish yellow (7.5YR 6/8) silty CLAY (CL), some white/ light gray mottling 2 to 4-feet bgs, plastic, stiff, damp, roots		1	4 6 6 7	--	71	0.0
2				2	7 5 6 7	--	63	0.8
			786.8					
4		Yellowish red (5YR 5/8) silty CLAY (CL), some white/ light gray mottling, plastic, medium stiff to soft, damp		3	4 6 5 7	--	100	0.8
6				4	5 6 7 7	--	75	0.8
			782.8					
8		Red (2.5YR 4/8) and white/ light gray silty CLAY (CL), plastic, soft, moist		5	5 4 5 6	--	75	0.8
			781.0					
10		***CLAY (CL)*** Very pale brown (10YR 7/4) CLAY (CL), plastic, very soft, moist		6	2 4 5 5	--	63	0.8
12		Brownish yellow (10YR 6/6) CLAY (CL), trace sand, plastic, soft, moist		7	3 3 4 6	--	21	0.0
			777.0					
14		***Clayey SILT (ML)*** Gray (10YR 5/1) clayey SILT (ML), trace rock fragments, slightly plastic, moist	775.6	8	3 3 9 15	--	100	0.0
16		***CLAY (CH)*** Yellowish brown (10YR 5/6) CLAY (CL), very plastic, very soft		9	14 18 31 35	--	100	0.0

Well Completion Details



Logged By: Erin Huntley — ***Method:*** 6.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-6 — ***Completion Date:*** 10/01/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 790.80 — ***Northing:*** 5728.37362

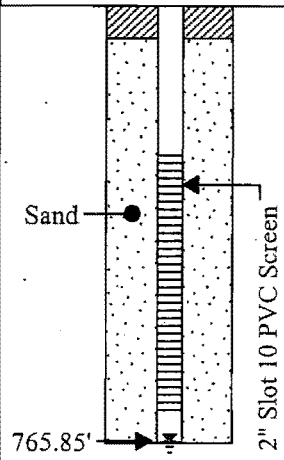
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 793.17 — ***Easting:*** 5783.49768

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11 — ***Total Depth (feet):*** 25

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		SILT (ML) Brownish yellow (10YR 6/8) SILT (ML), some clay, rock fragments at 17.5-feet bgs, non-plastic, very stiff, damp	772.8	10	17 18 24 32	--	71	0.0
19		***SILT/ Clayey SILT (ML)*** Brownish yellow (10YR 6/8) SILT/ Clayey SILT (ML), rock fragments, hard, damp	770.8	11	11 12 18 17	--	100	0.0
21		***Silty CLAY (CL)*** Brownish yellow (10YR 6/8) to yellowish brown (10 YR 5/8) silty CLAY (CL), some white/ light gray mottling, slightly plastic, very stiff, damp to moist	766.8	12	14 12 18 18	--	67	--
23		***CLAY (CH)*** Brown (10 YR 5/3) CLAY (CL), trace sand and silt, plastic, very soft, wet/ saturated	765.8	13	--	--	58	--
25		Refusal						
27								
29								
31								
33								
35								
37								

Well Completion Details



Logged By: Erin Huntley — ***Method:*** 6.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: ***MW-7*** | ***Completion Date:*** 10/02/2002

Project No.: 138055-11 | ***Surface Elevation (feet AMSL*):*** 792.20 | ***Northing:*** 5701.91800

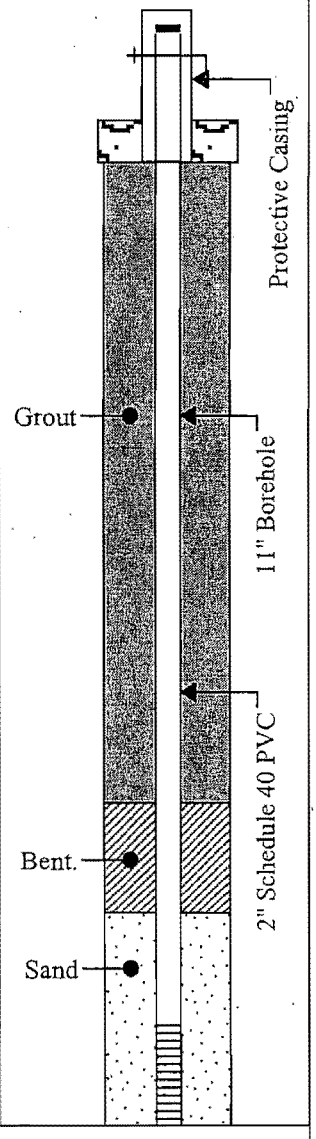
Project: Federal-Mogul Corp. | ***TOC Elevation (feet AMSL*):*** 794.74 | ***Easting:*** 5966.78137

Location: Scottsville, KY | ***Borehole Diameter (inches):*** 11 | ***Total Depth (feet):*** 21

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
-2		Ground Surface	792.2					
0		***Silty CLAY (CL)*** Strong brown (7.5 YR 5/8) silty CLAY (CL), plastic, medium stiff, damp	790.2	1	3 3 4 3	--	33	0.8
2		***SILT (ML)*** Brownish yellow (10YR 6/8) SILT (ML), friable, soft, dry, rootlets	788.2	2	5 8 10 14	--	58	0.8
4		***Silty CLAY (CL)*** Yellowish red (5YR 5/8) silty CLAY (CL), slightly plastic, very stiff, dry	786.2	3	6 9 11 15	--	75	0.0
6		***SILT/ SAND (ML)*** Very pale brown (10YR 7/4) SILT/ very fine SAND (ML), friable, medium dense, dry	784.2	4	15 21 24 20	--	50	0.0
8		***Clayey SILT/ Silty CLAY (ML/ CL)*** Yellow (10YR 7/6) clayey SILT/ silty CLAY (ML/CL), trace sub-angular chert fragments, slightly plastic, hard	782.2	5	11 16 21 22	--	100	0.0
10		Yellow (10YR 7/8) clayey SILT (ML), trace gravel/ rock fragments, slightly plastic, hard, moist/ damp	780.2	6	8 13 15 19	--	96	0.0
12		Yellow (10YR 7/8) clayey SILT/ silty CLAY (ML/CL), trace gravel, stiff, moist	778.2	7	7 8 8 23	--	21	0.0
14		***Silty CLAY (CL)*** Brownish yellow (10YR 6/6) silty CLAY (CL), plastic, very stiff, moist, gypsum crystals (in zones) at 16 to 18.5-feet bgs		8	5 8 15 14	--	83	0.0
16				9	10 15 22 21	--	75	0.0

Well Completion Details



Logged By: Erin Huntley | ***Method:*** 6.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. | ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts | ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-7 — ***Completion Date:*** 10/02/2002

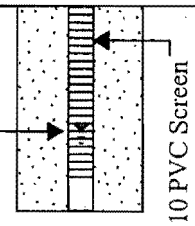
Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 792.20 — ***Northing:*** 5701.91800

Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 794.74 — ***Easting:*** 5966.78137

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11 — ***Total Depth (feet):*** 21

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)	Well Completion Details
			773.7						
19		***CLAY (CL)*** Yellowish brown (10YR 5/8) CLAY (CL), some sand, plastic, very stiff, saturated		10	5 5 8 7	--	92	0.0	772.64'
			771.2	11	50\1	--	--	--	
21		Refusal							
23									
25									
27									
29									
31									
33									
35									
37									



Logged By: Erin Huntley — ***Method:*** 6.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-8 — ***Completion Date:*** 10/02/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 796.00 — ***Northing:*** 5610.97746

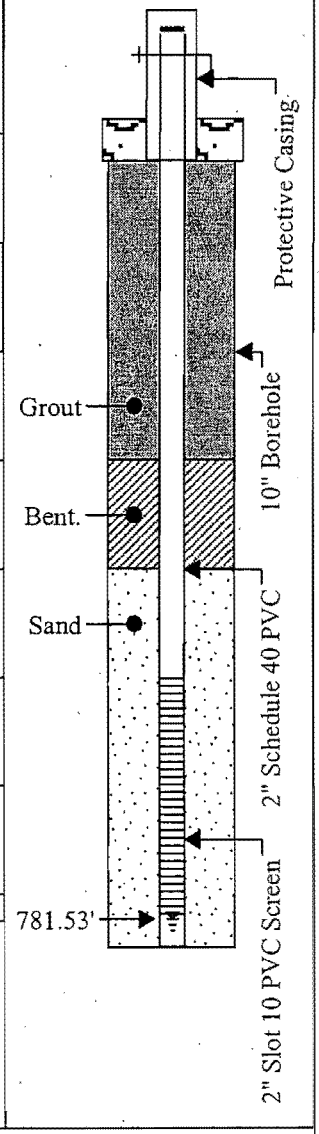
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 798.35 — ***Easting:*** 5928.20032

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11 — ***Total Depth (feet):*** 15

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
		Ground Surface	796.0					
		TOPSOIL	795.4					
		Silty CLAY (CL) Yellowish red (5YR 5/8) silty CLAY (CL), plastic, stiff, damp	794.0	1	3 8 6 8	--	54	0.8
		Clayey SILT (ML) Reddish yellow (5YR 6/8) clayey SILT (ML), nonplastic, medium stiff, damp	792.0	2	4 8 7 10	--	63	0.0
		Silty CLAY (CL) Strong brown (7.5YR 5/8) silty CLAY (CL), trace sand and rock fragments, plastic, soft, moist/damp		3	7 8 12 14	--	83	0.0
		Clayey SILT (ML) Reddish yellow (7.5 YR 6/8) clayey SILT (ML), sub-rounded rock fragments, slightly plastic, very stiff, damp		4	6 9 14 14	--	42	0.0
			786.0	5	4 8 12 14	--	92	0.0
		Silty CLAY (CL) Reddish yellow (7.5YR 7/8) to brownish yellow (10YR 6/8) silty CLAY (CL), sub-angular/ sub-rounded rock fragments, chert fragments (gravelly zone) at 11.5-feet bgs, slightly plastic/ plastic, stiff, black organic matter	784.0	6	4 12 11 12	--	79	0.0
				7	5 10 8 11	--	75	0.0
		Sandy CLAY (CL)/ Clayey SAND (SC) Very pale brown (10YR 7/4) sandy CLAY (CL)/ clayey SAND (SC), some gravel, plastic, very soft, wet/ saturated	781.5	8	50\3	--	21	11
		Highly Weathered SHALE	781.0					
		Refusal						

Well Completion Details



Logged By: Erin Huntley — ***Method:*** 6.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-9 — ***Completion Date:*** 10/03/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 798.00 — ***Northing:*** 5592.03031

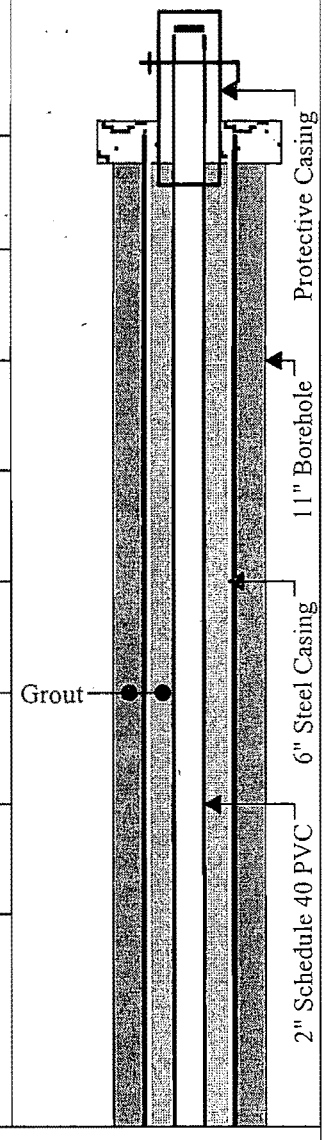
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 800.65 — ***Easting:*** 5952.68861

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11/6 — ***Total Depth (feet):*** 50

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
-2		Ground Surface	798.0					
0		***Topsoil***						
		Silty CLAY (CL) Reddish yellow (7.5 YR 6/8) silty CLAY (CL), some gravel, slightly plastic, soft, moist	796.0	1	5 5 5 8	--	66	0.0
2		Yellowish red (5YR 5/8) silty CLAY (CL), some weathered rock fragments from 4 to 6-feet bgs, slightly plastic, very stiff, damp		2	9 11 13 15	--	50	0.0
4			792.0	3	8 12 12 12	--	100	0.0
6		Reddish yellow and white (7.5 YR 6/8 and 8/0) silty CLAY (CL), slightly plastic, very stiff, damp/dry	790.0	4	8 13 15 15	--	21	0.0
8		***CLAY (CL)*** Yellow (10YR 7/8) CLAY (CL), some white/ light gray mottling, trace black organic matter, plastic, medium stiff, moist/wet	788.0	5	9 9 4 3	--	100	0.0
10		***Silty to Sandy CLAY (CL)*** Yellow (10YR 7/8) silty CLAY to sandy CLAY (CL), plastic, soft, wet/ saturated	786.0	6	3 4 4 3	--	100	--
12		***CLAY (CH)*** Yellowish brown (10YR 5/4) CLAY (CH), trace silt, very plastic, very soft, saturated	784.0	7	10 3 50\1	--	63	--
14		***SHALE/ MUDSTONE*** Light brown SHALE/ MUDSTONE, weathered, void with gypsum crystals	783.0					
16		Gray SHALE/ MUDSTONE, massive		8	--	70	100	--

Well Completion Details



Logged By: Erin Huntley and Michael Riggins — ***Method:*** 6.25 ID HSA, NX Core w/water, 9 7/8" & 5 7/8" Roller Bits

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☑ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-9 — ***Completion Date:*** 10/03/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 798.00 — ***Northing:*** 5592.03031

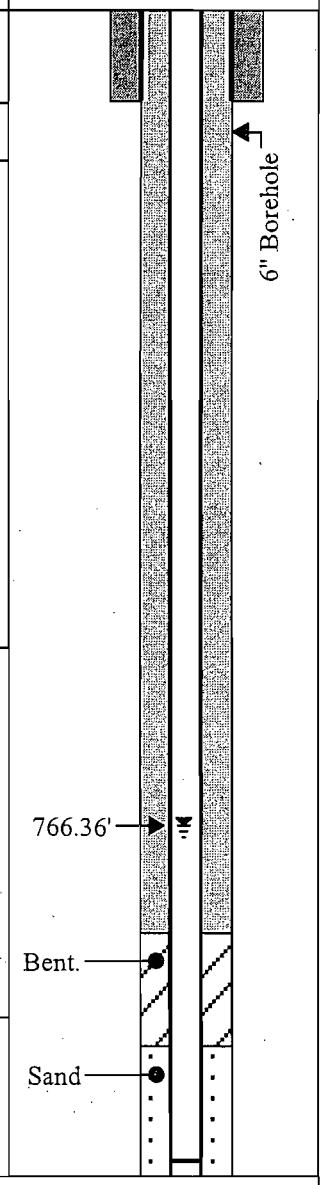
Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 800.65 — ***Easting:*** 5952.68861

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11/6 — ***Total Depth (feet):*** 50

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)
			779.5					
19		***LIMESTONE*** Light gray LIMESTONE, massive, calcite lined vugs, no vertical fractures	778.0					
21		***SHALE/ MUDSTONE*** Dark gray SHALE/ MUDSTONE, massive, no fractures	775.0					
23		***LIMESTONE*** Dark gray LIMESTONE, vuggy	774.2					
25		***SHALE/ MUDSTONE*** Dark gray SHALE/ MUDSTONE, massive, bedding plane fracture at 25.5-feet bgs		9	--	87	87	--
27			770.2					
29		***CLAY (CL)*** Pale brown, limey						
31		***LIMESTONE*** Pale brown, vuggy, fracture at 28.3-feet bgs; Gray LIMESTONE, massive, 31.4 to 32-feet bgs bedding plane fractures, calcite vein at 31.3-feet bgs, shale lense at 34.7-feet bgs with bedding plane fractures 0.25-inch apart		10	--	77	88	--
33			763.0					
35		Dark gray LIMESTONE, massive, no fractures						
37								

Well Completion Details



Logged By: Erin Huntley and Michael Riggins — ***Method:*** 6.25 ID HSA, NX Core w/water, 9 7/8" & 5 7/8" Roller Bits

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☑ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: MW-9 — ***Completion Date:*** 10/03/2002

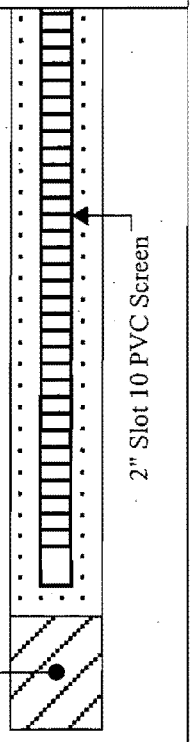
Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** 798.00 — ***Northing:*** 5592.03031

Project: Federal-Mogul Corp. — ***TOC Elevation (feet AMSL*):*** 800.65 — ***Easting:*** 5952.68861

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 11/6 — ***Total Depth (feet):*** 50

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Rock Quality Description	Recovery (%)	PID (ppm)	Well Completion Details
39				11	--	76	98	--	
			757.0						
41		***SHALE/ MUDSTONE*** Pale brown, oxidized fracture at 41-feet bgs, calcite filled vugs, soft, bedding fractures							
43									
			753.0						
45		Pale brown SHALE/ MUDSTONE with oxidized gypsum filled vugs, chert fragments at 45-feet bgs							
			751.0						
47		Dark gray SHALE/ MUDSTONE with gypsum filled vugs		12	--	77	95	--	
			749.4						
49		***SILTSTONE*** Pale brown with gypsum filled vugs							Bent.
			748.0						
		Refusal							
51									
53									
55									
57									



Logged By: Erin Huntley and Michael Riggins — ***Method:*** 6.25 ID HSA, NX Core w/water, 9 7/8" & 5 7/8" Roller Bits

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☑ ***Water*** ☐ ***Air Hammer*** ☐

RFI Phase IV Soil Boring Logs

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-40 — ***Completion Date:*** 10/07/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 13.6 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL = Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***TOPSOIL***						
		Silty CLAY (CL) Brownish yellow (10YR 6/8) silty CLAY (CL), medium stiff, plastic, damp	-2.0	1	2 2 3 4	75	0.0	
2		***Clayey SILT (ML)*** Red (2.5YR 5/8) clayey SILT (ML), very stiff, slightly plastic, damp	-4.0	2	6 8 16 18	67	0.0	
4		***Silty CLAY (CL)*** Red (2.5YR 4/8) silty CLAY (CL), very stiff, plastic, damp	-6.0	3	8 15 20 26	96	0.0	
6		Reddish yellow (7.5YR 6/8) silty CLAY (CL), white/gray mottling, trace black organic matter, very stiff, plastic, damp		4	9 23 34 44	100	0.0	
8			-10.0	5	5 14 16 30	100	0.0	SB-40-1 Cyanide
10		***Sandy Silty CLAY (CL)*** Reddish yellow (7.5YR 6/8) sandy silty CLAY (CL), soft, plastic, gypsum grains, wet/moist	-11.5	6	15 16 23 17	63	0.0	SB-40-2 Cyanide
12		***CLAY (CL)*** Reddish yellow (7.5YR 6/8) CLAY (CL), some black organic matter, soft, plastic, saturated, weathered brown shale at 13.6-feet	-13.6	7	6 4 5 50\1	100	--	SB-40-3 Cyanide
14		Refusal						
16								
18								
20								

Logged By: Erin Huntley — ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-41 ***Completion Date:*** 10/07/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 16.5 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***TOPSOIL***						
		Silty CLAY (CL) Yellow (10YR 7/8) silty CLAY (CL), medium stiff, plastic, damp	-2.0	1	3 4 6 5	79	0.0	
2		Brownish yellow (10YR 6/8) silty CLAY (CL), very stiff, plastic, damp, rootlets	-4.0	2	4 10 14 15	71	0.0	
4		***Clayey SILT (ML)*** Red (2.5YR 5/8) clayey SILT (ML), very stiff, plastic (in zones), damp, large tree root at 4-feet	-6.0	3	7 12 20 23	92	0.0	
6		Yellowish red (5YR 5/8) clayey SILT(ML), some white/ gray mottling, very stiff, non-plastic, damp	-8.0	4	5 14 26 35	68	0.0	
8		***Silty CLAY (CL)*** Brownish yellow (10YR 6/8) silty CLAY (CL), weathered rock zones, very stiff, plastic, damp	-10.0	5	11 20 19 24	92	0.0	SB-41-1 Arsenic
10		***Clayey SILT/Silty CLAY (ML/CL)*** Brownish yellow (10YR 6/8) clayey SILT/ silty CLAY (ML/CL), black organic matter, very stiff, plastic, damp, chert and coarse sand/gravel at 13.5-feet, moist		6	6 14 15 23	92	0.0	SB-41-2 Arsenic
12			-14.0	7	10 16 16 4	50	0.0	SB-41-3 Arsenic
14		***Clayey Silty SAND (SC)*** Yellow (10YR 7/8) clayey silty SAND (SC), rock fragments, soft, cohesive, saturated	-16.0	8	3 4 5 3	100	--	SB-41-4 Arsenic
16		***Silty CLAY (CL) to CLAY (CH)*** Yellow (10YR 7/8) silty CLAY (CL) to CLAY (CH), soft, plastic, cohesive, rock fragments, saturated	-16.5	9	17 50\1	100	--	SB-41-5 Arsenic
18		Refusal						
20								

Logged By: Erin Huntley ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-42 ***Completion Date:*** 10/07/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 15.5 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***TOPSOIL***						
		Silty CLAY (CL) Brownish yellow (10YR 6/8) silty CLAY (CL), stiff, plastic, moist, trace rock fragments	-2.0	1	2 3 4 5	75	0.0	
2		Brownish yellow (10YR 6/8) silty CLAY (CL) with gray and red mottling, some rock fragments, medium stiff, plastic to non-plastic (silty zones), damp	-4.0	2	--	75	0.0	
4		***Silty CLAY/Clayey SILT (CL/ML)*** Yellowish red (5YR 5/8) silty CLAY/clayey SILT (CL/ML), very stiff, plastic to slightly plastic, damp, sub-rounded cobble	-6.0	3	5 11 14 17	79	0.0	
6		***Silty CLAY (CL)*** Yellowish red (5YR 5/8) silty CLAY (CL), gray/white mottling, some/trace fine sand, very stiff, plastic, damp, chert gravel zone at 11.5-feet, moist, wet at 13.5-feet		4	9 22 26 25	63	0.0	
8				5	6 9 13 23	100	0.0	SB-42-1 Arsenic, Cyanide
10				6	4 7 21 18	100	0.0	SB-42-2 Arsenic, Cyanide
12				7	13 10 13 15	75	0.0	SB-42-3 Arsenic, Cyanide
14		***Sandy Silty CLAY (CL)*** Brownish yellow (10YR 6/8) sandy silty CLAY (CL), soft, plastic, saturated	-14.0 / -15.5	8	1 1 2 50\1	100	--	SB-42-4 Arsenic, Cyanide
16		Refusal						
18								
20								

Logged By: Erin Huntley ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-43 ***Completion Date:*** 10/08/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 18 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***TOPSOIL***	-0.5					
		Silty CLAY (CL) Strong brown (7.5YR 5/8) silty CLAY (CL), trace black organic matter, medium stiff, plastic, damp/ moist	-2.0	1	3 3 5 6	58	0.8	
2		***Clayey SILT (ML)*** Yellowish red (5YR 5/8), trace fine sand, stiff, slightly plastic, damp/moist	-4.0	2	4 6 9 11	67	0.8	
4		***Silty CLAY (CL)*** Yellowish red (5YR 5/6) to dark red (2.5YR 3/6) silty CLAY (CL), some fine sand, soft to medium stiff, plastic, damp	-6.0	3	4 7 11 18	100	0.8	
6		Red (2.5YR 4/8) silty CLAY (CL), gray mottling, very stiff, plastic, moist	-8.0	4	10 12 17 19	75	0.8	
8		***Clayey SILT (ML)*** Yellowish red (5YR 5/8) clayey SILT (ML), some fine sand, gray weathered rock zones, stiff, slightly plastic, moist	-10.0	5	7 12 14 19	100	3.4	SB-43-1 Arsenic
10		***Silty CLAY (CL)*** Yellowish red (5YR 5/6) silty CLAY (CL), medium stiff, plastic, moist	-11.0	6	7 11 12 15	92	2.5	SB-43-2 Arsenic
12		Reddish yellow (7.5YR 6/8) silty CLAY (CL), some fine sand and rock fragments, very stiff, plastic, moist	-12.0					
		Brownish yellow (10YR 6/8) silty CLAY (CL), trace rock fragments, very stiff, slightly plastic, damp	-14.0	7	11 22 27 29	75	2.5	SB-43-3 Arsenic
14		***Silty Sandy CLAY (CL)*** Brownish yellow (10YR 6/8) silty sandy CLAY (CL), rock fragments, very soft, plastic, cohesive, saturated	-16.0	8	1 2 1 1	100	--	SB-43-4 Arsenic
16								

Logged By: Erin Huntley ***Method:***

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-43 (continued) ***Completion Date:*** 10/08/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 18 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Analyte
		CLAY (CH) Brownish yellow (10YR 6/6) CLAY (CL), some silt and rock fragments, weathered limestone in tip, soft, saturated	-18.0	9	1 1 1 1	58	--	SB-43-5 Arsenic
18		Refusal						
20								
22								
24								
26								
28								
30								
32								

Logged By: Erin Huntley ***Method:***

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-44 — ***Completion Date:*** 10/08/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 15.6 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***TOPSOIL***	-0.5					
		Silty CLAY (CL) Strong brown (7.5YR 5/8) silty CLAY (CL), plastic, stiff, trace organic matter, damp	-2.0	1	3 3 5 6	83	0.0	
2		Reddish yellow (7.5YR 6/8) silty CLAY (CL), plastic, stiff, organic matter, damp	-3.5	2	6 7 9 10	63	4.2	
			-4.0					
4		***Clayey SILT (ML)*** Red (2.5YR 4/8) clayey SILT (ML), slightly plastic, very stiff, damp	-6.0	3	4 8 13 18	100	0.0	
6		***Silty CLAY (CL)*** Red (2.5YR 4/8) with gray mottling silty CLAY (CL), trace fine sand, slightly plastic/plastic, very stiff, trace organic matter, damp	-8.0	4	12 18 24 21	63	0.0	
8		***Clayey SILT (ML)*** Red (2.5YR 4/8) clayey SILT (ML), some fine sand, slightly plastic, very stiff, damp	-10.0	5	7 11 16 20	92	0.0	SB-44-1 Arsenic
10		***Silty CLAY (CL)*** Strong brown (7.5YR 5/8) silty CLAY (CL), plastic, stiff/ very stiff, weathered rock fragments, damp		6	5 12 18 20	88	0.8	SB-44-2 Arsenic
12		Brownish yellow (10YR 6/8) silty CLAY (CL), plastic, very stiff, organic matter, rock fragments, damp/moist, gypsum gravel zone at 13.5-feet	-14.0	7	12 25 29 36	42	3.4	SB-44-3 Arsenic; SB-44-4 (Duplicate)
14		***Silty Sandy CLAY (CL)*** Yellow (2.5Y 7/6) silty sandy CLAY (CL), rock fragments and weathered shale, plastic, soft, cohesive, saturated	-15.6	8	3 3 5 50\1	100	--	SB-44-5 Arsenic
16		Refusal						
18								
20								

Logged By: Erin Huntley — ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-45 — ***Completion Date:*** 10/08/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 18 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL						
		Silty CLAY (CL) Red (2.5YR 4/8) to reddish yellow (7.5YR 6/6) silty CLAY (CL), plastic, medium stiff to soft, roots, organic matter, strong ammonia odor, saturated		1	2 3 1 4	58	--	
2			-4.0	2	3 4 1 50\1	5	--	
4		***CLAY (CL)*** Dark grayish brown (2.5Y 4/2) to grayish brown (2.5Y 5/2) CLAY (CL), some dark red staining, plastic, very soft, ammonia odor, saturated		3	1 1 1 1	25	3.4	
6				4	2 3 5 7	33	1.7	
8			-9.0	5	2 3 5 7	100	31.2	SB-45-1 Arsenic
10		Yellowish red (5YR 4/6)CLAY (CL), some gray and brown mottling, very soft, roots, organic matter, ammonia odor, wet	-11.5	6	10 14 21 27	100	6.8	SB-45-2 Arsenic
12		***Silty CLAY (CL)*** Yellow (10YR 7/8) silty CLAY (CL), trace sand, plastic, stiff, no odor, moist		7	--	100	30.3	SB-45-3 Arsenic, VOCs
14			-15.0	8	14 12 16 13	100	20.6	SB-45-4 Arsenic
16		***Sandy Silty CLAY (CL)*** Yellow (10YR 7/8) sandy silty clay (CL), rock fragments, very soft, cohesive, ammonia odor, saturated	-17.0	9	--	100	0.8	SB-45-5 Arsenic; (Split with KDEP)
18		***CLAY (CL/CH)*** CLAY (CL/CH), plastic, very soft, saturated	-18.0					
		Refusal						
20								

Logged By: Erin Huntley — ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-46 — ***Completion Date:*** 10/08/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 15.6 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***TOPSOIL***	-0.5					
		Silty CLAY (CL) Yellowish brown (10YR 5/8), plastic, very stiff, damp	-2.0	1	2 3 4 5	46	0.0	
2		Yellowish red (5 YR 5/8) silty CLAY (CL), gypsum gravel, plastic, very stiff, organic matter, damp	-4.0	2	5 8 11 13	46	0.0	
4		Red (2.5 YR 4/8) silty CLAY (CL), gray mottling, trace/some sand, plastic, very stiff, moist	-6.0	3	7 10 16 24	100	0.0	
6		***Clayey SILT (ML)*** Clayey SILT (ML), some sand, slightly plastic, very stiff, moist	-8.0	4	7 11 15 19	25	0.0	
8		***Silty CLAY (CL)*** Yellowish brown (10YR 7/8) silty CLAY (CL), plastic, medium stiff, ammonia odor, moist		5	6 11 16 20	100	0.0	SB-46-1 Arsenic, Ammonia; (Split with KDEP)
10			-12.0	6	7 20 16 26	100	31	SB-46-2 Arsenic, Ammonia; (Split with KDEP)
12		***Sandy Silty CLAY (CL)*** Yellowish brown (10 YR 5/8) silty CLAY (CL), plastic, soft, cohesive, ammonia odor, saturated		7	9 14 13 12	100	504	SB-46-3 Arsenic; (Split with KDEP)
14			-15.6	8	5 8 7 50\1	100	50	SB-46-4 Arsenic; (Split with KDEP)
16		Refusal						
18								
20								

Logged By: Erin Huntley — ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: ***SB-47*** — ***Completion Date:*** 10/08/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 13.5 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL		1	2 2 3 2	50	0.0	
		Silty CLAY (CL) Strong brown (7.5YR 5/8) silty CLAY (CL), plastic, medium stiff/stiff, roots, moist	-2.0					
2		Yellowish red (5YR 5/8) silty CLAY (CL), some sand, plastic, medium stiff, moist	-4.0	2	3 5 6 7	58	0.0	
4		***CLAY (CL)*** Gray CLAY (CL) with bright blue streaks, plastic, very soft, slight odor, saturated	-5.0 -6.0	3	2 5 8 9	100	11	
6		***Silty CLAY (CL)*** Yellowish red (5YR 5/8) silty CLAY (CL) with gray mottling, some sand, plastic, very stiff	-8.0	4	11 15 19 22	100	15.1	
8		Yellowish brown (10YR 5/8) silty CLAY (CL) with gray mottling, some sand, plastic, very stiff, moist/damp	-9.0 -10.0	5	6 17 17 20	100	37	SB-47-1 Cyanide, VOCs
10		***Clayey SAND (SC)*** Yellowish red (5YR 5/8) clayey SAND (SC), well graded, plastic, soft	-11.0 -12.0	6	9 8 8 9	100	54	SB-47-2 Cyanide, VOCs
12		***CLAY (CL)*** Brownish yellow (10YR 6/8) CLAY (CL) with black staining, plastic, medium stiff, moist						
		Yellowish red (5YR 5/8) CLAY (CL), plastic, medium stiff, moist	-13.5	7	6 6 7 50\1	58	18.1	SB-47-3 Cyanide, VOCs
14		Olive (5Y 5/4) CLAY (CL), plastic, very soft, saturated						
16		***Sandy CLAY (CL)*** Olive gray (5Y 4/2) to yellow (2.5Y 7/6) sandy CLAY (CL), rock fragments, plastic, very soft to soft, saturated						
18		Refusal						
20								

Logged By: Erin Huntley — ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-48 ***Completion Date:*** 10/08/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 13.6 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL	-0.5					
		Clayey SILT (ML) Strong brown (7.5YR 5/6) clayey SILT (ML), non-plastic, very stiff, dry	-2.0	1	2 3 5 12	83	5.1	
2		Red (2.5YR 4/8) clayey SILT (ML), non-plastic, very stiff, damp		2	8 12 13 15	83	6.8	
4			-6.0	3	8 13 13 23	100	5.9	
6		***Silty CLAY (CL)*** Reddish yellow (7.5YR 6/8) silty CLAY (CL), plastic, very stiff, dry		4	11 15 17 18	50	9.4	
8			-9.0	5	7 8 7 10	100	322	SB-48-1 VOCs; SB-48-2 (Duplicate)
10		***CLAY (CL)*** Yellow brown (10YR 6/8) CLAY (CL), gypsum gravel, some sand, plastic, stiff, moist, saturated at 12-feet		6	4 9 9 6	100	119	SB-48-3 VOCs
12			-13.0	7	4 4 5 50\1	100	6.9	SB-48-4 VOCs
		Weathered SHALE Light yellowish brown (10YR 6/4) weathered SHALE	-13.6					
14		Refusal						
16								
18								
20								

Logged By: Erin Huntley ***Method:*** 3.25 ID

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-49 | ***Completion Date:*** 10/09/2002

Project No.: 138055-11 | ***Surface Elevation (feet AMSL*):*** NA | ***Northing:*** NA

Project: Federal-Mogul Corp. | ***Total Depth (feet):*** 13.6 | ***Easting:*** NA

Location: Scottsville, KY | ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL	-0.8					
		Clayey SILT (ML) Brownish yellow (10YR 6/8) clayey SILT (ML), slightly plastic, medium stiff, roots, damp	-2.0	1	3 5 5 6	75	0.8	
2		***SILT (ML)*** Strong brown (7.5YR 5/8) SILT (ML), some clay and rock fragments, non-plastic, dry	-4.0	2	6 20 20 21	83	2.5	
4		***Silty CLAY (CL)*** Brownish yellow (10YR 6/8), plastic/slightly plastic, very stiff, gravel zone at 6.5-feet, dry/damp		3	7 12 10 19	92	3.4	
6			-8.0	4	16 34 24 26	71	3.4	
8		***CLAY (CL)*** Yellow (10YR 7/8) CLAY(CL), some dark brown, some/trace sand, plastic, medium stiff, moist	-9.0 -10.0	5	8 13 14 15	100	17.1	SB-49-1 Arsenic
10		***Sandy CLAY (CL)*** Yellow (10YR 7/8) sandy CLAY (CL), plastic, soft, wet	-12.0	6	8 9 8 6	79	19.7	SB-49-2 Arsenic
12		***CLAY (CL)*** Yellow (10YR 7/8) CLAY (CL), some sand, plastic, medium stiff, moist	-13.6	7	5 7 5 50\1	92	0.0	SB-49-3 Arsenic
14		***Sandy Silty CLAY (CL)*** Pale yellow (2.5Y 7/4) sandy sitly CLAY (CL), plastic, soft, saturated						
16		Refusal						
18								
20								

Logged By: Erin Huntley and Michael Riggins | ***Method:*** 3.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. | ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts | ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-50 — ***Completion Date:*** 10/09/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 14 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL	-0.8					
2		***Clayey SILT (ML)*** Strong brown (7.5YR 5/8) clayey SILT (ML), slightly plastic, medium stiff, dry/damp	-2.0	1	4 4 4 9	83	0.0	
4		***Clayey SILT (ML)/ Silty CLAY (CL)*** Yellowish red (5YR 5/8) clayey SILT(ML)/silty CLAY (CL), plastic, very stiff, damp	-4.0	2	11 17 20 21	63	0.8	
6		***Clayey SILT (ML)*** Red (2.5Y 4/6) clayey SILT (ML), gray mottling, some sand, non-plastic, very stiff, dry	-7.0	3	9 19 23 31	--	2.5	
8		***CLAY (CL)*** Brownish yellow (10YR 6/8) CLAY (CL), plastic, stiff, gravel zone at 9.5-feet, organic matter, moist	-10.0	4	14 22 28 22	0	--	
				5	10 9 16 17	--	13.7	SB-50-1 Cyanide, VOCs
10		Brownish yellow (10YR 6/8) CLAY (CL), some sand, gypsum gravel, plastic, medium stiff/stiff, moist	-12.0	6	7 9 11 11	100	17.1	SB-50-2 Cyanide, VOCs
12		***Silty Sandy CLAY (CL)*** Brownish yellow (10YR 6/6) silty sandy CLAY (CL), plastic, soft, saturated	-13.0	7	2 6 7 7	75	--	SB-50-3 Cyanide, VOCs
14		***CLAY (CL)*** CLAY (CL), plastic, medium stiff, wet	-14.0					
		Refusal						
16								
18								
20								

Logged By: Erin Huntley and Michael Riggins — ***Method:*** 3.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-51 — ***Completion Date:*** 10/09/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 13.6 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL = Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL	-0.8					
2		***Clayey SILT (ML)*** Brownish yellow (10YR 6/8) clayey SILT (ML), slightly plastic, medium stiff, roots, damp	-2.0	1	3 5 5 6	75	0.8	
4		***SILT (ML)*** Strong brown (7.5YR 5/8) SILT (ML), some clay and rock fragments, non-plastic, dry	-4.0	2	6 20 20 21	83	2.5	
6		***Silty CLAY (CL)*** Brownish yellow (10YR 6/8), plastic/slightly plastic, very stiff, gravel zone at 6.5-feet, dry/damp		3	7 12 10 19	92	3.4	
			-8.0	4	16 34 24 26	71	3.4	
8		***CLAY (CL)*** Yellow (10YR 7/8) CLAY(CL), some dark brown, some/trace sand, plastic, medium stiff, moist	-9.0	5	8 13 14 15	100	17.1	SB-49-1 Arsenic
10		***Sandy CLAY (CL)*** Yellow (10YR 7/8) sandy CLAY (CL), plastic, soft, wet	-10.0	6	8 9 8 6	79	19.7	SB-49-2 Arsenic
12		***CLAY (CL)*** Yellow (10YR 7/8) CLAY (CL), some sand, plastic, medium stiff, moist	-12.0	7	5 7 5 50\1	92	0.0	SB-49-3 Arsenic
14		***Sandy Silty CLAY (CL)*** Pale yellow (2.5Y 7/4) sandy sitly CLAY (CL), plastic, soft, saturated	-13.6					
16		Refusal						
18								
20								

Logged By: Erin Huntley and Michael Riggins — ***Method:*** 3.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-52 ***Completion Date:*** 10/09/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 12.6 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***Clayey SILT (ML)*** Yellowish brown (10YR 5/4) clayey SILT (ML), slightly plastic, soft, roots, moist	-2.0	1	2 3 4 3	75	0.0	
2		***SILT/ Clayey SILT (ML)*** Brownish yellow (10YR 6/8) SILT/clayey SILT (ML), nonplastic, stiff, dry	-4.0	2	7 12 12 11	92	0.0	
4		***Silty CLAY (CL)*** Yellow (2.5Y 7/6), silty CLAY (CL), non-plastic, stiff, dry	-6.0	3	10 13 10 14	100	0.8	
6		***SILT (ML)*** Strong brown (7.5YR 5/8) SILT (ML), some gravel, non-plastic, very stiff, dry	-7.0 -8.0	4	15 15 17 18	75	1.7	
8		***Silty CLAY (CL)*** Strong brown (7.5YR 5/8) silty CLAY (CL), plastic, very stiff, damp	-9.0	5	6 9 13 7	100	31.7	SB-52-1 Arsenic
10		***CLAY (CL)*** Reddish yellow (7.5YR 6/8) CLAY (CL), plastic, medium stiff, wet	-11.8	6	4 4 8 9	100	18.8	SB-52-2 Arsenic; SB-52-3 (Duplicate)
12		***Silty Sandy CLAY (CL)*** Reddish yellow (7.5YR 6/8) silty sandy CLAY (CL), angular chert gravel, plastic, medium stiff to soft, wet to moist	-12.6	7	2 50\1	13	2.5	
14		***Sandy CLAY (CL)*** Yellow (2.5Y 7/8) sandy CLAY (CL), weathered rock, wet						
16		***CLAY (CH)*** Light olive brown (2.5Y 5/4) CLAY (CH), plastic, soft/very soft, wet						
18		Refusal						
20								

Logged By: Erin Huntley and Michael Riggins ***Method:*** 3.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-53 — ***Completion Date:*** 10/09/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 12.5 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL	-0.8					
		Silty CLAY (CL) Strong brown (7.5YR 5/8) silty CLAY (CL), plastic, medium stiff, moist	-2.0	1	2 2 5 7	92	0.0	
2		Yellowish red (5YR 5/8) silty CLAY (CL), slightly plastic, very stiff, damp	-4.0	2	5 8 10 11	71	0.0	
4		Red (2.5YR 4/8) silty CLAY (CL), gray mottling, some sand, plastic, very stiff, damp	-6.0	3	8 19 22 25	83	0.0	
6		***Silty CLAY/Clayey SILT (CL/ML)*** Red (5YR 5/8) silty CLAY/Clayey SILT (CL/ML), rock fragments, slightly plastic/non-plastic, hard, damp	-8.0	4	14 22 31 37	50	0.0	
8		***CLAY (CL)*** Brownihs yellow (10YR 6/8) CLAY (CL), trace sand, gypsum nodules, plastic, stiff, moist/wet	-10.0	5	3 7 10 14	100	--	SB-53-1 Arsenic
10		Yellowish brown (10YR 5/8 to 5/4) CLAY (CL), trace sand, plastic, medium stiff, wet/saturated	-12.5	6	5 7 7 7	100	--	SB-53-2 Arsenic
12		Boring Terminated		7	40 50\1	0	--	
14								
16								
18								
20								

Logged By: Erin Huntley and Michael Riggins — ***Method:***

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-54 ***Completion Date:*** 10/09/2002

Project No.: 138055-11 ***Surface Elevation (feet AMSL*):*** NA ***Northing:*** NA

Project: Federal-Mogul Corp. ***Total Depth (feet):*** 13.6 ***Easting:*** NA

Location: Scottsville, KY ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
		Ground Surface	0.0					
0		***Silty CLAY (CL)*** Yellowish brown (10YR 5/8) silty CLAY (CL), plastic, soft, roots, damp	-2.0	1	3 4 4 5	29	--	
2		Strong brown (7.5YR 5/8) silty CLAY (CL), angular fine chert gravel, plastic, medium stiff, roots	-4.0	2	6 9 13 17	67	--	
4		***Clayey SILT/Silty CLAY (ML/CL)*** Red (2.5YR 4/8) clayey SILT/silty CLAY (ML/CL), gray mottling, some sand and angular rock fragments	-6.0	3	6 7 34 21	75	--	
6		***Silty CLAY/ Clayey SILT (CL/ML)*** Red (5YR 5/8) silty CLAY/ Clayey SILT (CL/ML), rock fragments, slightly plastic/ non-plastic, hard, damp	-8.0	4	13 12 18 19	58	--	
8		Reddish yellow (7.5YR 6/8) silty CLAY/clayey SILT (CL/ML), non-plastic, very stiff, dry	-10.0	5	17 9 7 8	42	--	SB-54-1 Cyanide
10		***Silty CLAY (CL)*** Brownish yellow (10YR 6/8) silty CLAY (CL), gray mottling, plastic, stiff, damp		6	6 9 8 8	92	--	SB-54-2 Cyanide
12		Yellowish brown (10YR 5/8 to 5/4) CLAY (CL), trace sand, plastic, medium stiff, wet/saturated	-13.6	7	3 4 5 50\1	75	--	SB-54-3 Cyanide
14		Refusal						
16								
18								
20								

Logged By: Erin Huntley and Michael Riggins ***Method:*** 3.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

ENVIRONMENTAL STRATEGIES CORPORATION

Boring Log: SB-55 — ***Completion Date:*** 10/09/2002

Project No.: 138055-11 — ***Surface Elevation (feet AMSL*):*** NA — ***Northing:*** NA

Project: Federal-Mogul Corp. — ***Total Depth (feet):*** 15.6 — ***Easting:*** NA

Location: Scottsville, KY — ***Borehole Diameter (inches):*** 4

** AMSL= Above mean sea level*

Depth (feet)	Symbol	Description	Elevation (feet)	Sample Interval	Blow Count	Recovery (%)	PID (ppm)	Soil Sample No. and Anayte
0		Ground Surface	0.0					
		TOPSOIL						
		Clayey SILT (ML) Strong brown (7.5YR 3/8) clayey SILT (ML), non-plastic, medium stiff, roots, dry	-2.0	1	3 4 8 10	79	--	
2		***Silty CLAY (CL)*** Yellowish red (5YR 3/8) silty CLAY (CL), some sand, very stiff, roots, moist	-4.0	2	7 9 11 12	75	--	
4		***Clayey SILT/Silty CLAY (ML/CL)*** Yellowish red (5YR 5/8) clayey SILT/silty CLAY (ML/CL), some white/gray mottling, slightly plastic/plastic, very stiff, dry		3	9 17 25 28	100	--	
6				4	14 17 26 24	58	--	
8		***SILT (ML)*** Red (2.5YR 4/8) SILT (ML), non-plastic, very stiff, dry	-8.0 / -9.0	5	13 21 28 29	100	--	SB-55-1 Cyanide
10		***CLAY (CL)*** Brownish yellow (10YR 6/8) CLAY (CL), gray mottling, plastic, very stiff, damp	-10.0	6	6 22 20 25	100	--	SB-55-2 Cyanide
12		***Silty CLAY (CL)*** Brownish yellow (10YR 7/8) silty CLAY (CL), rock fragments, plastic, very stiff, organic matter, damp	-12.0	7	24 26 24 25	58	--	SB-55-3 Cyanide
14		***CLAY (CL)*** Brownish yellow (10YR 6/8) CLAY (CL), plastic, very stiff, organic matter, damp	-15.0 / -15.6	8	4 3 4 50\1	100	--	SB-55-4 Cyanide
16		***Sandy Silty CLAY (CL)*** Yellow (2.5Y 7/6) sandy silty CLAY (CL), plastic, soft, saturated						
18		Refusal						
20								

Logged By: Erin Huntley and Michael Riggins — ***Method:*** 3.25-inch ID

Subcontractor: Richard Simmons Drilling Co., Inc. — ***HSA*** ☑ ***Direct Push*** ☐ ***Rotosonic*** ☐ ***Cable Tool*** ☐

Driller/ Operator: Wade Betts — ***Rotary:*** ***Air*** ☐ ***Water*** ☐ ***Air Hammer*** ☐

Laboratory Analytical Data Sheets

No. 019797 303798 #9176

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055-11

PROJECT NAME AND LOCATION: FEDERAL-MOGUL/SCOTTSVILLE, KY

SAMPLERS: (Signature) E. Michael Riggins

PRINT NAME: E. MICHAEL RIGGINS

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FEET)	DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE					REMARKS
BB-1-10	0-1	10/2/02	0835	SOIL	1	X	X			02A	163491	30 DAY TAT
BB-2-10	0-1	10/2/02	0845	SOIL	1	X	X				92	
BB-3-10	0-1	10/2/02	0855	SOIL	1	X	X				93	SAMPLES SHIPPED
BB-4-10	0-1	10/2/02	0905	SOIL	1	X	X				94	ON ICE
BB-5-11	0-1	10/2/02	0915	SOIL	1	X	X				95	
SS-1	0-1	10/2/02	0930	SOIL	1	X	X				96	
SS-2	0-1	10/2/02	0945	SOIL	1	X	X				97	
SS-3	0-1	10/2/02	1045	SOIL	1	X	X				98	
SS-4	0-1	10/2/02	1100	SOIL	1	X	X				99	
SS-5	0+1	10/2/02	1115	SOIL	1	X	X				500	
SS-6	0-1	10/2/02	1130	SOIL	1	X	X				01	
SS-7	0-1	10/2/02	1140	SOIL	1	X	X				02	
SS-8	0-1	10/2/02	1155	SOIL	1	X	X				163503	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
E. Michael Riggins	10/4/02 12:25	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
R Hussman	10/4 12:25	[illegible]
Received for Laboratory by: (Signature)	PRINT NAME:	Date/Time
[illegible]	mike McBride	10-4-02 0900

LAB NAME: TEST AMERICA

CITY: NASHVILLE, TN

COURIER: ENVIRONMENTAL STRATEGIES

AIRBILL NO.

CUSTODY SEAL NOS:

COOLER NO:

ENVIRONMENTAL STRATEGIES CORPORATION
~~11911 Freedom Drive~~ 300 CORPORATE
~~Reston, Virginia 20190~~ CENTER DRIVE
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~~Fax (412) 787-8065~~ STE 200
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ESC

ATTENTION LAB: SEND ANALYTICAL RESULTS TO THE FOLLOWING ESC STAFF MEMBER: ELISA GROSS/MICHAEL RIGGINS

CA ____ MA ____ PA X MN ____

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No. 019798 303798

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055-11

PROJECT NAME AND LOCATION: FEDERAL-MOGUL/SCOTTSVILLE, KY

SAMPLERS: (Signature) E. Michael Riggins

PRINT NAME: E. MICHAEL RIGGINS

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FEET)	DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE					REMARKS
SS-9	0-1	10/2/02	1210	SOIL	1	X	X				163504	30 DAY TAT
												SAMPLES SHIPPED ON ICE

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	LAB NAME: TEST AMERICA
E. Michael Riggins	10/4/02 12:25		CITY: NASHVILLE, TN
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	COURIER: ENVIRONMENTAL STRATEGIES
R Dougmo	10/4 12:25		AIRBILL NO.
Received for Laboratory by: (Signature)	PRINT NAME:	Date/Time 10-4-02 0900	CUSTODY SEAL NOS:
(W)			COOLER NO:

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No. 012838

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC-SCOTTSVILLE, KY

SAMPLERS: (Signature) Ci Huntley

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC						REMARKS
SB-59-1	8-10	169289	10/10	1430	SOIL	1	X						LEVEL II
SB-59-2	10-12	90	10/10	1435	SOIL	1	X						DELIVERABLE
SB-60-1	8-10	91	10/14	1240		1	X						STAT
SB-60-2	10-12	92		1245		1	X						
SB-60-3	12-14	93		1255		1	X						
SB-61-1	8-10	94		1410		1	X						
SB-61-2	9-10	95		1415		1	X						
SB-61-3	10-12	96		1420		1	X						
SB-61-4	12-14	97		1425		1	X						
SB-61-5	14-16	98		1430		1	X						
SB-62-1	8-10	99		1500		1	X						
SB-62-2	10-12	00		1505		1	X						
SB-62-3	12-14	169301		1510		1	X						

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	LAB NAME:
Ci Huntley	10/15 1100	Ann Beckburn	TEST AMERICA
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	CITY: NASHVILLE
			COURIER: ESC
			AIRBILL NO.
Received for Laboratory by: (Signature)	PRINT NAME: 4.0	Date/Time	CUSTODY SEAL NOS:
		10/15/07 9:00	COOLER NO: 1

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412-604-1055 f.

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No. 012130 305037 **CHAIN OF CUSTODY RECORD** Page 2 of 2

PROJECT NO.	PROJECT NAME AND LOCATION:
138055	FMC- SCOTTSVILLE, KY

SAMPLERS: (Signature) Ci Huntley — PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH(FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	ARSENIC(HMOB)					REMARKS
SB-62-4	14-16	189302	10/14	1515	SOIL	1	X						LEVEL II DELIVERABLE STAT
EQBLK5	—	189287	10/15	900	AQ	1		X					

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	LAB NAME: TEST AMERICA
Ci Huntley	10/15 1100	Ann Blackburn	CITY: NASHVILLE, TN
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	COURIER: ESC
			AIRBILL NO. —
for Laboratory by:	PRINT NAME: MB	Date/Time 10/15/02 11:00	CUSTODY SEAL NOS: —
			COOLER NO: 1

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412-604-1055f.

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305037

No. 012131

CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT NO.	PROJECT NAME AND LOCATION:
138055	FMC- SCOTTSVILLE KY

SAMPLERS: (Signature) Erin Huntley

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	SAMPLE LOCATION	DATE	TIME	MATRIX	NO. OF CONTAINERS	TCLP METALS	TCLP VOAs	Corrosivity	Ignitability	Reactivity		REMARKS
Phase IV Water	169288	10/14	1730	AQ	2	X	X	X	X	X		WASTE
Phase IV Soil	169303	10/14	1740	AQ	5	X	X	X	X	X		CHARACTERIZATION

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Erin Huntley	10/15 1100	Ann Blackburn
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Received for Laboratory by: (Signature)	PRINT NAME: MB	Date/Time 10/15/02 9:00

LAB NAME: TESTAMERICA

CITY: NASHVILLE, TN

COURIER: ESC

AIRBILL NO. —

CUSTODY SEAL NOS: —

COOLER NO: 1

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ATTENTION LAB: SEND ANALYTICAL RESULTS TO THE FOLLOWING ESC STAFF MEMBER: ELISA GROSS

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304553

No. 019833 #9712

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC-SCOTTSVILLE, KY

SAMPLERS: (Signature) [signature]

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE	VOCs				REMARKS
SB-40-1	8-10	167015	10/7	1155	SOIL	1		X					LEVEL I DELIVERABLE
SB-40-2	10-12	16	10/7	1205	SOIL	1		X					STAT
SB-40-3	12-14	17	10/7	1210	SOIL	1		X					
SB-41-1	8-10	18	10/7	1405	SOIL	1	X						
SB-41-2	10-12	19	10/7	1410	SOIL	1	X						
SB-41-3	12-14	20	10/7	1415	SOIL	1	X						
SB-41-4	14-16	21	10/7	1440	SOIL	1	X						
SB-41-5	16-17.5	22	10/7	1445	SOIL	1	X						
SB-42-1	8-10	23	10/7	1525	SOIL	1	X	X					
SB-42-2	10-12	24	10/7	1530	SOIL	1	X	X					
SB-42-3	12-14	25	10/7	1535	SOIL	1	X	X					
SB-42-4	14-16	26	10/7	1540	SOIL	1	X	X					
SB-43-1	8-10	167027	10/8	0800	SOIL	1	X						

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[signature]	10/10 1430	[signature]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

LAB NAME: TEST AMERICA

CITY: NASHVILLE

COURIER: TEST AMERICA

AIRBILL NO.: —

Received for Laboratory by: (Signature)	PRINT NAME:	Date/Time
[signature]	4.0	10/10/07 1630

CUSTODY SEAL NOS.: 16327-28

COOLER NO.: 1

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~~Fax (412) 787-8065~~ 412-604-1040 P
412-604-1055 F

ESC

ATTENTION LAB: SEND ANALYTICAL RESULTS TO THE FOLLOWING ESC STAFF MEMBER: ELISA GROSS

CA

No. 019829

304553

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC SCOTTSVILLE KY

SAMPLERS: (Signature) [signature]

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE	VOCs				REMARKS
SB-43-2	10-12	167028	10/8	805	SOIL	1	X						LEVEL II DELIVERABLE
SB-43-3	12-14	29		810		1	X						STAT
SB-43-4	14-16	30		825		1	X						
SB-43-5	16-18	31		830		1	X						
SB-44-1	8-10	32		900		1	X						
SB-44-2	10-12	33		905		1	X						
SB-44-3	12-14	34		910		1	X						
SB-44-4	13-14	35		915		1	X						
SB-44-5	14-16	36		925		1	X						
SB-45-1	8-10	37		1005		1	X						
SB-45-2	10-12	38		1010		1	X						
SB-45-3	12-14	39		1015		2	X		X				
SB-45-4	14-16	167040		1025		1	X						

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[signature]	10/10	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

LAB NAME: TEST AMERICA

CITY: NASHVILLE, TN

COURIER: TEST AMERICA

AIRBILL NO.: —

Received for Laboratory by: (Signature)

PRINT NAME: MB

Date/Time: 10/10/07 1678

CUSTODY SEAL NOS.: 10327-28

COOLER NO.: 1

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304553

No. 019830

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC-SCOTTSVILLE, KY

SAMPLERS: (Signature) C. Huntley

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE	VOCs	ARSENIC (HNO3)	CYANIDE (NaOH)	VOCs (HCl)	REMARKS
SB-45-5	~~14-16~~ 16-18 ~~EMH~~	167049	10/8	~~925~~ 1030	SOIL	1	X						LEVEL II DELIVERABLE
EQBLK 1	—	167010		1100	AQ	5	~~X~~ EMH			X	X	X	STAT
SB-46-1	8-10	167042		1315	SOIL	1	X						
SB-46-2	10-12	43		1320		2	X						+ AMMONIA
SB-46-3	12-14	44		1325		2	X						+ AMMONIA
SB-47-1	8-10	45		1445		2		X	X				
SB-47-2	10-12	46		1450		2		X	X				
SB-47-3	12-14	47		1455		2		X	X				
SB-48-1	8-10	48		1550		1			X				
SB-48-2	~~10~~ 9-10	49		1555		1			X				
SB-48-3	10-12	50		1600		1			X				
SB-48-4	12-14	167051		1605		1			X				
EQBLK 2	—	167011		1530	AQ	2				X	X		

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C. Huntley	10/10	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Received for Laboratory by: (Signature)	PRINT NAME: MB	Date/Time: 10/10/06 16:30

LAB NAME: TEST AMERICA

CITY: NASHVILLE

COURIER: TEST AMERICA

AIRBILL NO.: —

CUSTODY SEAL NOS.: 10327-28

COOLER NO.: 1

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304553

No. 019831

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC-SCOTTSVILLE, KY

SAMPLERS: (Signature) E. Huntley

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE	VOCs	ARSENIC (HNO3)	CYANIDE (NaOH)	VOCs (HCl)	REMARKS
TRIP BLANK	—	167052	—	—	AQ	1						X	LEVEL II
SB-49-1	8-10	167052	10/9	810	SOIL	1	X						DELIVERABLE
SB-49-2	10-12	53		815		1	X						STAT
SB-49-3	12-~~DA~~ 14	54		820		1	X						
SB-50-1	8-10	55		925		2		X	X				
SB-50-2	10-12	56		930		2		X	X				
SB-50-3	12-14	57		935		2		X	X				
SB-51-1	8-10	58		1015		1		X					
SB-51-2	9-10	59		1020		1		X					
SB-51-3	10-12	60		1025		1		X					
SB-51-4	12-14	61		1030		1		X					
SB-52-1	8-10	62		1230		1	X						
SB-52-2	10-12	167063	↓	1235	↓	1	X						

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
E. Huntley	10/10	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Received for Laboratory by: (Signature) MB	PRINT NAME:	Date/Time 10/10/12 16:30

LAB NAME: TESTAMERICA

CITY: NASHVILLE, TN

COURIER: TEST AMERICA

AIRBILL NO.: —

CUSTODY SEAL NOS.: 10327-28

COOLER NO.: 1

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304553

No. 019832

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC - SCOTTSVILLE, KY

SAMPLERS: (Signature) C. Huntley

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)		DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE	VOCS	ARSENIC (HNO3)	CYANIDE (NaOH)	VOCS (HCl)	REMARKS
SB-52-3	11-12	167064	10/9	1240	SOIL	1	X						LEVEL IV DELIVERABLE
SB-53-1	8-10	65		1320		1	X						STAT
SB-53-2	10-12	66		1325		1	X						
SB-54-1	8-10	67		1350		1		X					
SB-54-2	10-12	68		1355		1		X					
SB-54-3	12-14	69		1400		1		X					
SB-55-1	8-10	70		1550		1		X					
SB-55-2	10-12	71		1555		1		X					
SB-55-3	12-14	72		1605		1		X					
SB-55-4	14-16	73		1615		1		X					
SB-56-1	8-10	74	10/10	815		1	X						
SB-56-2	10-12	75		820		1	X						
SB-57-1	8-10	167076		900		1	X						

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
C. Huntley	10/10	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Received for Laboratory by: (Signature) MB	PRINT NAME:	Date/Time 10/10/07 16:30

LAB NAME: TEST AMERICA

CITY: NASHVILLE

COURIER: TEST AMERICA

AIRBILL NO.: —

CUSTODY SEAL NOS.: 10327-28

COOLER NO.: 1

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No. 019844

CHAIN OF CUSTODY RECORD

PROJECT NO.: 138055

PROJECT NAME AND LOCATION: FMC-SCOTTSVILLE

SAMPLERS: (Signature) E Huntley

PRINT NAME: ERIN HUNTLEY

SAMPLE I.D.	~~SAMPLE LOCATION~~ DEPTH (FT)	DATE	TIME	MATRIX	NO. OF CONTAINERS	ARSENIC	CYANIDE	ARSENIC (HNO3)	CYANIDE (NaOH)	VOCs (HCl)		REMARKS
EQBLK3	— 167013	10/9	1120	AQ	5			X	X	X		LEVEL II
EQBLK4	— 167014	10/10	945	AQ	1			X				DELIVERABLE
SB-58-1	8-10 167077	10/10	1150	SOIL	1	X						STAT
SB-58-2	10-12 178	10/10	1155	SOIL	1	X						
SB-41-4	167079											

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	LAB NAME: TEST AMERICA
E Huntley	10/10		CITY: NASHVILLE
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	COURIER: TEST AMERICA
			AIRBILL NO. —
Received for Laboratory by: (Signature) MB	PRINT NAME:	Date/Time 10/10/02 1630	CUSTODY SEAL NOS: 10327-28
			COOLER NO: 1

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12/ 4/02

ENVIRONMENTAL STRATEGIES
ELISA GROSS
MOON TOWNSHIP, PA 15108

This report includes the analytical certificates of analysis for all samples listed below. These samples relate to your project 138055-11 FEDERAL-MOGUL. The Laboratory Project number is 303798. This is a duplicate copy of the original report.

Sample Identification	Lab Number	Collection Date
BB-1-10	02-A163491	10/ 2/02
BB-2-10	02-A163492	10/ 2/02
BB-3-10	02-A163493	10/ 2/02
BB-4-10	02-A163494	10/ 2/02
BB-4-11	02-A163495	10/ 2/02
SS-1	02-A163496	10/ 2/02
SS-2	02-A163497	10/ 2/02
SS-3	02-A163498	10/ 2/02
SS-4	02-A163499	10/ 2/02
SS-5	02-A163500	10/ 2/02
SS-6	02-A163501	10/ 2/02
SS-7	02-A163502	10/ 2/02
SS-8	02-A163503	10/ 2/02
SS-9	02-A163504	10/ 2/02

2960 Foster Creighton Drive / Nashville, TN 37204 / 615-726-0177 / Fax: 615-726-0954 / 800-765-0980

These results relate only to the items tested.
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Report Approved By: Report Date: 11/ 1/02

Paul E. Lane, Jr., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Serv.
Eric S. Smith, Assistant Technical Director
Mark D. Hollingsworth, Project Management
Gail A. Lage, Technical Serv.
Glenn L. Norton, Technical Serv.
Kelly S. Comstock, Technical Serv.
Pamela A. Langford, Technical Serv.

Laboratory Certification Number: 90038

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163491
Sample ID: BB-1-10
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 8:35
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	4.04	mg/kg	1.01	1	10/ 8/02	16:03	C.Johnson	6010B	694

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163492
Sample ID: BB-2-10
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 8:45
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	7.13	mg/kg	0.96	1	10/ 8/02	16:03	C.Johnson	6010B	694

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163493
Sample ID: BB-3-10
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 8:55
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	3.89	mg/kg	0.97	1	10/ 8/02	16:03	C.Johnson	6010B	694

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163494
Sample ID: BB-4-10
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 9:05
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	10.6	mg/kg	1.00	1	10/ 8/02	16:03	C.Johnson	6010B	694

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163495
Sample ID: BB-4-11
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 9:15
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	10.1	mg/kg	0.97	1	10/ 8/02	16:03	C.Johnson	6010B	694

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163496
Sample ID: SS-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 9:30
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	6.79	mg/kg	1.00	1	10/16/02	16:53	G.McCord	6010B	6278
Cyanide	< 2.00	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163497
Sample ID: SS-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 9:45
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	15.4	mg/kg	1.00	1	10/25/02	8:50	C.Johnson	6010B	1158
Cyanide	< 2.00	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163498
Sample ID: SS-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 10:45
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	21.1	mg/kg	0.96	1	10/25/02	8:50	C.Johnson	6010B	1158
Cyanide	< 2.00	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163499
Sample ID: SS-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 11:00
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	26.7	mg/kg	0.96	1	10/25/02	8:50	C.Johnson	6010B	1158
Cyanide	79.4	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163500
Sample ID: SS-5
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 11:15
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	29.7	mg/kg	0.98	1	10/31/02	17:09	G.McCord	6010B	8909
Cyanide	76.4	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163501
Sample ID: SS-6
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 11:30
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	27.5	mg/kg	0.98	1	10/31/02	17:09	G.McCord	6010B	8909
Cyanide	11.9	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163502
Sample ID: SS-7
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 11:40
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	29.0	mg/kg	0.98	1	10/31/02	17:09	G.McCord	6010B	8909
Cyanide	17.1	mg/kg	2.00	1	10/ 9/02	0:00	S. Prayter	9012A	1480

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163503
Sample ID: SS-8
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 11:55
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	29.9	mg/kg	0.95	1	10/31/02	17:09	G.McCord	6010B	5909
Cyanide	10.3	mg/kg	2.00	1	10/ 9/02	23:00	S. Prayter	9012A	2660

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055-11
Project Name: FEDERAL-MOGUL
Sampler: E.MICHAEL RIGGINS

Lab Number: 02-A163504
Sample ID: SS-9
Sample Type: Soil
Site ID:

Date Collected: 10/ 2/02
Time Collected: 12:10
Date Received: 10/ 4/02
Time Received: 9:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	31.6	mg/kg	0.98	1	10/31/02	17:09	G.McCord	6010B	8909
Cyanide	< 2.00	mg/kg	2.00	1	10/ 9/02	23:00	S. Prayter	9012A	2660

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ROJECT QUALITY CONTROL DATA
roject Number: 138055-11
roject Name: FEDERAL-MOGUL
age: 1
aboratory Receipt Date: 10/ 4/02

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
METALS								
Arsenic	mg/kg	2.31	20.6	20.0	91	80 - 120	694	Duplicate
Arsenic	mg/kg	13.0	31.7	20.0	94	80 - 120	6278	Duplicate
Arsenic	mg/kg	29.7	42.8	20.0	66#	80 - 120	8909	Duplicate

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
MISC PARAMETERS								
Cyanide	mg/kg	< 2.00	10.4	10.0	104	80 - 120	1480	02-A163476
Cyanide	mg/kg	< 2.00	10.6	10.0	106	80 - 120	2660	02-A165518

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
METALS						
Arsenic	mg/kg	20.6	19.7	4.47	20	694
Arsenic	mg/kg	31.7	30.4	4.19	20	6278
Arsenic	mg/kg	470.	487.	3.55	20	1158
Arsenic	mg/kg	42.8	43.0	0.47	20	8909

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055-11
roject Name: FEDERAL-MOGUL
age: 2
aboratory Receipt Date: 10/ 4/02

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
MISC PARAMETERS						
Cyanide	mg/kg	10.4	10.5	0.96	20	1480
Cyanide	mg/kg	10.6	11.2	5.50	20	2660

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
METALS						
Arsenic	mg/kg	20.0	19.0	95	80 - 120	694
Arsenic	mg/kg	20.0	19.0	95	80 - 120	6278
Arsenic	mg/kg	20.0	19.2	96	80 - 120	1158
Arsenic	mg/kg	20.0	19.2	96	80 - 120	8909

Continuing Calibration Verification

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
METALS						

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
MISC PARAMETERS						
Cyanide	mg/kg	5.00	4.66	93	90 - 110	1480
Cyanide	mg/kg	5.00	4.39	88 #	90 - 110	2660

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055-11
roject Name: FEDERAL-MOGUL
age: 3
aboratory Receipt Date: 10/ 4/02

Duplicates

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch	Sample Dup'd
Cyanide	mg/kg	17.1	15.8	7.90	15.	1480	02-A163502
Cyanide	mg/kg	< 2.00	< 2.00	N/A	15.	2660	02-A163504

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
METALS					
Arsenic	< 0.88	mg/kg	694	10/ 8/02	16:03
Arsenic	< 0.88	mg/kg	6278	10/16/02	16:53
Arsenic	< 0.88	mg/kg	1158	10/25/02	8:50
Arsenic	< 0.88	mg/kg	8909	10/31/02	17:09

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
MISC PARAMETERS					
Cyanide	< 2.00	mg/kg	1480	10/ 9/02	0:00
Cyanide	< 2.00	mg/kg	2660	10/ 9/02	23:00

= Value outside Laboratory historical or method prescribed QC limits.

End of Report for Project 303798

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12/ 4/02

ENVIRONMENTAL STRATEGIES
ELISA GROSS
MOON TOWNSHIP, PA 15108

This report includes the analytical certificates of analysis for all samples listed below. These samples relate to your project 138055 FMC-SCOTTSVILLE. The Laboratory Project number is 304553. This is a duplicate copy of the original report.

Sample Identification	Lab Number	Collection Date
EQBLK1	02-A167010	10/ 8/02
EQBLK2	02-A167011	10/ 8/02
TRIP BLANK	02-A167012	
EQBLK3	02-A167013	10/ 9/02
EQBLK4	02-A167014	10/10/02
SB-40-1	02-A167015	10/ 7/02
SB-40-2	02-A167016	10/ 7/02
SB-40-3	02-A167017	10/ 7/02
SB-41-1	02-A167018	10/ 7/02
SB-41-2	02-A167019	10/ 7/02
SB-41-3	02-A167020	10/ 7/02
SB-41-4	02-A167021	10/ 7/02
SB-41-5	02-A167022	10/ 7/02
SB-42-1	02-A167023	10/ 7/02
SB-42-2	02-A167024	10/ 7/02
SB-42-3	02-A167025	10/ 7/02
SB-42-4	02-A167026	10/ 7/02
SB-43-1	02-A167027	10/ 8/02
SB-43-2	02-A167028	10/ 8/02
SB-43-3	02-A167029	10/ 8/02
SB-43-4	02-A167030	10/ 8/02
SB-43-5	02-A167031	10/ 8/02
SB-44-1	02-A167032	10/ 8/02
SB-44-2	02-A167033	10/ 8/02
SB-44-3	02-A167034	10/ 8/02
SB-44-4	02-A167035	10/ 8/02
SB-44-5	02-A167036	10/ 8/02
SB-45-1	02-A167037	10/ 8/02
SB-45-2	02-A167038	10/ 8/02
SB-45-3	02-A167039	10/ 8/02

Sample Identification	Lab Number	Collection Date
SB-45-4	02-A167040	10/ 8/02
SB-45-5	02-A167041	10/ 8/02
SB-46-1	02-A167042	10/ 8/02
SB-46-2	02-A167043	10/ 8/02
SB-46-3	02-A167044	10/ 8/02
SB-47-1	02-A167045	10/ 8/02
SB-47-2	02-A167046	10/ 8/02
SB-47-3	02-A167047	10/ 8/02
SB-48-1	02-A167048	10/ 8/02
SB-48-2	02-A167049	10/ 8/02
SB-48-3	02-A167050	10/ 8/02
SB-48-4	02-A167051	10/ 8/02
SB-49-1	02-A167052	10/ 9/02
SB-49-2	02-A167053	10/ 9/02
SB-49-3	02-A167054	10/ 9/02
SB-50-1	02-A167055	10/ 9/02
SB-50-2	02-A167056	10/ 9/02
SB-50-3	02-A167057	10/ 9/02
SB-51-1	02-A167058	10/ 9/02
SB-51-2	02-A167059	10/ 9/02
SB-51-3	02-A167060	10/ 9/02
SB-51-4	02-A167061	10/ 9/02
SB-52-1	02-A167062	10/ 9/02
SB-52-2	02-A167063	10/ 9/02
SB-52-3	02-A167064	10/ 9/02
SB-53-1	02-A167065	10/ 9/02
SB-53-2	02-A167066	10/ 9/02
SB-54-1	02-A167067	10/ 9/02
SB-54-2	02-A167068	10/ 9/02
SB-54-3	02-A167069	10/ 9/02
SB-55-1	02-A167070	10/ 9/02
SB-55-2	02-A167071	10/ 9/02
SB-55-3	02-A167072	10/ 9/02
SB-55-4	02-A167073	10/ 9/02
SB-56-1	02-A167074	10/10/02
SB-56-2	02-A167075	10/10/02
SB-57-1	02-A167076	10/10/02
SB-58-1	02-A167077	10/10/02
SB-58-2	02-A167078	10/10/02
SB-46-4	02-A167079	10/ 8/02

Sample Identification	Lab Number	Collection Date

These results relate only to the items tested.
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Report Approved By: Report Date: 10/19/02

Paul E. Lane, Jr., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Serv.
Eric S. Smith, Assistant Technical Director
Mark D. Hollingsworth, Project Management
Gail A. Lage, Technical Serv.
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Laboratory Certification Number: 90038

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167010
Sample ID: EQBLK1
Sample Type: Ground water
Site ID:

Date Collected: 10/ 8/02
Time Collected: 11:00
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	< 0.0500	mg/l	0.0500	1	10/18/02	16:04	PageTaylor	8260B	116
Benzene	< 0.0020	mg/l	0.0020	1	10/18/02	16:04	PageTaylor	8260B	116
Bromobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Bromochloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Bromoform	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Bromomethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
2-Butanone	< 0.0500	mg/l	0.0500	1	10/18/02	16:04	PageTaylor	8260B	116
n-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
sec-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
t-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Carbon disulfide	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Carbon tetrachloride	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Chlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Chloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Chloroform	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Chloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
2-Chlorotoluene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
4-Chlorotoluene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2-Dibromo-3-chloropropane	< 0.0100	mg/l	0.0100	1	10/18/02	16:04	PageTaylor	8260B	116
Dibromochloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2-Dibromoethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Dibromomethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,3-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,4-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Dichlorodifluoromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167010
Sample ID: EQBLK1
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
1,1-Dichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2-Dichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,1-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
cis-1,2-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
trans-1,2-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,3-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
2,2-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,1-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
cis-1,3-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
trans-1,3-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Ethylbenzene	< 0.0020	mg/l	0.0020	1	10/18/02	16:04	PageTaylor	8260B	116
Hexachlorobutadiene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
2-Hexanone	< 0.0100	mg/l	0.0100	1	10/18/02	16:04	PageTaylor	8260B	116
Isopropylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
4-Isopropyltoluene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
4-Methyl-2-pentanone	< 0.0100	mg/l	0.0100	1	10/18/02	16:04	PageTaylor	8260B	116
Methylene chloride	< 0.00500	mg/l	0.00500	1	10/18/02	16:04	PageTaylor	8260B	116
Naphthalene	< 0.00500	mg/l	0.00500	1	10/18/02	16:04	PageTaylor	8260B	116
n-Propylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Styrene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,1,1,2-Tetrachloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,1,2,2-Tetrachloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Tetrachloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Toluene	< 0.0020	mg/l	0.0020	1	10/18/02	16:04	PageTaylor	8260B	116
1,2,3-Trichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2,4-Trichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,1,1-Trichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,1,2-Trichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Trichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2,3-Trichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
1,2,4-Trimethylbenzene	< 0.0020	mg/l	0.0020	1	10/18/02	16:04	PageTaylor	8260B	116
1,3,5-Trimethylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Vinyl chloride	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
Xylenes (Total)	< 0.0020	mg/l	0.0020	1	10/18/02	16:04	PageTaylor	8260B	116
Bromodichloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167010
Sample ID: EQBLK1
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
Trichlorofluoromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:04	PageTaylor	8260B	116
METALS									
Arsenic	< 0.0050	mg/l	0.0050	1	10/11/02	15:47	C.Johnson	6010B	3827
MISCELLANEOUS CHEMISTRY									
Cyanide	< 0.005	mg/l	0.005	1	10/11/02	18:30	S. Prayter	9012	4656

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	93.	73. - 133.
VOA Surr Toluene-d8	88.	80. - 121.
VOA Surr, 4-BFB	85.	80. - 128.
VOA Surr, DBFM	90.	81. - 121.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167011
Sample ID: EQBLK2
Sample Type: Ground water
Site ID:

Date Collected: 10/ 8/02
Time Collected: 15:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
METALS									
Arsenic	< 0.0050	mg/l	0.0050	1	10/11/02	15:47	C.Johnson	6010B	3827
MISCELLANEOUS CHEMISTRY									
Cyanide	< 0.005	mg/l	0.005	1	10/11/02	18:30	S. Prayter	9012	4656

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167012
Sample ID: TRIP BLANK
Sample Type: Ground water
Site ID:

Date Collected:
Time Collected:
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	< 0.0500	mg/l	0.0500	1	10/18/02	16:37	PageTaylor	8260B	116
Benzene	< 0.0020	mg/l	0.0020	1	10/18/02	16:37	PageTaylor	8260B	116
Bromobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Bromochloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Bromoform	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Bromomethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
2-Butanone	< 0.0500	mg/l	0.0500	1	10/18/02	16:37	PageTaylor	8260B	116
n-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
sec-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
t-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Carbon disulfide	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Carbon tetrachloride	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Chlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Chloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Chloroform	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Chloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
2-Chlorotoluene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
4-Chlorotoluene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2-Dibromo-3-chloropropane	< 0.0100	mg/l	0.0100	1	10/18/02	16:37	PageTaylor	8260B	116
Dibromochloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2-Dibromoethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Dibromomethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,3-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,4-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Dichlorodifluoromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167012
Sample ID: TRIP BLANK
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
1,1-Dichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2-Dichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,1-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
cis-1,2-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
trans-1,2-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,3-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
2,2-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,1-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
cis-1,3-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
trans-1,3-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Ethylbenzene	< 0.0020	mg/l	0.0020	1	10/18/02	16:37	PageTaylor	8260B	116
Hexachlorobutadiene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
2-Hexanone	< 0.0100	mg/l	0.0100	1	10/18/02	16:37	PageTaylor	8260B	116
Isopropylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
4-Isopropyltoluene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
4-Methyl-2-pentanone	< 0.0100	mg/l	0.0100	1	10/18/02	16:37	PageTaylor	8260B	116
Methylene chloride	< 0.00500	mg/l	0.00500	1	10/18/02	16:37	PageTaylor	8260B	116
Naphthalene	< 0.00500	mg/l	0.00500	1	10/18/02	16:37	PageTaylor	8260B	116
n-Propylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Styrene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,1,1,2-Tetrachloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,1,2,2-Tetrachloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Tetrachloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Toluene	< 0.0020	mg/l	0.0020	1	10/18/02	16:37	PageTaylor	8260B	116
1,2,3-Trichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2,4-Trichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,1,1-Trichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,1,2-Trichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Trichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2,3-Trichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
1,2,4-Trimethylbenzene	< 0.0020	mg/l	0.0020	1	10/18/02	16:37	PageTaylor	8260B	116
1,3,5-Trimethylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Vinyl chloride	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116
Xylenes (Total)	< 0.0020	mg/l	0.0020	1	10/18/02	16:37	PageTaylor	8260B	116
Bromodichloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167012
Sample ID: TRIP BLANK
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
Trichlorofluoromethane	< 0.00200	mg/l	0.00200	1	10/18/02	16:37	PageTaylor	8260B	116

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	98.	73. - 133.
VOA Surr Toluene-d8	89.	80. - 121.
VOA Surr, 4-BFB	86.	80. - 128.
VOA Surr, DBFM	93.	81. - 121.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167013
Sample ID: EQBLK3
Sample Type: Ground water
Site ID:

Date Collected: 10/ 9/02
Time Collected: 11:20
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.00640 J	mg/l	0.0500	1	10/18/02	17:11	PageTaylor	8260B	116
Benzene	< 0.0020	mg/l	0.0020	1	10/18/02	17:11	PageTaylor	8260B	116
Bromobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Bromochloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Bromoform	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Bromomethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
2-Butanone	< 0.0500	mg/l	0.0500	1	10/18/02	17:11	PageTaylor	8260B	116
n-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
sec-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
t-Butylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Carbon disulfide	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Carbon tetrachloride	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Chlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Chloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Chloroform	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Chloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
2-Chlorotoluene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
4-Chlorotoluene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2-Dibromo-3-chloropropane	< 0.0100	mg/l	0.0100	1	10/18/02	17:11	PageTaylor	8260B	116
Dibromochloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2-Dibromoethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Dibromomethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,3-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,4-Dichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Dichlorodifluoromethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167013
Sample ID: EQBLK3
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
1,1-Dichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2-Dichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,1-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
cis-1,2-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
trans-1,2-Dichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,3-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
2,2-Dichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,1-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
cis-1,3-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
trans-1,3-Dichloropropene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Ethylbenzene	< 0.0020	mg/l	0.0020	1	10/18/02	17:11	PageTaylor	8260B	116
Hexachlorobutadiene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
2-Hexanone	< 0.0100	mg/l	0.0100	1	10/18/02	17:11	PageTaylor	8260B	116
Isopropylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
4-Isopropyltoluene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
4-Methyl-2-pentanone	< 0.0100	mg/l	0.0100	1	10/18/02	17:11	PageTaylor	8260B	116
Methylene chloride	< 0.00500	mg/l	0.00500	1	10/18/02	17:11	PageTaylor	8260B	116
Naphthalene	< 0.00500	mg/l	0.00500	1	10/18/02	17:11	PageTaylor	8260B	116
n-Propylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Styrene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,1,1,2-Tetrachloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,1,2,2-Tetrachloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Tetrachloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Toluene	< 0.0020	mg/l	0.0020	1	10/18/02	17:11	PageTaylor	8260B	116
1,2,3-Trichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2,4-Trichlorobenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,1,1-Trichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,1,2-Trichloroethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Trichloroethene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2,3-Trichloropropane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
1,2,4-Trimethylbenzene	< 0.0020	mg/l	0.0020	1	10/18/02	17:11	PageTaylor	8260B	116
1,3,5-Trimethylbenzene	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Vinyl chloride	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
Xylenes (Total)	< 0.0020	mg/l	0.0020	1	10/18/02	17:11	PageTaylor	8260B	116
Bromodichloromethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167013
Sample ID: EQBLK3
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
Trichlorofluoromethane	< 0.00200	mg/l	0.00200	1	10/18/02	17:11	PageTaylor	8260B	116
METALS									
Arsenic	< 0.0050	mg/l	0.0050	1	10/15/02	13:44	C. Martin	6010B	4947
MISCELLANEOUS CHEMISTRY									
Cyanide	< 0.005	mg/l	0.005	1	10/11/02	18:30	S. Prayter	9012	4656

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	96.	73. - 133.
VOA Surr Toluene-d8	86.	80. - 121.
VOA Surr, 4-BFB	82.	80. - 128.
VOA Surr, DBFM	92.	81. - 121.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167014
Sample ID: EQBLK4
Sample Type: Ground water
Site ID:

Date Collected: 10/10/02
Time Collected: 9:45
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
METALS									
Arsenic	< 0.0050	mg/l	0.0050	1	10/15/02	13:44	C. Martin	6010B	4947

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167015
Sample ID: SB-40-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 11:55
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167016
Sample ID: SB-40-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 12:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167017
Sample ID: SB-40-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 12:10
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167018
Sample ID: SB-41-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 14:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	44.4	mg/kg	0.95	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167019
Sample ID: SB-41-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 14:10
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	17.0	mg/kg	0.97	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167020
Sample ID: SB-41-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 14:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	8.12	mg/kg	0.99	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167021
Sample ID: SB-41-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 14:40
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	7.91	mg/kg	0.99	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167022
Sample ID: SB-41-5
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 14:45
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	27.2	mg/kg	0.98	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167023
Sample ID: SB-42-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 15:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	18.3	mg/kg	0.95	1	10/15/02	16:05	C. Martin	6010B	3730
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167024
Sample ID: SB-42-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 15:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	28.5	mg/kg	0.97	1	10/15/02	16:05	C. Martin	6010B	3730
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167025
Sample ID: SB-42-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 15:35
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	7.91	mg/kg	0.99	1	10/15/02	16:05	C. Martin	6010B	3738
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3681

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167026
Sample ID: SB-42-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 7/02
Time Collected: 15:40
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	7.84	mg/kg	0.98	1	10/15/02	16:05	C. Martin	6010B	3730
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167027
Sample ID: SB-43-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 8:00
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	35.8	mg/kg	0.96	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167028
Sample ID: SB-43-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 8:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	43.5	mg/kg	0.97	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167029
Sample ID: SB-43-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 8:10
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	21.8	mg/kg	0.99	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167030
Sample ID: SB-43-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 8:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	9.20	mg/kg	1.00	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167031
Sample ID: SB-43-5
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 8:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	13.4	mg/kg	1.00	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167032
Sample ID: SB-44-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 9:00
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	17.2	mg/kg	0.99	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167033
Sample ID: SB-44-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 9:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	18.4	mg/kg	0.99	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167034
Sample ID: SB-44-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 9:10
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	19.0	mg/kg	0.97	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167035
Sample ID: SB-44-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 9:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	8.75	mg/kg	0.97	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167036
Sample ID: SB-44-5
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 9:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	9.71	mg/kg	0.97	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167037
Sample ID: SB-45-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 10:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	42.6	mg/kg	1.00	1	10/15/02	16:05	C. Martin	6010B	3730

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167038
Sample ID: SB-45-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 10:10
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	29.9	mg/kg	0.95	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167039
Sample ID: SB-45-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 10:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0191 J	mg/kg	0.0500	1	10/15/02	3:59	J. Adams	8260B	6023
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	3:59	J. Adams	8260B	6023
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	3:59	J. Adams	8260B	6023
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Carbon disulfide	0.00760	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	3:59	J. Adams	8260B	6023
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167039
Sample ID: SB-45-3
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
cis-1,2-Dichloroethene	0.00110J	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
trans-1,2-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	3:59	J. Adams	8260B	6023
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	3:59	J. Adams	8260B	6023
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	3:59	J. Adams	8260B	6023
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	3:59	J. Adams	8260B	6023
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	3:59	J. Adams	8260B	6023
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Tetrachloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Toluene	0.0076	mg/kg	0.0020	1	10/15/02	3:59	J. Adams	8260B	6023
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Trichloroethene	0.00180J	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	3:59	J. Adams	8260B	6023

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167039
Sample ID: SB-45-3
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	3:59	J. Adams	8260B	6023
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	3:59	J. Adams	8260B	6023
METALS									
Arsenic	21.3	mg/kg	0.98	1	10/15/02	18:12	G.McCord	6010B	3731

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	96.	56. - 155.
VOA Surr Toluene-d8	89.	79. - 130.
VOA Surr, 4-BFB	88.	62. - 155.
VOA Surr, DBFM	90.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167040
Sample ID: SB-45-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 10:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	25.3	mg/kg	0.99	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167041
Sample ID: SB-45-5
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 10:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	12.0	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167042
Sample ID: SB-46-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 13:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	19.4	mg/kg	0.96	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167043
Sample ID: SB-46-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 13:20
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	18.4	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	3731
Ammonia Nitrogen as N	15.0	mg/kg	1.00	1	10/14/02	22:30	S. Prayter	350.1M	3705

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167044
Sample ID: SB-46-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 13:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	10.9	mg/kg	0.95	1	10/15/02	18:12	G.McCord	6010B	3731
Ammonia Nitrogen as N	166.	mg/kg	2.00	2	10/14/02	22:30	S. Prayter	350.1M	3705

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167045
Sample ID: SB-47-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 14:45
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0769	mg/kg	0.0500	1	10/15/02	4:34	J. Adams	8260B	6023
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	4:34	J. Adams	8260B	6023
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	4:34	J. Adams	8260B	6023
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Carbon disulfide	0.00660	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	4:34	J. Adams	8260B	6023
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167045
Sample ID: SB-47-1
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
cis-1,2-Dichloroethene	0.770	mg/kg	0.100	50	10/15/02	12:45	J. Adams	8260B	6808
trans-1,2-Dichloroethene	0.00330	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	4:34	J. Adams	8260B	6023
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	4:34	J. Adams	8260B	6023
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	4:34	J. Adams	8260B	6023
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	4:34	J. Adams	8260B	6023
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	4:34	J. Adams	8260B	6023
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Tetrachloroethene	0.00560	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Toluene	0.0010 J	mg/kg	0.0020	1	10/15/02	4:34	J. Adams	8260B	6023
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Trichloroethene	0.169	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	4:34	J. Adams	8260B	6023

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167045
Sample ID: SB-47-1
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Vinyl chloride	0.00520	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	4:34	J. Adams	8260B	6023
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	4:34	J. Adams	8260B	6023
Cyanide	10.3	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	82.	56. - 155.
VOA Surr Toluene-d8	89.	79. - 130.
VOA Surr, 4-BFB	91.	62. - 155.
VOA Surr, DBFM	84.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167046
Sample ID: SB-47-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 14:50
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0786	mg/kg	0.0500	1	10/15/02	5:09	J. Adams	8260B	6023
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	5:09	J. Adams	8260B	6023
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	5:09	J. Adams	8260B	6023
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Carbon disulfide	0.0120	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	5:09	J. Adams	8260B	6023
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023

Sample report continued . . .

TestAmerica
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ANALYTICAL REPORT

Laboratory Number: 02-A167046
Sample ID: SB-47-2
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	0.00230	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
cis-1,2-Dichloroethene	1.05	mg/kg	0.100	50	10/15/02	13:21	J. Adams	8260B	6808
trans-1,2-Dichloroethene	0.00590	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	5:09	J. Adams	8260B	6023
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	5:09	J. Adams	8260B	6023
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	5:09	J. Adams	8260B	6023
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	5:09	J. Adams	8260B	6023
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	5:09	J. Adams	8260B	6023
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Tetrachloroethene	0.00690	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Toluene	0.0015 J	mg/kg	0.0020	1	10/15/02	5:09	J. Adams	8260B	6023
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Trichloroethene	0.154	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	5:09	J. Adams	8260B	6023

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167046
Sample ID: SB-47-2
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Vinyl chloride	0.0225	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	5:09	J. Adams	8260B	6023
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:09	J. Adams	8260B	6023
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	0:00	S. Prayter	9012A	3691

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	86.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	91.	62. - 155.
VOA Surr, DBFM	84.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167047
Sample ID: SB-47-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 14:55
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0488 J	mg/kg	0.0500	1	10/15/02	5:43	J. Adams	8260B	6023
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	5:43	J. Adams	8260B	6023
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	5:43	J. Adams	8260B	6023
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Carbon disulfide	0.00100J	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Chloromethane	0.00320	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	5:43	J. Adams	8260B	6023
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167047
Sample ID: SB-47-3
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	0.00260	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1-Dichloroethene	0.00190J	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
cis-1,2-Dichloroethene	0.855	mg/kg	0.100	50	10/15/02	13:56	J. Adams	8260B	6808
trans-1,2-Dichloroethene	0.0148	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	5:43	J. Adams	8260B	6023
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	5:43	J. Adams	8260B	6023
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	5:43	J. Adams	8260B	6023
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	5:43	J. Adams	8260B	6023
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	5:43	J. Adams	8260B	6023
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Tetrachloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Toluene	0.0011 J	mg/kg	0.0020	1	10/15/02	5:43	J. Adams	8260B	6023
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Trichloroethene	0.105	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	5:43	J. Adams	8260B	6023

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167047
Sample ID: SB-47-3
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Vinyl chloride	0.460	mg/kg	0.100	50	10/15/02	13:56	J. Adams	8260B	6808
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	5:43	J. Adams	8260B	6023
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	5:43	J. Adams	8260B	6023
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	90.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	92.	62. - 155.
VOA Surr, DBFM	86.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167048
Sample ID: SB-48-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 15:50
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0514	mg/kg	0.0500	1	10/15/02	6:19	J. Adams	8260B	6023
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	6:19	J. Adams	8260B	6023
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	6:19	J. Adams	8260B	6023
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	6:19	J. Adams	8260B	6023
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167048
Sample ID: SB-48-1
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
cis-1,2-Dichloroethene	0.350	mg/kg	0.100	50	10/15/02	14:31	J. Adams	8260B	6808
trans-1,2-Dichloroethene	0.00290	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	6:19	J. Adams	8260B	6023
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	6:19	J. Adams	8260B	6023
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	6:19	J. Adams	8260B	6023
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	6:19	J. Adams	8260B	6023
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	6:19	J. Adams	8260B	6023
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Tetrachloroethene	0.00210	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Toluene	< 0.0020	mg/kg	0.0020	1	10/15/02	6:19	J. Adams	8260B	6023
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,1,2-Trichloroethane	0.00120J	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Trichloroethene	0.920	mg/kg	0.100	50	10/15/02	14:31	J. Adams	8260B	6808
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	6:19	J. Adams	8260B	6023

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167048
Sample ID: SB-48-1
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	6:19	J. Adams	8260B	6023
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	6:19	J. Adams	8260B	6023

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	87.	56. - 155.
VOA Surr Toluene-d8	89.	79. - 130.
VOA Surr, 4-BFB	91.	62. - 155.
VOA Surr, DBFM	85.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167049
Sample ID: SB-48-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 15:55
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0409 J	mg/kg	0.0500	1	10/15/02	16:51	J. Adams	8260B	7007
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	16:51	J. Adams	8260B	7007
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	16:51	J. Adams	8260B	7007
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	16:51	J. Adams	8260B	7007
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167049
Sample ID: SB-48-2
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
cis-1,2-Dichloroethene	0.500	mg/kg	0.100	50	10/16/02	12:38	CHollingsw	8260B	8149
trans-1,2-Dichloroethene	0.00190J	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	16:51	J. Adams	8260B	7007
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	16:51	J. Adams	8260B	7007
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	16:51	J. Adams	8260B	7007
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	16:51	J. Adams	8260B	7007
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	16:51	J. Adams	8260B	7007
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Tetrachloroethene	0.00300	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Toluene	0.0013 J	mg/kg	0.0020	1	10/15/02	16:51	J. Adams	8260B	7007
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,1,2-Trichloroethane	0.00160J	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Trichloroethene	1.32	mg/kg	0.100	50	10/16/02	12:38	CHollingsw	8260B	8149
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	16:51	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167049
Sample ID: SB-48-2
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	16:51	J. Adams	8260B	7007
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	16:51	J. Adams	8260B	7007

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	102.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	92.	62. - 155.
VOA Surr, DBFM	88.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167050
Sample ID: SB-48-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 16:00
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0575	mg/kg	0.0500	1	10/15/02	17:26	J. Adams	8260B	7007
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	17:26	J. Adams	8260B	7007
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	17:26	J. Adams	8260B	7007
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	17:26	J. Adams	8260B	7007
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167050
Sample ID: SB-48-3
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
cis-1,2-Dichloroethene	0.570	mg/kg	0.100	50	10/16/02	13:13	CHollingsw	8260B	8149
trans-1,2-Dichloroethene	0.00220	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	17:26	J. Adams	8260B	7007
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	17:26	J. Adams	8260B	7007
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	17:26	J. Adams	8260B	7007
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	17:26	J. Adams	8260B	7007
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	17:26	J. Adams	8260B	7007
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Tetrachloroethene	0.00550	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Toluene	0.0011 J	mg/kg	0.0020	1	10/15/02	17:26	J. Adams	8260B	7007
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,1,2-Trichloroethane	0.00170J	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Trichloroethene	1.56	mg/kg	0.100	50	10/16/02	13:13	CHollingsw	8260B	8149
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	17:26	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
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ANALYTICAL REPORT

Laboratory Number: 02-A167050
Sample ID: SB-48-3
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	17:26	J. Adams	8260B	7007
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	17:26	J. Adams	8260B	7007

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	104.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	92.	62. - 155.
VOA Surr, DBFM	88.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167051
Sample ID: SB-48-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 16:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0217 J	mg/kg	0.0500	1	10/15/02	18:01	J. Adams	8260B	7007
Benzene	0.0014 J	mg/kg	0.0020	1	10/15/02	18:01	J. Adams	8260B	7007
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	18:01	J. Adams	8260B	7007
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	18:01	J. Adams	8260B	7007
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167051
Sample ID: SB-48-4
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
cis-1,2-Dichloroethene	0.0968	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
trans-1,2-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	18:01	J. Adams	8260B	7007
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	18:01	J. Adams	8260B	7007
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	18:01	J. Adams	8260B	7007
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	18:01	J. Adams	8260B	7007
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	18:01	J. Adams	8260B	7007
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Tetrachloroethene	0.00960	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Toluene	0.0038	mg/kg	0.0020	1	10/15/02	18:01	J. Adams	8260B	7007
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Trichloroethene	0.415	mg/kg	0.100	50	10/16/02	13:48	CHollingsw	8260B	8149
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	18:01	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167051
Sample ID: SB-48-4
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Xylenes (Total)	0.0030	mg/kg	0.0020	1	10/15/02	18:01	J. Adams	8260B	7007
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:01	J. Adams	8260B	7007

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	105.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	92.	62. - 155.
VOA Surr, DBFM	90.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167052
Sample ID: SB-49-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 8:10
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	31.8	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167053
Sample ID: SB-49-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 8:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	16.1	mg/kg	0.98	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167054
Sample ID: SB-49-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 8:20
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	11.8	mg/kg	0.97	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167055
Sample ID: SB-50-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 9:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0247 J	mg/kg	0.0500	1	10/15/02	18:36	J. Adams	8260B	7007
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	18:36	J. Adams	8260B	7007
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	18:36	J. Adams	8260B	7007
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	18:36	J. Adams	8260B	7007
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167055
Sample ID: SB-50-1
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
cis-1,2-Dichloroethene	0.194	mg/kg	0.100	50	10/17/02	15:00	CHollingsw	8260B	8153
trans-1,2-Dichloroethene	0.00290	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	18:36	J. Adams	8260B	7007
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	18:36	J. Adams	8260B	7007
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	18:36	J. Adams	8260B	7007
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	18:36	J. Adams	8260B	7007
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	18:36	J. Adams	8260B	7007
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Tetrachloroethene	0.00160J	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Toluene	0.0024	mg/kg	0.0020	1	10/15/02	18:36	J. Adams	8260B	7007
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Trichloroethene	0.500	mg/kg	0.100	50	10/17/02	10:57	CHollingsw	8260B	8153
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	18:36	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167055
Sample ID: SB-50-1
Project: 138055

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Xylenes (Total)	0.0032	mg/kg	0.0020	1	10/15/02	18:36	J. Adams	8260B	7007
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	18:36	J. Adams	8260B	7007
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	79.	56. - 155.
VOA Surr Toluene-d8	89.	79. - 130.
VOA Surr, 4-BFB	87.	62. - 155.
VOA Surr, DBFM	85.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
INCORPORATED

ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167056
Sample ID: SB-50-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 9:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.0348 J	mg/kg	0.0500	1	10/15/02	19:11	J. Adams	8260B	7007
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:11	J. Adams	8260B	7007
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	19:11	J. Adams	8260B	7007
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
sec-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	19:11	J. Adams	8260B	7007
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167056
Sample ID: SB-50-2
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
cis-1,2-Dichloroethene	0.109	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
trans-1,2-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:11	J. Adams	8260B	7007
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	19:11	J. Adams	8260B	7007
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	19:11	J. Adams	8260B	7007
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	19:11	J. Adams	8260B	7007
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	19:11	J. Adams	8260B	7007
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Tetrachloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Toluene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:11	J. Adams	8260B	7007
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Trichloroethene	0.130	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:11	J. Adams	8260B	7007

Sample report continued . . .

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INCORPORATED

ANALYTICAL REPORT

Laboratory Number: 02-A167056
Sample ID: SB-50-2
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Vinyl chloride	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	19:11	J. Adams	8260B	7007
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:11	J. Adams	8260B	7007
Cyanide	3.44	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	91.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	89.	62. - 155.
VOA Surr, DBFM	87.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167057
Sample ID: SB-50-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 9:35
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Acetone	0.130	mg/kg	0.0500	1	10/15/02	19:46	J. Adams	8260B	7007
Benzene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:46	J. Adams	8260B	7007
Bromobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Bromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Bromoform	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Bromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
2-Butanone	< 0.0500	mg/kg	0.0500	1	10/15/02	19:46	J. Adams	8260B	7007
n-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
sec-Butylbenzene	0.00170J	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
t-Butylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Carbon disulfide	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Carbon tetrachloride	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Chlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Chloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Chloroform	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Chloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
2-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
4-Chlorotoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	0.0100	1	10/15/02	19:46	J. Adams	8260B	7007
Dibromochloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2-Dibromoethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Dibromomethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,3-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007

Sample report continued . . .

TestAmerica
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ANALYTICAL REPORT

Laboratory Number: 02-A167057
Sample ID: SB-50-3
Project: 138055
Page 2

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,4-Dichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Dichlorodifluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2-Dichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1-Dichloroethene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
cis-1,2-Dichloroethene	0.178	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
trans-1,2-Dichloroethene	0.00160J	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,3-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
2,2-Dichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
cis-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
trans-1,3-Dichloropropene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Ethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:46	J. Adams	8260B	7007
Hexachlorobutadiene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
2-Hexanone	< 0.0100	mg/kg	0.0100	1	10/15/02	19:46	J. Adams	8260B	7007
Isopropylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
4-Isopropyltoluene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
4-Methyl-2-pentanone	< 0.0100	mg/kg	0.0100	1	10/15/02	19:46	J. Adams	8260B	7007
Methylene chloride	< 0.00500	mg/kg	0.00500	1	10/15/02	19:46	J. Adams	8260B	7007
Naphthalene	< 0.00500	mg/kg	0.00500	1	10/15/02	19:46	J. Adams	8260B	7007
n-Propylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Styrene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Tetrachloroethene	0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Toluene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:46	J. Adams	8260B	7007
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1,1-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,1,2-Trichloroethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Trichloroethene	0.690	mg/kg	0.100	50	10/16/02	14:23	CHollingsw	8260B	8149
1,2,3-Trichloropropane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	0.0020	1	10/15/02	19:46	J. Adams	8260B	7007

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A167057
Sample ID: SB-50-3
Project: 138055
Page 3

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Vinyl chloride	0.00940	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Xylenes (Total)	< 0.0020	mg/kg	0.0020	1	10/15/02	19:46	J. Adams	8260B	7007
Bromodichloromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Trichlorofluoromethane	< 0.00200	mg/kg	0.00200	1	10/15/02	19:46	J. Adams	8260B	7007
Cyanide	9.36	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	99.	56. - 155.
VOA Surr Toluene-d8	90.	79. - 130.
VOA Surr, 4-BFB	93.	62. - 155.
VOA Surr, DBFM	88.	74. - 127.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167058
Sample ID: SB-51-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 10:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167059
Sample ID: SB-51-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 10:20
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167060
Sample ID: SB-51-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 10:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167061
Sample ID: SB-51-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 10:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167062
Sample ID: SB-52-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 12:30
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	22.0	mg/kg	0.96	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167063
Sample ID: SB-52-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 12:35
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	17.8	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167064
Sample ID: SB-52-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 12:40
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	15.1	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	373_

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167065
Sample ID: SB-53-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 13:20
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	18.7	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167066
Sample ID: SB-53-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 13:25
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	23.7	mg/kg	0.98	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167067
Sample ID: SB-54-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 13:50
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167068
Sample ID: SB-54-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 13:55
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	2:00	S. Prayter	9012A	3692

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167069
Sample ID: SB-54-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 14:00
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	4:00	S. Prayter	9012A	4676

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167070
Sample ID: SB-55-1
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 15:50
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	4:00	S. Prayter	9012A	4676

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167071
Sample ID: SB-55-2
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 15:55
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	4:00	S. Prayter	9012A	4676

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167072
Sample ID: SB-55-3
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 16:05
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	4:00	S. Prayter	9012A	4676

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167073
Sample ID: SB-55-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 9/02
Time Collected: 16:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Cyanide	< 2.00	mg/kg	2.00	1	10/12/02	4:00	S. Prayter	9012A	4676

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167074
Sample ID: SB-56-1
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 8:15
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	13.7	mg/kg	0.97	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167075
Sample ID: SB-56-2
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 8:20
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	22.1	mg/kg	0.97	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167076
Sample ID: SB-57-1
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 9:00
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	15.3	mg/kg	0.97	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167077
Sample ID: SB-58-1
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 11:50
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	13.4	mg/kg	1.00	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167078
Sample ID: SB-58-2
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 11:55
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	15.1	mg/kg	0.98	1	10/15/02	18:12	G.McCord	6010B	3731

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A167079
Sample ID: SB-46-4
Sample Type: Soil
Site ID:

Date Collected: 10/ 8/02
Time Collected: 13:35
Date Received: 10/10/02
Time Received: 16:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	8.60	mg/kg	0.96	1	10/14/02	20:24	C.Johnson	6010B	5548

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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'ROJECT QUALITY CONTROL DATA
'roject Number: 138055
'roject Name: FMC-SCOTTSVILLE
'age: 1
aboratory Receipt Date: 10/10/02

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
VOA PARAMETERS								
Benzene	mg/l	< 0.0020	0.0553	0.0500	111	78. - 132.	116	02-A167010
Benzene	mg/kg	< 0.0020	0.0560	0.0500	112	63. - 133.	6023	blank
Benzene	mg/kg	< 0.0020	0.0562	0.0500	112	63. - 133.	7007	blank
Chlorobenzene	mg/l	< 0.00200	0.0568	0.0500	114	79. - 124.	116	02-A167010
Chlorobenzene	mg/kg	< 0.00200	0.0515	0.0500	103	65. - 129.	6023	blank
Chlorobenzene	mg/kg	< 0.00200	0.0505	0.0500	101	65. - 129	7007	blank
1,1-Dichloroethene	mg/l	< 0.00200	0.0594	0.0500	119	68. - 141.	116	02-A167010
1,1-Dichloroethene	mg/kg	< 0.00200	0.0548	0.0500	110	68. - 130	6023	blank
1,1-Dichloroethene	mg/kg	< 0.00200	0.0538	0.0500	108	68. - 130.	7007	blank
Toluene	mg/l	< 0.0020	0.0567	0.0500	113	77. - 134.	116	02-A167010
Toluene	mg/kg	< 0.0020	0.0522	0.0500	104	61. - 131.	6023	blank
Toluene	mg/kg	< 0.0020	0.0502	0.0500	100	61. - 131.	7007	blank
Trichloroethene	mg/l	< 0.00200	0.0550	0.0500	110	73. - 137.	116	02-A167010
Trichloroethene	mg/kg	< 0.00200	0.0512	0.0500	102	62. - 131.	6023	blank
Trichloroethene	mg/kg	< 0.00200	0.0481	0.0500	96	62. - 131.	7007	blank
Trichloroethene	mg/kg	< 0.00200	0.0473	0.0500	95	62. - 131.	8149	blank
Tetrachloroethene	mg/l	< 0.00200	0.0599	0.0500	120	72. - 136.	116	02-A167010

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
METALS								
Arsenic	mg/l	0.0140	0.0590	0.0500	90	80 - 120	3827	Duplicate

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 2
Laboratory Receipt Date: 10/10/02

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
Arsenic	mg/l	< 0.0050	0.0520	0.0500	104	80 - 120	4947	Duplicate
Arsenic	mg/kg	< 0.99	18.6	20.0	93	80 - 120	5548	Duplicate
Arsenic	mg/kg	44.4	218.	200.	87	80 - 120	3730	02-A167018
Arsenic	mg/kg	29.9	200.	200.	85	80 - 120	3731	02-A167038

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
MISC PARAMETERS								
Cyanide	mg/l	< 0.005	0.150	0.200	75#	80 - 120	4656	02-A167010
Cyanide	mg/kg	< 2.00	11.9	10.0	119	80 - 120	3691	02-A167015
Cyanide	mg/kg	< 2.00	10.9	10.0	109	80 - 120	3692	02-A167047
Cyanide	mg/kg	< 2.00	11.5	10.0	115	80 - 120	4676	02-A167069
Ammonia Nitrogen as N	mg/kg	15.0	111.	100.	96	80 - 120	3705	02-A167043

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
VOA PARAMETERS						
Benzene	mg/l	0.0553	0.0533	3.68	15.	116
Benzene	mg/kg	0.0560	0.0560	0.00	19.	6023
Benzene	mg/kg	0.0562	0.0581	3.32	19.	7007
Chlorobenzene	mg/l	0.0568	0.0528	7.30	16.	116
Chlorobenzene	mg/kg	0.0515	0.0510	0.98	26.	6023

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 3
Laboratory Receipt Date: 10/10/02

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
Chlorobenzene	mg/kg	0.0505	0.0531	5.02	26.	7007
1,1-Dichloroethene	mg/l	0.0594	0.0579	2.56	19.	116
1,1-Dichloroethene	mg/kg	0.0548	0.0546	0.37	18.	6023
1,1-Dichloroethene	mg/kg	0.0538	0.0569	5.60	18.	7007
Toluene	mg/l	0.0567	0.0571	0.70	16.	116
Toluene	mg/kg	0.0522	0.0515	1.35	28.	6023
Toluene	mg/kg	0.0502	0.0534	6.18	28.	7007
Trichloroethene	mg/l	0.0550	0.0532	3.33	20.	116
Trichloroethene	mg/kg	0.0512	0.0498	2.77	21.	6023
Trichloroethene	mg/kg	0.0481	0.0503	4.47	21.	7007
Trichloroethene	mg/kg	0.0473	0.0492	3.94	21.	8149
Tetrachloroethene	mg/l	0.0599	0.0569	5.14	23.	116
VOA Surr 1,2-DCA-d4	% Rec		92.			116
VOA Surr Toluene-d8	% Rec		97.			116
VOA Surr, 4-BFB	% Rec		80.			116
VOA Surr, DBFM	% Rec		86.			116

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
METALS						
Arsenic	mg/l	0.0590	0.0590	0.00	20	3827
Arsenic	mg/l	0.0520	0.0500	3.92	20	4947
Arsenic	mg/kg	18.6	18.7	0.54	20	5548
Arsenic	mg/kg	218.	215.	1.39	20	3730
Arsenic	mg/kg	200.	201.	0.50	20	3731

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055
roject Name: FMC-SCOTTSVILLE
age: 4
aboratory Receipt Date: 10/10/02

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
MISC PARAMETERS						
Cyanide	mg/l	0.150	0.137	9.06	20	4656
Cyanide	mg/kg	11.9	10.7	10.62	20	3691
Cyanide	mg/kg	10.9	11.2	2.71	20	3692
Cyanide	mg/kg	11.5	11.2	2.64	20	4676
Ammonia Nitrogen as N	mg/kg	111.	108.	2.74	20	3705

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
VOA PARAMETERS						
Acetone	mg/l	0.250	0.230	92	60 - 154	116
Acetone	mg/kg	0.250	0.245	98	50 - 154	6023
Acetone	mg/kg	0.250	0.275	110	50 - 154	7007
Benzene	mg/l	0.0500	0.0518	104	78 - 127	116
Benzene	mg/kg	0.0500	0.0489	98	77 - 123	6023
Benzene	mg/kg	0.0500	0.0579	116	77 - 123	7007
Bromobenzene	mg/l	0.0500	0.0488	98	80 - 120	116
Bromobenzene	mg/kg	0.0500	0.0448	90	72 - 121	6023
Bromobenzene	mg/kg	0.0500	0.0546	109	72 - 121	7007
Bromochloromethane	mg/l	0.0500	0.0567	113	66 - 137	116
Bromochloromethane	mg/kg	0.0500	0.0490	98	80 - 125	6023
Bromochloromethane	mg/kg	0.0500	0.0506	101	80 - 125	7007
Bromoform	mg/l	0.0500	0.0596	119	66 - 129	116
Bromoform	mg/kg	0.0500	0.0542	108	67 - 125	6023
Bromoform	mg/kg	0.0500	0.0550	110	67 - 125	7007
Bromomethane	mg/l	0.0500	0.0590	118	47 - 163	116
Bromomethane	mg/kg	0.0500	0.0451	90	47 - 156	6023

Project QC continued . . .

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'ROJECT QUALITY CONTROL DATA
'roject Number: 138055
'roject Name: FMC-SCOTTSVILLE
'age: 5
aboratory Receipt Date: 10/10/02

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Bromomethane	mg/kg	0.0500	0.0586	117	47 - 156	7007
2-Butanone	mg/l	0.250	0.288	115	75 - 140	116
2-Butanone	mg/kg	0.250	0.219	88	61 - 143	6023
2-Butanone	mg/kg	0.250	0.238	95	61 - 143	7007
n-Butylbenzene	mg/l	0.0500	0.0444	89	61 - 131	116
n-Butylbenzene	mg/kg	0.0500	0.0439	88	48 - 140	6023
n-Butylbenzene	mg/kg	0.0500	0.0562	112	48 - 140	7007
sec-Butylbenzene	mg/l	0.0500	0.0460	92	72 - 124	116
sec-Butylbenzene	mg/kg	0.0500	0.0461	92	68 - 126	6023
sec-Butylbenzene	mg/kg	0.0500	0.0561	112	68 - 126	7007
t-Butylbenzene	mg/l	0.0500	0.0486	97	74 - 123	116
t-Butylbenzene	mg/kg	0.0500	0.0463	93	72 - 124	6023
t-Butylbenzene	mg/kg	0.0500	0.0543	109	72 - 124	7007
Carbon disulfide	mg/l	0.0500	0.0495	99	67 - 138	116
Carbon disulfide	mg/kg	0.0500	0.0517	103	74 - 129	6023
Carbon disulfide	mg/kg	0.0500	0.0637	127	74 - 129	7007
Carbon tetrachloride	mg/l	0.0500	0.0513	103	69 - 132	116
Carbon tetrachloride	mg/kg	0.0500	0.0457	91	74 - 129	6023
Carbon tetrachloride	mg/kg	0.0500	0.0528	106	74 - 129	7007
Chlorobenzene	mg/l	0.0500	0.0526	105	81 - 120	116
Chlorobenzene	mg/kg	0.0500	0.0490	98	74 - 124	6023
Chlorobenzene	mg/kg	0.0500	0.0559	112	74 - 124	7007
Chloroethane	mg/l	0.0500	0.0496	99	65 - 134	116
Chloroethane	mg/kg	0.0500	0.0407	81	67 - 164	6023
Chloroethane	mg/kg	0.0500	0.0538	108	67 - 164	7007
Chloroform	mg/l	0.0500	0.0521	104	77 - 125	116
Chloroform	mg/kg	0.0500	0.0474	95	79 - 121	6023
Chloroform	mg/kg	0.0500	0.0565	113	79 - 121	7007
Chloromethane	mg/l	0.0500	0.0490	98	43 - 142	116
Chloromethane	mg/kg	0.0500	0.0461	92	39 - 147	6023
Chloromethane	mg/kg	0.0500	0.0546	109	39 - 147	7007

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 6
Laboratory Receipt Date: 10/10/02

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
2-Chlorotoluene	mg/l	0.0500	0.0492	98	76 - 126	116
2-Chlorotoluene	mg/kg	0.0500	0.0444	89	67 - 127	6023
2-Chlorotoluene	mg/kg	0.0500	0.0548	110	67 - 127	7007
4-Chlorotoluene	mg/l	0.0500	0.0488	98	79 - 123	116
4-Chlorotoluene	mg/kg	0.0500	0.0443	89	62 - 130	6023
4-Chlorotoluene	mg/kg	0.0500	0.0551	110	62 - 130	7007
1,2-Dibromo-3-chloropropane	mg/l	0.0500	0.0476	95	64 - 132	116
1,2-Dibromo-3-chloropropane	mg/kg	0.0500	0.0504	101	60 - 138	6023
1,2-Dibromo-3-chloropropane	mg/kg	0.0500	0.0496	99	60 - 138	7007
Dibromochloromethane	mg/l	0.0500	0.0560	112	78 - 124	116
Dibromochloromethane	mg/kg	0.0500	0.0488	98	73 - 129	6023
Dibromochloromethane	mg/kg	0.0500	0.0536	107	73 - 129	7007
1,2-Dibromoethane	mg/l	0.0500	0.0582	116	79 - 126	116
1,2-Dibromoethane	mg/kg	0.0500	0.0483	97	70 - 131	6023
1,2-Dibromoethane	mg/kg	0.0500	0.0520	104	70 - 131	7007
Dibromomethane	mg/l	0.0500	0.0532	106	75 - 131	116
Dibromomethane	mg/kg	0.0500	0.0479	96	77 - 130	6023
Dibromomethane	mg/kg	0.0500	0.0536	107	77 - 130	7007
1,2-Dichlorobenzene	mg/l	0.0500	0.0511	102	80 - 120	116
1,2-Dichlorobenzene	mg/kg	0.0500	0.0487	97	67 - 125	6023
1,2-Dichlorobenzene	mg/kg	0.0500	0.0549	110	67 - 125	7007
1,3-Dichlorobenzene	mg/l	0.0500	0.0540	108	79 - 120	116
1,3-Dichlorobenzene	mg/kg	0.0500	0.0473	95	59 - 129	6023
1,3-Dichlorobenzene	mg/kg	0.0500	0.0548	110	59 - 129	7007
1,4-Dichlorobenzene	mg/l	0.0500	0.0484	97	78 - 118	116
1,4-Dichlorobenzene	mg/kg	0.0500	0.0464	93	57 - 130	6023
1,4-Dichlorobenzene	mg/kg	0.0500	0.0540	108	57 - 130	7007
Dichlorodifluoromethane	mg/l	0.0500	0.0450	90	45 - 149	116
Dichlorodifluoromethane	mg/kg	0.0500	0.0484	97	44 - 148	6023
Dichlorodifluoromethane	mg/kg	0.0500	0.0606	121	44 - 148	7007
1,1-Dichloroethane	mg/l	0.0500	0.0516	103	73 - 128	116

Project QC continued . . .

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'ROJECT QUALITY CONTROL DATA
'roject Number: 138055
'roject Name: FMC-SCOTTSVILLE
'age: 7
aboratory Receipt Date: 10/10/02

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
1,1-Dichloroethane	mg/kg	0.0500	0.0478	96	76 - 126	6023
1,1-Dichloroethane	mg/kg	0.0500	0.0600	120	76 - 126	7007
1,2-Dichloroethane	mg/l	0.0500	0.0511	102	71 - 135	116
1,2-Dichloroethane	mg/kg	0.0500	0.0442	88	71 - 133	6023
1,2-Dichloroethane	mg/kg	0.0500	0.0551	110	71 - 133	7007
1,1-Dichloroethene	mg/l	0.0500	0.0486	97	72 - 128	116
1,1-Dichloroethene	mg/kg	0.0500	0.0488	98	79 - 122	6023
1,1-Dichloroethene	mg/kg	0.0500	0.0559	112	79 - 122	7007
cis-1,2-Dichloroethene	mg/l	0.0500	0.0538	108	76 - 127	116
cis-1,2-Dichloroethene	mg/kg	0.0500	0.0388	78	77 - 125	6023
cis-1,2-Dichloroethene	mg/kg	0.0500	0.0448	90	77 - 125	6808
cis-1,2-Dichloroethene	mg/kg	0.0500	0.0448	90	77 - 125	7007
cis-1,2-Dichloroethene	mg/kg	0.0500	0.0453	91	77 - 125	8149
cis-1,2-Dichloroethene	mg/kg	0.0500	0.0445	89	77 - 125	8149
cis-1,2-Dichloroethene	mg/kg	0.0500	0.0502	100	77 - 125	8153
trans-1,2-Dichloroethene	mg/l	0.0500	0.0505	101	71 - 131	116
trans-1,2-Dichloroethene	mg/kg	0.0500	0.0472	94	76 - 124	6023
trans-1,2-Dichloroethene	mg/kg	0.0500	0.0593	119	76 - 124	7007
1,2-Dichloropropane	mg/l	0.0500	0.0523	105	75 - 127	116
1,2-Dichloropropane	mg/kg	0.0500	0.0505	101	76 - 127	6023
1,2-Dichloropropane	mg/kg	0.0500	0.0576	115	76 - 127	7007
1,3-Dichloropropane	mg/l	0.0500	0.0534	107	81 - 128	116
1,3-Dichloropropane	mg/kg	0.0500	0.0494	99	78 - 125	6023
1,3-Dichloropropane	mg/kg	0.0500	0.0569	114	78 - 125	7007
2,2-Dichloropropane	mg/l	0.0500	0.0508	102	45 - 145	116
2,2-Dichloropropane	mg/kg	0.0500	0.0383	77	68 - 129	6023
2,2-Dichloropropane	mg/kg	0.0500	0.0450	90	68 - 129	7007
1,1-Dichloropropene	mg/l	0.0500	0.0520	104	76 - 127	116
1,1-Dichloropropene	mg/kg	0.0500	0.0456	91	80 - 120	6023
1,1-Dichloropropene	mg/kg	0.0500	0.0554	111	80 - 120	7007
cis-1,3-Dichloropropene	mg/l	0.0500	0.0525	105	72 - 131	116

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055
roject Name: FMC-SCOTTSVILLE
age: 8
aboratory Receipt Date: 10/10/02

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
cis-1,3-Dichloropropene	mg/kg	0.0500	0.0480	96	82 - 120	6023
cis-1,3-Dichloropropene	mg/kg	0.0500	0.0563	113	82 - 120	7007
trans-1,3-Dichloropropene	mg/l	0.0500	0.0454	91	69 - 131	116
trans-1,3-Dichloropropene	mg/kg	0.0500	0.0479	96	78 - 123	6023
trans-1,3-Dichloropropene	mg/kg	0.0500	0.0572	114	78 - 123	7007
Ethylbenzene	mg/l	0.0500	0.0533	107	78 - 125	116
Ethylbenzene	mg/kg	0.0500	0.0479	96	73 - 134	6023
Ethylbenzene	mg/kg	0.0500	0.0560	112	73 - 134	7007
Hexachlorobutadiene	mg/l	0.0500	0.0419	84	59 - 126	116
Hexachlorobutadiene	mg/kg	0.0500	0.0478	96	51 - 136	6023
Hexachlorobutadiene	mg/kg	0.0500	0.0535	107	51 - 136	7007
2-Hexanone	mg/l	0.250	0.262	105	71 - 142	116
2-Hexanone	mg/kg	0.250	0.248	99	65 - 143	6023
2-Hexanone	mg/kg	0.250	0.269	108	65 - 143	7007
Isopropylbenzene	mg/l	0.0500	0.0458	92	78 - 123	116
Isopropylbenzene	mg/kg	0.0500	0.0456	91	72 - 124	6023
Isopropylbenzene	mg/kg	0.0500	0.0545	109	72 - 124	7007
4-Isopropyltoluene	mg/l	0.0500	0.0468	94	73 - 125	116
4-Isopropyltoluene	mg/kg	0.0500	0.0451	90	62 - 129	6023
4-Isopropyltoluene	mg/kg	0.0500	0.0545	109	62 - 129	7007
4-Methyl-2-pentanone	mg/l	0.250	0.264	106	71 - 141	116
4-Methyl-2-pentanone	mg/kg	0.250	0.247	99	68 - 142	6023
4-Methyl-2-pentanone	mg/kg	0.250	0.264	106	68 - 142	7007
Methylene chloride	mg/l	0.0500	0.0475	95	70 - 140	116
Methylene chloride	mg/kg	0.0500	0.0531	106	66 - 136	6023
Methylene chloride	mg/kg	0.0500	0.0532	106	66 - 136	7007
Naphthalene	mg/l	0.0500	0.0467	93	52 - 140	116
Naphthalene	mg/kg	0.0500	0.0460	92	54 - 135	6023
Naphthalene	mg/kg	0.0500	0.0478	96	54 - 135	7007
n-Propylbenzene	mg/l	0.0500	0.0460	92	75 - 125	116
n-Propylbenzene	mg/kg	0.0500	0.0447	89	65 - 129	6023

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
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Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
n-Propylbenzene	mg/kg	0.0500	0.0557	111	65 - 129	7007
Styrene	mg/l	0.0500	0.0556	111	82 - 122	116
Styrene	mg/kg	0.0500	0.0506	101	71 - 126	6023
Styrene	mg/kg	0.0500	0.0576	115	71 - 126	7007
1,1,1,2-Tetrachloroethane	mg/l	0.0500	0.0550	110	85 - 123	116
1,1,1,2-Tetrachloroethane	mg/kg	0.0500	0.0501	100	77 - 127	6023
1,1,1,2-Tetrachloroethane	mg/kg	0.0500	0.0557	111	77 - 127	7007
1,1,2,2-Tetrachloroethane	mg/l	0.0500	0.0590	118	74 - 133	116
1,1,2,2-Tetrachloroethane	mg/kg	0.0500	0.0516	103	67 - 139	6023
1,1,2,2-Tetrachloroethane	mg/kg	0.0500	0.0564	113	67 - 139	7007
Tetrachloroethene	mg/l	0.0500	0.0523	105	76 - 123	116
Tetrachloroethene	mg/kg	0.0500	0.0475	95	67 - 127	6023
Tetrachloroethene	mg/kg	0.0500	0.0542	108	67 - 127	7007
Toluene	mg/l	0.0500	0.0488	98	78 - 127	116
Toluene	mg/kg	0.0500	0.0479	96	76 - 120	6023
Toluene	mg/kg	0.0500	0.0548	110	76 - 120	7007
1,2,3-Trichlorobenzene	mg/l	0.0500	0.0454	91	59 - 132	116
1,2,3-Trichlorobenzene	mg/kg	0.0500	0.0483	97	46 - 140	6023
1,2,3-Trichlorobenzene	mg/kg	0.0500	0.0520	104	46 - 140	7007
1,2,4-Trichlorobenzene	mg/l	0.0500	0.0418	84	60 - 133	116
1,2,4-Trichlorobenzene	mg/kg	0.0500	0.0471	94	37 - 145	6023
1,2,4-Trichlorobenzene	mg/kg	0.0500	0.0529	106	37 - 145	7007
1,1,1-Trichloroethane	mg/l	0.0500	0.0517	103	74 - 128	116
1,1,1-Trichloroethane	mg/kg	0.0500	0.0464	93	75 - 128	6023
1,1,1-Trichloroethane	mg/kg	0.0500	0.0537	107	75 - 128	7007
1,1,2-Trichloroethane	mg/l	0.0500	0.0480	96	85 - 125	116
1,1,2-Trichloroethane	mg/kg	0.0500	0.0506	101	73 - 131	6023
1,1,2-Trichloroethane	mg/kg	0.0500	0.0556	111	73 - 131	7007
Trichloroethene	mg/l	0.0500	0.0502	100	78 - 125	116
Trichloroethene	mg/kg	0.0500	0.0495	99	78 - 121	6023
Trichloroethene	mg/kg	0.0500	0.0545	109	78 - 121	6808

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
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Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Trichloroethene	mg/kg	0.0500	0.0545	109	78 - 121	7007
Trichloroethene	mg/kg	0.0500	0.0527	105	78 - 121	8149
Trichloroethene	mg/kg	0.0500	0.0525	105	78 - 121	8149
Trichloroethene	mg/kg	0.0500	0.0490	98	78 - 121	8153
1,2,3-Trichloropropane	mg/l	0.0500	0.0628	126	75 - 130	116
1,2,3-Trichloropropane	mg/kg	0.0500	0.0492	98	66 - 138	6023
1,2,3-Trichloropropane	mg/kg	0.0500	0.0523	105	66 - 138	7007
1,2,4-Trimethylbenzene	mg/l	0.0500	0.0475	95	77 - 122	116
1,2,4-Trimethylbenzene	mg/kg	0.0500	0.0432	86	63 - 126	6023
1,2,4-Trimethylbenzene	mg/kg	0.0500	0.0515	103	63 - 126	7007
1,3,5-Trimethylbenzene	mg/l	0.0500	0.0482	96	75 - 125	116
1,3,5-Trimethylbenzene	mg/kg	0.0500	0.0447	89	66 - 128	6023
1,3,5-Trimethylbenzene	mg/kg	0.0500	0.0535	107	66 - 128	7007
Vinyl chloride	mg/l	0.0500	0.0469	94	61 - 140	116
Vinyl chloride	mg/kg	0.0500	0.0472	94	67 - 131	6023
Vinyl chloride	mg/kg	0.0500	0.0572	114	67 - 131	6808
Vinyl chloride	mg/kg	0.0500	0.0572	114	67 - 131	7007
Xylenes (Total)	mg/l	0.150	0.170	113	77 - 126	116
Xylenes (Total)	mg/kg	0.150	0.141	94	75 - 123	6023
Xylenes (Total)	mg/kg	0.150	0.167	111	75 - 123	7007
Bromodichloromethane	mg/l	0.0500	0.0530	106	79 - 126	116
Bromodichloromethane	mg/kg	0.0500	0.0471	94	81 - 125	6023
Bromodichloromethane	mg/kg	0.0500	0.0568	114	81 - 125	7007
Trichlorofluoromethane	mg/l	0.0500	0.0443	89	60 - 140	116
Trichlorofluoromethane	mg/kg	0.0500	0.0455	91	37 - 134	6023
Trichlorofluoromethane	mg/kg	0.0500	0.0558	112	37 - 134	7007

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ROJECT QUALITY CONTROL DATA
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VOA Surr 1,2-DCA-d4	% Rec	93	73 - 133	116
VOA Surr Toluene-d8	% Rec	88	80 - 121	116
VOA Surr, 4-BFB	% Rec	79	80 - 128	116
VOA Surr, DBFM	% Rec	91	81 - 121	116

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
METALS						
Arsenic	mg/l	0.0500	0.0470	94	80 - 120	3827
Arsenic	mg/l	0.0500	0.0520	104	80 - 120	4947
Arsenic	mg/kg	20.0	18.8	94	80 - 120	5548
Arsenic	mg/kg	200.	197.	98	80 - 120	3730
Arsenic	mg/kg	200.	202.	101	80 - 120	3731

Continuing Calibration Verification

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
METALS						

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
MISC PARAMETERS						
Cyanide	mg/l	0.100	0.095	95	90 - 110	4656
Cyanide	mg/kg	5.00	5.08	102	90 - 110	3691
Cyanide	mg/kg	5.00	5.38	108	90 - 110	3692
Cyanide	mg/kg	5.00	5.29	106	90 - 110	4676
Ammonia Nitrogen as N	mg/kg	100.	90.8	91	90 - 110	3705

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ROJECT QUALITY CONTROL DATA
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Duplicates

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch	Sample Dup'd
Cyanide	mg/l	< 0.005	< 0.005	N/A	15.	4656	02-A167529
Cyanide	mg/kg	< 2.00	< 2.00	N/A	15.	3691	02-A167046
Cyanide	mg/kg	< 2.00	< 2.00	N/A	15.	3692	02-A167067
Cyanide	mg/kg	< 2.00	< 2.00	N/A	15.	4676	02-A167596

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
VOA PARAMETERS					
Acetone	< 0.00470	mg/l	116	10/18/02	15:30
Acetone	< 0.0500	mg/kg	6023	10/14/02	21:34
Acetone	< 0.0500	mg/kg	7007	10/15/02	10:25
Benzene	< 0.0005	mg/l	116	10/18/02	15:30
Benzene	< 0.0020	mg/kg	6023	10/14/02	21:34
Benzene	< 0.0020	mg/kg	7007	10/15/02	10:25
Bromobenzene	< 0.00030	mg/l	116	10/18/02	15:30
Bromobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
Bromobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
Bromochloromethane	< 0.00030	mg/l	116	10/18/02	15:30
Bromochloromethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Bromochloromethane	< 0.00200	mg/kg	7007	10/15/02	10:25
Bromoform	< 0.00060	mg/l	116	10/18/02	15:30
Bromoform	< 0.00200	mg/kg	6023	10/14/02	21:34
Bromoform	< 0.00200	mg/kg	7007	10/15/02	10:25
Bromomethane	< 0.00060	mg/l	116	10/18/02	15:30
Bromomethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Bromomethane	< 0.00200	mg/kg	7007	10/15/02	10:25
2-Butanone	< 0.00310	mg/l	116	10/18/02	15:30
2-Butanone	< 0.0500	mg/kg	6023	10/14/02	21:34
2-Butanone	< 0.0500	mg/kg	7007	10/15/02	10:25

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055
roject Name: FMC-SCOTTSVILLE
age: 13
aboratory Receipt Date: 10/10/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
n-Butylbenzene	< 0.00010	mg/l	116	10/18/02	15:30
n-Butylbenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
n-Butylbenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
sec-Butylbenzene	< 0.00030	mg/l	116	10/18/02	15:30
sec-Butylbenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
sec-Butylbenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
t-Butylbenzene	< 0.00030	mg/l	116	10/18/02	15:30
t-Butylbenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
t-Butylbenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
Carbon disulfide	< 0.00020	mg/l	116	10/18/02	15:30
Carbon disulfide	< 0.00200	mg/kg	6023	10/14/02	21:34
Carbon disulfide	< 0.00200	mg/kg	7007	10/15/02	10:25
Carbon tetrachloride	< 0.00040	mg/l	116	10/18/02	15:30
Carbon tetrachloride	< 0.00200	mg/kg	6023	10/14/02	21:34
Carbon tetrachloride	< 0.00200	mg/kg	7007	10/15/02	10:25
Chlorobenzene	< 0.00020	mg/l	116	10/18/02	15:30
Chlorobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
Chlorobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
Chloroethane	< 0.00100	mg/l	116	10/18/02	15:30
Chloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Chloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
Chloroform	< 0.00080	mg/l	116	10/18/02	15:30
Chloroform	< 0.00200	mg/kg	6023	10/14/02	21:34
Chloroform	< 0.00200	mg/kg	7007	10/15/02	10:25
Chloromethane	< 0.00070	mg/l	116	10/18/02	15:30
Chloromethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Chloromethane	< 0.00200	mg/kg	7007	10/15/02	10:25
2-Chlorotoluene	< 0.00040	mg/l	116	10/18/02	15:30
2-Chlorotoluene	< 0.00200	mg/kg	6023	10/14/02	21:34
2-Chlorotoluene	< 0.00200	mg/kg	7007	10/15/02	10:25
4-Chlorotoluene	< 0.00050	mg/l	116	10/18/02	15:30

Project QC continued . . .

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'ROJECT QUALITY CONTROL DATA
'roject Number: 138055
'roject Name: FMC-SCOTTSVILLE
'age: 14
aboratory Receipt Date: 10/10/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
4-Chlorotoluene	< 0.00200	mg/kg	6023	10/14/02	21:34
4-Chlorotoluene	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2-Dibromo-3-chloropropane	< 0.00070	mg/l	116	10/18/02	15:30
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	6023	10/14/02	21:34
1,2-Dibromo-3-chloropropane	< 0.0100	mg/kg	7007	10/15/02	10:25
Dibromochloromethane	< 0.00050	mg/l	116	10/18/02	15:30
Dibromochloromethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Dibromochloromethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2-Dibromoethane	< 0.00040	mg/l	116	10/18/02	15:30
1,2-Dibromoethane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,2-Dibromoethane	< 0.00200	mg/kg	7007	10/15/02	10:25
Dibromomethane	< 0.00090	mg/l	116	10/18/02	15:30
Dibromomethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Dibromomethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2-Dichlorobenzene	< 0.00020	mg/l	116	10/18/02	15:30
1,2-Dichlorobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,2-Dichlorobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
1,3-Dichlorobenzene	< 0.00030	mg/l	116	10/18/02	15:30
1,3-Dichlorobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,3-Dichlorobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
1,4-Dichlorobenzene	< 0.00040	mg/l	116	10/18/02	15:30
1,4-Dichlorobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,4-Dichlorobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
Dichlorodifluoromethane	< 0.00050	mg/l	116	10/18/02	15:30
Dichlorodifluoromethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Dichlorodifluoromethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,1-Dichloroethane	< 0.00020	mg/l	116	10/18/02	15:30
1,1-Dichloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1-Dichloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2-Dichloroethane	< 0.00060	mg/l	116	10/18/02	15:30
1,2-Dichloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34

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ROJECT QUALITY CONTROL DATA
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Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
1,2-Dichloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,1-Dichloroethene	< 0.00060	mg/l	116	10/18/02	15:30
1,1-Dichloroethene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1-Dichloroethene	< 0.00200	mg/kg	7007	10/15/02	10:25
cis-1,2-Dichloroethene	< 0.00060	mg/l	116	10/18/02	15:30
cis-1,2-Dichloroethene	< 0.00200	mg/kg	6023	10/14/02	21:34
cis-1,2-Dichloroethene	< 0.00200	mg/kg	6808	10/15/02	10:25
cis-1,2-Dichloroethene	< 0.00200	mg/kg	7007	10/15/02	10:25
cis-1,2-Dichloroethene	< 0.00200	mg/kg	8149	10/16/02	10:53
cis-1,2-Dichloroethene	< 0.00200	mg/kg	8149	10/16/02	23:07
cis-1,2-Dichloroethene	< 0.00200	mg/kg	8153	10/17/02	10:22
trans-1,2-Dichloroethene	< 0.00050	mg/l	116	10/18/02	15:30
trans-1,2-Dichloroethene	< 0.00200	mg/kg	6023	10/14/02	21:34
trans-1,2-Dichloroethene	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2-Dichloropropane	< 0.00040	mg/l	116	10/18/02	15:30
1,2-Dichloropropane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,2-Dichloropropane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,3-Dichloropropane	< 0.00040	mg/l	116	10/18/02	15:30
1,3-Dichloropropane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,3-Dichloropropane	< 0.00200	mg/kg	7007	10/15/02	10:25
2,2-Dichloropropane	< 0.00040	mg/l	116	10/18/02	15:30
2,2-Dichloropropane	< 0.00200	mg/kg	6023	10/14/02	21:34
2,2-Dichloropropane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,1-Dichloropropene	< 0.00050	mg/l	116	10/18/02	15:30
1,1-Dichloropropene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1-Dichloropropene	< 0.00200	mg/kg	7007	10/15/02	10:25
cis-1,3-Dichloropropene	< 0.00030	mg/l	116	10/18/02	15:30
cis-1,3-Dichloropropene	< 0.00200	mg/kg	6023	10/14/02	21:34
cis-1,3-Dichloropropene	< 0.00200	mg/kg	7007	10/15/02	10:25
trans-1,3-Dichloropropene	< 0.00050	mg/l	116	10/18/02	15:30
trans-1,3-Dichloropropene	< 0.00200	mg/kg	6023	10/14/02	21:34

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PROJECT QUALITY CONTROL DATA
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Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
trans-1,3-Dichloropropene	< 0.00200	mg/kg	7007	10/15/02	10:25
Ethylbenzene	< 0.0003	mg/l	116	10/18/02	15:30
Ethylbenzene	< 0.0020	mg/kg	6023	10/14/02	21:34
Ethylbenzene	< 0.0020	mg/kg	7007	10/15/02	10:25
Hexachlorobutadiene	< 0.00080	mg/l	116	10/18/02	15:30
Hexachlorobutadiene	< 0.00200	mg/kg	6023	10/14/02	21:34
Hexachlorobutadiene	< 0.00200	mg/kg	7007	10/15/02	10:25
2-Hexanone	< 0.00420	mg/l	116	10/18/02	15:30
2-Hexanone	< 0.0100	mg/kg	6023	10/14/02	21:34
2-Hexanone	< 0.0100	mg/kg	7007	10/15/02	10:25
Isopropylbenzene	< 0.00040	mg/l	116	10/18/02	15:30
Isopropylbenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
Isopropylbenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
4-Isopropyltoluene	< 0.00060	mg/l	116	10/18/02	15:30
4-Isopropyltoluene	< 0.00200	mg/kg	6023	10/14/02	21:34
4-Isopropyltoluene	< 0.00200	mg/kg	7007	10/15/02	10:25
4-Methyl-2-pentanone	< 0.00490	mg/l	116	10/18/02	15:30
4-Methyl-2-pentanone	< 0.0100	mg/kg	6023	10/14/02	21:34
4-Methyl-2-pentanone	< 0.0100	mg/kg	7007	10/15/02	10:25
Methylene chloride	< 0.00360	mg/l	116	10/18/02	15:30
Methylene chloride	< 0.00200	mg/kg	6023	10/14/02	21:34
Methylene chloride	< 0.00200	mg/kg	7007	10/15/02	10:25
Naphthalene	< 0.00120	mg/l	116	10/18/02	15:30
Naphthalene	< 0.00500	mg/kg	6023	10/14/02	21:34
Naphthalene	< 0.00500	mg/kg	7007	10/15/02	10:25
n-Propylbenzene	< 0.00030	mg/l	116	10/18/02	15:30
n-Propylbenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
n-Propylbenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
Styrene	< 0.00040	mg/l	116	10/18/02	15:30
Styrene	< 0.00200	mg/kg	6023	10/14/02	21:34
Styrene	< 0.00200	mg/kg	7007	10/15/02	10:25

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PROJECT QUALITY CONTROL DATA
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Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
1,1,1,2-Tetrachloroethane	< 0.00060	mg/l	116	10/18/02	15:30
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1,1,2-Tetrachloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,1,2,2-Tetrachloroethane	< 0.00040	mg/l	116	10/18/02	15:30
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1,2,2-Tetrachloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
Tetrachloroethene	< 0.00040	mg/l	116	10/18/02	15:30
Tetrachloroethene	< 0.00200	mg/kg	6023	10/14/02	21:34
Tetrachloroethene	< 0.00200	mg/kg	7007	10/15/02	10:25
Toluene	< 0.0006	mg/l	116	10/18/02	15:30
Toluene	< 0.0020	mg/kg	6023	10/14/02	21:34
Toluene	< 0.0020	mg/kg	7007	10/15/02	10:25
1,2,3-Trichlorobenzene	< 0.00100	mg/l	116	10/18/02	15:30
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,2,3-Trichlorobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2,4-Trichlorobenzene	< 0.00060	mg/l	116	10/18/02	15:30
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,2,4-Trichlorobenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
1,1,1-Trichloroethane	< 0.00070	mg/l	116	10/18/02	15:30
1,1,1-Trichloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1,1-Trichloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,1,2-Trichloroethane	< 0.00040	mg/l	116	10/18/02	15:30
1,1,2-Trichloroethane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,1,2-Trichloroethane	< 0.00200	mg/kg	7007	10/15/02	10:25
Trichloroethene	< 0.00040	mg/l	116	10/18/02	15:30
Trichloroethene	< 0.00200	mg/kg	6023	10/14/02	21:34
Trichloroethene	< 0.00200	mg/kg	6808	10/15/02	10:25
Trichloroethene	< 0.00200	mg/kg	7007	10/15/02	10:25
Trichloroethene	< 0.00200	mg/kg	8149	10/16/02	10:53
Trichloroethene	< 0.00200	mg/kg	8149	10/16/02	23:07
Trichloroethene	< 0.00200	mg/kg	8153	10/17/02	10:22

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 18
Laboratory Receipt Date: 10/10/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
1,2,3-Trichloropropane	< 0.00060	mg/l	116	10/18/02	15:30
1,2,3-Trichloropropane	< 0.00200	mg/kg	6023	10/14/02	21:34
1,2,3-Trichloropropane	< 0.00200	mg/kg	7007	10/15/02	10:25
1,2,4-Trimethylbenzene	< 0.0003	mg/l	116	10/18/02	15:30
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	6023	10/14/02	21:34
1,2,4-Trimethylbenzene	< 0.0020	mg/kg	7007	10/15/02	10:25
1,3,5-Trimethylbenzene	< 0.00100	mg/l	116	10/18/02	15:30
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	6023	10/14/02	21:34
1,3,5-Trimethylbenzene	< 0.00200	mg/kg	7007	10/15/02	10:25
Vinyl chloride	< 0.00050	mg/l	116	10/18/02	15:30
Vinyl chloride	< 0.00200	mg/kg	6023	10/14/02	21:34
Vinyl chloride	< 0.00200	mg/kg	6808	10/15/02	10:25
Vinyl chloride	< 0.00200	mg/kg	7007	10/15/02	10:25
Xylenes (Total)	< 0.0009	mg/l	116	10/18/02	15:30
Xylenes (Total)	< 0.0020	mg/kg	6023	10/14/02	21:34
Xylenes (Total)	< 0.0020	mg/kg	7007	10/15/02	10:25
Bromodichloromethane	< 0.00030	mg/l	116	10/18/02	15:30
Bromodichloromethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Bromodichloromethane	< 0.00200	mg/kg	7007	10/15/02	10:25
Trichlorofluoromethane	< 0.00040	mg/l	116	10/18/02	15:30
Trichlorofluoromethane	< 0.00200	mg/kg	6023	10/14/02	21:34
Trichlorofluoromethane	< 0.00200	mg/kg	7007	10/15/02	10:25
VOA Surr 1,2-DCA-d4	94.	% Rec	116	10/18/02	15:30
VOA Surr 1,2-DCA-d4	89.	% Rec	6023	10/14/02	21:34
VOA Surr 1,2-DCA-d4	101.	% Rec	6808	10/15/02	10:25
VOA Surr 1,2-DCA-d4	101.	% Rec	7007	10/15/02	10:25
VOA Surr 1,2-DCA-d4	108.	% Rec	8149	10/16/02	10:53
VOA Surr 1,2-DCA-d4	91.	% Rec	8149	10/16/02	23:07
VOA Surr 1,2-DCA-d4	88.	% Rec	8153	10/17/02	10:22
VOA Surr Toluene-d8	87.	% Rec	116	10/18/02	15:30
VOA Surr Toluene-d8	90.	% Rec	6023	10/14/02	21:34

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055
roject Name: FMC-SCOTTSVILLE
age: 19
aboratory Receipt Date: 10/10/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
VOA Surr Toluene-d8	89.	% Rec	6808	10/15/02	10:25
VOA Surr Toluene-d8	89.	% Rec	7007	10/15/02	10:25
VOA Surr Toluene-d8	89.	% Rec	8149	10/16/02	10:53
VOA Surr Toluene-d8	89.	% Rec	8149	10/16/02	23:07
VOA Surr Toluene-d8	90.	% Rec	8153	10/17/02	10:22
VOA Surr, 4-BFB	83.	% Rec	116	10/18/02	15:30
VOA Surr, 4-BFB	87.	% Rec	6023	10/14/02	21:34
VOA Surr, 4-BFB	92.	% Rec	6808	10/15/02	10:25
VOA Surr, 4-BFB	92.	% Rec	7007	10/15/02	10:25
VOA Surr, 4-BFB	94.	% Rec	8149	10/16/02	10:53
VOA Surr, 4-BFB	86.	% Rec	8149	10/16/02	23:07
VOA Surr, 4-BFB	86.	% Rec	8153	10/17/02	10:22
VOA Surr, DBFM	91.	% Rec	116	10/18/02	15:30
VOA Surr, DBFM	89.	% Rec	6023	10/14/02	21:34
VOA Surr, DBFM	90.	% Rec	6808	10/15/02	10:25
VOA Surr, DBFM	90.	% Rec	7007	10/15/02	10:25
VOA Surr, DBFM	90.	% Rec	8149	10/16/02	10:53
VOA Surr, DBFM	91.	% Rec	8149	10/16/02	23:07
VOA Surr, DBFM	89.	% Rec	8153	10/17/02	10:22

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
METALS					
Arsenic	< 0.0049	mg/l	3827	10/11/02	15:47
Arsenic	< 0.0049	mg/l	4947	10/15/02	13:44
Arsenic	< 0.88	mg/kg	5548	10/14/02	20:24
Arsenic	< 0.88	mg/kg	3730	10/15/02	16:05
Arsenic	< 0.88	mg/kg	3731	10/15/02	18:12

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055
roject Name: FMC-SCOTTSVILLE
age: 20
aboratory Receipt Date: 10/10/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
MISC PARAMETERS					
Cyanide	< 0.005	mg/l	4656	10/11/02	18:30
Cyanide	< 2.00	mg/kg	3691	10/12/02	0:00
Cyanide	< 2.00	mg/kg	3692	10/12/02	2:00
Cyanide	< 2.00	mg/kg	4676	10/12/02	4:00
Ammonia Nitrogen as N	< 1.00	mg/kg	3705	10/14/02	22:30

* = Value outside Laboratory historical or method prescribed QC limits.

End of Report for Project 304553

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ENVIRONMENTAL STRATEGIES
ELISA GROSS
MOON TOWNSHIP, PA 15108

This report includes the analytical certificates of analysis for all samples listed below. These samples relate to your project 138055 FMC-SCOTTSVILLE. The Laboratory Project number is 305037. This is a duplicate copy of the original report.

Sample Identification	Lab Number	Collection Date
EQBLK5	02-A169287	10/15/02
PHASE IV WATER	02-A169288	10/14/02
SB-59-1	02-A169289	10/10/02
SB-59-2	02-A169290	10/10/02
SB-60-1	02-A169291	10/14/02
SB-60-2	02-A169292	10/14/02
SB-60-3	02-A169293	10/14/02
SB-61-1	02-A169294	10/14/02
SB-61-2	02-A169295	10/14/02
SB-61-3	02-A169296	10/14/02
SB-61-4	02-A169297	10/14/02
SB-61-5	02-A169298	10/14/02
SB-62-1	02-A169299	10/14/02
SB-62-2	02-A169300	10/14/02
SB-62-3	02-A169301	10/14/02
SB-62-4	02-A169302	10/14/02
PHASE IV SOIL	02-A169303	10/14/02

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Sample Identification	Lab Number	Collection Date

These results relate only to the items tested.
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Report Approved By: Report Date: 10/25/02

Paul E. Lane, Jr., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Serv.
Eric S. Smith, Assistant Technical Director
Mark D. Hollingsworth, Project Management
Gail A. Lage, Technical Serv.
Glenn L. Norton, Technical Serv.
Kelly S. Comstock, Technical Serv.
Pamela A. Langford, Technical Serv.

Laboratory Certification Number: 90038

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169287
Sample ID: EQBLK5
Sample Type: Ground water
Site ID:

Date Collected: 10/15/02
Time Collected: 9:00
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
METALS									
Arsenic	< 0.0050	mg/l	0.0050	1	10/17/02	11:28	G.McCord	6010B	7928

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169288
Sample ID: PHASE IV WATER
Sample Type: Ground water
Site ID:

Date Collected: 10/14/02
Time Collected: 17:30
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
MISCELLANEOUS CHEMISTRY									
Reactive Cyanide	< 50.0	mg/kg	50.0	1	10/15/02	19:30	S. Prayter	SW-846	6722
Reactive Sulfide	< 100.	mg/kg	100.	1	10/15/02	19:30	S. Prayter	SW-846	6722
MISCELLANEOUS CHEMISTRY									
Corrosivity	Not Corrosive				10/18/00	3:15	T. Beverly	1110	9205
Ignitability	not ignitable up to 200f				10/18/02	11:10	T. Beverly	1010M	8940

TCLP Results

Analyte	Result	Units	Reg Limit	Matrix Spike Recovery (%)	Date	Method
Arsenic	< 0.100	mg/l	5.0	92	10/21/02	6010B
Barium	< 1.00	mg/l	100	100	10/21/02	6010B
Cadmium	< 0.100	mg/l	1.0	88	10/21/02	6010B
Chromium	< 0.500	mg/l	5.0	85	10/21/02	6010B
Lead	< 0.500	mg/l	5.0	87	10/21/02	6010B
Mercury	< 0.0100	mg/l	0.2	86	10/21/02	7470A
Selenium	< 0.100	mg/l	1.0	97	10/21/02	6010B
Silver	< 0.100	mg/l	5.0	109	10/21/02	6010B
Benzene	< 0.0200	mg/l	0.5	108	10/24/02	8260
Carbon tetrachloride	< 0.0200	mg/l	0.5	106	10/24/02	8260
Chlorobenzene	< 0.0200	mg/l	100	98	10/24/02	8260
Chloroform	< 0.0200	mg/l	6.0	106	10/24/02	8260
1,2-Dichloroethane	< 0.0200	mg/l	0.5	102	10/24/02	8260
1,1-Dichloroethene	< 0.0200	mg/l	0.7	108	10/24/02	8260

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A169288
Sample ID: PHASE IV WATER
Project: 138055

TCLP Results

Analyte	Result	Units	Reg Limit	Matrix Spike Recovery (%)	Date	Method
Methylethylketone	< 0.100	mg/l	200	99	10/24/02	8260
Tetrachloroethene	< 0.0200	mg/l	0.7	102	10/24/02	8260
Trichloroethene	< 0.0200	mg/l	0.5	108	10/24/02	8260
Vinyl Chloride	< 0.0200	mg/l	0.2	96	10/24/02	8260
TCLP Extraction	Initiated				10/17/02	1311
Zero Headspace Extraction	Initiated				10/17/02	1311

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	88.	73. - 133.
VOA Surr Toluene-d8	92.	80. - 121.
VOA Surr, 4-BFB	90.	80. - 128.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
Flash point/ignitability reported to the nearest 10 deg F.
Reactivity results reported from Total Determination Methods 9012 & 9034.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169289
Sample ID: SB-59-1
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 14:30
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	54.3	mg/kg	0.99	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169290
Sample ID: SB-59-2
Sample Type: Soil
Site ID:

Date Collected: 10/10/02
Time Collected: 14:35
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	14.4	mg/kg	0.99	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169291
Sample ID: SB-60-1
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 12:40
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	28.7	mg/kg	0.96	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169292
Sample ID: SB-60-2
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 12:45
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	26.1	mg/kg	0.99	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169293
Sample ID: SB-60-3
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 12:55
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	16.1	mg/kg	0.97	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169294
Sample ID: SB-61-1
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 14:10
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	16.8	mg/kg	0.97	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169295
Sample ID: SB-61-2
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 14:15
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	24.4	mg/kg	0.97	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169296
Sample ID: SB-61-3
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 14:20
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	43.8	mg/kg	0.96	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Lab Number: 02-A169297
Sample ID: SB-61-4
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 14:25
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	11.0	mg/kg	0.95	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169298
Sample ID: SB-61-5
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 14:30
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	12.4	mg/kg	0.96	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169299
Sample ID: SB-62-1
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 15:00
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	54.8	mg/kg	0.97	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169300
Sample ID: SB-62-2
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 15:05
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	7.51	mg/kg	0.99	1	10/16/02	17:07	C.Johnson	6010B	6872

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169301
Sample ID: SB-62-3
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 15:10
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	23.4	mg/kg	0.98	1	10/16/02	17:07	C.Johnson	6010B	687[illegible]

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169302
Sample ID: SB-62-4
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 15:15
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS									
Arsenic	13.4	mg/kg	0.97	1	10/16/02	17:07	C.Johnson	6010B	5372

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
All results reported on a wet weight basis.

End of Sample Report.

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ANALYTICAL REPORT

ENVIRONMENTAL STRATEGIES 9712
ELISA GROSS
300 CORPORATE CENTER DR STE200
MOON TOWNSHIP, PA 15108

Project: 138055
Project Name: FMC-SCOTTSVILLE
Sampler: ERIN HUNTLEY

Lab Number: 02-A169303
Sample ID: PHASE IV SOIL
Sample Type: Soil
Site ID:

Date Collected: 10/14/02
Time Collected: 17:40
Date Received: 10/15/02
Time Received: 11:00
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
GENERAL CHEMISTRY PARAMETERS									
pH	6.60	pH units			10/20/02	13:40	S. Self	9013	9561
Ignitability	not ignitable up to 200f				10/19/02	9:50	T. Beverly	1010M	9293
Reactive Cyanide	< 50.0	mg/kg	50.0	1	10/15/02	19:30	S. Prayter	SW-846	6722
Reactive Sulfide	< 100.	mg/kg	100.	1	10/15/02	19:30	S. Prayter	SW-846	6722

TCLP Results

Analyte	Result	Units	Reg Limit	Matrix Spike Recovery (%)	Date	Method
Arsenic	< 0.100	mg/l	5.0	92	10/21/02	6010B
Barium	< 1.00	mg/l	100	100	10/21/02	6010B
Cadmium	< 0.100	mg/l	1.0	88	10/21/02	6010B
Chromium	< 0.500	mg/l	5.0	85	10/21/02	6010B
Lead	< 0.500	mg/l	5.0	87	10/21/02	6010B
Mercury	< 0.0100	mg/l	0.2	86	10/21/02	7470A
Selenium	< 0.100	mg/l	1.0	97	10/21/02	6010B
Silver	< 0.100	mg/l	5.0	109	10/21/02	6010B
Benzene	< 0.0200	mg/l	0.5	96	10/21/02	8260
Carbon tetrachloride	< 0.0200	mg/l	0.5	96	10/21/02	8260
Chlorobenzene	< 0.0200	mg/l	100	90	10/21/02	8260
Chloroform	< 0.0200	mg/l	6.0	100	10/21/02	8260
1,2-Dichloroethane	< 0.0200	mg/l	0.5	98	10/21/02	8260
1,1-Dichloroethene	< 0.0200	mg/l	0.7	100	10/21/02	8260

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 02-A169303
Sample ID: PHASE IV SOIL
Project: 138055

TCLP Results

Analyte	Result	Units	Reg Limit	Matrix Spike Recovery (%)	Date	Method
Methylethylketone	< 0.100	mg/l	200	574	10/21/02	8260
Tetrachloroethene	< 0.0200	mg/l	0.7	96	10/21/02	8260
Trichloroethene	< 0.0200	mg/l	0.5	96	10/21/02	8260
Vinyl Chloride	< 0.0200	mg/l	0.2	94	10/21/02	8260
TCLP Extraction	Initiated				10/17/02	1311
Zero Headspace Extraction	Initiated				10/17/02	1311

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	104.	73. - 133.
VOA Surr Toluene-d8	96.	80. - 121.
VOA Surr, 4-BFB	86.	80. - 128.

LABORATORY COMMENTS:

ND = Not detected at the limit of detection
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
Flash point/ignitability reported to the nearest 10 deg F.
All results reported on a wet weight basis.
Reactivity results reported from Total Determination Methods 9012 & 9034.

End of Sample Report.

TestAmerica
INCORPORATED

PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 1
Laboratory Receipt Date: 10/15/02

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
VOA PARAMETERS								
Benzene	mg/l	< 0.0200	0.480	0.500	96	78. - 132.	1467	02-A170306
Benzene	mg/l	< 0.0200	0.540	0.500	108	78. - 132.	3758	02-A169288
Carbon tetrachloride	mg/l	< 0.0200	0.480	0.500	96	64. - 146.	1467	02-A170306
Carbon tetrachloride	mg/l	< 0.0200	0.530	0.500	106	64. - 146.	3758	02-A169288
Chlorobenzene	mg/l	< 0.0200	0.450	0.500	90	79. - 124.	1467	02-A170306
Chlorobenzene	mg/l	< 0.0200	0.490	0.500	98	79. - 124	3758	02-A169288
Chloroform	mg/l	< 0.0200	0.500	0.500	100	73. - 133.	1467	02-A170306
Chloroform	mg/l	< 0.0200	0.530	0.500	106	73. - 133	3758	02-A169288
1,2-Dichloroethane	mg/l	< 0.0200	0.490	0.500	98	70. - 140.	1467	02-A170306
1,2-Dichloroethane	mg/l	< 0.0200	0.510	0.500	102	70. - 140.	3758	02-A169288
1,1-Dichloroethene	mg/l	< 0.0200	0.500	0.500	100	68. - 141.	1467	02-A170306
1,1-Dichloroethene	mg/l	< 0.0200	0.540	0.500	108	68. - 141.	3758	02-A169288
Methylethylketone	mg/l	< 0.100	2.87	2.50	115	69. - 142.	1467	02-A170306
Methylethylketone	mg/l	< 0.100	2.48	2.50	99	69. - 142.	3758	02-A169288
Tetrachloroethene	mg/l	< 0.0200	0.480	0.500	96	72. - 136.	1467	02-A170306
Tetrachloroethene	mg/l	< 0.0200	0.510	0.500	102	72. - 136.	3758	02-A169288
Trichloroethene	mg/l	< 0.0200	0.480	0.500	96	73. - 137.	1467	02-A170306
Trichloroethene	mg/l	< 0.0200	0.540	0.500	108	73. - 137.	3758	02-A169288
Vinyl Chloride	mg/l	< 0.0200	0.470	0.500	94	52. - 156.	1467	02-A170306
Vinyl Chloride	mg/l	< 0.0200	0.480	0.500	96	52. - 156.	3758	02-A169288

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 2
Laboratory Receipt Date: 10/15/02

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
METALS								
Arsenic	mg/l	< 0.0050	0.0640	0.0500	128#	80 - 120	7928	Duplicate
Arsenic	mg/kg	12.4	160.	200.	74#	80 - 120	6872	02-A169298
Arsenic	mg/l	< 0.100	9.18	10.0	92	80 - 120	8867	Duplicate
Barium	mg/l	< 1.00	99.7	100.	100	80 - 120	8867	Duplicate
Cadmium	mg/l	< 0.100	8.80	10.0	88	80 - 120	8867	Duplicate
Chromium	mg/l	< 0.500	42.6	50.0	85	80 - 120	8867	Duplicate
Lead	mg/l	< 0.500	43.6	50.0	87	80 - 120	8867	Duplicate
Mercury	mg/l	< 0.0100	0.860	1.00	86	80 - 120	8753	02-A169462
Selenium	mg/l	< 0.100	9.74	10.0	97	80 - 120	8867	Duplicate
Silver	mg/l	< 0.100	10.9	10.0	109	80 - 120	8867	Duplicate

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
MISC PARAMETERS								
Reactive Cyanide	mg/kg	< 50.0	210.	200.	105	10 - 120	6722	02-A169288
Reactive Cyanide	mg/kg	< 50.0	211.	200.	106	10 - 120	6722	02-A169288
Reactive Sulfide	mg/kg	< 100.	464.	400.	116	10 - 120	6722	02-A169288

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 3
Laboratory Receipt Date: 10/15/02

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for MS/MSD analysis for that method and the method requirements for MS/MSD analysis could not be met.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
Reactive Sulfide	mg/kg	< 100.	470.	400.	118	10 - 120	6722	02-A169288

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
VOA PARAMETERS						
Benzene	mg/l	0.480	0.500	4.08	15.	1467
Benzene	mg/l	0.540	0.580	7.14	15.	3758
Carbon tetrachloride	mg/l	0.480	0.500	4.08	21.	1467
Carbon tetrachloride	mg/l	0.530	0.550	3.70	21.	3758
Chlorobenzene	mg/l	0.450	0.460	2.20	16.	1467
Chlorobenzene	mg/l	0.490	0.520	5.94	16.	3758
Chloroform	mg/l	0.450	0.500	10.53	20.	1467
Chloroform	mg/l	0.530	0.570	7.27	20.	3758
1,2-Dichloroethane	mg/l	0.490	0.490	0.00	16.	1467
1,2-Dichloroethane	mg/l	0.510	0.550	7.55	16.	3758
1,1-Dichloroethene	mg/l	0.500	0.500	0.00	19.	1467
1,1-Dichloroethene	mg/l	0.540	0.600	10.53	19.	3758
Methylethylketone	mg/l	2.87	2.68	6.85	21.	1467
Methylethylketone	mg/l	2.48	2.75	10.32	21.	3758
Tetrachloroethene	mg/l	0.480	0.490	2.06	23.	1467
Tetrachloroethene	mg/l	0.510	0.520	1.94	23.	3758
Trichloroethene	mg/l	0.480	0.480	0.00	20.	1467
Trichloroethene	mg/l	0.540	0.590	8.85	20.	3758
Vinyl Chloride	mg/l	0.470	0.460	2.15	28.	1467
Vinyl Chloride	mg/l	0.480	0.510	6.06	28.	3758

Project QC continued . . .

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ROJECT QUALITY CONTROL DATA
roject Number: 138055
roject Name: FMC-SCOTTSVILLE
age: 4
aboratory Receipt Date: 10/15/02

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
METALS						
Arsenic	mg/l	0.0640	0.0580	9.84	20	7928
Arsenic	mg/kg	160.	161.	0.62	20	6872
Arsenic	mg/l	9.18	9.29	1.19	20	8867
Barium	mg/l	99.7	95.2	4.62	20	8867
Cadmium	mg/l	8.80	8.96	1.80	20	8867
Chromium	mg/l	42.6	43.5	2.09	20	8867
Lead	mg/l	43.6	44.4	1.82	20	8867
Mercury	mg/l	0.860	0.880	2.30	20	8753
Selenium	mg/l	9.74	9.88	1.43	20	8867
Silver	mg/l	10.9	10.3	5.66	20	8867

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
MISC PARAMETERS						
Reactive Cyanide	mg/kg	210.	211.	0.48	20	6722
Reactive Sulfide	mg/kg	464.	470.	1.28	20	6722

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
VOA PARAMETERS						
Benzene	mg/l	0.0500	0.0510	102	78 - 127	1467
Benzene	mg/l	0.0500	0.0550	110	78 - 127	3758
Carbon tetrachloride	mg/l	0.0500	0.0510	102	69 - 132	1467

Project QC continued . . .

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'ROJECT QUALITY CONTROL DATA
'roject Number: 138055
'roject Name: FMC-SCOTTSVILLE
'age: 5
aboratory Receipt Date: 10/15/02

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Carbon tetrachloride	mg/l	0.0500	0.0560	112	69 - 132	3758
Chlorobenzene	mg/l	0.0500	0.0490	98	81 - 120	1467
Chlorobenzene	mg/l	0.0500	0.0510	102	81 - 120	3758
Chloroform	mg/l	0.0500	0.0530	106	77 - 125	1467
Chloroform	mg/l	0.0500	0.0570	114	77 - 125	3758
1,2-Dichloroethane	mg/l	0.0500	0.0520	104	71 - 135	1467
1,2-Dichloroethane	mg/l	0.0500	0.0570	114	71 - 135	3758
1,1-Dichloroethene	mg/l	0.0500	0.0470	94	72 - 128	1467
1,1-Dichloroethene	mg/l	0.0500	0.0520	104	72 - 128	3758
Methylethylketone	mg/l	0.250	0.316	126	75 - 140	1467
Methylethylketone	mg/l	0.250	0.255	102	75 - 140	3758
Tetrachloroethene	mg/l	0.0500	0.0520	104	76 - 123	1467
Tetrachloroethene	mg/l	0.0500	0.0500	100	76 - 123	3758
Trichloroethene	mg/l	0.0500	0.0500	100	78 - 125	1467
Trichloroethene	mg/l	0.0500	0.0620	124	78 - 125	3758
Vinyl Chloride	mg/l	0.0500	0.0470	94	61 - 140	1467
Vinyl Chloride	mg/l	0.0500	0.0480	96	61 - 140	3758

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
METALS						
Arsenic	mg/l	0.0500	0.0550	110	80 - 120	7928
Arsenic	mg/kg	200.	206.	103	80 - 120	6872
Arsenic	mg/l	1.00	0.897	90	80 - 120	8867
Barium	mg/l	10.0	9.71	97	80 - 120	8867
Cadmium	mg/l	1.00	0.891	89	80 - 120	8867
Chromium	mg/l	5.00	4.43	89	80 - 120	8867
Lead	mg/l	5.00	4.49	90	80 - 120	8867

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 6
Laboratory Receipt Date: 10/15/02

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Mercury	mg/l	0.100	0.110	110	85 - 115	8753
Selenium	mg/l	1.00	0.942	94	80 - 120	8867
Silver	mg/l	1.00	0.997	100	80 - 120	8867

Continuing Calibration Verification

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
METALS						

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
MISC PARAMETERS						
Reactive Cyanide	mg/kg	200.	191.	96	10 - 120	6722
Reactive Sulfide	mg/kg	400.	400.	100	10 - 120	6722

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
VOA PARAMETERS					
Benzene	< 0.00200	mg/l	1467	10/21/02	19:28
Benzene	< 0.00200	mg/l	3758	10/24/02	21:03
Carbon tetrachloride	< 0.00200	mg/l	1467	10/21/02	19:28
Carbon tetrachloride	< 0.00200	mg/l	3758	10/24/02	21:03
Chlorobenzene	< 0.00200	mg/l	1467	10/21/02	19:28

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 7
Laboratory Receipt Date: 10/15/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
Chlorobenzene	< 0.00200	mg/l	3758	10/24/02	21:03
Chloroform	0.00300	mg/l	1467	10/21/02	19:28
Chloroform	0.00200	mg/l	3758	10/24/02	21:03
1,2-Dichloroethane	< 0.00200	mg/l	1467	10/21/02	19:28
1,2-Dichloroethane	< 0.00200	mg/l	3758	10/24/02	21:03
1,1-Dichloroethene	< 0.00200	mg/l	1467	10/21/02	19:28
1,1-Dichloroethene	< 0.00200	mg/l	3758	10/24/02	21:03
Methylethylketone	< 0.0100	mg/l	1467	10/21/02	19:28
Methylethylketone	< 0.0100	mg/l	3758	10/24/02	21:03
Tetrachloroethene	< 0.00200	mg/l	1467	10/21/02	19:28
Tetrachloroethene	< 0.00200	mg/l	3758	10/24/02	21:03
Trichloroethene	< 0.00200	mg/l	1467	10/21/02	19:28
Trichloroethene	< 0.00200	mg/l	3758	10/24/02	21:03
Vinyl Chloride	< 0.00200	mg/l	1467	10/21/02	19:28
Vinyl Chloride	< 0.00200	mg/l	3758	10/24/02	21:03
VOA Surr 1,2-DCA-d4	97.	% Rec	1467	10/21/02	19:28
VOA Surr 1,2-DCA-d4	89.	% Rec	3758	10/24/02	21:03
VOA Surr Toluene-d8	94.	% Rec	1467	10/21/02	19:28
VOA Surr Toluene-d8	93.	% Rec	3758	10/24/02	21:03
VOA Surr, 4-BFB	89.	% Rec	1467	10/21/02	19:28
VOA Surr, 4-BFB	87.	% Rec	3758	10/24/02	21:03

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
METALS					
Arsenic	< 0.0049	mg/l	7928	10/17/02	11:28
Arsenic	< 0.88	mg/kg	6872	10/16/02	17:07
Arsenic	< 0.100	mg/l	8867	10/21/02	23:47

Project QC continued . . .

TestAmerica
INCORPORATED

PROJECT QUALITY CONTROL DATA
Project Number: 138055
Project Name: FMC-SCOTTSVILLE
Page: 8
Laboratory Receipt Date: 10/15/02

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
Barium	< 1.00	mg/l	8867	10/21/02	23:47
Cadmium	< 0.100	mg/l	8867	10/21/02	23:47
Chromium	< 0.500	mg/l	8867	10/21/02	23:47
Lead	< 0.500	mg/l	8867	10/21/02	23:47
Mercury	< 0.0100	mg/l	8753	10/21/02	13:31
Selenium	< 0.100	mg/l	8867	10/21/02	23:47
Silver	< 0.100	mg/l	8867	10/21/02	23:47

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
MISC PARAMETERS					
Reactive Cyanide	< 50.0	mg/kg	6722	10/15/02	19:30
Reactive Sulfide	< 100.	mg/kg	6722	10/15/02	19:30

= Value outside Laboratory historical or method prescribed QC limits.

End of Report for Project 305037

JUL 31 2000

Orig

COPY

ESC

ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West • Suite 315 • Pittsburgh, Pennsylvania 15276 • (412) 787-5100 • Fax (412) 787-8065

July 26, 2000

Mr. Michael V. Welch, P.E.
Commonwealth of Kentucky
Department of Environmental Protection
Hazardous Waste Branch
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

Re: April through June 2000 RFI Progress Report (2nd Quarter 2000)
Federal-Mogul Corporation, Scottsville, Kentucky
I.D. No. KYD 005 458401

Dear Mr. Welch:

This progress report provides a summary of activities performed from April 1 through June 30, 2000, as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) being conducted at the Federal-Mogul Corporation (Federal-Mogul) facility located in Scottsville, Kentucky. This progress report is submitted in response to Agreed Order (AO) DWM 89098, signed July 24, 1991, between the Kentucky Department for Environmental Protection (KDEP) and Cooper Industries, Federal-Mogul's predecessor. In accordance with the RFI Work Plan, approved by KDEP on August 28, 1998, quarterly RFI progress reports will be submitted to KDEP during May, July, and October 2000, and January 2001 describing RFI activities performed during 2000.

Summary of RFI activities performed during the period of April 1 through June 30, 2000, include:

- April 11, 2000, onsite meeting with KDEP, Federal-Mogul, and Environmental Strategies Corporation (ESC) representatives to discuss proposed RFI Phase II Work Plan and site activities
- May 3, 2000, quarterly RFI progress report (1st quarter 2000) submitted to KDEP in accordance with AO and approved RFI Work Plan
- May 18, 2000, RFI Phase II Work Plan submitted to KDEP
- KDEP letter dated May 25, 2000, approving the May 18, 2000, RFI Phase II Work Plan submitted by ESC, on behalf of Federal-Mogul
- June 26 through June 29, 2000, ESC implemented the KDEP approved RFI Phase II Work Plan and began initial data compilation and evaluation

Work Accomplished

During the period April 1 through June 30, 2000, Federal-Mogul conducted the described activities in accordance with the approved RFI Work Plan. These efforts are described in the subsections below.

Agency Contacts and Meetings

On April 11, 2000, KDEP, Federal-Mogul, and ESC representatives met at the Scottsville, Kentucky facility to discuss the RFI at the Scottsville facility. Topics discussed included; the completed RFI Phase I soil and groundwater investigations, the submitted RFI Phase I Report, Federal-Mogul's proposed Phase II soil investigation activities, and overall future project planning.

During April 1 through June 30, 2000, ESC on behalf of Federal-Mogul, conducted several telephone discussions with Bart Schaffer, KDEP project manager, regarding scheduling of the April 11, 2000, onsite meeting, preparation and finalization of the RFI Phase II Work Plan, his comments regarding the Phase II Work Plan, and the proposed RFI Phase II investigation schedule.

On June 27, 2000, Bart Schaffer visited the Scottsville facility during the Phase II subsurface soil investigation performed by ESC. Mr. Schaffer observed the completion of several soil borings, collection of subsurface soil samples, drilling procedures, and decontamination techniques during the site visit. Mr. Schaffer subsequently requested that upon completion of the June 2000 soil sampling activities, a copy of a site map showing the previous Phase I and the June 2000 Phase II boring locations be forwarded to KDEP.

Apart from a phone call on June 30, 2000, indicating that ESC was forwarding a copy of the boring location map to Mr. Schaffer, no other meetings or telephone conversations were held between KDEP, Federal-Mogul, or ESC during the period April 1 through June 30, 2000.

Document Submission

On May 3, 2000, ESC on behalf of Federal-Mogul, submitted to KDEP and the Environmental Protection Agency (EPA), a RFI progress report covering the period of January 1 through March 31, 2000 (1st quarter 2000), in accordance with the AO and the KDEP approved RFI Phase I Work Plan.

On May 18, 2000, ESC on behalf of Federal Mogul, submitted to KDEP and EPA, a RFI Phase II Work Plan. This work plan was prepared in response to KDEP comments, dated March 9, 2000 regarding the RFI Phase I Report submitted by ATC Associates, Inc. (ATC) dated February 8, 2000. The RFI Phase II Work Plan included a proposal for additional subsurface soil investigation as requested in KDEP's March 8, 2000, correspondence.

On May 31, 2000, Federal-Mogul received KDEP's approval letter, dated May 25, 2000, for the RFI Phase II Work Plan submitted to KDEP on May 18, 2000. The RFI Phase II Work Plan was approved by KDEP with no comments requiring any changes.

Apart from the boring location map forwarded to Bart Schaffer on June 30, 2000, no other documents were submitted to KDEP regarding the RFI during the reporting period.

Field Activities

Between June 26 and June 29, 2000, ESC on behalf of Federal-Mogul, implemented the KDEP approved RFI Phase II Work Plan at the Scottsville, Kentucky facility. The approved Phase II investigation included the completed of 24 onsite soil borings and the collection of 73 at-depth soil samples, one surface soil sample, and one groundwater sample for analysis. Selected soil

samples collected during the Phase II investigation were forwarded to the analytical laboratory for volatile organic compound (VOC), total metals (including zinc), cyanide, total organic carbon (TOC), and cation exchange capacity (CEC) analyses, in accordance with the KDEP approved Phase II Work Plan. In addition, selected surface soil and groundwater samples were collected and analyzed for ammonia.

No other field activities were performed by Federal-Mogul or ESC during the period April 1 through June 30, 2000.

Result of Sampling and Testing

Analytical data for soil samples collected by ESC during the June 2000 RFI Phase II subsurface investigation were submitted to TestAmerica, Inc. (TAI) laboratories in Nashville, Tennessee. Selected Phase II soil samples were analyzed for VOC's, total metals, cyanide, TOC, and CEC in accordance with the KDEP approved RFI Phase II Work Plan. Federal-Mogul and ESC expect to receive the analytical data for the Phase II soil samples from TAI during early August 2000. On receipt of the analytical data, ESC will perform quality assurance/quality control (QA/QC) procedures on the soil data. On completion of the QA/QC procedures, the Phase II soil data will be placed in data tables and submitted to KDEP in accordance with the approved RFI Phase II Work Plan. The Phase II soil data will be discussed between KDEP, Federal-Mogul, and ESC representatives to determine whether additional soil, and possibly groundwater, investigations are necessary to delineate the extent of constituents of concern at the Scottsville facility.

No other field activities were performed by Federal-Mogul or ESC during the period April 1 through June 30, 2000.

Work Planned

During the third quarter of 2000, Federal-Mogul and ESC will perform RFI Phase II activities including:

- QA/QC of the soil and groundwater samples collected during the Phase II field activities
- preparation and submittal of Phase II soil data to KDEP
- conduct a conference call or an onsite meeting between KDEP, Federal-Mogul, and ESC representatives to discuss the RFI Phase II soil data to determine if additional subsurface investigations (i.e., soil or groundwater) are necessary to further characterize subsurface conditions at the site
- preparation and submittal of the second quarter 2000 RFI progress report to KDEP and EPA
- initial preparation of the RFI Phase II Report if KDEP determines that the Phase II soil data sufficiently characterizes the site. If the data suggests that additional soil or groundwater investigations are warranted at the Scottsville facility, the Phase II Report will not be completed at this time
- perform additional onsite soil and groundwater investigations, if deemed necessary

No other activities associated with the KDEP approved RFI Phase II Work Plan are planned during the third quarter of 2000.

Schedule

A schedule of the Phase II RFI activities to be conducted at the Scottsville facility was included in the KDEP approved RFI Phase II Work Plan. In accordance with the KDEP approved Phase II Work Plan, the next scheduled deliverable is submittal of the second quarter 2000 progress report by July 31, 2000. Future RFI progress reports will be submitted to KDEP in accordance with the AO and the RFI Phase II schedule. The next quarterly progress report will be submitted during October 2000 covering the 3rd quarter 2000 period from July 1 through September 30, 2000.

The Phase II analytical soil data will be submitted to KDEP on or before September 6, 2000. A conference call or site visit between KDEP, Federal-Mogul, and ESC representatives will be held during September 2000 to discus the Phase II RFI soil results, and to determine whether additional subsurface soil or groundwater investigations are warranted.

Difficulties Encountered and Resolution

No difficulties were encountered with respect to the RFI Phase II subsurface soil investigation or RFI activities being conducted at the Scottsville facility during the period April 1 through June 30, 2000.

Project Management

There were no changes in project management or organization at Federal-Mogul or ESC during the second quarter 2000.

Should you have any questions or comments related to this second quarter 2000 RFI progress report, please do not hesitate to contact me at (412) 787-5100.

Sincerely yours,

Michael Riggins/lmk

E. Michael Riggins, P.G.
Project Manager

EMR:lmk
docs/Federal Mogul/138055/Progress Reports/July00ScottsvillePR.doc

cc: Caron Falconer, U.S. Environmental Protection Agency, Region IV, Atlanta, Georgia
Dale Burton, KDEP, Hazardous Waste Branch, Frankfort, KY
Bart Schaffer, KDEP, Hazardous Waste Branch, Frankfort, KY
Terry Rife, Federal-Mogul Corporation, Southfield, MI

SEP 0 4 1998

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
14 REILLY RD
FRANKFORT KY 40601-1190

August 27, 1998

Mr. Richard Uber
Cooper Industries, Inc.
600 Travis Street, Suite 5800
Houston, TX 77002

RE: Approval of RFI Work Plan, Plant #1
Kirsch/Scottscraft Plant #1
Scottsville, Allen County, KY
EPA ID #KYD 005 458 401

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have reviewed the RCRA Facility Investigation (RFI) Work Plan and subsequent amendments dated March 15, 1996 and May 29, 1998. The RFI Work Plan is hereby conditionally approved. The conditions of approval are as follows:

1) Because the waste material has not been removed, sampling must be conducted inside all seven pits. Samples should be obtained in the waste material and in native materials immediately below the bottom of the sludge waste to determine the concentrations of hazardous materials in the waste and if any migration has occurred below the waste. As sampling is already proposed in two of the pits, this entails conducting five additional borings.

2) Cooper Industries may want to consider running analysis on all the perimeter borings for antimony, arsenic, chromium, copper, cyanide, lead, nickel and zinc as opposed to the now proposed zinc and cyanide. This may help avoid the need for re-sampling and its associated costs in the future should the waste be found to contain elevated concentrations of these constituents and the subsequent need for determining the extent of their distribution.

3) Decontamination procedures were not included within the RFI Work Plan. Augers and spoons from the drill rig should be decontaminated upon arriving at the facility and before conducting sampling at each new sampling location. Decontamination should consist of a washing with alconox and water (while brushing to get visible material off), rinsing with water, rinsing with dilute HCl (diluted with distilled water) and allowing to air dry or rinsing with organic-free water.

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4) Cooper or its appointed entity shall contact KDWM personnel a minimum of 10 days before conducting sampling activities at the facility. KDWM personnel must be provided the opportunity to be present during investigatory activities.

During past correspondence we have indicated that a dye trace and groundwater monitoring will not be required at this time. We do feel that it would be appropriate to proceed with the installation of the proposed piezometers to determine whether a shallow, soil-bedrock interface type aquifer exists in the vicinity of the SWMUs. After analytical soil data has been collected, the depth to bedrock determined, and the presence or absence of a shallow soil-bedrock interface type aquifer discerned, we can make a more appropriate decision as to whether more extensive groundwater studies and sampling need to be conducted in the area.

Investigatory activities and reporting should proceed as outlined in the RFI Work Plan schedule. If you have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Caron Falconer, U.S. EPA, Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #93-1044

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

WASTE MANAGEMENT DIVISION
FEB 25 1 07 PM '97
I.O.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

February 13, 1997

Mr. Richard H. Uber
Manager, Field Operations
Environmental Affairs
Cooper Industries
P.O. Box 4446
Houston, TX 77210

RE: Confirmatory Sampling Report
Scottscraft/Kirsch Plant II
Cooper Industries
Scottsville, KY
EPA I.D. #KYD 005 458 401

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have reviewed the Confirmatory Sampling Report for the Cooper Industries, Scottsville, KY plant received on November 1, 1996. The report presents the findings of analyses performed on twelve soil samples derived from six borings outside of SWMU #9 (indoor paint storage area).

Xylene was detected at concentrations slightly above 1.0 ppm in all three samples taken from the 3.0 to 5.0 depth interval directly adjacent to the building. Several other constituents were also detected (2-propanol, toluene, and methanol) at concentrations of 1.0 ppm or lower in these and several of the other samples. While the presence of Total Petroleum Hydrocarbons (TPH) is inconclusive, they were confirmed to exist above 10.0 ppm in two of the same samples in which xylene was detected.

The purpose of confirmatory sampling is to determine whether or not a release has occurred from a SWMU or SWMUs. Because contamination has been detected in the sampling area, albeit at low concentrations, the true significance of the release and the hazards it poses, if any, cannot be assessed until the full extent of the release has been determined. As a result, Cooper Industries should prepare and submit an RFI Work Plan for this SWMU area. The RFI Work Plan should specify, but not be limited to, how and where additional sampling in the area will be conducted.

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KDWM recommends that further sampling in the vicinity be conducted via split spoon, cone penetrometer, or other method which enables samples to be extracted quickly and somewhat intact. During the confirmatory sampling, soils were encountered which were so cohesive that they could not be removed from the hand auger quickly or in large portions. Because this may have increased chances for volatilization, contaminant levels in soils analyzed may have actually been higher than reflected by laboratory analysis. Utilizing a sampling method which can enable quick and intact samples to be taken may provide more accurate results.

The requested RFI Work Plan should be submitted by May 13, 1997. To help expedite communication in the future, KDWM requests an updated phone number at which you may be reached. When attempting to reach you about these issues recently by phone, Bart Schaffer found your latest available number to be out of service. If you should have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Narindar Kumar, U.S. EPA, Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Enforcement Branch
Pending File #93-1044

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

October 16, 1997

Mr. Richard Uber
Cooper Industries, Inc.
600 Travis Street-Suite 5800
Houston, TX 77002

RE: RFI Work Plan Approval
Kirsch/Scottscraft Plant #2
Scottsville, Allen County, KY
EPA I.D. #KYD 005 458 401

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have completed a review of the RFI Work Plan responses to the Notice of Deficiency (NOD) dated July 14, 1997. The responses, dated August 12 and September 8, 1997, have adequately addressed issues presented in the NOD. Therefore, the RFI Work Plan for Plant #2 is approved. Field investigations and reporting should proceed as outlined in the RFI Work Plan.

If you should have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Caron Falconer, U.S. EPA Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #93-1044

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Date Form Completed 10/14/97

October 1996

Supervisor's Initials

CORRECTIVE ACTION
HAZARDOUS WASTE FACILITY MANAGEMENT STATUS SHEET

EPA ID#: KY KYD 005 458 401 COUNTY: ALLEN

FACILITY NAME: COOPER INDUSTRIES REVIEWER: BSC

INSTRUMENT INFORMATION

TYPE OF INSTRUMENT (PLEASE CIRCLE ONE OF THE FOLLOWING): (A) J, M, N, O, P, S, U, V, Z

RESPONSIBLE AGENCY: S EFFECTIVE DATE: 7 / 24 / 91 (MM/DD/YY) ISSUE DATE: 7 / 24 / 91 (MM/DD/YY)

LEGAL AUTHORITY (PLEASE CIRCLE ONE OF THE FOLLOWING): (A) B, E, F, G, U

LEGAL CITATION (ENTER ONLY IF LEGAL AUTHORITY EQUALS U): _____

AREA INFORMATION

AREA DESCRIPTION (40 SPACES): ENTIRE FACILITY

AREA SEQUENCE NUMBER: _____ (ENTER SEQ# ONLY FOR A CHANGE OR DELETE)

AREA COMMENTS: _____

EVENT CODE	STATUS CODES (CIRCLE ONE)	DESCRIPTION	ACTUAL DATE
CA010		RFA Initiation (Letter/Questionnaire sent to Company)	
CA451		SWMU Questionnaire Received from Company	
CA453		Visual Site Inspection	
CA050	RF, PA	RFA Completed and sent to Facility	
CA461		Comments Received from Company on the RFA	
CA462		Response to Comments on the RFA	
CA060		Notice of Contamination	
CA070	YE, NO	Determination of Need for a RFI	
CA075	HI, ME, LO	CA Prioritization	

EVENT COMMENTS:

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

October 16, 1997

Mr. Richard Uber
Cooper Industries, Inc.
600 Travis Street-Suite 5800
Houston, TX 77002

RE: RFI Work Plan Approval
Kirsch/Scottscraft Plant #2
Scottsville, Allen County, KY
EPA I.D. #KYD 005 458 401

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have completed a review of the RFI Work Plan responses to the Notice of Deficiency (NOD) dated July 14, 1997. The responses, dated August 12 and September 8, 1997, have adequately addressed issues presented in the NOD. Therefore, the RFI Work Plan for Plant #2 is approved. Field investigations and reporting should proceed as outlined in the RFI Work Plan.

If you should have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Caron Falconer, U.S. EPA Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #93-1044

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Date Form Completed 10/14/97

Supervisor's Initials

October 1996

CORRECTIVE ACTION
HAZARDOUS WASTE FACILITY MANAGEMENT STATUS SHEET

EPA ID#: KY KY0 005 458 401 COUNTY: ALLEN

FACILITY NAME: COOPER INDUSTRIES REVIEWER: BSC

INSTRUMENT INFORMATION

TYPE OF INSTRUMENT (PLEASE CIRCLE ONE OF THE FOLLOWING): (A) J, M, N, O, P, S, U, V, Z

RESPONSIBLE AGENCY: S EFFECTIVE DATE: 7/24/91 (MM/DD/YY) ISSUE DATE: 7/24/91 (MM/DD/YY)

LEGAL AUTHORITY (PLEASE CIRCLE ONE OF THE FOLLOWING): (A) B, E, F, G, U

LEGAL CITATION (ENTER ONLY IF LEGAL AUTHORITY EQUALS U):

AREA INFORMATION

AREA DESCRIPTION (40 SPACES): ENTIRE FACILITY

AREA SEQUENCE NUMBER: _____ (ENTER SEQ# ONLY FOR A CHANGE OR DELETE)

AREA COMMENTS:

EVENT CODE	STATUS CODES (CIRCLE ONE)	DESCRIPTION	ACTUAL DATE
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CA462		Response to Comments on the RFA	
CA060		Notice of Contamination	
CA070	YE, NO	Determination of Need for a RFI	
CA075	HI, ME, LO	CA Prioritization	

EVENT COMMENTS:

EVENT CODE	STATUS CODES	DESCRIPTION	ACTUAL DATE
CA102		Confirmatory Sampling Required	
CA104		Confirmatory Sampling Work Plan Received	
CA105		Confirmatory Sampling Work Plan NOTI Issued	
CA106		Confirmatory Sampling Work Plan Approved	
CA107		Confirmatory Sampling Report Received	
CA108		Confirmatory Sampling Report Reviewed - NOTI Issued	
CA109		Confirmatory Sampling Completed Approved	

EVENT COMMENTS:

CA100	DC	RFI Imposition (may be part of Permit Compliance Schedule)	
CA110		RFI Work Plan Received	
CA140		RFI Work Plan NOTI Issued	
CA150		RFI Work Plan Approved	10/14/97
CA184		Draft RFI Report Received	
CA186		Draft RFI Report Reviewed NOTI Issued	
CA200		RFI Approved	

EVENT COMMENTS:
INDOOR DRUM STORAGE (SWMU #9)

CA225	YE, NF, IN, NR	Stabilization Measures Evaluation	
CA600	SR, EC, GW, OT	Stabilization Measures Implemented	
CA605		Stabilization Measures Implemented Voluntarily by Facility	
CA606		Interim Measures Imposition	
CA610		Interim Measures Work Plan Received	
CA620		Interim Measures Work Plan Reviewed-NOTI Issued	
CA630		Interim Measures Plan Approved	
CA650		Stabilization Construction Complete	

EVENT COMMENTS:

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

WASTE MANAGEMENT DIVISION
FEB 25 1 07 PM '97

I.O.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

February 13, 1997

Mr. Richard H. Uber
Manager, Field Operations
Environmental Affairs
Cooper Industries
P.O. Box 4446
Houston, TX 77210

RE: Confirmatory Sampling Report
Scottscraft/Kirsch Plant II
Cooper Industries
Scottsville, KY
EPA I.D. #KYD 005 458 401

Dear Mr. Uber:

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KDWM recommends that further sampling in the vicinity be conducted via split spoon, cone penetrometer, or other method which enables samples to be extracted quickly and somewhat intact. During the confirmatory sampling, soils were encountered which were so cohesive that they could not be removed from the hand auger quickly or in large portions. Because this may have increased chances for volatilization, contaminant levels in soils analyzed may have actually been higher than reflected by laboratory analysis. Utilizing a sampling method which can enable quick and intact samples to be taken may provide more accurate results.

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Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Narindar Kumar, U.S. EPA, Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Enforcement Branch
Pending File #93-1044

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMOMWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

April 17, 1996

Mr. Richard H. Uber
Manager, Field Operations
Environmental Affairs
Cooper Industries
P.O. Box 4446
Houston, TX 77210

RE: Approval of RFI Phase II Confirmatory Sampling Work Plan
Scottscraft/KIRSCH
Scottsville, Allen County, Kentucky
EPA I.D. #KYD-005-458-401
Pending File #93-1044

Dear Mr. Uber:

The Kentucky Division of Waste Management (the Division) has completed a review of the RFI Phase II Confirmatory Sampling Work Plan (the Plan) submitted on October 18, 1993 and subsequent revisions submitted on December 20, 1995 and April 4, 1996. The Division hereby approves the Plan. Sampling activities and reporting of results should be performed within the time frame as specified in Agreed Order DWM 89098.

If you should have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c; Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Alan Farmer, U.S. EPA, Region IV
Pending File #93-1044

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elf atochem

Elf Atochem North America, Inc.
2000 Market Street
Philadelphia, PA 19103-3222
Tel.: 215.419.7000

January 18, 1996

Mr. James S. Smith
RCRA Permitting Section
U.S. Environmental Protection Agency
Region IV
345 Courtland Street NE
Atlanta, Georgia 30365

Subject: Progress Report No. 2
RCRA Corrective Action Program
Elf Atochem North America
Calvert City, Kentucky Facility

Dear Mr. Smith:

Elf Atochem North America, Inc. (Elf Atochem) has prepared this progress report to update U.S. Environmental Protection Agency (EPA) and Kentucky Department of Environmental Protection (KDEP) on Resource Conservation and Recovery Act (RCRA) Corrective Action Program (CAP) activities being conducted at the Elf Atochem Calvert City, Kentucky facility (Facility). This progress report is a requirement of and has been prepared consistent with Section II.E.3.a of the RCRA/HSWA Permit No. KYD 006 370 159 for the facility which requires quarterly reports be submitted to the EPA and KDEP, if completion of the RFI activities extend over 180 calendar days.

Currently, the activities required under the RCRA CAP include RCRA Facility Investigation (RFI)-1, RFI-2, Interim Measures (IM), Confirmatory Sampling (CS), the Underground Chemical Sewer System (UCSS) Solid Waste Management Unit (SWMU) Assessment Report (SAR) and the UCSS RFI. Elf Atochem has also conducted a Pre-RFI investigation on a voluntary basis to provide supplemental data in support of the RCRA CAP activities. Presently, the IM, UCSS SAR, CS and Pre-RFI do not require progress reporting in accordance with the Permit. However, Elf Atochem has elected to provide EPA/KDEP with progress information for these RCRA CAP components to keep you fully informed of related activities and schedules.

PROGRAM STATUS

The following sections present a narrative of program-related activities during the reporting period and projections for the upcoming reporting period.

RFI-1 & RFI-2

As discussed with EPA during a November 28, 1995 meeting, Elf Atochem implemented the soil investigation portion of the RFI-2 work plan. The soil investigation was conducted in the area of four SWMUs located in the K-97 and/or Forane® neutralization area. The SWMU's include Acid Sump V-1 (SWMU 42), neutralization pump tank (SWMU 48), old Isotron® neutralization tank 1 (SWMU 49), and old Isotron® neutralization tank 2 (SWMU 50).

The soil investigation consisted of drilling and sampling 10 borings, to approximately 30 feet below ground surface. Because of underground utilities and access restrictions in the area, one vertical boring was relocated and two planned angle borings were replaced by vertical borings adjacent to SWMU 49. These modifications were discussed with EPA and documented in a letter to EPA issued in December 1995. The vertical borings were drilled and sampled according to the RFI-2 Work Plan. The field work was completed on December 21, 1995.

Certain RFI-1 tasks were performed during execution of the Pre-RFI program. Generally, these included SWMU source characterization, groundwater sampling, continuous monitoring of surface water and groundwater elevations at select locations and completion of deep stratigraphic borings which were later converted into deep monitoring wells. The scope of work, the results and conclusions of these RFI-1 activities are discussed in the Pre-RFI report (January 1996).

Currently, Elf Atochem is preparing RFI-1 and RFI-2 Implementation Plans (IP) which will present Elf Atochem's proposed RFI modifications along with technical justification. These RFI IPs shall be submitted to EPA and KDEP for review and approval during January 1996.

A 90-day extension to the RFI-1 and RFI-2 programs was verbally approved during a November 28, 1995 meeting in Atlanta, Georgia. By way of two letters issued in December 1995, Elf Atochem formally requested written confirmation of the schedule extension. Accordingly, the schedules presented for both the RFI-1 and RFI-2 programs have been updated to reflect the 90-day extensions.

Pre-RFI

Elf Atochem and HLA conducted a formal presentation of Pre-RFI results and conclusions to EPA and KDEP representatives on November 28, 1995. During this reporting period, Elf Atochem has been preparing and reviewing the Pre-RFI report. This report will be submitted to both the EPA and KDEP by January 19, 1996.

There are no scheduled or planned Pre-RFI activities to be conducted during the next reporting period.

Confirmatory Sampling

Work continued on data evaluation and report preparation for the Draft Confirmatory Sampling (CS) report. Elf Atochem will issue the CS Report to EPA and KDEP on February 6, 1996.

Interim Measures

HLA completed Interim Measures (IM) field work on December 21, 1995. The scope of work, as described in the draft IM Implementation Plan, issued to EPA and KDEP in December 1995, included installing a pumping well and two piezometers extending to bedrock in the UST area, and conducting a aquifer pumping test in the pumping well. Elf Atochem issued a draft IM Pre-Design Study Report to EPA and KDEP on January 12, 1996. (The original due date was January 10, 1996; however, Elf Atochem requested and was granted a two-day extension.)

Underground Chemical Sewer System

On October 26, 1995, Elf Atochem issued the UCSS SAR. On December 6, 1995, EPA issued a letter requesting Elf Atochem to prepare an RFI work plan in connection with the UCSS. As discussed with EPA during a January 12, 1996 telephone conversation between Elf Atochem and EPA, as the first phase of the RFI, Elf Atochem plans to issue a Release Assessment (RA) work plan to evaluate potential current and historic releases of hazardous constituents from the UCSS. The RA work plan is currently being prepared and will be issued to EPA and KDEP by March 5, 1996.

We trust this progress report provides you the information you require at this time. If you have any questions, please call me at (215) 419-5552.

Sincerely,

Mark M. Kramer
Senior Environmental Engineer

cc: James H. Scarbrough, P.E. - U.S. Environmental Protection Agency, Region IV (2 copies
Bart Shaffer - Kentucky Department for Environmental Protection (3 copies)
Gerald Walker - Calvert City
Project File

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
14 REILLY RD
FRANKFORT KY 40601-1190

April 30, 1998

Mr. Richard Uber
Cooper Industries, Inc.
600 Travis Street, Suite 5800
Houston, TX 77002

RE: RFI Plant #2 Report
Kirsch/Scottscraft Plant #2
Scottsville, Allen County, KY
EPA I.D. #KYD 005 458 401

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management have completed a review of the *RCRA Facility Investigation Plant II* (RFI Report) document submitted on behalf of Cooper Industries on February 3, 1998. Based upon information presented within the RFI Report and data obtained as a result of the previous confirmatory sampling event, no further action is warranted at SWMU #9. However, we have not received a response to the Second Notice of Deficiencies for the RFI Work Plan for SWMU #s2-8, located at Plant #1. The NOD was issued on April 25, 1996.

A response to the Second Notice of Deficiencies must be submitted by June 30, 1998. If you have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Dale Burton for

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Caron Falconer, U.S. EPA, Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #93-1044

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

MAY 27 1993

4WD-RCRA

Ms. Caroline P. Haight, Director
Division of Waste Management
Kentucky Department for Environmental
Protection
Fort Boone Plaza, Building #2
18 Reilly Road
Frankfort, Kentucky 40601

RE: Final RCRA Facility Assessment (RFA) Report
Cooper Industries, Inc.
Scottsville, Kentucky
EPA I.D. No. KYD 005 458 401

Dear Ms. Haight:

As per your request, enclosed is a revised joint approval letter which finalizes the RFA of the above referenced facility. Revisions include the correct contact person and mailing address for Cooper Industries, Inc.

After signing, please forward this letter and a copy of the final RFA report via certified mail to Cooper Industries, Inc., and return a copy of the signed and dated letter to our office. If you have any questions concerning this matter, please contact Carin DeBenedictis at (404) 347-3433.

Sincerely yours,

Alan Farmer

G. Alan Farmer
Chief, RCRA Branch
Waste Management Division
Region IV

Enclosure

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4WD-RCRA

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Rick Uber
Cooper Industries, Inc.
P.O. Box 4446
Houston, Texas 77210

RE: Final RCRA Facility Assessment (RFA)
Cooper Industries, Inc.
Scottsville, Kentucky
EPA I.D. No. KYD 005 458 401

Dear Mr. Uber:

The Environmental Protection Agency (EPA) and the Kentucky Department for Environmental Protection (KYDEP) have reviewed the comments from Cooper Industries, Inc., concerning the draft RFA.

Please find enclosed the final RFA report. It should be noted that the final RFA incorporates several of the comments that were noted by Cooper Industries, Inc. However, the number of Solid Waste Management Units (SWMUs) and corresponding corrective action recommendations have not changed.

Please notify Carin DeBenedictis of EPA at (404) 347-3433 or Vicki Baker of KYDEP at (502) 564-6716, if you have any further questions.

Sincerely yours,

G. Alan Farmer

G. Alan Farmer
Chief, RCRA Branch
Waste Management Division

Caroline P. Haight, Director
Division of Waste Management
Kentucky Department for
Environmental Protection

Enclosure

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PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

July 9, 1993

Rick Uber
Cooper Industries, Inc.
P.O. Box 4446
Houston, Texas 77210

RE: Cooper Industries, Inc.
EPA ID #KYD-005-458-401
Scottsville, Allen County, Kentucky

Dear Mr. Uber:

The United States Environmental Protection Cabinet and the Kentucky Department for Environmental Protection recently notified you that the RCRA Facility Assessment (RFA) for Cooper Industries is final. The final RFA required further investigation Solid Waste Management Units (SWMUs) for SWMUs 2-9. We have determined that a RCRA Facility Investigation (RFI) is necessary for SWMUs 2-8 and that RFA Phase II Sampling, is necessary for SWMU #9. Please submit an RFI workplan for SWMUs 2-8 as well as a confirmatory sampling plan for SWMU #9 within 90 days of receipt of this letter. We recommend that RFI Guidance EPA-530/SW-89-031 be followed in preparing the workplan.

The Division has reviewed the Closure Certification Report for the Indoor Storage Area submitted April 16, 1992 and September 10, 1992. Our review indicates that clean closure has been accomplished for this unit and the Division hereby accepts the certification of closure.

The Division has also reviewed the financial test dated March 29, 1993. In accordance with 401 KAR 34:090 and 34:120, the financial test is hereby approved for:

Closure Assurance	$21,600
Sudden and Non-Sudden Liability Coverage	$8 million

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Because clean closure of this site has been certified and confirmed by inspection, in accordance with 401 KAR 34:090, Section 12 your company is hereby released from the requirement to maintain closure assurance. However, in accordance with KRS 224.46-520, your company must maintain a minimum of $2 million in sudden liability coverage until "termination." "Termination" is defined in KRS 224.01-010 to mean "the final actions taken by the Cabinet as to a ..... hazardous waste ..... storage ..... facility when formal responsibilities for postclosure monitoring and maintenance cease." Because postclosure includes corrective action, liability coverage must be maintained until satisfactory completion of these activities. Please contact Abbie Meyer at (502) 564-6716 if you have questions concerning the financial assurance requirements.

Any questions concerning the RFI workplan should be directed to Dale Burton at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/vb:am/ssb

cc: Nancy Mollers, Risk Manager
Cooper Industries
P.O. Box 4446
Houston, Texas 77210
Dale Burton, Hazardous Waste Branch
Abbie Meyer, Hazardous Waste Branch
Vicki Baker, Hazardous Waste Branch
Enforcement Branch
Bowling Green Regional Office
EPA Region IV
Central File

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

WASTE MANAGEMENT DIVISION
JUL 22 4 48 PM '94

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COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

July 18, 1994

RECEIVED
EPA/REGION IV
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WASTE
COMPLIANCE SECTION

Mr. Alan Farmer
RCRA Branch, Waste Management Division
U. S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30365

RE: Draft Notice of Technical Inadequacies
Scottscraft/KIRSCH RFI Workplan
Allen County, Kentucky
EPA I.D. #KYD-005-458-401
Pending File #93-1044

Dear Mr. Farmer:

The Kentucky Division of Waste Management (KDWM) has reviewed Scottscraft/KIRSCH (Cooper Industries) RFI Workplan dated October 19, 1993. This RFI was required in a state Agreed Order (DWM 89098).

Please forward your comments on this workplan to the Division within forty-five (45) days of receipt of this letter. If the Division does not receive a response from the U. S. EPA within the forty-five (45) days, the Kentucky Division of Waste Management will send the comments along to the facility.

If you have any questions involving this letter, please contact Scott Johanson at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/SJ:ds

c: Bowling Green Regional Office
Dale Burton
Scott Johanson
Pending File #93-1044

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KDWM COMMENTS ON THE RFI WORKPLAN
COOPER INDUSTRIES, SCOTTSVILLE, KENTUCKY

(1) Figure two is of insufficient detail; the locations of all the soil samples must be shown in the or figure(s) and at a scale which shows as much detail as possible. Figure 5B is of sufficient detail, however figure 5A must show all waste cells (approximate boundaries are acceptable) in relation to the site.

(2) The Division requires that at least five (5) background soil samples be taken. These five (5) samples must be located on a map (which is drawn to scale) showing the relative locations to the site.

(3) Section 3.2 (Quality Assurance Organization): The Division reserves the option of requiring additional work if the RFI data collected indicates that additional investigation is needed. The facility is responsible for all aspects of this workplan including Quality Assurance. The Division is not liable for any mistakes that are made, by the company or the consultant.

(4) The Division requires that all samples be maintained at four (4) degrees C. The last sentence in #6 on page QAPJP-24 should read "For example, samples must be maintained at 4°C, therefore the samples will be shipped in ice."

(5) Why are steps fourteen (14) and fifteen (15) included in 10.2 if only hollow stem augers are being used? If hollow stem augers are only being used then steps 14 and 15 can be deleted.

(6) What is meant by nitrogen in the Antimony Section on Page H & SP-6?

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

July 14, 1997

Mr. Richard Uber
Cooper Industries, Inc.
600 Travis Street-Suite 5800
Houston, TX 77002

RE: RFI Work Plan Notice of Deficiences
Kirsch/Scottscraft Plant #2
Scottsville, Allen County, KY
EPA I.D. #KYD 005 458 401

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have completed a review of the RFI Work Plan for Plant #2 (RFI WP) of the former Kirsch/Scottscraft facility. The RFI WP was submitted on June 13, 1997 by ATC Associates Inc. on behalf of Cooper Industries. Several deficiencies exist with the submitted RFI WP. These specific deficiencies are listed on the attachment to this letter. Please provide responses to each deficiency to KDWM within 30 days of receipt of this letter. Should you have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS
Attachment

c: Caron Falconer, U.S. EPA Region IV
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Bowling Green Regional Office
Pending File #93-1044

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Notice of Deficiencies - RFI Work Plan, Plant #2
Kirsch/Scottscraft, Scottsville, KY

1) On page sixteen (16), where background sampling is discussed, it should also be stated that the background sample will be sampled first so as to avoid any cross contamination of equipment.

2) A description of decontamination procedures to be utilized needs to be added to the plan. As it currently exists, the plan only specifies that "All equipment shall be decontaminated in accordance with SW-846...". Specific decontamination procedures need to be listed in the work plan. We recommend using a slightly modified version of those listed within the *EPA Region IV Standard Operating Procedures* manual. This would entail washing with phosphate-free detergent and distilled or tap water, followed by a rinse with deionized water. After rinsing with deionized water, equipment should be sprayed with pesticide grade isopropanol and then rinsed with deionized or distilled water and allowed to air dry.

3) It is somewhat unclear at exactly what depth horizon samples will be collected. Will two samples from each boring be retained for analysis, based on highest PID readings or will samples be retained for analysis at two specified depths per boring? We suggest considering obtaining samples from one (1) to two (2) feet bgs, four (4) to five (5) feet, and possibly a deeper horizon(s) as well based on PID detections, or lack thereof. A minimum of at least eight (8) of the borings should be advanced to a depth of fifteen (15) feet bgs and sampled between ten (10) and fifteen (15) feet, based upon best professional judgment and PID detections, or the lack thereof.

4) On page nineteen (19) it is specified that samples will be analyzed for Total Petroleum Hydrocarbons (TPH). We feel that analyzing for Polycyclic Aromatic Hydrocarbons (PAH's) instead of TPH constituents would yield more conclusive data. As such, samples should be analyzed for PAH's rather than TPH.

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

WASTE MANAGEMENT DIVISION
JAN 10 10 28 AM '96

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

I.O.

December 19, 1995

Mr. Richard H. Uber, Manager, Field Operations
Cooper Industries
P.O. Box 4446
Houston, TX 77210

RE: Notice of Technical Inadequacies (NOTI)
RFI Work Plan
Scottscraft/KIRSCH
Scottsville, Allen County, KY
EPA I.D. #KYD-005-458-101
Pending File #93-1044

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have conducted a review of the RFI Work Plan (Work Plan) for the Scottscraft/KIRSCH (Scottscraft) facility in Scottsville, KY. KDWM has found the Work Plan to be deficient in several areas. These deficiencies are listed in the attachment. Please amend the Work Plan to reflect the requirements listed in the attachment and submit it in the form of a Revised RFI Work Plan. As stipulated in the Agreed Order, the Revised Work Plan must be submitted within thirty (30) days of receipt of this letter. If you should have any questions concerning this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Alan Farmer, U.S. EPA, Region IV
Columbia Regional Office
Enforcement Branch
Pending File #93-1044

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NOTICE OF DEFICIENCIES
RFI WORK PLAN - SCOTTSCRAFT/KIRSCH

1) Background samples must be collected before sampling the SWMU area.

2) Investigative Derived Waste (IDW) and decontamination waters must be stored in drums or roll-offs and labeled as such.

3) Scottscraft must submit a detailed, to scale map of the site which will allow the Cabinet to determine the gradient of the site and the suitability of the proposed area from which soil samples will be collected and monitoring wells installed. The map should include individual waste cells and all proposed sampling points.

4) Because the facility is located in a karst region, a spring survey should be conducted so that possible discharge points of groundwater flowing from the site may be identified. Scottscraft must notify KDWM at least one (1) week prior to conducting the spring survey so we have the opportunity to participate. The results of this survey, and accompanying dye trace, if necessary, will determine the type of groundwater monitoring system which will need to be implemented at the site. The Work Plan must include a section which details the manner in which groundwater will be monitored at or near the site, be it by monitoring wells and/or springs. With this in mind, paragraph thirteen (13) should be deleted from Section 2.5.1 of the Quality Assurance Project Plan portion of the Work Plan.

5) Of the five samples to be taken from the perimeter of the SWMU area, why is no sample proposed to be taken from the east side?

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

April 25, 1996

Mr. Richard H. Uber, Manager, Field Operations
Cooper Industries
P.O. Box 4446
Houston, TX 77210

State agreed orders
proposed RFI

RE: Second Notice of Deficiencies
RFI Work Plan
Scottscraft/KIRSCH
Scottsville, Allen County, Ky
EPA I.D. #KYD-005-458-101
Pending File #93-1044

Dear Mr. Uber:

Personnel of the Kentucky Division of Waste Management (KDWM) have conducted a review of the March 15, 1996 submittal of RFI Work Plan Revisions submitted by ATEC Associates, Inc. on behalf of Cooper Industries (Cooper). The RFI Work Plan Revisions were submitted in response to a December 19, 1995 Notice of Technical Inadequacies issued to Cooper. The KDWM has some specific concerns related to the RFI Work Plan Revisions. These concerns are addressed in the attached list.

Cooper should submit a response to this Second Notice of Deficiencies by May 22, 1996. If you should have any questions regarding this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

c: Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Alan Farmer, U.S. EPA, Region IV
Bowling Green Regional Office
Pending File #93-1044

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NOTICE OF DEFICIENCIES
RFI WORK PLAN - SCOTTSCRAFT/KIRSCH

1) On the Boring Location Plan, the proposed location for Monitoring Well 5 (MW-05) is to the north of the other three proposed downgradient monitoring wells. KDWM feels that, should this monitoring well be required to be installed, it would be of greater utility if it were located between MW-03 and MW-04 at approximately the same distance north of the SWMU area as the other downgradient wells.

2) In the Response to Deficiencies it is stated that "Should the initial piezometer study indicate the lack of a water table within the unconsolidated material, the proposed groundwater monitoring wells will not be installed". Should monitoring well installation be necessary (depending upon the results of a spring survey and/or subsequent dye trace investigation), wells will need to be drilled into bedrock if groundwater is not present within surficial unconsolidated deposits.

3) Within the RFI Work Plan it should be specified that Cooper will submit a Dye Trace Investigation Work Plan, should the results of the spring survey warrant such.

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

November 8, 1995

Mr. Richard H. Uber
Manager, Field Operations
Environmental Affairs
Cooper Industries
P.O. Box 4446
Houston, TX 77210

RE: Notice of Technical Inadequacies (NOTI)
RFI Phase II Confirmatory Sampling Work Plan
Scottscraft/KIRSCH
Scottsville, Kentucky
EPA I.D. #KYD-005-458-401

Dear Mr. Uber:

The Kentucky Division of Waste Management (KDWM) has completed a review of the RFI Phase II Confirmatory Sampling Work Plan (plan) submitted on October 18, 1993 by Cooper Industries for the Scottscraft/KIRSCH facility in Scottsville, Kentucky. The attached comments should be addressed in a revised RFI Phase II Confirmatory Sampling Work Plan. Per Kentucky Agreed Order DWM 89098, the revised document should be submitted within thirty (30) days of receipt of this NOTI.

Should you have any questions concerning this correspondence, please contact Bart Schaffer at (502) 564-6716.

Sincerely,

Dale M. Burton for

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/BS

c: Alan Farmer, U.S. EPA, Region IV
Bowling Green Regional Office
Dale Burton, Hazardous Waste Branch
Bart Schaffer, Hazardous Waste Branch
Lucy Clarke, Enforcement Branch
Pending File #93-1044

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NOTICE OF TECHNICAL INADEQUACIES
PHASE II CONFIRMATORY SAMPLING WORK PLAN - SCOTTSCRAFT/KIRSCH

1) Because many volatile constituents released to surface soils might have volatilized during the long lag time between when a potential release could have occurred and the time of sampling, KDWM requests that a soil sample also be collected from the 3 to 5 foot interval as well as the shallower interval.

2) Samples must not be composited as this activity may lead to additional volatilization of potential contaminants. The Division requests that grab rather than composite samples be collected.

3) It is stated in the plan that samples will be analyzed for Volatile Organic Compounds (Method 8240) and Nonhalogenated Volatile Organics (Method 8015). The Division recommends that Cooper utilize the extended method 8015 B for detection of acetates and extended method 8015 M for mineral spirits. In addition, a Quality Assurance/Qualtiy Control plan should be submitted which will allow KDWM to determine whether samples have been analyzed with adequate detection limits.

4) Diagrams in the plan should be drawn to scale. A detailed sampling map should be submitted which displays sampling locations with relation to the drain and topography.

5) Provide a schedule which presents when confirmatory sampling activities will be conducted and when results will be submitted to KDWM.

6) It should be specified within the plan that an RFI Work Plan which addresses activities to be conducted at Plant #2 will be submitted to KDWM within a given time frame if contamination is found to exist.

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

July 18, 1994

WASTE MANAGEMENT DIVISION
JUL 26 4 46 PM '94

Mr. Alan Farmer
RCRA Facilities Waste Management Division
U. S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: Draft Notice of Technical Inadequacies
Phase II Confirmatory Sampling
Scottscraft/KIRSCH
Allen County, Kentucky
EPA I.D. #005-458-401
Pending File #93-1044

Dear Mr. Farmer:

The Kentucky Division of Waste Management (KDWM) has reviewed Scottscraft's/KIRSCH's (Cooper Industries) Phase II Confirmatory Sampling plan dated October 20, 1993. It should be noted that this sampling plan was required under a state Agreed Order (DWM 89 098).

Please forward your comments regarding the sampling plan to the Division within forty-five (45) days of receipt of this letter. Since this sample plan is being handled through a state Agreed Order, if the Division does not receive a response from the U. S. EPA within forty-five (45) days, the Kentucky Division of Waste Management will forward the comments on to the facility.

If you have any questions regarding this matter, please contact Scott Johanson at (502) 564-6716.

Sincerely,

Michael V. Welch

Michael V. Welch, P.E., Manager
Hazardous Waste Branch

MVW/SJ:ds

c: Bowling Green Regional Office
Dale Burton
Scott Johanson
Pending File #93-1044

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DRAFT NOTICE OF TECHNICAL INADEQUACIES

(1) Since most volatile organic compounds tend to volatilize in soils at the near surface (0 to 3 feet), the Division requests that a second set of samples be taken at the 3.0 to 5.0 foot interval.

(2) Samples must not be composited as this activity will cause additional volatilization. The Division requests that all samples be placed in separate sample containers and not composited.

(3) How was the decision to take two samples and then composite them arrived at? The Division requests that all samples be discrete samples, therefore two samples per interval should be taken.

(4) What is the approximate size of the area to be sampled? Both figures should be drawn to scale. The locations of the samples (drawn to scale) must be shown.

CARL H. BRADLEY
SECRETARY

WALLACE G. WILKINSON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

April 16, 1991

R.H. Uber
Manager, Field Operations
Environemental Affairs
Cooper Industries, Inc.
First City Tower, Suite 4000
P.O. Box 4446
Houston, Texas 77210

RE: Cooper Industries, Inc.
KYD-005-458-401
Scottsville, Allen County, Kentucky
Pending File #90-229

Dear Mr. Uber:

The Division of Waste Management has received the closure plan for the indoor storage area and will discuss the Notice of Defeciencies in a separate letter.

According to Title 401 KAR 34:060 Section 12, "Any person closing a facility for the treatment, storage or disposal of hazardous waste must institue corrective action as necessary to protect human health and environment for all releases of hazardous waste or constituents from any waste management unit at the facility, regardless of the time at which waste was placed in such unit."

To this end, our office will conduct a RCRA Facility Assessment to identify all areas having a potential to release hazardous constituents to the environment. These areas of potential concern are called "solid waste management units" or SWMU's.

A SWMU is defined as "any discernible waste management unit at RCRA facility from which hazardous constituents might migrate, irrespective or whether the unit was intended for the management of solid and/or hazardous waste."

The SWMU definition includes:

* Containers, tanks, surface inpoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells, including those units defined as "regulated units" under RCRA.

* Recycling units, wastewater treatment units and other units which EPA has generally exempted from standards applicable to hazardous waste management units.

* Areas contaminated by "routine, deliberate, and systematic discharges" from process areas.

The definition does not include accidental spills from production areas and units which wastes have not been managed (e.g., product storage areas).

Enclosed is a form for describing the waste management units at your facility. Please fill it out and return it to this office within 30 days.

If you have any questions, please call Vicki Baker at (502) 564-6716, extension 634.

Sincerely,

Md. Alauddin

Mohammad Alauddin, Manager
Hazardous Waste Branch

MA:vb:ssh

cc: James Scarbrough, EPA Region IV
Central File

INFORMATION REGARDING POTENTIAL RELEASES FROM

WASTE MANAGEMENT UNITS

FACILITY NAME: _____
EPA I.D. Number: _____
LOCATION : _____
_____

1. Are there any of the following waste management units (existing or closed, hazrdous or non-hazardous) at your facility? NOTE -- DO NOT INCLUDE HAZARDOUS WASTES UNITS CURRENTLY SHOWN IN YOUR PART B APPLICATION IF ONE WAS SUBMITTED.

	YES	NO
LANDFILL	____	____
SURFACE IMPOUNDMENT	____	____
LAND FARM	____	____
WASTE PILE	____	____
INCINERATOR	____	____
STORAGE TANK (above ground)	____	____
STORAGE TANK (underground)	____	____
CONTAINER STORAGE AREA	____	____
INJECTION WELLS	____	____
WASTEWATER TREATMENT UNITS	____	____
TRANSFER STATIONS	____	____
WASTE RECYCLING OPERATIONS	____	____

2. If there are "yes" answers to any of the items in Number 1, please provide a description of the wastes that were stored, treated or disposed of in each unit. In particular, focus on whether or not the wastes woud be considered as hazardous wastes or hazardous constituents under RCRA. Also include any available data on quantities or volumes of wastes disposed of, and the dates of disposal. Please provide a description of each unit, including: capacity, dimensions, location at facility, and a site plan if available.

_____
_____
_____
_____
_____
_____
_____
_____
_____

NOTE; Hazardous wastes are those identified in 40 CFR 261. Hazardous constituents are those listed in Appendix VIII of 40 CFR Part 261.

COR 0003
KY005458401

3. For the units noted in Number 1 and *also* those hazardous waste units in your Part B application, please describe for *each unit*, any data available on any prior or current releases of hazardous wastes or constituents to the environment that have occurred in the past or are still occurring.

Please provide the following information

a. Date of release
b. Type of waste released
c. Quantity or volume of waste released
d. Describe nature of release (i.e. spill, overflow, ruptured pipe or tank, etc.)

_____
_____
_____
_____

4. In regard to the prior releases described in Number 3, please provide (for each unit) any analytical date that may be available which would describe the nature and extent of enviromental contamination that exists, as a result of such releases. Please focus on concentrations of hazardous wastes or constituents present in contaminated soil or groundwater.

_____
_____
_____
_____
_____

SIGNATURE AND CERTIFICATION

As with reports in RCRA Permit Applications, submittal of this information must contain the following certification and signature by a principal executive officer of a least the level of vice president, or by a duly authorized reproesentative of that person:

> I certify under penalty of law, that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, it is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

_____ _____

signature name and title (typed)

COR 0004
NY005458401

CARL H. BRADLEY
SECRETARY

WALLACE G. WILKINSON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

June 4,1991

Richard Uber
Manager Field Operations
Environmental Affairs
Cooper Industries, Inc.
P.O. Box 4446
Houston, Texas 77210

Doc. Cit. - 2nd NOD on Closure Plan

RE: Cooper Industries, Inc.
EPA ID #KYD-005-458-401 — COR
Scottsville, Allen County, Kentucky
Pending File #90-229
2nd Notice of Deficiencies

Dear Mr. Uber:

The Division of Waste Management has reviewed the closure plan for the indoor storage area as well as subsequent submittals. 401 KAR 39:120, Section 3 requires that any owner or operator who submits a closure plan to submit a review fee of $3,600. Additionally, there is a review fee for each type of hazardous waste management unit. The review fee for a container storage area is $460. The total fee due for the closure plan is $4,160. Please remit the total amount due by a check made payable to the Kentucky State Treasurer within ten (10) days of the receipt of this letter.

The Division requested that the closure-plan contain a statement that the facility will comply with the requirements of 401 KAR 34:060, Section 12, regarding corrective action. If corrective action is deemed necessary, Cooper Industries will sign an Agreed Order with the Cabinet stipulating compliance with the above mentioned regulation before a closure certification can be accepted by the Cabinet. The Agreed Order #DWM09098 does not contain the statement concerning corrective action. Please incorporate this statement into the closure plan and submit to this office within ten (10) days of the receipt of this letter.

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If you have any questions, please contact Vicki Baker at (502) 564-6716, extension 634.

Sincerely,

Md. Alauddin

Mohammad Alauddin, Manager
Hazardous Waste Branch

MA:vb:ssh

cc: James Scarbrough, US EPA Region IV
Bowling Green Field Office
Central Files
Enforcement Branch

CARL H. BRADLEY
SECRETARY

WALLACE G. WILKINSON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

August 14, 1991

Rick Uber
Manager, Field Operations
Environmental Affairs
Cooper Industries, Inc.
P.O. Box 4446
Houston, Texas 77210

RE: Cooper Industries, Inc.
EPA ID #KYD-005-458-401
Scottsville, Allen County, Kentucky
Pending File #90-229

Dear Mr. Uber:

The Division of Waste Management has reviewed the closure plan submitted for the indoor storage area on July 18, 1990. The closure plan is approved in accordance with the requirements of 401 KAR 35:070, Section 3(2), provided the following condition is met:

> The Division has previously requested that the closure plan contain a statement that the facility will comply with the requirements of 401 KAR 34:060, Section 12 regarding corrective action. If corrective action is deemed necessary, Cooper Industries will sign an Agreed Order with the Cabinet stipulating compliance with the above-mentioned regulation before a closure certification can be accepted by the Cabinet. Agreed Order #DWM 09098 does not contain the statement concerning corrective action. Please incorporate this statement into the closure plan and submit it to the Division within fifteen (15) days of the receipt of this letter.

The Division has conducted a RCRA Facility Assessment (RFA) of Cooper Industries and is currently completed the draft RFA. The Hazardous Waste Regulations require that any owner or operator that

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submits a closure plan for a treatment, storage or disposal facility submit fees for the closure plan, a RFA fee, and a review fee for each type of hazardous waste management unit being closed. The Division has determined that an amount of $11,400 is due for your facility. The determination has been made according to the amount shown below:

Fees		Type of Unit/Regulation
Review Fee; Closure Plan	$3,600	401 KAR 39:120, Section 3
Review Fee; Containers	460	401 KAR 39:120, Section 3
RFA	11,500	401 KAR 39:120, Section 3
Subtotal	$15,560	
Less Received	4,160	
Total Due	$11,400	

Please remit the balance due by a check made payable to the Kentucky State Treasurer within thirty (30) days of the receipt of this letter.

Cooper Industries must arrange for the enclosed public notice conforming to 401 KAR 35:070, Section 3(4)(d) in the local newspaper by August 28, 1991. Any interested person, including the applicant has thirty (30) days from the date of advertisement to submit a comment to the Commonwealth of Kentucky. The newspaper should forward the affidavit of publication to Mohammad Alauddin, Manager, Hazardous Waste Branch, Division of Waste Management, 18 Reilly Road, Frankfort, Kentucky 40601. The facility owner/operator is responsible for the cost of the advertisement.

If you have any questions please contact Vicki Baker at (502) 564-6716, extension 634.

Sincerely,

Tammi Baker for

Mohammad Alauddin, Manager
Hazardous Waste Branch

MA:vb:ssc

cc: Bowling Green Regional Office
James Scarbrough, U.S. EPA Region IV
Central File
Buddy Farson, Enforcement Branch
Pending File #90-229

COOPER INDUSTRIES, INC.
SCOTTSVILLE, KENTUCKY
ALLEN COUNTY
EPA ID #KYD-005-458-401

PUBLIC NOTICE

Cooper Industries, Inc. has submitted a closure plan to the Kentucky Natural Resources and Environmental Protection Cabinet to clean close an indoor storage area in Plant #1 located at Cooper Industries, Inc. at 2620 Gallatin, Scottsville, Kentucky. Additional information is contained in the closure plan on file with the Division of Waste Management in Frankfort, Kentucky.

Any person who may be aggrieved by the closing of this hazardous waste storage area may file with the Cabinet in written comment setting forth the grounds of the objection as allowed by 401 KAR 35:070, Section 3(4)d and 40 CFR 265.112(d) or a petition stating the objection and demand a hearing pursuant to KRS 224.081(2). The written comments or petition may be sent to: Director, Division of Waste Management, 18 Reilly Road, Frankfort, Kentucky 40601. The letter must be received within thirty (30) days of today's date to be considered.

Cooper Industries
KYD 005 458 401
Scottsville, KY
Allen County

DRAFT

Oct. 91

SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	Reference
1a Indoor Storage Area	Primary Drum Storage Area	29	Dichloromethane Trichloroethylene	L	N	L	N		✓		
1b Indoor Storage Area	Auxiliary Drum Storage Area	29	" "	L	N	L	N		✓		
2 Sludge Burial Area	Land Fill	7	Zinc Cyanide	SW(H) S(H) GW(H)	N	H	N	✓			
3 Sludge Burial Area	"	7	"	"	N	H	N	✓			
4 "	"	"	"	"	"	"	"	✓			
5 "	"	"	"	"	"	"	"	✓			
6 "	"	"	"	"	"	"	"	✓			
7 "	"	"	"	"	"	"	"	✓			
8 "	"	"	"	"	"	"	"	✓			
9 Satellite Accumulation Area	Container Storage	29	Cell Osolve Acetate Mineral Spirits Isobutanol Zylene Lactol Spirits Toluene Isopropanol 2-Heptanone Methyl Alcohol Methyl Ethyl Ketone	S(M) GW(M)	Floors Stained appeared to be paint Ethyl Acetate Isobutyl Acetate Isobutyl Isobutyrate N M and P naphtha Methyl Isobutyl Ketone	M	N			✓ Conf. Sampling	

COR 0001

KY005458401

Central Service, Inc
KYD 981 805 526

DRAFT

SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	Reference
1. Spray, Paint Booth	Paint cleaner	6	Sodium Hydroxide + Paint	S(L)	no	L	no		✓		
2. Paint mixing Room	Gun Cleaner	6	Paint F003/F005 Spent Solvents	Thinner S(L)	no	L	no		✓	replaced monthly by Safety-Kleen	
3. Drum Storage Area	30 day Storage	6	Paint Tetrachloroethylene Spent Solvents	Thinner S(L)	Rain water seeps over drums into floor	L	no		✓	need to fix the roof (they are in process of fixing)	
4. Vibrator Tank	Tank	2	Plastic Pellets W/ Abrasives	N	no	none	no		✓		
AOC											
5. Paint Waste	Sidewalk	3	Used Paint + Solvent	SW(L) S(H) GW(H)	paint waste has been spilled but cleaned up	M	Yes			✓	Confirmatory Sampling

COR 0002

KY005458401

CHARLOTTE E. BALDWIN
SECRETARY

MARTHA LAYNE COLLINS
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FORT BOONE PLAZA
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

March 8, 1984

Mr. William Hagenbuch
Scotscraft, Inc.
P.O. Box 525
Scottsville, Kentucky 42164

RE: Letter of Warning - Annual Report
EPA I.D. KYD00-545-8401

Dear Mr. Hagenbuch:

Your company is on our list of hazardous waste generators and TSD facilities. To date, the Division of Waste Management has not received your Annual Report or justification for non-submittal. Therefore, your company is in violation of 401 KAR 32:040 Section 2 and/or 401 KAR 34:050 Section 6, of Kentucky Waste Management Regulations, requiring all hazardous waste generators and TSD facilities to submit an annual report, and are subject to penalties under KRS 224.994. These reports were due on March 1, 1984, as specified in a Notice to you dated January 11, 1984 from this Division.

Please submit your 1983 Annual Report or justification for not submitting it before March 23, 1984 to: Division of Waste Management, Permit Review Branch, 18 Reilly Road, Frankfort, Kentucky 40601. To avoid possible formal enforcement actions including assessment of penalties, you must submit this justification by March 20, 1984.

If you have any questions, please feel free to contact James A. Determann of this office at (502) - 564-6716, Ext. 231.

Sincerely,

Caroline Patrick Haight

Caroline Patrick Haight
Manager, Permit Review Branch
Division of Waste Management

CPH:JAD:cg

cc: Don Curry, Area Supervisor
U.S. EPA Region IV

COR
0001
KYD005458401

DIVISION OF WASTE MANAGEMENT
1508 WESTEN AVENUE
BOWLING GREEN KY 42104
(502) 746-7475

RCRA 1995 GRANT INSPECTION REPORT

1) FACILITY INFORMATION

KYD-005-458-401
Cooper Industries, Inc. (Wagner Brake Subsidiary)
2620 Gallatin Rd.
Scottsville, KY 42164

2) INSPECTOR AND AUTHOR OF REPORT

Merry Croft
Environmental Inspector
Bowling Green Regional Office

3) DATE & TIME OF INSPECTION

March 6, 1995
11:10 a.m.

4) PURPOSE OF INSPECTION

Routine compliance evaluation and informal multimedia inspection of a limited quantity generator and disposal facility to fulfill 1995 Grant Commitment.

5) INSPECTION PARTICIPANTS

Merry Croft, Environmental Inspector
Division of Waste Management
Renee Durbin, Environmental Inspector
Division for Air Quality
Cindy Cardwell, Environmental Inspector
Division of Water
Tom Wind, Manufacturing Engineer
Cooper Industries
Eric McAlexander, Plant Manager
Cooper Industries
Kyle Whetstone, Manufacturing Engineer & Maintenance Manager
Cooper Industries

6) FACILITY DESCRIPTION

Cooper Industries, formerly Kirsch Company, manufactured drapery and curtain rods from 1964 until May 1990. Processes that generated wastes during that period included a zinc plating line, a paint machine, and a still which is used to recycle Trichloroethane and Dichloromethane.

The zinc plating used a treatment process that consisted of a 3,000 gallon concrete cyanide destruct tank and a 5000 gallon concrete neutralization tank. This tank generated an (F008) sludge residue waste. All plating activities were discontinued in 1982 and the equipment was removed. Final clean out inventory of 28 drums of residue, trash, and hydro washings were removed as hazardous wastes by June 1983.

During an inspection in 1989 by representatives of the Columbia Regional Office, Division of Waste Management, it was discovered that employees had disposed of plating waste sludges on the plant site. This activity took place from 1972 to 1979. The sludge was generated after the pre-treatment stage of the plating process. This waste was assumed to be high in cyanide and zinc. The sludge was buried in trenches behind the plant with a back-hoe. There were seven trenches identified behind the plant. In the fall of 1979 Kirsch began shipping their plating waste sludge to LWD for disposal.

Cooper has rebuilt the old plant and is in full production, manufacturing automotive brakes at the facility.

7) FINDINGS

We began with an opening conference. We then toured the plant. Cooper is registered as a limited quantity generator. They had anticipated generating (D001) Naphtha waste from parts washers; however, Cooper is now using Simple Green detergent and hot water in place of the Naphtha and does not currently generate hazardous waste. We split samples of the parts washer waste to be analyzed for flash point, oil and grease, and metals. (The results were received on April 5, 1995 and determined the waste to be non-hazardous.) This waste is currently disposed to the city sewer system. Inspectors Durbin and Cardwell completed their inspections as we walked around the facility. The trenches behind the plant did not appear to have been disturbed.

No waste Management violations were observed during this inspection. A closing conference was held.

Merry Croft
Environmental Inspector II

5-3-95
Date

Kerry McDaniel
Environmental Control Supervisor

5-4-95
Date

DIVISION OF WASTE MANAGEMENT

SITE INVESTIGATION REPORT

Site Name: Wagner Brake/Cooper Ind. ID#: _____

County: Allen Date: 3-6-95 Time: 11:10am

Purpose of Site Visit

(x) Complaint ( ) Technical Assistance ( ) Sampling
( ) Closure ( ) Construction (x) Follow-Up ( ) Other

Participants:

Merry Croft - Division of Waste Management
Renee Durbin - Division for Air Qualtiy
Cindy Cardwell - Division of Water
Tom Wind, Manufacturing Engineer
Eric McAlexander, Plant Manager
Kyle Whetstone, Manufacturing Engineer and Maintenance Manager

Findings:

This was a complaint investigation of alleged improper disposal and releases of asbestos. We began with an opening conference to discuss the complaint and then toured the facility. All asbestos waste is placed in a dumpster which is specially designed to be completely enclosed. This waste is then properly disposed at the Ohio County Balefill. One parts washer was observed which uses hot water and Simple Green Detergent. A sample of this waste was taken by Wagner Brake to be tested for oil and grease and metals. A copy of the results is to be forwarded to this office. This waste is currently being disposed to the city sewer system.

Report prepared by: Merry Croft Date 4-4-95

Attachments:

Copies to:
File

Cooper Industries
Wagner Brake Subsidiary
2640 Old Gallatin Road
Scottsville, KY 42164
502 237-3900
FAX 502 237-5819

RECEIVED
APR 7 8 23 AM '95
BOWLING GREEN
D.E.P.

COOPER
Wagner Brake

April 5, 1995

Merry C. Croft
Department for Environmental Protection
Division of Waste Management
Bowling Green Regional Office
1508 Western Avenue
Bowling Green, KY 42104

Dear Merry:

I have enclosed the results from the maintenance parts washer sampling that we performed on March 6, 1995 during your visit. As the results show, we tested for Flash Point, Oils and Grease, and Total Metals.

I have contacted our waste disposal sight, the Ohio County Balefill, and have submitted an application to include this waste. Our plan is to mix it in with the non-friable waste that we are currently sending to the disposal sight. We estimate that we will need to change the parts washer water 4 times per year, generating approximately 30 gallons of waste each time. We will keep you informed as to the status of our application and will not change the water until we have found an acceptable method for disposal. If you have any questions please feel free to call myself or Kyle Whetstone at (502) 237 - 3900.

Regards,

Thomas C. Wind
Manufacturing Engineer
enclosures

cc: Eric McAlexander -Plant Manager
Kyle Whetstone -Maintenance Manager / Engineering Supervisor

Table 1
General Data Table
Wagner Brake
Antech Ltd. Project No. 95-0956
Water Characterization; Wagner Brake (Thomas Wind)
Purchase Order No. 601222; Scottsville, KY

Parameter	Analytical Method	Units	Sample Identification: 9503-0960 Maintenance Washer Sample (3/6/95)	Sample Identification: 9503-0962 Method Blank (3/7/95)
Flash Point	1010[1]	°F	>200	NAP[2]
Oil and Grease	413.1[3]	mg/l	290	<1.0
Metals:				
Silver (Total)	6010[1]	mg/l	0.031	<0.010
Arsenic (Total)	7060[1]	mg/l	<0.0010	<0.0010
Barium (Total)	6010[1]	mg/l	5.0	<0.020
Cadmium (Total)	6010[1]	mg/l	1.1	<0.010
Chromium (Total)	6010[1]	mg/l	1.2	<0.010
Mercury (Total)	7470[1]	mg/l	0.010	<0.00020
Lead (Total)	6010[1]	mg/l	2.8	<0.10
Selenium (Total)	7740[1]	mg/l	<0.0010	<0.0010

(1) U.S. Environmental Protection Agency, 1987, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.
(2) NAP = Not applicable.
(3) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.

DIVISION OF WASTE MANAGEMENT
1508 WESTEN AVENUE
BOWLING GREEN KY 42104
(502) 843-5475

RECEIVED
EPA/REGION
OCT 13 1 5
WAST
COMPLIANCE

RCRA GRANT INSPECTION REPORT

1) FACILITY INFORMATION

KYD-005-458-401
Cooper Industries (Kirsch), Inc.
Gallatin Road
Scottsville - Allen County

2) INSPECTOR AND AUTHOR OF REPORT

Robbie McGuffey
Environmental Inspector
Bowling Green Regional Office

3) DATE & TIME OF INSPECTION

June 16, 1994
12:45 pm

4) PURPOSE OF INSPECTION

Inspect and document disposal sites on property. Determine facilities compliance with applicable state hazardous waste regulations. Fulfill 1994 4th Quarter Grant Commitment. (Land disposal site)

5) INSPECTION PARTICIPANTS

Robbie McGuffey, Environmental Inspector
Division of Waste Management
Jack Watkins, Environmental Inspector
Division of Waste Management
Kyle Whetstone, Manufacturing Engineering & Maintenance
Cooper Industries
Eric Alexander, Plant Manager
Cooper Industries
David Sampson, Maintenance Supervisor
Cooper Industries

6) FACILITY DESCRIPTION

Cooper Industries, formerly Kirsch Company, manufactured drapery and curtain rods from 1960 till May 1990. Processes that generated wastes during that period included a zinc plating line, a paint machine, and a still used to recycle Trichloroethane and Dichloromethane.

The zinc plating line used a treatment process that consisted of a 3,000 gallon concrete cyanide destruct tank and a 5000 gallon concrete neutralization tank. This tank generated an (F008) sludge residue waste. All plating activities were discontinued in 1982 and the equipment was removed. Final clean out inventory of 28 drums of residue, trash, and hydro washings were removed as hazardous wastes by June 1883.

During an inspection in 1989 by representatives of the Columbia Regional office, Division of Waste Management, it was discovered that employees had disposed of plating waste sludges on the plant site. This activity took place from 1972 to 1979. The sludge was generated after the pre-treatment stage of the plating process. This waste was assumed to be high in cyanide and zinc. The sludge was buried in trenches behind the plant with a back-hoe. There were seven trenches identified behind the plant. In the fall of 1979 Kirsch began shipping their plating wastes sludge to LWD for disposal.

7) FINDINGS

On June 16, 1994 an inspection was conducted to observe the trenches behind the plant. Cooper has rebuilt the old plant and is in full production, manufacturing brakes at the facility. Cooper is registered as a limited quantity generator. They will generate (D001) Naphtha waste from parts washers. Cooper has not disposed of any waste since production at the new facility has begun. David Sampson, Maintenance Supervisor, directed us to the trench sites behind the plant. The trenches are 5' wide by 8-10' long and are 5' in depth. The trenches have not been disturbed from any of the construction work that has taken place (see attached photos). Mr. Sampson, who was present during the disposal, stated that pit #7 was excavated but no waste was placed in the trench.

8) VIOLATIONS OBSERVED & REMEDIAL MEASURES

No violations were observed during the inspections.

9) SIGNATURES

Robbie McGuffey
Environmental Inspector II

8-16-94
Date

Kerry McDaniel
Environmental Control Supervisor

9-29-94
Date

Attachments:
- Plant diagrams
- Photos

Copies:
- Frankfort file
- Regional File

RCRA FACILITY ASSESSMENT

COOPER INDUSTRIES
EPA ID #KYD-005-458-401
SCOTTSVILLE, KENTUCKY
ALLEN COUNTY

Report Prepared by:
Vicki Baker

July 1991

Closure plan approval proposed FY91 4Q
Closure certification proposed FY 92 4Q
RFA proposed FY92

ENI-
KY005458401

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ATTACHMENT

Aerial Photo Department of Transportation 1972

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I. EXECUTIVE SUMMARY

This RCRA Facility Assessment (RFA) is based on a Preliminary Review of Division of Waste Management, Division of Air Quality, and Division of Water files as well as a Visual Site Inspection (VSI) and SWMU information submitted by the facility. The file search was conducted in May 1991 and the VSI was conducted on June 17, 1991 and July 11, 1991. The purpose of the RFA is to identify Solid Waste Management Units (SWMUs) at the facility and to evaluate their potential for release of hazardous waste and/or hazardous constituents to air, surface water, soil, groundwater, and subsurface gas. Areas of Concern (AOCs) which may be potential sources of environmental contamination, not necessarily involving wastes, are also identified.

Cooper Industries occupies a total of 43 acres of land at 2620 Gallatin Road in Scottsville, Kentucky in Allen County. Plant #1, the main office and assemblage buildings occupies 39 acres. Plant #2 located across the road was known as the Display Building, occupies 14 acres.

The facility began operating as Scotscraft, a division of Kirsch in February 1961. The Kirsch Company which manufactured drapery and curtain rods was purchased by the parent-firm, Cooper Industries in 1981.

The facility generated zinc plating waste from 1961 until 1982. The plating operation was discontinued when the company began using plastic parts in the manufacturing of drapery and curtain rods. (Reference 1) The company buried plating wastes potentially high in zinc and cyanide behind Plant #1 from 1972-1979. From 1979-1982 the company manifested the waste off-site.

A total of 9 SWMUs were identified as a result of the PR and VSI. Seven SWMUs are suggested for a RFI and one SWMU is suggested for RFA Phase II Sampling. One SWMU requires no further action. The SMWUs identified at Cooper Industries and the suggested further actions for these units are summarized in Table 1-1.

II. INTRODUCTION

The RFA includes a Preliminary Review (PR) of all available relevant documents, a Visual Site Inspection (VSI) and if appropriate a Sampling Visit (SV). This report summarizes the results of the file review conducted in May 1991 and the VSI conducted June 17, 1991 and July 11, 1991. Chapter II of this report provides additional information about the history, process description, waste management practices, environment, and demographic settings of the facility. The SWMUs are described in Chapter III, and tables listing units requiring further actions are presented in Chapter IV. Chapter V contains suggested sampling strategy. Appendix A contains the VSI logbook and Appendix B presents the photographic log.

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TABLE 1 -1

SWMU IDENTIFICATION SUMMARY

SWMU NO.	TYPE OF UNIT	DATES OPERATED	WASTE (S) MANAGED	POLLUTION MIGRATION PATHWAYS 1	POTENTIAL FOR RELEASE 2	EVIDENCE OF RELEASE	RECOMMENDATIONS
1a	Container Storage Area	1961-1990	Dichloromethane and Trichloroethylene	None	L	No	No further action.
1b	Container Storage Area	1961-1990	Dichloromethane and Trichloroethylene	None	L	No	No further action.
2	Landfill	1972-1979	Zinc & Cyanide plating waste	SW,S,GW	H	No	RFI Necessary.
3.	Landfill	1972-1979	Zinc & Cyanide plating waste	SW,S,GW	H	No	RFI Necessary.
4.	Landfill	1972-1979	Zinc & Cyanide Plating waste	SW,S,GW	H	No	RFI Necessary.
5.	Landfill	1972-1979	Zinc & Cyanide Plating Waste	SW,S,GW	H	No	RFI Necessary.
6.	Landfill	1972-1979	Zinc & Cyanide Plating Waste	SW,S,GW	H	No	RFI Necessary.
7.	Landfill	1972-1979	Zinc & Cyanide Plating Waste	SW,S,GW	H	No	RFI Necessary.
8.	Landfill	1972-1979	Zinc & Cyanide Plating Waste	SW,S,GW	H	No	RFI Necessary.
9	Satellite Accum. Area	1971-1990	thinners and Paint; F005	S,GW	M	No	RFA Phase II Sampling.

1 A = air; SW = surface water; S = soil; GW = groundwater; SG = subsurface gas
2 L = low; M = moderate; H = high release potential
* See SWMU description for further information.

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A. File Search and VSI

This RFA is based on a review of file material available at Division of Waste Management, Central Office and Bowling Green Regional Office, Division of Air Quality and Division of Water. The file review was conducted in May 1991 by Vicki Baker, Environmental Engineer Technologist Principal with the Division of Waste Management. The VSI was conducted on June 17, 1991 and July 11, 1991 at Cooper Industries at 2620 Gallatin Road in Scottsville, Kentucky in Allen County. The VSI team representing the Division were Vicki Baker and Jack Watkins, Environmental Inspector with the Bowling Green Regional Office.

Arriving on site at approximately 2:45 p.m. on June 17, 1991 an entry interview was conducted with Mike Miller, David Sampson, and Otis Brown. Mr. Miller is an Environmental Engineer with Cooper Industries located in Sturgis, Michigan. Mr. Sampson and Mr. Brown were employed by Cooper Industries for many years and now work as groundskeepers at the closed facility. The Cooper Industries representatives responded to questions concerning past operations at Cooper Industries.

The site tour began at approximately 3:30 p.m. Mike Miller and David Sampson led us through the former manufacturing portion of Building 1. We also walked the grounds surrounding the building. The VSI tour ended at approximately 4:30 p.m. A wrap-up meeting was held until approximately 4:45 p.m. The temperature during the VSI was approximately 85° Fahrenheit. The skies were clear with little or no breeze.

On July 11, 1991 Jack Watkins and Vicki Baker returned to Cooper Industries to investigate information received concerning a pond located on Plant #1 property. During the June 17, 1991 VSI we did not observe any ponds on the property. Rick Uber, with Cooper Industries in Houston, Texas met us at 12 noon to conduct a tour of Plant #2 and to respond to questions about the pond on Plant #1 property. The pond in question was probably the former cyanide destruct tank located beside the former treatment plant. This unit was closed in 1983. The Division dropped enforcement action against the facility on April 4, 1984. The VSI team did not observe a pond anywhere on the property at Plant #1. The VSI team continued on to Plant #2. This facility had a satellite accumulation area in a room approximately 16'x18'. According to Rick Uber some raw products were stored here such as paints, paint thinner, and varnish. There were usually 2-3 drums partially filled with waste stored in this room.

The drums were then taken over to Plant #1 to be manifested off-site. There was a floor drain down the middle of the concrete floor. The drain led directly to a hole in the outside wall. Stains were observed on the floor. The rest of Plant #2 was empty. The walls and floors appeared to be intact.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

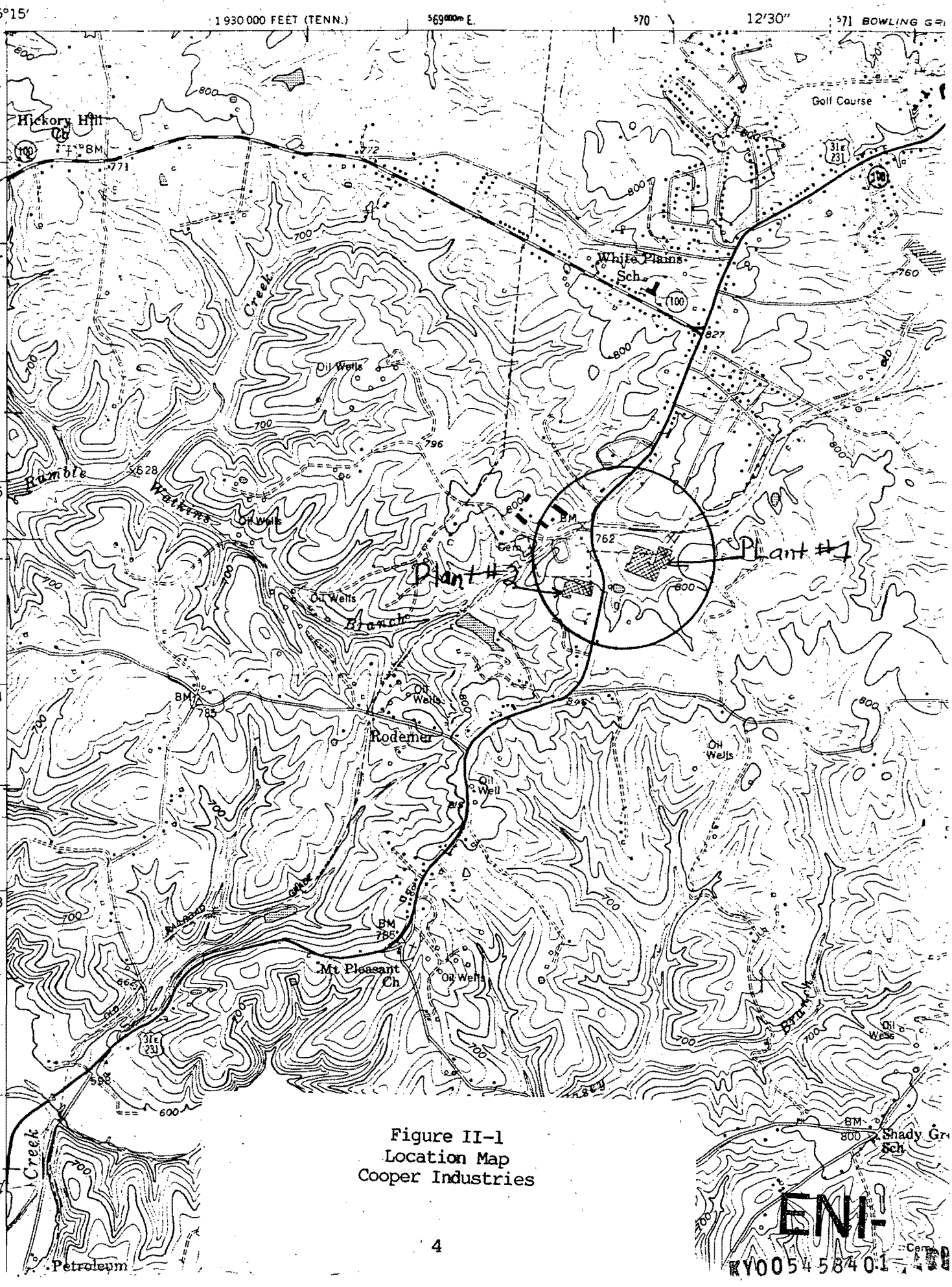

Figure II-1
Location Map
Cooper Industries

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B. Facility Description

Cooper Industries is located at 2620 Gallatin Road in Scottsville, Kentucky in Allen County. The facility manufactured drapery and curtain rods until May 25, 1990 when operations ceased. The closing down of this facility was a basic business decision. (Reference 2)

The facility began operating as Scotscraft, a division of Kirsch in February 1961. Cooper Industries acquired the facility in 1981. Since the facility ceased operating on May 25, 1990, David Sampson and Otis Brown have responsibility of keeping up the grounds. Both men worked for the facility during the years it operated as a drapery and curtain rod manufacturing facility.

Entry to the site is not controlled by a fence or gate. The access to the site is via a driveway from Gallatin Road in Scottsville.

The company had a pretreatment permit for discharge of industrial wastewaters into the publicly owned treatment works. (Reference 3) The pretreatment system was previously located in Plant 1.

Cooper Industries indicated that the only wastewaters discharged to the sewers were domestic wastes from restrooms. Representatives from the Division of Water indicated that the Division will inactivate Scottsville's pretreatment program due to lack of industrial source. (Reference 4)

The interior of the Plant #1 is empty. The roof of this building is in poor condition. There were many areas where water had pooled on the concrete floor.

The Division of Air Quality issued permit 0-76-77 for nine (9) points of emission on September 11, 1984. (Reference 5)

The facility had four (4) underground storage tanks. There was a 4,000 gallon tank located inside the manufacturing portion of Building #1. The tank was a process tank that collected the over run of the plating solution. The plating solution was pumped back up into the process. (Reference 6) There was a 1,000 gallon, 2,000 gallon, and 20,000 gallon underground storage tanks that held fuel oil. The underground storage tanks were removed by OSCO in 1988. (Reference 7)

The Division of Waste Management conducted a sampling investigation of drinking water wells in a one-mile radius of Cooper Industries. The investigation was conducted because the regional office received information from Cooper Industries representatives that plating wastes had been buried on-site from 1972-1979. The investigation revealed that 27 homes used wells for a water supply and one home used a spring. There was information about a contaminated spring located adjacent to the Gate Service Station on Paul Stinson's property located approximately one mile

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north of Cooper Industries. The Division's Underground Storage Tank program indicated that the contamination could be from a leaking underground storage tank. However, trichloromethane was observed in samples. Dichloromethane was stored at Cooper Industries in the indoor storage area in Plant #1. The Regional Office representatives requested that the local health department place a sign at the Paul Stinson property identifying the well as contaminated. (Reference 8) The case was referred to the Uncontrolled Sites Branch for assessment. Additional sampling was conducted on August 31, 1989. At least eleven of the original eighteen wells sampled had test results below the maximum contaminant level. The Scottsville City Water and the Allen County Water District have been active in laying water lines in Allen County. The Allen County Health Department said that many of the people within a one (1) mile radius of Cooper Industries would now have access to city or county water. (Reference 9)

In 1983 Cooper Industries, then Scotscraft, entered into an Agreed Order with the Natural Resources and Environmental Protection Cabinet for the disposal of sludge in the sludge tank (cyanide destruct tank). The facility had previously used the tanks to destroy the cyanide by using chlorine. The waste was manifested off-site and a closure plan was submitted May 26, 1983 for closure of the tanks. The Division accepted the certification of closure on February 24, 1984. (Reference 10)

Plant #2 located across the road from Plant #1 was previously the site for Wood Master. Wood Master discontinued operations in 1971. Cooper Industries began using the site which was known as Plant #2 and/or the Display Building sometime after 1971.

The VSI team, Rick Uber, and David Sampson toured Plant #2 and the grounds. The area previously used for satellite accumulation is a room approximately 16'x18'. The concrete floors were stained with paint. A floor drain was located down the middle of the room. The drain ran directly to a hole in the exterior wall. The hole is visible from inside the room as well as from outside the building.

Following is a list of solvents compiled from all thinners used at Plant #2:

Cellosolve Acetate	Methyl Alcohol
Mineral Spirits	Methyl Ketone (MEK)
Isobutanol	Ethyl Acetate
Zylene	Isobutyl Acetate
Lactol Spirits	Isobutyl Isobutyrate
Toluene	V M and P Naphtha
Isopropanol	Methyl Isobutyl Ketone (MIBK)
2-Heptanone	

The paints used at Plant #2 were nitrocellulose lacquers.

The wastes accumulated in Plant 2 would comprise of the above listed solvents and paint. Approximately 2-3 drums of waste were

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stored in this room at any given time. (Reference 11)

The rest of Plant #2 was used for lumber storage, displays of products, raw product storage, and a carpentry shop. There was a wood dust collector used in the carpentry shop area. This wood dust collector was leftover from Wood Master.

When Cooper Industries occupied the site, a wood dust collector had been torn down and was located in the parking lot. The equipment was dismantled as much as possible and placed in a wooded area behind the building.

Drains in the parking lot and surface water drains to a pond on Cooper Industries property. The pond is approximately 50' in diameter and very shallow. David Sampson says he tries to keep the pond siphoned out to minimize drowning hazard to local children that may decide to play in the pond.

C. Process Description

Cooper Industries manufactured drapery and curtain rods until May 25, 1990. A zinc plating line was operated until 1981. A sludge potentially high in cyanide and zinc was generated during this process. Sludge was buried in pits behind Building #1 from 1971-1979. (Reference #12)

The file search indicates that the sludge generated from the plating operation would be disposed at LWD, Inc. beginning July 1, 1979. The sludge from this process was pumped to a 3,500 gallon storage tank and then transferred to a chlorine gas treatment system where cyanide compounds were supposedly destroyed. The plating line was discontinued and according the Mike Miller the machine was sold in 1981. The cyanide destruct tanks were closed in 1983. The Division accepted the certification on February 24, 1984. The company began using plastic parts in the manufacturing process. (Reference 13) However, a RCRA inspection indicates that the plating line was not discontinued until 1983. (Reference 14)

The company operated a paint line until 1987. The paint machine generated a sludge consisting of paint, paint sludge, and mineral spirits. The waste was shipped off-site to LWD. (Reference 15)

Waste dichloromethane and waste trichloroethylene were stored on-site for two (2) to three (3) years prior to 1985. On November 13, 1985 the company began shipping the waste dichloromethane to LWD, Inc. The file search indicates that the facility did not have waste trichlorethylene after 1985. The file search further indicates that company gave the waste trichloroethylene away to employees for use on fence rows, etc. The last shipment of waste dichloromethane was September 30, 1988. (Reference 16)

Plant #2 had a satellite accumulation area. The following is

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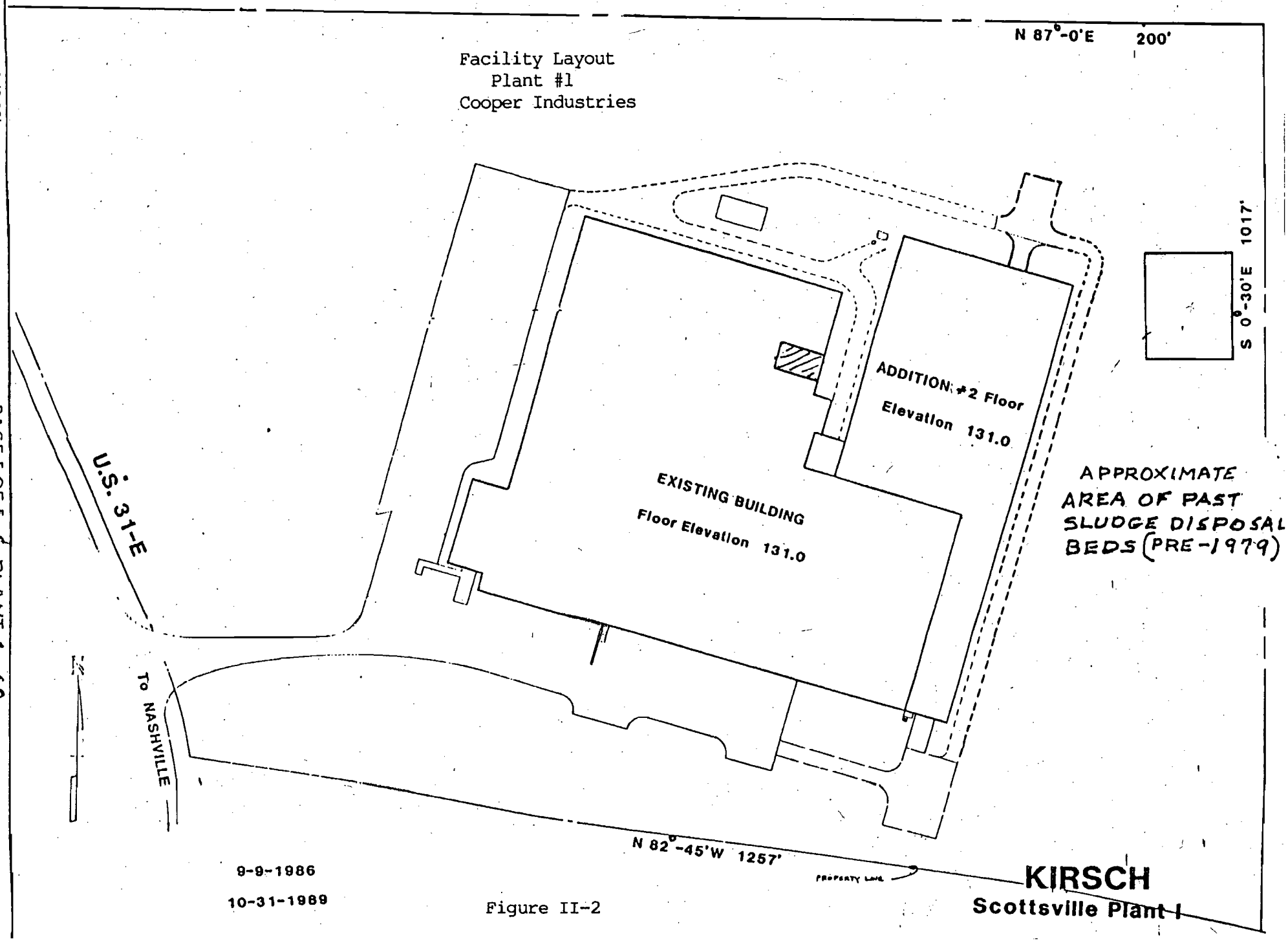
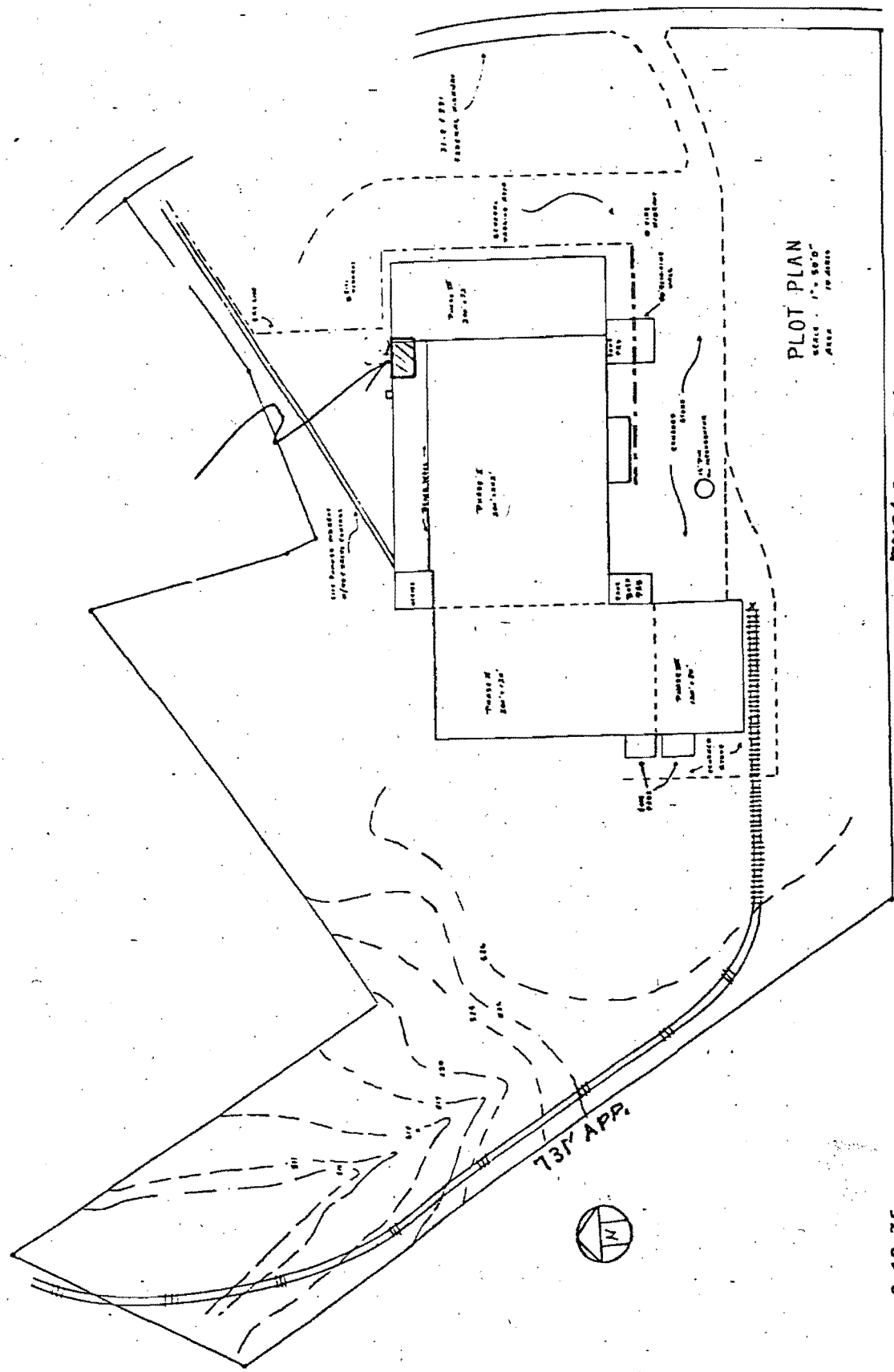

Facility Layout
Plant #1
Cooper Industries
N 87°-0'E 200'
S 0°-30'E 1017'
ADDITION #2 Floor
Elevation 131.0
EXISTING BUILDING
Floor Elevation 131.0
APPROXIMATE
AREA OF PAST
SLUDGE DISPOSAL
BEDS (PRE-1979)
U.S. 31-E
TO NASHVILLE
N 82°-45'W 1257'
PROPERTY LINE
9-9-1986
10-31-1989
KIRSCH
Scottsville Plant I

Figure II-2

Continued from page 4.

V. FACILITY DRAWING *(see page 4)*



Facility Layout
Plant #2
Cooper Industries

Figure II-3

KIRSCH
Scottsville Plant II

2-13-75
10-31-1989

a list of solvents used as thinners at Plant #2:

Cellosolve Acetate	Methyl Alcohol
Mineral Spirits	Methyl Ethyl Ketone (MEK)
Isobutanol	Ethyl Acetate
Zylene	Isobutyl Acetate
Lactol Spirits	Isobutyl Isobutyrate
Toluene	V M and P Naphtha
Isopropanol	Methyl Isobutyl Ketone (MIBK)
2-Heptanone	

The paints used at Plant #2 were nitrocellulose lacquers. (Reference 17) Cooper Industries closed down both Plant #1 and Plant #2 on May 25, 1991.

D. Wastes Generated and Waste Management Practices

The facility is closed. There are no current waste streams generated.

Prior to closing down on May 25, 1990, the facility was registered as a Limited Quantity Generator. The waste stream listed was D001-Ignitable Liquid. Prior to 1989 they were registered as a Full Quantity Generator with Waste Flammable Liquid (D001) and Waste Dichloromethane (F002).

Plant #2 had a satellite accumulation area. The following is a list of solvents accumulated at that site:

Cellosolve Acetate	Toluene	Ethyl Acetate
Mineral Spirits	Isoproponal	Isobutyl Acetate
Isobutanol	2-Heptanone	Isobutyl Isobutyrate
Zylene	Methyl Alcohol	V M and P Naphtha
Lactol Spirits	Methyl Ethyl Ketone (MEK)	Methyl Isobutyl Ketone (MIBK)

The paint used at Plant #2 was nitrocellulose lacquers. (Reference 18)

E. Regulatory History

1. <u>Hazardous Waste</u>

The facility, then known as Scotscraft, submitted a Part A on October 27, 1980. The wastestream listed was F002 in tank and containers. On March 23, 1984, the facility, then known as Kirsch, requested withdrawal of its Part A. The Division withdrew the Part A on June 8, 1984.

On January 15, 1980, the company registered as a Hazardous Waste Generator. The wastestreams listed were zinc plating sludge, paint sludge and cutting oil.

EPA Form 3510-3 (6-80)

SWMU Location Map
Plant #1
Cooper Industries

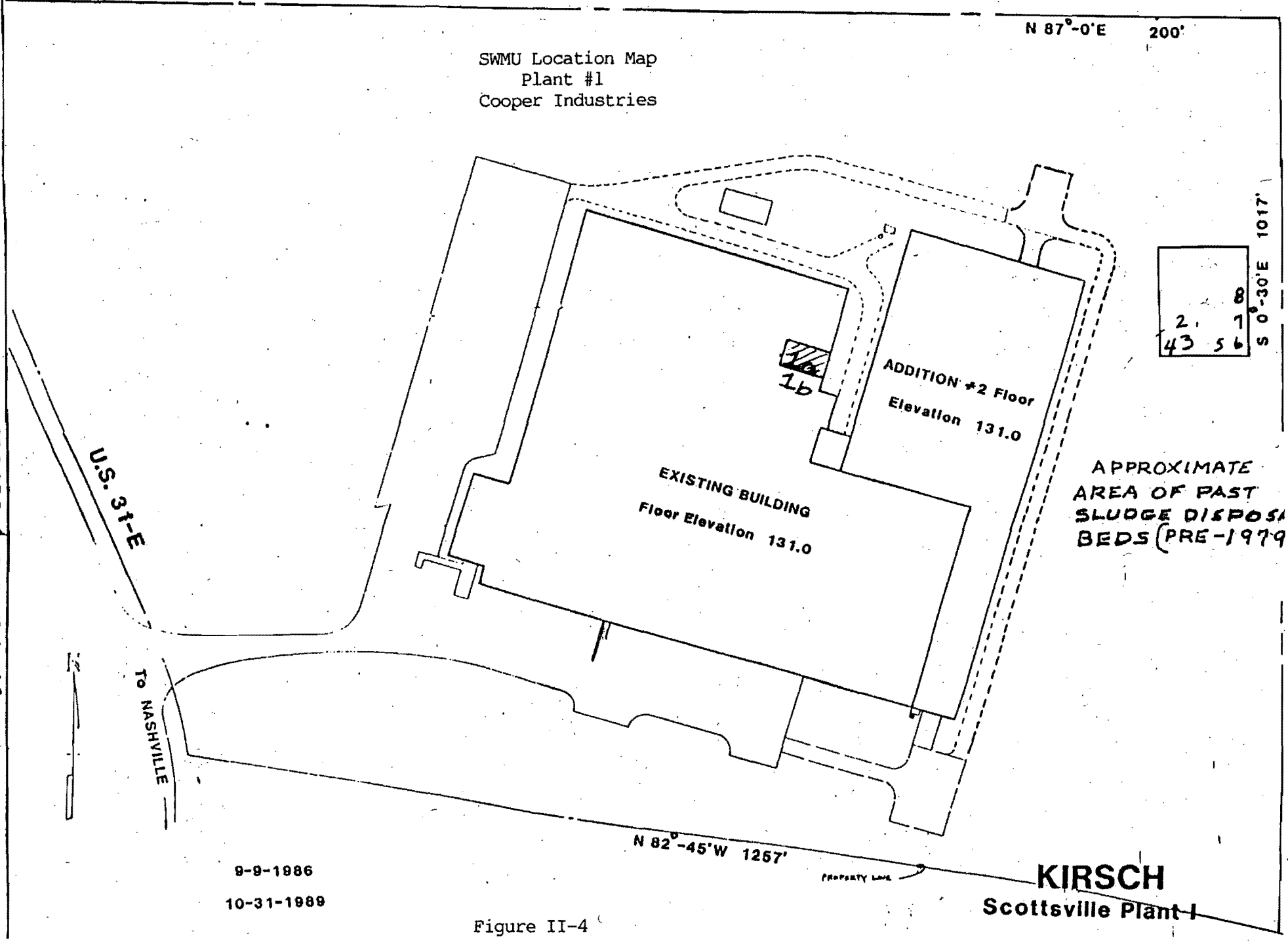
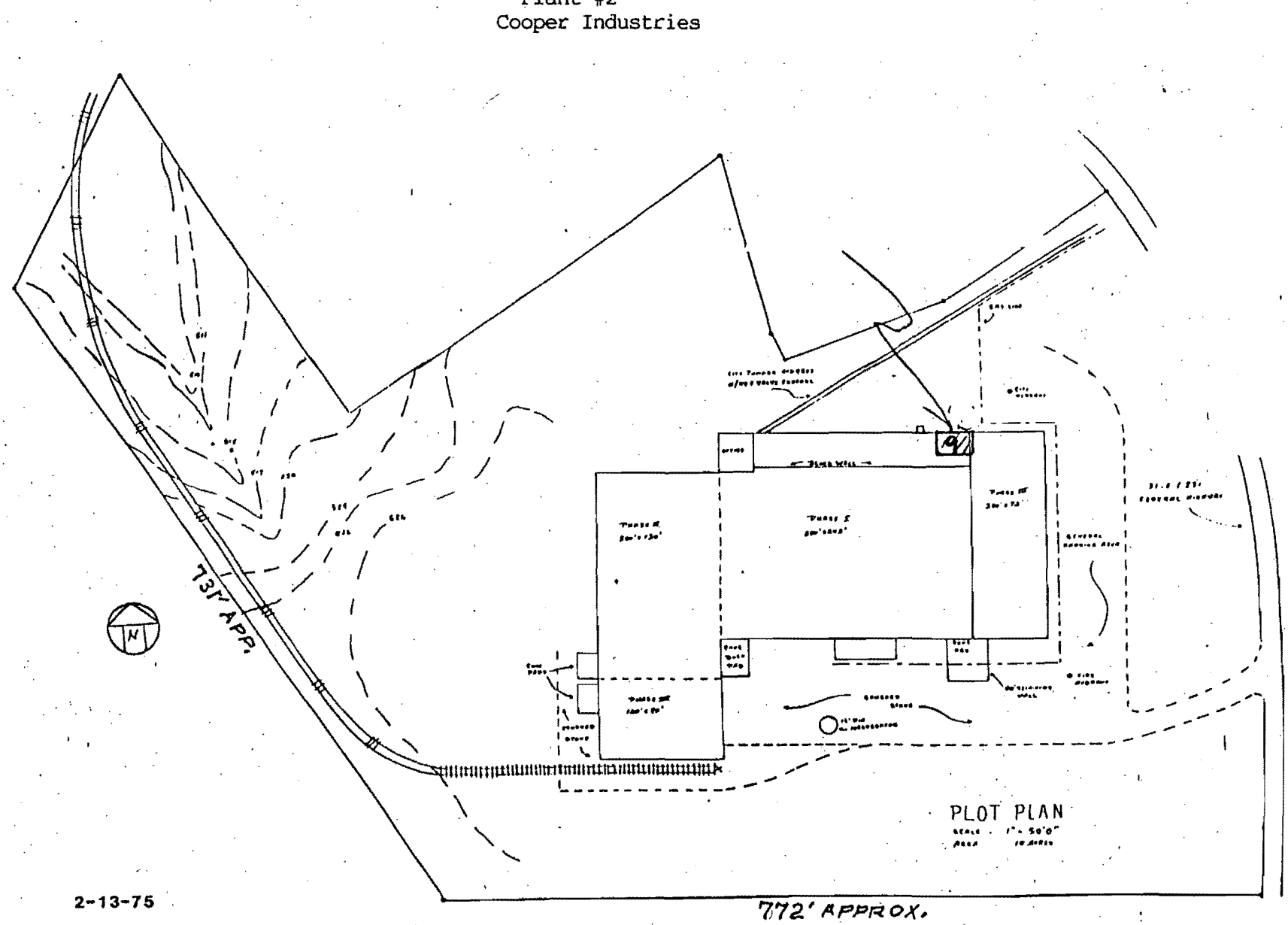


Figure II-4

Continued from page 4.

V. FACILITY DRAWING (see page 4)

SWMU Location Map
Plant #2
Cooper Industries



2-13-75

10-31-1989

Figure II-5

KIRSCH
Scottsville Plant II

The Division of Waste Management conducted Limited Quantity Generator Inspections on July 19, 1989 and a follow-up on August 24, 1989. The company was out of compliance for the following:

Item	Regulatory Cite
Manifest Document #01833 Dated 8/20/86 Original not on file, exception report not submitted	401 KAR Chapter 32:040, Section 1 and 3
Waste Dichloromethane Stored on site for approximately two years prior to shipment to disposal site on November 13, 1985	401 KAR Chapter 32:030, Section 5

The August 24, 1989 inspection report was a follow-up. All previous non-compliances were corrected. (Reference 19)

The Division issued a Notice of Violation to the facility on November 8,1982 for failure to demonstrate compliance with financial assurance and sudden liability. On January 20, 1983 the Division requested that the facility submit a closure plan and cost estimates because they had not requested withdrawal of their Part A or closed the facility. The Division issued a NOV on April 4, 1983 because the company did not respond to the November 8, 1982 NOV and did not submit a closure plan and cost estimates as required in the January 20, 1983 letter.

An informal hearing was scheduled for April 12, 1983. An Agreed Order was developed as a result of the informal hearing and was effective on May 31, 1983. The facility submitted a certification of closure of the sludge tank on February 17, 1984 which the Division approved on February 24, 1984. The Division closed the case against the company on April 4, 1984. (Reference 20)

The Division issued a letter of warning to the company on March 28, 1985 for failure to submit the annual report.

The Division began negotiating another Agreed Order with Cooper Industries in 1990. This Agreed Order required a closure plan for the indoor storage area. The closure plan was submitted in July 1990 and has been reviewed by the Division. The review process is near completion.

The facility buried sludge plating wastes behind Plant #1 from 1971-1979. There are approximately seven (7) pits where the sludge which is potentially high in zinc and cyanide was buried.

The Uncontrolled Sites Branch investigated the site in August 1989. The Columbia Regional Office and the Uncontrolled Sites Branch collected samples from springs around the company. One of

the samples indicated levels of metals and cyanide that could be expected from contamination resulting from plating sludge. (Reference 21) In December 1989, it was decided that this facility would be regulated under RCRA not CERCLA.

2. Air

The facility then known as Scotscraft received construction permit C-75-54 from the Division of Air Quality on August 8, 1975 for two (2) points of emission. These were a Peerless Boiler and Spray Paint Booth. On September 3, 1975 permit 0-75-113 was issued for the following points of emission:

03 - Natural Gas Fired Boiler
04 - Natural Gas Fired Boiler
05 - Space Heater
06 - Air Heater
07 - Paint Dip Line
08 - Zinc Plating Line

On September 7, 1976 permit 0-76-77 was issued for the following three (3) points of emission:

02 - Spray Paint Booth
08 - Zinc Plating Line
09 - Wood Working Operation

The Division of Air Quality issued permit 0-76-77 on September 11, 1984 for the following points of emission:

01 - Boiler
02 - Spray Paint Booth
03-05 - Boilers
06 - Flow-Coat Painting Line
07 - Paint Bake Oven
08 - Zinc Plating Line
09 - Wood Working Operation

The Division of Air Quality inspected the facility on April 8, 1987 and January 1, 1990. The facility appeared to be operating in compliance with the Air Quality Regulations. There was no evidence of NOV's or other enforcement activity.

The company filed a Ten Day Report Form for Prior Notification of Asbestos Abatement Activities. The amount of asbestos to be removed was 50 square feet. The removal was to begin April 5, 1990 with disposal at Walton Landfill in Independence, Kentucky. (Reference 22)

3. Water

Cooper Industries representatives said that the industrial wastewaters were discharged to the Scottsville Publicly Owned

Treatment Works from 1961-1964. From 1964 until 1981 the company had an evaporative recovery system until the zinc plating line was dismantled in 1981.

The City of Scottsville has an approved pretreatment program. However, the Division of Water plans to inactivate the pretreatment program for Scottsville in the near future due to lack of industrial contribution to the sewer system. (Reference 23)

F. RELEASE HISTORY

There was no evidence of any releases to the air, land or water in any of the available file material.

G. ENVIRONMENTAL AND DEMOGRAPHIC SETTING

1. LOCATION, METEOROLOGY, SOILS, AND GEOLOGY

Cooper Industries is located in Allen County in Scottsville, Kentucky at 2620 Gallatin Road also known as U.S. 31-E. It is approximately 30 miles south east of Bowling Green, Kentucky. The latitude is 36°43'35"N and the longitude is 86°13'00"W.

There are definite seasonal differences in the Scottsville, Kentucky area. Temperatures average 76° degrees Fahrenheit in the summer with occasional high temperatures in the upper 90's. The winter months have an average temperature around 35 degrees Fahrenheit with occasional lows below 0 degrees Fahrenheit.

The average precipitation is 50.95 inches per year with 12.9 inches per year being snowfall. (Reference 24)

There is no site-specific information available regarding soils and geology. The following discussion is based on regional and county information from the U.S. Geolgical Survey (USGS) and the county soil survey.

The site is located within the northern part of the Mississippian Plateau Physiographic province. Topography is characterized by well-dissected uplands, ridges and karst features. The site lies on a broad upland that slopes to the west to Watkins Branch. The region (reference U.S.G.S. maps) is underlain by Upper Mississippian Salem and Warsaw limestones which outcrop along the ridges and slopes. Bedrock in Allen County is composed of horizontal beds that dip gently to the north. Bedrock structures, jointing and joint (including fractures) patterns, and surficial deposits influence the surface drainage pattern. Karst topography, ridgetops, side slopes, and valleys dissected by small streams and drainage ways from the landscape of the Allen County.

According to the Soil Survey of Allen County, the site is underlain by soils of the Trimble-Bedford-Mountview Association. These soils are deep, well drained to moderately well drained with loamy to loamy clayey subsoils. Trimble soils formed in residum from limestone. A representative soil profile is characterized by

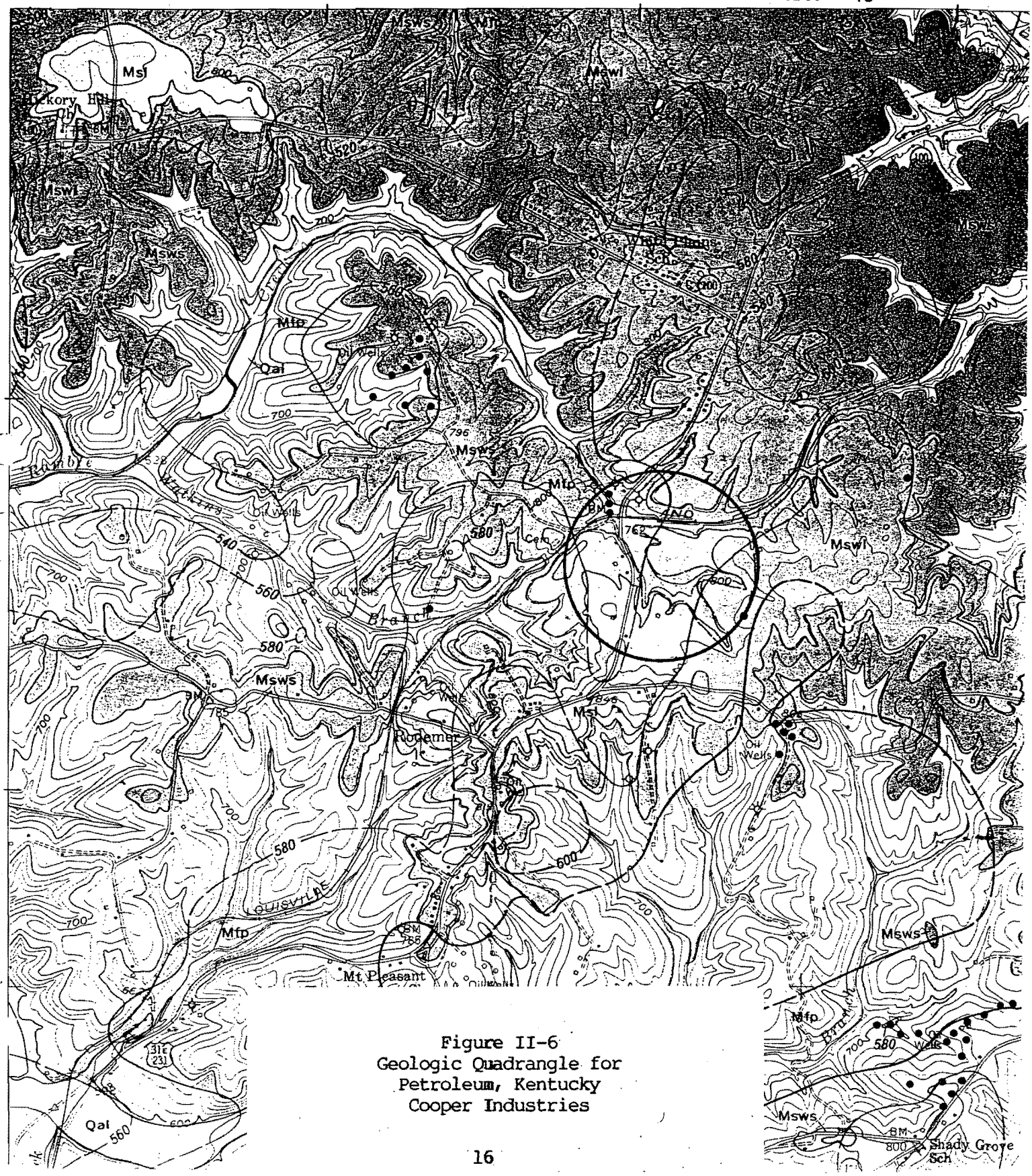


Figure II-6
Geologic Quadrangle for
Petroleum, Kentucky
Cooper Industries

4 inches of gravelly silt loam underlain by subsoils extending to a depth of about 63 inches or more. The upper part to a depth of about 40 inches is yellowish brown gravelly silt loam and brownish yellow gravelly clay loam. The middle part to a depth of about 52 inches is mottled strong brown, light yellowish brown, and yellowish brown gravelly clay loam. The lower part of the subsoil is strong brown silty clay loam that has reddish yellow and light yellowish brown nottles. Depth to bedrock is more than 60 inches.

2. Groundwater

Aquifers in the site area include the Mississippian Osage and Meramac Series Limestones. Most drilled wells are adequate for a domestic supply. The well yield is commonly 2 to 10 gallons/minute and the common well depth is about 100 feet. A few wells are lowland areas bordering streams that will yield enough for a domestic supply with power pump (more than 500 gpd). Most wells obtain water from fractures and small solution openings in limestone. There is significant potential for groundwater contamination through sinkholes and solution-formed cavities associated with limestone.

The water is generally hard, and deeper supplies may contain hydrogen sulfide. No-site specific information regarding groundwater is available. From ground surface elevations and elevations of nearby streams shown on the USGS topgraphic quadrangle, the depth to groundwater can be estimated at approximately 20 feet. In the region the common depth range is 20 to 70 feet.

3. Surface Water

There are at least two (2) streams in close proximity to the facility. Watkins Branch is located to the west of Plant #2. Ramble Creek is located to the North of Plant #1. Both streams show up as a blue line stream on U.S.G.S. topographic map. There is a pond located south west of the Plant #1 on the adjacent property. The parking lot of Plant #1 slopes to the southwest.

4. Environmental Receptors

Surface Water

The facility is situated near at least two (2) blue line streams. Watkins Branch is located to the west of Plant #2. Ramble Creek is located to the north of Plant #1. Due to close proximity of both streams, any surface drainage could potentially reach these streams. The pond located south west of Plant #1 could potentially receive surface drainage.

Groundwater

There is significant potential for groundwater contamination through sinkholes and solution formed cavities associated with limestone in the area.

Air

The facility is no longer operating therefore it is unlikely that there would be a release to the atmosphere. The SWMU's on site are located inside Plant #1 or are buried behind.

Direct Contact

There does not appear to be a threat to human health from direct contact. The indoor storage area is currently undergoing clean closure. All characterized wastes have been removed from the site. The zinc plating wastes were buried behind the Plant #1. Safety precautions should be taken when the facility begins investigating burial pits.

CHAPTER III

SWMU DATA SHEETS

SWMU DATA SHEET

SWMU NUMBER: 1a **PHOTO NUMBER:** 2

NAME: Indoor Storage Area

TYPE OF UNIT: Primary Drum Storage Area

PERIOD OF OPERATION: 1961-1990

PHYSICAL DESCRIPTION AND CONDITION:

The room is underlain by a concrete floor. The room is approximately 14'x28' in dimension. Rows of drums, two (2) deep stood against the longest walls. The floors were intact and without floor drains. All drums have been shipped off-site.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

Waste Dichloromethane and waste trichloroethylene were stored in the past.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L) Groundwater (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS:
No Further Action (X)
RFI Necessary ( )
RFA Phase II Sampling ( )

REFERENCES: Photo #2

COMMENTS:

The Division has reviewed the clean closure plan for the Indoor Storage Tank Area. The 2nd NOD was sent out on June 4, 1991.

SWMU DATA SHEET

SWMU NUMBER: 1b **PHOTO NUMBER:** 3

NAME: Indoor Storage Area

TYPE OF UNIT: Auxiliary Drum Storage Area

PERIOD OF OPERATION: 1961-1990

PHYSICAL DESCRIPTION AND CONDITION:

Drums were stored next to the primary storage area. The floor underneath is concrete.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

Waste Dichloromethane and waste trichloroethylene were stored here in the past.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L) Groundwater (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS:
No Further Action (X)
RFI Necessary ( )
RFA Phase II Sampling ( )

REFERENCES: Photo #3

COMMENTS:

The Division has reviewed the clean closure plan for the Indoor Storage Area. The 2nd NOD was sent out on June 4, 1991.

SWMU DATA SHEET

SWMU NUMBER: 2 **PHOTO NUMBER:** 4

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operation, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with a five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #4

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 3 **PHOTO NUMBER:** 5

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operations, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H) Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS:
No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #5

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 4 **PHOTO NUMBER:** 6

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operations, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with a five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H) Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS:
No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #6

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 5 **PHOTO NUMBER:** 7

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operations, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with a five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #7

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 6 **PHOTO NUMBER:** 8

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operations, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with a five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS:
No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #8

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 7 **PHOTO NUMBER:** 9

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operations, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with a five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #9

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 8 **PHOTO NUMBER:** 10

NAME: Sludge Burial Area

TYPE OF UNIT: Landfill

PERIOD OF OPERATION: 1972-1979

PHYSICAL DESCRIPTION AND CONDITION:

During the period of operations, the facility buried plating wastes potentially high in zinc and cyanide. Holes were excavated using a tractor with a five (5) foot blade. The pits were approximately six (6) feet wide, four (4) feet deep and 10-12 feet in length. The area is covered with grass and marked with a metal pole. The sludge burial area is behind Plant #1.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge from the plating line was potentially high in zinc and cyanide.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Groundwater (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

No evidence of release was observed during the VSI and in the available file material.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)
RFA Phase II Sampling ( )

REFERENCES: Photo #10

COMMENTS:

A RCRA Facility Investigation is necessary to determine the vertical and horizontal extent of contamination.

SWMU DATA SHEET

SWMU NUMBER: 9 **PHOTO NUMBER:** 14, 15

NAME: Satellite Accumulation Area

TYPE OF UNIT: Container Storage

PERIOD OF OPERATION: 1971-1990

PHYSICAL DESCRIPTION AND CONDITION:

The satellite accumulation area was in a 16'x18' room with concrete floors in Plant #2. A floor drain located down the center of the room led directly to the outside of the building.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED:

The sludge stored as satellite accumulation were as follows:

Cellosolve Acetate	Toluene	Ethyl Acetate
Mineral Spirits	Isopropanal	Isobutyl Acetate
Isobutanol	2-Heptanone	Isobutyl Isobutyrate
Zylene	Methyl Alcohol	V M and P Naphtha
Lactol Spirits	Methyl Ethyl Ketone (MEK)	Methyl Isobutyl Ketone

The paints used were nitrocellulose lacquers.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (M) Groundwater (M) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(s):

The floors were stained with what appeared to be paint.

RECOMMENDATIONS:
No Further Action ( )
RFI Necessary ( )
RFA Phase II Sampling (X)

REFERENCES: Photo #14, 15

COMMENTS:

I recommend sampling to determine if hazardous constituents remained on the floor and/or walls of the satellite accumulation area. Further samplings should be conducted in the area outside the building where the floor drain led directly from the storage area to the outside.

IV. SUMMARY

The following tables summarize the Solid Waste Management Units at Cooper Industries.

TABLE IV - 1

LIST OF SWMUs

SWMU Number	Description
1a	Indoor Storage Area
1b	Indoor Storage Area
2	Sludge Burial Area
3	Sludge Burial Area
4	Sludge Burial Area
5	Sludge Burial Area
6	Sludge Burial Area
7	Sludge Burial Area
8	Sludge Burial Area
9	Satellite Accumulation Area

TABLE IV - 2

LIST OF SWMUs REQUIRING NO FURTHER ACTION

SWMU Number	Description
1a	Indoor Storage Area
1b	Indoor Storage Area

TABLE IV - 3

LIST OF SWMUs RECOMMENDED FOR RFA PHASE II SAMPLING

SWMU Number	Description
9	Satellite Accumulation Area

TABLE IV - 4

LIST OF SWMUs REQUIRING RFI

SWMU Number	Description
2	Sludge Burial Area
3	Sludge Burial Area
4	Sludge Burial Area
5	Sludge Burial Area
6	Sludge Burial Area
7	Sludge Burial Area
8	Sludge Burial Area

V. SUGGESTED SAMPLING STRATEGY

Unit Number and Name	Dates of Operation and Evidence of Release	Suggested Samples
#2-8;Sludge Burial Areas	1972 - 1979; No	Soil Sampling to determine vertical and horizontal extent of contamination.
#9;Satellite Accumulation Area	1971 - 1990; No	Soil Sampling where the drain exits the building and other areas of potential releases.

REFERENCES

1. Miller, Mike, Environmental Engineer with Cooper Industries. Personal Communication, June 17, 1991.

2. Miller, Mike, Environmental Engineer with Cooper Industries. Personal Communication, June 17, 1991.

3. Division of Water Files.

4. Brumfield, Cyndy, Division of Water. Personal Communication, May 29, 1991.

5. Division of Air Quality Files.

6. Miller, Mike, Environmental Engineer with Cooper Industries. Personal Communication, June 17, 1991.

7. Miller, Mike, Environmental Engineer with Cooper Industries. Personal Communication, June 25, 1991.

8. Division of Waste Management Files.

9. Fitzpatrick, Donnie, Allen County Sanitation. Personal Communication, June 28, 1991.

10. Division of Waste Management Files.

11. Uber, Rick, Cooper Industries, Correspondence, July 23, 1991.

12. Division of Waste Management Files.

13. Miller, Mike, Environmental Engineer with Cooper Industries. Personal Communication, June 17, 1991.

14. Division of Waste Management Files.

15. Division of Waste Management Files.

16. Division of Waste Management Files.

17. Uber, Rick, Cooper Industries, Correspondence, July 23, 1991.

18. Uber, Rick, Cooper Industries, Correspondence, July 23, 1991.

19. Division of Waste Management Files.

20. Division of Waste Management Files.

21. Division of Waste Management Files.

22. Division of Air Quality Files.

23. Brumfield, Cyndy, Division of Water. Personal Communication, May 29, 1991.

24. Climate of Bowling Green, Kentucky Climate Center.

APPENDIX A

VSI LOG BOOK

6/12/91

2pm arrive Cooper Industries

Mike Miller, Eng. Eng.

Ward Sampson Pete Brown
on site

Beaman Schwarzl Feb. 17, 1961
Pt Kirwin
Cooper acquisition 1981

Ceased operating 5/25/90
basic telecommunication

zinc plating stopped in
1981. Started using plastic
parts, etc. Then paint
related mat'ls.
plating machine sold in
1981. Paint line down
1987-1988.
Full Quantity Generator only

39 acres at Plant D
14 acres at Plant 2
43
24,480 sq ft Plant 7
26,700 sq ft Plant 8

after 1972 - sludge, plating waste sent to T & D

waste water

Bldg 2 - satellite acc. only - brought over here

3 ~~TSP~~ ~~Pet~~ petroleum tanks

1 chem.

land all removed in 1981

tank ~~over~~ overrun of plating solution (cyanide) 4,000 g. tank - in Bldg. - Removed 1988 (certified no leakage) Rich Uber put together unit on TSP's. about 5 years ago.

(process tank) (brought back up)

pendon ~~cotag~~ adjacent property - floodwater in [illegible]

weather hot - high 85°

property slopes down to pond (slight slope) damage to roof

Solid waste taken to landfill

TCE. ~~stored~~ trichlorethylene chloride stored in area next to ~~paint~~ paint storage

WWTP - 1961 - 1964 - Had put to city sewers

Then had evaporative recovery systems - dismantled zinc plating line in 1981

left site @ 4:45 pm

Acme set up [illegible] stopped hauling sludge, ~~other~~ (hard to dispose)

~~day~~

Gilmore says 17 sludge burned 1972 - TE check file

Zinc plating was
[illegible] @ Hastes. Stopped
in 1972. Some chemicals
[illegible], sometimes sludge
dumped into trenches, maybe
[illegible] dump. Sludge family/[illegible]
[illegible] pour [illegible]
on site [illegible] 1981
when zinc plating ~~waste~~
[illegible]
then went to city
~~Cities Co. Water [illegible]~~
~~trying~~

most surrounding houses
have city water

3:15pm
photo #1 – View inside empty
Bldg – North

Drum storage area
#2 South side of Bldg

Fuel pump system removed
replaced [illegible]
[illegible] for
flooring [illegible] hole in wall

Had evaporative recovery unit
~~some years ago~~ for [illegible]
Paint machine South side of
Bldg, next to drum storage
area.

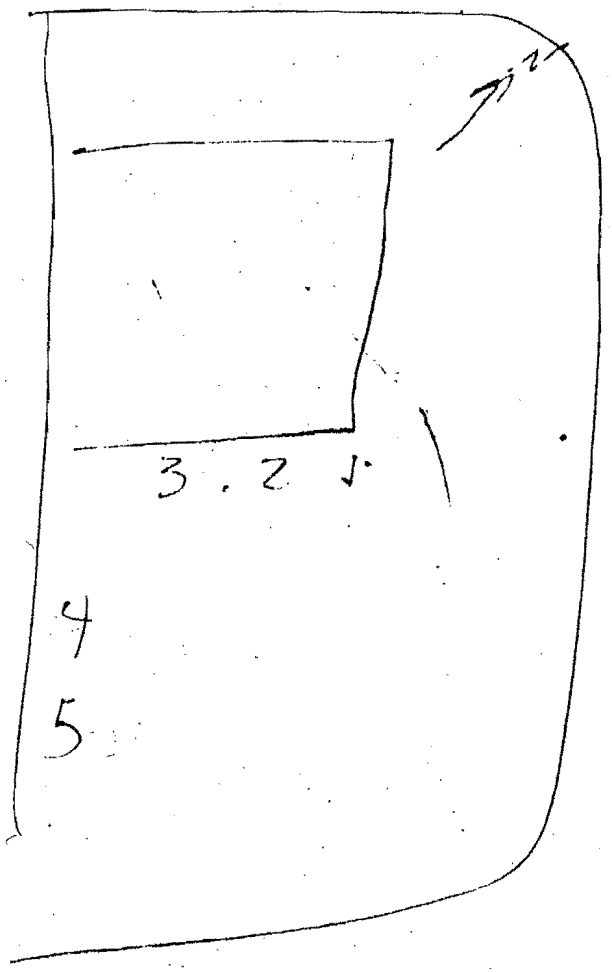
Zinc Plating waste
#1
Holding w/ trailer/bearc (5ft wide)

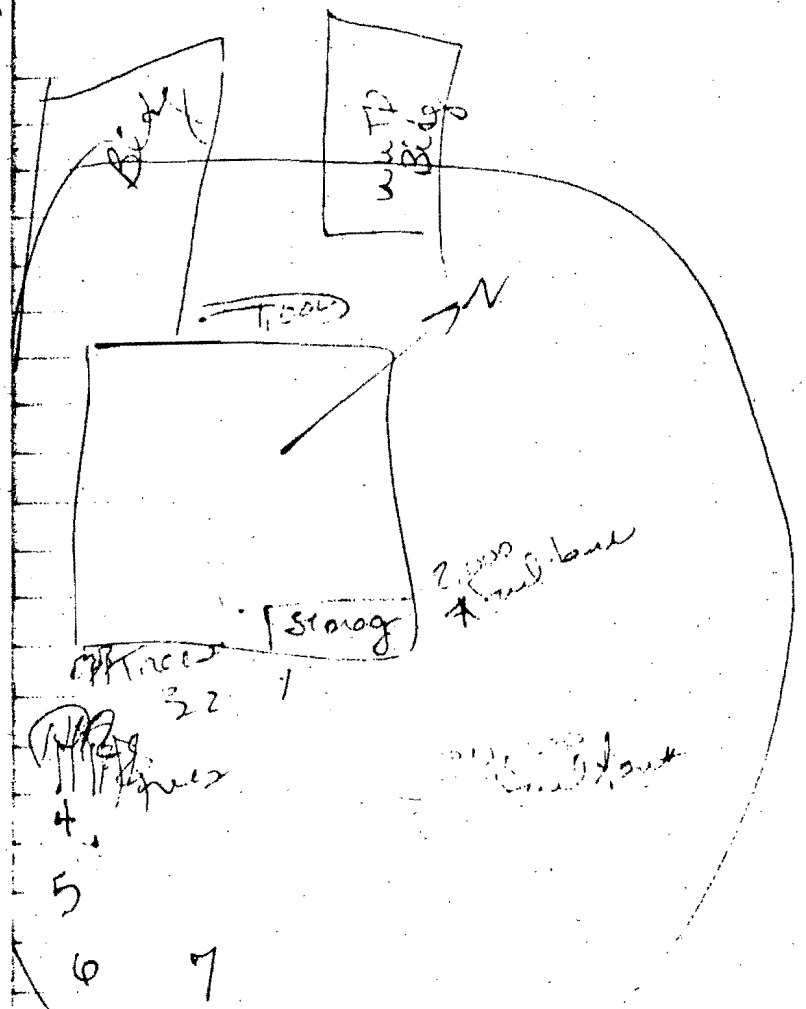
one hole excavated ~~never~~ never used
(approx 6' wide 10-12 ft long
depth unk)

#2 hole

#3 maybe matching (holding
pond maybe
never used

#4
#5 together
#6
#7


3 . 2
4
5


3
N
strong
32
4
5
6
7

7/10/91 11Am Central Time
met Rich Uber @ site - Jean
Watkins there too

next to stop was area where
cyanide pits located - closed
in 1983 thru A.O. 5/10/83

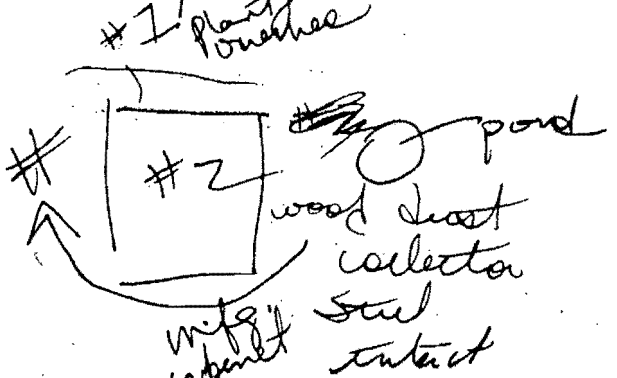
Plant #2 - had varnishing Booths
in this Bldg

Satt Salette accum. area -
seen 2-3 partial drums
then took to Plant #2

Some product storage also
floor [illegible] 1 w/paint etc
room 10X 13
used until 1989
concrete floor - floor drain
down [illegible]

Restaurant area used - bunk
Scouts product storage,
Carpentry Shop + display
area - concrete floor
intact - roof okay.

had a dust collector
in this bldg. now
dismantled + out back in
woods - wood dust collector
from carpentry area



1963-1971 - Wood Master had Bldg
Before Coop. The old
dust collector out Back was
in parking lot when Coop
purchased it.

Drains in parking lot + parking
lot drain to pond - very
shallow - key it siphoned out
so to keep local children from
falling in + drowned - accidents
Wildlife - Pond app 50x50
Could see pipe where siphon
left at noon central time

PHOTOGRAPH LOG
APPENDIX B

PHOTOGRAPH NUMBER: 1

ID: Plant #1

DESCRIPTION: Former manufacturing area for Cooper Industries. Floors appear dark in areas due to water from leaky roof.

PHOTOGRAPHER: Vicki Baker

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 2

ID: SWMU #1a

LOCATION: Plant #1

DESCRIPTION: Former indoor storage area. Floors are wet due to water from leaky roof.

PHOTOGRAPHER: Vicki Baker

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 3

ID: SWMU #1b

LOCATION: Plant #1, next to SWMU #1a

DESCRIPTION: Former auxiliary drum storage area.

PHOTOGRAPHER: Vicki Baker

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 4

ID: SWMU #2

LOCATION: Behind Plant #1, in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. The area where curtain rod is located is general area of the pit.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 5

ID: SWMU #3

LOCATION: Behind Plant #1 in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. The area in center of photo where curtain rods are located is general area of the pit.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 6

ID: SWMU #4

LOCATION: Behind Plant #1, in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. This is the general area where sludge may have been buried.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 7

ID: SWMU #5

LOCATION: Behind Plant #1, in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. The area void of grass is sludge burial area.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 8

ID: SWMU #6

LOCATION: Behind Plant #1, in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. The area with less vegetation is sludge burial area.

PHOTOGRAPH: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 9

ID: SWMU #7

LOCATION: Behind Plant #1, in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. The area where the curtain rod is located is general area where sludge was buried.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 10

ID: SWMU #8

LOCATION: Behind Plant #1, in the eastern portion of the property.

DESCRIPTION: Sludge Burial Area. The curtain rod in the center of photo marks sludge burial area.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 11

ID: Pond located on adjacent property.

LOCATION: South West of Plant #1

DESCRIPTION: Pond located south west of plant #1 on adjacent property.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 12

ID: Plant #1

LOCATION: Front of Plant #1, Cooper Industries

DESCRIPTION: Plant #1

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 13

ID: Former Cyanide Pits

LOCATION: West of Plant 1. The cyanide pits were located at the end of building in photo.

DESCRIPTION: The cyanide destruction pits were approximately 8'x12'x8'.

PHOTOGRAPHER: Jack Watkins

DATE: June 17, 1991

PHOTOGRAPH NUMBER: 14

ID: SWMU #9

LOCATION: Plant 2

DESCRIPTION: Satellite Accumulation Area

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 15

ID: SWMU #9

LOCATION: Plant 2, outside the satellite accumulation area.

DESCRIPTION: Floor drain from satellite accumulation area leads outside.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 16

ID: Plant 2

LOCATION: Inside Plant 2

DESCRIPTION: Interior of Plant 2, formerly used for finishing work, display area and wood working.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 17

ID: Plant 2

LOCATION: West side of Plant 2

DESCRIPTION: Wood dust collector used to collect dust from wood working operation.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 18

ID: Plant 2

LOCATION: North of Plant #2 in wooded area.

DESCRIPTION: Old wood dust collector dumped here after Cooper Industries occupied Plant #2.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 19

ID: Pond

LOCATION: East of Plant #2

DESCRIPTION: Drains and parking lot runoff will drain to this pond.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 20

ID: Siphon from pond.

LOCATION: East of Plant #2

DESCRIPTION: Hose used to siphon water from pond.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991

PHOTOGRAPH NUMBER: 21

ID: Pump for Siphon

LOCATION: East of Plant #2

DESCRIPTION: The pump for siphon is located on top of barrel.

PHOTOGRAPHER: Jack Watkins

DATE: July 10, 1991