UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

QUICK REFERENCE FOR STATUS OF ENVIRONMENTAL INDICATORS					
Name and EPA I.D. Number	Location (City or Town)	**Current CA725 Decision**	Current CA750 Decision (1997)	If Current Decision is Negative, Projected Date for Positive EI	
				CA725	CA750
Kerr-McGee Chemical, LLC MSD 990 866 329	Columbus, MS	**YE**	YE	N/A	N/A

4WD-*RPB*

SUBJ: Evaluation of Kerr-McGee Chemical LLC's (Kerr-McGee) status under the RCRAInfo Corrective Action Environmental Indicator Event Code (CA725)
EPA I.D. Number: MSD990 866 329

FROM: Russ McLean
South Programs Section 9/8/05

THRU: Lael Butler, Chief
South Programs Section 9/08/2005

TO: Jon D. Johnston, Chief
RCRA Programs Branch 9/9/05

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Kerr-McGee's status in relation to the corrective action event code Current Human Exposures Under Control (CA725), defined in the Resource Conservation and Recovery Information System (RCRAInfo):

Concurrence by the RCRA Programs, Branch Chief is required prior to entering these event codes into RCRAInfo. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by dating and signing at the appropriate location within Attachment 1.

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This particular evaluation is the second evaluation for Kerr-McGee's Columbus, MS facility. The initial evaluation was issued on July 2, 1997 and the event code, CA725NO, was entered into RCRIS. This initial evaluation concluded that human exposures were not controlled based on sediment sampling of on-site drainage ditches, indicating levels of carcinogenic PAH constituents two and three orders of magnitude above relevant action levels. These sediments, continually covered by water, presented no unacceptable exposure to on-site workers. However, because of the high concentration of constituents at the facility boundary, and no sampling conducted offsite, it was concluded that levels of these constituents above action levels presented plausible human exposures to contaminants at off-site locations. Additionally, as the Luxapillila Creek, located approximately one-half mile downstream of the facility, is classified for fish and wildlife support and incidental recreational use, human exposure to the sediments and possible bioaccumulation of constituents in aquatic organisms is plausible. The initial evaluation concluded that ground-water migration was under control and the event code, CA750YE, was entered into RCRIS and remains in effect.

III. FACILITY SUMMARY

Kerr-McGee, owns a former wood preserving facility in Columbus, Lowndes County, Mississippi. The site occupies approximately 90 acres and is surrounded by residential and industrial property. The facility commenced operations in 1928, manufacturing pressure treated railroad products including wooden crossties, switch ties and timbers. In 1964, the facility was purchased by Kerr-McGee from Moss American Corporation. Operations at the facility ceased in 2003 and the facility was subsequently decommissioned, with the removal of all process equipment. The only operations currently carried out at the facility are associated with the groundwater recovery system which is operated under the State Post-Closure permit.

The former production process utilized creosote and creosote coal tar solutions to produce pressure treated railroad products. Pentachlorophenol was also used as a preservative until 1976. The facility previously maintained two hazardous waste surface impoundments, an aeration basin and a sedimentation basin, as part of the wastewater treatment system, to settle out solids and preservatives from the process waste water. The sludge generated in the impoundment is identified as the listed waste K001, bottom sediment sludge from the treatment of waste waters from wood preserving processes that use creosote and/or pentachlorophenol. The surface impoundments were replaced by upgrading production process oil/water separators to recycle preservatives for re-application within the production process prior to final discharge to the City of Columbus Publicly Owned Treatment Works (POTW).

On January 27, 1981 Kerr-McGee notified the Mississippi Department of Environmental Quality (MDEQ) and EPA of the operation of the impoundments. Groundwater monitoring was initiated in July 1981 in compliance with RCRA Part 265, Subpart F requirements. The impoundments were closed in the summer of 1986 in accordance with a closure plan approved by MDEQ. In September 1987 Kerr-McGee notified MDEQ of the presence of dissolved creosote constituents in the downgradiant monitor wells. The RCRA Post-Closure permit was issued by

MDEQ to the facility on September 11, 1990 and, included a corrective action program for recovery of the creosote contaminants in the alluvial aquifer. In August 1992 the corrective action system was extended off-site with the construction of a trench and collection gallery system south of the production process area. An additional trench was constructed on-site in the black tie storage area. In addition to the collection sumps and hydraulic barrier recovery wells, seven product recovery wells have been installed in areas in which free product was encountered during past soil assessments. This system has provided for the recovery of contaminants from ground water and the hydraulic containment of the plume preventing further migration.

The HSWA portion of the RCRA permit was issued on August 1, 1995 and required the investigation of 15 SWMUs. Multiple phases of the RFI were conducted to investigate and delineate media associated with these SWMUs. The Phase I RFI was completed in November 1996 and included on-site ditch sediment sampling, groundwater sampling and on-site soil sampling. Based on the detection of contaminants of concern in on-site ditch sediments, sampling of the off-site ditches was imposed to delineate the extent of sediment contamination downstream of the facility. Storm water runoff from the facility is handled by a series of unlined ditches which flow into five permitted NPDES outfalls. Sediment sampling of the ditches at each NPDES discharge point identified carcinogenic PAH contamination generally two to three times above action levels. Subsequent TCLP sampling of these sediments were non-detect for the same constituents indicating that the PAHs are highly adsorbed to the sediments with very low solubilities to water. The off-site investigation did detect the presence of PAHs in the drainage ditch sediments which was documented in the Phase II RFI Report dated October 28, 1998. A supplemental investigation of the off-site ditches by Kerr-McGee was required as part of the RFI. This sampling effort was designed for deeper soil sampling to vertically delineate sediment/soil contamination and to sample surface water at various locations in the off-site portions of the ditches. This investigation was completed in February 2002 and the results documented in the Supplemental Phase II RFI Report dated September 2002.

Based on all historical sampling that was conducted in the ditches, Kerr-McGee developed an Interim Measures plan to excavate soils and sediments in those segments of the ditches which presented a potentially significant risk to human health and to mitigate further contaminant deposition in downstream residential areas.

IV. CONCLUSION FOR CA725

It is recommended that the status code YE be entered into RCRAInfo for CA725, as human exposures are controlled. The RFI has fully delineated soil and sediment contamination on-site and off-site. Interim Measures consisting of sediment and soil removal and backfilling with clean soils in impacted areas of the off-site ditches were completed in October 2004 and documented in the Interim Measures Report dated April 29, 2005. Groundwater contamination is being addressed through a Corrective Action Plan implemented under the State of Mississippi

Hazardous Waste Management Permit. There are no current public or private water supply wells located within the defined areas of the contamination.

Attachment: CA725: Current Human Exposures Under Control

Current Human Exposures Under Control
Environmental Indicator (EI) RCRAInfo Event Code (CA725)

ATTACHMENT
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo Code (CA725)
Current Human Exposures Under Control

Facility Name: **Kerr-McGee Chemical LLC (KMC)**
Facility Address: **Columbus, Mississippi**
Facility EPA ID #: **MSD 990 866 329**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   ✓ If yes - check here and continue with #2 below,

   ____ If no - re-evaluate existing data, or

   ____ If data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

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Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	✓			PAHs
Air (indoors)[2]		✓		
Surface Soil (e.g., <2 ft)	✓			PAHs
Surface Water	✓			
Sediment	✓			PAHs
Subsurface Soil (e.g., >2 ft)	✓			PAHs
Air (outdoors)		✓		

____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__✓__ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):Ground water: Ground water is contaminated with constituents of the preservative creosote, which consist primarily of polynuclear aromatic hydrocarbons (PAHs). There are two on-site contaminant source areas, the former production process area located in the southwestern corner of the facility and the black tie storage area which occupied the eastern half of the facility. The associated plumes for these areas contain both free creosote product and dissolved phase constituents (Figure 1).

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1 "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

2 Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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Within the black tie storage area, free product plumes are associated with a rail car loading/unloading area in the southeastern corner of the facility and a limited impact area of unknown origin in the northeastern corner of the facility, immediately south of 14th Avenue. Current constituent concentrations are documented in the Semi-Annual Corrective Action Performance Evaluation/Groundwater Monitoring Reports for 2004. These reports indicate maximum dissolved phase concentrations of the following PAH constituents: naphthalene at 9200 μg/l, acenaphthylene at 93 μg/l, fluoranthene at 150 μg/l, phenanthrene at 3000 μg/l, benzo(a)anthracene at 260 μg/l, benzo(b)fluoranthene at 140 μg/l, benzo(a)pyrene at 110 μg/l, and indeno(1,2,3-cd)Pyrene at 48 μg/l. The PRGs for each of these constituents are; naphthalene-6.2 μg/l, acenaphthylene-370 μg/l, fluoranthene- 1500 μg/l, phenanthrene-N/A, benzo(a)anthracene-.092 μg/l, benzo(b)fluoranthene-.092 μg/l, benzo(a)pyrene-.0092 μg/l and indeno(1,2,3-cd)pyrene-.092 μg/l.

Soils: During the initial phase of the RFI surficial soil sampling was conducted in the areas of the facility occupied by the wastewater treatment system, the former cooling tower basin and the black tie storage area. Soil contamination in former process areas occupied by the retorts, storage tanks and drip pad had previously been delineated through soil borings collected during the groundwater quality assessment program in 1989. Sample analyses conducted on RFI soil samples identified concentrations of carcinogenic PAHs and pentachlorophenol above relevant action levels in all areas sampled. Maximum constituent levels detected in on-site surface soils include; benzo(a)anthracene at 220 mg/kg, benzo(a)pyrene at 110 mg/kg, benzo(b)fluoranthene at 160 mg/kg, dibenz(a,h)anthracene at 23 mg/kg, indeno(1,2,3-cd)pyrene at 49 mg/kg and pentachlorophenol at 1000 mg/kg. The Region 9 PRGs for industrial soils are; 2.1 mg/kg for benzo(a)anthracene, 0.21 mg/kg for benzo(a)pyrene, 2.1 mg/kg for benzo(b)fluoranthene, 0.21 mg/kg for dibenz(a,h)anthracene, 2.1 mg/kg for indeno(1,2,3-cd)pyrene and 9 mg/kg for pentachlorophenol. A Phase II RFI was conducted to further delineate soil contamination in the southwest corner of the facility. Two of the seven soil borings, located closest to the former process area, contained visual evidence of contamination in this area of the facility. In 2001, Kerr-McGee submitted a SWMU Assessment Report (SAR) for a newly identified SWMU. This unit ,called the brickyard, contained a layer of brick fragments which occupied an area of approximately 150 feet by 50 feet located on the south facility boundary within the black tie storage area. This area exhibited visual evidence of tar-like material at ground surface with a footprint of approximately 50 feet by 25 feet. The tar-like material was sampled and found to contain PAH constituents above the health based levels..

Sediments: During the initial phase of the RFI, sediments in the on-site drainage ditches were sampled at two locations associated with each of the five NPDES outfalls (Figure 2). One sample was located at the beginning of the ditch and the second sample immediately upstream of the outfall. Sediments at all ten locations detected PAH constituents. As only the carcinogenic PAH constituents exceeded the respective action levels, the sample results were evaluated on a benzo(a)pyrene equivalent (BaPE) basis. The BaPE concentration is calculated by assigning Toxicity Equivalence Factors (TEFs)to each of the individual carcinogenic PAH constituents. As benzo(a) pyrene is the most toxic of these constituents, it is assigned a TEF equal to 1.0. A toxic equivalency (TEQ) is calculated for each of the carcinogenic PAH constituents by multiplying the constituent concentration by the TEF and then adding the TEQs together to come up with the BaPE concentration. This number is then compared to the PRG for benzo(a)pyrene, which for a residential exposure scenario is 0.062 mg/kg and for an industrial setting is 0.21 mg/kg. These numbers represent an excess 10^{-6} cancer risk for their respective exposure scenario.

The two ditch segments draining the black tie storage area and discharging at the eastern facility boundary contained the highest levels of constituents, with concentrations highest at the discharge end of each ditch segment. Sample 003B, located at the northeast corner of the facility exhibited a BaPE concentration of 169.8 mg/kg. Pentachlorophenol (PCP) was also detected at this location at 20 mg/kg, above the PRG for industrial settings of 9 mg/kg. Sample 004B, located east of the former rail car loading/unloading area, exhibited a BaPE concentration of 165.1 mg/kg. PCP was non-detect at this location. Based on these initial

findings, EPA required the delineation of the off-site drainage ditches downstream of the facility in a Phase II RFI.

During the Phase II RFI sampling event in March 1998, the ditch segments located downstream of each of the NPDES outfalls were sampled. The segment of ditch draining outfall 001, located at the southwestern facility boundary, runs south through a cemetery and the Sanderson Plumbing property. On the Sanderson property the ditch enters an underground concrete culvert where it flows for approximately 500 feet beneath a parking lot. Flow re-emerges into an unlined ditch crossing underneath railroad tracks prior to intersecting 7th Avenue, where it turns eastward, flowing along the north side of 7th Avenue. Samples collected in this segment of ditch indicated BaPE concentrations of 12.11 mg/kg, at a location approximately 200 feet south of the outfall and located on cemetery property and 1.28 mg/kg at a location immediately upstream of the point where the ditch enters the underground culvert on the Sanderson property.

No sediment samples were collected in the segment of ditch draining Outfall 002 on the north facility boundary, during this phase of the investigation. This ditch flows along the south side of 14th Avenue, and presents an extremely limited exposure potential, as it is bounded by 14th Avenue, which is heavily traveled, and the fence along the north property line of the Kerr-McGee facility.

Along the eastern boundary of the facility, Outfalls 003 and 005 located at the northeastern corner, drain northern areas of the black tie storage area and the former green tie storage area north of 14th Avenue, respectively . Outfall 004, located further south, drains the central portions of the black tie storage area. All three outfalls discharge into the drainage ditch system which flows southward along the railroad tracks east of the facility and eventually merges with the ditch segment flowing eastward along 7th Avenue. During the Phase II RFI, sediment samples were collected at three locations within this ditch system. BaPE concentrations were 2.83 and 0.62 mg/kg in the ditch segment drained by Outfalls 003 and 005 and 5.74 mg/kg at a location downstream of Outfall 004.

A sediment sample was also collected at the confluence of the eastern ditch and the 7th Avenue ditch. A BaPE concentration 1.167 mg/kg was measured at this location. All sampling results obtained during the Phase II RFI were documented in the Phase II RFI Report dated October 28, 1998.

In July 1999 MDEQ conducted sediment sampling in the drainage ditches downstream of the facility at the request of the Maranatha Faith Center (MFC). MFC was performing construction activities, replacing an old existing metal culvert, when apparent contamination was found in the sediments that had accumulated in the existing culvert. Eight sediment samples were taken from the ditches in the area that drain the Kerr-McGee facility. One sample taken in the ditch along 7th Avenue, was non-detect for all creosote constituents. One sample was taken in the ditch segment along 14th Avenue, which was not previously sampled by Kerr-McGee. This sample contained a BaPE concentration of 21.23 mg/kg. Of the remaining six samples, collected at various locations in the eastern ditch system, three contained BaPE concentrations below 1 mg/kg. The remaining three samples contained BaPE concentrations of 10.61, 22.44 and 24.61 mk/kg, with the highest concentration in a segment of ditch which flows from the Sanderson Plumbing discharge. Based on these findings, Kerr-McGee was required to vertically delineate the contamination within the ditches. Kerr-McGee's sampling of the ditches during the Phase II RFI, only included the upper 2–3 inches of sediment overlying the stream bed, whereas MDEQ had sampled the upper 12 inches of sediments. This difference in sampling protocol attributed to the higher concentration of constituents detected in the ditches during MDEQ's investigation. During the subsequent sampling effort conducted by Kerr-McGee in February 2001, six locations in the off-site ditches were selected for sampling. Borings at each location were advanced to a minium of 60 inches below grade, with three discreet depth intervals identified for laboratory analysis. These intervals consisted of the 0-6 inch and 6-12 inch intervals, and one

additional interval based on organoleptic evidence of impacted sediments and/or PID readings. If no evidence of contamination was indicated, the third sample was collected immediately above the existing water table. During the course of this investigation, four additional locations were selected for sediment sampling in the ditch along 14th Avenue, to provide additional delineation. At these four locations, sediments in the 0-6 inch and 6-12 inch intervals were selected for laboratory analysis. Analytical results of this sampling event are documented in the Supplemental Phase II RFI Report dated September 2002. Sample locations and laboratory results are shown on Figure 3.

Surface Water: The facility is located within the drainage basin of Luxapillila Creek As indicated in Figure 3, Luxapillila Creek receives storm water discharging from the ditches which drain the Kerr-McGee facility at a point approximately one mile southeast of the facility. Luxapillila Creek is classified as a public water supply upstream of the facility. The downstream portion of the creek, down to the confluence with the Tombigbee Waterway System, is classified for fish and wildlife support and for incidental recreational use during the months of May through October. As sediment contamination was identified in the drainage ditches, the initial Environmental Indicator evaluation recommended further assessment of the surface water in the ditch system. During the Phase II RFI, TCLP analyses were conducted on the sediments at the NPDES discharge locations to determine the potential leachability of the PAH constituents. Analytical results were non-detect for all PAH constituents. During the supplemental investigation, EPA required the collection of surface water samples within the off-site ditches. Samples were collected in each of the ditch segments identified above. All samples were non-detect for all PAH constituents and Pentachlorophenol, except for indeno(1,2,3-cd)pyrene, which was detected at a J-value of 6.0 μg/l in the sample located downstream of Outfall 002. This value is above the PRG for tap water of .092 μg/l.

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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table Potential **Human Receptors** (Under Current Conditions)							
"Contaminated" Media	**Residents**	**Workers**	**Day-Care**	**Construction**	**Trespassers**	**Recreation**	**Food**[3]
Groundwater	No	No	No	No	No	N/L	N/L
~~Air (indoors)~~	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Soil (surface, e.g., <2 ft)	No	No	No	No	Yes	No	No
~~Surface Water~~	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Sediment	Yes	No	N/L	Yes	Yes	Yes	No
Soil (subsurface, e.g., >2 ft)	N/L	N/L	N/L	No	N/L	N/L	No
~~Air (outdoors)~~	N/C	N/C	N/C	N/C	N/C	N/C	N/C

Instructions for Summary Exposure Pathway Evaluation Table:

1. For Media which are not "contaminated" as identified in #2, please strike-out specific Media, including Human Receptors' spaces, or enter "N/C" for not contaminated.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations, some potential "Contaminated" Media - Human Receptor combinations (Pathways) are not assigned spaces in the above table (i.e, **N/L - not likely**). While these combinations may not be probable in most situations, they may be possible in some settings and **should be added as necessary**.

____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

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3 Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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✓ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s): Groundwater: Groundwater investigations conducted at the facility have identified two separate constituent sources. The two product sources are the production process area in the southern part of the facility and the railcar loading and unloading area in the black tie storage area on the eastern portion of the site. Constituent plumes are composed of both free creosote product and dissolved constituents. The free product contaminants in the production process area occur primarily in the erosional depressions of the Eutaw surface. The free product plume in the eastern half of the facility, associated with the railcar loading and unloading area, is at a shallower depth than the product in the production process area. This is possibly due to the contamination being from a younger source and/or the presence of fine silt lenses in this area restricting vertical migration.

The current groundwater monitoring system consists of 43 monitoring wells and 26 piezometers in the Alluvial Aquifer and five monitoring wells in the Eutaw Formation (Figure 1). A corrective action program for recovery of the creosote contaminants in the alluvial aquifer was implemented in April 1990 with the installation of two product recovery wells in the process area. Another component of the groundwater recovery system at that time was the construction of an on-site hydraulic barrier to prevent further off-site migration of contaminants. This consisted of the installation of five recovery wells along the southwestern boundary of the facility. In August 1992 the corrective action system was extended off-site with the construction of a trench and collection gallery system south of the production process area. An additional trench was constructed on-site in the black tie area. In addition to the collection sumps and hydraulic barrier recovery wells, seven product recovery wells have been installed in areas in which free product was encountered during past soil assessments. The ground-water recovery wells and collection trenches are concentrated in the erosional depressions of the Eutaw Formation surface to maximize free product recovery. There are no known public or private water wells located within the defined plume areas. The corrective action system has been operating effectively for the past 15 years with no expansion of the plumes indicated. Although a limited area of impacted ground water has recently been identified in the northeastern portion of the facility, this plume is confined to facility property and has been adequately delineated. As the facility is shut down and all areas overlying the contaminant plumes are controlled by Kerr-McGee, no construction activities would be anticipated that would expose workers to contaminated ground water. As stated previously, the only operations currently being conducted at the facility are associated with the ground-water recovery and monitoring system. All workers are properly trained in the sampling and handling of contaminated media and would not be considered a potential receptor.

Soils: Contaminant source areas within the former tank farm, drip track and retorts underwent corrective action activities. In 1988 visually impacted soils in the existing tank farm and impoundment areas were excavated resulting in the removal of over 485 tons of impacted soils. Also in 1988, four feet of visually impacted soil was excavated from the drip track area during the construction of a new drip pad to meet the requirements of the 40 CFR 265 Subpart W regulations. Additionally, the former underground car unloading station, located in the black tie storage area, underwent soil excavation resulting in the removal of approximately 70 tons of visually impacted soils. As the facility is closed, no exposure to workers exists. Access to the facility is controlled by fencing to restrict exposure by potential trespassers. Subsurface soils are contaminated on-site. As no construction activities are anticipated, no pathway to subsurface soil contamination exists.

Sediments: As indicated above, sediment contamination has been identified in segments of the on-site and

off-site ditches which drain the facility. This contamination has been delineated through the numerous sampling events conducted on the sediments and soils in these ditches. In September 2004 Kerr-McGee implemented Interim Measures in four areas of the ditches adjoining the facility which contained impacted sediments. This consisted of the removal and off-site disposal of impacted sediments in four ditch segments (Figure4), confirmation sampling to demonstrate that remaining sediments were below the respective action levels, and backfilling with clean fill. All activities associated with this work are documented in the Interim Measures Report dated April 29, 2005. The objectives of the Interim Measures was to mitigate any current exposure to impacted sediments within the ditch and prevent the further redeposition of contaminated sediments in residential areas downstream of the heavily contaminated areas.

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4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

✓ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s): Soils: As discussed, on-site soils are contaminated with PAH constituents above relevant action levels for industrial exposures. As the facility is closed, the only completed exposure pathway is for a trespasser scenario. Access to the property is controlled by a perimeter fence along all sides of the facility, except where the railroad tracks enter the facility on the east side. Directly west of these tracks is a creek which would act as a deterrent to anyone walking onto the property due to steep banks covered with a thick growth of thorny vegetation. The impacted soils within the facility boundary are covered by a 6-12 inch layer of gravel, preventing direct contact with the impacted soils and therefore eliminating the ingestion pathway. Exposure to contaminated soils for a trespasser scenario is not expected to be significant.

Sediments within sections of the off-site ditches, which contained the most significant contamination, have been removed through Interim Measures as documented in the Interim Measures Report referenced above. At ditch locations downstream from NPDES outfall 001, at the southwestern corner of the property, contamination above relevant action levels remains. This contamination is confined to the cemetery property and the northern end of the Sanderson Plumbing property. BaPE concentrations at these locations are above the industrial PRG for benzo(a)pyrene of 0.21 mg/kg which represents a 10^{-6} excess cancer risk, but below the 10^{-4} risk level. In the eastern ditch system, the ditch segments downstream of the cleanup include locations that are in residential areas. BaPE concentrations in these areas are above the 10^{-6} risk characterization level of 0.062 mg/kg, but again are within the 10^{-6} to 10^{-4} risk range, which EPA considers when making risk management decisions. Risk management decisions also consider the variables and uncertainties that are inherent in the risk calculations and the qualitative aspects of the assessment. One variable considered is the default estimates for soil ingestion (on which the sediment concentrations are based). These estimates do not account for the fact that daily sediment intake will be substantially less than soil ingestion rates, especially given the fact that these sediments are continually covered by water. Another

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

variable considered in the risk management decision is the exposure assumptions used in the risk calculations. The risk calculations are based on a 350 or 250 day/year exposure frequency and a 30 or 25 year exposure duration for residential and industrial scenarios, respectively. The expected exposure to sediments within the ditches would be less frequent and over a shorter period of time. Additionally, the default assumption for ingestion rates would not typically apply. The route of exposure would be primarily through dermal absorption. For these reasons, EPA has determined that contaminant concentrations remaining in ditch sediments do not pose a significant exposure to human health.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRAInfo Event Code (CA725)

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):_____

Current Human Exposures Under Control
Environmental Indicator (EI) RCRAInfo Event Code (CA725)

6. Check the appropriate RCRAInfo status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

✓ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the _____ _____ facility, EPA ID #_____, located at _____ under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by: _____ Date: 9/8/05

Russ McLean
Environmental Engineer
South Programs Section

Supervisor _____ Date: 9/08/2005

Lael Butler
Chief, South Programs Section
RCRA Programs Branch

Branch Chief _____ Date 9/8/05 [5]

Jon D. Johnston
Chief, RCRA Programs Branch
Waste Management Division
EPA Region 4

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[5] **FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.**

Locations where References may be found:

EPA Region 4 RCRA File Room
10th Floor, 61 Forsyth Street SW
Atlanta, Georgia 30303

Contact telephone and e-mail numbers

Russ McLean
(404) 562-8504
mclean.russ@epa.gov

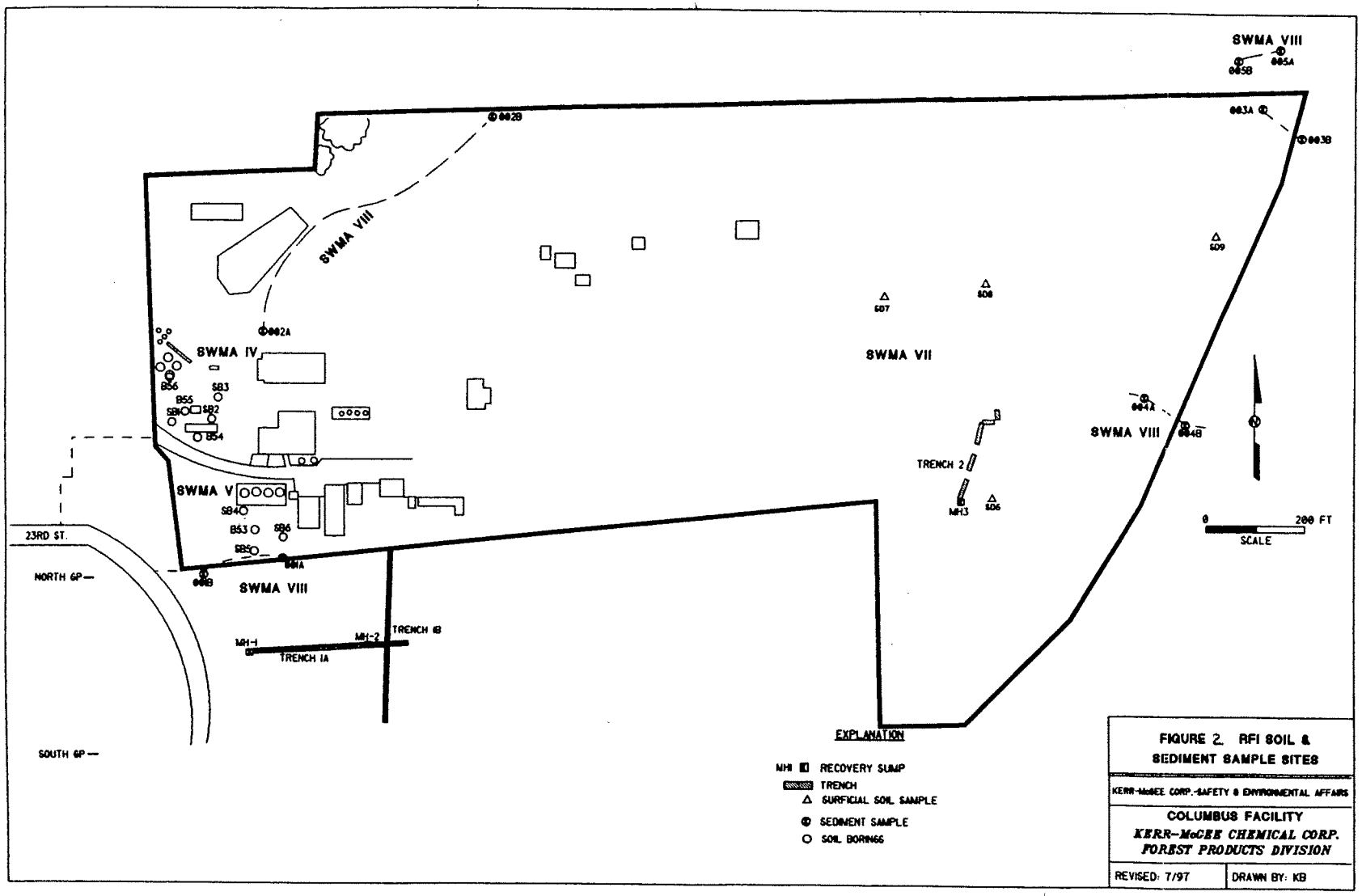


FIGURE 2. RFI SOIL & SEDIMENT SAMPLE SITES

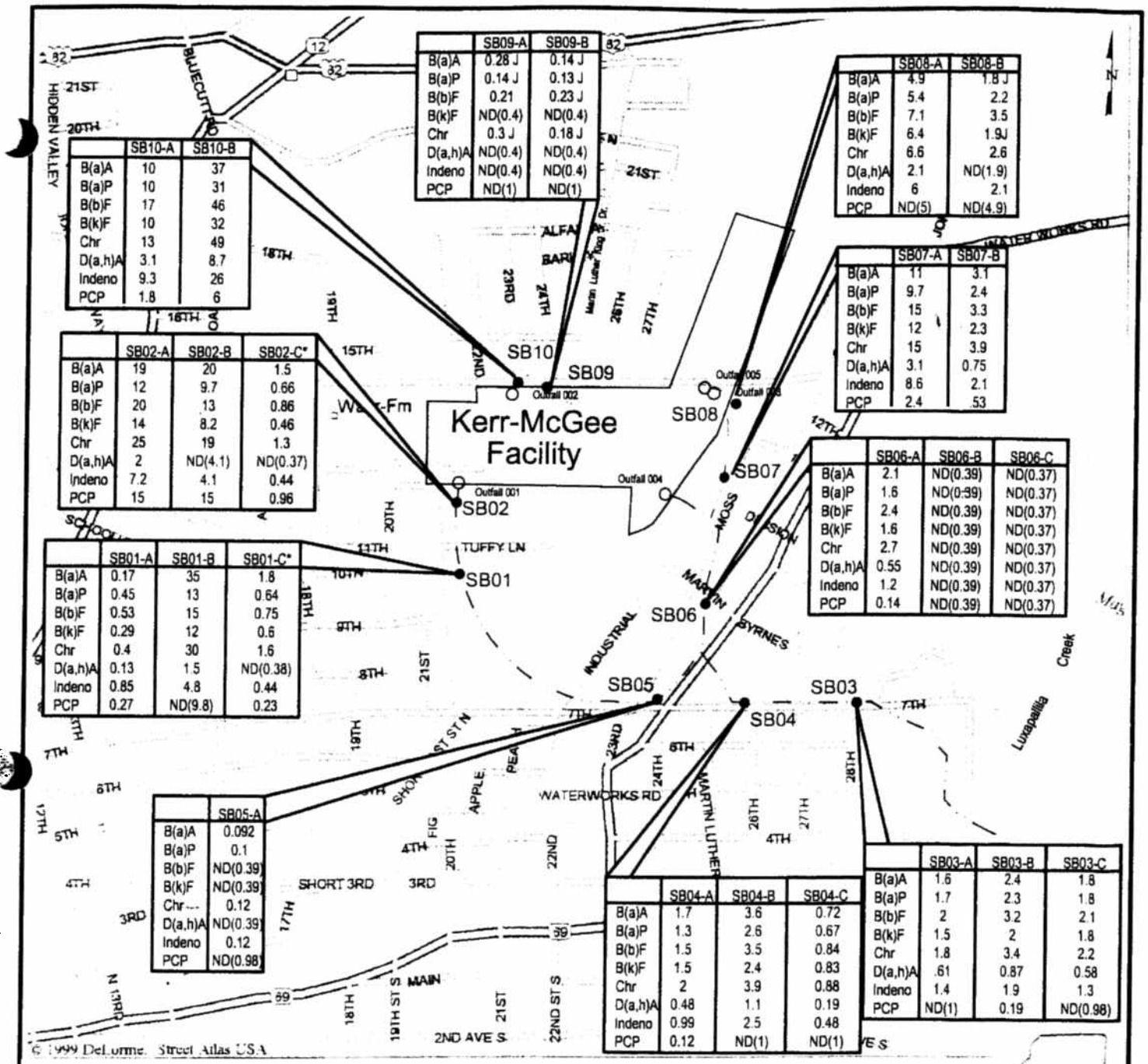
KERR-McGEE CORP.-SAFETY & ENVIRONMENTAL AFFAIRS

COLUMBUS FACILITY

KERR-McGEE CHEMICAL CORP.

FOREST PRODUCTS DIVISION

REVISED: 7/97 | DRAWN BY: KB



	SB09-A	SB09-B
B(a)A	0.28 J	0.14 J
B(a)P	0.14 J	0.13 J
B(b)F	0.21	0.23 J
B(k)F	ND(0.4)	ND(0.4)
Chr	0.3 J	0.18 J
D(a,h)A	ND(0.4)	ND(0.4)
Indeno	ND(0.4)	ND(0.4)
PCP	ND(1)	ND(1)

	SB08-A	SB08-B
B(a)A	4.9	1.8 J
B(a)P	5.4	2.2
B(b)F	7.1	3.5
B(k)F	6.4	1.9J
Chr	6.6	2.6
D(a,h)A	2.1	ND(1.9)
Indeno	6	2.1
PCP	ND(5)	ND(4.9)

	SB10-A	SB10-B
B(a)A	10	37
B(a)P	10	31
B(b)F	17	46
B(k)F	10	32
Chr	13	49
D(a,h)A	3.1	8.7
Indeno	9.3	26
PCP	1.8	6

	SB07-A	SB07-B
B(a)A	11	3.1
B(a)P	9.7	2.4
B(b)F	15	3.3
B(k)F	12	2.3
Chr	15	3.9
D(a,h)A	3.1	0.75
Indeno	8.6	2.1
PCP	2.4	.53

	SB02-A	SB02-B	SB02-C*
B(a)A	19	20	1.5
B(a)P	12	9.7	0.66
B(b)F	20	13	0.86
B(k)F	14	8.2	0.46
Chr	25	19	1.3
D(a,h)A	2	ND(4.1)	ND(0.37)
Indeno	7.2	4.1	0.44
PCP	15	15	0.96

	SB06-A	SB06-B	SB06-C
B(a)A	2.1	ND(0.39)	ND(0.37)
B(a)P	1.6	ND(0.39)	ND(0.37)
B(b)F	2.4	ND(0.39)	ND(0.37)
B(k)F	1.6	ND(0.39)	ND(0.37)
Chr	2.7	ND(0.39)	ND(0.37)
D(a,h)A	0.55	ND(0.39)	ND(0.37)
Indeno	1.2	ND(0.39)	ND(0.37)
PCP	0.14	ND(0.39)	ND(0.37)

	SB01-A	SB01-B	SB01-C*
B(a)A	0.17	35	1.8
B(a)P	0.45	13	0.64
B(b)F	0.53	15	0.75
B(k)F	0.29	12	0.6
Chr	0.4	30	1.6
D(a,h)A	0.13	1.5	ND(0.38)
Indeno	0.85	4.8	0.44
PCP	0.27	ND(9.8)	0.23

	SB05-A
B(a)A	0.092
B(a)P	0.1
B(b)F	ND(0.39)
B(k)F	ND(0.39)
Chr	0.12
D(a,h)A	ND(0.39)
Indeno	0.12
PCP	ND(0.98)

	SB04-A	SB04-B	SB04-C
B(a)A	1.7	3.6	0.72
B(a)P	1.3	2.6	0.67
B(b)F	1.5	3.5	0.84
B(k)F	1.5	2.4	0.83
Chr	2	3.9	0.88
D(a,h)A	0.48	1.1	0.19
Indeno	0.99	2.5	0.48
PCP	0.12	ND(1)	ND(1)

	SB03-A	SB03-B	SB03-C
B(a)A	1.6	2.4	1.8
B(a)P	1.7	2.3	1.8
B(b)F	2	3.2	2.1
B(k)F	1.5	2	1.8
Chr	1.8	3.4	2.2
D(a,h)A	.61	0.87	0.58
Indeno	1.4	1.9	1.3
PCP	ND(1)	0.19	ND(0.98)

Scale 1:15,625 (at center)

1000 Feet

500 Meters

Legend:

- ○ Outfall Location
- ● Soil Boring Sample Location

B(a)A = Benzo(a)Anthracene
B(a)P = Benzo(a)Pyrene
B(b)F = Benzo(b)Fluoranthene
B(k)F = Benzo(k)Fluoranthene
Chr = Chrysene
D(a,h)A = Dibenz(a,h)anthracene
Indeno = Indeno(1,2,3-cd)pyrene
PCP = Pentachlorophenol

Local Road
Major Connector
State Route
Drainage Ditch

Columbus
Mississippi

Notes:
1. All concentrations are presented in mg/kg.
2. ND = Not detected at the limit of quantitation in parentheses.
3. Only analytical results for cPAHs are shown on this figure.
4. Concentrations shown in red exceed default Region 9 PRGs with 10-6 target risk based on appropriate land -use scenario.
5. No concentrations exceed modified Region 9 PRGs with 10-4 target risk.
5. Sample detection suffixes; A – 0-6 inches, B – 6-12 inches, C – 12-18 inches. (Unless noted by asterisk).

ERM-Southwest, Inc.
HOUSTON · NEW ORLEANS · AUSTIN · DALLAS · BEAUMONT · BATON ROUGE

FIGURE 3
SEDIMENT SAMPLE ANALYTICAL RESULTS
SUPPLEMENTAL PHASE II INVESTIGATION
Kerr-McGee Chemical LLC
Columbus, Mississippi

DESIGN: BAC	CHKD.: CVB	DATE: 08/23/02	REV.:
DRAWN: MMH/RLM	SCALE: AS SHOWN	W.O.NO.: 515003A206 H02	

ERM

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