FINAL REMOVAL REPORT
FOR
MID-AMERICA REFINERY COMPANY (MARCO)
CHANUTE, KANSAS

FOR

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION VII EMERGENCY PLANNING AND RESPONSE (EP&R) BRANCH

BY

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TECHNICAL ASSISTANCE TEAM (TAT)
CONTRACT NO. 68-WO-0037
TDD: T07-9410-047C
PAN: EKS0368FDA

AUGUST 30, 1995

426329
RCRA RECORDS

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1.0 INTRODUCTION

The Ecology and Environment, Inc. (E & E), Technical Assistance Team (TAT) was tasked by the U. S. Environmental Protection Agency (EPA) Region VII Emergency Planning and Response (EP&R) Branch to provide technical assistance to EPA during the Superfund fund lead removal action at the Mid-America Refinery Company (MARCO) site in Chanute, Kansas, under TDD T07-9408-014 and T07-9410-047C. The site is the location of a former oil refinery. Specifically, the TAT was tasked to conduct an inventory of containers on site; collect samples and perform field screening tests to determine associated waste streams; collect samples for laboratory analysis and perform sample management; collect subsurface soil samples at selected on-site areas to assess subsurface contamination; perform air monitoring during the removal; document on-site activities; and provide monitoring of removal activities conducted by Riedel Environmental Services, the Emergency Response Cleanup Services (ERCS) contractor to EPA. TAT member (TATM) Hieu Vu was assigned as the TAT project manager for the site. This report summarizes removal activities which occurred on the site from August 15, 1994, to March 8, 1995.

2.0 BACKGROUND

2.1 Site Location

The MARCO site is located just outside the city limits on the north edge of Chanute, Kansas, northwest of the intersection of West Hickory Street and U.S. Highway 169 (Attachment 1: Site Location Map). The site is within the NE 1/4 of the SE 1/4 of Section 17, Township 27, Range 18E. The site comprises approximately 29.6 acres of land, with dimensions of 993 feet north to south, by 1,320 feet east to west (Reference 1). Chanute, located in Neosho County, had a population of 9,488, according to the 1990 census.

2.2 Site Description

MARCO operated as a crude oil processor from 1934 until it was shut down in February 1981 (Reference 1). During full production, MARCO processed approximately 2,800 barrels per day (bbl/day) of crude oil stock. This stock was refined into 350 bbl/day of diesel fuels, 550 bbl/day of jet fuels, and 700 bbl/day of gasoline, oil and kerosene. The remaining crude bottom products were used to make asphalt. The facility consists of 13 buildings, a few small sheds used for storage of fire extinguisher chemicals, a bottom sludge (BS) pit located on the northwest portion of the site, a collection pond located in the southwest portion of the site, and over 100 storage tanks with volume capacity ranging from 5 to 34,000 barrels.

MARCO was originally owned and operated by Petroleum Products Company. It was sold to the Missouri Farmers Association (MFA) Refining Company, a wholly owned subsidiary of MFA, Inc., in 1943. In 1955, MARCO was sold to Mid-America Refinery Company, Inc. From 1973 to 1976, MARCO was owned by a group of investors in Tulsa, Oklahoma. In 1976, General Energy, Inc. purchased MARCO's stock and operated the refinery. Some time later, an entity called Producers Group, Inc. purchased the MARCO stock from General Energy, Inc. In 1981, the facility was shut down as both General Energy, Inc. and Producers Group were bankrupt. In 1983, the facility was purchased by Chanute Energy and Refining, Inc. In 1986, Chanute Energy and Refining, Inc. sold approximately 5 acres in the northwest portion of the site to Fairway Crude, Inc. Fairway Crude subsequently sold the same 5 acres, less the BS pit, to Enron Oil Trading and Transportation Company. In 1987, the ownership of the BS pit was transferred to Rick Michael. In 1993, the Robert Cooley Trust purchased a large portion on the east side of the MARCO site (Attachment 2: Property Map).

The site has remained relatively inactive since 1981, although several attempts have been made to sell and restart the facility. In 1986, approximately 25 acres of the site were leased to Rose Chemical Company. Rose Chemical's plans included the development of a polychlorinated biphenyls (PCBs) destruction plant and reactivation of the refinery. The plans never proceeded because of public opposition to the facility (Reference 1).

Runoff from the site flows into an ephemeral tributary, which empties into the east-west trending Village Creek, which is part of the Neosho River Basin. The Neosho River is the primary source of drinking water for the City of Chanute. The public water supply intake for the City of Chanute is approximately 5 miles downstream from the site (see Site Location Map).

Local precipitation is the most important source of recharge to the aquifers in the Chanute area. The mean annual precipitation for Chanute is 39.1 inches. Lesser amounts are contributed to these aquifers by influent seepage from tributaries and rivers and by subsurface inflow from adjacent areas. Recharge is seasonal and water levels variable, with lower water tables recorded in the dry winter months. Area well depths range from 12.5 feet (monitoring well on Fairway Crude property, a portion of the MARCO site) to 128 feet (an off-site irrigation well). Static water levels of four monitoring wells installed on the site by the Kansas Department of Health and Environment (KDHE) in 1986 were reported to range between 3.54 to 5.0 feet (reference 1).

2.3 Investigative History

The KDHE Bureau of Environmental Remediation (BER) conducted an intensive file review and performed a preliminary assessment (PA) and site inspection (SI) for the site. Field work associated with the PA, conducted on February 2, 1986, visually identified several areas of possibly contaminated soil near the oil/water separator unit (Attachment 3: Site Map) and pools of hydrocarbons, apparently from leaky valves and/or pipes, scattered throughout the site (Reference 1).

Field work associated with the SI, conducted in September 1986, included ambient air monitoring for organic vapors and explosive atmospheres; installation of four on-site monitoring wells; ground water well sampling; limited sampling of on-site soil, sediment and sludge; and surface water sampling. The SI did not include an assessment of the buildings or their contents. The SI indicated that ground water contamination, composed of refined petroleum products, was migrating in a southeastwardly direction, following the ground water flow beneath the site. On-site surface water runoff flowed easterly, toward Highway 169, and accumulated along the eastern edge of the property. Surface water samples indicated the presence of hydrocarbons. Surface soil contamination was visible throughout the site; analysis indicated soils in stained areas to be slightly to heavily saturated with hydrocarbons (Reference 1).

In conjunction with the SI, a tank evaluation survey was conducted by KDHE. The survey indicated conditions of on-site tanks from fair to good, with approximately 40 percent of the tanks having inadequate diking (Reference 1).

On October 9, 1992, KDHE/BER visited the site and conducted a limited inventory of potentially hazardous substances remaining in the on-site buildings. Results indicated that numerous marked and unmarked containers holding various substances were located throughout the

buildings. Many hazardous substances, including corrosives, flammables and poisons, were noted. Buildings were reported to be in a dangerous state of decay and fully accessible to public. Although most of the site was fenced, it could be easily entered along the north boundary (Reference 2).

On November 16 through 18, 1992, the TAT, under EP&R's direction, conducted a site assessment of the MARCO site. The assessment included documentation of site conditions; inventory of containers inside buildings; collection of ground water samples from on-site monitoring wells; surface water samples from an off-site drainage ditch and from the oil/water separator system; and soil, debris, sediment and sludge samples from on the site. The TAT also conducted field screening from samples collected from select containers and sampled pipe wrapping materials and tank insulation materials for asbestos analysis. Findings of the assessment can be obtained in a TAT report under TDD: T-07-9211-001 (Reference 3). The assessment indicated the site was in deteriorating condition and access was partially open to the public on the west side of the site. Areas of visibly stained soil were noted throughout the site, and many areas had eroded extensively, uncovering buried pipes. Excessive runoff and pools of oily water were observed throughout the site during heavy precipitation, particularly at areas near the oil/water separator.

The assessment also indicated all buildings were easily accessible and suffered from apparent vandalism, particularly the laboratories (Bldg. #'s 1 and 3). Several of the buildings were in deteriorating condition and their contents exposed to the elements. Many of the drums were rusted and had begun to leak.

No PCBs were detected in the samples collected during the site assessment. Volatile organic compounds (VOCs) associated with petroleum products were detected in the ground water sample, with benzene showing the highest concentration at 972 micrograms per liter (ug/L). No VOCs or semivolatile organic compounds (semi-VOCs) were detected in the surface water samples. On-site soil and sludge samples collected from the collection pond indicated total petroleum hydrocarbons (TPH) contamination, with the highest concentration 165,400 milligrams per kilogram (mg/kg). Field screening results of the samples collected from the drums indicated Resource, Conservation and Recovery Act (RCRA) characteristic wastes, based on ignitability, corrosivity and reactivity. Laboratory results of the samples detected VOCs contamination.

Semi-VOCs were not detected in any soil, sediment or sludge samples at the laboratory detection limits. Those laboratory detection limits were high, which was probably caused by matrix interference.

Floor sweeping samples, composited from floors of Buildings #1 and 3, exhibited concentrations of mercury (17,000 mg/kg), lead (2,290 mg/kg), cadmium (2,330 mg/kg), chromium (881 mg/kg) and zinc (1,080 mg/kg). Analysis for asbestos was positive on some of the samples (Reference 3).

Because most of tank and pipe wrapping insulation contained asbestos, the EPA/EP&R tasked TapanAm Associates, Inc. to conduct a survey and asbestos inspection of the site. The survey was conducted from April 18 through May 26, 1994. TapanAm subdivided the MARCO site into 18 areas (Areas #1 to 18) and all structures located within each area were surveyed and labeled with discrete numbers. Asbestos-containing materials (ACM) in each area were surveyed and costs associated with asbestos abatement for the site were estimated (References 4, 5, 6, and 7).

On July 9, 1994, an Action Memorandum was signed by EPA (Attachment 4: Action Memorandum For The MARCO Site) for the removal of hazardous substances on site, including friable ACM. The TAT was subsequently tasked to assist with removal activities.

3.0 REMOVAL ACTIVITIES

The EPA on-scene coordinator (OSC) for the MARCO removal site was Carl Bailey, with Janice Kroone and Mark Roberts serving as backups. During the removal action, one TATM was generally on site to perform sampling and field screening of samples, air monitoring, site documentation and monitoring of cleanup activities conducted by the ERCS contractor. However, during the initial stage of the removal, several TATMs were on site to assist EPA with the removal assessment, waste stream determination, and assessment of subsurface contamination. Those included Scott Hayes, Sam Mudumala, Rick Claytor, and Kirby Rogers. Jim Davis was the initial ERCS response manager for the site; Ken Braig replaced Davis at a later stage of the removal. During the removal, the size of the ERCS crew varied, depending on site activities, with the largest crew of 12. Jacobson Asbestos Abatement and Insulation, Inc. (Jacobson) in Rossville, Kansas, a subcontractor to ERCS, was on site to perform asbestos abatement on a large portion of the site. Jacobson's crew varied from two to eight personnel during the course of the removal. Various elements of the MARCO removal began August 15 through November 17, 1994. On November 17, 1994, all personnel demobilized from the site, pending disposition of on-site tank waste streams, which was being evaluated by EPA. On March 8, 1995, EPA, TAT, and ERCS personnel returned to the site to dispose of tank waste stream #4, which exhibited the characteristic of ignitability. The remaining tank waste streams (see Section 3.3 of this report) were left on the site, because they were categorized as petroleum-related wastes and were excluded from this Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) funded response.

3.1 Mobilization and Removal Assessment

The TAT and EPA mobilized to the site on August 15, 1994. Upon arrival at the site, a reconnaissance was conducted, which revealed some alterations since the last assessment conducted by TAT in 1992. Small chemical bottles and cans that were observed inside Building #5 (northeast of the site) during the 1992 assessment had been removed from the building to an unknown location. The on-site laboratories (Buildings #1 and 3) had suffered from apparent vandalism; mercury beads from broken thermometers were scattered throughout the floor. The ERCS crew mobilized equipment and trailers to the site on August 16, 1994.

3.1.1 Assessment of Drums/Containers

The TAT conducted an inventory of containers inside the 13 buildings and collected samples for field screening and waste stream determination. Air monitoring was also conducted during the inventory, utilizing a Rad mini, HNu photoionization detector (HNu) or the Foxboro Model 128 organic vapor analyzer (OVA), Jerome Model 411 mercury vapor analyzer (MVA), and the hydrogen cyanide and hydrogen sulfide monitox. All readings obtained were at a background level. One hundred ninety-seven (197) containers of various sizes, ranging from 1 gallon to 55-gallon drums, were inventoried and labeled (Attachment 5: Drum Inventory List). One hundred and nine samples were collected from the

drums for field screening that included: corrosivity; solubility; water and air reactivity; cyanide containing; sulfide containing; halide containing; VOCs-containing via headspace readings utilizing either the HNu or OVA; oxidizer characteristic; and flammability utilizing the Seta flash. In addition, selected samples were further tested for possible PCBs utilizing Chlor-N-Oil kits.

Approximately 280 small containers inside the laboratories were inventoried (Attachment 6: Small Container Inventory List) from which 102 samples were collected and subjected to the same field screening tests mentioned above. A box of metal shavings labeled "radioactive" that was observed in one of the laboratories during the TAT 1992 assessment had been removed from the site to an unknown location. The field screening results were used to develop 12 waste streams, as summarized in Table 1. The waste-stream list was provided to ERCS for bulking purposes. The ERCS subsequently staged all the drums that were scattered throughout the buildings to a central area for ease of bulking and shipping. The ERCS also contained all leaking drums in 85-gallon overpacks. Contents of small containers were placed into the drums, in accordance with their waste streams. After all hazardous substances were bulked, the number of drums was reduced from 197 to 140, and the number of small containers from 280 to 17 (Attachment 7: Lab Pack Inventory List).

TABLE 1: SUMMARY OF DRUM WASTE STREAMS

Waste Stream	No. of Containers	Estimated Volume (gallons)
1. Flammable Liq./Halides/Soluble in H_2O	7	300
2. Flammable Liq./Chlorinated/Sinks in H_2O	1	55
3. Flammable Liq./Miscible in H_2O	6	190
4. Flammable Liq./Base/Floats on H_2O	18	900
5. Flammable Liq./Soluble in H_2O	4	180
6. Combustible Liq./Floats on H_2O	7	250
7. Acid Liquids	4	160
8. Base Liquids/Oxidizer	1	20
9. Base Liquids	4	50
10. Combustible Solids	1	25 (*)
11. Base Solids	8	425 (*)
12. Non-hazardous Solids/Liquids/Sludges, and	47	485
Tar Drums	32	1,600
Total:	140	4,640

Flammability test was conducted using the Seta Flash
(*) Estimated volume; weight was not available

3.1.2 Assessment of On-Site Tanks

In addition to the drum inventory and characterization, TAT assisted ERCS with a tank inventory and sample collection. Survey and characterization activities began August 24, 1994, and were completed September 10, 1994. No underground storage tanks were located on site. Air monitoring was conducted by ERCS during the tank survey, using headspace readings, using the HNu and the Gastech for oxygen and lower explosive limit (LEL) levels (Attachment 8: Tank Inventory List compiled by ERCS). One hundred thirty-eight (138) tanks of various sizes ranging from thousands of gallons to one-million-gallon storage capacity were inspected for their contents. Seventy-six (76) tanks were empty and samples were collected from the remaining 62 tanks for field characterization (see Attachment 3: Site Map for tank locations). In addition, seven samples were collected from four tanks (these tanks were called "bays" and were located immediately west of Building #3) and three transformers found on site. The tank samples were screened with the same characterization tests as were the drum samples. Field screening results were used to develop eight waste streams, as summarized in Table 2 (Attachment 9: Tank Waste Stream List):

TABLE 2: SUMMARY OF TANK WASTE STREAMS

Waste Stream	No. of Tanks	Estimated Volume (gallons)
1. Combustible Solid Tar	4	3,140
Combustible Liquid Tar	10	18,180
2. Combustible Liquid/Floats on H_2O	2T + 19	50,396
3. Flammable Liquid/Floats on H_2O	2	3,350
4. Flammable Liquid/Soluble in H_2O	1	300
5. Base liquids (pH 10-11)	2	1,200
6. Combustible Liq./Chlorinated/Floats on H_2O	4 Bays	700
7. Flammable Liq./Chlorinated/Floats on H_2O	4	3,160
8. Non-haz Liquids	1T + 14	30,140
Non-haz Solids	6	3,830
Total:	3T + 4 Bays + 62	114,396

Flammability test was conducted using the Seta Flash
(T) = Transformers

3.1.3 Assessment of Mercury Contamination

Mercury contamination was found only in the on-site laboratories (Buildings #1 and 3), where vandalism had created numerous mercury beads mingled with debris and oily materials on the floors of these buildings. Air monitoring using the Jerome Model 411 Mercury Vapor Analyzer indicated the highest concentration of mercury, under undisturbed conditions, at 0.16 milligrams per cubic meter (mg/m^3), which was above the established action level for the site of 0.05 mg/m^3.

3.1.4 Assessment of Asbestos-Containing Materials (ACM)

No assessment of ACM was conducted by the TAT, because the work had been previously completed by TapanAm. During the course of asbestos removal on site, TAT collected suspected ACM for field screening purposes via the HazCat kit. All confirmation samples were collected and submitted to an ERCS's subcontractor laboratory for asbestos analysis.

3.1.5 Assessment of Subsurface Contamination

The assessment of subsurface contamination was conducted August 23 and 24, 1994. The scope of work was to assess subsurface contamination in selected areas, such as stained areas, suspected lead-additive areas, and loading areas. Sixteen locations were selected for the assessment (see Attachment 3: Site Map for subsurface sampling locations). At each location, subsurface soil samples were collected at depth intervals ranging from 0 to 14 feet, using the Geoprobe. The samples were field screened for presence of VOCs, utilizing the HNu or OVA. Field observations and screening results of the samples indicated that subsurface soils were contaminated with petroleum-related compounds at depths varying from 1 foot to 7 feet below ground surface (BGS) in several areas; particularly at areas near the oil/water separator located on the east portion of the site (Geoprobe Locations #1, #2, #3 and #4). Strong petroleum odors were noted in subsurface soils collected from other sampling locations, particularly at depths ranging 5 to 7 feet BGS.

Six subsurface samples (Sample BB1KN001 to BB1KN006) were subsequently collected and submitted to the ERCS's subcontractor laboratory for total metals, VOCs, semi-VOCs, and TPH analyses (see Attachment 10: Field Sheets and Analytical Results). Analytical results indicated that lead was the only metal contaminant detected at significant concentrations. The highest lead concentration detected was 1,570 mg/kg (from Geoprobe Location #1 at 5 to 7 feet BGS). Mercury was detected in only one sample, at a concentration of 0.171 mg/kg, above the analytical method detection limit of 0.1 mg/kg.

Benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in the sample collected from Geoprobe Location #13 (at depths ranging from 3 to 5 feet) at concentrations of 76 micrograms per kilogram (ug/kg), 35 ug/kg, 120 ug/kg and 280 ug/kg, respectively. No other VOCs were detected at concentrations significantly above the analytical detection limits. It was noted that analytical detection limits for VOCs were much higher for analysis of samples collected from Geoprobe Locations #1 and #2 than for other samples, which was apparently caused by matrix interference in the laboratory.

Semi-VOCs were detected in samples collected from Geoprobe Locations #1 and #2 only (both at depths ranging from 5 to 7 feet BGS). The sample collected from Geoprobe Location #1 had the highest semi-VOCs concentrations, including: naphthalene (20,000 ug/kg), phenanthrene (26,000 ug/kg), and pyrene (36,000 ug/kg). The analytical detection

limits for semi-VOCs for this sample were also higher than for other samples. TPH were detected in all samples, with a highest concentration of 29,600 mg/kg (from Geoprobe Location #2 at a depth 5 to 7 feet BGS).

3.2 Removal of Drum Waste Streams

The TAT-generated drum waste-stream list was provided to ERCS for bulking purposes. Bulking of drum and small container contents was completed by September 9, 1994. The TAT assisted the ERCS crew with consolidation and solidification of 47 containers containing non-hazardous waste (drum waste stream #12) for disposal as solid waste. A representative sample (sample BB1KN007) was collected from the thirty-two 55-gallon drums as listed in Table 1 containing a tar-like material and analyzed for total metals, VOCs, semi-VOCs, and British thermal unit (Btu) content. Analytical results indicated non-detect for all analytes, except for Btu, which had a value of 100 Btu per pound (Btu/lb). It was noted that the analytical detection limits were high for both VOCs (less than 6,300 ug/kg) and semi-VOCs (90,000 ug/kg) analyses, which was probably caused by matrix interference. These 32 drums were left on site near the BS pit.

On September 14, 1994, the TAT assisted ERCS with treatment of nine drums containing corrosive waste streams (drum waste streams #7, #8, and #9) via on-site neutralization. The treated wastewater was field screened via HazCat, and results indicated that the waste no longer exhibited the characteristic of corrosivity. The treated wastewater was subsequently disposed of on site. The remaining drum waste streams were further consolidated into five waste streams for disposal purposes. A representative sample was collected from each waste stream (sample BB1KN017 to BB1KN021) and submitted to the ERCS's subcontractor laboratory for analyses of VOCs, semi-VOCs, total metals or toxicity characteristic leaching procedures (TCLP) for metals, total halides and/or PCBs, and Btu content (see Attachment 10: Field Sheets and Analytical Results). The remaining five waste streams are summarized in Table 3.

TABLE 3: SUMMARY OF DRUM WASTE STREAMS TO BE DISPOSED OF OFF SITE

Waste Stream	No. of Drums	Est. Volume (gallons)
1, 3 & 5	17	670
2	1	55
4	18	900
6	7	250
10	1	25
11	8	425
Total:	52	1,875

The drums were transported to HRW, Inc. in Kansas City, Missouri, for treatment/disposal as hazardous waste (see Attachment 11: Hazardous Waste Manifest Forms). Empty drums were crushed and disposed of as

solid waste in a local sanitary landfill. Approximately 80 cubic yards of solid waste (approximately 4.9 tons) were disposed of in the Neosho County landfill. All drums of the hazardous waste were shipped off site by October 10, 1994.

On October 14, 1994, the ERCS crew, through the support of a local quarry located near the site on Cherry Street, detonated two small containers containing ethers. The explosive caps were provided and attached to the containers by the quarry personnel. The destruction was successfully completed without incident.

3.3 Removal of Tank Waste Streams

Ten representative samples were collected from the aforementioned eight tank waste streams. The samples were submitted to the ERCS's subcontractor laboratory for VOCs, semi-VOCs, TCLP metals, total halide and/or PCBs, and/or Btu content analyses (see Attachment 10: Field Sheets and Analytical Results). Analytical parameters for the tank waste streams were selected based on field screening results. Table 4 summarizes analytical parameters for the tank waste stream samples.

TABLE 4: SUMMARY OF ANALYTICAL PARAMETERS FOR TANK WASTE STREAM SAMPLES

Sample No.	Waste Stream	VOCs	Semi-VOCs	TCLP Metals	Halide	PCBs	Btu
BB1KN010	1 (SOLIDS)	--	YES	YES	YES	--	--
BB1KN011	1 (TAR)	YES	YES	YES	YES	--	YES
BB1KN012	2	YES	YES	YES	YES	--	YES
BB1KN013	3	YES	YES	YES	YES	--	YES
BB1KN023	4	YES	--	--	--	--	YES
BB1KN022	5 (*)	--	--	--	--	--	--
BB1KN015	6	YES	YES	YES	YES	YES	YES
BB1KN014	7	YES	YES	YES	YES	YES	YES
BB1KN016	8 (LIQUID)	YES	YES	YES	--	--	--
BB1KN024	8 (SOLID) (*)						

(*) Waste streams (#5 and #8 solid) were analyzed for pH and total metals only.

-- Not Analyzed

Analytical results indicated BTEX were the only VOCs contaminants detected in the analyzed samples. Those contaminants were detected in tank waste streams #1 (tar), 2, 3, 6, and 7, with the highest concentrations of 39,300 ug/L (benzene); 519,000 ug/L (toluene); 347,000 ug/L (ethylbenzene); and 779 ug/L (xylenes).

Semi-VOCs were detected in tank waste streams #1, 2, 3, 6, 7. The highest concentrations detected in the samples included 11,900,000 ug/kg (naphthalene); 261,000 ug/kg (phenanthrene); 19,700 ug/kg (anthracene); 14,000 ug/kg (fluoranthene); 208,200 ug/kg (pyrene); 100,000 ug/kg

(benzo[a]anthracene); 177,000 ug/kg (chrysene); 30,000 ug/kg (benzo[b]fluoranthene); 62,000 ug/kg (benzo[a]pyrene); 23,600 ug/kg (acenaphthene); and 39,400 ug/kg (fluorene); 13,400 ug/kg (butyl benzyl phthalate); 1,600 ug/kg (1,4-dichlorobenzene).

Analytical results for TCLP metals and total halides showed concentrations slightly above the analytical method detection limits. TCLP metal concentrations were all below respective regulatory limits. Laboratory analysis did not detect any PCBs in the analyzed samples. Heat content analysis indicated that all analyzed samples had high Btu values, but tank waste stream #4. The highest Btu value was 19,800 Btus.

Total metals analysis for tank waste streams #5 and #8 indicated low metal concentrations, with most not detected above the analytical detection limits. The pH values for tank waste streams #5 and #8 were 10.01 and 4.22, respectively, which do not represent RCRA-characteristic wastes.

Of the eight tank waste streams, only tank waste stream #4 was transported off site for disposal. This waste stream consisted of Tank #190 only and had approximately 300 gallons of a flammable liquid (flash point less than 135°F). Alcohol odors were noted from the sample collected from this tank. On March 8, 1995, the ERCS crew returned to the site (all personnel demobilized from the site on November 17, 1994) and pumped the contents of Tank #190 into five 55-gallon drums. The drums were transported to Systech Corp. in Fredonia, Kansas, March 9, 1994, for disposal. The remaining tank waste streams were left on site, because they are either excluded from CERCLA (see Attachment 12: Petroleum Exclusion Memorandum from EPA OSC to CNSL), or were not RCRA-characteristic wastes.

Because Tanks #180, #199, and #180A were leaking, their contents were transferred to Tanks #155, #156, and #157, respectively. Oil drained from piping was also stored in Tank #157. Valve locks were used to secured the aforementioned tanks.

3.4 Removal of Mercury-Contaminated Waste

As stated previously, mercury contamination was observed only in Buildings #1 and #3. Because of vandalism, mercury beads were mingled with oily debris scattered throughout the building floors. Removal of mercury-contaminated waste was periodically conducted by ERCS from August 19 to November 8, 1994. During this period, TAT assisted the ERCS crew with segregation of "clean" versus mercury-contaminated debris, utilizing the MVA. Suspected mercury-contaminated debris from the building floors was placed into sealed plastic bags in small quantities. The bags were placed under direct sunlight to allow for evaporation of mercury. Air monitoring was than conducted, using the MVA via headspace readings. Air monitoring results were used to determine the mercury-contaminated waste requiring disposal. After all debris was removed from the buildings, TAT applied a small quantity of methanol onto the oily mercury-contaminated floors to enhance the

removal of mercury beads via the mercury vacuum system. During the removal of mercury, TAT conducted indoor air monitoring using the MVA to verify the effectiveness of the cleanup and to ensure that workers were wearing proper protective equipment. The action level for the site was 0.05 mg/m^3 of mercury. Upon completion of the mercury removal, TAT conducted indoor air sampling for mercury, using National Institute for Occupational Safety and Health (NIOSH) Method 6009. During the sampling period, all access doors and windows were sealed with plastic and two portable fans were turned on inside the building to create an agitated condition. Three 8-hour samples (BB1KN035 to BB1KN037) were collected from different areas inside Building #3. In addition, one field blank and one media blank sample (BB1KN038 and BB1KN039) were collected. The samples were submitted to the ERCS's subcontractor laboratory for mercury analysis. Indoor air sampling of Building #1 was conducted by ERCS. ERCS subsequently informed the TAT that analytical results indicated mercury was below the site action level (see Attachment 10: Field Sheets and Analytical Results). Analytical results of the air samples collected by TAT have not been received by the TAT.

Two 55-gallon drums and one 30-gallon drum containing mercury-contaminated debris, and one 1-gallon container containing mercury beads were shipped to HWR in Kansas City, Missouri, for disposal (see Attachment 11: Hazardous Waste Manifest Forms).

3.5 Removal of Sludge From The Oil/Water Separator

Sludge in the oil/water separator (a concrete basin) was determined to be RCRA F037 waste, which is waste associated with petroleum refinery primarily oil/water/solids separation sludge. Therefore, it was necessary to remove and dispose of the sludge at a RCRA-approved facility. Excavation of sludge in the oil/water separator by ERCS began on October 5, 1994, and completed October 13, 1994. Following inspection of the excavated area, further excavation of sludge in the oil/water separator was required by the OSC. The work resumed on October 20, 1994, and completed by November 7, 1994. The excavated sludge was stockpiled on site and subsequently solidified with lime. Approximately 476 tons of this sludge were transported off site to USPCI in Wayneka, Oklahoma, for disposal (see Attachment 11: Hazardous Waste Manifest Forms). Approximately 1,508 tons of fill dirt were brought to the site to backfill the excavated area. A representative sample (BB1KN025) was collected from this fill dirt and submitted to the ERCS's subcontractor laboratory for total metals analysis. Analytical results indicated low metal concentrations (see Attachment 10: Field Sheets and Analytical Results).

3.6 Asbestos Abatement

The site was subdivided into two areas for asbestos removal. The ERCS was responsible for ACM removal in one area and the bulk of ACM was removed by Jacobson from the other area. ACM insulation wrapped around tanks and piping was first dampened with water to minimize the possibility of airborne ACM-particulates. In addition, enclosures constructed with plastic were erected around work areas to minimize the

spreading of ACM. The ACM wrapping was subsequently stripped from the tanks and piping and placed inside double-bagged plastic bags. The bags were tagged and inspected for leakage prior to shipment off site for disposal. It was necessary to remove trees immediately surrounding the ACM-insulated tanks to facilitate the removal. ACM that fell onto the ground in the area around the tanks and/or piping was vacuumed and was added into ACM bags. Following the ACM removal, the tanks and piping were inspected by a Kansas state-certified asbestos specialists, including the EPA OSC and the ERCS crew supervising the asbestos abatement project, prior to applying a sealant on the surface of the tanks and piping using latex paint. All work associated with asbestos abatement was conducted by Kansas State-certified asbestos workers. During the asbestos abatement, ERCS conducted air monitoring to ensure the adequacy of the control technique for airborne ACM-particulates and the safety of workers on site.

The ERCS was responsible for removal of ACM in Areas #3 through 11, and 15 through 18 (see Attachment 3: Site Map for Area Locations), which began on September 9, 1994, and concluded on November 16, 1994. Because it was not feasible to erect enclosures around tall crude-oil cracking towers on site, it was necessary to cut the towers and lay them on the ground for ease of asbestos removal. Three towers (Towers #170, 175, and 178), which were of no apparent future use, were targeted to be cut down with a welding torch and laid on the ground. Two of the towers (Towers # 178 and 170) contained oily liquids. Two samples were collected from the towers for total metals, PCBs, total halogens, VOCs, semi-VOCs, and Btu content analyses (see Attachment 10: Field Sheets and Analytical Results). Analytical results indicated the oil exhibited characteristics of diesel fuel. Approximately 2,800 gallons of diesel fuel waste were subsequently drained from the towers (approximately 1,800 gallons from Tower #178 and 1,000 gallons from Tower #170) and transported off site to Systech Corporation in Fredonia, Kansas, for disposal as fuel energy. An ERCS's subcontractor mobilized two cranes to the site on October 3, 1994, and by October 7, 1994, all three of the towers had been cut from their bases and placed on plastic-lined ground. The ACM on the towers was subsequently removed by the Jacobson crew.

ACM in Building #8 (the Boiler House) was located between the boiler's steel drum and a brick layer housing the boiler. Because of the unstable brick layer, it was necessary to dismantle the brick layer in order to remove ACM beneath it. Bricks contaminated with asbestos were subsequently double-bagged and disposed of along with other ACM. A supervacuum was brought to the site November 11 to 15, 1994, to facilitate the removal of asbestos-contaminated bricks.

The bulk of ACM removal on site was conducted by Jacobson, including Areas #1, 2, 12, 13, and 14 (see Attachment 3: Site Map for Area Locations). Jacobson began ACM removal on September 12, 1994, and concluded on November 14, 1994.

A total of 1,240 cubic yards (CY) of ACM were removed from the site, including 960 CY by Jacobson and 280 CY by ERCS. The ACM bags

were transported off site and disposed of in the Allen County Landfill in Iola, Kansas (see Attachment 11: Hazardous Manifest Forms).

3.7 Other Removal/Assessment Activities

No assessment nor removal of contaminated soils was conducted during this removal action. On-site soils contaminated with petroleum-related compounds would be excluded from CERCLA, because of the petroleum exclusion.

On October 19 and 20, 1994, TAT collected grab samples from the BS pit located on the northwest portion of the site and the collection pond located on the southwest portion of the site (see Attachment 3: Site Map). A former employee of MARCO stated that stormwater entering the oil/water separator had been pumped into this pond during MARCO operations. A sampling device constructed by TAT, using a perforated PVC-pipe allowed for the assessment and collection of samples from the BS pit. The BS pit, approximately one-half acre in area, appeared to be 6 feet deep with the top 1 foot covered with a layer of a tar-like sludge and the bottom five feet occupied by water. The bottom of the pit could not be assessed, because the thick tar layer atop the pit thwarted access. The collection pond covers an area of approximately 350 by 300 feet. At the time of sampling, the pond had approximately 3 feet of water with a large portion of the pond covered with cattails. A sampling device made by TAT, using a PVC-pipe, was used to collect a sediment sample from this pond. During sampling, TAT observed that a sheen appeared when the bottom sludge was disturbed. This sludge was black and oily and had petroleum odors. Table 5 summarizes the aforementioned samples and analytical parameters (see Attachment 10: Field Sheets and Analytical Results).

TABLE 5: SUMMARY OF SAMPLES COLLECTED FROM THE BS PIT AND COLLECTION POND

Sample No.	Location	Analytical Parameters
BB1KN030	BS Pit; Top (tar sludge)	Semi-VOCs, TCLP Metals
BB1KN031	BS Pit; Bottom (water)	VOCs, Total Metals
BB1KN032	Collection Pond; sediment	VOCs, Semi-VOCs, TCLP Metals
BB1KN033	Collection Pond; water	VOCs, Total Metals

The above samples were submitted to the ERCS's subcontractor laboratory for analyses. Analytical results indicated that barium was the only contaminant detected in TCLP metals analysis--at a concentration of 2 mg/L. This sample was collected from the collection pond sediment (sample BB1KN032). No other metal analytes were detected at significant concentrations. All detected metal analytes were below respective regulatory TCLP limits.

VOCs analysis detected tetrachloroethene in the BS pit water at 2 ug/L (sample BB1KN031); and BTEX constituents in the collection pond sediment (sample BB1KN032) at concentrations of 4.3 ug/kg, 17.1 ug/kg, 6 ug/kg and 26.2 ug/kg, respectively.

Semi-VOCs analysis detected phenanthrene (3,300 ug/kg) in the collection pond sediment (sample BB1KN032); and naphthalene (24,200 ug/kg), fluorene (17,200 ug/kg), phenanthrene (106,000 ug/kg), fluoranthene (9,200 ug/kg), benzo(a)anthracene (12,500 ug/kg), chrysene (35,400 ug/kg), and benzo(a)pyrene (7,800 ug/kg) in the sample collected from the BS sludge (sample BB1KN030).

During the removal action at the MARCO site, the TAT performed documentation of removal activities via log books and photographic records (see Attachment 13: Photographic Records). Interim removal reports were also prepared by the TAT and submitted to the OSC, describing the progress of the removal. TAT observed pools of crude oil-like material oozing from the ground, particularly at the area near the former oil/water separator (after this area had been backfilled with clean soil). A sheen was also observed migrating off site to a drainage ditch located east of the site (see Photographic Records) during heavy precipitation.

4.0 SUMMARY

TAT provided technical assistance to EPA during the removal action at the MARCO site in Chanute, Kansas. The removal began on August 15, 1994, and ended on March 8, 1995. During the removal, TAT inventoried all containers on site, including 197 drums, 280 small containers, and 138 storage tanks. Samples were collected from the containers for field screening, waste stream determination, and for laboratory analyses. Hazardous waste streams were either treated on site or transported off site to RCRA-permitted facilities for disposal, including drummed contents, one tank's contents, mercury-contaminated waste, F037 sludge from the oil/water separator, and ACM. The oil/water separator was backfilled with clean soil. During the removal, the TAT conducted air monitoring to confirm the cleanup of mercury-contaminated waste and to ensure the safety of workers on site, and performed documentation of on-site activities and monitoring of cleanup activities conducted by the ERCS contractor. In addition, the TAT conducted a limited subsurface investigation of the site, which indicated subsurface soil was contaminated with petroleum-related contaminants. Assessment of the BS pit and the collection pond on site also indicated petroleum-related contamination. No contaminated soil was removed from the site, because of the CERCLA petroleum exclusion. Fifty-nine tanks containing petroleum-related waste remain at the site, also because of the petroleum exclusion. The estimated total volume of waste contained in those tanks is 111,300 gallons.

ATTACHMENTS

Attachment 1: Site Location Map
Attachment 2: Property Map
Attachment 3: Site Map
Attachment 4: Action Memorandum For The MARCO Site
Attachment 5: Drum Inventory List
Attachment 6: Small Container Inventory List
Attachment 7: Lab Pack Inventory List
Attachment 8: Tank Inventory List
Attachment 9: Tank Waste Stream List
Attachment 10: Field Sheets and Analytical Results and Chain-of-Custody Forms
Attachment 11: Hazardous Waste Manifest Forms
Attachment 12: Petroleum Exclusion Memorandum from EPA OSC to CNSL
Attachment 13: Photographic Records
Attachment 14: Hazcat Results
Attachment 15: Site Safety Plan

5.0 REFERENCES

Kansas Department of Health and Environment, Bureau of Remediation, Final Site Inspection Report for the Mid-America Refinery, March 1, 1987.

Kansas Department of Health and Environment, Bureau of Remediation, Mid-America Refinery Site Visit Report, October 12, 1995.

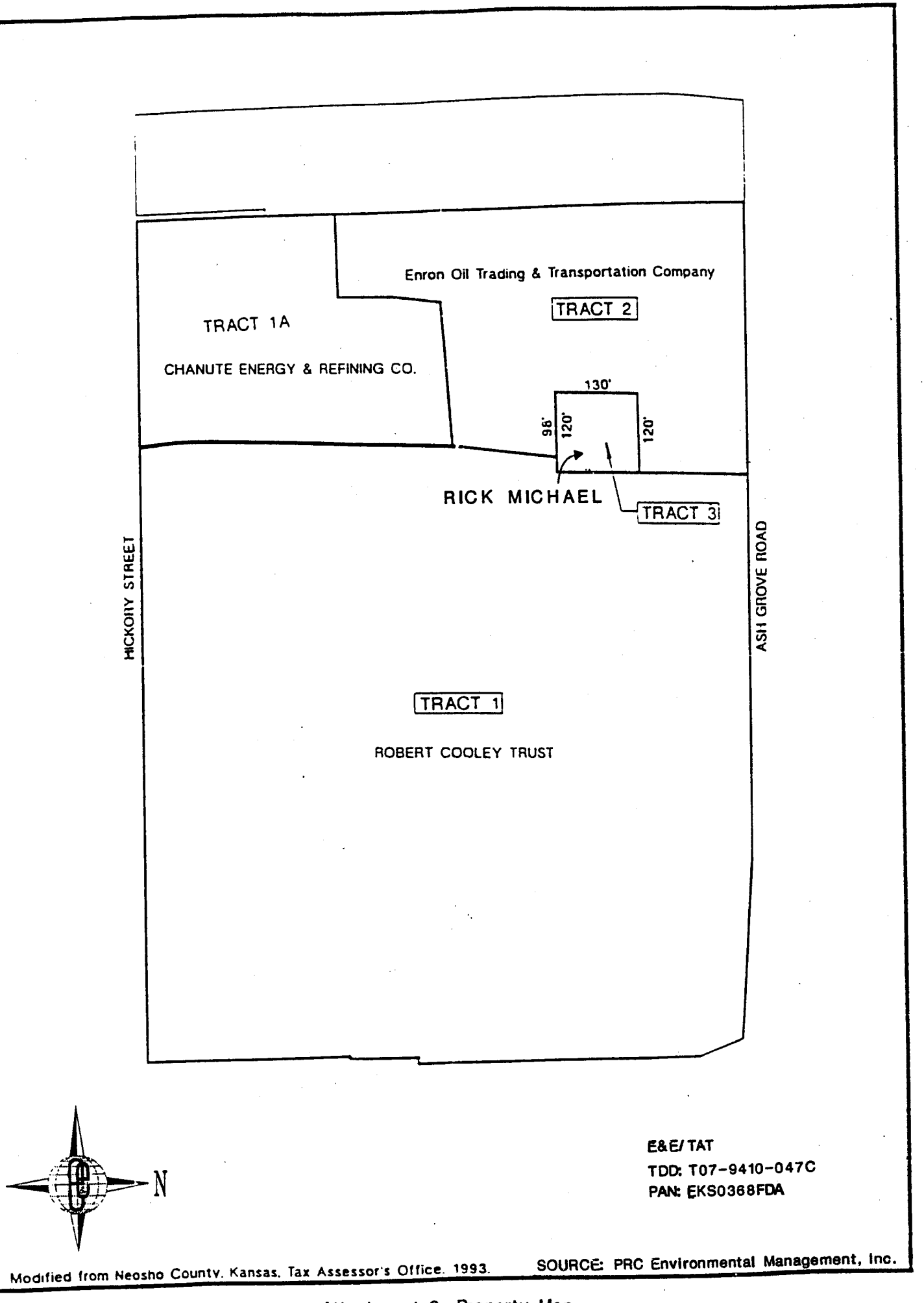
Ecology and Environment, Inc. Technical Assistance Team, Mid-America Refinery Company Site Assessment Report, TDD: T07-9211-001, February 2, 1993.

TapanAm Associates, Inc. Site Survey and Site Layout Plan For MARCO Petroleum Site, June 1994.

TapanAm Associates, Inc., Asbestos Inspection Report For MARCO Petroleum Site, June 1994.

TapanAm Associates, Inc., Asbestos Abatement Project Specifications For MARCO Petroleum Site, June 1994.

TapanAm Associates, Inc., Cost Estimate For Asbestos Abatement At MARCO Petroleum Site, June 1994.



Attachment 2: Property Map

Tank samples

SITE NAME: Marco Refinery DATE: 9/8/94 TDD/PAN: T07-9408-014 / EKSY 58FCA

07-9410-047C

ECOLOGY AND ENVIRONMENT, INC.
TAT 7 FIELD SCREENING DATA SUMMARY SHEET

Note: Flash test range 90 - 170°F

TEST SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH >7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
T48 BOTTOM	N	7	N ~~Sink~~	N	—	N	N	Sparks —	No flash	light green ? inconcl.	—	Tar like sludge
T48 top	N	7	Y	N	—	N	N	N	—	N	—	water top
~~69~~ 74	N	7	—	N	—	N	N	Y	no flash @ 150°F	—	—	solid tar-like May be MT
75	N	7	—	N	N	N	N	Y but very high m.p. Temp	—	—	—	tar like solid - may be empty
76	N	7	N float	N	—	N	N	Y	no flash @ 170°F	N	—	Viscous oily liq. black
78	N	7	N float	N	N	N	N	Y	180°F	N	MRAE 30 ppm < 50 ppm Chlor-n-ol	black ~~viscous~~ oily liq.
79	—		Same as		74	black tar-like solids			May be MT		—	
35	N	7	Y	N	—	N	N	N	—	—	MRAE Ø	water like
46	N	7	Y	N	N	N	N	N	—	—	MRAE Ø	water like
65	N	7	N float	N	N	N	N	Y		N	—	black ~~viscous~~ liq. viscous
66	N	7	N float	N	N	N	N	Y	same as 65	N	—	black same ~~tar~~ as 65
67	same as 66											

~~69~~ HAV 9/8/94

Tank samples

SITE NAME: Marco DATE: 9/8/94 TDD/PAN: T07-9408-014/EKS0368FCA

07-9410-047C

ECOLOGY AND ENVIRONMENT, INC.
TAT 7 FIELD SCREENING DATA SUMMARY SHEET

TEST SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH >7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
✓ 68	Same as 66											
✓ 70	Same as 66											
✓ 71	N	7	N float	N	N	N	N	Y	no flash @ 17°F	N	—	black oily liq.
72	Same as 71											
✓ 73	Same as 70											

9/8/94

Tank samples **SITE NAME:** Marco Refinery **DATE:** 9/9/94 **TDD/PAN:** T07-9408-014/EKS00-SFCA

ECOLOGY AND ENVIRONMENT, INC.

07-9410-047C **TAT 7 FIELD SCREENING DATA SUMMARY SHEET**

Mini RAE ppm

TEST SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH >7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
19	N	7	Y	N	N	N	N	N	—	—	Ø	light yellow water-like liq
22A	—	—	N	—	N	N	N				Activated carbon	
22 Top	N	7	Float	N	—	N	N	Y	no flash @ 170°F	N	Ø	black oily liquid
22 Bottom	N	7	Y	N	N	N	N	N	—	—	—	water like liq
24	—	—	Float	N	N	N	N	Y sparks	—	N	Ø	thick black TAR
25	—	—	Float	N	N	N	N	Y	No flash @ 170°F	N	Ø	same as 24, but thinner
36	N	7	Float	N	N	N	N	Y	—	N	Ø	Thick (Liq. viscous black
125	N	7	Float	N	—	N	N	N	—	light green	226 ppm	same as 48 but Thick black sludge ~~TAR~~
141A	N	7	Float	~~N~~ Yes	—	N	N	Y	<120°F	light green in conch.	>50 ppm Chlorinated 260 ppm	brown thin liq
142A	N	7	Yes	N	~~*~~ Yes N	N	N	N	—	N	—	white crystal
144	N	7	float	N	N	N	N	Y	No flash @ 170°F	N	Ø <50 ppm Chlorinated	black oily liq.
145B	N	7	float	N	—	N	N	Y	<124°F	light green in conch.	>50 ppm Chlorinated 160 ppm	yellow thin liq

SITE NAME: Marco DATE: 9/9/94 TDD/PAN: T07-9408-014/EKS0368FCA

Tank samples 07-9410-0471

ECOLOGY AND ENVIRONMENT, INC.
TAT 7 FIELD SCREENING DATA SUMMARY SHEET

Mini RAE

TEST SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH >7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
154	N	7	Float	N	—	N	N	Y	No flash @ 170°F	Y	2.5 ppm <50 ppm Chlor-n oil	brow/red oily liq.
145	N	7	Y	N	—	N	N	N	—	N	— thin layer of oil on top	clear water like liq.
146 Top	N	7	Float	N	—	N	N	sparks N	—	Y >50 ppm Chlor-n oil	— same as 125 (Tank bottom)	black oily liq - thick
146 Bottom	N	7	Y	N	—	N	N	N	—	N	—	water like clear
158 A	N	7	Y	N	—	N	N	N	—	N	—	Clear water like liq.
161 Top	N	7	Y	N	—	N	N	N	—	—	—	water like
161 Bottom sludge	—	7	Float	N	—	N	N	N sparks	—	N		black sludge
162	N	7	Float	N	—	N	N	sparks	—	N	—	Thick oily black/sludge
163	N	7	Float	N	—	N	N	Y	No flash @ 170°F	N	—	black oily liq.
164	N	7	Float	N	—	N	N	Y	—	N	—	same as 163
170 Top	N	7	float	N	—	N	N	Y	—	N	—	black oily liq
170 Bottom	N	7	Soluble Y	N	—	N	N	N	—	N	—	clear water like liq.

SITE NAME: Marco DATE: 7/9/94 TDD/PAN: T07-9408-014 /EKS03 68 FCA

Tank samples

ECOLOGY AND ENVIRONMENT, INC.
TAT 7 FIELD SCREENING DATA SUMMARY SHEET

07-9410-047

Mini RAE

TEST / SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH > 7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
Transformer by 173	N	7	Y	N	—	N	N	N	—	N	Ø	water like liq.
176	N	7	Y	N	—	N	N	N	—	N	Ø	similar to the above
177	N	7	Y	N	—	N	N	N	—	N	Ø	Water like liq.
177A	N	11	Y	N	N	N	N	N	—	N	Ø	water like liq. pH 11
177B	N	7	Y	N	—	N	N	N	—	N	Ø	water like liq
177C	N	7	Y	N	—	N	N	N	—	N	Ø	water like liq.
178	N	7	Float	N	—	N	N	Y	<140°F	N	90 ppm >50 ppm Chlor-n-oil	black thin liq.
180	N	7	Y	N	—	N	N	N	—	light green → inconclusive	>50 ppm Chlor-n-oil	brown liq. thin layer of oil on top
180A	N	7	Float	N	—	N	N	Y	no flash @ 170°F	N	HCN ~~<50 ppm Chlor-n-oil~~	black thin liq.
180 Transformer A	N	7	Float	N	—	N	N	Y	no flash @ 170°F	N	<50 ppm Chlor-n-oil	yellow oily liq.
180 Transformer B	N	7	Float	N	—	N	N	Y	no flash @ 170°F	light green HCN ~~inconclusive~~	<50 ppm Chlorn-oil	yellow oily liq.
190	N	7	Yes	N	—	N	N	Y	<135°F	N	230 ppm	Clear liq.

SITE NAME: Marco DATE: 9/9/94 TDD/PAN: T07-9408-014/EKS0368FCA

Tank samples

ECOLOGY AND ENVIRONMENT, INC.
TAT 7 FIELD SCREENING DATA SUMMARY SHEET

07-9410-0470
Mini RAE

TEST SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH >7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
192	N	7	Y	N	—	N	N	N	—	N	∅ flam. 4	yellow liq w thin layer of clear oily on top
→ check volume — may want to Hazcat the top layer (depends on vol. of top layer.												
194A	— floor dry —											
194B	N	7	Float	N	—	N	N	Y	<125°F	N	270 ppm ~~<125°F~~ HNU	clear liq.
197A Top	N	7	float	N	—	N	N	Y	—	N	∅	Thick black oily liq
197A Bottom	N	7	Y	N	N	N	N	N	—	N	∅	clear liq. water like.
199	N	7	Float	N	—	N	N	Y	<135°F	N	<50 ppm Chlor-n-oil 290 ppm	Light yellow thin liq
199A	N	4	N	N	—	Y	N	—	—	light green?	—	solid - dirt like
199C	N	7	— activated carbon									black granular solid
201E	N	7	Float	~~N~~	—	N	N	Y	132°F	N	>50 ppm Chloro-oil >200 ppm	Light yellow liq. thin.
202A	— activated carbon —											
40	N	7	Float	N	—	N	N	N sparks	—	N	20 ppm	thick black viscous oily

SITE NAME: Marco DATE: 9/9/94 TDD/PAN: T07-9408-014/EKS Ø363FCA

Tank samples

ECOLOGY AND ENVIRONMENT, INC.
TAT 7 FIELD SCREENING DATA SUMMARY SHEET

07-9410-0470 MiniRAE

TEST SAMPLE	CORROSIVE Y/N	CORROSIVE pH	WATER SOLUBLE (Y, F or S)	WATER REACTIVE (Y or N)	CYANIDE (pH >7)	OXIDIZER (KI + Acid)	SULFIDE (Lead Acetate) (+ H_2O)	FLAMMABILITY FLAMMABLE (Y or N)	FLAMMABILITY SETA FLASHPOINT	HALIDE (Copper Wire) (>17% Cl sinks)	OTHER TESTS (OVA/HNU READING DRAEGER, ETC.)	SAMPLE DESCRIPTION AND COMMENTS
44 Top	N	7	~~Float~~	Same as		40	—	Sparks	—	N	—	black oily tar
44 Bottom	N	7	Yes	N	—	N	N	N	—	N	—	clear H_2O like liq
63	N	7	N	N	—	N	N	Y	—	N	—	solid tar
20 Top	N	7	Float	N	—	—	—	N	—	—	Ø thin layer on top	black oily
20 Bottom	N	7	Y	N	—	N	N	N	—	N	—	water like liquid
Bay 1	N	7	Float	N	—	N	N	Y	no flash @ 170°F	N	>50 ppm Chlor-n oil Ø	brown oily liq
Bay 2	N	7	Float	N	—	N	N	Y	—	N	>50 ppm Chlor-n oil Ø	Same as Bay 1
Bay 3	N	7	Float	N	—	N	N	Y	—	—	>50 ppm Chlor-n oil Ø	Same as Bay 1
Bay 4	N	7	Float	N	—	N	N	Y	—	N	>50 ppm Chlor-n oil	thick brown oily liq.
116A	N	10-11 ~~7~~ ~~Hq~~	Yes	N	—	N	N	N	—	N	Ø	black thin liq.
172	N	7	Yes	N	—	N	N	N	—	N	Ø	water + algae?
172A	N	7	Yes	N	—	N	N	N	—	N	Ø	water like liq.

P9/29/94

September 22, 1994

Riedel Environmental Services, Inc.
C/O: Mid-America Refining Co.
North Santa Fe & Hickory Sts.
Chanute, KS 66720

Mid-America Refining Co. Remediation Project (MARCO Oil) Job #9009.

This inventory lists information collected from storage tanks found within specified areas on the MARCO Oil project. All tanks were checked for volume and air monitored for PPM, % LEL, and % O_2 including all empty (MT) tanks.

Area	Tank	Volume	HNU ppm	Gastech %LEL	%O_2	Comments	
1	39	MT	0	0	20.9		
	47	MT	0	0	20.9	Water and Tar Sludge	WS# 1-L
	48	1000 gal	0	0	20.9	Yellow Liquid - Oily	WS#2
	62	1600 gal	0	0	20.9		
	69	MT	0	0	20.9	Solid Tar	WS#1-S
	74	500 gal	0	0	20.9	Solid Tar	WS#1-S
	75	500 gal	0	0	20.9	Black Liquid - Oily	WS#2
	76	2000 gal	0	0	20.9	Solid Tar	WS#1-S
	79	2000 gal	0	0	20.9		
	112	MT	0	0	20.9	Solid chunks considered empty	
	113	MT	0	0	20.9		
	114	MT	0	0	20.9		
	Tank Total		12				
	Tanks w/ Product		6				
	Tanks Empty		6				
2	35	2300 gal	0	0	20.9	Water	WS#8-L
	46	5900 gal	0	0	20.9	Water	WS#8-L
	60	MT	0	0	20.9		
	61	MT	0	0	20.9		
	63	140 gal	0	0	20.9	Solid Tar	WS#1-S
	65	250 gal	0	0	20.9	Black Liquid - Viscous	WS#1-L
	66	750 gal	0	0	20.9	Black Liquid - Viscous	WS#1-L
	67	250 gal	0	0	20.9	Black Liquid - Viscous	WS#1-L
	68	500 gal	0	0	20.9	Black Liquid - Viscous	WS#1-L
	70	180 gal	0	0	20.9	Black Liquid - Viscous	WS#1-L
	71	1100 gal	10	0	20.9	Black Liquid - Oily	WS#2
	72	960 gal	0	0	20.9	Black Liquid - Oily	WS#2
	73	960 gal	0	0	20.9	Black Liquid - Viscous	WS#1-L
	77	MT	0	0	20.9		
	77A	MT	0	0	20.9		
	78	2200 gal	0	0	20.9	Black Liquid - Oily	WS#2
	116	MT	0	0	20.9		

	116A	300 gal	0	0	20.9	Black Liquid - pH 11	WS#5
	117	MT	0	0	20.9		
	117A	MT	0	0	20.9		
	118	MT	0	0	20.9		
	118A	MT	0	0	20.9		
	Tank Total		22				
	Tanks w/ Product		13				
	Tanks Empty		9				
3	38	MT	0	0	20.9		
	40	600 gal	0	0	20.9	Black Liquid - Viscous	WS#2
	41	MT	0	0	20.9		
	42	MT	0	0	20.9		
	43	MT	0	0	20.9		
	44	1100 gal	5	0	20.9	Black Oily Tar	WS#2
	45	MT	0	0	20.9		
	45A	MT	0	0	20.9		
	125	12200 gal	31	0	20.9	Crude Oil	WS#1-L
	Tank Total		9				
	Tanks w/ Product		3				
	Tanks Empty		6				
8	Bay 1	100 gal	0	0	20.9	Black Liquid - Oil	WS#6
	Bay 2	200 gal	0	0	20.9	Black Liquid - Oil	WS#6
	Bay 3	200 gal	0	0	20.9	Black Liquid - Oil	WS#6
	Bay 4	200 gal	0	0	20.9	Black Liquid - Oil	WS#6
	Tank Total		4				
	Tanks w/ Product		4				
	Tanks Empty		0				
9	141A	690 gal	110	50	20.9	Flammable Liquid	WS#7
	142A	730 gal	60	5	20.9	Salt Like - White Crystal	WS#8-S
	143	MT	0	0	20.9		
	144	900 gal	0	0	20.9	Black Liquid - Oily	WS#2
	145	800 gal	0	0	20.9	Water	WS#8-L
	145A	MT	300	100	17.0	Vapors Only	
	145B	820 gal	85	0	20.9	Flammable Liquid	WS#7
	146	2500 gal	0	0	20.9	Black Oil/Water	WS#2
	147	MT	6	0	20.9		
	150	MT	0	0	20.9		
	151	MT	0	0	20.9		
	152	MT	0	0	20.9		
	153	MT	0	0	20.9		
	154	MT	0	0	20.9		

from 180A

~~gal/of 180 added to 155~~

+1500 gal 4000 gal - what leaked out of 180A

	155	~~2500 gal~~	0	0	20.9	Black Liquid - Oily	WS#2
	156	2400 gal	72	30	20.0	Flammable Liquid	WS#3 — some from 180 added here
199	157	~~MT~~ 7800 gal from 180	0	0	20.9	Brown aqueous liquid w/ oil layer	WS#8L
	Tank Total		17				
	Tanks w/ Product		7				
	Tanks Empty		10				
10	24	2000 gal	0	0	20.9	Solid Tar	WS#1-L
	25	3900 gal	0	0	20.9	Sludge Tar	WS#2
	158A	MT	0	0	20.9		
	Tank Total		3				
	Tanks w/ Product		2				
	Tanks Empty		1				
11	161	90 gal	0	0	20.9	Black Sludge/Water	WS#1-L
	162	300 gal	0	0	20.9	Black Sludge/Oily	WS#2
	163	1050 gal	0	0	20.9	Black Liquid/Oily	WS#2
	164	250 gal	0	0	20.9	Black Liquid/Oily	WS#2
	Tank Total		4				
	Tanks w/ Product		4				
	Tanks Empty		0				
12	167	MT	0	0	20.9		
	168	MT	0	0	20.9		
	169	MT	0	0	20.9		
	170	800 gal	0	0	20.9	Black Oil/Water	WS#2
	171	MT	0	0	20.9		
	172	100 gal	0	0	20.9	Water/Algae	WS#8-L
	172A	8500 gal	0	0	20.9	Water/Algae	WS#8-L
	Tank Total		7				
	Tanks w/ Product		3				
	Tanks Empty		4				
13	36	4600 gal	0	0	20.9	Black Liquid - Viscous	WS#2
	173	MT	0	0	20.9		
	173	70 gal	0	0	20.9	Transformer by 173 - Water	WS#8-L
	174	MT	0	0	20.9		
	174A	MT	0	0	20.9		
	175	MT	0	0	20.9		
	175A	MT	0	0	20.9		
	176	30 gal	0	0	20.9	Water	WS#8-L
	177	40 gal	0	0	20.9	Water	WS#8-L

	177A	900 gal	0	0	20.9	Water - pH 11	WS#5
	177B	100 gal	0	0	20.9	Water	WS#8-L
	177C	100 gal	0	0	20.9	Water	WS#8-L
	Tank Total		12				
	Tanks w/ Product		7				
	Tanks Empty		5				
14	178	1500 gal	80	9	20.9	Fuel Oil	WS#7
	179	MT	0	0	20.9		
	179A	MT	0	0	20.9		
	180	~~7800 gal~~ MT	185	75	19.0	Brown Aqueous Liquid w/ Oil Layer	WS#8-L
	180	2-15 gal	0	0	20.9	Transformer A - Oil	WS#2
	180	2-13 gal	0	0	20.9	Transformer B - Oil	WS#2
	180A	~~1500 gal~~ MT	175	70	15.0	Black Liquid - Fuel Oil	WS#2
	182	MT	0	0	20.9		
	183	MT	0	0	20.9		
	Tank Total		9				
	Tanks w/ Product		5				
	Tanks Empty		4				
15	19	2000 gal	0	0	20.9	Water	WS#8-L
	19A	MT	0	0	20.9		
	20	2000 gal	0	0	20.9	Oil/Water	WS#8-L
	21	MT	0	0	20.9		
	21A	MT	80	0	20.9	Vapor Only	
	22	1000 gal	0	0	20.9	Black Liquid - Oily	WS#2
	22A	200 gal	0	0	20.9	Activated Carbon	WS#8-S
	185	MT	0	0	20.9		
	Tank Total		8				
	Tanks w/ Product		4				
	Tanks Empty		4				
16	8	MT	0	0	20.9		
	9	MT	0	0	20.9		
	10	MT	0	0	20.9		
	186	MT	0	0	20.9		
	187	MT	0	0	20.9		
	188	MT	0	0	20.9		
	189	MT	0	0	20.9		
	Tank Total		7				
	Tanks w/ Product		0				
	Tanks Empty		7				

Jacobson hit a Valve on this tank at 1400 on 2 Nov Contents leaking material transferred to #159

To tank 155

17	54	MT	0	0	20.9		
	190	300 gal	700	0	20.9	Flammable Liquid	WS#4
	191	MT	0	0	20.9		
	192	150 gal	0	0	20.9	Oil/Water	WS#8-L
	193	MT	0	0	20.9		
	194	MT	0	0	20.9		
	194A	800 gal	200	80	20.9	Floor Dry	WS#8-S
	194B	950 gal	120	0	20.9	Flammable Liquid	WS#3
	195	MT	0	0	20.9		
	196	MT	0	0	20.9		
	Tank Total		10				
	Tanks w/ Product		4				
	Tanks Empty		6				
18	197	MT	0	0	20.9		
	197A	22500 gal	0	0	20.9	Crude Oil/Water	WS#2
	198	MT	0	0	20.9		
	198A	MT	0	0	20.9		
	199	MT	0	0	20.9		
15	~~44~~ 199A	600 gal	72	5	20.9	Solid Desiccant	WS#8-S
	199B	MT	98	20	20.9		
	199C	550 gal	41	0	20.9	Activated Carbon	WS#8-S
	199D	MT	0	0	20.9		
	199E	MT	0	0	20.9		
	201A	MT	0	0	20.9		
	201B	MT	0	0	20.9		
	201C	MT	0	0	20.9		
	201D	MT	0	0	20.9		
	201E	300 gal	450	70	20.9	Flammable Liquid	WS#7
	201G	MT	130	0	20.9	Vapor Only	
	202	MT	0	0	20.9		
	202A	950 gal	90	0	20.9	Activated Carbon	WS#8-S
	202B	MT	0	0	20.9		
	203	MT	450	0	20.9	Vapor Only	
	204	MT	0	0	20.9		
	Tank Total		21				
	Tanks w/ Product		6				
	Tanks Empty		15				
Tank Grand Total			145				
Tanks w/ Product			68				
Tanks Empty			77				

The following data lists the tanks in a particular waste stream according to their hazardous characteristics. Each waste stream lists the type of analysis requested from the laboratory

Waste Stream	(TANK VOL/GAL)	— ANALYTICAL —	
#1 - Solid	— 3140 gallons —	TOTAL Halogens	122 ppm
Solid material in TANK BOTTOMS -		Naphthalene	247 ppm
sample collected with metal ice		PHENANTHRENE	200 ppm
scraper.		Anthracene	19 ppm
		Fluoranthene	14 ppm
		Pyrene	208 ppm
		Benzo(a) anthracene	100 ppm
		Chrysene	176 ppm
		Benzo(b)-Fluoranthene	30 ppm
		Benzo(a) pyrene	59 ppm

#1 - LIQUID TAR/OIL	- 18290 gallons -	BTU	15900
		Halogens	240 ppm
		BTEX	105 ppm
		Naphthalene	110 ppm
		Acenaphthene	23 ppm
		Fluorene	39 ppm
		PHENANTHRENE	134 ppm
		pthalate	13 ppm
		Benzo(a) anthracene	92 ppm
		Chrysene	177 ppm
		Benzo (a) pyrene	62 ppm

#2 - Liquid	- 49850 gallons -	BTU	18400
		Halogens	109 ppm

(over)

#2 - Liquid

BTEX	1.3 ppm
PHENANTHRACENE	261 ppm
pyrene	9 ppm

#3 - Liquid (Ignitable) - 3300 gallons -

BTU		19800
Halogens		< 10 ppm
TCLP	Ba	3.2 (100) ppm
	Hg	0.02 (.2) ppm
BTEX		117 ppm
NAPHTHALENE		11900 ppm

#4 - Liquid (Ignitable) - 300 gallons BTU 7590
water soluble alcohol

#5 - Liquid (BASE pH 11) 1200 gallons

TCLP Cr	220 ppm (5)
Pb	41 ppm (5)

⊗

MARCO TANKS

(3)

Waste Stream	(VOL)	Analytical	
#6 - Liquid (chlorinated)	700 gallons	BTU	18800
		Halogens	< 20 ppm (100)
		TCLP Ba	212 ppm
		BTEX	1.6 ppm
		Dichlorobenzene	1.6 ppm
		phenanthrene	24 ppm
		Pyrene	85 ppm
		PCBs	< 5 ppm
#7 - Liquid (Ignitable)	3310 gallons	BTU	19400
		Halogens	< 10 ppm
		Naphthalene	384 ppm
		phenanthrene	90 ppm
		Chrysene	12 ppm
		BTEX	910 ppm
#8 Liquid -	30140 gallons	TCLP Ba	5.6 ppm (100)
		Cd	0.06 ppm (1.0)
#8 - Solid - pH 4 -		TOTAL Metals	< 100 ppm

MARCO — Waste + Waste Stream Analyses —

① TAR Pit

ⓐ BTU — 14300

ⓑ TCLP — Hg 0.0277 mg/L (.2)

ⓒ VOC — Toluene 9.3 mg/L ETHBENZENE 4.6 mg/L, xylene 25 mg/L

ⓓ PAH — ND

② OIL - CONCRETE TANK

ⓐ TCLP — ND

ⓑ VOC — ETHbenzene 0.85 mg/L, xylene 1.7 mg/L

ⓒ PAH - Napthalene 17 ppm, phenanthrene 100 ppm, Pyrene 23 ppm

ⓓ BTU — 19591

③ TAR DRUMS

ⓐ BTU — 9840

ⓑ TCLP — ND

ⓒ VOC — ND

ⓓ PAH — ND

④ Oil Separator Sludge (F037)

ⓐ BTU — 958

ⓑ TCLP — Pb 0.478 mg/L (5.0)

ⓒ PCB — ND

ⓓ VOC — Benzene 0.35 ppm ETHBenzene 1.7 ppm

ⓔ PAH — NAPHTHALENE 10 ppm, PHENANTHRENE 20 ppm

⑤ POND

ⓐ BTU — 1190

ⓑ TCLP — Hg 0.299 (.2)

ⓒ PCB — ND

ⓓ VOC — ND

ⓔ PAH — ND

MARCO SITE - TANK WASTE STREAM LIST		
	TANK #	ESTIMATE VOLUME (GALLON)
Tank Waste Stream #1 - Combustible Solid Tar	63	140
	75	500
	74	500
	79	2,000
	TOTAL GALLONS	3,140
Tank Waste Stream #1 - Combustible Liquid Tar	65	250
	66	750
	67	250
	68	500
	70	180
	73	960
	125	12,200
	24	2,000
	161	90
	48	1,000
	TOTAL GALLONS	18,180
Tank Waste Stream #2 - Flammable liquid >150°F and Floats on Water	76	2,000
	162	300
	78	2,200
	71	1,100
	72	960
	36	4,600
	197A	22,500
	144	900
	164	250
	163	1,050
	170	1080
	25	3,900
	180A	1,500
	154	1,200

MARCO SITE - TANK WASTE STREAM LIST		
	TANK #	ESTIMATE VOLUME (GALLON)
	22	1,000
	Transformer A on Tank 180	30
	Transformer B on Tank 180	26
	62	1,600
	40	600
	44	1,100
	146	2,500
TOTAL GALLONS		50,396
Tank Waste Stream #3 - Flammable liquid <150°F and Floats on Water	199	2,400
	194B	950
TOTAL GALLONS		3,350
Tank Waste Stream #4 - Flammable liquid <150°F and Soluble on Water	190	300
Tank Waste Stream #5 - Base Liquid	177A	900
	116A	300
TOTAL GALLONS		1,200
Tank Waste Stream #6 - Flammable liquid >150-°F, Chlorinated, and Floats on Water	Bay 1	100
	Bay 2	200
	Bay 3	200
	Bay 4	200
TOTAL GALLONS		700
Tank Waste Stream #7 - Flammable liquid <150-°F, Chlorinated, and Floats on Water	201E	300
	178	1,800
	141A	690
	145B	820
TOTAL GALLONS		3,610
Tank Waste Stream #8 - Non-Haz Liquids	20	2,000

MARCO SITE - TANK WASTE STREAM LIST		
	TANK #	ESTIMATE VOLUME (GALLON)
	35	2,300
	46	5,900
	192	150
	19	2,000
	177	40
	145	800
	177C	100
	158A	250
	172A	8,500
	176	30
	Transformer by Tank 173	70
	177B	100
	180	7,800
	172	100
TOTAL GALLONS		30,140
Tank Waste Stream #8 - Non-Haz Solids	22A	200
	194A	800
	199A	600
	142A	730
	202A	950
	199C	550
TOTAL GALLONS		3,830

Note:

1. Tank waste stream #4 (approx. 300 gallons) has been disposed of at a RCRA-approved facility.
2. Contents of towers #170 and 178 (approx. 2,800 gallons of diesel fuel waste) have been disposed of at a RCRA-approved facility.
3. Contents of Tanks #180, 199, 180A (all leaking) were transferred to Tanks #155, 156, and 157, respectively.

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

PACE Project Number: 601137
Client Project ID: MARCO Refinery

Attn: Mr. Scott Brandon
Phone: (316)431-6039

Solid results are reported on a dry weight basis

PACE Sample No: 6074504
Client Sample ID: BBIKN-01 Subsurface Soil GP-1 (5'-7')
Date Collected: 08/22/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	3.65	mg/kg	0.5	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				08/30/94				
Selenium, AAS Furnace								
Selenium	1.32	mg/kg	0.5	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				08/30/94				
Lead, AAS Furnace								
Lead	1570	mg/kg	250	08/31/94	EPA 7421	JAH	7439-92-1	
Date Digested				08/30/94				
Metals, ICP								
Barium	137	mg/kg	0.952	08/31/94	EPA 6010	JAH	7440-39-3	
Cadmium	73.8	mg/kg	0.476	08/31/94	EPA 6010	JAH	7440-43-9	
Chromium	14.1	mg/kg	1.9	08/31/94	EPA 6010	JAH	7440-47-3	
Silver	ND	mg/kg	2.86	08/31/94	EPA 6010	JAH	7440-22-4	
Date Digested				08/30/94				
Wet Chemistry								
Total Petroleum Hydrocarbons								
Total Petroleum Hydrocarbons	11200	mg/kg	499	09/03/94	EPA 418.1 MO Mod	DLV		
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	13000	09/02/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	33000	09/02/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-15-0	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074504 Date Collected: 08/22/94
Client Sample ID: 8BIKN-01 Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Trichlorofluoromethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	33000	09/02/94	EPA 8240	DJE	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	13000	09/02/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-27-4	
1,2-Dichloropropane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	79-00-5	
Benzene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	14000	09/02/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	79-34-5	
Toluene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	108-88-3	
Chlorobenzene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	100-41-4	
Styrene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	63000	09/02/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	12000	09/02/94	EPA 8240	DJE	95-50-1	
1,2-Dichloroethane-D4 (S)	91	%		09/02/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	124	%		09/02/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	111	%		09/02/94	EPA 8240	DJE	460-00-4	
Date Prepared				09/02/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	20000	ug/kg	32000	09/12/94	EPA 8270	MSR	91-20-3	1

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
PAGE: 3

PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074504 Date Collected: 08/22/94
Client Sample ID: BBIKN-01 Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Acenaphthylene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	86-73-7	
Phenanthrene	26000	ug/kg	32000	09/12/94	EPA 8270	MSR	85-01-8	1
Anthracene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	206-44-0	
Pyrene	36000	ug/kg	33000	09/12/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	32000	09/12/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	0	%		09/12/94	EPA 8270	MSR	321-60-8	2
Terphenyl-D14 (S)	0	%		09/12/94	EPA 8270	MSR	1718-51-0	2
Date Extracted				09/01/94				

Comments : 2-Methylnaphthalene detected at 68,000 ug/kg

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REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

Date Collected: 08/23/94
Date Received: 08/26/94

PACE Sample No: 6074520
Client Sample ID: BBTKN-02 subsurface soil GP-1 (12'-14')

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	0.857	mg/kg	0.476	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				08/30/94				
Selenium, AAS Furnace								
Selenium	ND	mg/kg	0.476	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				08/30/94				
Metals, ICP								
Barium	64.1	mg/kg	1	08/31/94	EPA 6010	JAH	7440-39-3	
Cadmium	ND	mg/kg	0.5	08/31/94	EPA 6010	JAH	7440-43-9	
Chromium	7.4	mg/kg	2	08/31/94	EPA 6010	JAH	7440-47-3	
Silver	ND	mg/kg	3	08/31/94	EPA 6010	JAH	7440-22-4	
Date Digested				08/30/94				
Lead, AAS Furnace								
Lead	10.6	mg/kg	1.9	08/31/94	EPA 7421	JAH	7439-92-1	
Date Digested				08/30/94				
Wet Chemistry								
Total Petroleum Hydrocarbons								
Total Petroleum Hydrocarbons	23.3	mg/kg	9.86	09/03/94	EPA 418.1 MO Mod	DLV		
GC/MS -- VOA								
Volatile Organics								
Chloromethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	74-87-3	
Bromomethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	74-83-9	
Vinyl Chloride	ND	ug/kg	10	09/06/94	EPA 8240	CHL	75-01-4	
Chloroethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	75-00-3	
Methylene Chloride	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-09-2	
Acetone	ND	ug/kg	100	09/06/94	EPA 8240	CHL	67-64-1	
Carbon Disulfide	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-15-0	
Trichlorofluoromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-69-4	
1,1-Dichloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-35-4	
1,1-Dichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	5	09/06/94	EPA 8240	CHL	540-59-0	
Chloroform	ND	ug/kg	5	09/06/94	EPA 8240	CHL	67-66-3	
1,2-Dichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	107-06-2	
2-Butanone	ND	ug/kg	5	09/06/94	EPA 8240	CHL	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	71-55-6	
Carbon Tetrachloride	ND	ug/kg	100	09/06/94	EPA 8240	CHL	56-23-5	
Vinyl Acetate	ND	ug/kg	5	09/06/94	EPA 8240	CHL	108-05-4	
			50	09/06/94	EPA 8240			

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074520 Date Collected: 08/23/94
Client Sample ID: BBIKN-02 Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Bromodichloromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-27-4	
1,2-Dichloropropane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	10061-01-5	
Trichloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-01-6	
Dibromochloromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-00-5	
Benzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	10061-02-6	
Bromoform	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	50	09/06/94	EPA 8240	CHL	108-10-1	
2-Hexanone	ND	ug/kg	50	09/06/94	EPA 8240	CHL	591-78-6	
Tetrachloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-34-5	
Toluene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	108-88-3	
Chlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	108-90-7	
Ethylbenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	100-41-4	
Styrene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	100-42-5	
Xylene (Total)	ND	ug/kg	5	09/06/94	EPA 8240	CHL	1330-20-7	
Acrolein	ND	ug/kg	100	09/06/94	EPA 8240	CHL	107-02-8	
Acrylonitrile	ND	ug/kg	100	09/06/94	EPA 8240	CHL	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	10	09/06/94	EPA 8240	CHL	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	95-50-1	
1,2-Dichloroethane-D4 (S)	103	%		09/06/94	EPA 8240	CHL	17060-07-0	
Toluene-D8 (S)	89	%		09/06/94	EPA 8240	CHL	2037-26-5	
4-Bromofluorobenzene (S)	114	%		09/06/94	EPA 8240	CHL	460-00-4	
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	91-20-3	
Acenaphthylene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	208-96-8	
Acenaphthene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	83-32-9	
Fluorene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	86-73-7	
Phenanthrene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	85-01-8	
Anthracene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	120-12-7	
Fluoranthene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	206-44-0	
Pyrene	ND	ug/kg	330	09/02/94	EPA 8270	DJE	129-00-0	
Benzo(a)anthracene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	56-55-3	
Chrysene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	205-99-2	

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074520
Client Sample ID: BBIKN-02

Date Collected: 08/23/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzo(k)fluoranthene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	207-08-9	
Benzo(a)pyrene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	50-32-8	
Indeno (1.2.3-cd) pyrene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	193-39-5	
Benzo(g.h.i)perylene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	191-24-2	
Dibenz(a.h)anthracene	ND	ug/kg	320	09/02/94	EPA 8270	DJE	53-70-3	
2-Fluorobiphenyl (S)	58	%		09/02/94	EPA 8270	DJE	321-60-8	
Terphenyl-D14 (S)	117	%		09/02/94	EPA 8270	DJE	1718-51-0	
Date Extracted				09/01/94				

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074546 Date Collected: 08/23/94
Client Sample ID: 8BIKN-03 subsurface soil GP-2 (5'-7') Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0.171	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	5.43	mg/kg	0.521	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				08/30/94				
Selenium, AAS Furnace								
Selenium	1.76	mg/kg	0.521	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				08/30/94				
Lead, AAS Furnace								
Lead	881	mg/kg	104	08/31/94	EPA 7421	JAH	7439-92-1	
Date Digested				08/30/94				
Metals, ICP								
Barium	158	mg/kg	0.952	08/31/94	EPA 6010	JAH	7440-39-3	
Cadmium	74.4	mg/kg	0.476	08/31/94	EPA 6010	JAH	7440-43-9	
Chromium	10	mg/kg	1.9	08/31/94	EPA 6010	JAH	7440-47-3	
Silver	ND	mg/kg	2.86	08/31/94	EPA 6010	JAH	7440-22-4	
Date Digested				08/30/94				
Wet Chemistry								
Total Petroleum Hydrocarbons								
Total Petroleum Hydrocarbons	29600	mg/kg	5030	09/03/94	EPA 418.1 MO Mod	DLV		
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	1300	09/06/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	3300	09/06/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	3300	09/06/94	EPA 8240	DJE	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	1300	09/06/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-27-4	

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074546
Client Sample ID: BBIKN-03

Date Collected: 08/23/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
1.2-Dichloropropane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	78-87-5	
cis-1.3-Dichloropropene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	124-48-1	
1.1.2-Trichloroethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	79-00-5	
Benzene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	71-43-2	
trans-1.3-Dichloropropene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	1400	09/06/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	127-18-4	
1.1.2.2-Tetrachloroethane	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	79-34-5	
Toluene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	108-88-3	
Chlorobenzene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	100-41-4	
Styrene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	4200	ug/kg	1200	09/06/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	6300	09/06/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	110-75-8	
1.3-Dichlorobenzene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	541-73-1	
1.4-Dichlorobenzene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	106-46-7	
1.2-Dichlorobenzene	ND	ug/kg	1200	09/06/94	EPA 8240	DJE	95-50-1	
1.2-Dichloroethane-D4 (S)	103	%		09/06/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	122	%		09/06/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	130	%		09/06/94	EPA 8240	DJE	460-00-4	
Date Prepared				09/06/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	7300	ug/kg	3300	09/12/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	83-32-9	
Fluorene	2700	ug/kg	3300	09/12/94	EPA 8270	MSR	86-73-7	1
Phenanthrene	11000	ug/kg	3300	09/12/94	EPA 8270	MSR	85-01-8	
Anthracene	2300	ug/kg	3300	09/12/94	EPA 8270	MSR	120-12-7	1
Fluoranthene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	206-44-0	
Pyrene	15000	ug/kg	3300	09/12/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	1300	ug/kg	3300	09/12/94	EPA 8270	MSR	56-55-3	1
Chrysene	3300	ug/kg	3300	09/12/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	205-99-2	

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PACE Project Number: 601137
Client Project ID: MAKLO Refinery

PACE Sample No: 6074546 Date Collected: 08/23/94
Client Sample ID: BBIKN-03 Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzo(k)fluoranthene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	50-32-8	
Indeno (1.2.3-cd) pyrene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	193-39-5	
Benzo(g.h.i)perylene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	191-24-2	
Dibenz(a.h)anthracene	ND	ug/kg	3300	09/12/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	0	%		09/12/94	EPA 8270	MSR	321-60-8	2
Terphenyl-D14 (S)	0	%		09/12/94	EPA 8270	MSR	1718-51-0	2
Date Extracted				09/01/94				

Comments : Elevated quantitation limits resulting from matrix interference.

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PACE Project Number: 601137
Client Project ID: HARCO Refinery

PACE Sample No: 6074561
Client Sample ID: BBIKN-04 subsurface soil GP-4 (2'-4')
Date Collected: 08/23/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	4.41	mg/kg	0.5	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				08/30/94				
Selenium, AAS Furnace								
Selenium	0.55	mg/kg	0.5	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				08/30/94				
Lead, AAS Furnace								
Lead	278	mg/kg	50	08/31/94	EPA 7421	JAH	7439-92-1	
Date Digested				08/30/94				
Metals, ICP								
Barium	150	mg/kg	1.02	08/31/94	EPA 6010	JAH	7440-39-3	
Cadmium	41.2	mg/kg	0.51	08/31/94	EPA 6010	JAH	7440-43-9	
Chromium	11.2	mg/kg	2.04	08/31/94	EPA 6010	JAH	7440-47-3	
Silver	ND	mg/kg	3.06	08/31/94	EPA 6010	JAH	7440-22-4	
Date Digested				08/30/94				

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REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074595
Client Sample ID: BBIKN-05 subsurface soil GP-4 (5'-7')
Date Collected: 08/23/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	3.62	mg/kg	0.495	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				08/30/94				
Selenium, AAS Furnace								
Selenium	ND	mg/kg	0.495	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				08/30/94				
Metals, ICP								
Barium	245	mg/kg	0.952	08/31/94	EPA 6010	JAH	7440-39-3	
Cadmium	ND	mg/kg	0.476	08/31/94	EPA 6010	JAH	7440-43-9	
Chromium	11.3	mg/kg	1.9	08/31/94	EPA 6010	JAH	7440-47-3	
Silver	ND	mg/kg	2.86	08/31/94	EPA 6010	JAH	7440-22-4	
Date Digested				08/30/94				
Lead, AAS Furnace								
Lead	9.62	mg/kg	1.98	08/31/94	EPA 7421	JAH	7439-92-1	
Date Digested				08/30/94				
Wet Chemistry								
Total Petroleum Hydrocarbons								
Total Petroleum Hydrocarbons	813	mg/kg	50.5	09/03/94	EPA 418.1 MO Mod	DLV		
GC/MS -- VOA								
Volatile Organics								
Chloromethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	74-87-3	
Bromomethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	74-83-9	
Vinyl Chloride	ND	ug/kg	10	09/06/94	EPA 8240	CHL	75-01-4	
Chloroethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	75-00-3	
Methylene Chloride	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-09-2	
Acetone	160	ug/kg	100	09/06/94	EPA 8240	CHL	67-64-1	
Carbon Disulfide	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-15-0	
Trichlorofluoromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-69-4	
1,1-Dichloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-35-4	
1,1-Dichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	5	09/06/94	EPA 8240	CHL	540-59-0	
Chloroform	ND	ug/kg	5	09/06/94	EPA 8240	CHL	67-66-3	
1,2-Dichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	107-06-2	
2-Butanone	ND	ug/kg	100	09/06/94	EPA 8240	CHL	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	71-55-6	
Carbon Tetrachloride	ND	ug/kg	5	09/06/94	EPA 8240	CHL	56-23-5	
Vinyl Acetate	ND	ug/kg	50	09/06/94	EPA 8240	CHL	108-05-4	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074595 Date Collected: 08/23/94
Client Sample ID: BBIKN-05 Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Bromodichloromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-27-4	
1,2-Dichloropropane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	10061-01-5	
Trichloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-01-6	
Dibromochloromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-00-5	
Benzene	2	ug/kg	5	09/06/94	EPA 8240	CHL	71-43-2	1
trans-1,3-Dichloropropene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	10061-02-6	
Bromoform	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	50	09/06/94	EPA 8240	CHL	108-10-1	
2-Hexanone	ND	ug/kg	50	09/06/94	EPA 8240	CHL	591-78-6	
Tetrachloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-34-5	
Toluene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	108-88-3	
Chlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	108-90-7	
Ethylbenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	100-41-4	
Styrene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	100-42-5	
Xylene (Total)	4.5	ug/kg	5	09/06/94	EPA 8240	CHL	1330-20-7	1
Acrolein	ND	ug/kg	100	09/06/94	EPA 8240	CHL	107-02-8	
Acrylonitrile	ND	ug/kg	100	09/06/94	EPA 8240	CHL	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	10	09/06/94	EPA 8240	CHL	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	95-50-1	
1,2-Dichloroethane-D4 (S)	105	%		09/06/94	EPA 8240	CHL	17060-07-0	
Toluene-D8 (S)	110	%		09/06/94	EPA 8240	CHL	2037-26-5	
4-Bromofluorobenzene (S)	117	%		09/06/94	EPA 8240	CHL	460-00-4	
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	86-73-7	
Phenanthrene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	206-44-0	
Pyrene	ND	ug/kg	3300	09/09/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	205-99-2	

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074595
Client Sample ID: BBIKN-05

Date Collected: 08/23/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzo(k)fluoranthene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	3200	09/09/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	0	%		09/09/94	EPA 8270	MSR	321-60-8	2
Terphenyl-D14 (S)	0	%		09/09/94	EPA 8270	MSR	1718-51-0	2
Date Extracted				09/01/94				

Comments : Elevated quantitation limits resulting from matrix interference.

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074629
Client Sample ID: BBIKN-06 subsurface soil GP-13 (3'-5')
Date Collected: 08/24/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	2.31	mg/kg	0.49	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				08/30/94				
Selenium, AAS Furnace								
Selenium	ND	mg/kg	0.49	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				08/30/94				
Metals, ICP								
Barium	175	mg/kg	0.952	08/31/94	EPA 6010	JAH	7440-39-3	
Cadmium	ND	mg/kg	0.476	08/31/94	EPA 6010	JAH	7440-43-9	
Chromium	8.86	mg/kg	1.9	08/31/94	EPA 6010	JAH	7440-47-3	
Silver	ND	mg/kg	2.86	08/31/94	EPA 6010	JAH	7440-22-4	
Date Digested				08/30/94				
Lead, AAS Furnace								
Lead	7.16	mg/kg	0.98	08/31/94	EPA 7421	JAH	7439-92-1	
Date Digested				08/30/94				
Wet Chemistry								
Total Petroleum Hydrocarbons								
Total Petroleum Hydrocarbons	121	mg/kg	10.1	09/03/94	EPA 418.1 MO Mod	DLV		
GC/MS -- VOA								
Volatile Organics								
Chloromethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	74-87-3	
Bromomethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	74-83-9	
Vinyl Chloride	ND	ug/kg	10	09/06/94	EPA 8240	CHL	75-01-4	
Chloroethane	ND	ug/kg	10	09/06/94	EPA 8240	CHL	75-00-3	
Methylene Chloride	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-09-2	
Acetone	100	ug/kg	100	09/06/94	EPA 8240	CHL	67-64-1	
Carbon Disulfide	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-15-0	
Trichlorofluoromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-69-4	
1,1-Dichloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-35-4	
1,1-Dichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	5	09/06/94	EPA 8240	CHL	540-59-0	
Chloroform	ND	ug/kg	5	09/06/94	EPA 8240	CHL	67-66-3	
1,2-Dichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	107-06-2	
2-Butanone	ND	ug/kg	100	09/06/94	EPA 8240	CHL	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	71-55-6	
Carbon Tetrachloride	ND	ug/kg	5	09/06/94	EPA 8240	CHL	56-23-5	
Vinyl Acetate	77	ug/kg	50	09/06/94	EPA 8240	CHL	108-05-4	

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074629
Client Sample ID: BBIKN-06

Date Collected: 08/24/94
Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Bromodichloromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-27-4	
1,2-Dichloropropane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	10061-01-5	
Trichloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-01-6	
Dibromochloromethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-00-5	
Benzene	76	ug/kg	5	09/06/94	EPA 8240	CHL	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	10061-02-6	
Bromoform	ND	ug/kg	5	09/06/94	EPA 8240	CHL	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	50	09/06/94	EPA 8240	CHL	108-10-1	
2-Hexanone	ND	ug/kg	50	09/06/94	EPA 8240	CHL	591-78-6	
Tetrachloroethene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5	09/06/94	EPA 8240	CHL	79-34-5	
Toluene	35	ug/kg	5	09/06/94	EPA 8240	CHL	108-88-3	
Chlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	108-90-7	
Ethylbenzene	120	ug/kg	5	09/06/94	EPA 8240	CHL	100-41-4	
Styrene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	100-42-5	
Xylene (Total)	280	ug/kg	5	09/06/94	EPA 8240	CHL	1330-20-7	
Acrolein	ND	ug/kg	100	09/06/94	EPA 8240	CHL	107-02-8	
Acrylonitrile	ND	ug/kg	100	09/06/94	EPA 8240	CHL	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	10	09/06/94	EPA 8240	CHL	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	5	09/06/94	EPA 8240	CHL	95-50-1	
1,2-Dichloroethane-D4 (S)	90	%		09/06/94	EPA 8240	CHL	17060-07-0	
Toluene-D8 (S)	104	%		09/06/94	EPA 8240	CHL	2037-26-5	
4-Bromofluorobenzene (S)	143	%		09/06/94	EPA 8240	CHL	460-00-4	3
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	86-73-7	
Phenanthrene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	206-44-0	
Pyrene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	205-99-2	

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PACE Sample No: 6074629 Date Collected: 08/24/94
Client Sample ID: BBIKN-06 Date Received: 08/26/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzo(k)fluoranthene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	330	09/06/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	52	%		09/06/94	EPA 8270	MSR	321-60-8	
Terphenyl-D14 (S)	98	%		09/06/94	EPA 8270	MSR	1718-51-0	
Date Extracted				09/01/94				

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PACE Project Number: 601137
Client Project ID: MARCO Refinery

PARAMETER FOOTNOTES

ND	Not Detected
PRL	PACE Reporting Limit
(S)	Surrogate
[1]	Detected but below the PRL: therefore, result is an estimated concentration.
[2]	Spike and/or surrogate recoveries could not be calculated due to sample dilution.
[3]	The percent recovery for surrogate 4-Bromofluorobenzene is outside of laboratory established control limits. This is due to the matrix effect of the sample. The sample was not reanalyzed.

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REPORT OF LABORATORY ANALYSIS

Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

September 16, 1994
PACE Project Number: 540901502

Attn: Mr. Scott Brandon

Client Reference: Marco Oil

PACE Sample Number:			60 0093075		
Date Collected:			08/27/94		
Date Received:			09/01/94		
			BB1KN-07		
Parameter	Units	MDL		METHOD	DATE ANALYZED
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
BTU	BTU/lb	100	9860	D271-58	09/08/94

tar drums

PACE Sample Number:			60 0093083		
Date Collected:			08/31/94		
Date Received:			09/01/94		
Client Sample ID:			BB1KN-08		
Parameter	Units	MDL		METHOD	DATE ANALYZED
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
BTU	BTU/lb	100	19591	D271-58	09/12/94

These data have been reviewed and are approved for release.

Brian J. Smith
Manager, Inorganic Chemistry

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Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

PACE Project Number: 601191
Client Project ID: Marco Oil

Attn: Mr. Scott Brandon
Phone: (316)431-6039

Solid results are reported on a dry weight basis

PACE Sample No: 6078695
Client Sample ID: BB1KN-07 four drums

Date Collected: 08/27/94
Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Inorganics								
RCRA Metals, ICP, TCLP Leach.								
Date Digested				09/02/94				
Metals								
Mercury, CVAAS, TCLP Leachate								
Mercury	ND	mg/L	0.01	09/06/94	EPA 7470	MRM	7439-97-6	
RCRA Metals, ICP, TCLP Leach.								
Barium	ND	mg/L	5	09/12/94	EPA 6010	MHT	7440-39-3	
Cadmium	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7440-43-9	
Chromium	ND	mg/L	0.05	09/12/94	EPA 6010	MHT	7440-47-3	
Lead	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7439-92-1	
Silver	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7440-22-4	
Arsenic	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7440-38-2	
Selenium	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7782-49-2	
Date Digested				09/02/94				
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	1300	09/07/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	3300	09/07/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	3300	09/07/94	EPA 8240	DJE	78-93-3	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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PACE Project Number: 601191
Client Project ID: Marco Oil

PACE Sample No: 6078695
Client Sample ID: BB1KN-07

Date Collected: 08/27/94
Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
1,1,1-Trichloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	1300	09/07/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-27-4	
1,2-Dichloropropane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	79-00-5	
Benzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	1400	09/07/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	79-34-5	
Toluene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	108-88-3	
Chlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	100-41-4	
Styrene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	6300	09/07/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	95-50-1	
1,2-Dichloroethane-D4 (S)	96	%		09/07/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	123	%		09/07/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	126	%		09/07/94	EPA 8240	DJE	460-00-4	1
Date Prepared				09/07/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	86-73-7	
Phenanthrene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	206-44-0	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601191
Client Project ID: Marco Oil

PACE Sample No: 6078695
Client Sample ID: BB1KN-07

Date Collected: 08/27/94
Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Pyrene	ND	ug/kg	91000	09/06/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	90000	09/06/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	600	%		09/06/94	EPA 8270	MSR	321-60-8	
Terphenyl-D14 (S)	1060	%		09/06/94	EPA 8270	MSR	1718-51-0	
Date Extracted				09/01/94				

Comments : Elevated quantitation limits resulting from matrix interference.

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REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601191
Client Project ID: Marco Oil

PACE Sample No: 6078703 Date Collected: 08/31/94
Client Sample ID: BB1KN-08 tank pit 197A Date Received: 09/01/94
cement oil

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Inorganics								
RCRA Metals, ICP, TCLP Leach.								
Date Digested				09/02/94				
Metals								
Mercury, CVAAS, TCLP Leachate								
Mercury	ND	mg/L	0.01	09/06/94	EPA 7470	MRM	7439-97-6	
RCRA Metals, ICP, TCLP Leach.								
Barium	ND	mg/L	5	09/12/94	EPA 6010	MHT	7440-39-3	
Cadmium	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7440-43-9	
Chromium	ND	mg/L	0.05	09/12/94	EPA 6010	MHT	7440-47-3	
Lead	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7439-92-1	
Silver	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7440-22-4	
Arsenic	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7440-38-2	
Selenium	ND	mg/L	0.25	09/12/94	EPA 6010	MHT	7782-49-2	
Date Digested				09/02/94				
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	1300	09/07/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	3300	09/07/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	3300	09/07/94	EPA 8240	DJE	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	1300	09/07/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-27-4	
1,2-Dichloropropane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	79-00-5	
Benzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	71-43-2	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601191
Client Project ID: Marco Oil

PACE Sample No: 6078703 Date Collected: 08/31/94
Client Sample ID: BB1KN-08 Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
trans-1,3-Dichloropropene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	1400	09/07/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	79-34-5	
Toluene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	108-88-3	
Chlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	850	ug/kg	1200	09/07/94	EPA 8240	DJE	100-41-4	2
Styrene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	1700	ug/kg	1200	09/07/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	6300	09/07/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	1200	09/07/94	EPA 8240	DJE	95-50-1	
1,2-Dichloroethane-D4 (S)	93	%		09/07/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	129	%		09/07/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	110	%		09/07/94	EPA 8240	DJE	460-00-4	
Date Prepared				09/07/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	17000	ug/kg	90000	09/12/94	EPA 8270	MSR	91-20-3	2
Acenaphthylene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	86-73-7	
Phenanthrene	100000	ug/kg	90000	09/12/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	206-44-0	
Pyrene	23000	ug/kg	91000	09/12/94	EPA 8270	MSR	129-00-0	2
Benzo(a)anthracene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	90000	09/12/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	0	%		09/12/94	EPA 8270	MSR	321-60-8	3

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601191
Client Project ID: Marco Oil

PACE Sample No: 6078703
Client Sample ID: BB1KN-08

Date Collected: 08/31/94
Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Terphenyl-D14 (S)	0	%		09/12/94	EPA 8270	MSR	1718-51-0	3
Date Extracted				09/01/94				

Comments : Elevated quantitation limits resulting from matrix interference.
2-Methylnaphthalene detected at 15000 ug/kg

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REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601191
Client Project ID: Marco Oil

PARAMETER FOOTNOTES

ND	Not Detected
PRL	PACE Reporting Limit
(S)	Surrogate
[1]	The Surrogate recovery value exceeded the established laboratory control limit value. The sample did not contain target analyte compounds; therefore, the surrogate recovery should not affect the quality of the reported results, and the data is ac
[2]	Detected but below the PRL; therefore, result is an estimated concentration.
[3]	Spike and/or surrogate recoveries could not be calculated due to sample dilution.

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REPORT OF LABORATORY ANALYSIS

Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

September 09, 1994
PACE Project Number: 540901503

Attn: Mr. Scott Brandon

Client Reference: Marco Oil

PACE Sample Number:			60 0093091		
Date Collected:			08/31/94		
Date Received:			09/01/94		
			BB1KN-09 → large tar-pit collected from SE site		
Parameter	Units	MDL		METHOD	DATE ANALYZED
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
BTU	BTU/lb	100	14300	D271-58	09/08/94

These data have been reviewed and are approved for release.

Brian J. Smith
Manager, Inorganic Chemistry

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REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

PACE Project Number: 601190
Client Project ID: Marco Oil

Attn: Mr. Scott Brandon
Phone: (316)431-6039

Solid results are reported on a dry weight basis

PACE Sample No: 6078687 Date Collected: 08/31/94
Client Sample ID: BB1KM-09 Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Inorganics								
RCRA Metals, ICP, TCLP Leach.								
Date Digested				09/02/94				
Metals								
Mercury, CVAAS, TCLP Leachate								
Mercury	0.0277	mg/L	0.01	09/06/94	EPA 7470	MRM	7439-97-6	
RCRA Metals, ICP, TCLP Leach.								
Barium	ND	mg/L	5	09/07/94	EPA 6010	MHT	7440-39-3	
Cadmium	ND	mg/L	0.25	09/07/94	EPA 6010	MHT	7440-43-9	
Chromium	ND	mg/L	0.05	09/07/94	EPA 6010	MHT	7440-47-3	
Lead	ND	mg/L	0.25	09/07/94	EPA 6010	MHT	7439-92-1	
Silver	ND	mg/L	0.25	09/07/94	EPA 6010	MHT	7440-22-4	
Arsenic	ND	mg/L	0.25	09/07/94	EPA 6010	MHT	7440-38-2	
Selenium	ND	mg/L	0.25	09/07/94	EPA 6010	MHT	7782-49-2	
Date Digested				09/02/94				
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	13000	09/07/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	33000	09/07/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	33000	09/07/94	EPA 8240	DJE	78-93-3	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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PACE Project Number: 601190
Client Project ID: Marco Oil

PACE Sample No: 6078687
Client Sample ID: BB1KN-09

Date Collected: 08/31/94
Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
1.1.1-Trichloroethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	13000	09/07/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-27-4	
1,2-Dichloropropane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	79-00-5	
Benzene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	14000	09/07/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	79-34-5	
Toluene	9300	ug/kg	12000	09/07/94	EPA 8240	DJE	108-88-3	1
Chlorobenzene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	4600	ug/kg	12000	09/07/94	EPA 8240	DJE	100-41-4	1
Styrene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	25000	ug/kg	12000	09/07/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	63000	09/07/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	12000	09/07/94	EPA 8240	DJE	95-50-1	
1,2-Dichloroethane-D4 (S)	91	%		09/07/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	120	%		09/07/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	113	%		09/07/94	EPA 8240	DJE	460-00-4	
Date Prepared				09/07/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	86-73-7	
Phenanthrene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	206-44-0	

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THE ASSURANCE OF QUALITY

07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
PAGE: 3

PACE Project Number: 601190
Client Project ID: Marcu Oil

PACE Sample No: 6078687
Client Sample ID: B81KN-09

Date Collected: 08/31/94
Date Received: 09/01/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Pyrene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	880000	09/16/94	EPA 8270	MSR	53-70-3	
2-Fluorobiphenyl (S)	0	%		09/16/94	EPA 8270	MSR	321-60-8	2
Terphenyl-D14 (S)	0	%		09/16/94	EPA 8270	MSR	1718-51-0	2
Date Extracted				09/01/94				

Comments : Elevated quantitation limits resulting from matrix interference.

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
PAGE: 4

PACE Project Number: 601190
Client Project ID: Marco Oil

PARAMETER FOOTNOTES

ND	Not Detected
PRL	PACE Reporting Limit
(S)	Surrogate
[1]	Detected but below the PRL; therefore, result is an estimated concentration.
[2]	Spike and/or surrogate recoveries could not be calculated due to sample dilution.

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07-9410-047

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LABORATORY REPORT

105126

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-010
Sample No.: 93936

Tank WS #1 (Solid from tank #75)
Black - tar-like

Extractable Organic Halogens	122

Analysis performed on TCLP extract

Arsenic	<0.2
Barium	<0.5
Cadmium	<0.02
Chromium	<0.1
Lead	0.33
Mercury	<0.01
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

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LABORATORY REPORT

105126-B

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-010
Sample No.: 93936

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<400	<0.4	400	4000
2. 2-Chlorophenol	<400	<0.9	400	4000
3. 2-Nitrophenol	<400	<1.8	400	4000
4. 2,4-Dimethylphenol	<400	<0.5	400	4000
5. 2,4-Dichlorophenol	<400	<1.7	400	4000
6. p-Chloro-m-cresol	<400	<2.2	400	4000
7. 2,4,6-Trichlorophenol	<400	<2.2	400	4000
8. 2,4-Dinitrophenol	<2000	<9.8	2000	20000
9. 4-Nitrophenol	<2000	<3.9	2000	20000
10. 4,6-Dinitro-o-cresol	<2000	<8.6	2000	20000
11. Pentachlorophenol	<2000	<7.3	2000	20000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zehr

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07-9410-047C

LABORATORY REPORT

105126-A

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-010
Sample No.: 93936

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<400	<0.7	400	4000
2. Bis(2-chloroethyl)ether	<400	<0.5	400	4000
3. 1,3-Dichlorobenzene	<400	<0.4	400	4000
4. 1.4-Dichlorobenzene	<400	<0.4	400	4000
5. 1,2-Dichlorobenzene	<400	<0.9	400	4000
6. Bis(2-chloroisopropyl)ether	<400	<1.2	400	4000
7. Hexachloroethane	<400	<0.7	400	4000
8. N-Nitrosodi-n-propylamine	<400	<1.5	400	4000
9. Nitrobenzene	<400	<1.3	400	4000
10. Isophorone	<400	<0.3	400	4000
11. Bis(2-chloroethoxy)methane	<400	<0.4	400	4000
12. 1,2,4-Trichlorobenzene	<400	<0.4	400	4000
[redacted]	[redacted]	[redacted]	400	4000
14. Hexachlorobutadiene	<400	<0.5	400	4000
15. Hexachlorocyclopentadiene	<4000	<9.5	4000	40000
16. 2-Chloronaphthalene	<400	<0.3	400	4000
17. Acenaphthylene	<400	<8	400	4000
18. Dimethylphthalate	<400	<0.7	400	4000
19. 2,6-Dinitrotoluene	<400	<0.9	400	4000
20. Acenaphthene	<400	<8	400	4000
21. 2,4-Dinitrotoluene	<400	<0.7	400	4000
22. Fluorene	<400	<8	400	4000
23. Diethylphthalate	<400	<1.0	400	4000
24. 4-Chlorophenyl phenyl ether	<400	<0.4	400	4000

Luk E. Zhu

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07-9410-047C

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LABORATORY REPORT

105126-A

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-010
Sample No.: 93936

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<400	<0.5	400	4000
26. Diphenylhydrazine	<400	<1.6	400	4000
27. 4-Bromophenyl phenyl ether	<400	<0.6	400	4000
28. Hexachlorobenzene	<400	<1.9	400	4000
[redacted]		<8	400	4000
[redacted]		<8	400	4000
31. Di-n-butylphthalate	<400	<0.5	400	4000
[redacted]		<8	400	4000
33. Benzidine	<2000	<4.7	2000	20000
[redacted]		<8	400	4000
35. Butyl benzyl phthalate	<400	<1.9	400	4000
[redacted]		<8	400	4000
[redacted]		<8	400	4000
38. 3,3'—Dichlorobenzidine	<4000	<17.0	4000	40000
39. Bis(2-ethylhexyl)phthalate	<4000	<2.[illegible]	4000	40000
40. Di-n-octylphthalate	<4000	<4.[illegible]	4000	40000
[redacted]		<8	400	4000
42. Benzo(k)fluoranthene	<400	<8	400	4000
[redacted]		<8	400	4000
44. Indeno(1,2,3-cd)pyrene	<400	<8	400	4000
45. Dibenzo(a,h)anthracene	<400	<8	400	4000
46. Benzo(ghi)perylene	<400	<8	400	4000

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

105020-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge - BB1KN-011 Tank WS #1 (sludge)
Sample No.: 93937

BTU	15900
Total Halogens	240

Analysis performed on TCLP extract

Arsenic	<0.2
Barium	<0.5
Cadmium	<0.02
Chromium	<0.1
Lead	<0.1
Mercury	<0.01
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary W. Wright

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07-9410-047C

LABORATORY REPORT

105020-A

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/15/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge - BB1KN-011
Sample No.: 93937

Compound Acid Extractables	Concentration Found IN Sample	Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<2820	<0.4	2820	70000
2. 2-Chlorophenol	<6340	<0.9	6340	70000
3. 2-Nitrophenol	<12700	<1.8	12700	70000
4. 2,4-Dimethylphenol	<3520	<0.5	3520	70000
5. 2,4-Dichlorophenol	<12000	<1.7	12000	70000
6. p-Chloro-m-cresol	<15500	<2.2	15500	70000
7. 2,4,6-Trichlorophenol	<15500	<2.2	15500	70000
8. 2,4-Dinitrophenol	<69000	<9.8	69000	350000
9. 4-Nitrophenol	<27400	<3.9	27400	350000
10. 4,6-Dinitro-o-cresol	<60500	<8.6	60500	350000
11. Pentachlorophenol	<51400	<7.3	51400	350000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeber
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07-9410-047C

LABORATORY REPORT

105020

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/15/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge - BB1KN-011
Sample No.: 93937

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<4930	<0.7	4930	70000
2. Bis(2-chloroethyl)ether	<3520	<0.5	3520	70000
3. 1,3-Dichlorobenzene	<2820	<0.4	2820	70000
4. 1.4-Dichlorobenzene	<2820	<0.4	2820	70000
5. 1,2-Dichlorobenzene	<6340	<0.9	6340	70000
6. Bis(2-chloroisopropyl)ether	<8450	<1.2	8450	70000
7. Hexachloroethane	<4930	<0.7	4930	70000
8. N-Nitrosodi-n-propylamine	<10500	<1.5	10500	70000
9. Nitrobenzene	<12700	<1.8	12700	70000
10. Isophorone	<2100	<0.3	2100	70000
11. Bis(2-chloroethoxy)methane	<2820	<0.4	2820	70000
12. 1,2,4-Trichlorobenzene	<2820	<0.4	2820	70000
[redacted]	[redacted]	<8	5630	70000
14. Hexachlorobutadiene	<3520	<0.5	3520	70000
15. Hexachlorocyclopentadiene	<70000	<9.5	70000	140000
16. 2-Chloronaphthalene	<2110	<0.3	2110	70000
17. Acenaphthylene	<5630	<8	5630	70000
18. Dimethylphthalate	<4930	<0.7	4930	70000
19. 2,6-Dinitrotoluene	<6340	<0.9	6340	70000
[redacted]	[redacted]	<8	5630	70000
21. 2,4-Dinitrotoluene	<4930	<0.7	4930	70000
[redacted]	[redacted]	<8	5630	70000
23. Diethylphthalate	<7040	<1.0	7040	70000
24. 4-Chlorophenyl phenyl ether	<2820	<0.4	2820	70000

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07-9410-047C

LABORATORY REPORT

105020

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/15/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge - BB1KN-011
Sample No.: 93937

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<3520	<0.5	3520	70000
26. Diphenylhydrazine	<11300	<1.6	11300	70000
27. 4-Bromophenyl phenyl ether	<4200	<0.6	4200	70000
28. Hexachlorobenzene	<13400	<1.9	13400	70000
29. Phenanthrene	138000	<8	5630	70000
30. Anthracene	<5630	<8	5630	70000
31. Di-n-butylphthalate	<3520	<0.5	3520	70000
32. Fluoranthene	<5630	<8	5630	70000
33. Benzidine	<33100	<4.7	33100	350000
34. Pyrene	130000	<8	5630	70000
35. Butylbenzylphthalate	13400	<1.9	13400	70000
36. Benzo(a)anthracene	92000	<8	5630	70000
37. Chrysene	177000	<8	5630	70000
38. 3,3'--Dichlorobenzidine	<120000	<17.0	120000	140000
39. Bis(2-ethylhexyl)phthalate	<17600	<2.5	17600	70000
40. Di-n-octylphthalate	<33100	<4.7	33100	70000
41. Benzo(b)fluoranthene	<5630	<8	5630	70000
42. Benzo(k)fluoranthene	<5630	<8	5630	70000
43. Benzo(a)pyrene	62000	<8	5630	70000
44. Indeno(1,2,3-cd)pyrene	<5630	<8	5630	70000
45. Dibenzo(a,h)anthracene	<5630	<8	5630	70000
46. Benzo(ghi)perylene	<5630	<8	5630	70000

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zeh

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07-9410-047C

LABORATORY REPORT

105020-D

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge - BB1KN-011
Sample No.: 93937

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	99.9	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zehr

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07-9410-047C

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LABORATORY REPORT

105020-D

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge - BB1KN-011
Sample No.: 93937

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. [redacted]	[redacted]	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
[redacted]	[redacted]	<0.6	0.6	5
[redacted]	[redacted]	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test methods for Evaluating Solid Waste".

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Leah E. Zehr

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07-9410-047C

LABORATORY REPORT

105130-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-012 Tank WS #2 (crud oil-like)
Sample No.: 93938

BTU	18400
Total Halogens	109

Analysis performed on TCLP extract

Arsenic	<0.2
Barium	<0.5
Cadmium	<0.02
Chromium	<0.1
Lead	<0.1
Mercury	<0.01
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary W. Vogel

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07-9410-047C

LABORATORY REPORT

105130-D

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-012
Sample No.: 93938

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	[illegible]	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105130-D

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-012
Sample No.: 93938

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	786.	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	394.	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zehr

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07-9410-047C

LABORATORY REPORT

105130-A

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-012
Sample No.: 93938

Compound	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
Acid Extractables				
1. Phenol	<1580	<0.4	1580	39500
2. 2-Chlorophenol	<3550	<0.9	3550	39500
3. 2-Nitrophenol	<7110	<1.8	7110	39500
4. 2,4-Dimethylphenol	<1970	<0.5	1970	39500
5. 2,4-Dichlorophenol	<6710	<1.7	6710	39500
6. p-Chloro-m-cresol	<8700	<2.2	8700	39500
7. 2,4,6-Trichlorophenol	<8700	<2.2	8700	39500
8. 2,4-Dinitrophenol	<38700	<9.8	38700	19700
9. 4-Nitrophenol	<15400	<3.9	15400	19700
10. 4,6-Dinitro-o-cresol	<33900	<8.6	33900	19700
11. Pentachlorophenol	<28800	<7.3	28800	19700

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zhu

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07-9410-047C

LABORATORY REPORT

105130

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-012
Sample No.: 93938

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2760	<0.7	2760	39500
2. Bis(2-chloroethyl)ether	<1970	<0.5	1970	39500
3. 1,3-Dichlorobenzene	<1580	<0.4	1580	39500
4. 1.4-Dichlorobenzene	<1580	<0.4	1580	39500
5. 1,2-Dichlorobenzene	<3550	<0.9	3550	39500
6. Bis(2-chloroisopropyl)ether	<4700	<1.2	4700	39500
7. Hexachloroethane	<2760	<0.7	2760	39500
8. N-Nitrosodi-n-propylamine	<5900	<1.5	5900	39500
9. Nitrobenzene	<7100	<1.8	7100	39500
10. Isophorone	<1180	<0.3	1180	39500
11. Bis(2-chloroethoxy)methane	<1580	<0.4	1580	39500
12. 1,2,4-Trichlorobenzene	<1580	<0.4	1580	
13. Naphthalene	<3160	<8	3160	39500
14. Hexachlorobutadiene	<1970	<0.5	1970	39500
15. Hexachlorocyclopentadiene	<37500	<9.5	37500	79000
16. 2-Chloronaphthalene	<1180	<0.3	1180	39500
17. Acenaphthylene	<3160	<8	3160	39500
18. Dimethylphthalate	<2760	<0.7	2760	39500
19. 2,6-Dinitrotoluene	<3550	<0.9	3550	39500
20. Acenaphthene	<3160	<8	3160	39500
21. 2,4-Dinitrotoluene	<2760	<0.7	2760	39500
22. Fluorene	<3160	<8	3160	39500
23. Diethylphthalate	<3950	<1.0	3950	39500
24. 4-Chlorophenyl phenyl ether	<1580	<0.4	1580	39500

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105130

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-012
Sample No.: 93938

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1970	<0.5	1970	39500
26. Diphenylhydrazine	<6320	<1.6	6320	39500
27. 4-Bromophenyl phenyl ether	<2370	<0.6	2370	39500
28. Hexachlorobenzene	<7500	<1.9	7500	39500
29. Phenanthrene	261000	<8	3160	39500
30. Anthracene	<3160	<8	3160	39500
31. Di-n-butylphthalate	<1970	<0.5	1970	39500
32. Fluoranthene	<3160	<8	3160	39500
33. Benzidine	<18500	<4.7	18500	197000
34. Pyrene	9700	<8	3160	39500
35. Butyl benzyl phthalate	<7500	<1.9	7500	39500
36. Benzo(a)anthracene	<3160	<8	3160	39500
37. Chrysene	<3160	<8	3160	39500
38. 3,3'--Dichlorobenzidine	<67100	<17.0	67100	79000
39. Bis(2-ethylhexyl)phthalate	<9900	<2.5	9900	39500
40. Di-n-octylphthalate	<18500	<4.7	18500	39500
41. Benzo(b)fluoranthene	<3160	<8	3160	39500
42. Benzo(k)fluoranthene	<3160	<8	3160	39500
43. Benzo(a)pyrene	<3160	<8	3160	39500
44. Indeno(1,2,3-cd)pyrene	<3160	<8	3160	39500
45. Dibenzo(a,h)anthracene	<3160	<8	3160	39500
46. Benzo(ghi)perylene	<3160	<8	3160	39500

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

105221

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-013 Tank WS # 3 (solvent-like liquid)
Sample No.: 93939

BTU	19800
Total Halogens	<10.0

Analysis performed on TCLP extract

Arsenic	<0.75
[redacted]	[redacted]
Cadmium	<0.8
Chromium	<1.
Lead	<3.5
[redacted]	[redacted]
Selenium	<0.4
Silver	<2.50

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary W. Wright

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07-9410-047C

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LABORATORY REPORT

105236-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-013
Sample No.: 93939

Compound	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
Acid Extractables				
1. Phenol	<1500	<0.4	1500	37500
2. 2-Chlorophenol	<3400	<0.9	3400	37500
3. 2-Nitrophenol	<6750	<1.8	6750	37500
4. 2,4-Dimethylphenol	<1870	<0.5	1870	37500
5. 2,4-Dichlorophenol	<6400	<1.7	6400	37500
6. p-Chloro-m-cresol	<8250	<2.2	8250	37500
7. 2,4,6-Trichlorophenol	<8250	<2.2	8250	37500
8. 2,4-Dinitrophenol	<36700	<9.8	36700	187000
9. 4-Nitrophenol	<14600	<3.9	14600	187000
10. 4,6-Dinitro-o-cresol	<32200	<8.6	32200	187000
11. Pentachlorophenol	<27400	<7.3	27400	187000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Lee E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

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LABORATORY REPORT

105236-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-013
Sample No.: 93939

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2600	<0.7	2600	37500
2. Bis(2-chloroethyl)ether	<1870	<0.5	1870	37500
3. 1,3-Dichlorobenzene	<1500	<0.4	1500	37500
4. 1.4-Dichlorobenzene	<1500	<0.4	1500	37500
5. 1,2-Dichlorobenzene	<3400	<0.9	3400	37500
6. Bis(2-chloroisopropyl)ether	<4500	<1.2	4500	37500
7. Hexachloroethane	<2600	<0.7	2600	37500
8. N-Nitrosodi-n-propylamine	<5600	<1.5	5600	37500
9. Nitrobenzene	<6750	<1.8	6750	37500
10. Isophorone	<1120	<0.3	1120	37500
11. Bis(2-chloroethoxy)methane	<1500	<0.4	1500	37500
12. 1,2,4-Trichlorobenzene	<1500	<0.4	1500	37500
[redacted]			3000	37500
14. Hexachlorobutadiene	<1870	<0.5	1870	37500
15. Hexachlorocyclopentadiene	<35600	<9.5	35600	75000
16. 2-Chloronaphthalene	<1120	<0.3	1120	37500
17. Acenaphthylene	<3000	<8	3000	37500
18. Dimethylphthalate	<2600	<0.7	2600	37500
19. 2,6-Dinitrotoluene	<3400	<0.9	3400	37500
20. Acenaphthene	<3000	<8	3000	37500
21. 2,4-Dinitrotoluene	<2600	<0.7	2600	37500
22. Fluorene	<3000	<8	3000	37500
23. Diethylphthalate	<3750	<1.0	3750	37500
24. 4-Chlorophenyl phenyl ether	<1500	<0.4	1500	37500

Leah E. Zeber

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

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LABORATORY REPORT

105236-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-013
Sample No.: 93939

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1870	<0.5	1870	37500
26. Diphenylhydrazine	<6000	<1.5	6000	37500
27. 4-Bromophenyl phenyl ether	<2200	<0.5	2200	37500
28. Hexachlorobenzene	<7100	<1.9	7100	37500
29. Phenanthrene	<3000	<8	3000	37500
30. Anthracene	<3000	<8	3000	37500
31. Di-n-butylphthalate	<1870	<0.5	1870	37500
32. Fluoranthene	<3000	<8	3000	37500
33. Benzidine	<17600	<4.7	17600	187000
34. Pyrene	<3000	<8	3000	3750
35. Butyl benzyl phthalate	<7100	<1.9	7100	3750
36. Benzo(a)anthracene	<3000	<8	3000	3750
37. Chrysene	<3000	<8	3000	3750
38. 3,3'--Dichlorobenzidine	<63700	<17.0	63700	75000
39. Bis(2-ethylhexyl)phthalate	<9400	<2.5	9400	37500
40. Di-n-octylphthalate	<17600	<4.7	17600	37500
41. Benzo(b)fluoranthene	<3000	<8	3000	37500
42. Benzo(k)fluoranthene	<3000	<8	3000	37500
43. Benzo(a)pyrene	<3000	<8	3000	37500
44. Indeno(1,2,3-cd)pyrene	<3000	<8	3000	37500
45. Dibenzo(a,h)anthracene	<3000	<8	3000	37500
46. Benzo(ghi)perylene	<3000	<8	3000	37500

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Lee E. Zeller

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07-9410-047C

LABORATORY REPORT

105236-F

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-013
Sample No.: 93939

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
[redacted]	[redacted]	[redacted]	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

105236-F

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-013
Sample No.: 93939

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
[redacted]	[redacted]	[redacted]	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
[redacted]	[redacted]	[redacted]	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105123-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-014 Tank WS # 7 (black thin liquid
Sample No.: 93940

BTU	19400
Total Halogens	<10.0

Analysis performed on TCLP extract

Arsenic	<0.75
[redacted]	[redacted]
Cadmium	<0.8
Chromium	<1.0
Lead	<3.5
Mercury	<0.01
Selenium	<0.4
Silver	<2.5

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Wright

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07-9410-047C

LABORATORY REPORT

105131-A

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-014
Sample No.: 93940

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1540	<0.4	1540	38500
2. 2-Chlorophenol	<3460	<0.9	3460	38500
3. 2-Nitrophenol	<6900	<1.8	6900	38500
4. 2,4-Dimethylphenol	<1900	<0.5	1900	38500
5. 2,4-Dichlorophenol	<6500	<1.7	6500	38500
6. p-Chloro-m-cresol	<8500	<2.2	8500	38500
7. 2,4,6-Trichlorophenol	<8500	<2.2	8500	38500
8. 2,4-Dinitrophenol	<37700	<9.8	37700	192000
9. 4-Nitrophenol	<15000	<3.9	15000	192000
10. 4,6-Dinitro-o-cresol	<33100	<8.6	33100	192000
11. Pentachlorophenol	<28100	<7.3	28100	192000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105131

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-014
Sample No.: 93940

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2700	<0.7	2700	38500
2. Bis(2-chloroethyl)ether	<1900	<0.5	1900	38500
3. 1,3-Dichlorobenzene	<1540	<0.4	1540	38500
4. 1.4-Dichlorobenzene	<1540	<0.4	1540	38500
5. 1,2-Dichlorobenzene	<3460	<0.9	3460	38500
6. Bis(2-chloroisopropyl)ether	<4600	<1.2	4600	38500
7. Hexachloroethane	<2700	<0.7	2700	38500
8. N-Nitrosodi-n-propylamine	<5770	<1.5	5770	38500
9. Nitrobenzene	<6900	<1.8	6900	38500
10. Isophorone	<1150	<0.3	1150	38500
11. Bis(2-chloroethoxy)methane	<1540	<0.4	1540	38500
12. 1,2,4-Trichlorobenzene	<1540	<0.4	1540	
[redacted]	384000	<8	3080	38500
14. Hexachlorobutadiene	<1900	<0.5	1900	38500
15. Hexachlorocyclopentadiene	<36500	<9.5	36500	77000
16. 2-Chloronaphthalene	<1150	<0.3	1150	38500
17. Acenaphthylene	<3080	<8	3080	38500
18. Dimethylphthalate	<2700	<0.7	2700	38500
19. 2,6-Dinitrotoluene	<3460	<0.9	3460	38500
20. Acenaphthene	<3080	<8	3080	38500
21. 2,4-Dinitrotoluene	<2700	<0.7	2700	38500
22. Fluorene	<3080	<8	3080	38500
23. Diethylphthalate	<3850	<1.0	3850	38500
24. 4-Chlorophenyl phenyl ether	<1540	<0.4	1540	38500

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07-9410-047C

LABORATORY REPORT

105131

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-014
Sample No.: 93940

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1900	<0.5	1900	38500
26. Diphenylhydrazine	<6200	<1.6	6200	38500
27. 4-Bromophenyl phenyl ether	<2300	<0.6	2300	38500
28. Hexachlorobenzene	<7300	<1.9	7300	38500
29. Phenanthrene	90100	<8	3080	38500
30. Anthracene	<3080	<8	3080	38500
31. Di-n-butylphthalate	<1900	<0.5	1900	38500
32. Fluoranthene	<3080	<8	3080	38500
33. Benzidine	<18100	<4.7	18100	192000
34. Pyrene	<3080	<8	3080	38500
35. Butyl benzyl phthalate	<7300	<1.9	7300	38500
36. Benzo(a)anthracene	<3080	<8	3080	38500
37. Chrysene	12800	<8	3080	38500
38. 3,3'--Dichlorobenzidine	<65400	<17.0	65400	77000
39. Bis(2-ethylhexyl)phthalate	<9600	<2.5	9600	38500
40. Di-n-octylphthalate	<18100	<4.7	18100	38500
41. Benzo(b)fluoranthene	<3080	<8	3080	38500
42. Benzo(k)fluoranthene	<3080	<8	3080	38500
43. Benzo(a)pyrene	<3080	<8	3080	38500
44. Indeno(1,2,3-cd)pyrene	<3080	<8	3080	38500
45. Dibenzo(a,h)anthracene	<3080	<8	3080	38500
46. Benzo(ghi)perylene	<3080	<8	3080	38500

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zehner

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07-9410-047C

LABORATORY REPORT

105123

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-014
Sample No.: 93940

	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
PCB 1221	<5000	<0.08	5000	25000
PCB 1232	<5000	<0.08	5000	25000
PCB 1016 (1242)	<5000	<0.08	5000	25000
PCB 1248	<5000	<0.08	5000	25000
PCB 1254	<5000	<0.08	5000	50000
PCB 1260	<5000	<0.08	5000	50000
(Total PCB)	<5000	<0.08	5000	----

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeber

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07-9410-047C

LABORATORY REPORT

105123-C

Riedel Environmental Services, Inc.
18207 Ellison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-014
Sample No.: 93940

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
[redacted]	[redacted]	[redacted]	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

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07-9410-047C

LABORATORY REPORT

105123-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, EBIKN-014
Sample No.: 93940

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
[redacted]	[redacted]	[redacted]	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
[redacted]	[redacted]	[redacted]	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

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07-9410-047C

LABORATORY REPORT

105124-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil, BBIKN-015 Tank WS # 6 (oily liquid)
Sample No.: 93941

BTU	18800
Total Halogens	<20.0

Analysis performed on TCLP extract

Arsenic	<0.75
[redacted]	
Cadmium	<0.8
Chromium	<1.0
Lead	<3.5
Mercury	<0.01
Selenium	<0.4
Silver	<2.5

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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07-9410-047C

LABORATORY REPORT

105132-A

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-015
Sample No.: 93941

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1600	<0.4	1600	40000
2. 2-Chlorophenol	<3600	<0.9	3600	40000
3. 2-Nitrophenol	<7200	<1.8	7200	40000
4. 2,4-Dimethylphenol	<2000	<0.5	2000	40000
5. 2,4-Dichlorophenol	<6800	<1.7	6800	40000
6. p-Chloro-m-cresol	<8800	<2.2	8800	40000
7. 2,4,6-Trichlorophenol	<8800	<2.2	8800	40000
8. 2,4-Dinitrophenol	<39200	<9.8	39200	200000
9. 4-Nitrophenol	<15600	<3.9	15600	200000
10. 4,6-Dinitro-o-cresol	<34400	<8.6	34400	200000
11. Pentachlorophenol	<29200	<7.3	29200	200000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

105132

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-015
Sample No.: 93941

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2800	<0.7	2800	40000
2. Bis(2-chloroethyl)ether	<2000	<0.5	2000	40000
3. 1,3-Dichlorobenzene	<1600	<0.4	1600	40000
4. 1,4-Dichlorobenzene	<1600	<0.4	1600	40000
5. 1,2-Dichlorobenzene	<3600	<0.9	3600	40000
6. Bis(2-chloroisopropyl)ether	<4800	<1.2	4800	40000
7. Hexachloroethane	<2800	<0.7	2800	40000
8. N-Nitrosodi-n-propylamine	<6000	<1.5	6000	40000
9. Nitrobenzene	<7200	<1.8	7200	40000
10. Isophorone	<1200	<0.3	1200	40000
11. Bis(2-chloroethoxy)methane	<1600	<0.4	1600	40000
12. 1,2,4-Trichlorobenzene	<1600	<0.4	1600	40000
13. Naphthalene	<3200	<8	3200	40000
14. Hexachlorobutadiene	<2000	<0.5	2000	40000
15. Hexachlorocyclopentadiene	<38000	<9.5	38000	80000
16. 2-Chloronaphthalene	<1200	<0.3	1200	40000
17. Acenaphthylene	<3200	<8	3200	40000
18. Dimethylphthalate	<2800	<0.7	2800	40000
19. 2,6-Dinitrotoluene	<3600	<0.9	3600	40000
20. Acenaphthene	<3200	<8	3200	40000
21. 2,4-Dinitrotoluene	<2800	<0.7	2800	40000
22. Fluorene	<3200	<8	3200	40000
23. Diethylphthalate	<4000	<1.0	4000	40000
24. 4-Chlorophenyl phenyl ether	<1600	<0.4	1600	40000

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07-9410-047C

LABORATORY REPORT

105132

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-015
Sample No.: 93941

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<2000	<0.5	2000	40000
26. Diphenylhydrazine	<6400	<1.6	6400	40000
27. 4-Bromophenyl phenyl ether	<2400	<0.6	2400	40000
28. Hexachlorobenzene	<7600	<1.9	7600	40000
29. Phenanthrene	74300	<8	3200	40000
30. Anthracene	<3200	<8	3200	40000
31. Di-n-butylphthalate	<2000	<0.5	2000	40000
32. Fluoranthene	<3200	<8	3200	40000
33. Benzidine	<18800	<4.7	18800	200000
34. Pyrene	85800	<8	3200	40000
35. Butyl benzyl phthalate	<7600	<1.9	7600	40000
36. Benzo(a)anthracene	<3200	<8	3200	40000
37. Chrysene	<3200	<8	3200	40000
38. 3,3'--Dichlorobenzidine	<68000	<17.0	68000	80000
39. Bis(2-ethylhexyl)phthalate	<10000	<2.5	10000	40000
40. Di-n-octylphthalate	<18800	<4.7	18800	40000
41. Benzo(b)fluoranthene	<3200	<8	3200	40000
42. Benzo(k)fluoranthene	<3200	<8	3200	40000
43. Benzo(a)pyrene	<3200	<8	3200	40000
44. Indeno(1,2,3-cd)pyrene	<3200	<8	3200	40000
45. Dibenzo(a,h)anthracene	<3200	<8	3200	40000
46. Benzo(ghi)perylene	<3200	<8	3200	40000

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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07-9410-047C

LABORATORY REPORT

105124

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Sludge/Oil, BBIKN-015
Sample No.: 93941

	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
PCB 1221	<5000	<0.08	5000	25000
PCB 1232	<5000	<0.08	5000	25000
PCB 1016 (1242)	<5000	<0.08	5000	25000
PCB 1248	<5000	<0.08	5000	25000
PCB 1254	<5000	<0.08	5000	50000
PCB 1260	<5000	<0.08	5000	50000
(Total PCB)	<5000	<0.08	5000	----

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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07-9410-047C

LABORATORY REPORT

105474

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/26/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BB1KN-015
Sample No.: 93941

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	.0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.5	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
~~20. Benzene~~	~~0.2~~	~~<0.5~~	0.5	5
21. Dibromochloromethane	<0.5	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105474

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/26/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil EB1KN-015
Sample No.: 93941

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	[redacted]	[redacted]	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
[redacted]	[redacted]	[redacted]	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zehr

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07-9410-047C

LABORATORY REPORT

105127

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Non-haz liquids

Report Date: 9/19/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Water, BBIKN-016
Sample No.: 93942

Tank WS #8 (yellow color water not oil layer on top)

Analysis performed on TCLP extract

Arsenic	<0.2
[redacted]	[redacted]
[redacted]	[redacted]
Chromium	<0.1
Lead	<0.1
Mercury	<0.01
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary W. Wright

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-0476

8100 North Austin Avenue
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LABORATORY REPORT

105127-E

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Water, BBIKN-016
Sample No.: 93942

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<4	<0.4	4	100
2. 2-Chlorophenol	<9	<0.9	9	100
3. 2-Nitrophenol	<18	<1.8	18	100
4. 2,4-Dimethylphenol	<5	<0.5	5	100
5. 2,4-Dichlorophenol	<17	<1.7	17	100
6. p-Chloro-m-cresol	<22	<2.2	22	100
7. 2,4,6-Trichlorophenol	<22	<2.2	22	100
8. 2,4-Dinitrophenol	<98	<9.8	98	500
9. 4-Nitrophenol	<39	<3.9	39	500
10. 4,6-Dinitro-o-cresol	<86	<8.6	86	500
11. Pentachlorophenol	<73	<7.3	73	500

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zdru

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

8100 North Austin Avenue
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LABORATORY REPORT

105127-D

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Water, BBIKN-016
Sample No.: 93942

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<7	<0.7	7	100
2. Bis(2-chloroethyl)ether	<5	<0.5	5	100
3. 1,3-Dichlorobenzene	<4	<0.4	4	100
4. 1.4-Dichlorobenzene	<4	<0.4	4	100
5. 1,2-Dichlorobenzene	<9	<0.9	9	100
6. Bis(2-chloroisopropyl)ether	<12	<1.2	12	100
7. Hexachloroethane	<7	<0.7	7	100
8. N-Nitrosodi-n-propylamine	<15	<1.5	15	100
9. Nitrobenzene	<18	<1.8	18	100
10. Isophorone	<3	<0.3	3	100
11. Bis(2-chloroethoxy)methane	<4	<0.4	4	100
12. 1,2,4-Trichlorobenzene	<4	<0.4	4	100
13. Naphthalene	12	<8	8	100
14. Hexachlorobutadiene	<5	<0.5	5	100
15. Hexachlorocyclopentadiene	<95	<9.5	95	200
16. 2-Chloronaphthalene	<3	<0.3	3	100
17. Acenaphthylene	<8	<8	8	100
18. Dimethylphthalate	<7	<0.7	7	100
19. 2,6-Dinitrotoluene	<9	<0.9	9	100
20. Acenaphthene	<8	<8	8	100
21. 2,4-Dinitrotoluene	<7	<0.7	7	100
22. Fluorene	<8	<8	8	100
23. Diethylphthalate	<10	<1.0	10	100
24. 4-Chlorophenyl phenyl ether	<4	<0.4	4	100

Paul E. Zeller

LABORATORY DIRECTOR

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07-9410-047C
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LABORATORY REPORT

105127-D

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/12/94

Project Name: Marco Refinery
Sample Description: Water, BBIKN-016
Sample No.: 93942

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<5	<0.5	5	100
26. Diphenylhydrazine	<16	<1.6	16	100
27. 4-Bromophenyl phenyl ether	<6	<0.6	6	100
28. Hexachlorobenzene	<19	<1.9	19	100
29. Phenanthrene	<8	<8	8	100
30. Anthracene	<8	<8	8	100
31. Di-n-butylphthalate	<5	<0.5	5	100
32. Fluoranthene	<8	<8	8	100
33. Benzidine	<47	<4.7	47	500
34. Pyrene	<8	<8	8	100
35. Butyl benzyl phthalate	<19	<1.9	19	100
36. Benzo(a)anthracene	<8	<8	8	100
37. Chrysene	<8	<8	8	100
38. 3,3'--Dichlorobenzidine	<170	<17.0	170	200
39. Bis(2-ethylhexyl)phthalate	<25	<2.5	25	100
40. Di-n-octylphthalate	<47	<4.7	47	100
41. Benzo(b)fluoranthene	<8	<8	8	100
42. Benzo(k)fluoranthene	<8	<8	8	100
43. Benzo(a)pyrene	<8	<8	8	100
44. Indeno(1,2,3-cd)pyrene	<8	<8	8	100
45. Dibenzo(a,h)anthracene	<8	<8	8	100
46. Benzo(ghi)perylene	<8	<8	8	100

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

LABORATORY DIRECTOR

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07-9410-047C

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LABORATORY REPORT

105127-A

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Water, BBIKN-016
Sample No.: 93942

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	<0.5	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105127-A

Report Date: 9/20/94
Sample Received: 9/12/94

Project Name: Mid-America Refining Co.
Sample Description: Water, BBIKN-016
Sample No.: 93942

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	<0.5	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	<0.6	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeller

LABORATORY DIRECTOR

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9410-047C

Drum Waste Streams

LABORATORY REPORT

105408-E

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-017 Drum WS H 1,3,5 (composite red thin liquid)
Sample No.: 94114

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	3200	<0.5	0.5	5
20. Benzene	5370	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. [illegible]

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

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LABORATORY REPORT

105408-E

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-017
Sample No.: 94114

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	17000	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	1230000	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	1880000	<0.6	0.6	5
31. Xylenes	<0.6	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.
07-9410-047C
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LABORATORY REPORT

Riedel Environmental Services, INc.
18207 Edison Avenue
Chesterfield, MO 63005

105331

Report Date: 9/21/94
Sample Received: 9/14/94

Project Name: Mid America Refining Co.
Sample Description: Oil/Sludge Grab, BB1KN-017
Sample No.: 94114

BTU	15500
Total Halogens	8640

Analysis performed on TCLP extract

Arsenic	<1.50
Barium	<1.00
Cadmium	<0.80
Chromium	37.0
Lead	<3.50
Mercury	<0.0100
Selenium	<0.400
Silver	<2.50

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary W. Wright

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.
07-9410-047C
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LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105408-A

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-017
Sample No.: 94114

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1400	<0.4	1400	36400
2. 2-Chlorophenol	<3300	<0.9	3300	36400
3. 2-Nitrophenol	<6500	<1.8	6500	36400
4. 2,4-Dimethylphenol	<1800	<0.5	1800	36400
5. 2,4-Dichlorophenol	<6200	<1.7	6200	36400
6. p-Chloro-m-cresol	<8000	<2.2	8000	36400
7. 2,4,6-Trichlorophenol	<8000	<2.2	8000	36400
8. 2,4-Dinitrophenol	<35600	<9.8	35600	182000
9. 4-Nitrophenol	<14200	<3.9	14200	182000
10. 4,6-Dinitro-o-cresol	<31300	<8.6	31300	182000
11. Pentachlorophenol	<26600	<7.3	26600	182000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zhu

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.
07-9410-047C
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LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105408

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-017
Sample No.: 94114

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb
1. N-Nitrosodimethylamine	<2500	<0.7	2500	36400
2. Bis(2-chloroethyl)ether	<1800	<0.5	1800	36400
3. 1,3-Dichlorobenzene	<1400	<0.4	1400	36400
4. 1.4-Dichlorobenzene	<1400	<0.4	1400	36400
5. 1,2-Dichlorobenzene	<3300	<0.9	3300	36400
6. Bis(2-chloroisopropyl)ether	<4400	<1.2	4400	36400
7. Hexachloroethane	<2500	<0.7	2500	36400
8. N-Nitrosodi-n-propylamine	<5500	<1.5	5500	36400
9. Nitrobenzene	<6500	<1.8	6500	36400
10. Isophorone	<1100	<0.3	1100	36400
11. Bis(2-chloroethoxy)methane	<1400	<0.4	1400	36400
12. 1,2,4-Trichlorobenzene	<1400	<0.4	1400	34600
13. Naphthalene	1100000	<8	2900	34600
14. Hexachlorobutadiene	<1800	<0.5	1800	34600
15. Hexachlorocyclopentadiene	<34600	<9.5	34600	72800
16. 2-Chloronaphthalene	<1100	<0.3	1100	36400
17. Acenaphthylene	<2900	<8	2900	36400
18. Dimethylphthalate	<2500	<0.7	2500	36400
19. 2,6-Dinitrotoluene	<3300	<0.9	3300	36400
20. Acenaphthene	<2900	<8	2900	36400
21. 2,4-Dinitrotoluene	<2500	<0.7	2500	36400
22. Fluorene	54200	<8	2900	36400
23. Diethylphthalate	<3640	<1.0	3640	36400
24. 4-Chlorophenyl phenyl ether	<1400	<0.4	1400	36400

Leah E. Zehr
LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.
07-9410-047C

8100 North Austin Avenue
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708/967-6666
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LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105408

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-017
Sample No.: 94114

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb
25. N-Nitrosodiphenylamine	<1800	<0.5	1800	36400
26. Diphenylhydrazine	<5800	<1.6	5800	36400
27. 4-Bromophenyl phenyl ether	<2200	<0.6	2200	36400
28. Hexachlorobenzene	<6900	<1.9	6900	36400
29. Phenanthrene	14200	<8	2900	36400
30. Anthracene	<2900	<8	2900	36400
31. Di-n-butylphthalate	10,600,000	<0.5	1800	36400
32. Fluoranthene	<2900	<8	2900	36400
33. Benzidine	<17100	<4.7	17100	182000
34. Pyrene	<2900	<8	2900	36400
35. Butyl benzyl phthalate	<6900	<1.9	6900	36400
36. Benzo(a)anthracene	<2900	<8	2900	36400
37. Chrysene	<2900	<8	2900	36400
38. 3,3'--Dichlorobenzidine	<61900	<17.0	61900	72800
39. Bis(2-ethylhexyl)phthalate	<9100	<2.5	9100	36400
40. Di-n-octylphthalate	<17100	<4.7	17100	36400
41. Benzo(b)fluoranthene	<2900	<8	2900	36400
42. Benzo(k)fluoranthene	<2900	<8	2900	36400
43. Benzo(a)pyrene	<2900	<8	2900	36400
44. Indeno(1,2,3-cd)pyrene	<2900	<8	2900	36400
45. Dibenzo(a,h)anthracene	<2900	<8	2900	36400
46. Benzo(ghi)perylene	<2900	<8	2900	36400

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.
07-9410-047C

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LABORATORY REPORT

105408-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-017
Sample No.: 94114

	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
PCB 1221	<2000	<0.08	2000	10,000
PCB 1232	<2000	<0.08	2000	10,000
PCB 1016 (1242)	<2000	<0.08	2000	10,000
PCB 1248	<2000	<0.08	2000	10,000
PCB 1254	<2000	<0.08	2000	20,000
PCB 1260	<2000	<0.08	2000	20,000
(Total PCB)	<2000	<0.08	2000	—

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zehr

LABORATORY DIRECTOR

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07-9410-047C

LABORATORY REPORT

105170

Riedel Environmental Services, INc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/14/94

Project Name: Marco Refinery
Sample Description: Oil/Sludge, BB1KN018 Drum WS #4 (oily yellow liquid)
Sample No.: 94115

BTU	15900
Total Halogens	<20.0

Analysis performed on TCLP extract

Arsenic	<0.75
Barium	<1.0
Cadmium	<0.8
Chromium	3.2
Lead	<3.5
Mercury	<0.01
Selenium	<0.4
Silver	<2.5

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary L. Wright

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07-9410-047C

LABORATORY REPORT

105409-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-018
Sample No.: 94115

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1500	<0.4	1500	37500
2. 2-Chlorophenol	<3400	<0.9	3400	37500
3. 2-Nitrophenol	<6700	<1.8	6700	37500
4. 2,4-Dimethylphenol	<1800	<0.5	1800	37500
5. 2,4-Dichlorophenol	<6400	<1.7	6400	37500
6. p-Chloro-m-cresol	<8250	<2.2	8250	37500
7. 2,4,6-Trichlorophenol	<8250	<2.2	8250	37500
8. 2,4-Dinitrophenol	<36700	<9.8	36700	190000
9. 4-Nitrophenol	<14600	<3.9	14600	190000
10. 4,6-Dinitro-o-cresol	<32200	<8.6	32200	190000
11. Pentachlorophenol	<27400	<7.3	27400	190000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

105409-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-018
Sample No.: 94115

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2600	<0.7	2600	37500
2. Bis(2-chloroethyl)ether	<1800	<0.5	1800	37500
3. 1,3-Dichlorobenzene	<1500	<0.4	1500	37500
4. 1.4-Dichlorobenzene	<1500	<0.4	1500	37500
5. 1,2-Dichlorobenzene	<3400	<0.9	3400	37500
6. Bis(2-chloroisopropyl)ether	<4500	<1.2	4500	37500
7. Hexachloroethane	<2600	<0.7	2600	37500
8. N-Nitrosodi-n-propylamine	<5600	<1.5	5600	37500
9. Nitrobenzene	82000	<1.8	6750	37500
10. Isophorone	<1120	<0.3	1120	37500
11. Bis(2-chloroethoxy)methane	<1500	<0.4	1500	37500
12. 1,2,4-Trichlorobenzene	<1500	<0.4	1500	37500
13. Naphthalene	64100	<8	3000	37500
14. Hexachlorobutadiene	<1800	<0.5	1800	37500
15. Hexachlorocyclopentadiene	<35600	<9.5	35600	75000
16. 2-Chloronaphthalene	<1120	<0.3	1120	37500
17. Acenaphthylene	<3000	<8	3000	37500
18. Dimethylphthalate	<2600	<0.7	2600	37500
19. 2,6-Dinitrotoluene	<3400	<0.9	3400	37500
20. Acenaphthene	<3000	<8	3000	37500
21. 2,4-Dinitrotoluene	<2600	<0.7	2600	37500
22. Fluorene	<3000	<8	3000	37500
23. Diethylphthalate	<3750	<1.0	3750	37500
24. 4-Chlorophenyl phenyl ether	<1500	<0.4	1500	37500

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07-9410-047C

LABORATORY REPORT

105409-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-018
Sample No.: 94115

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1800	<0.5	1800	37500
26. Diphenylhydrazine	<6000	<1.6	6000	37500
27. 4-Bromophenyl phenyl ether	<2250	<0.6	2250	37500
28. Hexachlorobenzene	<7100	<1.9	7100	37500
29. Phenanthrene	<3000	<8	3000	37500
30. Anthracene	<3000	<8	3000	37500
31. Di-n-butylphthalate	<1800	<0.5	1800	37500
32. Fluoranthene	<3000	<8	3000	37500
33. Benzidine	<17600	<4.7	17600	190000
34. Pyrene	3750000	<8	3000	37500
35. Butyl benzyl phthalate	<7100	<1.9	7100	37500
36. Benzo(a)anthracene	<3000	<8	3000	37500
37. Chrysene	<3000	<8	3000	37500
38. 3,3'--Dichlorobenzidine	<61700	<17.0	61700	75000
39. Bis(2-ethylhexyl)phthalate	<9400	<2.5	9400	37500
40. Di-n-octylphthalate	<17600	<4.7	17600	37500
41. Benzo(b)fluoranthene	<3000	<8	3000	37500
42. Benzo(k)fluoranthene	<3000	<8	3000	37500
43. Benzo(a)pyrene	<3000	<8	3000	37500
44. Indeno(1,2,3-cd)pyrene	<3000	<8	3000	37500
45. Dibenzo(a,h)anthracene	<3000	<8	3000	37500
46. Benzo(ghi)perylene	<3000	<8	3000	37500

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

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07-9410-047C

LABORATORY REPORT

105407

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: ~~Water, BBIKN-013~~ Sludge/Oil BBIKN-018
Sample No.: 94115 Typo [illegible] 9/22/94 1605

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	569.	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	272.	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	276.	<0.6	0.6	5
16. Bromodichloromethane	158.	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	494.	<0.5	0.5	5
20. Benzene	488	<0.5	0.5	5
21. Dibromochloromethane	225.	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105407

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: ~~Water, BBIKN-013~~ Sludge/Oil BBIKN-018
Sample No.: 94115 Type MSS 9/22/94 1605

Compound Purgeables	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	326.	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	5,180	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	5,230	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zehrer

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07-9410-047C

LABORATORY REPORT

105496

Riedel Environmental Services, Inc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/26/94
Sample Received: 9/22/94

Project Name: Mid America Refining Co.
Sample Description: Oil/Sludge Grab, BB1KN-019 WS # 2 (red/brown liquid) -1 drum
Sample No.: 94914

BTU	11900 BTU/Lb

Analysis performed on TCLP extract

Arsenic	<1.50
Barium	<1.00
Cadmium	<0.80
Chromium	<1.00
Lead	<1.00
Mercury	<0.0100
Selenium	<0.400
Silver	<2.50

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Vick

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, INc.
18207 Edison Avenue
Chesterfield, MO 63005

105401

Report Date: 9/22/94
Sample Received: 9/14/94

Project Name: Mid America Refining Co.
Sample Description: Oil/Sludge Grab, BB1KN-019
Sample No.: 94116

Total Halogens	182000

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in it's entirety.

Gary W. Wright

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07-9410-047C

LABORATORY REPORT

105410-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-019
Sample No.: 94116

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1480	<0.4	1480	37000
2. 2-Chlorophenol	<3300	<0.9	3300	37000
3. 2-Nitrophenol	<6680	<1.8	6660	37000
4. 2,4-Dimethylphenol	<1800	<0.5	1850	37000
5. 2,4-Dichlorophenol	<6300	<1.7	6300	37000
6. p-Chloro-m-cresol	<8140	<2.2	8140	37000
7. 2,4,6-Trichlorophenol	<8140	<2.2	8140	37000
8. 2,4-Dinitrophenol	<36300	<9.8	36300	185000
9. 4-Nitrophenol	<14400	<3.9	14400	185000
10. 4,6-Dinitro-o-cresol	<31800	<8.6	31800	185000
11. Pentachlorophenol	<27000	<7.3	27000	185000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105410-B

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-019
Sample No.: 94116

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2600	<0.7	2600	37000
2. Bis(2-chloroethyl)ether	<1850	<0.5	1850	37000
3. 1,3-Dichlorobenzene	<1480	<0.4	1480	37000
4. 1.4-Dichlorobenzene	<1480	<0.4	1480	37000
5. 1,2-Dichlorobenzene	<3300	<0.9	3300	37000
6. Bis(2-chloroisopropyl)ether	<4400	<1.2	4400	37000
7. Hexachloroethane	<2600	<0.7	2600	37000
8. N-Nitrosodi-n-propylamine	<5550	<1.5	5550	37000
9. Nitrobenzene	<6660	<1.8	6660	37000
10. Isophorone	<1100	<0.3	1100	37000
11. Bis(2-chloroethoxy)methane	<1480	<0.4	1480	37000
12. 1,2,4-Trichlorobenzene	<1480	<0.4	1480	37000
13. Naphthalene	504000	<8	2960	37000
14. Hexachlorobutadiene	<1850	<0.5	1850	37000
15. Hexachlorocyclopentadiene	<35100	<9.5	35100	74000
16. 2-Chloronaphthalene	<1100	<0.3	1100	37000
17. Acenaphthylene	<2960	<8	2960	37000
18. Dimethylphthalate	<2600	<0.7	2600	37000
19. 2,6-Dinitrotoluene	<3300	<0.9	3300	37000
20. Acenaphthene	<2960	<8	2960	37000
21. 2,4-Dinitrotoluene	<2600	<0.7	2600	37000
22. Fluorene	<2960	<8	2960	37000
23. Diethylphthalate	<3700	<1.0	3700	37000
24. 4-Chlorophenyl phenyl ether	<1480	<0.4	1480	37000

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07-9410-047C

LABORATORY REPORT

105410-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-019
Sample No.: 94116

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1850	<0.5	1850	37000
26. Diphenylhydrazine	<5900	<1.6	5900	37000
27. 4-Bromophenyl phenyl ether	<2200	<0.6	2200	37000
28. Hexachlorobenzene	<7000	<1.9	7000	37000
29. Phenanthrene	<2960	<8	2960	37000
30. Anthracene	<2960	<8	2960	37000
31. Di-n-butylphthalate	<1850	<0.5	1850	37000
32. Fluoranthene	<2960	<8	2960	37000
33. Benzidine	<17400	<4.7	17400	185000
34. Pyrene	<2960	<8	2960	37000
35. Butyl benzyl phthalate	<7000	<1.9	7000	37000
36. Benzo(a)anthracene	<2960	<8	2960	37000
37. Chrysene	<2960	<8	2960	37000
38. 3,3'--Dichlorobenzidine	<62900	<17.0	62900	74000
39. Bis(2-ethylhexyl)phthalate	<9300	<2.5	9300	37000
40. Di-n-octylphthalate	<17400	<4.7	17400	37000
41. Benzo(b)fluoranthene	<2960	<8	2960	37000
42. Benzo(k)fluoranthene	<2960	<8	2960	37000
43. Benzo(a)pyrene	<2960	<8	2960	37000
44. Indeno(1,2,3-cd)pyrene	<2960	<8	2960	37000
45. Dibenzo(a,h)anthracene	<2960	<8	2960	37000
46. Benzo(ghi)perylene	<2960	<8	2960	37000

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zehr

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ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

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LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105410-E

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-019
Sample No.: 94116

	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
PCB 1221	<5000	<0.08	5000	25,000
PCB 1232	<5000	<0.08	5000	25,000
PCB 1016 (1242)	<5000	<0.08	5000	25,000
PCB 1248	<5000	<0.08	5000	25,000
PCB 1254	<5000	<0.08	5000	50,000
PCB 1260	<5000	<0.08	5000	50,000
(Total PCB)	<5000	<0.08	5000	---

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

105410-G

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil HB1KN-019 WS # 2
Sample No.: 94116

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	62.2	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.5	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	990.	<0.5	0.5	5
21. Dibromochloromethane	<0.5	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

LABORATORY DIRECTOR

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07-9410-047C

LABORATORY REPORT

105410-G

Riedel Environmental Services, Inc.
18207 Ellison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BB1KN-019
Sample No.: 94116

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	44.4	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	3,170	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	11,100	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

07-9410-047C

LABORATORY REPORT

105171

Riedel Environmental Services, INc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/14/94

Project Name: Marco Refinery
Sample Description: Oil/Sludge, BB1KN020 Drum Waste stream #10 (1 drum of purple red powder)
Sample No.: 94117

T. metals only

Arsenic	<3.0
Barium	<1.8
Cadmium	<0.8
Chromium	1.7
Lead	<3.5
Mercury	0.06
Selenium	<0.2
Silver	<2.5

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Wright

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

07-9410-047C

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LABORATORY REPORT

105172

Riedel Environmental Services, INc.
18207 Edison Avenue
Chesterfield, MO 63005

Report Date: 9/20/94
Sample Received: 9/14/94

Project Name: Marco Refinery
Sample Description: Oil/Sludge, BB1KN021 Drum WS #6 (Drum liquid and water 7 drums
Sample No.: 94118

BTU	16100
Total Halogens	95.6

Analysis performed on TCLP extract

Arsenic	<0.75
Barium	1.6
Cadmium	<0.8
Chromium	<1.0
Lead	<3.5
Mercury	<0.01
Selenium	<0.4
Silver	<2.5

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Wright

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

105411-C

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-021
Sample No.: 94118

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1340	<0.4	1340	33400
2. 2-Chlorophenol	<3000	<0.9	3000	33400
3. 2-Nitrophenol	<6000	<1.8	6000	33400
4. 2,4-Dimethylphenol	<1670	<0.5	1670	33400
5. 2,4-Dichlorophenol	<5700	<1.7	5700	33400
6. p-Chloro-m-cresol	<7300	<2.2	7300	33400
7. 2,4,6-Trichlorophenol	<7300	<2.2	7300	33400
8. 2,4-Dinitrophenol	<32700	<9.8	32700	16700
9. 4-Nitrophenol	<13000	<3.9	13000	16700
10. 4,6-Dinitro-o-cresol	<28700	<8.6	28700	16700
11. Pentachlorophenol	<24400	<7.3	24400	16700

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zeber

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07-9410-047C

LABORATORY REPORT

105411-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-021
Sample No.: 94118

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2340	<0.7	2340	33400
2. Bis(2-chloroethyl)ether	<1670	<0.5	1670	33400
3. 1,3-Dichlorobenzene	<1340	<0.4	1340	33400
4. 1.4-Dichlorobenzene	<1340	<0.4	1340	33400
5. 1,2-Dichlorobenzene	<3000	<0.9	3000	33400
6. Bis(2-chloroisopropyl)ether	<4000	<1.2	4000	33400
7. Hexachloroethane	<2340	<0.7	2340	33400
8. N-Nitrosodi-n-propylamine	<5000	<1.5	5000	33400
9. Nitrobenzene	<6000	<1.8	6000	33400
10. Isophorone	<1000	<0.3	1000	33400
11. Bis(2-chloroethoxy)methane	<1340	<0.4	1340	33400
12. 1,2,4-Trichlorobenzene	<1340	<0.4	1340	33400
13. Naphthalene	323000	<8	2700	33400
14. Hexachlorobutadiene	<1670	<0.5	1670	33400
15. Hexachlorocyclopentadiene	<31700	<9.5	31700	66800
16. 2-Chloronaphthalene	<1000	<0.3	1000	33400
17. Acenaphthylene	<2700	<8	2700	33400
18. Dimethylphthalate	<2340	<0.7	2340	33400
19. 2,6-Dinitrotoluene	<3000	<0.9	3000	33400
20. Acenaphthene	<2700	<8	2700	33400
21. 2,4-Dinitrotoluene	<2340	<0.7	2340	33400
22. Fluorene	<2700	<8	2700	33400
23. Diethylphthalate	<3340	<1.0	3340	33400
24. 4-Chlorophenyl phenyl ether	<1340	<0.4	1340	33400

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07-9410-047C

LABORATORY REPORT

105411-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/22/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BBIKN-021
Sample No.: 94118

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb
25. N-Nitrosodiphenylamine	<1670	<0.5	1670	33400
26. Diphenylhydrazine	<5300	<1.6	5300	33400
27. 4-Bromophenyl phenyl ether	<2000	<0.6	2000	33400
28. Hexachlorobenzene	<6300	<1.9	6300	33400
29. Phenanthrene	24500	<8	2700	33400
30. Anthracene	<2700	<8	2700	33400
31. Di-n-butylphthalate	<1670	<0.5	1670	33400
32. Fluoranthene	<2700	<8	2700	33400
33. Benzidine	<15700	<4.7	15700	167000
34. Pyrene	<2700	<8	2700	33400
35. Butyl benzyl phthalate	<6300	<1.9	6300	33400
36. Benzo(a)anthracene	<2700	<8	2700	33400
37. Chrysene	<2700	<8	2700	33400
38. 3,3'--Dichlorobenzidine	<56800	<17.0	56800	66800
39. Bis(2-ethylhexyl)phthalate	<8350	<2.5	8350	33400
40. Di-n-octylphthalate	<15700	<4.7	15700	33400
41. Benzo(b)fluoranthene	<2700	<8	2700	33400
42. Benzo(k)fluoranthene	<2700	<8	2700	33400
43. Benzo(a)pyrene	<2700	<8	2700	33400
44. Indeno(1,2,3-cd)pyrene	<2700	<8	2700	33400
45. Dibenzo(a,h)anthracene	<2700	<8	2700	33400
46. Benzo(ghi)perylene	<2700	<8	2700	33400

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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07-9410-047C

LABORATORY REPORT

105421

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil BB1KN-021 ws # 6
Sample No.: 94118

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.5	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	81.2	<0.5	0.5	5
20. Benzene	2,630	<0.5	0.5	5
21. Dibromochloromethane	<0.5	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

105421

Riedel Environmental Services, Inc.
18207 Ellison Ave.
Chesterfield, MO 63005

Report Date: 9/23/94
Sample Received: 9/13/94

Project Name: Mid-America Refining Co.
Sample Description: Sludge/Oil EB1KN-021
Sample No.: 94118

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	103.	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	13,100	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	32,100	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

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Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, Inc.
500 Eastern Avenue
Bensenville, IL 60106

105505

Tank

Project Name: Marco Refinery
Sample Description: Waste Grab, BB1 KN - 024
Sample No.: 94917

Report Date: 9/26/94
Sample Received: 9/21/94
WS # 8 (Tank #199A only brown soil-like solid)

pH (Units)	4.22
Arsenic	6.30
Barium	12.0
Cadmium	<0.80
Chromium	36.0
Lead	15.0
Mercury	0.0100
Selenium	1.30
Silver	<2.50

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Wright

LABORATORY DIRECTOR

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07-9410-047C

LABORATORY REPORT

108032

Riedel Environmental Services, Inc.
18207 Edison Avneue
Chesterfield, MO 63005

Report Date: 10/18/94
Sample Received: 10/12/94

Project Name: Marco
Sample Description: BB1KN 025
Sample No.: 97215

Arsenic	5.3
Barium	56.0
Cadmium	<0.80
Chromium	9.0
Lead	3.30
Mercury	0.02
Selenium	0.23
Silver	<2.5

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Wright

LABORATORY DIRECTOR

07-9410-047C

ENVIRONMENT & ENERGY CONSULTANTS, INC.
ASBESTOS DATA SUMMARY

CLIENT Riedel Environmental REPORT NO. 94-10-00984 PAGE ___ OF ___

SAMPLE IDENTIFICATION	LAB NO.	COLOR	% CONSTITUENT
BBIKN026	5644	tan	10-20% asbestos chrysotile 1-3% cellulose 20-30% ~~wool~~ mineral wool 40-50% nonfibrous material
BBIKN027	5645	tan	10-20% asbestos chrysotile 1-3% cellulose 20-30% mineral wool 40-50% nonfibrous material
BBIKN028	5646	~~tan~~ brown	10-20% asbestos chrysotile 1-3% cellulose 20-30% mineral wool 40-50% nonfibrous material
BBIKN029	5647	tan	10-20% asbestos chrysotile 1-3% cellulose 20-30% mineral wool 40-50% nonfibrous material

ANALYST SWEF DATE 10/21/94

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
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07-9410-047C

LABORATORY REPORT

104997

Riedel Environmental Services, Inc.
500 Eastern Avenue
Bensenville, IL 60106

Report Date: 9/26/94
Sample Received: 9/21/94

Project Name: Marco Refinery
Sample Description: Grab, BB1 KN - 023 WS#4 (Tank #190)
Sample No.: 94916

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	<0.5	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	<0.6	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

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Leah E. Zehr

LABORATORY DIRECTOR

07-9410-047C

Tanks - 2 no Batch

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
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LABORATORY REPORT

104998

Riedel Environmental Services, Inc.
500 Eastern Avenue
Bensenville, IL 60106

Report Date: 9/26/94
Sample Received: 9/21/94

Project Name: Marco Refinery
Sample Description: Waste Grab, BB1 KN - 022 WS # 5 (Tanks 177A and 116A)
Sample No.: 94915

pH (Units)	10.01
Total metals:	
Arsenic	<0.750
Barium	<1.00
Cadmium	<0.80
Chromium	220
Lead	41.0
Mercury	<0.0100
Selenium	<0.400
Silver	<2.50

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Gary W. Wright

LABORATORY DIRECTOR

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07-9410-047C

LABORATORY REPORT

Riedel Environmental Services, Inc.
500 Eastern Avenue
Bensenville, IL 60106

104997-A

Project Name: Marco Refinery
Sample Description: Waste Grab, BB1 KN - 023
Sample No.: 94916

Report Date: 9/26/94
Sample Received: 9/21/94
WS #4 (Tank #190)

BTU	7590 BTU/Lb.

All results expressed as ppm unless otherwise indicated.

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Gary W. Wright
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07-9410-047C

LABORATORY REPORT

104997

Riedel Environmental Services, Inc.
500 Eastern Avenue
Bensenville, IL 60106

Report Date: 9/26/94
Sample Received: 9/21/94

Project Name: Marco Refinery
Sample Description: Grab, BB1 KN - 023 US # 4 (Tank # 190)
Sample No.: 94916

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	<0.5	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zeller

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07-9410-047C

LABORATORY REPORT

108586

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN030
Sample No.: 98216

Report Date: 10/26/94
Sample Received: 10/21/94

Tar pit Sludge

Analysis performed on TCLP extract

Arsenic	<0.2
Barium	<0.5
Cadmium	<0.02
Chromium	<0.1
Lead	<0.2
Mercury	<0.01
Selenium	<0.02
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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07-9410-047C

LABORATORY REPORT

108586-H

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/26/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN030
Sample No.: 98216

TAR PIT

Compound Acid Extractables	Concentration Found IN Sample	Concentration Found IN Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<1230	<0.4	1230	31000
2. 2-Chlorophenol	<2770	<0.9	2770	31000
3. 2-Nitrophenol	<5200	<1.8	5500	31000
4. 2,4-Dimethylphenol	<1540	<0.5	1540	31000
5. 2,4-Dichlorophenol	<5200	<1.7	5200	31000
6. p-Chloro-m-cresol	<6800	<2.2	6800	31000
7. 2,4,6-Trichlorophenol	<6800	<2.2	6800	31000
8. 2,4-Dinitrophenol	<30200	<9.8	50200	155000
9. 4-Nitrophenol	<12000	<3.9	12000	155000
10. 4,6-Dinitro-o-cresol	<26500	<8.6	26500	155000
11. Pentachlorophenol	<22500	<7.3	22500	155000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

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Leah E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

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07-9410-047C

LABORATORY REPORT

108586-I

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/27/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN030
Sample No.: 98216

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<2100	<0.7	2100	31000
2. Bis(2-chloroethyl)ether	<1540	<0.5	1540	31000
3. 1,3-Dichlorobenzene	<1230	<0.4	1230	31000
4. 1.4-Dichlorobenzene	<1230	<0.4	1230	31000
5. 1,2-Dichlorobenzene	<2770	<0.9	2770	31000
6. Bis(2-chloroisopropyl)ether	<3700	<1.2	3700	31000
7. Hexachloroethane	<2100	<0.7	2100	31000
8. N-Nitrosodi-n-propylamine	<4600	<1.5	4600	31000
9. Nitrobenzene	<5500	<1.8	5500	31000
10. Isophorone	<920	<0.3	920	31000
11. Bis(2-chloroethoxy)methane	<1230	<0.4	1230	31000
12. 1,2,4-Trichlorobenzene	<1230	<0.4	1230	31000
13. Naphthalene	24200	<8	2500	31000
14. Hexachlorobutadiene	<1540	<0.5	1540	31000
15. Hexachlorocyclopentadiene	<29200	<9.5	29200	62000
16. 2-Chloronaphthalene	<920	<0.3	920	31000
17. Acenaphthylene	<2500	<8	2500	31000
18. Dimethylphthalate	<2100	<0.7	2100	31000
19. 2,6-Dinitrotoluene	<2770	<0.9	2770	31000
20. Acenaphthene	<2550	<8	2500	31000
21. 2,4-Dinitrotoluene	<2100	<0.7	2100	31000
22. Fluorene	17200	<8	2500	31000
23. Diethylphthalate	<3100	<1.0	3100	31000
24. 4-Chlorophenyl phenyl ether	<1230	<0.4	1230	31000

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07-9410-047C

LABORATORY REPORT

108586-I

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/27/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN030
Sample No.: 98216

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1540	<0.5	1540	31000
26. Diphenylhydrazine	<1900	<1.6	4900	31000
27. 4-Bromophenyl phenyl ether	<1850	<0.6	1850	31000
28. Hexachlorobenzene	<5800	<1.9	5800	31000
29. Phenanthrene	106000	<8	2500	31000
30. Anthracene	30600	<8	2500	31000
31. Di-n-butylphthalate	<1540	<0.5	1540	31000
32. Fluoranthene	9200	<8	2500	31000
33. Benzidine	<14500	<4.7	14500	155000
34. Pyrene	<2500	<8	2500	31000
35. Butyl benzyl phthalate	<5800	<1.9	5800	31000
36. Benzo(a)anthracene	12500	<8	2500	31000
37. Chrysene	35400	<8	2500	31000
38. 3,3'-Dichlorobenzidine	<52300	<17.0	52300	62000
39. Bis(2-ethylhexyl)phthalate	<7700	<2.5	7700	31000
40. Di-n-octylphthalate	<14500	<4.7	14500	31000
41. Benzo(b)fluoranthene	<2500	<8	2500	31000
42. Benzo(k)fluoranthene	<2500	<8	2500	31000
43. Benzo(a)pyrene	7800	<8	2500	31000
44. Indeno(1,2,3-cd)pyrene	<2500	<8	2500	31000
45. Dibenzo(a,h)anthracene	<2500	<8	2500	31000
46. Benzo(ghi)perylene	<2500	<8	2500	31000

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

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07-9410-047C

LABORATORY REPORT

108944-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Waste - BB1KN031 (TAR) B.S. pit water
Sample No.: 98218

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	<0.5	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

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07-9410-047C

LABORATORY REPORT

108944-B

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Waste - BB1KN031
Sample No.: 98218

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	2	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	<0.5	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	<0.6	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

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07-9410-047C

LABORATORY REPORT

108944

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Waste - BB1KN031
Sample No.: 98218

Arsenic	<0.2
Barium	1.4
Cadmium	<0.02
Chromium	<0.1
Lead	<0.2
Mercury	<0.0003
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except its entirety.

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07-9410-047C

LABORATORY REPORT

108943-A

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN032
Sample No.: 98217

Pond - Sludge

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	4.3	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

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07-9410-047C

LABORATORY REPORT

108943-A

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN032
Sample No.: 98217

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	17.1	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	6	<0.6	0.6	5
31. Xylenes	26.2	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

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07-9410-047C

LABORATORY REPORT

108943-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/27/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN032
Sample No.: 98217

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. N-Nitrosodimethylamine	<1560	<0.7	1560	22300
2. Bis(2-chloroethyl)ether	<1100	<0.5	1100	22300
3. 1,3-Dichlorobenzene	<890	<0.4	890	22300
4. 1.4-Dichlorobenzene	<890	<0.4	890	22300
5. 1,2-Dichlorobenzene	<2000	<0.9	2000	22300
6. Bis(2-chloroisopropyl)ether	<2670	<1.2	2670	22300
7. Hexachloroethane	<1560	<0.7	1560	22300
8. N-Nitrosodi-n-propylamine	<3340	<1.5	3340	22300
9. Nitrobenzene	<4010	<1.8	4010	22300
10. Isophorone	<669	<0.3	669	22300
11. Bis(2-chloroethoxy)methane	<890	<0.4	890	22300
12. 1,2,4-Trichlorobenzene	<890	<0.4	890	22300
13. Naphthalene	<1780	<8	1780	22300
14. Hexachlorobutadiene	<1100	<0.5	1100	22300
15. Hexachlorocyclopentadiene	<21200	<9.5	21200	44600
16. 2-Chloronaphthalene	<669	<0.3	669	22300
17. Acenaphthylene	<1780	<8	1780	22300
18. Dimethylphthalate	<1560	<0.7	1560	22300
19. 2,6-Dinitrotoluene	<2000	<0.9	2000	22300
20. Acenaphthene	<1780	<8	1780	22300
21. 2,4-Dinitrotoluene	<1560	<0.7	1560	22300
22. Fluorene	<1780	<8	1780	22300
23. Diethylphthalate	<2230	<1.0	2230	22300
24. 4-Chlorophenyl phenyl ether	<890	<0.4	890	22300

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07-9410-047C

LABORATORY REPORT

108943-C

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/27/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN032
Sample No.: 98217

Compound Base/Neutral Extractables	Concentration Found In Sample (ppb)	Concentration Found In Blank (ppb)	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
25. N-Nitrosodiphenylamine	<1100	<0.5	1100	22300
26. Diphenylhydrazine	<3500	<1.6	3500	22300
27. 4-Bromophenyl phenyl ether	<1340	<0.6	1340	22300
28. Hexachlorobenzene	<4240	<1.9	4240	22300
29. Phenanthrene	3300	<8	1780	22300
30. Anthracene	<1780	<8	1780	22300
31. Di-n-butylphthalate	<1100	<0.5	1100	22300
32. Fluoranthene	<1780	<8	1780	22300
33. Benzidine	<10500	<4.7	10500	110000
34. Pyrene	<1780	<8	1780	22300
35. Butyl benzyl phthalate	<4240	<1.9	4240	22300
36. Benzo(a)anthracene	<1780	<8	1780	22300
37. Chrysene	<1780	<8	1780	22300
38. 3,3'—Dichlorobenzidine	<720000	<17.0	720000	22300
39. Bis(2-ethylhexyl)phthalate	<5570	<2.5	5570	44600
40. Di-n-octylphthalate	<10500	<4.7	10500	22300
41. Benzo(b)fluoranthene	<1780	<8	1780	22300
42. Benzo(k)fluoranthene	<1780	<8	1780	22300
43. Benzo(a)pyrene	<1780	<8	1780	22300
44. Indeno(1,2,3-cd)pyrene	<1780	<8	1780	22300
45. Dibenzo(a,h)anthracene	<1780	<8	1780	22300
46. Benzo(ghi)perylene	<1780	<8	1780	22300

All results expressed as parts per billion, unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeber

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07-9410-047C

LABORATORY REPORT

108943-D

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BBIKN032
Sample No.: 98217

Report Date: 10/27/94
Sample Received: 10/21/94

Compound Acid Extractables	Concentration Found In Sample	Concentration Found In Blank	Method Detection Limit (MDL) ug/kg (ppb)	Quantitation Limit ug/kg (ppb)
1. Phenol	<890	<0.4	890	22300
2. 2-Chlorophenol	<2000	<0.9	2000	22300
3. 2-Nitrophenol	<4000	<1.8	4000	22300
4. 2,4-Dimethylphenol	<1100	<0.5	1100	22300
5. 2,4-Dichlorophenol	<3790	<1.7	3790	22300
6. p-Chloro-m-cresol	<4900	<2.2	4900	22300
7. 2,4,6-Trichlorophenol	<4900	<2.2	4900	22300
8. 2,4-Dinitrophenol	<21800	<9.8	21800	110000
9. 4-Nitrophenol	<8700	<3.9	8700	110000
10. 4,6-Dinitro-o-cresol	<19200	<8.6	19200	110000
11. Pentachlorophenol	<16300	<7.3	16300	110000

All results expressed as ppb unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeher

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07-9410-047C

LABORATORY REPORT

108943

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Sludge - BB1KN032
Sample No.: 98217

Analysis performed on TCLP extract

Arsenic	<0.2
Barium	2.0
Cadmium	<0.02
Chromium	<0.1
Lead	<0.2
Mercury	<0.01
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except its entirety.

Gary W. Wright

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07-9410-047C

LABORATORY REPORT

108945

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/28/94
Sample Received: 10/21/94

Project Name: Marco, Chanute, Kansas
Sample Description: Waste - BB1KN033
Sample No.: 98219

Pond Water

Arsenic	<0.2
Barium	0.32
Cadmium	<0.02
Chromium	<0.1
Lead	<0.2
Mercury	<0.0003
Selenium	<0.2
Silver	<0.2

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except its entirety.

Gary W. Wright

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07-9410-047C

LABORATORY REPORT

108525

Riedel Environmental Services, Inc.
18307 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/24/94
Sample Received: 10/20/94

Project Name: Marco, Chanute, Kansas
Sample Description: Grab - BB1KN033
Sample No.: 98219

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
1. Chloromethane	<1.0	<1.0	1.0	10
2. Bromomethane	<0.7	<0.7	0.7	10
3. Vinyl chloride	<0.7	<0.7	0.7	10
4. Chloroethane	<0.7	<0.7	0.7	10
5. Dichloromethane	<0.8	<0.8	0.8	5
6. Acrolein	<15.0	<15.0	15.0	50
7. Acrylonitrile	<5.0	<5.0	5.0	50
8. Trichlorofluoromethane	<0.5	<0.5	0.5	5
9. 1,1-Dichloroethene	<0.5	<0.5	0.5	5
10. 1,1-Dichloroethane	<0.5	<0.5	0.5	5
11. trans-1,2-Dichloroethene	<0.5	<0.5	0.5	5
12. Chloroform	<0.5	<0.5	0.5	5
13. 1,2-Dichloroethane	<1.6	<1.6	1.6	5
14. 1,1,1-Trichloroethane	<0.5	<0.5	0.5	5
15. Carbon tetrachloride	<0.6	<0.6	0.6	5
16. Bromodichloromethane	<0.6	<0.6	0.6	5
17. 1,2-Dichloropropane	<0.5	<0.5	0.5	5
18. cis-1,3-Dichloropropene	<0.5	<0.5	0.5	5
19. Trichloroethene	<0.5	<0.5	0.5	5
20. Benzene	<0.5	<0.5	0.5	5
21. Dibromochloromethane	<1.8	<1.8	1.8	5
22. Trans-1,3-Dichloropropene	<0.9	<0.9	0.9	5
23. 1,1,2-Trichloroethane	<2.5	<2.5	2.5	5
24. 2-Chloroethyl vinyl ether	<90.2	<90.2	90.2	100

Leah E. Zuber

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

108525

Riedel Environmental Services, Inc.
18207 Edison Ave.
Chesterfield, MO. 63005

Report Date: 10/24/94
Sample Received: 10/20/94

Project Name: Marco, Chanute, Kansas
Sample Description: Grab - BB1KN033
Sample No.: 98219

Compound Purgeables	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Quantitation Limit ug/L (ppb)
25. Bromoform	<4.0	<4.0	4.0	5
26. Tetrachloroethene	<0.7	<0.7	0.7	5
27. 1,1,2,2-Tetrachloroethane	<3.9	<3.9	3.9	5
28. Toluene	<0.5	<0.5	0.5	5
29. Chlorobenzene	<0.6	<0.6	0.6	5
30. Ethylbenzene	<0.6	<0.6	0.6	5

All results expressed as ppb unless otherwise indicated.

Analyses performed using EPA approved Method No. 624 in accordance with 40 CFR136.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

LABORATORY DIRECTOR

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REPORT OF LABORATORY ANALYSIS

September 13, 1994
Report No.: 00034543
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: PACE INCORPORATED-KANSAS
ADDRESS: 9608 LOIRET BOULEVARD
LENEXA, KS 66219-
ATTENTION: TED TANIUS

LIMS CLIENT: 0719 0523
PACE PROJECT: N07190523
PACE CLIENT: 000560
P.O. NO: VERBAL

SAMPLE ID: NR-4 fuel oil from Tower 178
SAMPLE NO: H281918

DATE SAMPLED: 25-AUG-94
DATE RECEIVED: 10-SEP-94
PROJECT MANAGER: Debbie Proctor

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	1315S	Halogens, Total Organic (EOX)	< 20	ug/g

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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SUPPLEMENTAL INFORMATION

LN	TEST CODE	LCSR BLNK BATCH	DUP/MS MS/MSD BATCH	SAMPLE PREPARATION LR-METHOD	DATE/TIME	ANALYST	SAMPLE ANALYSIS LR-METHOD	DATE/TIME	ANALYST	INSTRUMENT
SAMPLE ID: MR-6									SAMPLE NO: H281918	
1	I315S	42982	42982	46-APP D			19-9020	13-SEP-94 0700	LJH	151WAT

LR Method Literature Reference

19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986 and updates
46 EPA-Development & Evaluation of Methods for Lux & Purgeable Org. Halide in Waste

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LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	LCS % RECOVERY	ACCEPTANCE LIMITS
BATCH NO: 42982			SAMPLE NO: H336300
I315S	Halogens, Total Organic (EOX)	104.3	-

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METHOD BLANK DATA

TEST CODE	DETERMINATION	RESULT	UNIT
BATCH NO: 42982		SAMPLE NO: H336301	
I315S	Halogens, Total Organic (EOX)	< 20	ug/g

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DUPLICATE AND MATRIX SPIKE DATA

TEST CODE	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	MS RESULT	MS % RCVRY
BATCH NO: 42982						SAMPLE NO: H281527	
1315S	Halogens, Total Organic (EOX)	< 20	< 20	ug/L	---	1400	100.0

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Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

PACE Project Number: 601165
Client Project ID: Marco Oil - 9009

Attn: Mr. Scott Brandon
Phone: (316)431-6039

Solid results are reported on a dry weight basis

PACE Sample No: 6077408
Client Sample ID: MR-4 diesel fuel from tower 178

Date Collected: 08/25/94
Date Received: 08/29/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	08/31/94	EPA 7471	MRM	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	ND	mg/kg	0.5	09/06/94	EPA 7060	JAH	7440-38-2	
Date Digested				09/01/94				
Lead, AAS Furnace								
Lead	ND	mg/kg	0.5	09/02/94	EPA 7421	JAH	7439-92-1	
Date Digested				09/01/94				
Selenium, AAS Furnace								
Selenium	ND	mg/kg	0.5	09/06/94	EPA 7740	SMS	7782-49-2	
Date Digested				09/01/94				
Metals, ICP								
Barium	ND	mg/kg	1	09/01/94	EPA 6010	SMS	7440-39-3	
Cadmium	ND	mg/kg	0.5	09/01/94	EPA 6010	SMS	7440-43-9	
Chromium	ND	mg/kg	2	09/01/94	EPA 6010	SMS	7440-47-3	
Silver	ND	mg/kg	3	09/01/94	EPA 6010	SMS	7440-22-4	
Date Digested				09/01/94				

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REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601165
Client Project ID: Marco Oil - 9009

PACE Sample No: 6084016
Client Sample ID: MR-4

Date Collected: 08/25/94
Date Received: 08/29/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC								
Polychlorinated Biphenyls-Oil								
PCB-1016 (Arochlor 1016)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	12674-11-2	
PCB-1221 (Arochlor 1221)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	11104-28-2	
PCB-1232 (Arochlor 1232)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	11141-16-5	
PCB-1242 (Arochlor 1242)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	53469-21-9	
PCB-1248 (Arochlor 1248)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	12672-29-6	
PCB-1254 (Arochlor 1254)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	11097-69-1	
PCB-1260 (Arochlor 1260)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA	11096-82-5	
PCB-1262 (Arochlor 1262)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA		
PCB-1268 (Arochlor 1268)	ND	mg/kg	1.9	09/08/94	EPA 8080	EMA		
Dibutylchloroendate (S)	73	%		09/08/94	EPA 8080	EMA	PEST-SURR1	

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PACE Project Number: 601165
Client Project ID: Marco Oil - 9009

PARAMETER FOOTNOTES

ND	Not Detected
PRL	PACE Reporting Limit
(S)	Surrogate

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REPORT OF LABORATORY ANALYSIS

DATE: 09/20/94
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PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6083067 Date Collected: 09/02/94
Client Sample ID: MR-8 -> sludge from collection pond on site Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Inorganics								
RCRA Metals, ICP, TCLP Leach.								
Date Digested				09/16/94				
Metals								
Mercury, CVAAS								
Mercury	0.299	mg/kg	0.1	09/14/94	EPA 7471	MRM	7439-97-6	
RCRA Metals, ICP, TCLP Leach.								
Barium	ND	mg/L	5	09/19/94	EPA 6010	JAH	7440-39-3	
Cadmium	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7440-43-9	
Chromium	ND	mg/L	0.05	09/19/94	EPA 6010	JAH	7440-47-3	
Lead	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7439-92-1	
Silver	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7440-22-4	
Arsenic	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7440-38-2	
Selenium	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7782-49-2	
Date Digested				09/19/94				
Organochlorine Pesticides/PCBs								
PCB-1016 (Arochlor 1016)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	12674-11-2	
PCB-1221 (Arochlor 1221)	ND	ug/kg	4000	09/12/94	EPA 8080	AKG	11104-28-2	
PCB-1232 (Arochlor 1232)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	11141-16-5	
PCB-1242 (Arochlor 1242)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	53469-21-9	
PCB-1248 (Arochlor 1248)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	12672-29-6	
PCB-1254 (Arochlor 1254)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	11097-69-1	
PCB-1260 (Arochlor 1260)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	11096-82-5	
Decachlorobiphenyl (S)	0	%		09/12/94	EPA 8080	AKG		2
Tetrachloro-meta-xylene (S)	0	%		09/12/94	EPA 8080	AKG	877-09-8	
Dibutylchloroendate (S)	81	%		09/12/94	EPA 8080	AKG	PEST-SURR1	
Date Extracted				09/08/94				
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	1300	09/09/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	3300	09/09/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-34-3	

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sludge bottom from pond @ the site

PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6083067
Client Sample ID: MR-8

Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	0.299	mg/kg	0.1	09/14/94	EPA 7471	MRM	7439-97-6	
GC								
Organochlorine Pesticides/PCBs								
PCB-1016 (Arochlor 1016)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	12674-11-2	
PCB-1221 (Arochlor 1221)	ND	ug/kg	4000	09/12/94	EPA 8080	AKG	11104-28-2	
PCB-1232 (Arochlor 1232)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	11141-16-5	
PCB-1242 (Arochlor 1242)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	53469-21-9	
PCB-1248 (Arochlor 1248)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	12672-29-6	
PCB-1254 (Arochlor 1254)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	11097-69-1	
PCB-1260 (Arochlor 1260)	ND	ug/kg	2000	09/12/94	EPA 8080	AKG	11096-82-5	
Decachlorobiphenyl (S)	0	%		09/12/94	EPA 8080	AKG		2
Tetrachloro-meta-xylene (S)	0	%		09/12/94	EPA 8080	AKG	877-09-8	
Dibutylchloroendate (S)	81	%		09/12/94	EPA 8080	AKG	PEST-SURR1	
Date Extracted				09/08/94				
/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	1300	09/09/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	3300	09/09/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	3300	09/09/94	EPA 8240	DJE	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	1300	09/09/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-27-4	
1,2-Dichloropropane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	79-00-5	

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REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6083067
Client Sample ID: MR-8

Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	1400	09/09/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	79-34-5	
Toluene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	108-88-3	
Chlorobenzene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	100-41-4	
Styrene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	6300	09/09/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	1200	09/09/94	EPA 8240	DJE	95-50-1	
1,2-Dichloroethane-D4 (S)	92	%		09/09/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	119	%		09/09/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	109	%		09/09/94	EPA 8240	DJE	460-00-4	
Date Prepared				09/09/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	86-73-7	
Phenanthrene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	206-44-0	
Pyrene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	190000	09/13/94	EPA 8270	MSR	53-70-3	

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REPORT OF LABORATORY ANALYSIS

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PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6083067
Client Sample ID: MR-8

Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
2-Fluorobiphenyl (S)	0	%		09/13/94	EPA 8270	MSR	321-60-8	1
Terphenyl-D14 (S)	0	%		09/13/94	EPA 8270	MSR	1718-51-0	1
Date Extracted				09/08/94				

Comments : Elevated quantitation limits resulting from matrix interference.

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PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6084438 Date Collected: 09/02/94
Client Sample ID: MR-7 Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC								
Polychlorinated Biphenyls-Oil								
PCB-1016 (Arochlor 1016)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	12674-11-2	
PCB-1221 (Arochlor 1221)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	11104-28-2	
PCB-1232 (Arochlor 1232)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	11141-16-5	
PCB-1242 (Arochlor 1242)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	53469-21-9	
PCB-1248 (Arochlor 1248)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	12672-29-6	
PCB-1254 (Arochlor 1254)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	11097-69-1	
PCB-1260 (Arochlor 1260)	ND	mg/kg	2	09/09/94	EPA 8080	EMA	11096-82-5	
PCB-1262 (Arochlor 1262)	ND	mg/kg	2	09/09/94	EPA 8080	EMA		
PCB-1268 (Arochlor 1268)	ND	mg/kg	2	09/09/94	EPA 8080	EMA		
Dibutylchloroendate (S)	60	%		09/09/94	EPA 8080	EMA	PEST-SURR1	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
PAGE: 8

PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PARAMETER FOOTNOTES

ND	Not Detected
PRL	PACE Reporting Limit
(S)	Surrogate
[1]	Spike and/or surrogate recoveries could not be calculated due to sample dilution.
[2]	The sample contains matrix interferences which required sample dilution. The method detection limits are adjusted for the dilution and the surrogate recovery information is not available for DCB and TCX.

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REPORT OF LABORATORY ANALYSIS

Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

September 16, 1994
PACE Project Number: 540902500

Attn: Mr. Scott Brandon

DRAFT

Client Reference: Marco Oil - 9009

Parameter	Units	MDL		METHOD	DATE ANALYZED
PACE Sample Number:			60 0093288		
Date Collected:			09/02/94		
Date Received:			09/02/94		
			MR-7 fuel oil from tower 170		
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
BTU	BTU/lb	100	ND	D271-58	09/12/94
KF Water			0.68	ASTM E203	09/12/94
Total Organic Halides for Soil			$	9020	/ /
pH			5.98	150.1	09/08/94

Parameter	Units	MDL		METHOD	DATE ANALYZED
PACE Sample Number:			60 0093296		
Date Collected:			09/02/94		
Date Received:			09/02/94		
Client Sample ID:			MR-8		
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
BTU	BTU/lb	100	1190	D271-58	09/12/94

These data have been reviewed and are approved for release.

Brian J. Smith
Manager, Inorganic Chemistry

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

Mr. Scott Brandon
Page 2

FOOTNOTES
for page 1

September 16, 1994
PACE Project Number: 540902500

Client Reference: Marco Oil - 9009

$	Analytical results are not available.
MDL	Method Detection Limit
ND	Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
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Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

Attn: Mr. Scott Brandon
Phone: (316)431-6039

Solid results are reported on a dry weight basis

PACE Sample No: 6083042
Client Sample ID: MR-7

Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	09/14/94	EPA 7471	MRM	7439-97-6	
Wet Chemistry								
Flash Point, Closed Cup								
Flash Point	94	deg C	10	09/09/94	EPA 1010	GMF		
VMS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	13000	09/09/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	33000	09/09/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-34-3	
1,2-Dichloroethene (Total)	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	540-59-0	
Chloroform	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	67-66-3	
2-Butanone	ND	ug/kg	33000	09/09/94	EPA 8240	DJE	78-93-3	
1,1,1-Trichloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	71-55-6	
Carbon Tetrachloride	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	56-23-5	
Vinyl Acetate	ND	ug/kg	13000	09/09/94	EPA 8240	DJE	108-05-4	
Bromodichloromethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-27-4	
1,2-Dichloropropane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	10061-01-5	
Trichloroethene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	79-01-6	
Dibromochloromethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	124-48-1	
1,1,2-Trichloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	79-00-5	

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07-9410-047C

REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
PAGE: 2

PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6083042
Client Sample ID: MR-7

Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Benzene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	71-43-2	
trans-1,3-Dichloropropene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	10061-02-6	
Bromoform	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-25-2	
4-Methyl-2-Pentanone	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	108-10-1	
2-Hexanone	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	591-78-6	
Tetrachloroethene	ND	ug/kg	14000	09/09/94	EPA 8240	DJE	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	79-34-5	
Toluene	17000	ug/kg	12000	09/09/94	EPA 8240	DJE	108-88-3	
Chlorobenzene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	108-90-7	
Ethylbenzene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	100-41-4	
Styrene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	100-42-5	
Xylene (Total)	93000	ug/kg	12000	09/09/94	EPA 8240	DJE	1330-20-7	
Acrolein	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	107-02-8	
Acrylonitrile	ND	ug/kg	63000	09/09/94	EPA 8240	DJE	107-13-1	
2-Chloroethyl Vinyl Ether	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	110-75-8	
1,3-Dichlorobenzene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	106-46-7	
1,2-Dichlorobenzene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	95-50-1	
1,2-Dichloroethane-D4 (S)	92	%		09/09/94	EPA 8240	DJE	17060-07-0	
Toluene-D8 (S)	112	%		09/09/94	EPA 8240	DJE	2037-26-5	
4-Bromofluorobenzene (S)	104	%		09/09/94	EPA 8240	DJE	460-00-4	
Date Prepared				09/09/94				
GC/MS -- Semi-VOA								
Polyaromatic Hydrocarbons								
Naphthalene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	91-20-3	
Acenaphthylene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	208-96-8	
Acenaphthene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	83-32-9	
Fluorene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	86-73-7	
Phenanthrene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	85-01-8	
Anthracene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	120-12-7	
Fluoranthene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	206-44-0	
Pyrene	ND	ug/kg	100000	09/13/94	EPA 8270	MSR	129-00-0	
Benzo(a)anthracene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	56-55-3	
Chrysene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	218-01-9	
Benzo(b)fluoranthene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	207-08-9	
Benzo(a)pyrene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	50-32-8	
Indeno (1,2,3-cd) pyrene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	193-39-5	
Benzo(g,h,i)perylene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	191-24-2	
Dibenz(a,h)anthracene	ND	ug/kg	990000	09/13/94	EPA 8270	MSR	53-70-3	

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REPORT OF LABORATORY ANALYSIS

DATE: 09/16/94
PAGE: 3

PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

PACE Sample No: 6083042
Client Sample ID: MR-7

Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
2-Fluorobiphenyl (S)	0	%		09/13/94	EPA 8270	MSR	321-60-8	1
Terphenyl-D14 (S)	0	%		09/13/94	EPA 8270	MSR	1718-51-0	1
Date Extracted				09/08/94				

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REPORT OF LABORATORY ANALYSIS

September 16, 1994
Report No.: 00034578
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: PACE INCORPORATED-KANSAS
ADDRESS: 9608 LOIRET BOULEVARD
LENEXA, KS 66219-
ATTENTION: TED TANIUS

SAMPLE ID: MR-7 6083042 → fuel oil from tower 170
SAMPLE NO: H281962

LIMS CLIENT: 0719 0524
PACE PROJECT: 601902500
PACE CLIENT: 000560
P.O. NO: VERBAL

DATE SAMPLED: 02-SEP-94
DATE RECEIVED: 13-SEP-94
PROJECT MANAGER: Debbie Proctor

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	1315S	Halogens, Total Organic (EOX)	< 20	ug/g

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

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SUPPLEMENTAL INFORMATION

LN	TEST CODE	LCSR BLNK BATCH	DUP/MS MS/MSD BATCH	SAMPLE PREPARATION LR-METHOD	DATE/TIME	ANALYST	SAMPLE ANALYSIS LR-METHOD	DATE/TIME	ANALYST	INSTRUMENT
SAMPLE ID: MR-7 6083042										
									SAMPLE NO: H281962	
1	I315S	42982	42982	46-APP D			19-9020	13-SEP-94 0700	LJH	151WAT

LR Method Literature Reference

19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986 and updates
46 EPA-Development & Evaluation of Methods for TOX & Purgeable Org. Halide in Waste

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Houston, TX 77058
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FAX: 713-488-4661

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REPORT OF LABORATORY ANALYSIS

September 16, 1994
Report No.: 00034572
Section D Page 1

LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	LCS % RECOVERY	ACCEPTANCE LIMITS
BATCH NO: 42982			SAMPLE NO: M336300
I315S	Halogens, Total Organic (EOX)	104.3	-

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Houston, TX 77058
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FAX: 713-488-4661

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REPORT OF LABORATORY ANALYSIS

September 16, 1994
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Section E Page 1

METHOD BLANK DATA

TEST CODE	DETERMINATION	RESULT	UNIT
BATCH NO: 42982			
		SAMPLE NO: H336301	
I315S	Halogens, Total Organic (EOX)	< 20	ug/g

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REPORT OF LABORATORY ANALYSIS

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Section F Page 1

DUPLICATE AND MATRIX SPIKE DATA

TEST CODE	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	MS RESULT	MS % RCVRY
BATCH NO: 42982						SAMPLE NO: H281527	
I315S	Halogens, Total Organic (EOX)	< 20	< 20	ug/g	---	1400	100.0

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REPORT OF LABORATORY ANALYSIS

DATE: 09/20/94
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Riedel Environmental Services
18207 Edison Ave.
Chesterfield, MO 63005

Not Complete

PACE Project Number: 601247
Client Project ID: Marco Oil - 9009

Attn: Mr. Scott Brandon
Phone: (316)431-6039

Solid results are reported on a dry weight basis

PACE Sample No: 6083042
Client Sample ID: MR-7 Fuel from tower 170
Date Collected: 09/02/94
Date Received: 09/02/94

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Inorganics								
RCRA Metals, ICP, TCLP Leach.								
Date Digested				09/19/94				
Metals								
Mercury, CVAAS								
Mercury	ND	mg/kg	0.1	09/14/94	EPA 7471	MRM	7439-97-6	
RCRA Metals, ICP, TCLP Leach.								
Barium	ND	mg/L	5	09/19/94	EPA 6010	JAH	7440-39-3	
Cadmium	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7440-43-9	
Chromium	ND	mg/L	0.05	09/19/94	EPA 6010	JAH	7440-47-3	
Lead	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7439-92-1	
Silver	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7440-22-4	
Arsenic	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7440-38-2	
Selenium	ND	mg/L	0.25	09/19/94	EPA 6010	JAH	7782-49-2	
Date Digested				09/19/94				
Wet Chemistry								
Flash Point, Closed Cup								
Flash Point	94	deg C	10	09/09/94	EPA 1010	GMF		
GC/MS -- VOA								
Volatile Organics (VOA91)-Med.								
Chloromethane	ND	ug/kg	13000	09/09/94	EPA 8240	DJE	74-87-3	
Bromomethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	74-83-9	
Vinyl Chloride	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-01-4	
Chloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-00-3	
Methylene Chloride	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-09-2	
Acetone	ND	ug/kg	33000	09/09/94	EPA 8240	DJE	67-64-1	
Carbon Disulfide	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-15-0	
Trichlorofluoromethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-69-4	
1,1-Dichloroethene	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-35-4	
1,1-Dichloroethane	ND	ug/kg	12000	09/09/94	EPA 8240	DJE	75-34-3	

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CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Bailey	MARCO Refinery	23+24 / 08 / 94	1 of 1

CONTENTS OF SHIPMENT: Chanute, KS

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	8oz BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BBIKN-01		2			1		X				VOCs, BNAs, TPH+T. Metals
-02		2			1		X				
-03		2			1		X				
-04		1					X				
-05		3			1		X				
-06		2			1		X				
					5						
		12									

DESCRIPTION OF SHIPMENT

17 PIECE(S) CONSISTING OF _____ BOX(ES)

1 ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

_____ COMMERCIAL CARRIER: _____

_____ COURIER

_____ SAMPLER CONVEYED _____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] SEALED ☐ UNSEALED ☑	8/24/94	1500	[signature] SEALED ☐ UNSEALED ☑	deliver to lab.
SEALED ☐ UNSEALED ☐			SEALED ☐ UNSEALED ☐	
SEALED ☐ UNSEALED ☐			SEALED ☐ UNSEALED ☐	

7-EPA-9262(Revised 5/85)

CHAIN OF CUSTODY RECORD 07-9410-047C
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Bailey	MARCO Refinery	27 31 08 94	1 of 1

CONTENTS OF SHIPMENT: Chanute, KS

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	BOTTLE (8 oz)	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other (Sludge oil)	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BBIKN-07		3			1					X	VOCs, BNAs, BTUs, TCLP Metals
BBIKN-08		3			1					X	
BBIKN-09		4								X	

DESCRIPTION OF SHIPMENT

12 PIECE(S) CONSISTING OF _____ BOX(ES)

_____ ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

_____ COMMERCIAL CARRIER: _____

_____ COURIER

✓ SAMPLER CONVEYED

_____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] SEALED ☐ UNSEALED ☐	8/31/94	1545	[signature] SEALED ☐ UNSEALED ☑	Lab shipment
RELINQUISHED BY SEALED ☐ UNSEALED ☐	DATE	TIME	RECEIVED BY SEALED ☐ UNSEALED ☐	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED ☐ UNSEALED ☐	DATE	TIME	RECEIVED BY SEALED ☐ UNSEALED ☐	REASON FOR CHANGE OF CUSTODY

7-EPA-9262(Revised 5/85)

07-9410-047C

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Carl Bailey	Marco Refinery	12 / 09 / 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	8 oz BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other sludge/soil/solids	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BB1KN-Ø1Ø		3								X	TCLP metals, Semi VOC's, total halide
" -Ø11		3			1					X	VOC's, semi-VOC's, TCLP metals, tot. halide, BTU
" -Ø12		3			1					X	VOC's, semi-VOC's, TCLP metals, tot. halide, BTU
" -Ø13		3			1					X	VOC's, semi-VOC's, TCLP metals, tot. halide, BTU
" -Ø14		3			1					X	VOC's, semi-VOC's, TCLP metals, tot. halide, BTU's, P
" -Ø15		3			1					X	VOC's, semi-VOC's, TCLP metals, tot. halide, BTU's, P
" -Ø16		2			1	X					VOC's, TCLP metals, semi-VOC's

DESCRIPTION OF SHIPMENT	MODE OF SHIPMENT
26 PIECE(S) CONSISTING OF ____ BOX(ES)	X COMMERCIAL CARRIER: Fed Express
1 ICE CHEST(S); OTHER ____	____ COURIER
	____ SAMPLER CONVEYED
	2155110090 (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] X SEALED UNSEALED	9/12/94	1600 hrs	[signature] X SEALED UNSEALED	Transport to lab.
RELINQUISHED BY [signature] SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY To EMT of IL
RELINQUISHED BY SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY

7-EPA-9262(Revised 5/85)

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

07-9410-047C

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Mac Scott Brandon	Marco Oil	9 / 15 / 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	32 oz BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BBIKM-015		2								X	Extra Samples per Ulana Lestina's Request - TCLP Metals

Add'l sample quantity to lab

DESCRIPTION OF SHIPMENT

2 PIECE(S) CONSISTING OF # BOX(ES)

1 ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

✓ COMMERCIAL CARRIER: Fed Ex

___ COURIER

___ SAMPLER CONVEYED

1914781595 (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] SEALED UNSEALED			SEALED UNSEALED	To EMT in IL.
RELINQUISHED BY SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY

7-EPA-9262(Revised 5/85)

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

07-9410-0476

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Carl Bailey	Marco Refinery	13 / 09 / 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	32 oz BOTTLE	8 oz BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	Liquid/oil or solid	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER											
BBIKNØ16		2				X						Addl sample quantity to lab
BBIKNØ17		1			1					X		VOC's, semi VOC's TCLP metals, halide, PCBs, BTU
BBIKNØ18		1			1					X		VOC's, semi VOC's, TCLP metals, halide, BTU's
BBIKNØ19		1			1					X		VOC's, semi VOC's, TCLP metals, halide, PCBs, BTU
BBIKNØ2Ø			1							X		Total metals
BBIKNØ21		1			1					X		VOC's, semi VOC's, total halide, TCLP metals, BTU's

DESCRIPTION OF SHIPMENT

11 PIECE(S) CONSISTING OF _____ BOX(ES)

1 ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

X COMMERCIAL CARRIER: FedEx

___ COURIER

___ SAMPLER CONVEYED

1576926566 (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] X SEALED UNSEALED	9/13/94	1545	[signature] X SEALED UNSEALED	SHIPMENT TO LAB
RELINQUISHED BY [signature] X SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY TO EMT of IL
RELINQUISHED BY SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY

7-EPA-9262(Revised 5/85)

07-9410-047C

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print): Bailey

NAME OF SURVEY OR ACTIVITY: Marco Refinery Chanute, KS

DATE OF COLLECTION: 21 (DAY) 09 (MONTH) 94 (YEAR)

SHEET 1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	BOTTLE 32oz	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BB1KN-019		1									resample
-022		1									Total Metals + pH
-023		1									VOC's + BTU's
-024		1									Total Metals + pH

DESCRIPTION OF SHIPMENT

4 PIECE(S) CONSISTING OF _____ BOX(ES)

1 ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

✓ COMMERCIAL CARRIER: _____

COURIER

SAMPLER CONVEYED

(SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] SEALED UNSEALED	9/21/94	0800	[signature] SEALED UNSEALED ✓	From TAT to Riedel
[signature] SEALED UNSEALED	9/		SEALED UNSEALED	To EMT of IL.
SEALED UNSEALED			SEALED UNSEALED	

7-EPA-9262(Revised 5/85)

07-9410-047C

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Carl Bailey	MARCO site, Chanute, Ks	11 / 10 / 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	BOTTLE (32 oz)	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BBIKN025		1					X				Total metals

DESCRIPTION OF SHIPMENT

1 PIECE(S) CONSISTING OF _____ BOX(ES)

_____ ICE CHEST(S); OTHER DOT Box

MODE OF SHIPMENT

X COMMERCIAL CARRIER: Federal Express

_____ COURIER

_____ SAMPLER CONVEYED

1914833690 (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] X SEALED UNSEALED	10/11/94	1500	[signature] X SEALED UNSEALED	Transport to lab
RELINQUISHED BY [signature] X SEALED UNSEALED	DATE 10/11/94	TIME 1505	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY Transport to lab
RELINQUISHED BY SEALED UNSEALED	DATE	TIME	RECEIVED BY SEALED UNSEALED	REASON FOR CHANGE OF CUSTODY

7-EPA-9262(Revised 5/85)

Riedel

07-9410-047C

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print): Carl Bailey

NAME OF SURVEY OR ACTIVITY: MARCO, Chanute, KS

DATE OF COLLECTION: 12 (DAY) 10 (MONTH) 94 (YEAR)

SHEET 1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: WIPE	SOIL	SEDIMENT	DUST	OTHER: Insulation	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BBIKN#26					1					X	Asbestos
BBIKN#27					1					X	↓
BBIKN#28					1					X	
BBIKN#29					1					X	↓

DESCRIPTION OF SHIPMENT

4 PIECE(S) CONSISTING OF _____ BOX(ES)

_____ ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

_____ COMMERCIAL CARRIER: _____

_____ COURIER

_____ SAMPLER CONVEYED _____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] ☐ SEALED ☒ UNSEALED	10/14/94	1800 hrs	[signature] ☐ SEALED ☒ UNSEALED	Transport to lab
[signature] ☒ SEALED ☐ UNSEALED	10/14/94	0955	[signature] ☐ SEALED ☐ UNSEALED	Transport to lab
[signature] ☐ SEALED ☐ UNSEALED	10/17/94	14:04	[signature] ☒ SEALED ☐ UNSEALED	Analysis

7-EPA-9262(Revised 5/85)

07-9410-047C

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY MONTH YEAR)	SHEET
Carl Bailey	MARCO, Chanute, Kansas	19-20 10 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	8 oz BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other: sludge	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BB1KNØ3Ø		1								X	semi-VOC's, TCLP metals, incl. Hg
BBKNØ32		1								X	VOC's, semi-VOC's, TCLP metals incl. Hg.
											Note: semi-VOC's reqd HPLC method
											Note: Samples BB1KNØ3Ø, BB1KNØ31, BB1KNØ32, BB1KNØ33 c-o-c form sent to EAC's subcontractor lab for analyses (see field sheets)

DESCRIPTION OF SHIPMENT	MODE OF SHIPMENT
2 PIECE(S) CONSISTING OF ____ BOX(ES)	____ COMMERCIAL CARRIER: ____
____ ICE CHEST(S); OTHER ____	____ COURIER
	X SAMPLER CONVEYED ____ (SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] SEALED ☐ UNSEALED ☒	10/20/94	1520 hrs	SEALED ☐ UNSEALED ☐	Transport to EPA Lab by OSC Kroon
RELINQUISHED BY SEALED ☐ UNSEALED ☐	DATE	TIME	RECEIVED BY SEALED ☐ UNSEALED ☐	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED ☐ UNSEALED ☐	DATE	TIME	RECEIVED BY SEALED ☐ UNSEALED ☐	REASON FOR CHANGE OF CUSTODY

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CHAIN OF CUSTODY RECORD 07-9410-047C
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Carl Bailey	MARCO, Chanute, KS	21 / 10 / 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	3202 BOTTLE	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER									sludge	
B&IKN0034		1								X	Semi-VOC's, TCLP metals

DESCRIPTION OF SHIPMENT

1 PIECE(S) CONSISTING OF 1 BOX(ES)

ICE CHEST(S); OTHER

MODE OF SHIPMENT

X COMMERCIAL CARRIER:

COURIER

SAMPLER CONVEYED

(SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] ☒ SEALED ☐ UNSEALED	10/21/94	1500 hrs	[signature] ☐ SEALED ☐ UNSEALED	Transport to Lab
[signature] ☐ SEALED ☐ UNSEALED	10/21/94		☐ SEALED ☐ UNSEALED	Lab Analysis
☐ SEALED ☐ UNSEALED			☐ SEALED ☐ UNSEALED	

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07-9410-047C

CHAIN OF CUSTODY RECORD
ENVIRONMENTAL PROTECTION AGENCY REGION VII

ACTIVITY LEADER(Print)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY / MONTH / YEAR)	SHEET
Carl Bailey	MARCO, Chanute, KS	09 / 11 / 94	1 of 1

CONTENTS OF SHIPMENT

SAMPLE NUMBER	TYPE OF CONTAINERS: CUBITAINER	BOTTLE (Mercury tube)	BOTTLE	BOTTLE	VOA SET (2 VIALS EA)	SAMPLED MEDIA: water	soil	sediment	dust	other: Air	RECEIVING LABORATORY REMARKS/OTHER INFORMATION (condition of samples upon receipt, other sample numbers, etc.)
	NUMBERS OF CONTAINERS PER SAMPLE NUMBER										
BB1KN035		1								X	Mercury by Niosh 6009 meth
BB1KN036		1								X	
BB1KN037		1								X	
BB1KN038		1								X	
BB1KN039		3								X	

DESCRIPTION OF SHIPMENT

7 PIECE(S) CONSISTING OF _____ BOX(ES)

1 ICE CHEST(S); OTHER _____

MODE OF SHIPMENT

X COMMERCIAL CARRIER: _____

___ COURIER

___ SAMPLER CONVEYED

(SHIPPING DOCUMENT NUMBER)

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	DATE	TIME	RECEIVED BY	REASON FOR CHANGE OF CUSTODY
[signature] SEALED ☐ UNSEALED ☒	11/10/94	0810	[signature] SEALED ☐ UNSEALED ☒	
RELINQUISHED BY: [signature] SEALED ☐ UNSEALED ☐			RECEIVED BY: SEALED ☐ UNSEALED ☐	Lab Analysis
RELINQUISHED BY: SEALED ☐ UNSEALED ☐			RECEIVED BY: SEALED ☐ UNSEALED ☐	

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