REPORT TO HALLIBURTON NUS
ON
BENCH-SCALE LOW TEMPERATURE THERMAL DESORPTION TREATABILITY STUDY

PROJECT NUMBER 854

AT THE

RAYMARK INDUSTRIES SITE
STRATFORD, CONNECTICUT

SUBMITTED BY:

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MAY, 1994

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LOW TEMPERATURE THERMAL DESORPTION
TREATABILITY STUDY REPORT

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1.0 INTRODUCTION

1.1 TERMS OF REFERENCE

Kiber Environmental Services, Inc. (Kiber) prepared this report as a final presentation of the results for the low temperature thermal desorption (LTTD) treatability study conducted for Halliburton NUS Corporation (Halliburton NUS). The treatability study was performed on soil sampled from the Raymark Industries site (the site) located in Stratford, Connecticut. All treatability testing was performed at Kiber's facilities located in Atlanta, Georgia. Conceptual engineering design and additional technical assistance was provided by RMT / Four Nines, Inc. (Four Nines). The work was performed in accordance with the scope of work outlined in Kiber's proposal dated 14 December 1993, and authorized in the subcontract awarded to Kiber by Halliburton NUS numbered S93-117-055 and dated 18 February 1994.

1.2 SCOPE OF WORK

The testing program implemented by Kiber provided a systematic and cost-effective approach to evaluating the effectiveness of low temperature thermal desorption treatment. The evaluation criteria included organic analyses for volatiles, semivolatiles, PCBs and pesticides, as well as inorganic analyses. All testing performed as a part of the treatability study was in accordance with the Work Plan developed by Halliburton NUS for the Raymark site, dated March 1994. Specifically, the scope of work for the project included:

- Characterize the four soil samples for organic and inorganic contamination.

- Conduct bench-scale studies to evaluate the effectiveness of Low Temperature Thermal Desorption (LTTD), including any pretreatment to obtain a homogeneous blend.

- Perform chemical analyses of treated materials.

- Provide engineering design criteria for full-scale treatment.

In order to perform the scope of work as outlined above, Kiber proposed a project team that included both Kiber and Four Nines. While Kiber performed all testing associated with the treatability study, Four Nines provided the design and operation criteria for treatment using low temperature thermal desorbers (LTTD), equipment and operating costs, and interpretation of the treatability study results as they apply to full-scale treatment.

The primary objective of the treatability study was to evaluate the feasibility of using LTTD to reduce the concentrations of PCBs to less than 2 mg/kg in the treated soils. Additionally, the treatability study was designed to evaluate the effect of LTTD treatment on other organic and inorganic compounds found in the site soils. The testing program implemented by Kiber to achieve the study objectives included: 1) characterization of the untreated soil, 2) intermediate LTTD treatment and screening analyses of the treated soils, and 3) final treatment and comprehensive evaluations of selected treatment parameters as identified by Halliburton NUS.

1.3 TECHNOLOGY DESCRIPTION

Thermal desorption is an ex-situ process that uses either direct or indirect heat exchange to vaporize organic contaminants from soil or sludge. Air, combustion gas or inert gas can be used as the transfer medium from the vaporized components. Thermal desorption systems are physical separation processes and are not specifically designed to destroy organic contaminants. This section presents a brief overview of the treatment technology. For a complete description of full-scale LTTD technology, refer to the Four Nines report included as Appendix A.

Full scale LTTD treatment equipment can be divided into two types of systems composed of either: 1) direct fired rotary desorbers which vaporize organics and then burn the organic vapors in a secondary combustion chamber or 2) indirectly heated desorbers followed by condensers which cool and condense the organic vapors for further treatment, typically followed by activated carbon for final cleansing of the vent gas. While there are many variations in LTTD systems, they all share a requirement of having to treat off gases generated from the treatment process. Thermal desorption processes can be operated at a range of temperatures, determined by contaminant type and concentration, as well as site specific requirements. While temperature is an important process consideration, another parameter is retention time, or the time for which the soil is subjected to the treatment temperature. Soil type, level and type of contaminants, and moisture content will also affect LTTD treatment processes.

Full-scale LTTD treatment requires excavation and transportation of the contaminated materials to the treatment unit. Generally, LTTD treatment systems will have some type of screening/pretreatment prior to being transferred to the desorption unit. Oversize contaminated materials can be separated by a power screen or crushed to reduce top size, and then either placed in the LTTD unit or treated using an alternate treatment method.

1.4 REPORT ORGANIZATION

This report presents the sample tracking information, the test methods and conditions, and the test results for all analyses and testing conducted by Kiber for the Raymark treatability study. All full-scale recommendations and design criteria, as developed by Four Nines, are presented in the report developed by Four Nines and included as Appendix A of this report. The information presented herein pertains to the testing and protocols associated with all phases of the treatability study. Section 2.0 presents the results and testing protocol associated with the soil receipt and untreated waste characterization. The testing protocols and test results for the LTTD treatment study, for both the intermediate and final testing phases, are presented in Section 3.0. A summary of the conceptual design and cost estimations developed by Four Nines is presented in Section 4.0. Kiber's Quality Assurance (QA) and Quality Control (QC) procedures is presented in Section 5.0. Conclusions and recommendations pertaining to the LTTD treatment process and treatability study are included in Section 6.0.

Kiber and Four Nines worked together throughout the treatability study to evaluate the available data and to develop recommendations for further testing and potential full-scale treatment. Upon completion of the laboratory testing, Four Nines developed a detailed report presenting their recommendations and design criteria for full-scale treatment. The report developed by Four Nines, included as Appendix A, presents a complete discussion of the treatment effectiveness and the applicability of full-scale LTTD treatment. The report developed by Four Nines also includes a detailed discussion of potential full-scale treatment equipment and a preliminary design for treatment of the Raymark site. Note that the Four Nines report is separate and distinct from Kiber's report, and is intended to augment this report. Again, a summary of the conceptual design and cost estimations developed by Four Nines is presented in Section 4.0.

2.0 UNTREATED WASTE CHARACTERIZATION

2.1 OVERVIEW

Untreated waste characterization is an essential component of the treatability study. The establishment of the baseline level of contamination is important for comparing and determining the effectiveness of LTTD treatment. The characterization analyses allowed Kiber to determine the extent of contamination in the materials received from Halliburton NUS and to confirm that the soils were similar to that expected.

2.2 MATERIAL SAMPLING AND RECEIPT

Halliburton NUS was responsible for sampling of the untreated material from the site. Eight 5-gallon plastic buckets were received by Kiber in good condition on 24 February 1994. Two buckets were received for each of the following soils:

TS*B-7*4-6
TS*B-10*1.5-4
TS*B-68*2-4
TS*B-68*8-10

Upon receipt, Kiber homogenized each contaminated soil, separately, to better ensure a homogeneous material. All soil was emptied from the two buckets for each material into a large tub and composited. The soil was thoroughly and gently blended until visually homogeneous. This process was repeated for each of the four untreated materials. Samples were then taken of each homogenized material for particle-size distribution analyses of the as-received soils.

Prior to initiating laboratory testing, Kiber and Four Nines performed visual evaluations of the untreated soils. The following discussions summarize observations performed on each of the untreated materials:

> **<u>TS*B-7*4-6:</u>** Soil was black and clay-like with gravel. The soil was fairly moist and appeared oily. There was a significant amount of straw and paper-like fibrous material. No significant odor was noticed. Oversized pieces were unknown black fibrous material.
>
> **<u>TS*B-10*1.5-4:</u>** Soil was reddish brown in color and fairly moist throughout. The soil was coarse sand through gravel, with small rocks spaced throughout. No significant odor was noticed. Oversized material was composed of smooth river stone.
>
> **<u>TS*B-68*2-4:</u>** Soil was brown in color, fine sand through gravel, with small clay-like chunks throughout. The soil was very moist. No significant odor was noticed. Oversized material was composed of smooth river stone.
>
> **<u>TS*B-68*6-8:</u>** Soil was black and sandy with black chunks of rubber-like material spaced throughout. The soil was moist, with chunks of organic matter visible. No significant odor was noticed. The soil is more friable than the other soils.

Prior to bench-scale testing, any large and agglomerated particles were broken into smaller, more manageable sizes. Kiber removed all particles and debris larger than 1 inch in diameter which could not be reduced in size. This process was performed in order to 1) simulate potential full-scale particle size reduction, and 2) ensure that the material is practical for laboratory analysis. The following represents the percentage, by weight, of over-sized particles removed from each as-received material:

- TS*B-7*4-6 — 21% Over-sized Particles
- TS*B-10*1.5-4 — 29% Over-sized Particles
- TS*B-68*2-4 — 5% Over-sized Particles
- TS*B-68*6-8 — 4% Over-sized Particles

Kiber's experience indicates that contaminants are generally concentrated on the fine-grained particles; therefore, laboratory testing on material of less than 1 inch in diameter typically presents a worst-case contamination scenario.

2.3 UNTREATED WASTE CHARACTERIZATION

Upon completion of the homogenization process, a representative aliquot of each soil was selected for characterization testing. All untreated characterization testing was conducted in accordance with test methods approved by the U.S. Environmental Protection Agency (EPA) and the American Society for Testing and Materials (ASTM). The following analyses were conducted in accordance with the referenced test method:

Total TCL Volatiles	EPA Method 8260
Total TCL Semivolatiles	EPA Method 3550/8270
Total Pesticides / PCBs	EPA Method 3550/8080
Total RCRA Metals	EPA Method 6010/3051/7471
Total Dioxin	EPA Method 8280
Total Organic Carbon	EPA Method 9060
Material pH	EPA Method 9045
Moisture Content	ASTM D 2216
Bulk Density	ASTM D 2937
Particle-Size Distribution	ASTM D 422

The results for the untreated waste characterization testing are summarized on Tables I-1 through I-6. Each of these tables include the Halliburton NUS sample number, the analytical parameter, the corresponding detection limit for each target, and the detectable concentration. Complete data reports pertaining to all untreated analyses are included as Appendix B.

Initially, Kiber performed untreated waste characterization on each soil prior to initiation of the treatment process. This data provided the initial characterization of the as-received soils. However, in order to better estimate the variability of the untreated soils, and to estimate any potential contaminant reduction due to storage and material handling, Kiber performed additional waste characterization analyses of the four untreated soils prior to initiation of the final treatment process. All untreated analyses were performed for this additional testing, with the exception of dioxin and particle-size distribution. Results from these additional analyses, performed prior to initiation of the final treatment phase, are also presented on Tables I-1 through I-6.

Table I-1 presents the results of total volatiles analyses performed on each of the untreated soils. The work plan provided by Halliburton NUS stated that volatiles analyses be performed in accordance with EPA Method 8240. However, based on experience analyzing similar types of contaminated soils, Kiber performed all volatiles analyses in accordance with EPA Method 8260. This change in the work plan was noted in Kiber's original proposal provided to Halliburton NUS. Review of the data reveals significant variation between the four untreated soils. The primary contaminants included benzene, carbon disulfide, chlorobenzene, 1,2-Dichloroethene, ethylbenzene, tetrachloroethene, toluene, trichloroethene, and xylenes at concentrations from 0.6 ug/kg to 120 ug/kg. Detectable concentrations of both acetone and methylene chloride, which often represent typical laboratory contamination, were also observed at concentrations from 6.0 to 290 ug/kg. Analysis of the untreated soil labeled TS*B-68*2-4 revealed no volatiles contamination, with the exception of acetone and methylene chloride. Good reproducibility was noted for the two sets of analyses performed on each of the four untreated soils.

Results of semivolatile analyses are presented on Table I-2. This data reveals significantly higher levels of contamination than was observed for the volatiles analyses. The highest levels of contamination were observed for benzo(a)anthracene, benzo(b)fluoranthene, chrysene, 2,4-dimethylphenol, fluoranthene, phenanthrene, and pyrene. In general, the untreated soils labeled TS*B-68*2-4 and TS*B-7*4-6 revealed slightly higher levels of semivolatile contamination, than did the other two soils. Review of the analyses performed prior to the final treatment phase indicates that fairly good reproducibility was observed. However, a slight reduction was observed in the concentrations of contaminants for the second set of analyses performed on soils labeled TS*B-7*4-6 and TS*B-68*6-8. This apparent reduction is attributed primarily to the elevated detection limits observed for the duplicate analyses of these materials. Note that all detection limits are included on Table I-2. The increased detection limits observed for these semivolatile analyses reflect the high organic contents of some of the untreated soils. Review of the TOC data summarized below indicates that certain aliquots of the untreated materials contain high levels of organic material. While there appears to be a significant variation in the organics content of each material, those aliquots of untreated material containing elevated levels of organics will contribute to increased detection limits for semivolatile analyses. Therefore, many of the target compounds detected in the original analysis were not detected in the additional testing.

Table I-3 presents the results of pesticide and PCB analyses of the untreated soils. This data indicates that no pesticides were present in any of the untreated soils. High levels of PCB contamination were observed for all untreated materials. PCB contamination ranged from 8,600 to 140,000 ug/kg of Aroclor-1262 and Aroclor-1268. While good reproducibility was observed for most analyses, some variation was observed for the analyses of soil labeled TS*B-7*4-6. Kiber attributes this variation to the heterogeneity of the untreated material. Visual observations of the waste material, presented in Section 2.2, indicate the waste had a black, clay-like consistency. The soil was moist and appeared oily. The soils also contained a black, fibrous material. The TS*B-7*4-6 exhibited the greatest heterogeneity based on these visual observations. Kiber cannot conclude as to the potential distribution of the PCB compounds throughout the soil and waste material. Based on comparison of the material consistencies, the LTTD treatment results presented in later sections of this report, and the untreated soil characterizations for all four sampling locations, Kiber believes that the PCB concentrations are more likely in the range of 50,000 to 150,000 ug/kg. However, without further PCB characterization analyses, Kiber cannot confirm the variability of the TS*B-7*4-6 waste material. The concentrations obtained by Kiber are comparable to the untreated data supplied by Halliburton NUS which ranged from 2,000 to 300,000 ug/kg of total PCBs in untreated soil samples.

As noted on Table I-3, all results of PCB analyses are reported as estimated values. The estimated values are due to the similarity between Aroclor-1262 and Aroclor-1268 based on gas chromatography analyses. Review of the chromatographs resulting from PCB analyses indicates that coeluting interference was observed for these two aroclors. That is, the peaks defining Aroclor-1262 and Aroclor-1268 overlap, requiring estimations of the individual areas by the GC chemist. While there are peaks unique to each of the two target aroclors, it was not possible to utilize these peaks for quantitation due to the relatively weak response observed during analyses. As such, these peaks were used only as a tool to aid in identification of the individual aroclors. Also, the GC chemist relied upon pattern recognition for identification of the specific aroclors and estimations of the specific concentrations. This process allows for interpretation of numerous peaks which, although individually are insufficient for identification, can be interpreted based on the pattern in which they appear.

The results of RCRA metals analyses of the untreated soils are summarized in Table I-4. The highest levels of contamination were observed for lead, ranging from 23 to 15,000 mg/kg. Barium was also observed at levels as high as 2,400 mg/kg. This data also reveals detectable levels of cadmium, chromium and silver. A detailed discussion of the metals results, as they apply to potential full-scale LTTD treatment, is presented in the report developed by Four Nines and included as Appendix A. Note that data supplied by Halliburton NUS revealed lead concentrations of from 100 to greater than 10,000 mg/kg in untreated soil samples.

Table I-5 reveals the results of dioxin analyses performed on the untreated soils. This data reveals that no dioxin was present in the soil labeled TS*B-10*1.5-4. The other three soils revealed that TCDD through HpCDD dioxins were below the method detection limits, however, the TCDF through HpCDF furans ranged from 1.3 to 25 ug/kg, including TCDF, PeCDF, HxCDF, and HpCDF. As previously noted, no additional analyses were performed for dioxin on the untreated soils.

All additional untreated analyses are summarized on Table I-6. The Work Plan provided by Halliburton NUS stated that total organic carbon (TOC) analyses be performed in accordance with MSA 20.3.5.2. Kiber's experience in analyzing similar types of soils indicated that EPA Method 9060 was often a more practical and effective method of analysis. This modification was also noted in Kiber's original proposal and scope of work. TOC analyses of the untreated soils revealed concentrations from 1,000 to 40,000 mg/kg. While Kiber has no explanation for the apparent variability of the TOC analyses, Kiber has experienced considerable variability due to heterogeneity of similar material types. Kiber's experience also indicates that variation in the TOC results are observed in soils containing high concentrations of 1) total organics, and 2) petroleum and other oil-based hydrocarbon compounds. Material pH of the soil was in the range of 5.6 to 6.7. Moisture content and unit weight results are also presented on this table.

3.0 THERMAL DESORPTION TREATMENT

3.1 OVERVIEW

Upon completion of the untreated waste characterization, Kiber performed low temperature thermal desorption treatment on the site soils. The initial LTTD treatability testing was performed to determine if PCBs can be thermally desorbed using this technology. Generally, treatment was performed at three different residence times at temperatures of 700°F, 1000°F and 1200°F. Specifically, the process is intended to provide Halliburton NUS with a basis for valid comparison between the different treatment temperatures and residence times. The testing program was also developed in order to provide Four Nines with sufficient information to develop recommendations for full-scale LTTD treatment of the site soils.

While the bench-scale testing procedures were intended to evaluate the potential effectiveness of LTTD treatment, the results only correlate to the specific testing conditions outlined herein. The residence times identified during the bench-scale testing cannot be directly applied to design of full-scale LTTD equipment since the muffle furnace tests do not accurately simulate the solid/gas dynamics of full-scale equipment.

In the muffle furnace tests, heat is transferred to the soil samples in the stainless steel trays by natural convection and radiation. The LTTD system assumed for this project is a direct-fired rotary co-current desorber, where heat transfer is primarily by forced convection, plus radiation and conduction from the flights and wall of the drum. Heat transfer is not well modeled by the treatability study muffle furnace; however, experience has shown that monitoring soil temperature in a muffle furnace test does provide guidance on appropriate processed soil temperatures which must be achieved using a low-temperature desorber.

This parameter is critical to design and operation of an LTTD. Moreover, the muffle furnace tests produced clean (<2 mg/kg PCB) soil samples at temperatures expected for vaporization of PCBs. More information on application of the treatability study data to LTTD design can be found in the RMT/Four Nines section of the report.

3.2 INTERMEDIATE TREATMENT AND ANALYSES

3.2.1 Intermediate Treatment

The low temperature thermal treatability testing was conducted using a Fisher Scientific Series 750 muffle furnace capable of reaching temperatures of 2000°F. A stainless steel pan, measuring approximately 6 inches in width by 10 inches in length was cleaned, dried and weighed. For each test, a 1,000 gram aliquot of untreated soil was placed in the pan in a shallow layer, approximately 1 inch deep. Visual observations were performed on the soil, prior to treatment. These observations were performed in order to evaluate the material characteristics, including consistency, texture, color, odor and any other distinguishing properties. The tray and soil were weighed prior to LTTD treatment.

Treatment was performed by placing the tray in the muffle furnace at a steady target temperature. The preliminary treatment was performed at 700°F, 1000°F and 1200°F. For each of the three temperatures, treatment was performed on distinct 1000 gram aliquots of soil for each of three residence times, including 10, 20 and 40 minutes. The residence time was defined as the length of time that the soil remained in the pre-heated oven. Note that, during treatment, no mixing or agitation of the soil was performed.

Upon completion of the treatment process, the soil was removed from the muffle furnace. The pan and treated soil were then weighed, immediately, to determined the total weight of the treated soil. Each treated soil was then placed in a laboratory fume hood and allowed to cool to room temperature. Table II-1 presents a summary of the preliminary treatment performed on the site soils. This table includes the material type, the treatment temperature and residence times for each treatment process. This table also includes the weight of the untreated and treated soils, and the weight loss due to the treatment process.

During treatment of TS*B-7*4-6, Kiber observed flaming of the soil as a result of treatment at temperatures of 1000°F and higher. The problem was discussed with Four Nines and a decision was made to continuously purge the furnace with nitrogen in order to minimize the likelihood of combustion occurring during future treatment tests and to better model the LTTD process where combustion of organics does not occur in the primary chamber. Purging was performed by pumping nitrogen through a stainless steel tube to the center of the furnace. This process allowed for continuous testing without combustion of the soils being treated. Kiber has noted those treatment processes which were performed with the nitrogen purge on Table II-1.

3.2.2 Intermediate Treatment Monitoring and Analyses

Throughout the testing process, monitoring was performed for the temperature of the soil using a digital thermocouple. The thermocouple was placed directly in the soil during treatment, via a vent in the top of the muffle furnace. Monitoring of the soil temperature was performed at regular intervals throughout the testing procedure. Due to equipment problems, however, Kiber was unable to monitor the soil temperature during intermediate treatment performed at 700°F. All data pertaining to the temperature monitoring during treatment is presented on Tables II-2 through II-5. These tables present the data for each of the four materials, at each treatment temperature and residence time. Temperature monitoring was also performed, at regular intervals, throughout the cooling process. This temperature data is also presented on Tables II-2 through II-5. Complete data sheets pertaining to the treatment process are included as Appendix C.

After each soil had cooled to near room temperature, visual observations were again performed on each material. These observations are included in the data sheets presented in Appendix C. Table II-6 presents a summary of the observations performed on each soil. The following conclusions were drawn based on the observations presented in Table II-6:

- Treated soil became lighter in color, especially on the surface layer.
- Treated soil was fairly homogeneous throughout; however, at lower residence times, the bottom layer of soil appeared somewhat darker and wetter than the surface.
- Treated soil was visually dry and more friable than the untreated soils.
- No crusting was evident on the treated soils; however, some of the organic matter appeared charred or ashed.

After cooling to near room temperature, each treated soil was sampled for total PCB analyses in accordance with EPA Method 8080.

3.2.3 Discussion of Results

Tables II-7 through II-10 present the results of PCB analyses performed on the treated soils. These tables present information pertaining to each soil, treated at the specified temperatures and residence times. Complete data sheets for all treated analyses are included as Appendix D.

Table II-7 presents the results of treatment performed on material labeled TS*B-10*1.5-4. Review of this data reveals slight reduction for all treatment temperatures and residence times. Treatment performed at 700°F resulted in slight reduction in the concentrations of PCBs at the shortest residence times of 10 and 20 minutes. Treatment at 700°F for 40 minutes achieved the best reduction in PCB concentrations for treatment at that temperature. Similarly, treatment at 1000°F and 1200°F achieved the best reductions in PCB concentrations at the longest residence times. PCB concentrations in the TS*B-10*1.5-4 material were reduced to concentrations below the treatment criteria, for treatment performed at 1000°F for 40 minutes and at 1200°F for both 20 and 40 minute residence times.

Table II-8 presents the results of treatment performed on material labeled TS*B-68*2-4. Review of this information indicates that the most effective treatment was achieved at the longest residence times for each treatment temperature. Treatment performed at 700°F and 1000°F achieved only slight reduction in PCB concentrations at residence times of 10 and 20 minutes. While slightly better reduction was noted for 40 minutes of treatment at 700°F, significant reduction was noted for 40 minutes of treatment at 1000°F. Similar results were observed for treatment at 1200°F, in which longer residence times resulted in lower PCB concentrations. PCB concentrations in the TS*B-68*2-4 material were reduced to below the method detection limit for treatment performed at 1200°F for a period of 40 minutes.

Table II-9 presents the results of treatment performed on untreated material labeled TS*B-7*4-6. This data indicates that treatment performed at a temperature of 700°F achieved little reduction in PCB concentrations. Treatment performed at 1000°F achieved significant reduction only at a residence time of 40 minutes. Similarly, treatment at 1200°F achieved significant reduction only at a residence time of 40 minutes. The only treated PCB concentrations which achieved the treatment objectives were achieved with a residence time of 40 minutes at temperatures of 1000°F and 1200°F.

The results of treatment performed on material labeled TS*B-68*6-8 are presented on Table II-10. Review of this data indicates that no treatment succeeded in reducing the PCB concentrations to below the method detection limits, for residence times up to 40 minutes. The most effective treatment was achieved at 1200°F for a residence time of 40 minutes.

3.2.4 Additional Intermediate Testing

Based on the data presented herein, and discussions between Kiber, Halliburton NUS and Four Nines, additional intermediate testing was outlined for the TS*B-68*6-8 material. This material was selected due to the difficulty encountered in effectively reducing the PCB contamination at the residence times outlined. Review of the data, however, reveals that treatment effectiveness is improved by longer residence times and higher temperatures. Therefore, additional testing was performed at 1000°F with residence times of 60 and 90 minutes and at 1200°F with residence times of 60, 75 and 90 minutes.

Upon completion of the additional intermediate testing, aliquots of each treated soil were submitted for PCB analyses. Results of these analyses are included with the previous intermediate test results presented on Table II-10. This data indicates that all treatment performed at residence times of greater than 60 minutes, for treatment at 1000°F and 1200°F, was effective at reducing the PCB concentrations to below the method detection limit.

3.2.5 Recommendations for Final Treatment

Table II-11 presents a summary of the basic testing parameters for all the preliminary and intermediate testing. This table includes the furnace temperature, the residence time and the maximum soil temperature achieved during the treatment process. Also presented on this table are the results of PCB analyses of the treated soils.

Kiber estimates that the distillation temperature for PCB compounds is in the approximate range of 660 to 840°F (THE MERCK INDEX, Tenth Edition, 1983). Review of the temperatures achieved for each test as presented on Tables II-2 through II-5 and the corresponding PCB concentrations presented on Tables II-7 through II-10 shows that any soils which achieved maximum temperatures above the approximate distillation range produced PCB concentrations below the method detection limits. Also, Kiber feels that good correlations or trends between the treatment temperature and the residence times were observed, given that separate 1000 gram aliquots were used for each test run. Often, erratic test results or trends are observed when comparing testing or treatment performed on discrete aliquots due to the potential heterogeneity of the contamination. Figure 1 presents a graphical presentation of the correlation between the maximum soil temperature achieved during treatment and the concentrations of PCBs remaining in the treated soils.

As outlined in the initial work plan, one treatment temperature and residence time was to be evaluated for the final treatment testing. This process was intended to identify the single treatment process which would effectively treat all of the site soils, regardless of potential heterogeneity of the site soils. The final treatment selected included a temperature of 1000°F at a residence time of 60 minutes for all laboratory testing.

As indicated in Four Nines' report included in Appendix A, some parameters from laboratory muffle furnace tests cannot be applied directly to design of a desorber since the testing does not adequately represent the heat transfer and soil-gas dynamics achieved with full-scale equipment. However, the testing does provide an indication of the processed soil temperatures which must be achieved for effective treatment. Based on review of the laboratory results, Four Nines recommended that full-scale treatment be performed using a direct-fired desorber and indicated that direct-fired desorbers will process the Raymark soils to temperatures of more than 900 °F within the typical operating residence time of 15 minutes.

3.3 FINAL TREATMENT AND EVALUATIONS

3.3.1 Final Treatment and Monitoring

The low temperature thermal treatability testing performed during final treatment and evaluations was conducted using identical protocols as outlined in Section 3.2. A stainless steel pan, measuring approximately 6 inches in width by 10 inches in length was cleaned, dried and weighed. For each test, a 1,000 gram aliquot of untreated soil was placed in the pan in a shallow layer, approximately 1 inch deep. Visual observations were performed on the soil, prior to treatment. These observations were performed in order to evaluate the material characteristics, including consistency, texture, color, odor and any other distinguishing properties. The tray and soil were weighed prior to LTTD treatment.

Treatment was performed by placing the tray in the muffle furnace at a steady target temperature. The treatment was performed at 1000°F for a residence time of 60 minutes. Note that, during treatment, no mixing or agitation of the soil was performed. Upon completion of the treatment process, the soil was removed from the muffle furnace. The pan and treated soil were then weighed, immediately, to determined the total weight of the treated soil. Each treated soil was then placed in a laboratory fume hood and allowed to cool to room temperature. Table III-1 presents complete information pertaining to the testing procedure, including oven temperature, the weight of material treated, the residence time, and the material loss due to the treatment process.

As a result of flaming observed during the intermediate testing phase, all final testing was performed with nitrogen purging the muffle furnace. Temperature monitoring was performed throughout the treatment and cooling process. A summary of the temperature monitoring performed during the final treatment process is presented in Table III-2.

After each soil had cooled to room temperature, visual observations were again performed on each material. These observations are included in the data sheets presented in Appendix E. Note that the treatment process as outlined herein was performed on each of the four untreated materials. However, in order to better estimate potential variation in the treatment process, one additional aliquot of TS*B-7*4-6 was treated in accordance with the identical treatment protocols. The information pertaining to this additional testing is also included on Table III-1.

In addition to the visual observations outlined above, Kiber also took photographic documentation of each material, both before and after treatment. These photographs are included as Appendix F. Review of these photographs, as well as the visual observations performed by Kiber, indicates that the untreated soils are similar to the as-received untreated material, as well as the soil samples utilized for the intermediate phase of testing. Comparison of the untreated and treated photographs reveals that LTTD treatment resulted in a significant change in material characteristics. The following observations were made on the treated and untreated soils:

- Treated materials were lighter in color than the corresponding untreated soils.

- Treated materials were visually extremely dry and friable.
- Treated material was homogeneous throughout the depth of the soil.
- No heavy crusting was observed as a result of the treatment process.
- Organic material appeared visually charred as a result of treatment.

3.3.2 Treated Analyses and Discussion of Results

A series of analytical characterization analyses were performed on each of the treated soils in order to confirm the effectiveness of the treatment process. Specifically, the following analyses were performed on each final mixture after LTTD treatment:

Total TCL Volatiles	EPA Method 8260
Total TCL Semivolatiles	EPA Method 3550/8270
Total Pesticides / PCBs	EPA Method 3550/8080
Total RCRA Metals	EPA Method 6010/3051/7471
Total Dioxin	EPA Method 8280
Total Organic Carbon	EPA Method 9060
Material pH	EPA Method 9045
Moisture Content	ASTM D 2216

The test results for each of these analyses are summarized on Tables III-3 through III-8. These tables include the results for each analysis, as well as the corresponding detection limit. Complete data sheets pertaining to each analysis are presented in Appendix G. Note that, although not specified in the original scope of work, Kiber performed additional untreated waste characterizations to further identify the contamination present in the materials prior to initiation of the final testing phase. All untreated waste characterization testing has been previously discussed and presented in Section 2.3.

Table III-3 presents a summary of the total volatiles analyses performed on the treated soils. This data indicates that the primary volatile contamination is composed of benzene, 2-butanone and xylene, for all treated soils. Methylene chloride and acetone was detected in several samples, but is attributed to laboratory contamination. Due to the extremely low levels of volatile organics, a discussion of contaminant reduction is inappropriate. Review of the results does indicate the presence of volatile organics in the treated material; however, Kiber believes that these contaminants may have absorbed into the soil from the laboratory and fume hood air, during the cooling and monitoring following LTTD treatment.

Table III-4 presents the results of semivolatile analyses performed on the treated soils. The only detectable concentrations of semivolatile compounds were bis(2-ethylhexyl)phthalate for TS*B-7*4-6, and 1,2 dichlorobenzene for TS*B-68*6-8. All other compounds were at levels below the method detection limit for each treated soil. These values represent a complete reduction in contaminant concentrations over the untreated values presented in Table I-2. Based on review of this data, LTTD is effective at eliminating the concentrations of semivolatile organics in the site soils.

Pesticide and PCB analyses performed on the treated soils are summarized on Table III-5. As in the untreated analyses, no pesticides were detected in any of the treated soils. Treated analyses revealed that LTTD treatment reduced the concentrations of PCBs from the range of 8,000 to 140,000 ug/kg in the untreated soils to less than the detection limit for the treated soils. Based on this data, LTTD is effective at reducing the concentrations of PCBs to below the site specific limit of 2 mg/kg.

Table III-6 includes complete results of RCRA metals analyses of the treated soils. This data indicates that lead is the primary inorganic contaminant, at levels of from 35 to 18,000 mg/kg. Other metals include barium, cadmium, chromium and silver. Comparing this data with the untreated analyses presented in Table I-4 reveals no significant change in the concentrations of metals due to the LTTD treatment process. Kiber had anticipated a slight increase in metals concentrations due to the reduction in organic content of the treated soil.

Dioxin analyses performed on the treated soils are summarized on Table III-7. This data reveals that, as in the untreated analyses, no dioxin was present in the treated soil for material labeled TS*B-10*1.5-4. Treatment performed on soil labeled TS*B-68*2-4 resulted in a reduction in dioxin contamination to below the method detection limit for all compounds. The other two treated soils revealed that TCDD through HpCDD dioxins were below the method detection limits, however, the TCDF through HpCDF furans ranged from 0.2 to 3.0 ug/kg, including TCDF, PeCDF, HxCDF, and HpCDF. This data indicates that, for sample number TS*B-7*4-6, concentrations of both HxCDF and HpCDF were significantly reduced to less than 1 ug/kg. No significant change was observed for TCDF and PeCDF concentrations as measured for sample TS*B-7*4-6. Review of the untreated data for sample TS*B-68*6-8 indicates that the only dioxin contamination was for HxCDF at a level of 17 ug/kg. It should be noted that elevated detection limits were observed for the untreated analyses performed on this material. Treated analyses revealed that the only dioxin contamination for treated sample TS*B-68*6-8 was at levels of less than 1.0 ug/kg for both TCDF and PeCDF. While these compounds were not detected in the untreated analyses, Kiber attributes this to the elevated detection limits observed during untreated waste characterization testing.

Table III-8 presents a summary of additional analyses performed on the treated soils, including total organic carbon and moisture content determination testing. Total organic carbon data reveals concentrations of from less than the detection limit to 38,000 mg/kg. Due to the variability observed in the untreated soils, however, a discussion of the potential reduction in TOC levels is inappropriate. No reduction can be attributed specifically to the LTTD treatment process. The moisture content of the treated materials was reduced to less than 1% due to the treatment process.

4.0 CONCEPTUAL DESIGN AND COST ESTIMATIONS

4.1 OVERVIEW

Based on the data obtained throughout the treatability study, Four Nines developed recommendations and conceptual design criteria for full scale treatment of the site soils. The following presents a summary of the conclusions prepared by Four Nines upon completion of the treatability testing program. In general, the results of the treatability study indicate that full scale LTTD treatment will be effective in treating the site soils.

4.2 EQUIPMENT SELECTION

Typically, full-scale LTTD equipment falls into two categories, including 1) modified asphalt batch plants which desorb organics and burn the organic vapors, and 2) desorbers/condensers which vaporize the organics, then cool and condense for later off-site incineration. The modified asphalt batch plants have a high capacity, relatively low capital cost, and moderate operating costs. They are capable of processing greater than 40 tons of untreated soil per hour (tph) at costs significantly below high-temperature incinerators or desorber/condensers. The desorber/condensers typically provide limited capacity, high capital cost and moderate to high operating costs. Four Nines noted that a low temperature desorber/condenser is strictly a separation device, which will produce an organic waste which requires off-site treatment via incineration or firing as a waste-derived fuel in a cement kiln or other BIF combustion systems. A direct-fired desorber has been recommended for treatment of the Raymark soils.

The brown, sandy soils, typical of TS*B-10*1.5-4 and TS*B-68*2-4, present no material handling or particulate emission problems for the LTTD. The black cohesive soil samples, typical of TS*B-7*4-6 and TS*B-68*6-8, which appear to contain asbestos and other fibrous material, may require some additional handling considerations. All soils contain a variety of metals which may present problems for some LTTD systems which work at higher temperatures in the primary chamber and may volatilize light metals. Systems equipped with a baghouse are expected to remove metals, except for mercury, and asbestos and should keep particulate levels low. The performance of the baghouse is dependent on particle size, however, and better definition of fines content and particle size would be necessary prior to selecting a system. Based on the metals contamination found in the untreated soils, some modifications may be required for full-scale treatment. However, with some partitioning in the primary chamber and a taller stack, the metals can be made to pass limits for stack emissions, as long as complex terrain is not a factor.

Based on the treatability testing, a direct-fired 40 tph desorber has been identified for treatment of the site soils. This unit is a direct-fired, co-current LTTD with dual cyclones after the desorber to remove most of the fly ash, a secondary combustion chamber, quench tower, baghouse and acid gas absorber. This design is expected to offer the best capacity and cost for this project. This type of system is available and has been used on several Superfund sites. A flow diagram of the conceptual system, as outlined by Four Nines, is included as Figure 2.

As noted in the Four Nines report, the wide range of organics plus cellulosic waste could cause corrosion and fouling problems with condensers. If a desorber/condenser is to be considered, Four Nines suggests that additional muffle furnace or larger bench-scale tests be performed to vaporize and condense the organics, and then assess the pH, reactivity, viscosity and moisture content.

4.3 ESTIMATED OPERATING COSTS

The cost to purchase a LTTD system, as outlined above, has been estimated at $2.45 million. This cost includes instrumentation and temperature rating required for TSCA waste processing. To allow for upgrading and customizing, and the cost of engineering consulting, a cost of $3 million is more appropriate for budgeting purposes.

Operating costs have been estimated based on discussions with thermal treatment remediation vendors. The costs are limited to "chute-to-chute" operations and do not include excavation, material preparation or other site activities. Based on 450,000 tons of contaminated soil, a unit price of $94 per ton has been estimated for LTTD treatment of the site soils. This assumes an average organics contaminant concentration of less than 2 percent by weight. Detailed information pertaining to the price estimations is included in Four Nines report presented in Appendix A.

5.0 QUALITY ASSURANCE / QUALITY CONTROL

Kiber Environmental Services, Inc. maintains strict Quality Assurance (QA) and Quality Control (QC) programs as part of Kiber's Standard Operating Procedures. Kiber's QA/QC plan has been developed in accordance with EPA Level III and IV standards. Kiber's QA/QC program for the Raymark Industries treatability study has two primary objectives; 1) validate the quality of each analysis conducted in accordance with EPA and/or CLP protocols, and 2) evaluate the effectiveness and/or variability of the various treatment processes on the chemical treatment of the site soil.

The primary objective of the treatability QA/QC program was to validate the quality of each analysis and treatment evaluation, and to evaluate the effectiveness and variability of the solidification process on the site soil. These objectives were achieved for the treatability testing through 1) calibration of the associated equipment, and 2) supervision and review by qualified technical personnel.

The primary objective of the analytical QA/QC program was to ensure that the data generated was comparable, accurate, reproducible, valid and defensible. All QA/QC testing was applied to the Raymark Industries treatability study on a batch-specific basis. The program included analyses of method blanks, duplicates, blank spikes and surrogate recoveries, as appropriate. Complete QA/QC data is reported with the full data reports presented in each of the referenced appendices. Any sample-specific observations are either reported on the appropriate data reports or with the corresponding case narrative included in the respective reports.

As identified by Halliburton NUS, the primary contaminants of concern included Aroclor-1262 and Aroclor-1268. As these represent aroclors not typically included in Kiber's standard calibration procedures, additional protocols were implemented for the Raymark project. Prior to analyzing soils developed as a part of the Raymark project, Kiber performed a standard five-point calibration for each aroclor, including Aroclor-1262 and Aroclor-1268. The Quality Control criteria established for each aroclor was in accordance with the protocols outlined in EPA Methods 8000 and 8080.

Review of the chromatographs resulting from PCB analyses indicates that coeluting interference was observed for these two aroclors. That is, the peaks defining Aroclor-1262 and Aroclor-1268 overlap, requiring estimations of the individual areas by the GC chemist. While there are peaks unique to each of the two target aroclors, it was not possible to utilize these peaks for quantitation due to the relatively weak response observed during analyses. Pattern recognition was also relied upon for identification of the specific aroclors and estimations of the specific concentrations. This process allows for interpretation of numerous peaks which, although individually are insufficient for identification, can be interpreted based on the pattern in which they appear.

Throughout the interpretation process, the GC chemist attempted to isolate those peaks, or patterns of peaks, which were specific to each individual aroclor. However, due to the coeluting interference, it is possible that some peaks were attributed to both target aroclors. Therefore, the reported values are believed to be worst-case estimations of the actual concentrations. While each aroclor value is presented as estimated, Kiber feels confident that the values are accurate for evaluating the treatment of the PCB contaminated soils.

6.0 CONCLUSIONS

The following conclusions are presented for the low temperature thermal desorption treatability study performed on soils sampled from the Raymark site:

1. Generally, multiple untreated characterization analyses revealed good reproducibility. Review of the data indicates that the PCB concentrations associated with TS*B-7*4-6 are highly variable. Visual observations of this material reveals a black, oily and clay-like consistency with large amounts of a black fibrous material. Due to the heterogeneity and the limited analyses, Kiber cannot make any conclusions as to the potential distribution of the PCB compounds. Based on review of the data presented by Halliburton and all treatability testing, Kiber feels that the analyses do represent potential variability of the PCB concentrations at the Raymark site. Also, the total organic carbon concentrations exhibited extensive variation in the range of 1,000 to 40,000 mg/kg, further indicating heterogeneity of the site soils.

2. Low temperature thermal desorption treatment was effective at reducing the concentrations of PCBs in the treated soils to below the site specific limit of 2.0 mg/kg.

3. The optimum treatment parameters, based on available data, included treatment at 1000°F in a muffle furnace with a residence time of 60 minutes. Analysis of corresponding soil temperature data showed that the PCB goal of <2 mg/kg was achieved at soil temperatures above 768° F. A processed soil temperature of 900°F has been chosen for a full scale LTTD system to allow for complete heating of larger soil agglomerates.

4. Four Nines recommends a direct-fired 40 ton per hour desorber equipped with dual cyclones, secondary combustion chambers, quench tower, and baghouse and acid absorbers.

5. The capital equipment costs are estimated at $3 million.

6. Operating costs of a chute-to-chute process on a subcontract basis are estimated at $94 per ton of material processed, based on 450,000 tons of contaminated soil.

The treatability study performed provided important information pertaining to the effectiveness of low temperature thermal desorption (LTTD) for treatment of the Raymark soils. If LTTD treatment is selected as the candidate process for the Raymark soils, additional testing is recommended in order to provide the data necessary to engineer the thermal systems. These additional analyses may include higher heating value determination; ultimate and proximate analyses; ash major, minor and fusion analyses; total petroleum hydrocarbon concentrations; and organic chlorine and sulfur content. Additional tests using a bench-scale rotary desorber are also recommended in order to assess removal efficiency requirements for the air pollution control systems.

DISCLAIMER

When performing treatability studies, Kiber Environmental Services, Inc. is typically provided with samples from a given site. These samples usually have been collected by site personnel and are intended to be representative of the site materials. The treatability study, however, is constrained by the accuracy of the samples taken in the field. Since Kiber has no control over the sample collection, the results of the study are assumed to be only estimations of the anticipated full-scale results.

Kiber Environmental Services, Inc. has applied their best technical and scientific knowledge to the performance of the work under the economic parameters of the study. The information contained in the report in no way guarantees the same results in full scale adaptation and is only meant to be used as a guideline for operational procedures.

Furthermore, the study period defined by the client, limits the evaluation of technologies to a specified, limited time frame. Kiber can evaluate the technologies based on this time frame; however, Kiber cannot comment on the long term effects.

ENGINEERING REPORT
RAYMARK SUPERFUND SITE
CONTAMINATED SOIL TREATABILITY STUDY

FOR

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by

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May 18, 1994

Project 69206.01

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EXECUTIVE SUMMARY

This project is a treatability study for Superfund soils from the Raymark site in Stratford, CT. RMT/Four Nines, Inc. provided assistance in planning for the treatability tests; review of existing data on the contaminated soil; input/oversight of selected tests; interpretation of results; selection of a flow sheet to accomplish clean-up of the soil; assessing the fate of metals (such as lead) and inert materials (such as asbestos); production of a preliminary heat and mass balance; capital and operating cost estimates for thermal treatment equipment; and soil treatment services by remediation vendors.

The major findings are:

- A low-temperature thermal desorber (LTTD) can remove the organics from the soil to the required <2 ppm level.

- Throughput and costs are highly dependent on the process flowsheet.

- Use of a low-temperature desorber equipped with a secondary combustion chamber (SCC) and an air pollution control system is proven technology. Use of a desorber/condenser system without further tests is risky due to the wide range of chemical compounds, boiling points, halogen and oxygen content in the waste. Some waste decomposition is expected and polymerization and reaction have not been ruled out.

- Capital cost for a 40-tph desorber/afterburner/APC system is approximately $3MM.

- Operating costs, on a chute-to-chute thermal treatment subcontract basis are projected to be $94/ton.

The report and appendices which follow define the basis and limitations of the above findings.

TREATABILITY STUDY SAMPLES

The treatability study test was designed to answer the question of whether a low-temperature desorber can clean the Raymark soil by removal of organic contaminants to the intended contract level of <2 ppm PCB. Tests were also run to assess the fate of metals (such as lead) and inert materials (such as asbestos).

The soil samples were subjected to lab tests per the request for proposal (RFP) requirements. Some additional tests were run in the lab, such as the propane torch test on waste in crucibles.

Review of Lab Data from Halliburton NUS March 1994 Work Plan

Data from Table 1-1 of the work plan shows maximum concentrations of contaminants. Notable organics are toluene at 2,569 ppm, xylenes at 114 ppm, chlorinated herbicides (with Silvex, an herbicide, at 1.7 ppm being the highest concentration), pesticides ≤1 ppm, sulfide 250 ppm, cyanide 8 ppm, and metals (with lead at 57,230 ppm and chromium 317 ppm), PCBs 190 ppm, dioxin 0.007 ppm, and asbestos from 1-100%.

These values are "maximums" and as such are not very useful in designing a thermal system for soil which will be excavated and homogenized prior to treatment. The data on high levels of contaminants is useful in identifying and isolating hot spots for off-site treatment or intensive mixing to decrease their concentration.

Data from Table 4-1, p. 12 of the work plan, produces an average PCB concentration of 98 ppm by taking the mid-range of the values given and assuming the <50 ppm is actually zero. Due to "more than" designations on the lead content, no average value can be estimated. However, it is obvious that the average must be above 5,000 ppm. Asbestos contents in the same table averages approximately 45% when the <25% value is ignored.

Visual Observation of Lab Samples

RMT/Four Nines personnel examined soil samples in 5-gallon buckets on 3/15/94.

General Observations

Four samples were examined, each in a 5-gallon pail. The samples had been screened and homogenized prior to examination. The oversize had been a significant fraction of the original sample, about 4-29% by weight. The oversize was +1" to 3" top size. For samples TS*B-10*1.5-4 and TS*B-68*2-4, it was smooth river stone. For TS*B-7*4-6, it was black fibrous material. The oversize included one ~6"x8" piece which appeared to be gasket paper or 30-lb roofing felt, a small piece (~2x2x1/4") of riveted automotive brake shoe lining, and assorted rocks and debris.

The visual appearance of the samples is summarized in Table 1.

Table 1
Visual Appearance of Raw Samples

Sample	Appearance
TS*B-10*1.5-4	Light brown, coarse sand through coarse gravel
TS*B-68*2-4	Light brown, fine sand through gravel
TS*B-7*4-6	Black, fibrous, cohesive clumps, clay-like with gravel
TS*B-68*6-8	Very black, more friable than TS*B-7*4-6

Sample TS*B-10*1.5-4 appeared damp and was not cohesive. It had very low odor.

Sample TS*B-68*2-4 looked damp, and had no discernable odor. It contained less gravel than TS*B-10*1.5, and had smaller gravel.

Sample TS*B-7*4-6 had low odor but looked oily and wet. It had a significant amount of straw and cellulosic material. There were frequent agglomerates which had a fudge-like consistency. They could be torn apart easily, and contained fibers or multiple layers of paper-like material.

Sample TS*B-68*6-8 was similar to but more friable than TS*B-7*4-6.

Crucible Test and Observation of Muffle Furnace Tests

On 3/18/94, RMT/Four Nines personnel examined samples which had been heated in the muffle furnace to the lowest temperature level, 700 F (371 C). The brown sandy soils appeared to be dry and visually clean. The black samples were not visually clean and had tar-like bubbles and blisters on some of the lumps. There were tar deposits on the side wall of the stainless pan used in the muffle furnace test. Based on visual observations and confirmed by lab tests, 700 F is not a high enough temperature to produce soil with <2 ppm PCBs.

In order to assess the amount of fuel in the waste and what the ash would look like, RMT/Four Nines personnel placed two samples of the black fibrous soil from TS*B-7*4-6 in 2" ceramic crucibles. After placement in the crucibles, the samples were directly heated with a propane torch in a lab hood. Photos were taken of the test.

The first sample burned well (no visible steam or smoke) while the torch flame impinged on the surface of the sample. Initially, when the propane flame was removed, it smoked, likely a combination of steam and hydrocarbon fog droplets. Upon further heating, the sample continued to burn briefly with a yellow/orange flame when the propane flame was removed.

The second sample exhibited the same properties, but had significantly more fuel value. It was quite capable of supporting combustion with the propane flame removed. It bubbled while burning with and without the torch. The second sample was weighed before and after firing. It went from 11.82 to 5.06 gr, showing a 57% volatile content. The volatiles are assumed to be water plus organics. Assuming 10% moisture content and 47% organic (at 20,000 Btu/lb), the sample has a higher heating value in the range of 9,400 Btu/lb.

The ash was gray in color, fibrous, with a sand crust appearance. There was some black residue (presumably carbon) on the crucible and in the ash.

<u>Review of Kiber Lab Data</u>

Organics and Metal in Untreated Soil

Table I-3, Summary of Pesticide/PCB Analyses - EPA Method 8080 for contaminated (untreated) soil, shows PCB concentrations of 11-140 ppm (estimated). Table I-4, Summary of RCRA Metal Analyses - EPA Method 6016/7471, shows lead at 23-15,000 ppm, chromium (estimated) 6.2-85 ppm. Barium was high, 34-3,900 ppm; however, it has low toxicity. Cadmium was low, with the highest value 2.3 ppm, as was silver, with the highest level 2.5 ppm. Mercury, selenium and arsenic were below detection limits. Table I-5, Summary of Dioxin Analysis - EPA Method 8280, shows TCDD through HpCDD dioxins to be below detection limits. The TCDF through HpCDF Furans ranged from below detection limits to 0.025 ppm.

Muffle Furnace Tests by Kiber

The untreated soils are lightly contaminated with volatile and semi-volatile organics. PCBs are found in higher concentration than other organics. In general, they are above the TSCA 50 ppm "non-PCB" limit, but would average below the 500 ppm TSCA "PCB-contaminated" limit and were slightly higher in PCBs than earlier tests by Halliburton NUS.

Some RCRA/BIF metals had significant concentrations. This is discussed in more detail in a later section.

Regarding the organic lab tests performed by Kiber and summarized in Table II-11, it is obvious that the 700 F tests did not show full organic removal. The 1,000 F and 1,200 F tests did show PCB removal to below the detection limit of 0.033 ppm.

Table 2
Soil Temperatures
for PCB Removal

Sample No.	Muffle Furnace Temp. F	Muffle Furnace Temp. C	Soil Temp. F	Soil Temp. C	Res. Time, min.	PCB<ND
TS*B-10*1.5-4	1,000	538	925	496	40	Yes
	1,200	649	907	486	20	Yes
TS*B-68*2-4	1,000	538	558	292	40	No
	1,200	649	990	532	40	Yes
TS*B-7*4-6	1,000	538	667	353	40	No
	1,200	649	950	510	40	Yes
TS*B-68*6-8	1,000	538	768	409	60	Yes
	1,200	649	1090	588	60	Yes

Based on the data from Kiber lab muffle furnace tests, the ash quality goal of ≤ 2 ppm total PCB was achieved at soil temperatures exceeding 768 F (409 C) in the intermediate tests, and 743 F (395 C) in the final test. Residence times for tests which succeeded in reducing PCBs to below detection limits were 40-60 min. The residence time in these tests cannot be directly applied to design of a desorber as the muffle furnace tests do not well represent the heat transfer and solid/gas dynamics in full-scale equipment. Soil temperature can be used as the parameter for scale-up, and we expect that the PCB ash quality goal can be achieved at soil outlet temperature of >900 F. The higher temperature allows for heat penetration to the center of larger particles and provides a margin for error in scale-up. Normal soil residence times for direct-fired desorbers are in the range of 15 minutes. The 900 F soil temperature assumes that the soils are lightly contaminated and have less than 15% moisture. The time and temperature of 900 F and 15 minutes applies to direct-fired desorbers; significantly higher residence time is required for indirectly-heated desorbers.

Particle Size of Samples

The soil samples were sieved for particle size analysis. Results below are for samples after homogenization and removal of >1" oversize.

Sample #/Raw Sample Appearance	Dp, avg., microns	10% less than, microns
TS*B-10*1.5-4 (light brown/sandy)	1,200	300
TS*B-68*2-4 (light brown/sandy)	350	40 (estimated)
TS*B-68*6-8 (very black)	400	15 (estimated)
TS*B-7*4-6 (black)	1,000	17 (estimated)

For the last three entries in the table, the particle size corresponding to 10% by weight was estimated by extrapolating the particle size vs. weight curve as a straight line and is a rough estimate only.

The particle size varies from 3/4-1" top size to 15 microns at the 10% by weight "less than" level. In general, the size range is good, with a moderate level of very fine material indicative of find sand or clay. However, after thermal treatment, the soil may liberate more fines than were found in the sieve test.

Implications for Thermal Treatment

The brown sandy soils will work well with a wide variety of material handling and LTTD systems. The black samples contain enough cohesive material that use of screw feeders would be ill-advised; belt feeders and chutes would work well. The amount of oversize is large, and specification of an LTTD with 2" maximum feedstock size would significantly cut the amount of oversize debris which would have to be landfilled or washed free of contamination. The multilayered cohesive material may not break down in many of the LTTD systems and could pass through the system without being stripped of all the organic contaminants. Hence, some feed preparation is advisable to turn the black cohesive soil into a friable state. An example of such a system would be a pugmill mixing dry ash or sand with the cohesive soil.

From visual observation, the black samples have a small cellulosic fraction composed of grass and straw. At soil temperatures expected in a LTTD, this material will be charred. Wood is 78% volatile material, and this can be used as a guide as to the amount of organic material which will be devolatilized from the cellulosic fraction of the soil. The volatiles from the cellulose will be similar to "blue haze" emitted from plywood and oriented strand board dryers in the wood products industries. These volatiles are a complex mixture of PAH and oxygenated compounds typical of destructive distillation of wood and can be expected to be acidic and reactive if condensed. They will burn well, however, in an SCC.

Additional Lab Tests

The lab tests performed offer good insight into the organic contamination and major waste constituents. However, we recommend that the following additional tests be performed to provide engineering data for thermal system design.

Parameter	Test Protocol
Higher heating value	ASTM E711
Ultimate and proximate analysis	ASTM D5142
Ash major and minor analysis	ASTM D3682
Ash fusion (oxidative and reactive)	ASTM D1857
Total recoverable petroleum hydrocarb.	ASTM 418.1
Organic chlorine	(1)
Organic sulfur	(1)

Note (1): Method selection must be discussed with the laboratory; total chlorine (or sulfur) minus inorganic chlorine (or sulfur) is used to determine the organic concentration.

In addition to the lab tests, the average concentration of organic contaminants should be estimated for use in cost estimation. The average concentration would result if the waste is mixed to the point where it is homogeneous, thereby eliminating rich and lean soils. While this cannot actually be achieved (it would take infinite mixing), it represents the goal for good material handling and mixing practices.

In addition to lab tests, material handling tests are advisable. The goal would be to define how much dry additive would be needed to blend the cohesive tarry soils and produce a friable, soil-like consistency. Defining equipment capable of breaking up the fibrous lumps would also be worthwhile.

LTTD EQUIPMENT DESCRIPTION FOR ON-SITE REMEDIATION

Review of Low-Temperature Thermal Desorber Technology

LTTD equipment falls into two categories:

- Modified asphalt batch plants which desorb organics in a direct fired desorber and then burn the organic vapors.
- Desorbers/condensers which cool and condense the organic vapors for off-site incineration.

The former has high capacity, relatively low capital cost and moderate operating costs, while the latter has limited capacity, high capital cost and moderate to high operating costs. More information on these systems, as well as a comparison with high-temperature incinerators for soil treatment is found on pages 53 through 55 in a paper in Appendix A.

The modified asphalt batch plants using direct fired desorbers are capable of processing 40+ tph at costs significantly below high-temperature incinerators or desorber condensers. Many contractors are using modified asphalt batch plants to treat UST soils contaminated with gasoline, diesel, lube oil and other petroleum products. These systems are capable of processing Superfund waste when their control and instrumentation systems are upgraded and secondary combustion chambers (SCC) are designed for higher temperatures. They have processed wastes which are similar to or identical in chemistry to RCRA/CERCLA wastes. In some cases, this has occurred under state air permits when the waste concentrations were low or the source of the waste was not designated in 40 CFR 261.32, Hazardous Waste from Specific Sources. In other cases, it has been done under ARARs (Applicable, Relevant and Appropriate Requirements) for CERCLA sites.

If the waste has organic chlorine which would produce >4 lb/hr of HCl, an acid gas absorber or lime slurry spray tower is required for acid gas removal.

Waste Properties and Equipment Suitability

The brown, sandy soil samples present no material handling or particulate emission problems for the LTTD. The black soils samples appear to contain asbestos. The soils contain a variety of metals which may present problems for some LTTD systems which work at higher temperatures in the primary chamber and may volatilize light metals.

Can the LTTD handle this waste? The answer is a qualified yes. Those equipped with a baghouse (considered best available control technology for particulates and most metals) are expected to remove metals and asbestos and should keep particulates below 0.015 gr/dscf. The performance of the baghouse is dependent on particle size, however, and better definition of fines content and particle size (especially for asbestos) is required to make a definitive judgment.

Superfund projects have been subjected to the BIF/RCRA metal emission limits. In order to provide an idea of magnitude, these are listed below for a 50' stack height in flat, rural terrain.

Table 3
EPA Tier I & II Metals Limits
and Raymark Metals Data

Metal	Tier I & Tier II limits lb/hr	Kiber Lab Data Avg. Conc., ppm	Metals Feedrate @ 40 tph capacity, lb/hr
Barium	49	1970	160
Silver	2.9	1.25	0.10
Antimony	0.29	No data	--
Mercury	0.29	ND	--
Thallium	0.29	No data	--
Lead	0.088	762	61
Cadmium	0.0055	1.15	0.09
Beryllium	0.0041	No data	--
Arsenic	0.0023	ND	--
Chromium	0.00082	46	3.7

Note: Based on Kiber lab data, Table 4, Summary of RCRA Metal Analysis - Method 6010/7471, using an average of the range of values.

No conclusion can be drawn for metals which were not tested or were below detection limits.

For barium, lead, cadmium and chromium, the amount of metals is sufficient to fail on the Tier I BIF feedstock screening limits for a 40-tph LTTD if it were equipped with a 50' stack located in a rural area with flat terrain. With a 99% efficient baghouse, all but lead and chromium would pass on Tier II stack test limits. With some partitioning in the primary chamber (the majority of most metals, including lead, will leave with the bottom ash in an LTTD system) and with a taller stack, the metals can be made to pass Tier II BIF limits for stack emissions as long as complex terrain is not a factor at the site.

LTTD EQUIPMENT DESCRIPTION FOR ON-SITE REMEDIATION

LTTD System for Raymark Site

A direct-fired 40 tph desorber has been chosen for this analysis. The process and major components are as shown in the process flow sheet, Figure 1. It is a direct-fired, co-current LTTD with dual cyclones after the desorber to remove most of the fly ash, an SCC, quench tower, baghouse and acid gas absorber. This design is capable of doing the job at a reasonable cost in a reasonable amount of time.

Other systems have been considered, such as a desorber followed by a condenser. However, only two such systems have been developed commercially for Superfund waste -- the CWM X*TRAX and the Weston LT^3. The CWM externally-fired retort system has a capacity limited to 7.5 tph. Such a retort system can be built with a capacity of 15 tph in a single alloy shell (private communication with John Lees, equipment vendor, Allis Mineral Systems, Inc., 3/25/94). Above that, multiple systems or two-stage desorbers could be used. The Weston LT^3 uses indirect heating via multiple decks of screw augers. It also has limited throughput of 7.5 tph. Weston is planning a second larger unit with two stage desorption (private communication with Luis Velasquez, Weston, 3/28/94).

Since these systems are one-of-a-kind, little hard cost data exists. More important, condensation of vapors from the Raymark site may be hindered by the wide range of organics and their potential for decomposition and polymerization. The condensing systems work best with well-defined, stable organics. The Raymark site does not fit this profile.

As noted above, a direct-fired LTTD system equipped with an SCC and scrubber was chosen for cost analysis, and is available and in use for Superfund sites. It is expected to offer the best capacity and cost for this project.

LTTD with a direct-fired desorber and SCC is limited to approximately 2% organic (assuming non-chlorinated organics with a higher heating value of about 20,000 Btu/lb). This is required to keep the vapor leaving the primary chamber below 25% of LEL (lower explosion limit) as required by NFPA for standard combustion systems. This limit can be raised to about 4% organic by weight if more sophisticated combustion controls are added. At this level, the SCC chamber will have reached full capacity based on the organic vapor from the primary chamber.

In comparison, a high-temperature rotary kiln incinerator run in the excess air mode can burn up to 100% organics; however, capacity drops as heating value rises above 1,000 Btu/lb.

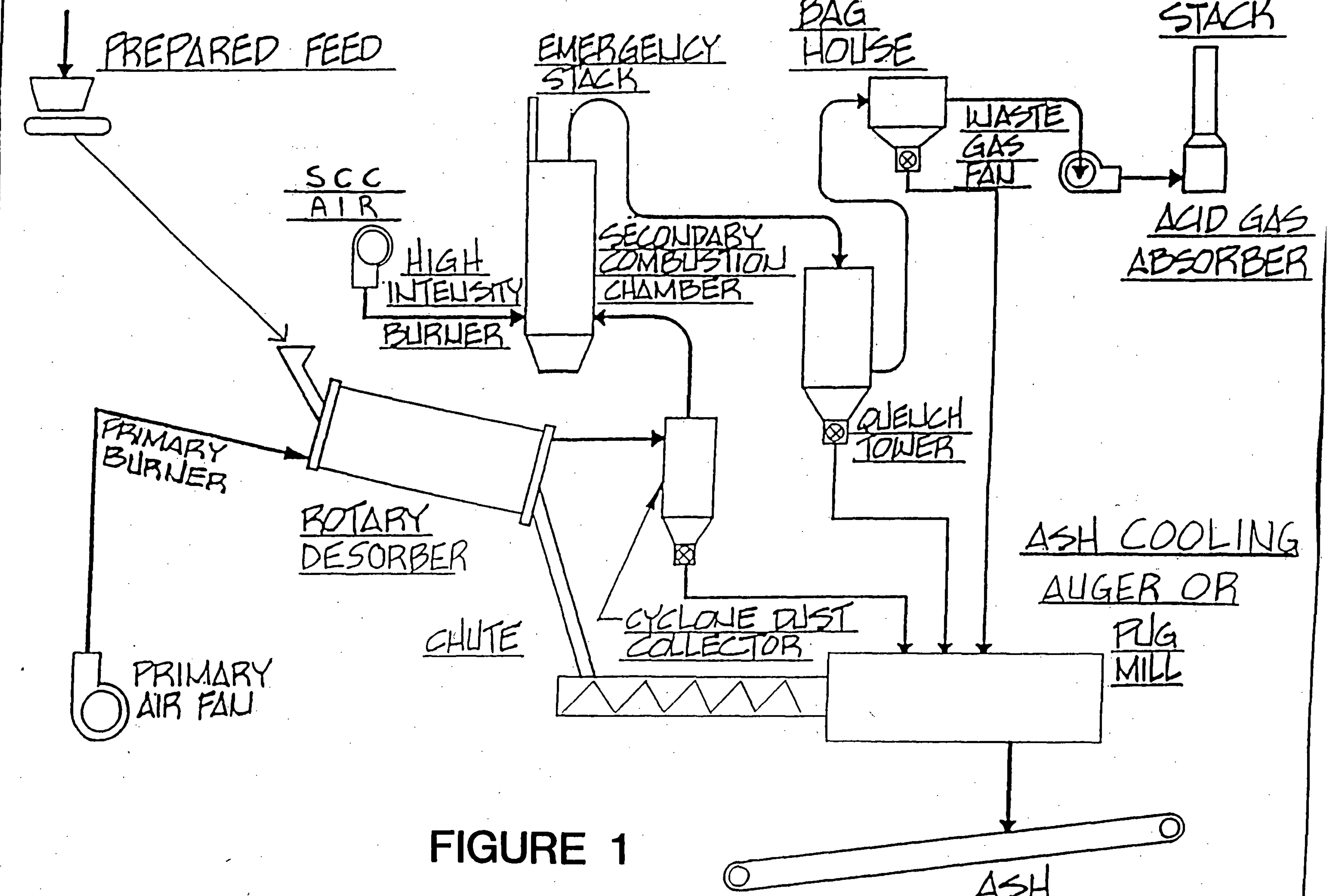


FIGURE 1

LTTD FLOW SHEET

Assuming that there are isolated hot spots of highly-contaminated organics, those above a certain organic concentration (e.g., 10%) could be excavated and shipped for off-site treatment. This could leave soil of 0-<10% organic concentration on site to be blended prior to processing. Since the soil to be treated will be excavated and stockpiled, there are ample opportunities to test and remove "hot" waste and blend the remaining to <2-4% organic, by weight, prior to treatment.

The low-temperature systems utilized in this study are capable of 750 F soil outlet temperature with carbon steel primary chambers, and when using Corten steel or stainless steel alloys, can reach 800-1,000 F soil temperatures. Data from other sites, pilot and lab tests suggests that at 750 F, and more certainly at 1000 F soil temperature, these systems can clean the soil to the ash quality goal of 2 ppm. A service contractor may allow for some re-burn of waste not passing the ash quality goal when using a low-temperature unit. This would raise the cost per ton slightly, and this has not been factored into the cost analysis for the site.

There have been multiple Superfund projects, generally burning PCBs and dioxins and their surrogates, where equipment by Ogden, Vesta, Weston, Ensco and others have passed on 99.9999% DRE. While these units had high-temperature primary chambers, the SCCs are responsible for most of the destruction; hence, achieving the desired DRE on this project is not a significant concern as long as appropriate temperatures are employed in the SCC.

<u>LTTD Performance Specifications</u>

The information in the table is based on blending PCBs to less than 50 ppm to remove the waste from TSCA regulation. Similarly, it is assumed that the Silvex and associated dioxin concentrations are low enough that there is no regulatory need to impose a destruction and removal efficiency (DRE) requirement of 99.9999%. The average organic chlorine content is low and if the soil is well-blended, the stack gas will contain <4 lb/hr of HCl. In addition, most soils contain some lime, or it could be added to the feed stock. This will reduce HCl and SO_2 emitted from the stack and could conceivably eliminate the need for an acid gas absorber. Metals are governed by the BIF regulations which use stack height and dispersion to set limits. In some cases, HCl may be governed by similar dispersion models.

Line items appearing in italics are for items which would change if PCBs are above 50 ppm and TSCA requirements (including 99.9999% DRE) must be met and if HCl removal is required.

Table 4
Design Criteria -- Thermal Treatment System
Raymark Superfund Site, Stratford, CT

ITEM/PARAMETER	Basis of Design (1)
Feed Stock -- Contaminated soil, primarily sand, gravel, debris, and asbestos	
Moisture Content (design value)	10%
Ash Content	88%
Combustible Organics (basic low-temp system)	<2%
Chlorine Content (total)	*
Sulfur Content (total)	*
Higher Heating Value	Btu/lb*
Ash Fusion Temperature	>2,600 F*
PCB Concentration, range	0-2,300 ppm
PNA/BNA and Semi-vol. Concen., range	0-50 ppm
Dioxins, range	0-0.027 ppm
Wet Bulk Density (approx.)	110 pcf
Approx. amount to be treated	300,000 cu yds
" " "	405,000 tons
Particle Size (2)	<2"
Regulatory Requirements	
POHC DRE (Destruction & Removal Efficiency)	≥99.99%
" " *If TSCA Waste*	≥99.9999%
Treated Soil Quality	
PCBs	<2 ppm
HCl Stack Gas Emissions *(if required)*	<4 lb/hr or ≥99% removal
Particulate Emissions from Stack	≤0.08 gr/dscf corr. to 7% O_2
Metals Emissions from Stack	Per BIF regs
Carbon Monoxide	<100 ppm, corr. to 7% O_2, 1 hr
RA	
Combustion Efficiency, if TSCA Waste	≥99.9%
Process Parameters	
Operating Schedule	24 hr/day
Capacity in Tons per Hour, Assumed	40 tph
Primary Chamber Processed Soil Outlet Temp	
Low-Temp System	900 F
Primary Chamber Soil Residence Time	
Low-Temp System	15 minutes
SCC (Secondary Combustion Chamber)	
Minimum Outlet Temp (3)	>1,800 F
" ", *If TSCA*	>1,850 F
SCC Residence Time (4)	>1 second
Ash Quality, Total PCBs	<2 ppm

Notes follow:

NOTES FOR TABLE 4

* Data is not available for the soil.

(1) Soil data is from Kiber test results. It is from grab samples and composites and should be used as a guide to feedstock properties. Actual properties of excavated soil may vary from the design criteria.

(2) The table is based on contaminated soil being pre-screened by others to a maximum of two inches. The thermal treatment contractor may need to re-screen to break up consolidated material.

(3) This requirement applies to systems with SCCs. The SCC must be capable of operating at or above the temperature shown in order to achieve the desired DRE. Good engineering practice would provide for refractory and system design to achieve 250 F over the minimum shown in the table. Lower operating temperatures may be allowed if existing data shows (and the trial burn proves) that the required DRE capability exists at lower temperatures.

(4) Lower SCC residence time may be allowed if existing data shows (and the trial burn proves) that the required DRE capability exists at lower residence time.

LTTD CAPITAL AND OPERATING COSTS

Capital Cost

The cost to purchase a LTTD has been estimated, based on the detailed description found in Appendix C.

The base cost, provided by ASTEC, an equipment vendor, is $2.45 MM. This includes instrumentation and temperature rating required for TSCA waste processing. To allow for upgrading and customizing, and the cost of engineering consulting for system specification, a cost of $3MM is appropriate for budgeting purposes.

Operating Costs

Operating cost estimates have been produced based on thermal treatment equipment and soil treatment services being provided by a remediation vendor. The costs will be limited to "chute-to-chute" operations which exclude excavation and other site activities.

Cost estimates includes fixed and variable costs. Fixed costs apply to items done once, such as the trial burn, consultants fees and mobilization/demobilization. The low-temperature system used in this analysis was assumed to be mobile, with short mobe/demobe time and cost.

No costs were assigned for standby time (as may occur if a shutdown was required between the trial burn and final approval of the trial burn report). This cost could be significant. A value of 70% capacity utilization factor was used throughout the analysis. This factor is conservative for long projects (in excess of six months production burn duration) with good equipment and well-trained operators.

TRANSPORTABLE INCINERATION SYSTEM COST ESTIMATION PROGRAM
For: Kiber/Raymark Site Filename: 1FILES\TISKIB1A
By: Tom McGowan and Barney Spratt, RMT/Four Nines, Inc.
Revised: 20-May-94

DATA INPUT COLUMN

ITEM	VALUE
Rated capacity, wet tph	.40
Availability, %	70%
Waste @ site, tons	450000
Capital cost, $MM	3.00
Site/placement costs, $MM	0.50
Amortization period, yrs **	1.50
Primary fuel input MM Btuh	44.66
Secndy. fuel input MM Btuh	52.19
Fuel cost, $/MM Btu	$6.00
Power required, hp	600
Electricity cost, $/kwh	$0.12
Contingency, % of subttl 1	20%
Profit margin, % subttl 2	30%
Subcontr. & non prod. operations:	
Trial burn testing, total	$150,000
Con. startup&shutdown, ttl	$46,286
Permits, Consult., ttl	$125,000
Total Mobe/Demob Cost	$500,000
Startup and shutdown labor:	
Number of personnel	3
Time, days	45
Avg rate, inc. fringe, $/hr	30
Subtotal	32400
Margin, at rate used above	13886
Total	$46,286

COST SUMMARY COLUMN

ITEM	$/ton	% Ttl
Fuel cost, $/ton	20.75	39%
Power cost, $/ton	2.40	5%
Total labor, $/ton	7.11	13%
Cst of cap, $/ton	8.15	15%
Placement/constr, $/ton *	1.11	2%
Maintenance, $/ton	0.86	2%
Taxes & eq. insur, $/ton	1.22	2%
Soil loader, $/ton	1.25	2%
Ash carts, $/ton	0.54	1%
Overhead, $/ton	0.00	0%
Sampling	5.00	9%
Travel and lodging	4.27	8%
Subtotal 1	52.66	100%
Contingency, $/ton	10.53	
Conting., + 10% on fuel	2.08	
Subtotal 2	65.27	
Profit, $/ton	27.97	
Total price per ton	$93.24	
Subtotal 2	$37,392,523	
Con. startup&shutdn labr *	0.10	
Trial burn testing *	0.33	
Consultants *	0.28	
Total price per ton	$93.96	
Total job price	$42,280,731	

Costing for tonnage above the base amount:
$/ton values below assume trial burn, Con. startup, placement/constr., consultant costs are paid for in the first tonnage increment. These fixed costs are marked by an * in the summary column. The margin, amortiz. period & base tons are in the input col.

Tons	Avg $/ton	Ttl cost
400000	94.28	37713808
425000	94.11	39997270
450000	93.96	42280731
475000	93.82	44564192
500000	93.70	46847653
525000	93.58	49131115
550000	93.48	51414576
575000	93.39	53698037
600000	93.50	55981498

Increment, tons:	25000
Variable cost per ton:	91.34
Increment price:	$2,283,461

LTTD INSTRUMENTATION AND CONTROL

Major variables monitored are the soil feed rate, gas temperatures, chamber pressures and process gas stream constituents. The principal process variables to be monitored are shown in Table 5.

The feed rate of the soil to the LTTD is monitored by a weigh belt scale located on the inclined feed conveyor. The readout in the control room gives instantaneous feed rate in tons per hour plus integrated totals. The following data will be continuously recorded: waste soil feed rate, combustion gas velocity, temperature at the exit of the primary treatment unit and SCC, stack gas carbon monoxide concentration, opacity and primary thermal unit draft. This data is recorded by multi-pen strip chart recorders and printed out on a data logger every 15 minutes and when an alarm condition occurs.

Table 5
Principal Process Variables Monitored

Feed rate of contaminated soil via weigh belt scale

Temperatures via thermocouples
- PTU (primary treatment unit) exit gas
- SCC exit gas
- Venturi scrubber or baghouse inlet gas
- Stack gas

Pressures
- PTU feed end draft
- Venturi scrubber or baghouse pressure drop

Process Water Flow
- Venturi scrubber water flow rate

Baghouse Particulate Outlet
- Triboelectric broken bag detector

Stack gas velocity
- Via ID fan amps

Stack gas composition
- CO, CO_2 & O_2

Pressures are registered on standard industrial pressure and vacuum gauges for low pressures and draft and registered on industrial Bourdon tube gauges for high pressures. Temperatures are measured by K-type thermocouples installed in standard industrial thermowells. These must be installed well into the combustion gases and away from burners to obtain accurate temperature measurement.

Emissions Monitoring

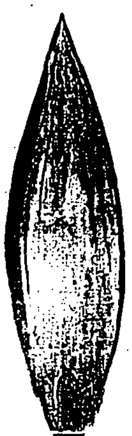
The LTTD will be equipped with continuous gas analyzers. An extractive flue gas sampling and conditioning system will be employed to remove gases downstream from the stack for analysis of O_2, CO_2 and CO. A back-up monitor is provided for CO.

The control strategy for the system is straightforward. The desorber exit gas temperature is controlled manually by the primary combustion air damper, which in turn is linked with the burner fuel control valve to maintain the desorber temperature. The SCC exit temperature is automatically maintained by modulation of the combustion air flow rate and the burner fuel control valve. For venturis, the clearance of the venturi throat is varied to maintain constant draft on the system. For baghouses, bags are cleaned periodically via a pulse jet of compressed air to maintain appropriate pressure drop and dust cake thickness.

Safety interlocks and shutdown features comprise a major portion of the control system. These interlocks are tied to combustion safety logic and regulatory imposed process limits.

APPENDIX A
INCINERATION IS GOING MOBILE

Incineration is an increasingly popular choice for contaminated soils. Mobile units improve overall economics



HAZARDOUS WASTE INCINERATION

Thomas McGowan
and Richard Ross,
Four Nines, Inc.

For hazardous waste generators, the main advantage of incineration is that it makes a long-term problem disappear. Incineration tends to be expensive, but those costs have become more predictable, and in some cases lower, than they were several years ago.

The finality of hazardous waste incineration in solving contamination problems is now showing up in a new area: soil decontamination. These soils are very often the surrounding materials where hazardous wastes of the past were improperly disposed.

Incineration can thoroughly decontaminate the soil, ending what could be a longterm liability. This technique is now becoming useful for soils that are not contaminated with a legally-defined hazardous waste, but with other wastes, such as hydrocarbon fuels that leaked from underground storage tanks (USTs). For this reason, such soils are sometimes called UST wastes, and are state regulated.

One of the ways that treatment costs with incineration are being reduced is through the use of mobile incinerators. Superfund wastes are shipped to a non-mobile, commercial incinerator when the amounts are small (below 2,000 tons). For many projects, especially remedial actions at Superfund sites, the preferable solution is to bring the incinerator to the waste. Mobile and transportable incinerators are routinely burning hazardous wastes at contaminated sites in the 2,000- to 100,000-ton range.

When to incinerate

The decision to use incineration as a treatment and disposal technology is based on cost and regulations. An integrated waste-management study should be conducted first, to measure the volume and types of wastes, and to determine where source reduction and recycling can lower the waste generation. For some organic wastes, incineration is officially designated as BACT (Best Available Control Technology) and is required by the U.S. Environmental Protection Agency (EPA) [sidebar, p. 116]. In other cases, the generator must weigh the costs of alternative disposal options and their future liability.

For a waste generator, owning and operating an incinerator can have a number of benefits:

- Low liability, as wastes never leave the site
- Generator familiarity with the chemistry of the waste
- Less expensive relative to a commercial facility
- The possibility of energy recovery

Despite such compelling benefits, few generators own and operate their own incinerators because the permitting process is time-consuming and expensive. If the materials are listed as hazardous wastes, for example, a RCRA Part B permit is required. This can take upwards of 18 months to complete and can cost several hundred thousand dollars. Applicants are often turned down. A major hurdle is the public review process — a required part of the permitting — and many a planned facility has been abandoned due to public protest. Table 1 presents the levels of permits required for various wastes. Generally, as the toxicity of the waste goes up, so does the difficulty in obtaining permits.

Soil treatment

Regulations form a critical part of the decisionmaking process when considering thermal treatments for con-

WASTE AND REQUIRED PERMITS

Waste	Permits	Permitting Difficulty
Solid, non-hazardous	State air, solid waste permit	low
Storage-tank-contaminated soil, nonhazardous petroleum products	State air permit	low
Listed or characteristic hazardous wastes, burned in a cement kiln, boiler or specified industrial furnace under "Burning and Blending Rules"	State air permit Boiler and Industrial Furnace (BIF) permit	low
Listed or characteristic hazardous wastes, burned in an incinerator	RCRA Part B permit, "ARARS" for Superfund waste (see below)	high
TSCA (Toxic Substances Control Act) waste; e.g., PCBs, dioxins	TSCA permit	high

TABLE 1. The type of waste determines what laws are applicable, and how difficult treatment permits are to obtain

IS GOING MOBILE

taminated soil. Other factors are:

- Size of the job
- Type of contamination
- Future liability
- Other treatment options

Taking a hypothetical example, a specialty chemical manufacturer has a 10-acre lagoon that must be closed. The lagoon contains organic contaminants, including still bottoms. They are a RCRA-listed waste; hence, they are an EPA hazardous waste. What are the treatment options? Can the waste be excavated and trucked to a landfill, or is this precluded by the land ban? If not, will stabilization or other treatment be required before landfilling? What is BACT for this waste?

As these types of questions are answered, the choices narrow, and the optimum solution appears. In some cases, especially at Superfund sites, EPA may unilaterally make the decision as to the treatment method.

The two primary disposal options for organics are landfilling and incineration. Landfilling has been cheaper in the past, but with the new toxicity-leaching (known as TCLP) tests, stabilization may now be required, pushing costs above $100/ton and sometimes as high as $250/ton.

The incineration option has lower liabilities, as the organic compounds of concern will be burned out of the soil. If the job is less than 2,000 tons, incineration at a fixed (non-mobile) facility is usually best. While costs are high there — about $500/ton — no permits are required by the generator and the job can proceed as rapidly as excavation can be approved and implemented.

A mobile incinerator should be considered when the job is larger than 2,000 tons. When the project exceeds 5,000 tons, a wide variety of cost-effective equipment becomes available, and prices become more attractive. Costs are in the $60–100/ton range for "non-hazardous" (UST) wastes, and $150–250/ton for RCRA solvents and chlorinated materials. The project will take longer, however, due to the time required to receive regulatory approvals and perform the required tests.

When a Superfund project is being done with a mobile incinerator only, it is bound by Superfund regulations, but the incinerator is approved by EPA under RCRA guidelines. Instead, "ARARs" — Applicable, Relevant and Appropriate Requirements — are used. This speeds the regulatory review process and reduces documentation costs significantly.

What to use

Once the determination has been made to use incineration to handle a waste, the choice of equipment is relatively straightforward. If atomizable liquids are the only waste to be burned, use a liquid-injection incinerator. It has a burner that fires directly into a refractory-lined chamber, which is followed by an air-pollution control system. If the liquid waste contains salts or metals (e.g., sodium or potassium) a downfired liquid-injection incinerator is used with a submerged quench to capture the molten material.

For solids and sludges, rotary kilns are used, with feed systems designed to handle the wastes' physical properties. Ram feeders are used for boxes or drummed solids. Bulk solids are fed via chutes or screw feeders, and sludges via lances — or by mixing

RCRA REGULATIONS LIMIT OPTIONS

In order to burn waste or contaminated soil in the United States, an organization must obtain permits from the Environmental Protection Agency (EPA) and most states. The type of permit varies according to the toxicity of the waste, and the difficulty in obtaining permits varies in roughly the same manner. Table 1 shows these levels of complexity, and indicates the laws that define the wastes.

EPA further requires that to burn a "listed" or "characteristic" waste (i.e., RCRA wastes), an incinerator must meet criteria that are demonstrated during a formal trial burn and witnessed by the regulatory agency. Currently, regulations require that the incinerator destroy a selected "principal organic hazardous constituent" (POHC) that is in the waste or which has been added to it as a marker. The POHC must be destroyed to a level defined as the "destruction removal efficiency" (DRE) of at least 99.99%. This means that the POHC measured in the stack must not exceed 0.01% of the POHC weight measured in the feed.

A RCRA incinerator (i.e., one that meets these DRE requirements) must remove at least 99% of all hydrochloric acid in the incinerator fluegas or limit emissions to 4 lb/h or less. Federal regulations limit particulate emissions in the fluegas to 0.08 grains/ft³ (dry), but many states have lower emissions standards, and some states require that "best available control technology" (BACT) be employed, with limits as low as 0.015 gr/dscf in New Jersey. BACT identifies a candidate list of technologies that are approved for use in specific hazardous waste treatment applications.

Carbon monoxide in the fluegas is now regulated to 100 ppm(v) measured as a 1-h rolling average corrected to 7% oxygen. Sulfur and nitrogen oxides are regulated by federal New Source Performance Standards (NSPS), but many

Four Nines

with dry solids (pre-bulking) to reduce them to a solid consistency.

An alternative to rotary kilns for these feedstocks is the fluidized-bed incinerator. These work best when the physical properties of the waste are consistent and well-established. They are less "omnivorous" than the rotary kiln, and more attention must be paid to the physical size of the feedstock and how it is fed into the bubbling combustion bed. An important asset of fluidized-bed units is the ability to use limestone or other solid reagent in the bed to remove hydrochloric acid and sulfur dioxide.

While many other types of incinerators exist, such as flares or switched-bed regenerative incinerators (both used for gases and volatile organics), they are not applicable to RCRA or Superfund wastes. They have limitations as to the completeness of destruction of toxic chemicals, and they do not apply to solids, sludges or liquids.

Cost estimating

Along with the waste type, the cost of the incineration equipment is an important design factor. This cost is related to the unit's thermal capacity or "heat release," which in turn dictates the incineration capacity. Since organic wastes usually have good heating values (about 20,000 Btu/lb for most solvents, and 8,000–18,000 Btu/lb for chlorinated compounds), most of the heat is supplied by the waste itself, with little auxiliary fuel consumed once the system is in operation. For example, a 10-million-Btu/h liquid-injection incinerator burning a spent solvent such as benzene (with a heating value of 19,068 Btu/lb) can consume 520 lb/h of solvent.

For rotary kiln systems, little auxiliary fuel is required if the waste entering the kiln is above 1,200 Btu/lb and if liquid waste is used to fuel the secondary combustion chamber. If not, the waste capacity must be calculated based on the chemical composition and heating value of the waste.

The capital costs shown in Table 2 are for equipment purchases only. It includes "chute to stack" equipment, from the feed system through air pollution control, ash handling, controls and instrumentation. Civil works, utilities, erection and installation of the equipment are typically in the range of 50–100% of equipment cost. The cost of engineering, permitting, commissioning and testing usually equals 10–20% of the equipment cost.

These estimates are for owner-operated facilities. Specifics of the types of wastes being handled, and the incinerator site, can change total cost signifi-

CAPITAL COST FOR INCINERATORS

Type	Thermal capacity, million Btu/hr*	Soil capacity, ton/h	Capital cost, million $**
Rotary kiln	60	15	5.6
Rotary kiln	40	10	3.5
Rotary kiln	20	5	2.2
Liquid injection	50	N/A	2.3
Liquid injection	20	N/A	1.2

*Combined primary and secondary chamber heat release capacity.
**Ref. 7.

TABLE 2. These costs are typical for purchasing incineration equipment

States have more stringent limits. NO_x is not usually a problem unless there is a significant amount of fuel-bound nitrogen (i.e., nitrogen chemically bonded into the feed matter) or unless the facility is located in a "nonattainment" region of the United States where levels are already too high.

In the Federal Register of April 27, 1990, EPA proposed new regulations for metals control in RCRA incinerator emissions. These are currently in the "guidance" form and are contained in the EPA publication, *Guidance on Metals and Hydrogen Chloride Controls for Hazardous Waste Incinerators*, published in October 1989. The guidelines are being enforced via a federal rule (the RCRA "Omnibus" provision) that gives them the same force as regulations. These guidelines cover HCl and the emissions of 10 metals: antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver and thallium.

These metals are regulated by concentration in the incinerator feed (Tier I), by concentration in the stack (Tier II) or by a risk assessment based on the stack emissions (Tier III). Allowable emissions limits vary with the effective height of the stack and the incinerator location. The emission limits are more stringent for urban locations and complex terrains (which could cause flue gases to concentrate in one area). They are most stringent for the carcinogenic metals (arsenic, cadmium, chromium and beryllium). The limit for chromium is the most stringent; on a recent project in the southeastern United States, the limit for a 50-ft stack was 0.0008 lb/h, roughly equal to the weight of an aspirin tablet. If the feedrate of chromium exceeds the Tier I limit, stack tests are required; these can cost $15,000–30,000.

An interesting development has occurred due to the metal and acid regulations. In certain circumstances, they cause the stack height to be raised as the most efficient method of meeting the regulations. For example, raising the effective stack height from 20 to 50 ft can triple the emissions limits of metals like chromium or arsenic. This is due to the use of risk factors based on ambient air conditions at ground-level concentrations in the vicinity of the stack. The higher the stack, the lower those concentrations will tend to be.

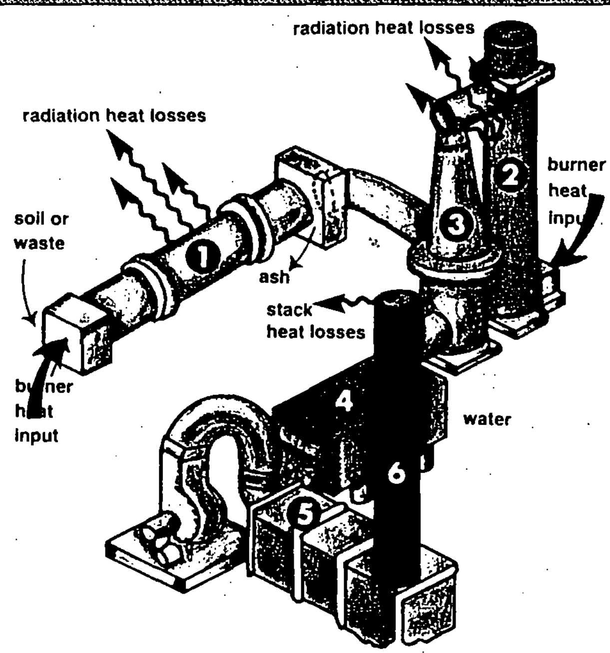


FIGURE 1. Heat inputs occur at the kiln and the secondary combustion chamber; heat outputs are at those units and the stack

SUSAN COHEN

cantly. Commercial facilities that accept others' wastes cost far more, due to the need for larger and more-sophisticated receiving and storage facilities, and the wide range of chemical and physical properties of the wastes received.

Air pollution control

Besides solving an environmental problem, an incinerator must be designed to avoid causing further environmental damage. This means that extra attention must be given to the air-pollution control system that follows the incinerator. There are two basic types of control systems used with incinerators: dry or wet. Dry systems use a baghouse for removal of particulates. For acid gas absorption, dry reagents are blown into the baghouse or are injected as a slurry in a spray tower preceding the baghouse.

Wet systems use a venturi scrubber for particulate removal and an acid gas absorber — typically a vertical, counterflow packed tower — to remove the acid gases. More recently, multistage ionizing wet-scrubber (IWS) systems have been used for the removal of particulates.

Baghouses have a reputation for excellent particulate removal, down to 0.01 to 0.02 grains/ft^3(dry). For wastes with high chlorine content, such as chlorinated solvents, wet scrubbers are more economical for acid-gas removal. They reliably attain 99% removal, or emit less than 4 lb/h of HCl in the stackgas, thereby satisfying RCRA requirements.

Hybrid dry-wet systems are now being used, in the arrangement of a baghouse followed by a wet acid-gas absorber. These systems work well, produce excellent particulate and acid-gas removal, and are in favor with regulators. However, a well-insulated baghouse (as well as proper preheating on startup) is a must to prevent acid gas condensation and severe corrosion.

System design

Process design of an incinerator starts with calculating the capacity, followed by overall heat and mass balances. Incinerator consultants, equipment vendors and incineration service contractors use proprietary computer programs for developing designs. The basic concepts can be seen in Figure 1, which presents the components of

PROCESS DESIGN FOR GENERATOR-OPERATED RCRA HAZARDOUS WASTE INCINERATORS

Type of system	Rotary Kiln	Liquid Injection
Waste	Still bottoms, sludge and solids	High heating value liquid waste
Disposal cap.	1,000 lb/h	1,000 lb/h
Heating value	15,000 Btu/lb	20,000 Btu/lb
Incinerator Heat and Mass Balance Summary		
Operation (h/day)	24	24
Capacity utilization factor	85%	90%
Design capacity (lb/h)	1,180	1,110
Kiln heat release (million Btu/h)	18	N/A
Kiln water injection (gal/min)	4	N/A
Secondary chamber heat release (million Btu/h)	4	22
Kiln temperature (°F)	1,700	N/A
SCC temperature (°F)	1,800	2,000
SCC residence time (s)	2	2
Kiln size, l x i.d. (ft)	36 x 6.5	N/A
SCC size, l x i.d. (ft)	38 x 6	32 x 7
Baghouse inlet (actual ft³/min)	19,000	N/A
Scrubber outlet (actual ft³/min)	15,000	21,000
Stack O_2 dry %	10%	12%

TABLE 3. Rotary kilns are able to process lower-heating value materials such as solids, while liquid-injection units can process higher volumes

the overall heat and mass balances.

The values produced by the heat and mass balances are required when sizing and costing incinerators. These figures are also useful when evaluating the capabilities of an incineration service vendor's equipment to do a job. The temperatures used in Table 3 are typical of those used for hazardous (RCRA) and nonhazardous UST wastes. Solid TSCA wastes (polychlorinated biphenyls —PCBs, dioxins, furans) require higher DREs (99.9999%, or six nines), so secondary-combustion-chamber temperatures are usually raised 50–100°F over those of RCRA wastes. If liquid PCBs are burned in the secondary combustion chamber, a temperature of over 2,200°F is required by the regulations.

The computer programs noted above are used to do an accurate job of sizing the equipment and estimating process flows. The heat balance around the primary and secondary chambers must be solved by iteration, a time-consuming process when calculated by hand. However, the overall validity of the calculation can be checked by some rules of thumb.

For each million Btu of fuel or waste burned, approximately 725 lbs of air are required for stoichiometric combustion. Assuming an excess air level of 100%, 2 × 725 or 1,450 lbs of air are required. Add to that about 50 lbs for the weight of the million Btu of fuel, and a total weight of stack gas (post-combustion, pre-pollution-control-treatment) per million Btu is 1,500 lb.

A 50-million-Btu/h system would therefore produce about 75,000 lb/h of stack gas having a dry oxygen content of 10%. If no waste-heat boiler is used and the gas is quenched adiabatically via water sprays, the stack gas will saturate at about 180°F, and will be 40% water by weight, producing a wet stack-gas flow of 125,000 lb/h. The mass values can be easily converted to actual or standard ft³/m (acfm or scfm) using the appropriate gas density at prevailing conditions.

Examples

A design example for two types of hazardous waste incinerators is detailed in Table 3. One burns sludges and solids in a rotary kiln. The other is a liquid-injection incinerator designed for high heating-value liquid wastes.

As mentioned previously, the total heat release is the primary factor in sizing the equipment. The secondary factor is the excess air level, which is proportional to the stack-gas oxygen content. The kiln system has a total heat release of 22 million Btu/h, the same as the liquid-injection system. However, the liquid-injection unit's stack volume is 40% greater, due to the higher excess air levels used to keep outlet temperatures at 2,000°F. The rotary kiln also employs a water spray to provide thermal ballast to limit temperatures in the kiln. This can also be done with a liquid-injection incinerator, but more care must be taken to ensure that the water does not quench combustion.

Thermal treatment of soil

The use of incinerators for onsite cleanups is relatively recent. Superfund regulations prompted the development of mobile or transportable units, complete with air pollution control, to provide onsite treatment and disposal. The term "mobile" usually refers to lower-capacity systems comprising two or three truckloads that can be set up in less than two weeks. "Transportable" systems take 5–30 truckloads to transport to a site, and 4–10 weeks to set up.

Much can be learned by studying the history of onsite soil-remediation projects, which began in 1984 with the ENSCO project at the Sydney Mines site in Florida. Prices have decreased since then as operators have gained experience, and as new and more efficient equipment has been developed.

Figure 2 represents cost-vs.-tonnage data for 20 major Superfund sites. "Chute-to-chute" incineration refers to the cost of thermally treating the soil, but does not include site preparation or backfilling the soil. While there is some variation in the data, costs for chute-to-chute incineration only are \$100–250/ton, while total costs, including excavation, permitting and the rest, are in the \$200–650/ton range. The curves drawn through the data points are the authors' judgment of current costs for typical Superfund projects.

One way to categorize Superfund projects is by the level and type of contamination present, especially of

such materials as PCBs, dioxins and other chlorinated hydrocarbons. If the waste contains materials that require high temperatures for destruction, or if the wastes have heating values above 1,000 Btu/lb, the system will have to be designed for high-temperature operation. In this case, a fluidized-bed incinerator might be used, or a rotary kiln lined with refractory materials.

For sites with less difficult contaminants — low-heating-value, nonchlorinated hydrocarbons — a less complex system can be used. Often a modified asphalt batch plant will suffice, in which the primary chamber is an unlined dryer used to volatilize the hydrocarbons from the soil. The offgases are then destroyed in a secondary combustion chamber running at higher temperatures. Table 4 shows some typical chute-to-chute soil-decontamination costs, for a project of greater than 30,000 tons.

Total job costs including excavation and engineering may double the cost for RCRA or TSCA projects. The selection of the proper equipment is predicated more on the concentration and volatility of the contaminant than its toxicity. Generally, organic concentrations up to 2% in soil can be handled in a volatilizer (such as the asphalt plant) if the boiling point of the compounds is below 450°F.

The scale of soil cleanup projects underway or completed ranges widely, from as low as 200 tons to over 300,000 tons. Equipment is matched to the job size. Highly mobile, high-temperature incinerators with capacities of 2 ton/h handle jobs up to 10,000 tons. In the mid-size range, systems with 3- to 7-ton/h capacity are matched to jobs in the 5,000- to 25,000-ton range.

The largest transportable systems have capacities of 15–25 tons/h, and are used on jobs of 15,000 tons and above. There is a considerable overlap in any size range which can be addressed by a given system.

It is not unusual to find incineration service vendors with small equipment suggesting the use of multiple units to speed completion of a project, or a vendor with a large system, which might be currently idle, bidding on a relatively small job.

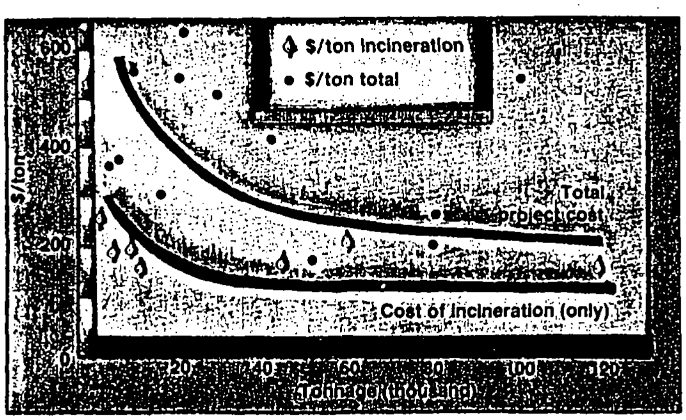


FIGURE 2. These costs are based on Superfund soil-incineration projects

Type of waste	cost	$/ton
Underground storage-tank waste, nonhazardous	low	$75
RCRA hazardous waste, < 1,000 Btu/lb	medium	150
RCRA hazardous waste, > 1,000 Btu/lb	high	200+
TSCA hazardous waste (dioxins, etc.)	high	250

TABLE 4. Treatment cost rises as the toxicity of the waste increases

Trends in onsite services

The major trends in mobile or transportable incineration services are a growing market, and more partnering between prime contractors and incineration-service subcontractors. The technology is also evolving, with subcontractors developing such innovations as oxygen injection for extended capacity and reduced operating cost, or wider use of low-temperature volatilization for lightly contaminated soils containing UST wastes.

Most states require afterburners for gasoline, diesel fuel and other "virgin" oil-contaminated soils, although a few allow operation without an afterburner if the soil contamination can be shown to limit VOC emissions. When properly designed and instrumented, these low-temperature systems can burn many RCRA wastes.

Most states require 95% destruction and removal efficiency (DRE) for non-RCRA organics, while California requires 99.99%. The organic-content limit in the ash also varies. Some states have a two-tier limit: for example, a concentration of < 5 ppm residual organics is considered clean soil; a concentration between 5 and 50 ppm can be used for road fill or other specified purposes.

Although the size of the equipment varies, incinerators for onsite cleanups all have the same major components:

- Feed and ash-handling gear
- Primary reactor
- Secondary combustion chamber (SCC)
- Air pollution control system
- Instrumentation and controls

Primary-reactor designs have been undergoing steady evolution. The usual design is now the high-temperature rotary kiln. A lower-temperature alternative is the rotary desorber. To a

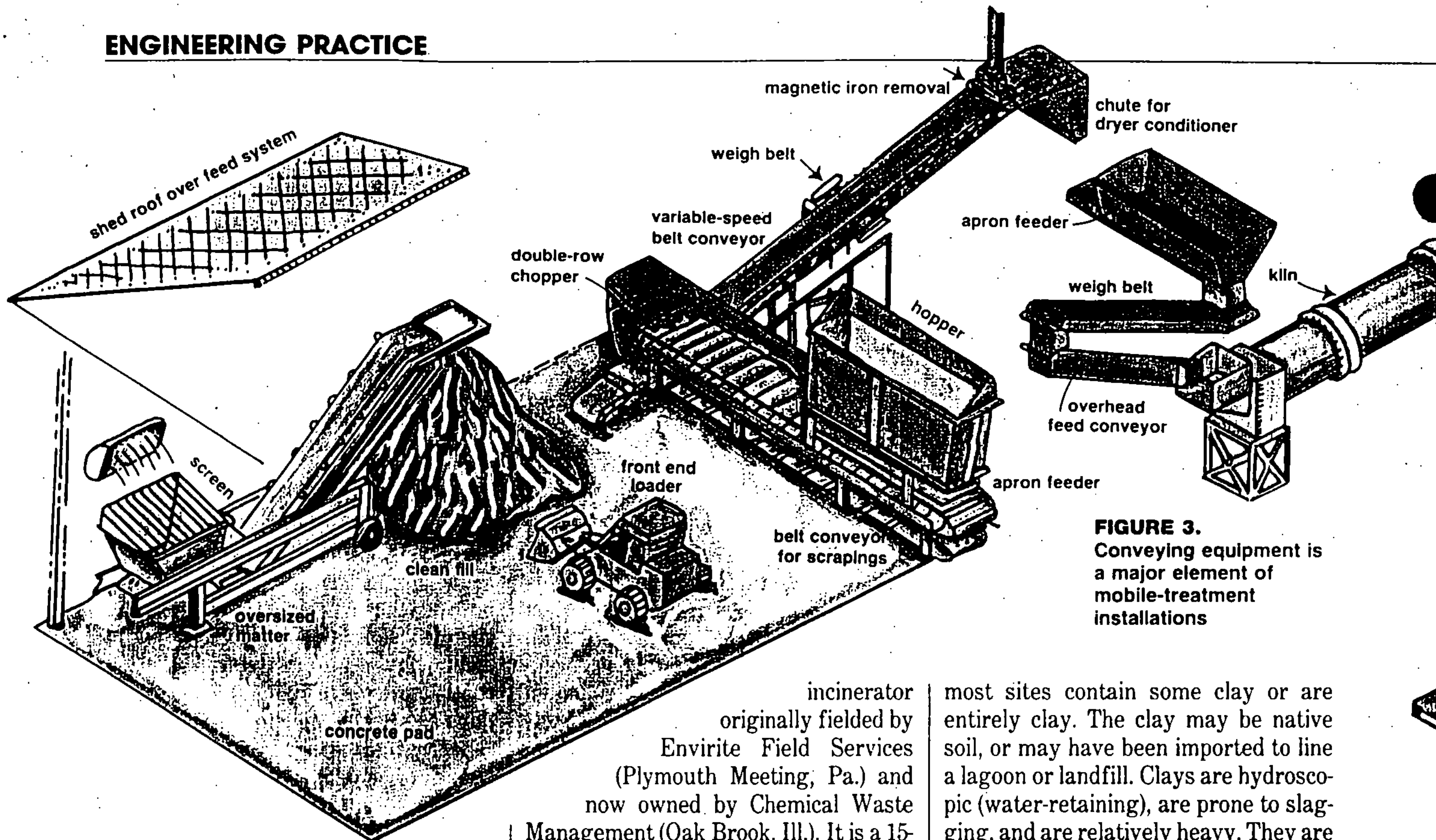


FIGURE 3. Conveying equipment is a major element of mobile-treatment installations

lesser extent, fluidized-bed systems have been used by some, as well as belt furnaces with infrared heating.

SCCs raise gas temperature to burn out the volatiles. The best SCC designs are vertical, using a side-mounted high-swirl vortex-type burner. These produce high DREs, even on heavily chlorinated species, at low retention times and moderate temperatures. On a recent project, such a design yielded a >99.999% DRE when operating at 1,850°F, with a 0.5-s residence time, for the destruction of trichlorobenzene.

Air pollution control systems are either dry or wet, just as in conventional, fixed incinerators. Feed and ash sytems use conventional conveyors and metering sytems (such as screw conveyors, belt conveyors, live-bottom bins, and so on), and either a wet ash quench or rotating product coolers for the ash.

Systems that are used to incinerate soils, particularly those containing fine clays, incorporate a refractory-lined cyclone after the primary chamber to reduce particulate carryover to the SCC. When not so equipped, fines build up in the SCC, and slagging and other problems increase.

Figure 3 shows a typical equipment configuration for mobile soil decontamination. These drawings are based on an incinerator originally fielded by Envirite Field Services (Plymouth Meeting, Pa.) and now owned by Chemical Waste Management (Oak Brook, Ill.). It is a 15-ton/h, 82-million Btu/h unit using a baghouse for particulate collection, followed by an acid-gas absorber.

Operating problems

The operating procedures for onsite cleanups are different from those of fixed-site incineration. Mobilization, demobilization and startup are conducted similarly to how a contractor would handle a contruction project, while soil burning is a blend of construction and process-plant operations.

The most frequently encountered problems are soil preparation and solids handling and, to a lesser degree, ash handling. Free-flowing sandy soils are the easiest to handle; however, most sites contain some clay or are entirely clay. The clay may be native soil, or may have been imported to line a lagoon or landfill. Clays are hydroscopic (water-retaining), are prone to slagging, and are relatively heavy. They are sticky when wet, and dusty when dry. Soil feeders designed for free-flowing solids frequently bridge over, clog or form ratholes when processing clays.

To mitigate these problems, the incinerator operator should keep at least five days of prepared soil under rain cover at all times, and should screen all materials before feeding to remove oversized objects. Air drying of thin lifts of soil before feed preparation can reduce moisture to a manageable level. When all else fails, raw soil can be mixed with dry bulking agents or recycled ash to reduce the moisture content and stickiness.

Some contractors have failed stack particulate tests. Systems with high

Four Nines

SUSAN COHEN

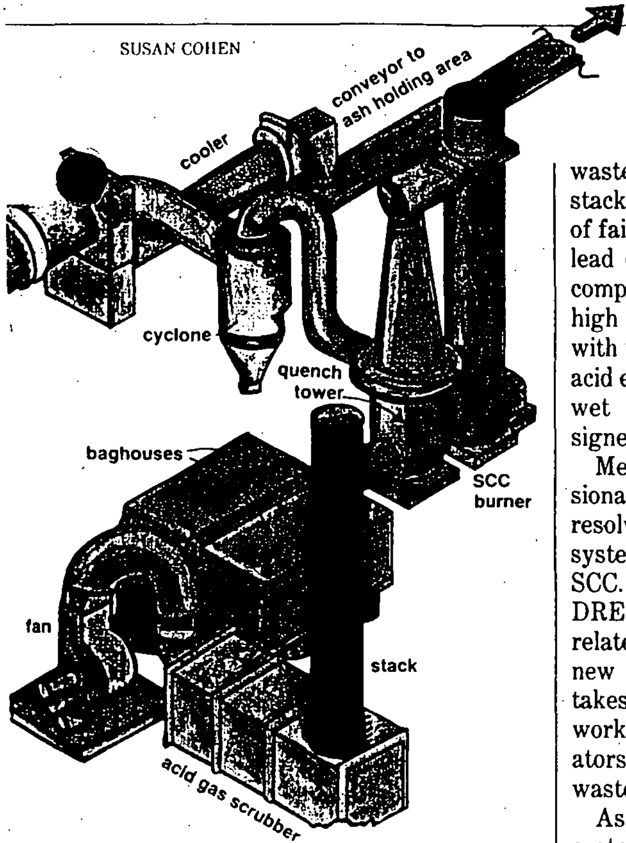


TABLE 5. RCRA-regulated hazardous soil requires a greater degree of decontamination than soil polluted with fuel leakage

PROCESS DESIGN FOR SOIL-TREATMENT INCINERATORS		
Job Requirements		
Soil type	RCRA hazardous	"UST" non-hazardous
Tons of soil (tons)	30,000	30,000
Contamination	< 5% RCRA solvents	< 2% petroleum
Chlorine (%)	< 1	0
Moisture content (%)	10	10
Regulatory Requirements		
DRE	99.99%	95%
Ash quality (ppm)	< 10	< 50
Incinerator Heat and Mass Balance Summary		
Operation (h/day)	24	12
Capacity utilization factor (%)	60	75
Soil design capacity (ton/h)	10	30
Time to complete burn (months)	7	4
Kiln temp (°F)	1600	850
SCC temp (°F)	1800	1400
SCC residence time (s)	2	1
Kiln/dryer size l x i.d. (ft)	38 x 7	22 x 5
SCC size l x i.d. (ft)	38 x 8	26 x 6
Baghouse outlet (actual ft³/min)	35,000	30,000
Scrub. outlet (actual ft³/min)	27,000	24,000
Total heat input (million Btu/h)	47	47
Stack O_2, dry %	9%	6%

waste-metal concentrations and short stack heights have the greatest chance of failing emissions tests. In particular, lead chloride and other volatile metal compounds have caused problems on high temperature systems, especially with wet scrubbers, while hydrochloric acid emissions are rarely a problem for wet acid-gas absorbers or well-designed dry scrubber systems.

Meeting the DRE has been an occasional problem, although it is usually resolved by checking the combustion system and raising temperatures in the SCC. All too often, a failure on a single DRE test is due to a brief process upset related to insufficient experience with a new system or waste. This problem takes care of itself as the bugs are worked out of the equipment and operators gain more experience with the waste, process and instrumentation.

As with other types of mobile-incinerator systems, those designed for soil decontamination can be optimized for either RCRA hazardous-waste projects or for UST wastes. Table 5 shows these two arrangements: a high-temperature rotary kiln and a lower-temperature devolatilizing kiln. Both are followed by SCCs and related pollution-control gear.

Over the past 20 years, incineration of RCRA-type hazardous wastes has matured as an industry, and is now used by virtually all chemical process industries for disposal of wastes. Installation of generator-owned and -operated incinerators is an option that can reduce costs and eliminate the liability of shipping wastes offsite. ■

Edited by Nicholas Basta

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The authors

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Thomas McGowan, P.E., is a principal with Four Nines, Inc., and is currently involved in the development of new thermal processes, solids handling and incineration technologies. He received his B.S. and M.S.Ch.E degrees from Manhattan College, and an M.S. in industrial management from the Georgia Institute of Technology. Previously, he was vice president of thermal destruction at Envirite Field Services. He is a licensed engineer in six states, and a member of AIChE, the Air and Waste Management Assn., and the Scientific Research Society of North America.

APPENDIX B
HEAT AND MASS BALANCE

HEAT AND MASS BALANCE FOR THERMAL TREATMENT

By: Tom McGowan and Barney Spratt, RMT/Four Nines, Inc.
Program Date: 12-Dec-89 Filename: 1FILES\HTKIB01
Date Printed: 31-Mar-94
For: Kiber Enviro. Ser., Raymark Superfund Site
Overview: Low Temp Thermal Desorption of Contaminated Soils.
Excess air (XCS) includes leakage air.
All flow values (mass or volume) are per hour basis.
No POHC used for sizing maximum SCC burner capacity.
Propane gas is auxiliary fuel.

Major Parameters:

Primary Burner XCS	SCC XCS	POHC XCS	Prim. Temp	SCC Temp	Solids Chr lb/hr	Feed Moisture	Radiatn Loss	Wet Wgt POHC	Gas Cp, Btu/lb
50%	50%	0%	900	1850	80000	10.00%	10%	0.00%	0.279
			(+50 degrees over ash temp)				(0.5xfor SCC)		0.355

Stage 1, Primary Kiln Burner

Item	lb/hr	HHV MMBtuh	LHV MMBtuh	Sensible Heat MMBtuh	Flame Temp	Fuel Balance % Diff.
Auxiliary fuel	2075	44.66	41.04			0.23%
Air	48876					
Total	50951	44.66	41.04	41.04	2947	

Stage 2, Solids Injected in Primary Furnace

Item	lb/hr	HHV MMBtuh	LHV MMBtuh	Sensible Heat MMBtuh
Solids	72000			14.22
Moisture	8000		-8.47	1.87
POHC	0	0.00	0.00	0.00
Air	0			0.00
Total	80000	0.00	-8.47	16.09

Primary Chamber Outlet Gas Stream Plus Clean Ash

Item	lb/hr	HHV MMBtuh	LHV MMBtuh	Sensible Heat MMBtuh
Total gas	58951			13.82
Total solids	72000			14.22
Rad. loss			-4.47	
Total input			28.10	28.04

Stage 3, Primary Chamber Outlet Gas Stream

Item	lb/hr	Sensible Heat MMBtuh	SCC Inlet Gas temp	XCS air or O2, dry
Total gas	58951			
Solids		0.00		50%
Total	58951	13.82	900	7.2%

Stage 4, Secondary Combustion Chamber

Item	lb/hr	HHV MMBtuh	LHV MMBtuh	Sensible Heat MMBtuh	Flame Temp	Scfm	Acfm	Fuel Balance % Diff.
Total inlet gas	58951		13.82					
Auxiliary fuel	2425	52.19	47.96					
POHC in SCC	0	0.00	0.00					-0.02%
Air	57120							
Rad. loss			-2.61					
Total	118495			59.18	2947	24972	110932	
Stage 1-3+stg4			59.17					

Stage 5, Quench and Baghouse

Item	lb/hr	LHV MMBtuh	Sensible Heat MMBtuh	Stack Gas Temp	Scfm	Acfm	XCS air or O2, dry
Total gas	118495		59.18				
Water added	41500	-43.95					
Total stack gas	159995				40670	67353	
Approx. XCS %							50%
Approx. O2 % dry							7.2%
Gas temp, F				401			

Stage 6, Scrubber

Item	lb/hr	LHV MMBtuh	Sensible Heat MMBtuh	Stack Gas Temp	Scfm	Acfm	XCS air or O2, dry
Total gas	118495		59.18				
Water added	50700	-53.69					
Total stack gas	169195				43009	52621	
Approx. XCS %							50%
Approx. O2 % dry							7.2%
Gas temp, F				176			

APPENDIX C
DETAILED LTTD SYSTEM DESCRIPTION

Process and material flows begin with mixed and pre-screened soil from covered storage being delivered to the TIS hopper via a front-end loader. The soil is extracted from the bottom of the hopper by a horizontal variable speed belt which controls the feed rate and delivers the soil to the inclined belt conveyor which takes it to the chute on the primary treatment unit. The inclined belt has a weigh cell which provides instantaneous and totalized soil tonnage data.

After the soil enters the feed chute, it drops into the rotating direct fired co-current desorber. The rotary drum is lined with flights which lift the soil and drop it into the hot air stream provided by the external burner and furnace. The flights aid in breaking up the soil and opening up surface area to the heat to remove moisture and the organic contaminants. The heated solids exit the end of the primary treatment unit and are cooled by water sprays in an ash cooling auger (or are mixed with water in a pug mill).

The hot gas stream from the primary treatment unit passes through steel ductwork to dual cyclones in parallel which remove most of the particulate. The particulate is taken by screw conveyor to the ash cooling auger.

The cleaned gases are then transported to the inlet of the SCC via steel ductwork. The SCC is lined with high-temperature refractory and has a burner which raises the temperature of the gases to burn off and oxidize the organic vapors generated in the desorber.

The hot gases are taken from the SCC by insulated ductwork to a quench tower. Water sprays reduce the gas temperature to approximately 400 F before they enter the baghouse for particulate removal. An ID (induced draft) fan follows the baghouse and moves the gas stream into an acid gas absorber which contains caustic (NaOH, sodium hydroxide) for HCl and SO_2 removal.

The entire system is mounted on truck frames for easy transport and set-up at multiple sites.

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40310

- Four soil samples were submitted for analysis on 3/2/94 at 1205 hours. The samples arrived at room temperature and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*	*Instrument*
Total Semivolatiles	SW-846 Methods: 3550 and 8270	Hewlett Packard 5890 GC/MSD
Total Volatiles	SW-846 Method 8260	Hewlett Packard 5890 GC/MSD
Total RCRA Metals	SW-846 Methods: 6010 and 3051	Thermo Jarrell ASH ENVIRO 61E ICAP
Total Mercury	SW-846 Method 7471	Bacharach Mercury Analyzer
Dioxins	SW-846 Method 8280	Hewlett Packard 5890 GC/MSD
Total Organic Carbon	SW-846 Methods: 9060	Carbonaceous Analyzer
Total Pesticides and PCBs	SW-846 Methods: 3550 and 8080	Hewlett Packard 5890 GC/ECD

Total RCRA Metals (except mercury)

The QC recoveries were within the method recommended limits except for the following:

1) The matrix spike performed on sample TS*B-68*2-4 was outside the method specified recovery limits for Barium (30%) and Chromium (28%) and the Lead recovery was diluted out. The bench spike recoveries for Barium and Chromium were both at 76% and within the method specified limits. However, the Lead recovery was 49%. This indicates that a matrix interference is occurring. The bench spike is performed on an aliquot of the

reported sample and not a second digested sample. This eliminates the possibility of sample nonhomogeneity contributing to the bench spike recovery.

2) The Laboratory Control Standard (LCS) recovered Silver and Chromium out of the method recommended limits. Silver is usually low for microwave digestion due to silver precipitation and the subsequent filtration of the digestate prior to analysis.

Chromium was slightly outside of the recommended recovery range. Since the magnitude of the Chromium recovery in the sample is at least ten times the Chromium LCS error then the Chromium error is negated for samples 40310-2, 40310-3, and 40310-4. Since the Chromium recovery is in the estimated range (E) for 40310-1, the Chromium LCS variation is already acknowledged in the estimated status of the result.

There were no further difficulties during the analyses.

Total Mercury

The QC recoveries were within the method recommended limits. There were no difficulties during the analyses.

Total Volatiles

The QC recoveries were within the method recommended limits. There were no difficulties during the analyses.

Total Semivolatiles

The QC recoveries were within the method recommended limits except for the following:

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40310

Continued

1) The matrix spike duplicate analysis recovered 2,4-Dinitrotoluene and Pentachlorophenol above the QC limits. However, the Extraction Blank Spike contained all matrix spike and surrogate compounds within the method recommended limits. This indicates that the matrix of the sample interfered with the recovery of these compounds in the matrix spike duplicate as well as the consistency between the matrix spike and matrix spike duplicate recoveries for these two compounds.

There were no further difficulties during the analyses.

Total Pesticides

The samples required a dilution prior to sample analysis due to the oily nature of the matrix. As a result, the surrogate and matrix spike recoveries were unable to be determined and the report is flagged "DO" for diluted out. There were no difficulties during the analyses.

Total PCBs

The samples required a dilution prior to sample analysis due to the oily nature of the matrix. As a result, the surrogate and matrix spike recoveries were unable to be determined and the report is flagged "DO" for diluted out. Also, aroclors 1262 and 1268 were found to coelute. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

Dioxins

The QC recoveries were within the method recommended limits. The TCDF/TCDDs analytes are flagged with an "X" to indicate the presence of contamination from the standard. The contamination was detected within the analyte retention time window, however there is no indication that the sample results were affected. There were no further difficulties during the analyses.

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40310

Continued

Total Organic Carbon

The QC recoveries were within the method recommended limits. There were no difficulties during the analyses.

K M Clemons

QA Authorization

3/24/94

Date

The above referenced data has been reviewed for compliance with all applicable portions of Kiber Environmental Services, Inc. QA/QC Program and all methodologies. Any anomalies encountered during analyses are noted by the analyst above.

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-1
PROJECT #854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init) : 3/2/94, 1000, SH
ICP ANALYSIS (Date/Init) : 3/3/94, LD
CV ANALYSIS (Date/Init) : 3/7/94, KK

DATE REPORTED : 3/7/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 104

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.6	54.5	<DL	<DL
Total Barium (Ba)	6010	0.208	0.832	34	0.003 E
Total Cadmium (Cd)	6010	0.312	1.25	<DL	0.003 E
Total Chromium (Cr)	6010	1.98	7.90	6.2 E	<DL
Total Lead (Pb)	6010	3.85	15.4	23	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.55	26.2	<DL	<DL
Total Silver (Ag)	6010	0.312	1.25	0.56 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-2
PROJECT #854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init) : 3/2/94, 1000, SH
ICP ANALYSIS (Date/Init) : 3/3/94, LD
CV ANALYSIS (Date/Init) : 3/7/94, KK

DATE REPORTED : 3/7/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 156

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	20.4	81.7	<DL	<DL
Total Barium (Ba)	6010	0.312	1.25	2,400	0.003 E
Total Cadmium (Cd)	6010	0.468	1.87	<DL	0.003 E
Total Chromium (Cr)	6010	2.96	11.9	47	<DL
Total Lead (Pb)	6010	28.9	115	11,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	9.83	39.3	<DL	<DL
Total Silver (Ag)	6010	0.468	1.87	1.3 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-3
PROJECT #854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init) : 3/2/94, 1000, SH
ICP ANALYSIS (Date/Init) : 3/3/94, LD
CV ANALYSIS (Date/Init) : 3/7/94, KK

DATE REPORTED : 3/7/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 152

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	19.9	79.6	<DL	<DL
Total Barium (Ba)	6010	0.304	1.22	3,900	0.003 E
Total Cadmium (Cd)	6010	0.456	1.82	0.49 E	0.003 E
Total Chromium (Cr)	6010	2.89	11.6	85	<DL
Total Lead (Pb)	6010	28.1	112	8,800	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	9.58	38.3	<DL	<DL
Total Silver (Ag)	6010	0.456	1.82	1.6 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-4
PROJECT #854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init) : 3/2/94, 1000, SH
ICP ANALYSIS (Date/Init) : 3/3/94, LD
CV ANALYSIS (Date/Init) : 3/7/94, KK

DATE REPORTED : 3/7/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 141

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	18.5	73.9	<DL	<DL
Total Barium (Ba)	6010	0.282	1.13	2,200	0.003 E
Total Cadmium (Cd)	6010	0.423	1.69	2.3	0.003 E
Total Chromium (Cr)	6010	2.68	10.7	69	<DL
Total Lead (Pb)	6010	52.2	209	15,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	8.88	35.5	<DL	<DL
Total Silver (Ag)	6010	0.423	1.69	2.5	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # LCSS 0303A

METALS LABORATORY CONTROL SAMPLE

RAYMARK INDUSTRIES
BATCH# 495

MATRIX: SOIL

TARGET ANALYTE	CERTIFIED VALUE mg/Kg	MEASURED VALUE mg/Kg	ACCEPTABLE RANGE mg/Kg
Total Arsenic (As)	150	150	75-224
Total Barium (Ba)	247	240	173-321
Total Cadmium (Cd)	79.1	79	40-126
Total Chromium (Cr)	66.2	94	30-93
Total Lead (Pb)	101	110	45-146
Total Mercury (Hg)	0.50	0.47	0.37-0.63
Total Selenium (Se)	73.5	69	37-118
Total Silver (Ag)	88.1	6.6*	44-123

*Silver Values Are Typically Low In Microwave Digestion
Environmental Resource Associates
Quality Control Standards
Inorganics in Soil
Lot Number 217

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-3R

METALS
REPLICATE RESULTS

RAYMARK INDUSTRIES
BATCH# 495

MATRIX: SOIL

TARGET ANALYTE LIST	RELATIVE % DIFF (RPD)	ACCEPTABLE RPD LIMIT (%)
Total Arsenic (As)	<PQL	25
Total Barium (Ba)	21	25
Total Cadmium (Cd)	<PQL	25
Total Chromium (Cr)	4	25
Total Lead (Pb)	15	25
Total Mercury (Hg)	<PQL	25
Total Selenium (Se)	<PQL	25
Total Silver (Ag)	<PQL	25

PQL: Practical Quantitation Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-3S

METALS MATRIX SPIKE RESULTS

RAYMARK INDUSTRIES
BATCH# 495

MATRIX: SOIL

TARGET ANALYTE	% RECOVERY	ACCEPTABLE % RECOVERY RANGE
Total Arsenic (As)	97	75 - 125
Total Barium (Ba)	30*	75 - 125
Total Cadmium (Cd)	89	75 - 125
Total Chromium (Cr)	28*	75 - 125
Total Lead (Pb)	D.O.**	75 - 125
Total Mercury (Hg)	90	75 - 125
Total Selenium (Se)	100	75 - 125
Total Silver (Ag)	85	75 - 125

*Due To Matrix Interference: See Case Narrative
**Diluted Out
SPEX Industries, Inc.
Multi-Element Plasma Standard
Spike-1
Lot # 5-154AS

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 40310-1

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/03/94, 13:05, ALH

DATE REPORTED: 3/ 4/94

Dilution Factor: 1.027
%Solids: 96

Sample Matrix SOLID
Analysis Method: 8260

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	2.70	11.30	9.1 E	7.6 E
Benzene	71-43-2	0.30	1.20	<MDL	<MDL
Bromodichloromethane	75-27-4	0.60	2.30	ND	ND
Bromoform	75-25-2	0.60	2.60	ND	ND
Bromomethane	74-83-9	1.80	7.20	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	12.30	48.30	ND	ND
Carbon Disulfide	75-15-0	1.10	4.60	ND	ND
Carbon Tetrachloride	56-23-5	0.70	2.70	ND	ND
Chlorobenzene	108-90-7	0.60	2.10	57	<MDL
Chloroethane	75-00-3	1.30	5.40	ND	ND
Chloroform	67-66-3	0.70	2.90	ND	ND
Chloromethane	74-87-3	1.70	7.00	ND	ND
Dibromochloromethane	124-48-1	0.60	2.50	ND	ND
1,1-Dichloroethane	75-34-3	0.80	3.10	ND	ND
1,2-Dichloroethane	107-06-2	0.50	2.00	ND	ND
1,1-Dichloroethene	75-35-4	0.90	4.00	ND	ND
1,2-Dichloroethene (total)	540-59-0	1.30	5.10	12	ND
1,2-Dichloropropane	78-87-5	0.50	2.20	ND	ND
cis-1,3-Dichloropropene	10061-01-5	0.80	3.10	ND	ND
trans-1,3-Dichloropropene	10061-02-6	0.70	2.90	ND	ND
Ethylbenzene	100-41-4	1.00	4.00	2.9 E	<MDL
2-Hexanone	591-78-6	1.30	5.50	ND	ND
Methylene Chloride	75-9-2	2.90	11.30	6.0 E	3.2 E
4-Methyl-2-pentanone (MIBK)	108-10-1	2.30	9.10	ND	ND
Styrene	100-42-5	0.40	1.40	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	0.70	2.80	ND	<MDL
Tetrachloroethene	127-18-4	0.90	3.60	2.4 E	ND
Toluene	108-88-3	0.90	3.60	4.1	<MDL
1,1,1-Trichloroethane	71-55-6	0.40	1.50	ND	ND
1,1,2-Trichloroethane	79-00-5	0.90	3.50	ND	ND
Trichloroethene	79-01-6	0.60	2.50	96	ND
Vinyl Acetate	108-05-4	0.80	3.20	ND	ND
Vinyl Chloride	75-01-4	1.70	6.90	ND	ND
Xylene (total)	10061-01-5	0.70	2.90	14	0.4 E
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		102	96
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		108	87
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		85	87

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 40310-2

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/03/94, 15:51, ALH

DATE REPORTED: 3/ 4/94

Dilution Factor: 7.975
%Solids: 67

Sample Matrix SOLID
Analysis Method: 8260

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	20.70	87.70	190	59 E
Benzene	71-43-2	2.50	9.60	6.2 E	<MDL
Bromodichloromethane	75-27-4	4.40	17.50	ND	ND
Bromoform	75-25-2	4.90	19.90	ND	ND
Bromomethane	74-83-9	14.40	55.80	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	95.70	374.80	<MDL	ND
Carbon Disulfide	75-15-0	8.80	35.90	53	ND
Carbon Tetrachloride	56-23-5	5.30	20.70	ND	ND
Chlorobenzene	108-90-7	4.90	15.90	ND	<MDL
Chloroethane	75-00-3	10.40	42.30	ND	ND
Chloroform	67-66-3	5.60	22.30	ND	ND
Chloromethane	74-87-3	13.60	54.20	ND	ND
Dibromochloromethane	124-48-1	4.80	19.10	ND	ND
1,1-Dichloroethane	75-34-3	6.10	23.90	ND	ND
1,2-Dichloroethane	107-06-2	3.90	15.20	ND	ND
1,1-Dichloroethene	75-35-4	7.20	31.10	ND	ND
1,2-Dichloroethene (total)	540-59-0	10.40	39.90	ND	ND
1,2-Dichloropropane	78-87-5	4.10	16.70	ND	ND
cis-1,3-Dichloropropene	10061-01-5	5.90	23.90	ND	ND
trans-1,3-Dichloropropene	10061-02-6	5.70	22.30	ND	ND
Ethylbenzene	100-41-4	7.80	31.10	23 E	<MDL
2-Hexanone	591-78-6	10.40	43.10	ND	ND
Methylene Chloride	75-9-2	22.30	87.70	48 E	25 E
4-Methyl-2-pentanone (MIBK)	108-10-1	17.50	71.00	ND	ND
Styrene	100-42-5	2.80	11.20	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	5.30	21.50	ND	<MDL
Tetrachloroethene	127-18-4	7.00	27.90	ND	ND
Toluene	108-88-3	6.90	27.90	8.1 E	<MDL
1,1,1-Trichloroethane	71-55-6	3.00	12.00	ND	ND
1,1,2-Trichloroethane	79-00-5	6.80	27.10	ND	ND
Trichloroethene	79-01-6	4.70	19.10	ND	ND
Vinyl Acetate	108-05-4	6.10	24.70	ND	ND
Vinyl Chloride	75-01-4	13.60	53.40	ND	ND
Xylene (total)	10061-01-5	5.70	22.30	35	3.0 E
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		95	96
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		98	87
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		71	87

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 40310-3

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/04/94, 14:06, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 3/ 8/94

Dilution Factor: 7.019
%Solids: 67

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	18.30	77.20	96	57 E
Benzene	71-43-2	2.20	8.40	ND	ND
Bromodichloromethane	75-27-4	3.90	15.40	ND	ND
Bromoform	75-25-2	4.30	17.50	ND	ND
Bromomethane	74-83-9	12.60	49.10	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	84.20	329.90	ND	ND
Carbon Disulfide	75-15-0	7.70	31.60	ND	ND
Carbon Tetrachloride	56-23-5	4.60	18.30	ND	ND
Chlorobenzene	108-90-7	4.30	14.00	ND	ND
Chloroethane	75-00-3	9.10	37.20	ND	ND
Chloroform	67-66-3	4.90	19.70	ND	ND
Chloromethane	74-87-3	11.90	47.70	ND	ND
Dibromochloromethane	124-48-1	4.20	16.80	ND	ND
1,1-Dichloroethane	75-34-3	5.30	21.10	ND	ND
1,2-Dichloroethane	107-06-2	3.40	13.30	ND	ND
1,1-Dichloroethene	75-35-4	6.30	27.40	ND	ND
1,2-Dichloroethene (total)	540-59-0	9.10	35.10	ND	ND
1,2-Dichloropropane	78-87-5	3.70	14.70	ND	ND
cis-1,3-Dichloropropene	10061-01-5	5.20	21.10	ND	ND
trans-1,3-Dichloropropene	10061-02-6	5.00	19.70	ND	ND
Ethylbenzene	100-41-4	6.90	27.40	ND	<MDL
2-Hexanone	591-78-6	9.10	37.90	ND	ND
Methylene Chloride	75-9-2	19.70	77.20	290	37 E
4-Methyl-2-pentanone (MIBK)	108-10-1	15.40	62.50	<MDL	ND
Styrene	100-42-5	2.50	9.80	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	4.70	19.00	ND	ND
Tetrachloroethene	127-18-4	6.20	24.60	<MDL	ND
Toluene	108-88-3	6.10	24.60	<MDL	<MDL
1,1,1-Trichloroethane	71-55-6	2.70	10.50	ND	ND
1,1,2-Trichloroethane	79-00-5	6.00	23.90	ND	ND
Trichloroethene	79-01-6	4.10	16.80	ND	ND
Vinyl Acetate	108-05-4	5.40	21.80	ND	ND
Vinyl Chloride	75-01-4	11.90	47.00	ND	ND
Xylene (total)	10061-01-5	1.60	10.50	ND	2.6 E
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		102	90
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		105	99
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		98	94

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services	GC/MS VOA RESULTS	LAB SAMPLE # 40310-4

RAYMARK INDUSTRIES — SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
SAMPLE # TS*B-7*4-6 — ANALYSIS (Date/Time/Init): 3/04/94, 15:28, ALH

Sample Matrix SOLID
DATE REPORTED: 3/ 8/94 — Dilution Factor: 6.872 — Analysis Method: 8260
%Solids: 68

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	17.90	75.60	160	56 E
Benzene	71-43-2	2.10	8.20	7.1 E	ND
Bromodichloromethane	75-27-4	3.80	15.10	ND	ND
Bromoform	75-25-2	4.20	17.20	ND	ND
Bromomethane	74-83-9	12.40	48.10	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	82.50	323.00	<MDL	ND
Carbon Disulfide	75-15-0	7.60	30.90	17 E	ND
Carbon Tetrachloride	56-23-5	4.50	17.90	ND	ND
Chlorobenzene	108-90-7	4.20	13.70	16	ND
Chloroethane	75-00-3	8.90	36.40	28 E	ND
Chloroform	67-66-3	4.80	19.20	ND	ND
Chloromethane	74-87-3	11.70	46.70	ND	ND
Dibromochloromethane	124-48-1	4.10	16.50	ND	ND
1,1-Dichloroethane	75-34-3	5.20	20.60	ND	ND
1,2-Dichloroethane	107-06-2	3.40	13.10	ND	ND
1,1-Dichloroethene	75-35-4	6.20	26.80	ND	ND
1,2-Dichloroethene (total)	540-59-0	8.90	34.40	<MDL	ND
1,2-Dichloropropane	78-87-5	3.60	14.40	ND	ND
cis-1,3-Dichloropropene	10061-01-5	5.10	20.60	ND	ND
trans-1,3-Dichloropropene	10061-02-6	4.90	19.20	ND	ND
Ethylbenzene	100-41-4	6.70	26.80	14 E	<MDL
2-Hexanone	591-78-6	8.90	37.10	ND	ND
Methylene Chloride	75-9-2	19.20	75.60	260	36 E
4-Methyl-2-pentanone (MIBK)	108-10-1	15.10	61.20	ND	ND
Styrene	100-42-5	2.40	9.60	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	4.60	18.60	ND	ND
Tetrachloroethene	127-18-4	6.00	24.10	<MDL	ND
Toluene	108-88-3	6.00	24.10	37	<MDL
1,1,1-Trichloroethane	71-55-6	2.60	10.30	ND	ND
1,1,2-Trichloroethane	79-00-5	5.80	23.40	ND	ND
Trichloroethene	79-01-6	4.10	16.50	5.1 E	ND
Vinyl Acetate	108-05-4	5.30	21.30	ND	ND
Vinyl Chloride	75-01-4	11.70	46.00	ND	ND
Xylene (total)	10061-01-5	4.90	19.20	110	2.5 E
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		108	90
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		108	99
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		92	94

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 40310-BS

ANALYSIS (Date/Time/Init): 3/3/94, 10:49, ALH

DATE REPORTED: 3/4/94

Analysis Method: 8260 (SOLID)

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
1,1-Dichloroethene	75-35-4	59-172	115
Trichloroethene	79-01-6	62-137	102
Benzene	71-43-2	66-142	105
Toluene	108-88-3	59-139	97
Chlorobenzene	108-90-7	60-133	99
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	101
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	92
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	92

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 40310-BS

ANALYSIS (Date/Time/Init): 3/04/94, 13:11, ALH

DATE REPORTED: 3/ 4/94

Analysis Method: 8260 (SOLID)

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
1,1-Dichloroethene	75-35-4	59-172	95
Trichloroethene	79-01-6	62-137	92
Benzene	71-43-2	66-142	104
Toluene	108-88-3	59-139	88
Chlorobenzene	108-90-7	60-133	100
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	101
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	94
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	100

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 40310-3 MS

RAYNARK INDUSTRIES
SAMPLE #: TS*B-68*2-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/04/94, 14:33, ALH

Sample Matrix: SOLID
Analysis Method: 8260 (SOIL)

DATE REPORTED: 3/ 14/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
1,1-Dichloroethene	75-35-4	59-172	109
Trichloroethene	79-01-6	62-137	86
Benzene	71-43-2	66-142	108
Toluene	108-88-3	59-139	100
Chlorobenzene	108-90-7	60-133	100
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	109
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	112
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	101

ANALYSIS (Date/Time/Init): 3/04/94, 15:00, ALH

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery	RPD
1,1-Dichloroethene	75-35-4	59-172	113	4
Trichloroethene	79-01-6	62-137	88	2
Benzene	71-43-2	66-142	106	2
Toluene	108-88-3	59-139	101	1
Chlorobenzene	108-90-7	60-133	98	2
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	107	
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	106	
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	93	

CI: COELUTING INTERFERENCE

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 40310-1

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/07/94, 21:37 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 3/11/94

Dilution Factor: 34.21
Extract Method: 3550
%Solids: 96.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	27.40	109.50	ND	ND
Acenaphthylene	208-96-8	27.40	106.00	<MDL	ND
Anthracene	120-12-7	17.10	71.80	ND	ND
Benzo(a)anthracene	56-55-3	20.50	78.70	<MDL	ND
Benzo(b)fluoranthene	205-99-2	30.80	119.70	42 E	ND
Benzo(k)fluoranthene	207-08-9	30.80	126.60	ND	ND
Benzoic acid	65-85-0	260.00	1046.80	ND	ND
Benzo(g,h,i)perylene	191-24-3	17.10	71.80	ND	ND
Benzo(a)pyrene	193-39-5	17.10	68.40	ND	ND
Benzyl alcohol	100-51-6	20.50	85.50	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	34.20	133.40	ND	ND
bis(2-Chloroethyl)ether	111-44-4	27.40	102.60	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	71.80	283.90	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	30.80	119.70	550	ND
4-Bromophenyl-phenylether	101-55-3	23.90	92.40	ND	ND
Butylbenzylphthalate	85-68-7	27.40	112.90	ND	ND
4-Chloroaniline	106-47-8	17.10	68.40	ND	ND
4-Chloro-3-methylphenol	59-50-7	23.90	95.80	ND	ND
2-Chloronaphthalene	91-58-7	27.40	116.30	ND	ND
2-Chlorophenol	95-57-8	23.90	99.20	ND	ND
4-Chlorophenyl-phenylether	59-50-7	27.40	109.50	ND	ND
Chrysene	218-01-9	17.10	65.00	<MDL	ND
Dibenz(a,h)anthracene	53-70-3	20.50	78.70	ND	ND
Dibenzofuran	132-64-9	27.40	102.60	<MDL	ND
Di-n-butylphthalate	84-74-2	23.90	102.60	150	ND
1,2-Dichlorobenzene	95-50-1	27.40	106.00	ND	ND
1,3-Dichlorobenzene	541-73-1	23.90	95.80	ND	ND
1,4-Dichlorobenzene	106-46-7	23.90	102.60	ND	ND
3,3'-Dichlorobenzidine	91-94-1	30.80	126.60	ND	ND
2,4-Dichlorophenol	120-83-2	30.80	116.30	ND	ND
Diethylphthalate	84-66-2	20.50	85.50	ND	ND
2,4-Dimethylphenol	105-67-9	47.90	184.70	280	ND
Dimethylphthalate	131-11-3	23.90	99.20	<MDL	ND
4,6-Dinitro-2-methylphenol	534-52-1	20.50	85.50	ND	ND
2,4-Dinitrophenol	51-28-5	841.50	3362.80	ND	ND
2,4-Dinitrotoluene	121-14-2	47.90	198.40	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-1

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/07/94, 21:37 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 3/11/94

Dilution Factor: 34.21
Extract Method: 3550
%Solids: 96.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	23.90	88.90	ND	ND
Di-n-octylphthalate	117-84-0	44.50	174.50	<MDL	ND
Fluoranthene	206-44-0	23.90	92.40	<MDL	ND
Fluorene	7782-41-4	23.90	102.60	ND	ND
Hexachlorobenzene	118-74-1	20.50	88.90	ND	ND
Hexachlorobutadiene	87-68-3	27.40	112.90	ND	ND
Hexachlorocyclopentadiene	77-47-4	20.50	82.10	ND	ND
Hexachloroethane	67-72-1	23.90	95.80	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	20.50	78.70	ND	ND
Isophorone	78-59-1	30.80	119.70	ND	ND
2-Methylnaphthalene	91-57-6	34.20	130.00	64 E	ND
2-Methylphenol	95-48-7	30.80	123.20	ND	ND
3-,4-Methylphenol	106-44-5	13.70	51.30	730	ND
Naphthalene	91-57-6	30.80	123.20	42 E	ND
2-Nitroaniline	88-74-4	20.50	82.10	ND	ND
3-Nitroaniline	99-09-3	82.10	335.20	ND	ND
4-Nitroaniline	100-01-6	34.20	133.40	ND	ND
Nitrobenzene	98-95-3	30.80	119.70	ND	ND
2-Nitrophenol	88-75-5	23.90	99.20	110	ND
4-Nitrophenol	100-01-6	253.10	1012.60	620 E	ND
N-Nitrosodiphenylamine*	86-30-6	34.20	130.00	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	27.40	27.40	ND	ND
Pentachlorophenol	87-86-5	20.50	88.90	ND	ND
Phenanthrene	85-01-8	23.90	88.90	92	ND
Phenol	108-95-2	13.70	65.00	ND	ND
Pyrene	129-00-0	23.90	99.20	<MDL	ND
1,2,4-Trichlorobenzene	120-82-1	27.40	112.90	ND	ND
2,4,5-Trichlorophenol	95-95-4	27.40	116.30	ND	ND
2,4,6-Trichlorophenol	88-06-02	27.40	102.60	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		61	67
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		60	65
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		66	77
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		82	67
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		89	70
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		101	77

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit
*as Diphenylamine
DO: Diluted Out
CI: Coeluting Interference

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-2

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/10/94, 4:53 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 3/11/94

Dilution Factor: 250.4
Extract Method: 3550
%Solids: 66.7

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	200.30	801.20	<MDL	ND
Acenaphthylene	208-96-8	200.30	776.20	ND	ND
Anthracene	120-12-7	125.20	525.80	210 E	ND
Benzo(a)anthracene	56-55-3	150.20	575.90	460 E	ND
Benzo(b)fluoranthene	205-99-2	225.30	876.30	910	ND
Benzo(k)fluoranthene	207-08-9	225.30	926.40	<MDL	ND
Benzoic acid	65-85-0	1902.90	7661.50	ND	ND
Benzo(g,h,i)perylene	191-24-3	125.20	525.80	ND	ND
Benzo(a)pyrene	193-39-5	125.20	500.80	350 E	ND
Benzyl alcohol	100-51-6	150.20	625.90	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	250.40	976.50	ND	ND
bis(2-Chloroethyl)ether	111-44-4	200.30	751.10	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	525.80	2078.10	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	225.30	876.30	440 E	ND
4-Bromophenyl-phenylether	101-55-3	175.30	676.00	ND	ND
Butylbenzylphthalate	85-68-7	200.30	826.20	ND	ND
4-Chloroaniline	106-47-8	125.20	500.80	ND	ND
4-Chloro-3-methylphenol	59-50-7	175.30	701.10	ND	ND
2-Chloronaphthalene	91-58-7	200.30	851.30	ND	ND
2-Chlorophenol	95-57-8	175.30	726.10	ND	ND
4-Chlorophenyl-phenylether	59-50-7	200.30	801.20	ND	ND
Chrysene	218-01-9	125.20	475.70	420 E	ND
Dibenz(a,h)anthracene	53-70-3	150.20	575.90	ND	ND
Dibenzofuran	132-64-9	200.30	751.10	<MDL	ND
Di-n-butylphthalate	84-74-2	175.30	751.10	<MDL	ND
1,2-Dichlorobenzene	95-50-1	200.30	776.20	ND	ND
1,3-Dichlorobenzene	541-73-1	175.30	701.10	ND	ND
1,4-Dichlorobenzene	106-46-7	175.30	751.10	ND	ND
3,3'-Dichlorobenzidine	91-94-1	225.30	926.40	2800	ND
2,4-Dichlorophenol	120-83-2	225.30	851.30	ND	ND
Diethylphthalate	84-66-2	150.20	625.90	ND	ND
2,4-Dimethylphenol	105-67-9	350.50	1352.00	380 E	ND
Dimethylphthalate	131-11-3	175.30	726.10	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	150.20	625.90	ND	ND
2,4-Dinitrophenol	51-28-5	6159.20	24611.90	ND	ND
2,4-Dinitrotoluene	121-14-2	350.50	1452.20	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-2

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/10/94, 4:53 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 3/11/94

Dilution Factor: 250.4
Extract Method: 3550
%Solids: 66.7

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	175.30	651.00	ND	ND
Di-n-octylphthalate	117-84-0	325.50	1276.90	ND	ND
Fluoranthene	206-44-0	175.30	676.00	780	ND
Fluorene	7782-41-4	175.30	751.10	270 E	ND
Hexachlorobenzene	118-74-1	150.20	651.00	ND	ND
Hexachlorobutadiene	87-68-3	200.30	826.20	ND	ND
Hexachlorocyclopentadiene	77-47-4	150.20	600.90	ND	ND
Hexachloroethane	67-72-1	175.30	701.10	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	150.20	575.90	ND	ND
Isophorone	78-59-1	225.30	876.30	ND	ND
2-Methylnaphthalene	91-57-6	250.40	951.40	760 E	ND
2-Methylphenol	95-48-7	225.30	901.40	ND	ND
3-,4-Methylphenol	106-44-5	100.20	375.60	ND	ND
Naphthalene	91-57-6	225.30	901.40	880 E	ND
2-Nitroaniline	88-74-4	150.20	600.90	ND	ND
3-Nitroaniline	99-09-3	600.90	2453.70	ND	ND
4-Nitroaniline	100-01-6	250.40	976.50	ND	ND
Nitrobenzene	98-95-3	225.30	876.30	ND	ND
2-Nitrophenol	88-75-5	175.30	726.10	ND	ND
4-Nitrophenol	100-01-6	1852.80	7411.10	ND	ND
N-Nitrosodiphenylamine*	86-30-6	250.40	951.40	770 E	ND
N-Nitroso-di-n-propylamine	621-64-7	200.30	200.30	ND	ND
Pentachlorophenol	87-86-5	150.20	651.00	ND	ND
Phenanthrene	85-01-8	175.30	651.00	1200	ND
Phenol	108-95-2	100.20	475.70	ND	ND
Pyrene	129-00-0	175.30	726.10	890	ND
1,2,4-Trichlorobenzene	120-82-1	200.30	826.20	ND	ND
2,4,5-Trichlorophenol	95-95-4	200.30	851.30	ND	ND
2,4,6-Trichlorophenol	88-06-02	200.30	751.10	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		91	67
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		106	65
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		101	77
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		119	67
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		88	70
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		126	77

E: Estimated, ND: Not detected | *as Diphenylamine | CI: Coeluting Interference
MDL: Method Detection Limit | DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-3

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/10/94, 5:33 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 4/13/94

Dilution Factor: 247.4
Extract Method: 3550
%Solids: 67.2

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	197.90	791.50	<MDL	ND
Acenaphthylene	208-96-8	197.90	766.80	440 E	ND
Anthracene	120-12-7	123.70	519.40	410 E	ND
Benzo(a)anthracene	56-55-3	148.40	568.90	1700	ND
Benzo(b)fluoranthene	205-99-2	222.60	865.70	4700	ND
Benzo(k)fluoranthene	207-08-9	222.60	915.20	ND	ND
Benzoic acid	65-85-0	1879.90	7569.10	ND	ND
Benzo(g,h,i)perylene	191-24-3	123.70	519.40	ND	ND
Benzo(a)pyrene	193-39-5	123.70	494.70	2200	ND
Benzyl alcohol	100-51-6	148.40	618.40	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	247.40	964.70	ND	ND
bis(2-Chloroethyl)ether	111-44-4	197.90	742.10	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	519.40	2053.10	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	222.60	865.70	280 E	ND
4-Bromophenyl-phenylether	101-55-3	173.10	667.90	ND	ND
Butylbenzylphthalate	85-68-7	197.90	816.30	ND	ND
4-Chloroaniline	106-47-8	123.70	494.70	ND	ND
4-Chloro-3-methylphenol	59-50-7	173.10	692.60	ND	ND
2-Chloronaphthalene	91-58-7	197.90	841.00	ND	ND
2-Chlorophenol	95-57-8	173.10	717.30	ND	ND
4-Chlorophenyl-phenylether	59-50-7	197.90	791.50	ND	ND
Chrysene	218-01-9	123.70	470.00	2500	ND
Dibenz(a,h)anthracene	53-70-3	148.40	568.90	ND	ND
Dibenzofuran	132-64-9	197.90	742.10	<MDL	ND
Di-n-butylphthalate	84-74-2	173.10	742.10	<MDL	ND
1,2-Dichlorobenzene	95-50-1	197.90	766.80	ND	ND
1,3-Dichlorobenzene	541-73-1	173.10	692.60	ND	ND
1,4-Dichlorobenzene	106-46-7	173.10	742.10	ND	ND
3,3'-Dichlorobenzidine	91-94-1	222.60	915.20	500 E	ND
2,4-Dichlorophenol	120-83-2	222.60	841.00	ND	ND
Diethylphthalate	84-66-2	148.40	618.40	ND	ND
2,4-Dimethylphenol	105-67-9	346.30	1335.70	ND	ND
Dimethylphthalate	131-11-3	173.10	717.30	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	148.40	618.40	ND	ND
2,4-Dinitrophenol	51-28-5	6085.00	24315.10	ND	ND
2,4-Dinitrotoluene	121-14-2	346.30	1434.70	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-3

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/10/94, 5:33 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 4/13/94

Dilution Factor: 247.4
Extract Method: 3550
%Solids: 67.2

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	173.10	643.10	ND	ND
Di-n-octylphthalate	117-84-0	321.60	1261.50	<MDL	ND
Fluoranthene	206-44-0	173.10	667.90	3500	ND
Fluorene	7782-41-4	173.10	742.10	220 E	ND
Hexachlorobenzene	118-74-1	148.40	643.10	ND	ND
Hexachlorobutadiene	87-68-3	197.90	816.30	ND	ND
Hexachlorocyclopentadiene	77-47-4	148.40	593.70	ND	ND
Hexachloroethane	67-72-1	173.10	692.60	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	148.40	568.90	780	ND
Isophorone	78-59-1	222.60	865.70	ND	ND
2-Methylnaphthalene	91-57-6	247.40	940.00	<MDL	ND
2-Methylphenol	95-48-7	222.60	890.50	ND	ND
3-,4-Methylphenol	106-44-5	98.90	371.00	ND	ND
Naphthalene	91-57-6	222.60	890.50	<MDL	ND
2-Nitroaniline	88-74-4	148.40	593.70	ND	ND
3-Nitroaniline	99-09-3	593.70	2424.10	ND	ND
4-Nitroaniline	100-01-6	247.40	964.70	ND	ND
Nitrobenzene	98-95-3	222.60	865.70	ND	ND
2-Nitrophenol	88-75-5	173.10	717.30	ND	ND
4-Nitrophenol	100-01-6	1830.40	7321.70	ND	ND
N-Nitrosodiphenylamine*	86-30-6	247.40	940.00	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	197.90	197.90	ND	ND
Pentachlorophenol	87-86-5	148.40	643.10	ND	ND
Phenanthrene	85-01-8	173.10	643.10	2300	ND
Phenol	108-95-2	98.90	470.00	ND	ND
Pyrene	129-00-0	173.10	717.30	3500	ND
1,2,4-Trichlorobenzene	120-82-1	197.90	816.30	ND	ND
2,4,5-Trichlorophenol	95-95-4	197.90	841.00	ND	ND
2,4,6-Trichlorophenol	88-06-02	197.90	742.10	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		88	67
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		104	65
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		101	77
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		116	67
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		90	70
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		119	77

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

*as Diphenylamine
DO: Diluted Out

CI: Coeluting Interference

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-4

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/10/94, 6:13 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 3/11/94

Dilution Factor: 244.5
Extract Method: 3550
%Solids: 68.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	195.60	782.50	870	ND
Acenaphthylene	208-96-8	195.60	758.00	1100	ND
Anthracene	120-12-7	122.30	513.50	1400	ND
Benzo(a)anthracene	56-55-3	146.70	562.40	2700	ND
Benzo(b)fluoranthene	205-99-2	220.10	855.80	4300	ND
Benzo(k)fluoranthene	207-08-9	220.10	904.80	1200	ND
Benzoic acid	65-85-0	1858.40	7482.50	ND	ND
Benzo(g,h,i)perylene	191-24-3	122.30	513.50	1600	ND
Benzo(a)pyrene	193-39-5	122.30	489.10	2900	ND
Benzyl alcohol	100-51-6	146.70	611.30	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	244.50	953.70	ND	ND
bis(2-Chloroethyl)ether	111-44-4	195.60	733.60	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	513.50	2029.60	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	220.10	855.80	520 E	ND
4-Bromophenyl-phenylether	101-55-3	171.20	660.20	ND	ND
Butylbenzylphthalate	85-68-7	195.60	806.90	ND	ND
4-Chloroaniline	106-47-8	122.30	489.10	ND	ND
4-Chloro-3-methylphenol	59-50-7	171.20	684.70	ND	ND
2-Chloronaphthalene	91-58-7	195.60	831.40	ND	ND
2-Chlorophenol	95-57-8	171.20	709.10	ND	ND
4-Chlorophenyl-phenylether	59-50-7	195.60	782.50	ND	ND
Chrysene	218-01-9	122.30	464.60	2700	ND
Dibenz(a,h)anthracene	53-70-3	146.70	562.40	430 E	ND
Dibenzofuran	132-64-9	195.60	733.60	1100	ND
Di-n-butylphthalate	84-74-2	171.20	733.60	<MDL	ND
1,2-Dichlorobenzene	95-50-1	195.60	758.00	ND	ND
1,3-Dichlorobenzene	541-73-1	171.20	684.70	ND	ND
1,4-Dichlorobenzene	106-46-7	171.20	733.60	ND	ND
3,3'-Dichlorobenzidine	91-94-1	220.10	904.80	ND	ND
2,4-Dichlorophenol	120-83-2	220.10	831.40	ND	ND
Diethylphthalate	84-66-2	146.70	611.30	ND	ND
2,4-Dimethylphenol	105-67-9	342.30	1320.40	20000	ND
Dimethylphthalate	131-11-3	171.20	709.10	1400	ND
4,6-Dinitro-2-methylphenol	534-52-1	146.70	611.30	ND	ND
2,4-Dinitrophenol	51-28-5	6015.40	24037.10	ND	ND
2,4-Dinitrotoluene	121-14-2	342.30	1418.30	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 40310-4

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
ANALYSIS (Date/Time/Init): 3/10/94, 6:13 , TAG
EXTRACTION (Date/Init): 3/3/94, JG & KK

DATE REPORTED: 3/11/94

Dilution Factor: 244.5
Extract Method: 3550
%Solids: 68.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	171.20	635.80	ND	ND
Di-n-octylphthalate	117-84-0	317.90	1247.10	ND	ND
Fluoranthene	206-44-0	171.20	660.20	6000	ND
Fluorene	7782-41-4	171.20	733.60	2100	ND
Hexachlorobenzene	118-74-1	146.70	635.80	ND	ND
Hexachlorobutadiene	87-68-3	195.60	806.90	ND	ND
Hexachlorocyclopentadiene	77-47-4	146.70	586.90	ND	ND
Hexachloroethane	67-72-1	171.20	684.70	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	146.70	562.40	1200	ND
Isophorone	78-59-1	220.10	855.80	ND	ND
2-Methylnaphthalene	91-57-6	244.50	929.20	2000	ND
2-Methylphenol	95-48-7	220.10	880.30	880 E	ND
3-,4-Methylphenol	106-44-5	97.80	366.80	7100	ND
Naphthalene	91-57-6	220.10	880.30	2000	ND
2-Nitroaniline	88-74-4	146.70	586.90	ND	ND
3-Nitroaniline	99-09-3	586.90	2396.40	ND	ND
4-Nitroaniline	100-01-6	244.50	953.70	ND	ND
Nitrobenzene	98-95-3	220.10	855.80	ND	ND
2-Nitrophenol	88-75-5	171.20	709.10	ND	ND
4-Nitrophenol	100-01-6	1809.50	7238.00	ND	ND
N-Nitrosodiphenylamine*	86-30-6	244.50	929.20	830 E	ND
N-Nitroso-di-n-propylamine	621-64-7	195.60	195.60	ND	ND
Pentachlorophenol	87-86-5	146.70	635.80	ND	ND
Phenanthrene	85-01-8	171.20	635.80	5900	ND
Phenol	108-95-2	97.80	464.60	ND	ND
Pyrene	129-00-0	171.20	709.10	5700	ND
1,2,4-Trichlorobenzene	120-82-1	195.60	806.90	ND	ND
2,4,5-Trichlorophenol	95-95-4	195.60	831.40	ND	ND
2,4,6-Trichlorophenol	88-06-02	195.60	733.60	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		94	67
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		103	65
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		97	77
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		138	67
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		98	70
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		126	77

E: Estimated, ND: Not detected
*as Diphenylamine
CI: Coeluting Interference
MDL: Method Detection Limit
DO: Diluted Out
PQL: Practical Quantitation Limit

KIBER Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-BS

EXTRACTION (Date/Init): 3/3/94, JG & KK
ANALYSIS (Date/Time/Init): 3/3/94, 22:17, ALH

DATE REPORTED: 3/11/94

Analysis Method: 8270

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
Phenol	108-95-2	29-90	58
2-Chlorophenol	95-57-8	25-102	64
1,4-Dichlorobenzene	106-46-7	28-104	73
N-Nitroso-di-n-propylamine	621-64-7	41-126	75
1,2,4-Trichlorobenzene	120-82-1	38-107	68
4-Chloro-3-methylphenol	59-50-7	26-103	63
Acenaphthene	83-32-9	31-137	70
4-Nitrophenol	100-02-7	11-114	84
2,4-Dinitrotoluene	121-14-2	28-89	79
Pentachlorophenol	87-86-5	17-109	96
Pyrene	129-00-0	35-142	77
2-Fluorophenol	% Recovery	[OK=25-121]	66
Phenol-d6	% Recovery	[OK=24-113]	63
Nitrobenzene-d5	% Recovery	[OK=23-120]	67
2-Fluorobiphenyl	% Recovery	[OK=30-115]	67
2,4,6-Tribromophenol	% Recovery	[OK=19-122]	82
Terphenyl-d14	% Recovery	[OK=18-137]	80

KIBER Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 40310-1MS

RAYMARK
SAMPLE #: TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTION (Date/Init): 3/3/94, JG & KK
ANALYSIS (Date/Time/Init): 3/7/94, 22:17, TAG

Sample Matrix: SOLID
Analysis Method: 8270

DATE REPORTED: 3/11/94
** SEE CASE NARRATIVE

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Phenol	108-95-2	29-90	58
2-Chlorophenol	95-57-8	25-102	66
1,4-Dichlorobenzene	106-46-7	28-104	66
N-Nitroso-di-n-propylamine	621-64-7	41-126	69
1,2,4-Trichlorobenzene	120-82-1	38-107	75
4-Chloro-3-methylphenol	59-50-7	26-103	68
Acenaphthene	83-32-9	31-137	76
4-Nitrophenol	100-02-7	11-114	92
2,4-Dinitrotoluene	121-14-2	28-89	95**
Pentachlorophenol	87-86-5	17-109	108
Pyrene	129-00-0	35-142	82
2-Fluorophenol	% Recovery	[OK=25-121]	62
Phenol-d6	% Recovery	[OK=24-113]	60
Nitrobenzene-d5	% Recovery	[OK=23-120]	68
2-Fluorobiphenyl	% Recovery	[OK=30-115]	73
2,4,6-Tribromophenol	% Recovery	[OK=19-122]	90
Terphenyl-d14	% Recovery	[OK=18-137]	86

ANALYSIS (Date/Time/Init): 3/7/94, 22:57, TAG

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	%RPD
Phenol	108-95-2	29-90	63	8
2-Chlorophenol	95-57-8	25-102	72	9
1,4-Dichlorobenzene	106-46-7	28-104	73	9
N-Nitroso-di-n-propylamine	621-64-7	41-126	76	10
1,2,4-Trichlorobenzene	120-82-1	38-107	76	2
4-Chloro-3-methylphenol	59-50-7	26-103	73	7
Acenaphthene	83-32-9	31-137	80	5
4-Nitrophenol	100-02-7	11-114	98	6
2,4-Dinitrotoluene	121-14-2	28-89	111**	16
Pentachlorophenol	87-86-5	17-109	123**	12
Pyrene	129-00-0	35-142	77	7
2-Fluorophenol	% Recovery	[OK=25-121]	66	
Phenol-d6	% Recovery	[OK=24-113]	65	
Nitrobenzene-d5	% Recovery	[OK=23-120]	71	
2-Fluorobiphenyl	% Recovery	[OK=30-115]	78	
2,4,6-Tribromophenol	% Recovery	[OK=19-122]	94	
Terphenyl-d14	% Recovery	[OK=18-137]	89	

CI: Coeluting Interference

KIBER Environmental Services

LAB SAMPLE # 40310-1
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-10*1.5-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTION (Date/Init): 3/10/94, JG
ANALYSIS (Date/Time/Init): 3/10/94, 16:00, DLL

DATE REPORTED: 3/14/94

Quant Factor: 3.49
Extract Method: 3550
% Solids: 96.0

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	70	279	ND	ND
alpha-BHC	319-84-6	70	279	ND	ND
beta-BHC	319-85-7	70	279	ND	ND
gamma-BHC (Lindane)	58-89-9	70	279	ND	ND
delta-BHC	319-86-8	70	279	ND	ND
alpha-Chlordane	5103-71-9	70	279	ND	ND
gamma-Chlordane	5103-74-2	70	279	ND	ND
4,4'-DDD	72-54-8	140	558	ND	ND
4,4'-DDE	72-55-9	140	558	ND	ND
4,4'-DDT	50-29-3	140	558	ND	ND
Dieldrin	60-57-1	140	558	ND	ND
Endosulfan I	959-98-8	70	279	ND	ND
Endosulfan II	33213-65-9	140	558	ND	ND
Endosulfan sulfate	1031-07-8	140	558	ND	ND
Endrin	72-20-8	140	558	ND	ND
Endrin aldehyde	7421-93-4	140	558	ND	ND
Endrin ketone	53494-70-5	140	558	ND	ND
Heptachlor	76-44-8	70	279	ND	ND
Heptachlor epoxide	1024-57-3	70	279	ND	ND
Methoxychlor	72-43-5	698	2,792	ND	ND
Toxaphene	8001-35-2	3,490	13,959	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	127

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 40310-2
PROJECT # 854

G ECD CHLORINATED
ESTICIDE RESULTS

SAMPLE : TS*B-68*6-8
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTION (Date/Init): 3/10/94, JG
ANALYSIS (Date/Time/Init): 3/10/94, 16:37, DLL

DATE REPORTED: 3/14/94

Quant Factor: 95.25
Extract Method: 3550
% Solids: 66.7

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	1,905	7,620	ND	ND
alpha-BHC	319-84-6	1,905	7,620	ND	ND
beta-BHC	319-85-7	1,905	7,620	ND	ND
gamma-BHC (Lindane)	58-89-9	1,905	7,620	ND	ND
delta-BHC	319-86-8	1,905	7,620	ND	ND
alpha-Chlordane	5103-71-9	1,905	7,620	ND	ND
gamma-Chlordane	5103-74-2	1,905	7,620	ND	ND
4,4'-DDD	72-54-8	3,810	15,240	ND	ND
4,4'-DDE	72-55-9	3,810	15,240	ND	ND
4,4'-DDT	50-29-3	3,810	15,240	ND	ND
Dieldrin	60-57-1	3,810	15,240	ND	ND
Endosulfan I	959-98-8	1,905	7,620	ND	ND
Endosulfan II	33213-65-9	3,810	15,240	ND	ND
Endosulfan sulfate	1031-07-8	3,810	15,240	ND	ND
Endrin	72-20-8	3,810	15,240	ND	ND
Endrin aldehyde	7421-93-4	3,810	15,240	ND	ND
Endrin ketone	53494-70-5	3,810	15,240	ND	ND
Heptachlor	76-44-8	1,905	7,620	ND	ND
Heptachlor epoxide	1024-57-3	1,905	7,620	ND	ND
Methoxychlor	72-43-5	19,050	76,201	ND	ND
Toxaphene	8001-35-2	95,251	381,004	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	127

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 40310-3
PROJECT # 854

GC-ECD CHLORINATED
PESTICIDE RESULTS

SAMPLE # TS*B-68*2-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTION (Date/Init): 3/10/94, JG
ANALYSIS (Date/Time/Init): 3/10/94, 17:15, DLL

DATE REPORTED: 3/14/94

Quant Factor: 96.25
Extract Method: 3550
% Solids: 67.2

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	1,925	7,700	ND	ND
alpha-BHC	319-84-6	1,925	7,700	ND	ND
beta-BHC	319-85-7	1,925	7,700	ND	ND
gamma-BHC (Lindane)	58-89-9	1,925	7,700	ND	ND
delta-BHC	319-86-8	1,925	7,700	ND	ND
alpha-Chlordane	5103-71-9	1,925	7,700	ND	ND
gamma-Chlordane	5103-74-2	1,925	7,700	ND	ND
4,4'-DDD	72-54-8	3,850	15,401	ND	ND
4,4'-DDE	72-55-9	3,850	15,401	ND	ND
4,4'-DDT	50-29-3	3,850	15,401	ND	ND
Dieldrin	60-57-1	3,850	15,401	ND	ND
Endosulfan I	959-98-8	1,925	7,700	ND	ND
Endosulfan II	33213-65-9	3,850	15,401	ND	ND
Endosulfan sulfate	1031-07-8	3,850	15,401	ND	ND
Endrin	72-20-8	3,850	15,401	ND	ND
Endrin aldehyde	7421-93-4	3,850	15,401	ND	ND
Endrin ketone	53494-70-5	3,850	15,401	ND	ND
Heptachlor	76-44-8	1,925	7,700	ND	ND
Heptachlor epoxide	1024-57-3	1,925	7,700	ND	ND
Methoxychlor	72-43-5	19,251	77,004	ND	ND
Toxaphene	8001-35-2	96,255	385,018	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO	127

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 40310-4
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-7*4-6
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTION (Date/Init): 3/10/94, JG
ANALYSIS (Date/Time/Init): 3/10/94, 17:52, DLL

DATE REPORTED: 3/14/94

Quant Factor: 97.00
Extract Method: 3550
% Solids: 68.0

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	1,940	7,760	ND	ND
alpha-BHC	319-84-6	1,940	7,760	ND	ND
beta-BHC	319-85-7	1,940	7,760	ND	ND
gamma-BHC (Lindane)	58-89-9	1,940	7,760	ND	ND
delta-BHC	319-86-8	1,940	7,760	ND	ND
alpha-Chlordane	5103-71-9	1,940	7,760	ND	ND
gamma-Chlordane	5103-74-2	1,940	7,760	ND	ND
4,4'-DDD	72-54-8	3,880	15,521	ND	ND
4,4'-DDE	72-55-9	3,880	15,521	ND	ND
4,4'-DDT	50-29-3	3,880	15,521	ND	ND
Dieldrin	60-57-1	3,880	15,521	ND	ND
Endosulfan I	959-98-8	1,940	7,760	ND	ND
Endosulfan II	33213-65-9	3,880	15,521	ND	ND
Endosulfan sulfate	1031-07-8	3,880	15,521	ND	ND
Endrin	72-20-8	3,880	15,521	ND	ND
Endrin aldehyde	7421-93-4	3,880	15,521	ND	ND
Endrin ketone	53494-70-5	3,880	15,521	ND	ND
Heptachlor	76-44-8	1,940	7,760	ND	ND
Heptachlor epoxide	1024-57-3	1,940	7,760	ND	ND
Methoxychlor	72-43-5	19,401	77,604	ND	ND
Toxaphene	8001-35-2	97,005	388,018	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO	127

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 854-40310-1
MS & MSD

PESTICIDE MATRIX
SPIKE RESULTS

SAMPLE # TS*B-10*1.5-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTED (Date / Init) : 3/10/94, JG
ANALYSIS (Date/Time/Init): 3/10/94, 18:29, DLL

Sample Matrix: SOLID
Analysis Method: 8080

DATE REPORTED: 3/14/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
gamma-BHC (Lindane)	58-89-9	56- 123	DO
Heptachlor	76-44-8	40- 131	DO
Aldrin	309-00-2	40- 120	DO
Dieldrin	60-57-1	52- 126	DO
Endrin	72-20-8	56- 121	DO
4,4'-DDT	50-29-3	38- 127	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS (Date/Time/Init): 3/14/94, 19:06, DLL

MATRIX SPIKE DUP	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
gamma-BHC (Lindane)	58-89-9	56- 123	DO	DO
Heptachlor	76-44-8	40- 131	DO	DO
Aldrin	309-00-2	40- 120	DO	DO
Dieldrin	60-57-1	52- 126	DO	DO
Endrin	72-20-8	56- 121	DO	DO
4,4'-DDT	50-29-3	38- 127	DO	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTED (Date / Init) : 3/2/94, JG
ANALYSIS (Date/Time/Init): 3/11/94, 10:20, DLL

DATE REPORTED: 3/14/94

Quant Factor: 35.23 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 96.0

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	3523	ND	ND
Aroclor-1221	11104-28-2	7045	ND	ND
Aroclor-1232	11141-16-5	3523	ND	ND
Aroclor-1242	53469-21-9	3523	ND	ND
Aroclor-1248	12672-29-6	3523	ND	ND
Aroclor-1254	11097-69-1	3523	ND	ND
Aroclor-1260	11096-82-5	3523	ND	ND
Aroclor-1262	37324-23-5	3523	19,000E	ND
Aroclor-1268	11100-14-4	3523	11,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	99

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTED (Date / Init) : 3/2/94, JG
ANALYSIS (Date/Time/Init): 3/11/94, 05:41, DLL

DATE REPORTED: 3/14/94

Quant Factor: 252.0 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 66.7

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	25197	ND	ND
Aroclor-1221	11104-28-2	50395	ND	ND
Aroclor-1232	11141-16-5	25197	ND	ND
Aroclor-1242	53469-21-9	25197	ND	ND
Aroclor-1248	12672-29-6	25197	ND	ND
Aroclor-1254	11097-69-1	25197	ND	ND
Aroclor-1260	11096-82-5	25197	ND	ND
Aroclor-1262	37324-23-5	25197	96,000E	ND
Aroclor-1268	11100-14-4	25197	60,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	99

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTED (Date / Init) : 3/2/94, JG
ANALYSIS (Date/Time/Init): 3/11/94, 06:37, DLL

DATE REPORTED: 3/14/94

Quant Factor: 100.6 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 67.2

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	10062	ND	ND
Aroclor-1221	11104-28-2	20123	ND	ND
Aroclor-1232	11141-16-5	10062	ND	ND
Aroclor-1242	53469-21-9	10062	ND	ND
Aroclor-1248	12672-29-6	10062	ND	ND
Aroclor-1254	11097-69-1	10062	ND	ND
Aroclor-1260	11096-82-5	10062	ND	ND
Aroclor-1262	37324-23-5	10062	54,000E	ND
Aroclor-1268	11100-14-4	10062	35,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	99

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40310-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTED (Date / Init) : 3/2/94, JG
ANALYSIS (Date/Time/Init): 3/11/94, 07:33, DLL

DATE REPORTED: 3/14/94

Quant Factor: 247.7 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 68.0

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	24766	ND	ND
Aroclor-1221	11104-28-2	49531	ND	ND
Aroclor-1232	11141-16-5	24766	ND	ND
Aroclor-1242	53469-21-9	24766	ND	ND
Aroclor-1248	12672-29-6	24766	ND	ND
Aroclor-1254	11097-69-1	24766	ND	ND
Aroclor-1260	11096-82-5	24766	ND	ND
Aroclor-1262	37324-23-5	24766	140,000E	ND
Aroclor-1268	11100-14-4	24766	90,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	99

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 854-40310-3
MS & MSD

PCB MATRIX
SPIKE RESULTS

SAMPLE # TS*B-68*2-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/2/94, 10:00, SH
EXTRACTED (Date / Init) : 3/2/94, JG
ANALYSIS (Date/Time/Init): 3/11/94, 08:28, DLL

DATE REPORTED: 3/14/94

Sample Matrix: SOLID
Analysis Method: 8080

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS(Date/Time/Init): 3/11/94, 09:24, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	DO	NA

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out, NA: Not Applicable

KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082

PCDD/PCDF ANALYSIS REPORT

BATCH: B001024S

SAMPLE: DFBLK1024

FILE: MA03195

BLANK

QUOTE NO:	39856	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	854 140310	DATE RECEIVED:	NA	RETCHECK:	MA03187
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03186
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/10/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/11/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	10.03 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#39

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.069	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.12	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.2	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.099	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.17	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.2	-	-	-	U
OCDD	458/460	ND	0.26	-	-	-	U
2,3,7,8-TCDF	304/306	ND	0.06	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	0.094	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	0.098	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	0.11	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	0.086	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.16	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.2	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	0.16	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.18	-	-	-	U
OCDF	442/444	ND	0.33	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.07	0.677	21.17 – 25.01	X
TOTAL PeCDD	0	ND	0.12	0.543	26.75 – 30.58	X
TOTAL HxCDD	0	ND	0.2	-	33.02 – 35.97	U
TOTAL HpCDD	0	ND	0.2	-	38.60 – 39.97	U
TOTAL TCDF	0	ND	0.06	0.0683	20.06 – 25.06	X
TOTAL PeCDF	0	ND	0.098	-	25.12 – 30.83	U
TOTAL HxCDF	0	ND	0.2	-	31.95 – 36.59	U
TOTAL HpCDF	0	ND	0.18	0.483	38.46 – 40.32	X

NOTE: Concentrations, EMPCs, and EDLs are calculated on a WET weight basis.

Reviewed by: MARISTELLA PARTIN 3/11/94

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PROJECT: P013082

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B001024S

FILE: MA03195

SAMPLE: DFBLK1024

BLANK

QUOTE NO:	39856	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	854140310	DATE RECEIVED:	NA	RETCHECK:	MA03187
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03186
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/10/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/11/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	10.03 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#39

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	4	80%	40%-120%	0.81	23.00	-
13C12-2,3,7,8-TCDD	332/334	4.19	84%	40%-120%	0.79	23.77	-
13C12-1,2,3,6,7,8-HxCDD	402/404	4.26	86%	40%-120%	1.25	35.39	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	6.72	67%	40%-120%	1.09	38.47	-
13C12-OCDD	470/472	3.89	39%	25%-120%	0.92	43.90	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.81	23.55	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.26	35.90	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	2.39	96%	40%-120%	NA	23.79	-

Flags:

- **U** – The compound was analyzed for but not detected at or above the detection limit.
- **J** – The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E** – The analyte was detected at concentrations greater than the calibrated range.
- **B** – The analyte was found in the associated blank.
- **D** – The analyte was identified in the analysis at a secondary dilution factor.
- **S** – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X** – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y** – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC** – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- **DL** – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **EMPC** – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **RATIO** – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT** – The retention time of an analyte, given decimal minutes.
- **NO** – The total number of peaks identified as analytes within the retention time window.
- **% REC** – The percent recovery of the indicated standard.

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PROJECT: P013082 **PCDD/PCDF TOXICITY EQUIVALENTS REPORT**

BATCH: B001024S SAMPLE: DFBLK1024

FILE: MA03195 BLANK

QUOTE NO:	39856	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	854 140310	DATE RECEIVED:	NA	RETCHECK:	MA03187
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03186
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/10/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/11/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	10.03 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#39

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

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KIBER ENVIRONMENTAL SERVICES

PROJECT: B001025S

PCDD/PCDF ANALYSIS REPORT

BATCH: B001025S

FILE: MA03211

SAMPLE: DFBLK1025

BLANK

QUOTE NO:	NA	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	NA	DATE RECEIVED:	NA	RETCHECK:	MA03201
PROJECT P.O.:	NA	DATE EXTRACTED:	3/5/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001025S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/14/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	3.04 G	DETECTION LIMIT:	EDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#36

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	6.9	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	8.9	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	24	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	23	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	22	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	30	-	-	-	U
OCDD	458/460	ND	78	-	-	-	U
2,3,7,8-TCDF	304/306	ND	4.8	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	5.9	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	5.9	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	18	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	16	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	18	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	19	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	25	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	28	-	-	-	U
OCDF	442/444	ND	54	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	6.90	56.7	21.16 – 25.00	X
TOTAL PeCDD	0	ND	8.9	64	26.76 – 30.59	X
TOTAL HxCDD	0	ND	24	-	33.06 – 35.98	U
TOTAL HpCDD	0	ND	30	-	38.61 – 39.97	U
TOTAL TCDF	0	ND	4.80	5.58	20.08 – 25.08	X
TOTAL PeCDF	0	ND	5.9	-	25.12 – 30.85	U
TOTAL HxCDF	0	ND	19	-	31.97 – 36.60	U
TOTAL HpCDF	0	ND	28	-	38.48 – 40.34	U

NOTE: Concentrations, EMPCs, and EDLs are calculated on a WET weight basis.

Reviewed by: MARK JONES 3/14/94

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082 — ***PCDD/PCDF QUALITY CONTROL REPORT***

BATCH: B001025S — **SAMPLE: DFBLK1025**

FILE: MA03211 — **BLANK**

QUOTE NO:	39856	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	854 140310	DATE RECEIVED:	NA	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/5/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001025S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/14/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	3.04 G	DETECTION LIMIT:	EDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#36

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	286	87%	40%-120%	0.80	23.02	-
13C12-2,3,7,8-TCDD	332/334	280	85%	40%-120%	0.80	23.78	-
13C12-1,2,3,6,7,8-HxCDD	402/404	286	87%	40%-120%	1.29	35.40	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	454	69%	40%-120%	1.08	38.48	-
13C12-OCDD	470/472	300	46%	25%-120%	0.91	43.90	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.80	23.57	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.28	35.91	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	146	89%	40%-120%	NA	23.80	-

Flags:

- **U** – The compound was analyzed for but not detected at or above the detection limit.
- **J** – The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E** – The analyte was detected at concentrations greater than the calibrated range.
- **B** – The analyte was found in the associated blank.
- **D** – The analyte was identified in the analysis at a secondary dilution factor.
- **S** – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X** – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y** – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC** – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- **DL** – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **EMPC** – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **RATIO** – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT** – The retention time of an analyte, given decimal minutes.
- **NO** – The total number of peaks identified as analytes within the retention time window.
- **% REC** – The percent recovery of the indicated standard.

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082 ***PCDD/PCDF TOXICITY EQUIVALENTS REPORT***

BATCH: B001025S **SAMPLE: DFBLK1025**

FILE: MA03211 **BLANK**

QUOTE NO:	39856	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	854 140310	DATE RECEIVED:	NA	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/5/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001025S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/14/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	3.04 G	DETECTION LIMIT:	EDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#36

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082 — *PCDD/PCDF ANALYSIS REPORT*

BATCH: B001024S — **SAMPLE: TSB-10-1.5-4**

FILE: MA03208

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-1
PROJECT ID:	854.140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	9.81691 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	# 37

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.07	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.12	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.2	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.1	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.17	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.2	-	-	-	U
OCDD	458/460	ND	0.27	-	-	-	U
2,3,7,8-TCDF	304/306	ND	0.061	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	0.096	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	0.1	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	0.11	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	0.088	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.16	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.21	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	0.17	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.18	-	-	-	U
OCDF	442/444	ND	0.33	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.07	4.99	21.14 – 24.97	X
TOTAL PeCDD	0	ND	0.12	5.39	26.73 – 30.55	X
TOTAL HxCDD	0	ND	0.2	-	33.05 – 35.97	U
TOTAL HpCDD	0	ND	0.2	-	38.60 – 39.96	U
TOTAL TCDF	0	ND	0.06	0.0764	20.06 – 25.05	X
TOTAL PeCDF	0	ND	0.1	-	25.09 – 30.81	U
TOTAL HxCDF	0	ND	0.21	-	31.96 – 36.59	U
TOTAL HpCDF	0	ND	0.18	0.567	38.47 – 40.33	X

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: MARK JONES 3/15/94

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PROJECT: P013082

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B001024S

SAMPLE: TSB-10-1.5-4

FILE: MA03208

-

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-1
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	9.81691 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	# 37

M 3/15/94

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	4.49	88%	40%-120%	0.82	22.99	-
13C12-2,3,7,8-TCDD	332/334	4.56	90%	40%-120%	0.79	23.75	-
13C12-1,2,3,6,7,8-HxCDD	402/404	4.14	81%	40%-120%	1.28	35.39	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	5.28	52%	40%-120%	0.92	38.47	-
13C12-OCDD	470/472	4.23	42%	25%-120%	0.91	43.89	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.80	23.54	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.20	35.90	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	2.22	87%	40%-120%	NA	23.77	-

Flags:

- **U –** The compound was analyzed for but not detected at or above the detection limit.
- **J –** The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E –** The analyte was detected at concentrations greater than the calibrated range.
- **B –** The analyte was found in the associated blank.
- **D –** The analyte was identified in the analysis at a secondary dilution factor.
- **S –** The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X –** An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y –** The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC –** The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- **DL –** The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **EMPC –** The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **RATIO –** The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT –** The retention time of an analyte, given decimal minutes.
- **NO –** The total number of peaks identified as analytes within the retention time window.
- **% REC –** The percent recovery of the indicated standard.

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PROJECT: P013082 ***PCDD/PCDF TOXICITY EQUIVALENTS REPORT***

BATCH: B001024S **SAMPLE: TSB-10-1.5-4**

FILE: MA03208 -

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-1
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	9.81691 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

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02.47 PM 3/15/94

PROJECT: P013082 — **PCDD/PCDF ANALYSIS REPORT**

BATCH: B001024S — SAMPLE: TSB-68-2-4

FILE: MA03209

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-3
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	8.90506 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#37 3/15/94

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.077	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.13	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.22	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.11	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.19	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.22	-	-	-	U
OCDD	458/460	1.56	0.3	-	0.77	43.92	J
2,3,7,8-TCDF	304/306	ND	0.067	-	-	-	U
1,2,3,7,8-PeCDF	340/342	0.177	0.11	-	1.43	28.07	J
2,3,4,7,8-PeCDF	340/342	0.616	0.11	-	1.40	29.12	J
1,2,3,4,7,8-HxCDF	374/376	3.59	0.12	-	1.25	34.00	-
1,2,3,6,7,8-HxCDF	374/376	ND	0.097	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	1.74	0.18	-	1.13	35.10	J
1,2,3,7,8,9-HxCDF	374/376	ND	0.23	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	8.91	0.18	-	1.08	38.49	-
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.2	-	-	-	U
OCDF	442/444	0.771	0.37	-	0.80	44.12	J

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.08	0.434	21.17 – 25.01	X
TOTAL PeCDD	0	ND	0.13	15.3	26.77 – 30.60	X
TOTAL HxCDD	0	ND	0.22	1.63	33.07 – 36.00	X
TOTAL HpCDD	0	ND	0.22	-	38.63 – 39.99	U
TOTAL TCDF	0	ND	0.07	0.511	20.08 – 25.08	X
TOTAL PeCDF	4	2.26	0.11	2.54	25.12 – 30.85	-
TOTAL HxCDF	3	15.9	0.23	16.5	31.98 – 36.61	-
TOTAL HpCDF	1	8.91	0.2	9.65	38.49 – 40.35	-

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: MARK JONES 3/15/94

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082
BATCH: B001024S
FILE: MA03209

PCDD/PCDF QUALITY CONTROL REPORT

SAMPLE: TSB-68-2-4
-

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-3
PROJECT ID:	854.140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	8.90506 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD	8280	GC COLUMN SN:	# 37

5/13/94

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	5.33	95%	40%-120%	0.89	23.02	-
13C12-2,3,7,8-TCDD	332/334	6	107%	40%-120%	0.75	23.79	-
13C12-1,2,3,6,7,8-HxCDD	402/404	5.11	91%	40%-120%	1.29	35.42	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	6.96	62%	40%-120%	1.08	38.49	-
13C12-OCDD	470/472	3.87	35%	25%-120%	0.92	43.93	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.82	23.57	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.26	35.93	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	2.84	101%	40%-120%	NA	23.82	-

Flags:

- **U –** The compound was analyzed for but not detected at or above the detection limit.
- **J –** The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E –** The analyte was detected at concentrations greater than the calibrated range.
- **B –** The analyte was found in the associated blank.
- **D –** The analyte was identified in the analysis at a secondary dilution factor.
- **S –** The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X –** An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y –** The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC –** The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- **DL –** The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **EMPC –** The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **RATIO –** The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT –** The retention time of an analyte, given decimal minutes.
- **NO –** The total number of peaks identified as analytes within the retention time window.
- **% REC –** The percent recovery of the indicated standard.

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PROJECT: P013082 **PCDD/PCDF TOXICITY EQUIVALENTS REPORT**

BATCH: B001024S SAMPLE: TSB-68-2-4

FILE: MA03209 -

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-3
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	8.90506 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	1.56	×	0.001	=	0.0016
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	0.177	×	0.05	=	0.0089
2,3,4,7,8-PeCDF	0.616	×	0.5	=	0.31
1,2,3,4,7,8-HxCDF	3.59	×	0.1	=	0.36
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	1.74	×	0.1	=	0.17
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	8.91	×	0.01	=	0.089
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	0.771	×	0.001	=	0.00077

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 0.94 PPB

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082 — **PCDD/PCDF ANALYSIS REPORT**

BATCH: B001025S — **SAMPLE: TSB-68-6-8**

FILE: HH06436

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-2
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	HH06432
PROJECT P.O.:	532	DATE EXTRACTED:	3/5/94	CONCAL:	HH06431
SAMPLE ORIGIN:	GA	DATE ANALYZED:	3/11/94	ICAL:	I000105H
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/14/94	INSTRUMENT:	VG 70H
SAMPLE SIZE:	3.09 G	DETECTION LIMIT:	EDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#36

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	18	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	45	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	16	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	14	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	16	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	24	-	-	-	U
OCDD	458/460	ND	18	-	-	-	U
2,3,7,8-TCDF	304/306	ND	11	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	20	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	24	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	12	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	10	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	11	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	13	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	16	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	20	-	-	-	U
OCDF	442/444	ND	13	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	18.00	46.4	21.63 – 25.55	X
TOTAL PeCDD	0	ND	45	-	27.33 – 31.28	U
TOTAL HxCDD	0	ND	16	-	33.85 – 36.79	U
TOTAL HpCDD	0	ND	24	-	39.58 – 41.07	U
TOTAL TCDF	0	ND	11.00	-	20.50 – 25.63	U
TOTAL PeCDF	0	ND	24	-	25.65 – 31.55	U
TOTAL HxCDF	1	16.6	13	-	32.72 – 37.42	-
TOTAL HpCDF	0	ND	20	-	39.38 – 41.49	U

NOTE: Concentrations, EMPCs, and EDLs are calculated on a WET weight basis.

Reviewed by: ALEX VILLALOBOS 3/14/94

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PROJECT: P013082 — **PCDD/PCDF QUALITY CONTROL REPORT**

BATCH: B001025S — **SAMPLE: TSB-68-6-8**

FILE: HH06436

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-2
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	HH06432
PROJECT P.O.:	532	DATE EXTRACTED:	3/5/94	CONCAL:	HH06431
SAMPLE ORIGIN:	GA	DATE ANALYZED:	3/11/94	ICAL:	I000105H
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/14/94	INSTRUMENT:	VG 70H
SAMPLE SIZE:	3.09 G	DETECTION LIMIT:	EDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#36

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	225	70%	40%-120%	0.83	23.52	-
13C12-2,3,7,8-TCDD	332/334	206	64%	40%-120%	0.81	24.28	-
13C12-1,2,3,6,7,8-HxCDD	402/404	174	54%	40%-120%	1.30	36.20	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	295	46%	40%-120%	1.08	39.40	-
13C12-OCDD	470/472	374	58%	25%-120%	0.93	45.57	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.82	24.08	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.27	36.70	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	112	69%	40%-120%	NA	24.30	-

Flags:

- **U –** The compound was analyzed for but not detected at or above the detection limit.
- **J –** The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E –** The analyte was detected at concentrations greater than the calibrated range.
- **B –** The analyte was found in the associated blank.
- **D –** The analyte was identified in the analysis at a secondary dilution factor.
- **S –** The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X –** An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y –** The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC –** The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- **DL –** The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **EMPC –** The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **RATIO –** The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT –** The retention time of an analyte, given decimal minutes.
- **NO –** The total number of peaks identified as analytes within the retention time window.
- **% REC –** The percent recovery of the indicated standard.

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082 ***PCDD/PCDF TOXICITY EQUIVALENTS REPORT***

BATCH: B001025S **SAMPLE: TSB-68-6-8**

FILE: HH06436 **-**

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-2
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	HH06432
PROJECT P.O.:	532	DATE EXTRACTED:	3/5/94	CONCAL:	HH06431
SAMPLE ORIGIN:	GA	DATE ANALYZED:	3/11/94	ICAL:	I000105H
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/14/94	INSTRUMENT:	VG 70H
SAMPLE SIZE:	3.09 G	DETECTION LIMIT:	EDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#36

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

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02:47 PM 3/15/94

KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082

PCDD/PCDF ANALYSIS REPORT

BATCH: B001024S

SAMPLE: TSB-7-4-6

FILE: MA03210

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-4
PROJECT ID:	854 140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	6.81351 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	# 39

av 3/15/94

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.1	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.18	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.29	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.15	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.25	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.29	-	-	-	U
OCDD	458/460	2.63	0.39	-	0.78	43.96	J
2,3,7,8-TCDF	304/306	0.922	0.088	-	0.86	23.05	J
1,2,3,7,8-PeCDF	340/342	ND	0.14	0.452	0.87	28.07	X
2,3,4,7,8-PeCDF	340/342	1.14	0.14	-	1.47	29.12	J
1,2,3,4,7,8-HxCDF	374/376	7.45	0.16	-	1.35	34.00	-
1,2,3,6,7,8-HxCDF	374/376	1.16	0.13	-	1.42	34.19	J
2,3,4,6,7,8-HxCDF	374/376	3.19	0.23	-	1.35	35.10	J
1,2,3,7,8,9-HxCDF	374/376	ND	0.3	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	11.2	0.24	-	1.00	38.49	-
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.26	-	-	-	U
OCDF	442/444	ND	0.48	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.10	0.906	21.18 – 25.02	X
TOTAL PeCDD	0	ND	0.18	8.03	26.78 – 30.61	X
TOTAL HxCDD	0	ND	0.29	2.41	33.07 – 36.00	X
TOTAL HpCDD	0	ND	0.29	-	38.63 – 39.99	U
TOTAL TCDF	2	1.33	0.09	3.29	20.10 – 25.10	-
TOTAL PeCDF	2	3.47	0.14	5.61	25.14 – 30.88	-
TOTAL HxCDF	4	24.6	0.3	27	31.98 – 36.61	-
TOTAL HpCDF	1	11.2	0.26	12.5	38.49 – 40.35	-

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: MARK JONES 3/15/94

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PROJECT: B001024S

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B001024S

SAMPLE: TSB-7-4-6

FILE: MA03210

-

QUOTE NO:	200001209	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-4
PROJECT ID:	NA	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	6.81351 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#7,7

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	6.77	92%	40%-120%	0.86	23.03	-
13C12-2,3,7,8-TCDD	332/334	11.9	162%	40%-120%	0.66	23.80	Y
13C12-1,2,3,6,7,8-HxCDD	402/404	6.36	87%	40%-120%	1.35	35.42	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	9	61%	40%-120%	1.05	38.49	-
13C12-OCDD	470/472	5.06	35%	25%-120%	0.95	43.93	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.82	23.59	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.26	35.93	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	3.25	89%	40%-120%	NA	23.82	-

Flags:

- **U –** The compound was analyzed for but not detected at or above the detection limit.
- **J –** The analyte was detected at concentrations between the calibrated range and the detection limit.
- **E –** The analyte was detected at concentrations greater than the calibrated range.
- **B –** The analyte was found in the associated blank.
- **D –** The analyte was identified in the analysis at a secondary dilution factor.
- **S –** The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- **X –** An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- **Y –** The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- **CONC –** The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- **DL –** The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **EMPC –** The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- **RATIO –** The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- **RT –** The retention time of an analyte, given decimal minutes
- **NO –** The total number of peaks identified as analytes within the retention time window.
- **% REC –** The percent recovery of the indicated standard.

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KIBER ENVIRONMENTAL SERVICES

PROJECT: P013082 *PCDD/PCDF TOXICITY EQUIVALENTS REPORT*

BATCH: B001024S **SAMPLE: TSB-7-4-6**

FILE: MA03210 -

QUOTE NO:	39856	DATE COLLECTED:	3/2/94	ACCESSION NO:	26-95-4
PROJECT ID:	854.140310	DATE RECEIVED:	3/3/94	RETCHECK:	MA03201
PROJECT P.O.:	532	DATE EXTRACTED:	3/3/94	CONCAL:	MA03200
SAMPLE ORIGIN:	B001024S	DATE ANALYZED:	3/11/94	ICAL:	I000107A
SAMPLE MATRIX:	SOIL	DATE PROCESSED:	3/15/94	INSTRUMENT:	HP MSD A
SAMPLE SIZE:	6.81351 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	2.63	×	0.001	=	0.0026
2,3,7,8-TCDF	0.922	×	0.1	=	0.092
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	1.14	×	0.5	=	0.57
1,2,3,4,7,8-HxCDF	7.45	×	0.1	=	0.75
1,2,3,6,7,8-HxCDF	1.16	×	0.1	=	0.12
2,3,4,6,7,8-HxCDF	3.19	×	0.1	=	0.32
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	11.2	×	0.01	=	0.11
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 2 PPB

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

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KIBER ENVIRONMENTAL SERVICES PROJECT # 854-40310

ANALYTICAL RESULTS

PROJECT NAME: Raymark Industries
MATRIX : Soil
SAMPLED (Date/Time/Init) : 3/2/94, 1000, SGH
PARAMETER: Total Organic Carbon
EPA METHOD: 9060
ANALYSIS (Date/Init): 3/16/94, MCB

DATE REPORTED: 3/17/94

SAMPLE ID #	LAB ID #	DL	Result	Units
TS*B-10*1.5-4	40310-1	1100	2,100	mg/Kg
TS*B-68*6-8	40310-2	1300	1,900	mg/Kg
TS*B-68*2-4	40310-3	820	1,200	mg/Kg
TS*B-7*4-6	40310-4	1300	1,900	mg/Kg

DL : Detection Limit

KIBER ENVIRONMENTAL SERVICES PROJECT # 854-40310

QA/QC DATA

PROJECT NAME: Raymark Industries
MATRIX : Soil
SAMPLED (Date/Time/Init) : 3/2/94, 1000, SH
PARAMETER: Total Organic Carbon
EPA METHOD: SW 846-9060
ANALYSIS (Date/Init): 3/16/94, MCB

DATE REPORTED: 3/17/94

SAMPLE ID #	LAB ID #	DL	Matrix Spike % Recovery	M S Duplicate % Recovery
TS*B-68*2-4	40310-3	820	98.5	91.3

DL : Detection Limit

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	RAYMARK INDUSTRIES
PROJECT No.:	854
TESTING DATE:	13 April 1994
TESTED BY:	SGH
TRACKING CODE:	1580_PH

KIBER SAMPLE No.	MATERIAL pH
1. TS*B-10*1.5-4	6.65
2. TS*B-68*2-4	5.58
3. TS*B-7*4-6	6.38
4. TS*B-68*6-8	6.00
5.	
6.	
7.	
8.	
9.	
10.	

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	RAYMARK INDUSTRIES
PROJECT No.:	854
SAMPLE No.:	TS*B-68*6-8
TESTING DATE:	13 April 1994
TESTED BY:	SGH
TRACKING CODE:	1579_UW

MOISTURE CONTENT (Dry Basis)			
1. MOISTURE TIN NO.	1	2	3
2. WT MOISTURE TIN (tare weight)	1.01 g	0.99 g	1.00 g
3. WT WET SOIL + TARE	20.39 g	24.25 g	25.56 g
4. WT DRY SOIL + TARE	14.87 g	18.17 g	19.08 g
5. WT WATER, Ww	5.52 g	6.08 g	6.48 g
6. WT DRY SOIL, Ws	13.86 g	17.18 g	18.08 g
7. ASTM MOISTURE CONTENT, W	39.83 %	35.39 %	35.84 %

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	TS*B-68*6-8		
2. WT OF MOLD (tare weight)	21.09 g	g	g
3. WT OF MOLD + SOIL	366.83 g	g	g
4. WT OF WET SOIL, W	345.74 g	g	g
5. WT OF DRY SOIL, Ws	252.33 g	g	g
6. DIAMETER OF SPECIMEN	2.00 in	in	in
7. HEIGHT OF SPECIMEN	4.00 in	in	in
8. SOIL VOLUME, V	0.0073 ft^3	ft^3	ft^3
9. BULK DENSITY	104.8 pcf	pcf	pcf
10. DRY DENSITY	76.5 pcf	pcf	pcf
11. BULK SPECIFIC GRAVITY	1.7		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	RAYMARK INDUSTRIES
PROJECT No.:	854
SAMPLE No.:	TS*B-7*4-6
TESTING DATE:	13 April 1994
TESTED BY:	SGH
TRACKING CODE:	1578_UW

MOISTURE CONTENT (Dry Basis)			
1. MOISTURE TIN NO.	1	2	3
2. WT MOISTURE TIN (tare weight)	0.99 g	0.98 g	0.99 g
3. WT WET SOIL + TARE	33.46 g	31.23 g	36.41 g
4. WT DRY SOIL + TARE	22.20 g	21.41 g	26.08 g
5. WT WATER, Ww	11.26 g	9.82 g	10.33 g
6. WT DRY SOIL, Ws	21.21 g	20.43 g	25.09 g
7. ASTM MOISTURE CONTENT, W	53.09 %	48.07 %	41.17 %

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	TS*B-7*4-6		
2. WT OF MOLD (tare weight)	21.09 g	g	g
3. WT OF MOLD + SOIL	379.39 g	g	g
4. WT OF WET SOIL, W	358.30 g	g	g
5. WT OF DRY SOIL, Ws	243.01 g	g	g
6. DIAMETER OF SPECIMEN	2.00 in	in	in
7. HEIGHT OF SPECIMEN	4.00 in	in	in
8. SOIL VOLUME, V	0.0073 ft^3	ft^3	ft^3
9. BULK DENSITY	108.6 pcf	pcf	pcf
10. DRY DENSITY	73.6 pcf	pcf	pcf
11. BULK SPECIFIC GRAVITY	1.7		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	RAYMARK INDUSTRIES
PROJECT No.:	854
SAMPLE No.:	TS*B-68*2-4
TESTING DATE:	13 April 1994
TESTED BY:	SGH
TRACKING CODE:	1577_UW

MOISTURE CONTENT (Dry Basis)			
1. MOISTURE TIN NO.	1	2	3
2. WT MOISTURE TIN (tare weight)	0.99 g	0.98 g	0.98 g
3. WT WET SOIL + TARE	19.04 g	17.10 g	17.79 g
4. WT DRY SOIL + TARE	16.32 g	14.57 g	15.23 g
5. WT WATER, Ww	2.72 g	2.53 g	2.56 g
6. WT DRY SOIL, Ws	15.33 g	13.59 g	14.25 g
7. ASTM MOISTURE CONTENT, W	17.74 %	18.62 %	17.96 %

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	TS*B-68*2-4		
2. WT OF MOLD (tare weight)	21.10 g	g	g
3. WT OF MOLD + SOIL	387.87 g	g	g
4. WT OF WET SOIL, W	366.77 g	g	g
5. WT OF DRY SOIL, Ws	310.54 g	g	g
6. DIAMETER OF SPECIMEN	2.00 in	in	in
7. HEIGHT OF SPECIMEN	4.00 in	in	in
8. SOIL VOLUME, V	0.0073 ft^3	ft^3	ft^3
9. BULK DENSITY	111.1 pcf	pcf	pcf
10. DRY DENSITY	94.1 pcf	pcf	pcf
11. BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

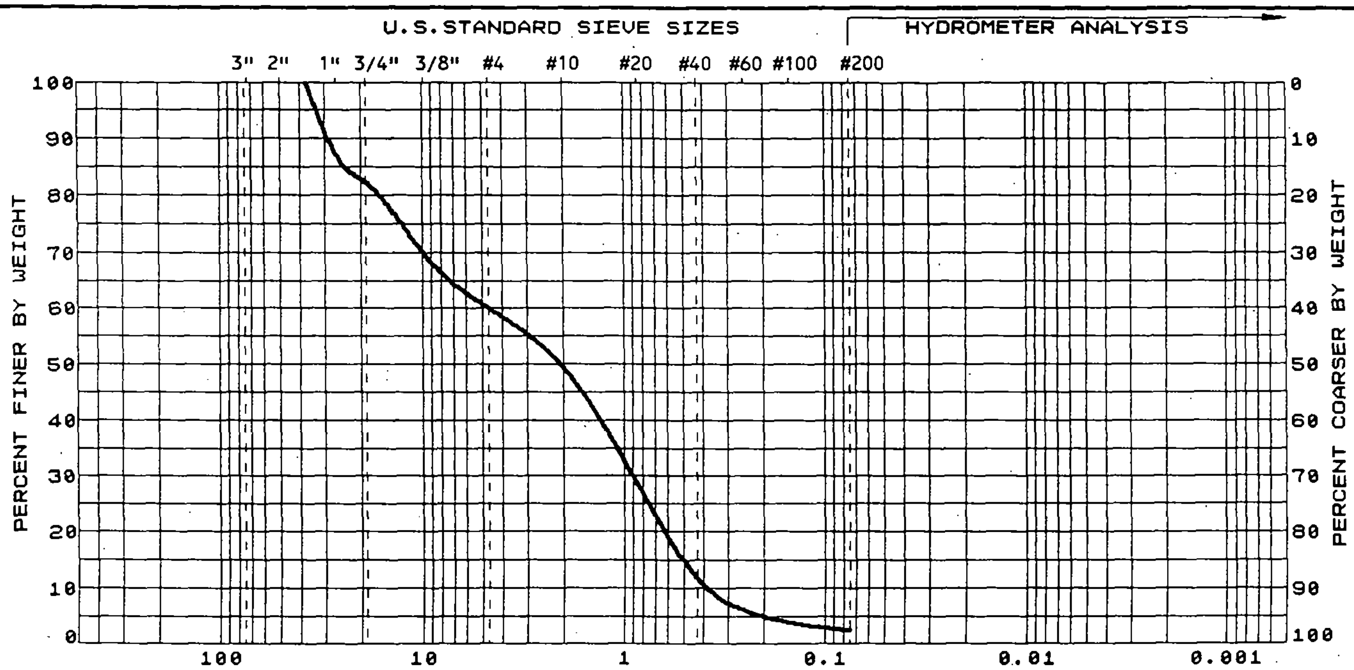
PROJECT:	RAYMARK INDUSTRIES
PROJECT No.:	854
SAMPLE No.:	TS*B-10*1.5-4
TESTING DATE:	13 April 1994
TESTED BY:	SGH
TRACKING CODE:	1576_UW

MOISTURE CONTENT (Dry Basis)			
1. MOISTURE TIN NO.	1	2	3
2. WT MOISTURE TIN (tare weight)	0.98 g	0.99 g	0.99 g
3. WT WET SOIL + TARE	37.02 g	33.24 g	24.95 g
4. WT DRY SOIL + TARE	35.65 g	31.89 g	24.03 g
5. WT WATER, Ww	1.37 g	1.35 g	0.92 g
6. WT DRY SOIL, Ws	34.67 g	30.90 g	23.04 g
7. ASTM MOISTURE CONTENT, W	3.95 %	4.37 %	3.99 %

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	TS*B-10*1.5-4		
2. WT OF MOLD (tare weight)	21.05 g	g	g
3. WT OF MOLD + SOIL	416.24 g	g	g
4. WT OF WET SOIL, W	395.19 g	g	g
5. WT OF DRY SOIL, Ws	379.61 g	g	g
6. DIAMETER OF SPECIMEN	2.00 in	in	in
7. HEIGHT OF SPECIMEN	4.00 in	in	in
8. SOIL VOLUME, V	0.0073 ft^3	ft^3	ft^3
9. BULK DENSITY	119.7 pcf	pcf	pcf
10. DRY DENSITY	115.0 pcf	pcf	pcf
11. BULK SPECIFIC GRAVITY	1.9		

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services, Inc JOB NO. 41-1919 DATE March 7, 1994
3786 DeKalb Technology Parkway LAB NO. 04140 PAGE 1
Atlanta, Georgia 30340 PROJECT Raymark Ind.
CLIENT JOB NO./PO# Prj.#854/CoC#564 SAMPLE ID TS*B-10*1.5-4 Before Homogen.



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5	100.0		0.005
1"	25	85.8		0.002
3/4"	19	82.3		0.001
1/2"	12.5	74.8		
3/8"	9.5	69.2		
No.4	4.75	60.2		
No.10	2.00	49.4		
No.20	0.850	28.4		
No.40	0.425	11.5		
No.60	0.250	6.0		
No.100	0.150	3.9		
No.200	0.075	2.4		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY 12.69
COEFFICIENT OF CURVATURE 0.48
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION POORLY GRADED SAND with GRAVEL (SP)
WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

M. A. Kelley

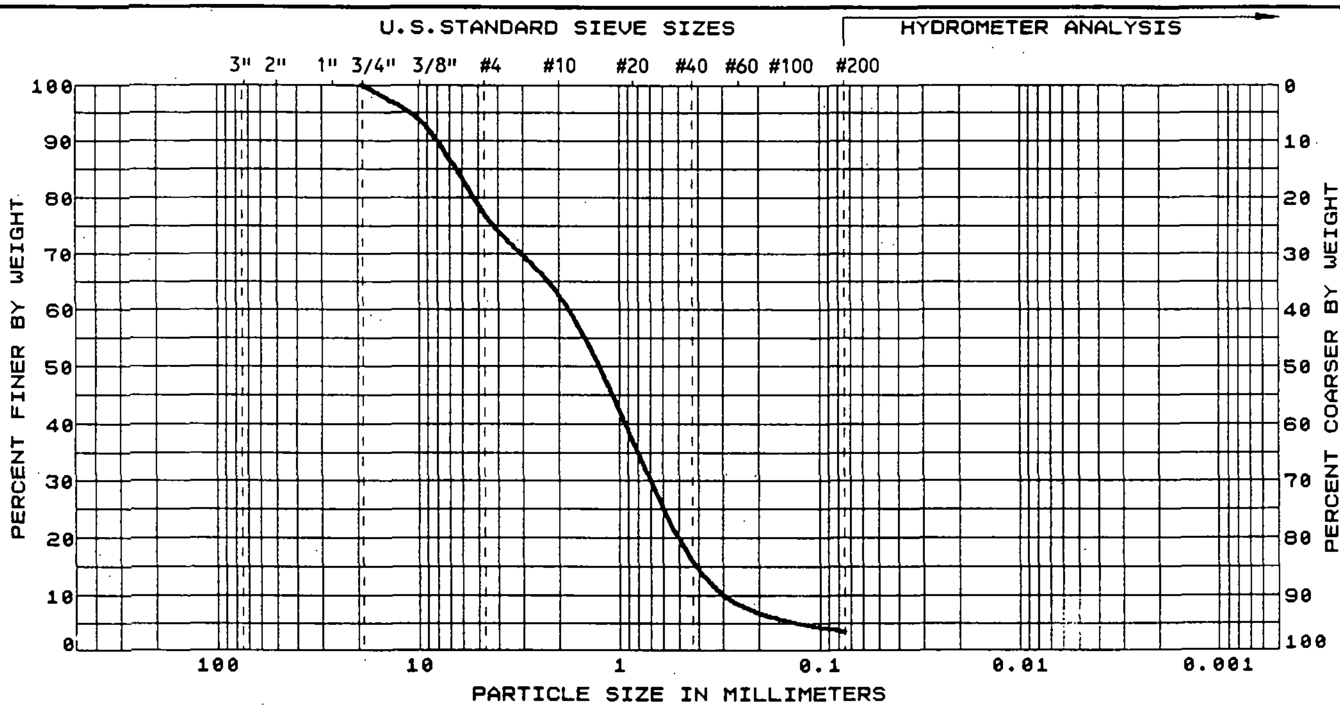
PARTICLE SIZE DISTRIBUTION
& PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services, Inc
3786 DeKalb Technology Parkway
Atlanta, Georgia 30340

JOB NO. 41-1919
LAB NO. 04141
PROJECT Raymark Ind.

DATE March 7, 1994
PAGE 2

CLIENT JOB NO./PO# Prj.#854/CoC#564
SAMPLE ID TS*B-10*1.5-4 After Homogen.



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

U.S.STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER PARTICLE DIAMETER (MILLIMETERS)
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25			0.002
3/4"	19	100.0		0.001
1/2"	12.5	96.4		
3/8"	9.5	93.3		
No.4	4.75	77.4		
No.10	2.00	62.5		
No.20	0.850	36.8		
No.40	0.425	15.7		
No.60	0.250	8.3		
No.100	0.150	5.5		
No.200	0.075	3.4		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

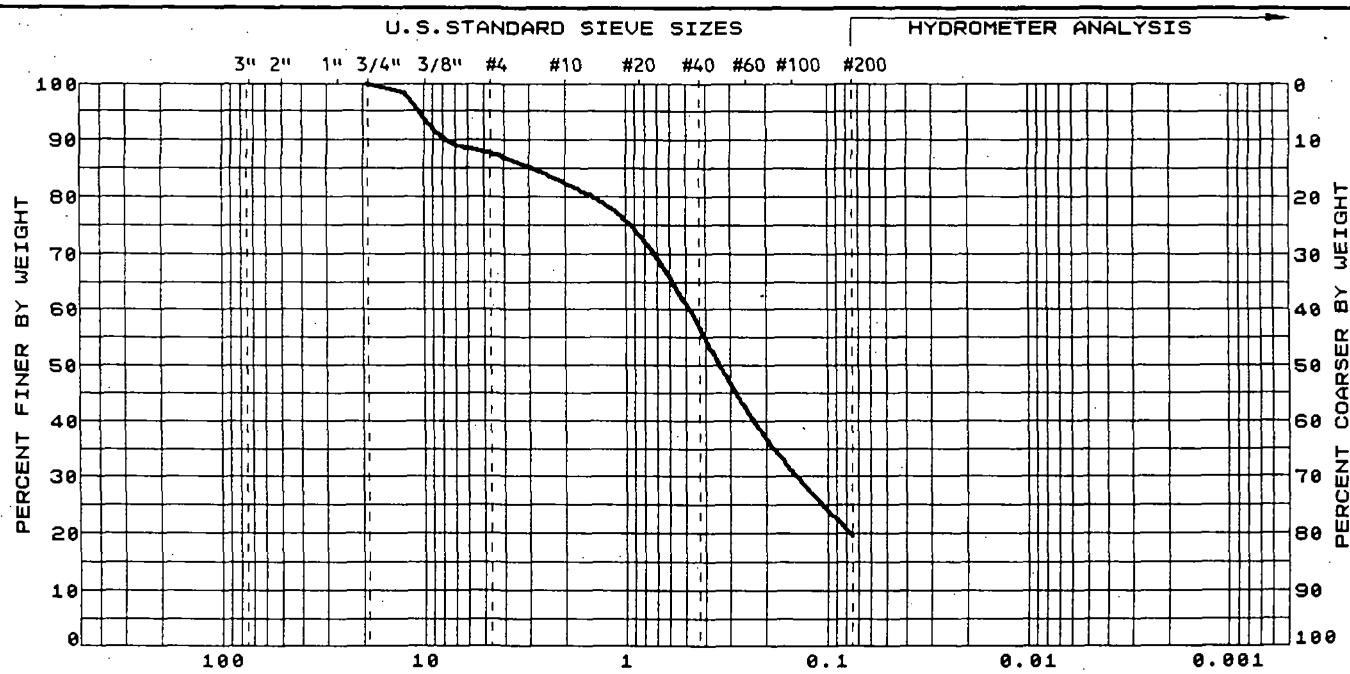
TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY 6.53
COEFFICIENT OF CURVATURE 0.89
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION POORLY GRADED SAND with GRAVEL (SP)
WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

M. A. O'Kelly

PARTICLE SIZE DISTRIBUTION
& PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services, Inc JOB NO. 41-1919 DATE March 7, 1994
3786 DeKalb Technology Parkway LAB NO. 04142 PAGE 3
Atlanta, Georgia 30340 PROJECT Raymark Ind.
CLIENT JOB NO./PO# Prj.#854/CoC#564 SAMPLE ID TS*B-68*2-4 Before Homogen.



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25			0.002
3/4"	19	100.0		0.001
1/2"	12.5	98.3		
3/8"	9.5	92.9		
No.4	4.75	87.8		
No.10	2.00	82.5		
No.20	0.850	73.3		
No.40	0.425	56.3		
No.60	0.250	41.8		
No.100	0.150	31.1		
No.200	0.075	19.6		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION ()

WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY
(cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

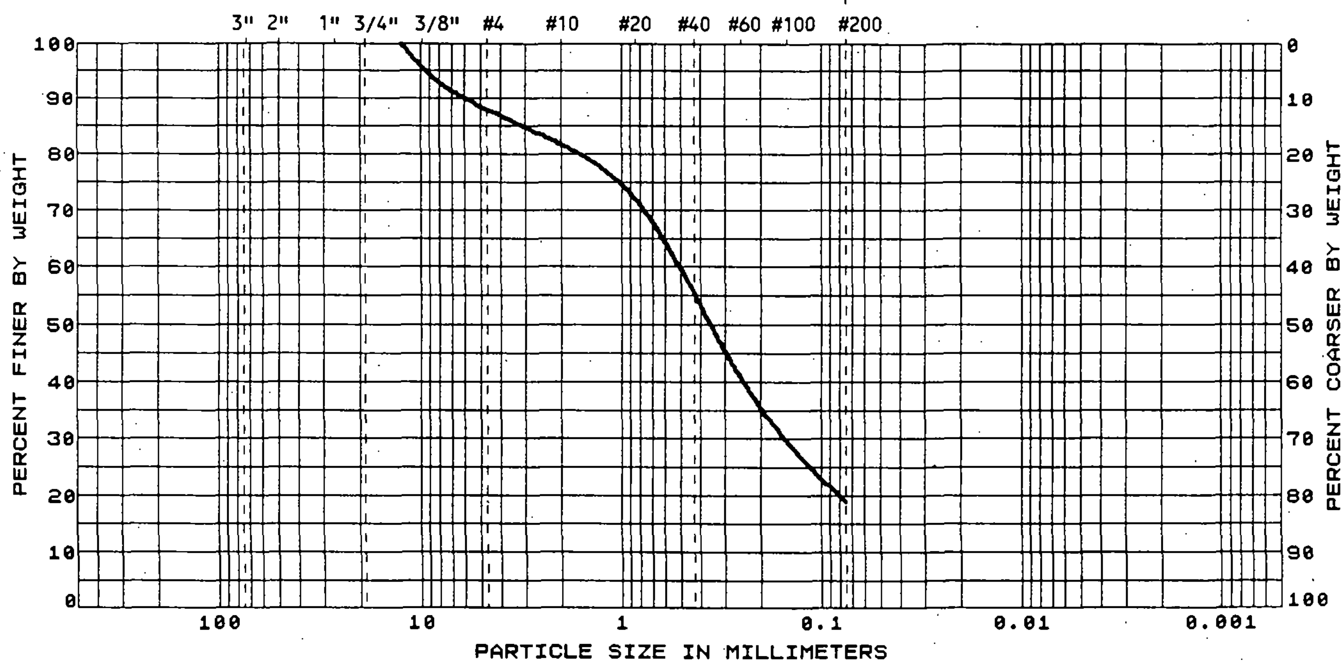
M. A. OKelly

PARTICLE SIZE DISTRIBUTION
& PHYSICAL PROPERTIES

CLIENT	Kiber Environmental Services, Inc	JOB NO.	41-1919
	3786 DeKalb Technology Parkway	LAB NO.	04143
	Atlanta, Georgia 30340	PROJECT	Raymark Ind.
CLIENT JOB NO./PO#	Prj.#854/CoC#564	SAMPLE ID	TS*B-68*2-4 After Homogen.

DATE March 7, 1994
PAGE 4

U.S.STANDARD SIEVE SIZES — HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

U.S.STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25			0.002
3/4"	19			0.001
1/2"	12.5	100.0		
3/8"	9.5	95.3		
No.4	4.75	88.2		
No.10	2.00	81.8		
No.20	0.850	71.9		
No.40	0.425	54.9		
No.60	0.250	40.5		
No.100	0.150	29.8		
No.200	0.075	18.9		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION ()

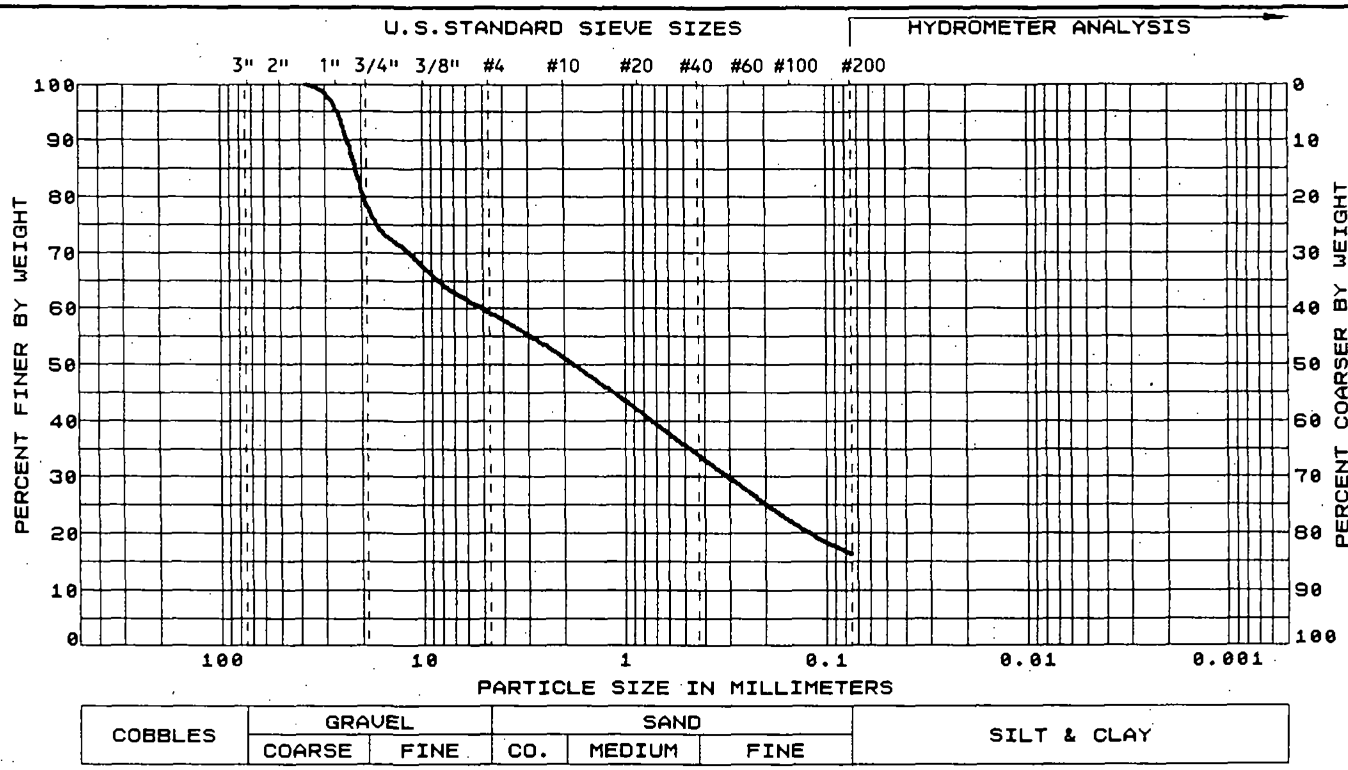
WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

M. A. O'Kelley

PARTICLE SIZE DISTRIBUTION
& PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services,Inc JOB NO. 41-1919 DATE March 7, 1994
3786 DeKalb Technology Parkway LAB NO. 04146 PAGE 7
Atlanta, Georgia 30340 PROJECT Raymark Ind.
CLIENT JOB NO./PO# Prj.#854/CoC#564 SAMPLE ID TS*B-7*4-6 Before Homogen.



U.S. STANDARD SIEVE SIZE: SIEVE NO.	SIEVE SIZE (MILLIMETERS)	*PERCENT PASSING		HYDROMETER PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5	100.0		0.005
1"	25	93.1		0.002
3/4"	19	78.8		0.001
1/2"	12.5	71.0		
3/8"	9.5	66.8		
No.4	4.75	59.5		
No.10	2.00	51.2		
No.20	0.850	41.7		
No.40	0.425	33.7		
No.60	0.250	27.7		
No.100	0.150	22.1		
No.200	0.075	16.2		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION ()

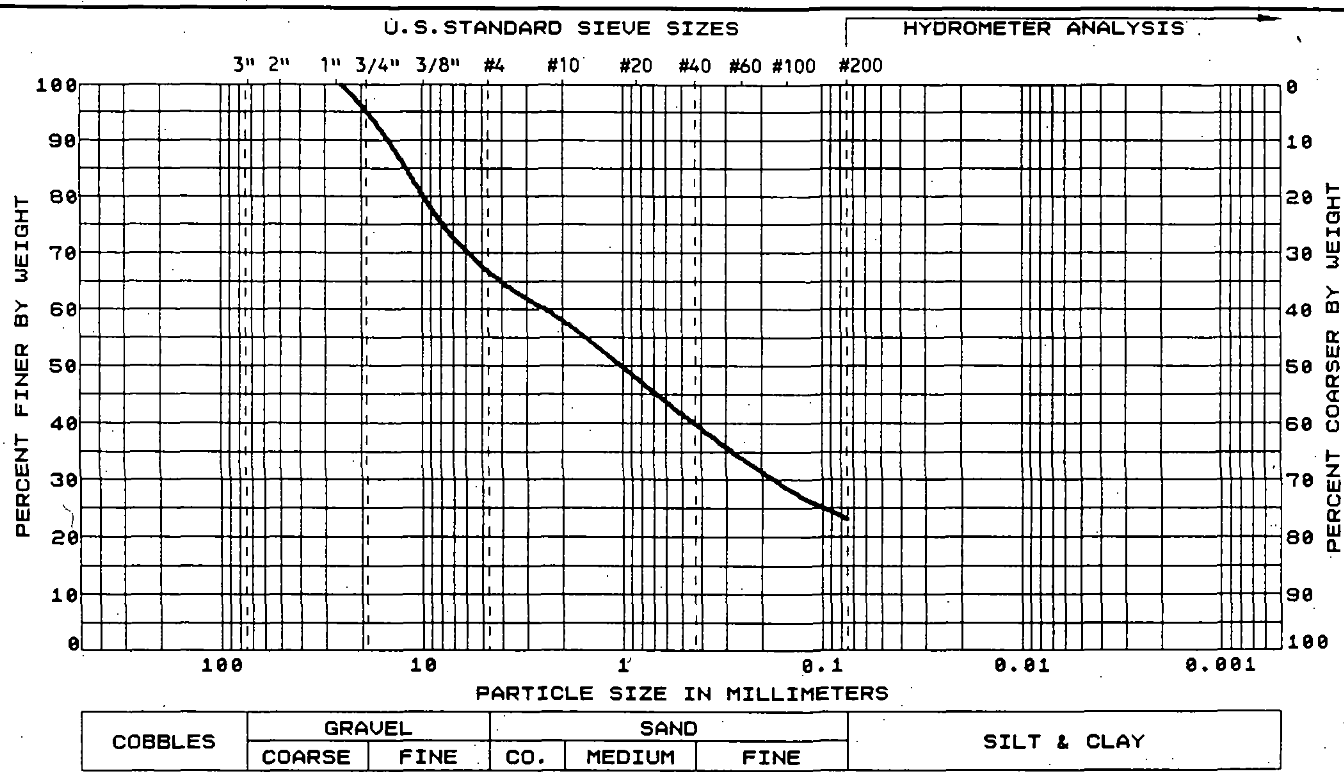
WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

M. A. Kelly

PARTICLE SIZE DISTRIBUTION
& PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services, Inc JOB NO. 41-1919 DATE March 7, 1994
3786 DeKalb Technology Parkway LAB NO. 04147 PAGE 8
Atlanta, Georgia 30340 PROJECT Raymark Ind.
CLIENT JOB NO./PO# Prj.#854/CoC#564 SAMPLE ID TS*B-7*4-6 After Homogen.



U.S. STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25	100.0		0.002
3/4"	19	95.3		0.001
1/2"	12.5	86.2		
3/8"	9.5	79.2		
No.4	4.75	66.8		
No.10	2.00	58.1		
No.20	0.850	47.8		
No.40	0.425	39.7		
No.60	0.250	33.8		
No.100	0.150	28.6		
No.200	0.075	23.0		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

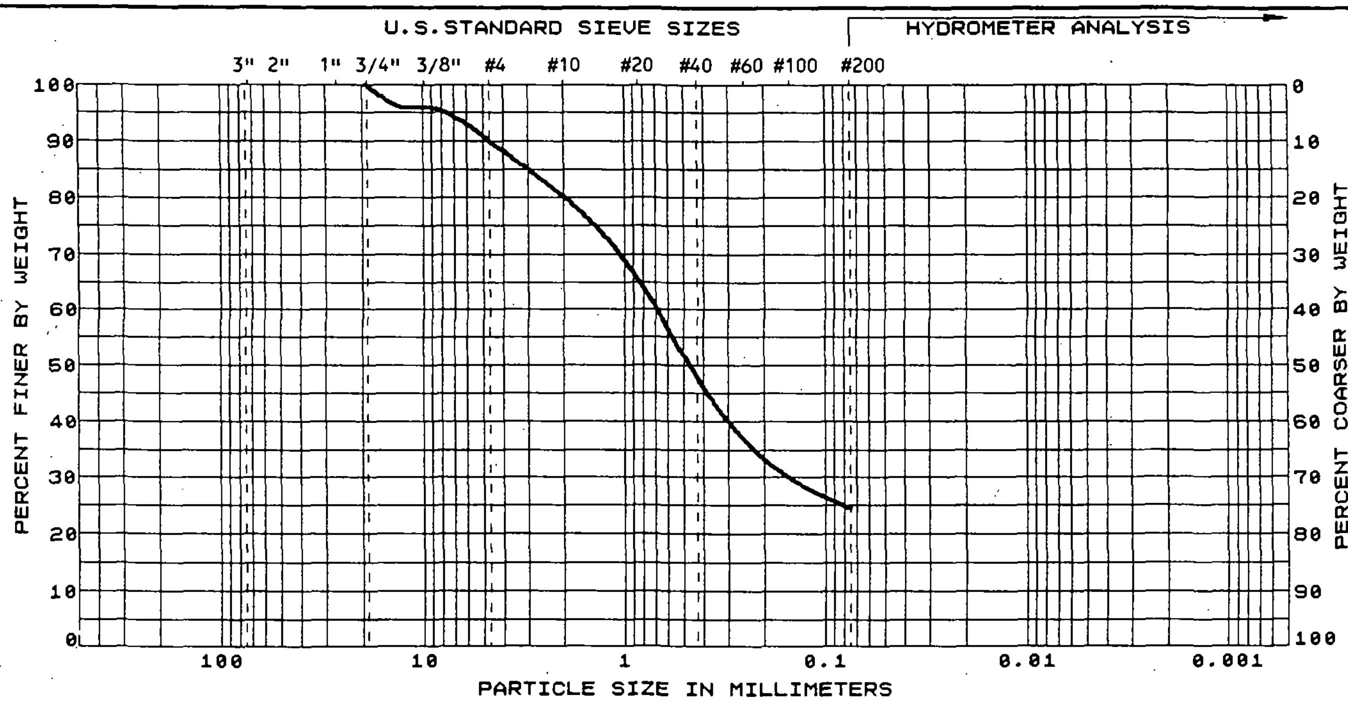
TOTAL POROSITY (%) ____
EFFECTIVE SIZE (mm) ____
COEFFICIENT OF UNIFORMITY ____
COEFFICIENT OF CURVATURE ____
LIQUID LIMIT ____
PLASTIC LIMIT ____
PLASTICITY INDEX ____
CLASSIFICATION ( )
WATER CONTENT (%) ____
DRY DENSITY (PCF) ____
SPECIFIC GRAVITY OF SOLIDS ____
HYDRAULIC CONDUCTIVITY (cm/sec - 20C) ____
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

M. A. O'Kelley

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services, Inc JOB NO. 41-1919 DATE March 7, 1994
3786 DeKalb Technology Parkway LAB NO. 04144 PAGE 5
Atlanta, Georgia 30340 PROJECT Raymark Ind.
CLIENT JOB NO./PO# Prj.#854/CoC#564 SAMPLE ID TS*B-68*6-8 Before Homogen.



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

SIEVE NO.	SIEVE SIZE (MILLIMETERS)	*PERCENT PASSING		HYDROMETER PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25			0.002
3/4"	19	100.0		0.001
1/2"	12.5	96.0		
3/8"	9.5	96.0		
No.4	4.75	90.3		
No.10	2.00	80.2		
No.20	0.850	65.4		
No.40	0.425	47.4		
No.60	0.250	36.6		
No.100	0.150	30.0		
No.200	0.075	24.5		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION ()

WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

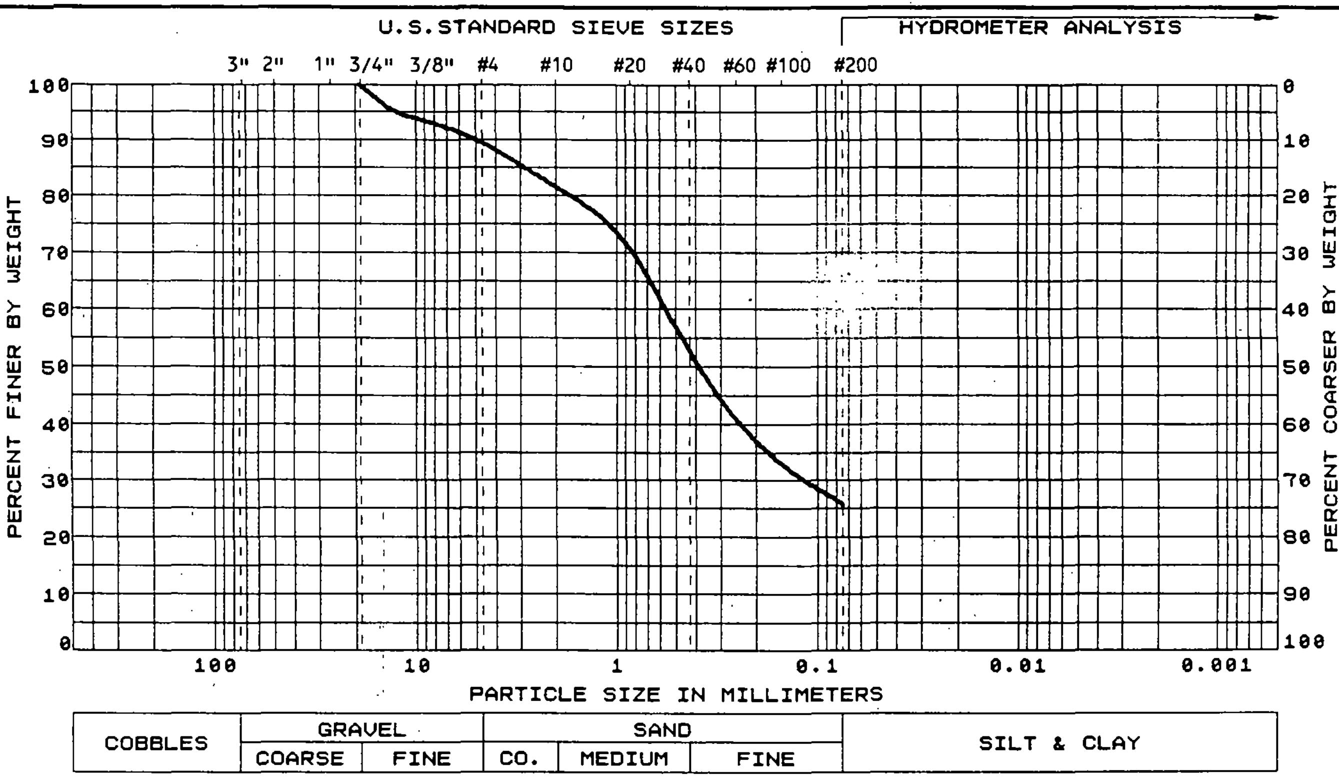
M. A. O'Kelley

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT Kiber Environmental Services, Inc
3786 DeKalb Technology Parkway
Atlanta, Georgia 30340
CLIENT JOB NO./PO# Prj.#854/CoC#564

JOB NO. 41-1919
LAB NO. 04145
PROJECT Raymark Ind.
SAMPLE ID TS*B-68*6-8 After Homogen.

DATE March 7, 1994
PAGE 6



U.S. STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25			0.002
3/4"	19	100.0		0.001
1/2"	12.5	95.1		
3/8"	9.5	93.8		
No.4	4.75	89.7		
No.10	2.00	81.6		
No.20	0.850	70.5		
No.40	0.425	52.3		
No.60	0.250	40.7		
No.100	0.150	33.1		
No.200	0.075	25.8		

*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.

TESTED BY: SC JM MO

TOTAL POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION ()

WATER CONTENT (%)
DRY DENSITY (PCF)
SPECIFIC GRAVITY OF SOLIDS
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.

M. A. Kelly

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*1.5-4:1A
TESTING DATE: 3-17-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:1A	
2. OVEN TEMPERATURE	371	°C
3. WEIGHT OF PAN (tare weight)	357.75	g
4. WEIGHT OF UNTREATED SOIL + TARE	1357.47	g
5. WEIGHT OF UNTREATED SOIL	999.72	g
6. WEIGHT OF TREATED SOIL + TARE	1329.75	g
7. WEIGHT OF TREATED SOIL	972.00	g
8. WEIGHT LOSS	27.72	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES	101	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	93	°C
2 MINUTES	N/A	°C
3 MINUTES	85	°C
5 MINUTES	79	°C
10 MINUTES	67	°C
15 MINUTES	58	°C
20 MINUTES	51	°C
30 MINUTES	40	°C
40 MINUTES	36	°C
50 MINUTES	31	°C
60 MINUTES	28	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*B -10*1.5-4:1A
TESTING DATE: 3-17-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil.
Small rocks throughout.
Slightly moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Soil much more brown (reddish tint is gone).
Visibly much drier.
Soil has lost cohesion due to dryness. Powdery consistency that of
a dry sand.
Some MOISTURE IN SOIL ON BOTTOM OF PAN.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*3-10*1.5-4:2A
TESTING DATE: 3-17-94
TESTED BY: JSO

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:2A	
2. OVEN TEMPERATURE	371°	°C
3. WEIGHT OF PAN (tare weight)	~~334.19~~ JSO 341.15	g
4. WEIGHT OF UNTREATED SOIL + TARE	~~1340.26~~ JSO 1340.93	g
5. WEIGHT OF UNTREATED SOIL	999.78	g
6. WEIGHT OF TREATED SOIL + TARE	1302.69	g
7. WEIGHT OF TREATED SOIL	961.54	g
8. WEIGHT LOSS	38.24	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES		°C
15 MINUTES		°C
20 MINUTES	182	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	163	°C
2 MINUTES	154	°C
3 MINUTES	148	°C
5 MINUTES	136	°C
10 MINUTES	114	°C
15 MINUTES	100	°C
20 MINUTES	85	°C
30 MINUTES	67	°C
40 MINUTES	57	°C
50 MINUTES	48	°C
60 MINUTES	42	°C

→ 90 MINUTES TO REACH 30°

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*15-4:2A
TESTING DATE: 3-17-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish Brown sandy soil.
Small rocks throughout
Slightly moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

More brown in color (reddish tint gone).
Visibly dry.
Slight Crust to middle portion.
Gritty, powdery texture.

ALMOST COMPLETELY DRY.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*1.5-4:3A
TESTING DATE: 3-17-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:3A	
2. OVEN TEMPERATURE	371	°C
3. WEIGHT OF PAN (tare weight)	334.23	g
4. WEIGHT OF UNTREATED SOIL + TARE	1334.23	g
5. WEIGHT OF UNTREATED SOIL	1000.00	g
6. WEIGHT OF TREATED SOIL + TARE	1293.26	g
7. WEIGHT OF TREATED SOIL	959.03	g
8. WEIGHT LOSS	40.97	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES		°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES	276	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	273	°C
2 MINUTES	266	°C
3 MINUTES	255	°C
5 MINUTES	237	°C
10 MINUTES	190	°C
15 MINUTES	160	°C
20 MINUTES	138	°C
30 MINUTES	104	°C
40 MINUTES	77	°C
60 MINUTES	52	°C
115 MINUTES	31	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS* B-10 #1.5-4 :3A
TESTING DATE: 3-17-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish Brown sandy soil.
Small rocks throughout.
Slightly moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Brown in color (Reddish tint is gone, Looks darker than 1A or 2A)
MATERIAL HAS CRUSTED SLIGHTLY, BUT IS EASILY BROKEN UP
⇒ CRUST CRUMBLES UP TO SAND.
MATERIAL IS COMPLETELY DRY.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.

PROJECT No.: 854

MATERIAL TYPE: TS*B-10*1.5-4:4B

TESTING DATE: 3-21-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:4B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	341.22	g
4. WEIGHT OF UNTREATED SOIL + TARE	1341.07	g
5. WEIGHT OF UNTREATED SOIL	999.85	g
6. WEIGHT OF TREATED SOIL + TARE	1301.13	g
7. WEIGHT OF TREATED SOIL	959.91	g
8. WEIGHT LOSS	39.94	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	54	°C
2 MINUTES	73	°C
3 MINUTES	94	°C
5 MINUTES	112	°C
10 MINUTES	165	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	157	°C
2 MINUTES	162	°C
3 MINUTES	160	°C
5 MINUTES	153	°C
10 MINUTES	131	°C
15 MINUTES	118	°C
20 MINUTES	136	°C
30 MINUTES	79	°C
40 MINUTES	63	°C
60 MINUTES	49	°C
105 MINUTES	32	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAY MACK IND.
PROJECT No.: 854
MATERIAL TYPE: TS * B-10 * 1.5-4 : 4B
TESTING DATE: 3-21-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil.
Moist.
Small rocks throughout

VISUAL OBSERVATIONS - AFTER TREATMENT

Small dark spot on surface (appears to be small chunk of organic material.)

Very dry in appearance and texture
Light tan in color

THERMAL DESORPTION DATA

REPORT FORM
PAGE 1 OF 2

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*1.5-4:5B
TESTING DATE: 3-21-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:5B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	354.60	g
4. WEIGHT OF UNTREATED SOIL + TARE	1355.01	g
5. WEIGHT OF UNTREATED SOIL	1000.41	g
6. WEIGHT OF TREATED SOIL + TARE	1313.20	g
7. WEIGHT OF TREATED SOIL	958.6	g
8. WEIGHT LOSS	41.81	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	N/A	°C
2 MINUTES	66	°C
3 MINUTES	84	°C
5 MINUTES	115	°C
10 MINUTES	176	°C
15 MINUTES	250	°C
20 MINUTES	326	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	288	°C
2 MINUTES	N/A	°C
3 MINUTES	271	°C
5 MINUTES	249	°C
10 MINUTES	225	°C
15 MINUTES	197	°C
20 MINUTES	174	°C
30 MINUTES	133	°C
40 MINUTES	106	°C
60 MINUTES	62	°C
135 MINUTES	30	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS * B-10 * 1.5-4.5B
TESTING DATE: 3-21-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil
Moist
Small Rocks throughout

VISUAL OBSERVATIONS - AFTER TREATMENT

SANDY SOIL IS VERY DRY THROUGHOUT
LIGHT TAN IN COLOR
VERY GRANULAR IN APPEARANCE (DUE TO ABSENCE OF MOISTURE)
~~A~~ JSD

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-10 *1.5-4:B3
TESTING DATE: 3-21-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:B3	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	357.84	g
4. WEIGHT OF UNTREATED SOIL + TARE	1358.00	g
5. WEIGHT OF UNTREATED SOIL	1000.16	g
6. WEIGHT OF TREATED SOIL + TARE	1314.15	g
7. WEIGHT OF TREATED SOIL		g
8. WEIGHT LOSS		g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	N/A	°C
2 MINUTES	86	°C
3 MINUTES	92	°C
5 MINUTES	116	°C
10 MINUTES	204	°C
15 MINUTES	302	°C
20 MINUTES	390	°C
30 MINUTES	JSD ~~456~~ 468	°C
40 MINUTES	496	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	491	°C
2 MINUTES	473	°C
3 MINUTES	447	°C
5 MINUTES	N/A	°C
10 MINUTES	307	°C
15 MINUTES	270	°C
20 MINUTES	228	°C
30 MINUTES	166	°C
40 MINUTES	135	°C
60 MINUTES	75	°C
120 MINUTES	31	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS* B-10-*1.5-4:0B
TESTING DATE: 3-21-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil
Moist
Small rocks throughout

VISUAL OBSERVATIONS - AFTER TREATMENT

SANDY SOIL IS DARKER ON TOP, ACTUALLY A LIGHTER COLOR THROUGHOUT.
DRY ALL THE WAY THROUGH.
MORE GRANULAR IN APPEARANCE.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*1.5-4:7C
TESTING DATE: 3-22-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:7C	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	341.85	g
4. WEIGHT OF UNTREATED SOIL + TARE	1341.98	g
5. WEIGHT OF UNTREATED SOIL	1000.13	g
6. WEIGHT OF TREATED SOIL + TARE	1299.86	g
7. WEIGHT OF TREATED SOIL	958.01	g
8. WEIGHT LOSS	42.12	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	82	°C
2 MINUTES	100	°C
3 MINUTES	112	°C
5 MINUTES	142	°C
10 MINUTES	225	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	148	°C
2 MINUTES	167	°C
3 MINUTES	180	°C
5 MINUTES	195	°C
10 MINUTES	205	°C
15 MINUTES	195	°C
20 MINUTES	179	°C
30 MINUTES	125	°C
40 MINUTES	100	°C
60 MINUTES	62	°C
105 MINUTES	34	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*1.5-4:7C
TESTING DATE: 3-22-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil.
Small rocks throughout.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Soil is completely dry.
Light tan color on surface.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Zaymack Ind

PROJECT No.: 854

MATERIAL TYPE: TS*B-10*1.5-4:8C

TESTING DATE: 3-22-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-10*1.5-4:8C	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	360.12	g
4. WEIGHT OF UNTREATED SOIL + TARE	1360.12	g
5. WEIGHT OF UNTREATED SOIL	1000.00	g
6. WEIGHT OF TREATED SOIL + TARE	1314.71	g
7. WEIGHT OF TREATED SOIL	954.59	g
8. WEIGHT LOSS	45.41	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN	JSD	
1 MINUTE	~~82~~ 63	°C
2 MINUTES	~~100~~ 95	°C
3 MINUTES	105	°C
5 MINUTES	148	°C
10 MINUTES	265	°C
15 MINUTES	396	°C
20 MINUTES	486	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	430	°C
2 MINUTES	449	°C
3 MINUTES	442	°C
5 MINUTES	417	°C
10 MINUTES	341	°C
15 MINUTES	276	°C
20 MINUTES	229	°C
30 MINUTES	162	°C
40 MINUTES	116	°C
60 MINUTES	67	°C
110 MINUTES	34	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND

PROJECT No.: 854

MATERIAL TYPE: TS * B-10 * 1.5-4 : 8C

TESTING DATE: 3-22-94

TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil.

Small rocks throughout

Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Completely dry.

Light tan color on surface, but more than 7:C.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-10 *1.5-4:9C

TESTING DATE: 3-22-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-10 * 1.5-4:9C	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	366.62	g
4. WEIGHT OF UNTREATED SOIL + TARE	1367.29	g
5. WEIGHT OF UNTREATED SOIL	1000.67	g
6. WEIGHT OF TREATED SOIL + TARE	1321.15	g
7. WEIGHT OF TREATED SOIL	954.53	g
8. WEIGHT LOSS	46.14	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	59	°C
2 MINUTES	80	°C
3 MINUTES	106	°C
5 MINUTES	145	°C
10 MINUTES	254	°C
15 MINUTES	402	°C
20 MINUTES	481	°C
30 MINUTES	573	°C
40 MINUTES	605	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	525	°C
2 MINUTES	560	°C
3 MINUTES	550	°C
5 MINUTES	514	°C
10 MINUTES	428	°C
15 MINUTES	352	°C
20 MINUTES	290	°C
30 MINUTES	200	°C
40 MINUTES	132	°C
60 MINUTES	75	°C
120 MINUTES	35	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS* B-10*1.5-4.9C

TESTING DATE: 3-22-94

TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil.

Small rocks throughout.

Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Completely dry,

Light tan throughout, as though the color was burned off.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*2-4:1A
TESTING DATE: 3-18-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*2-4:1A	
2. OVEN TEMPERATURE	371	°C
3. WEIGHT OF PAN (tare weight)	354.57	g
4. WEIGHT OF UNTREATED SOIL + TARE	1355.04	g
5. WEIGHT OF UNTREATED SOIL	1000.47	g
6. WEIGHT OF TREATED SOIL + TARE	1316.82	g
7. WEIGHT OF TREATED SOIL	962.25	g
8. WEIGHT LOSS	38.22	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES	95	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	88	°C
2 MINUTES	85	°C
3 MINUTES	81	°C
5 MINUTES	76	°C
10 MINUTES	64	°C
15 MINUTES	55	°C
20 MINUTES	49	°C
30 MINUTES	41	°C
40 MINUTES	N/A	°C
50 MINUTES	28	°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS * B-68 * Z-4:1A
TESTING DATE: 3-18-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN SANDY SOIL w/ SMALL CLAY-LIKE CHUNKS.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

SLIGHT CRUST HAS FORMED ALONG THE TOP WHICH IS
EASILY CRUMBLED.
VISIBLY MUCH MORE DRY THAN BEFORE TESTING.

Note: 3 pictures taken of the samples (Before Testing) 1st No flash, wrong time 2nd Flash, wrong time 3d Correct. SCM

IAL DESORPTION DATA

REPORT FORM

ROJECT: Raymark Ind

ROJECT No.: 854

MATERIAL TYPE: TSX B-68 X 2-4 : 2A

TESTING DATE: 3/19/94

TESTED BY: SCM

NITORING and TESTING INFORMATION		
	TSX B-68 X 2-4 : 2A	
	371	°C
	341.18	g
- TARE	1341.22	g
5. WEIGHT OF UNTREATED SOIL	1000.04	g
6. WEIGHT OF TREATED SOIL + TARE	1264 18	g
7. WEIGHT OF TREATED SOIL	923.00	g
8. WEIGHT LOSS	77.04	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES		°C
15 MINUTES		°C
20 MINUTES	96	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	90	°C
2 MINUTES	88	°C
3 MINUTES	85	°C
5 MINUTES	80	°C
10 MINUTES	70	°C
15 MINUTES	61	°C
20 MINUTES	56	°C
30 MINUTES	47	°C
40 MINUTES	41	°C
50 MINUTES	36	°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Rugmark Ind

PROJECT No.: 554

MATERIAL TYPE: TS*B-6S*2-4: 2A

TESTING DATE: 3/14/94

TESTED BY: SOH

VISUAL OBSERVATIONS - BEFORE TREATMENT

Dark brown sandy soil with small, clay-like chunks. moist

VISUAL OBSERVATIONS - AFTER TREATMENT

Material Appears to be dryer - the color is lighter (light brown/tan) and the texture is sandier and more granular than before Treatment. Crystal-Like specks can be seen throughout material.

THERMAL DESORPTION DATA

REPORT FORM
PAGE 1 OF 2

PROJECT: Raymark Ind
PROJECT No.: 554
MATERIAL TYPE: TSXB-68X2-4 : 3A
TESTING DATE: 3/19/94
TESTED BY: SOH

SET-UP, MONITORING and TESTING INFORMATION	
1. SAMPLE No.	TSXB-68X2-4 : 3A
2. OVEN TEMPERATURE	371 °C
3. WEIGHT OF PAN (tare weight)	354.60 g
4. WEIGHT OF UNTREATED SOIL + TARE	1355.01 g
5. WEIGHT OF UNTREATED SOIL	1000.41 g
6. WEIGHT OF TREATED SOIL + TARE	1211.17 g
7. WEIGHT OF TREATED SOIL	856.57 g
8. WEIGHT LOSS	143.84 g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40 Min.
10. SOIL TEMPERATURE - WHILE IN OVEN	
1 MINUTE	°C
2 MINUTES	°C
3 MINUTES	°C
5 MINUTES	°C
10 MINUTES	°C
15 MINUTES	°C
20 MINUTES	°C
30 MINUTES	°C
40 MINUTES	99 °C
11. SOIL TEMPERATURE - WHILE COOLING	
1 MINUTE	98 °C
2 MINUTES	95 °C
3 MINUTES	91 °C
5 MINUTES	88 °C
10 MINUTES	80 °C
15 MINUTES	75 °C
20 MINUTES	70 °C
30 MINUTES	61 °C
40 MINUTES	53 °C
50 MINUTES	47 °C
70 MINUTES	38 °C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind
PROJECT No.: 854
MATERIAL TYPE: TS*B-68* 2-4:3A
TESTING DATE: 3/19/94
TESTED BY: SGH

VISUAL OBSERVATIONS - BEFORE TREATMENT

Dark Brown sandy soil with small, clay like chunks. moist

VISUAL OBSERVATIONS - AFTER TREATMENT

Material was smoking upon removal from furnace. Several particles in material were ~~burning~~ SGH red hot and smoking. Material is lighter in color than before ~~tes~~ SGH treatment. Specks of a crystalline material (reflects light) can be seen throughout. - more than 2A.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Paymack Ind.

PROJECT No.: 854

MATERIAL TYPE: TS*B-68*2-4:4B

TESTING DATE: 3-21-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*2-4:4B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	341.23	g
4. WEIGHT OF UNTREATED SOIL + TARE	1340.98	g
5. WEIGHT OF UNTREATED SOIL	999.75	g
6. WEIGHT OF TREATED SOIL + TARE	1256.55	g
7. WEIGHT OF TREATED SOIL	915.32	g
8. WEIGHT LOSS	84.43	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	63	°C
2 MINUTES	78	°C
3 MINUTES	85	°C
5 MINUTES	99	°C
10 MINUTES	113	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	102	°C
2 MINUTES	99	°C
3 MINUTES	97	°C
5 MINUTES	92	°C
10 MINUTES	80	°C
15 MINUTES	70	°C
20 MINUTES	61	°C
30 MINUTES	48	°C
40 MINUTES	39	°C
60 MINUTES	31	°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT:	RAYMARK IND
PROJECT No.:	854
MATERIAL TYPE:	TS* B-68 * Z-4:4B
TESTING DATE:	3-21-94
TESTED BY:	JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Dark brown, sandy soil.
Small clay-like chunks throughout.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Slight moisture still in soil.
Pieces of organic material relatively undisturbed.
Some dark spots on surface.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*2-4:5B
TESTING DATE: 3-21-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*Z-4:5B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	354.69	g
4. WEIGHT OF UNTREATED SOIL + TARE	1354.52	g
5. WEIGHT OF UNTREATED SOIL	999.83	g
6. WEIGHT OF TREATED SOIL + TARE	1203.45	g
7. WEIGHT OF TREATED SOIL		g
8. WEIGHT LOSS		g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	56	°C
2 MINUTES	66	°C
3 MINUTES	77	°C
5 MINUTES	93	°C
10 MINUTES	102	°C
15 MINUTES	116	°C
20 MINUTES	143	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	122	°C
2 MINUTES	N/A	°C
3 MINUTES	109	°C
5 MINUTES	104	°C
10 MINUTES	97	°C
15 MINUTES	89	°C
20 MINUTES	82	°C
30 MINUTES	68	°C
40 MINUTES	56	°C
60 MINUTES	44	°C
90 MINUTES	30	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*2-4:5B
TESTING DATE: 3-21-94
TESTED BY: JJD

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN, SANDY SOIL
SMALL, CLAY-LIKE CHUNKS THROUGHOUT
PIECES OF GLASS & OTHER ORGANIC MATERIAL PRESENT
MOIST

VISUAL OBSERVATIONS - AFTER TREATMENT

Several dark spots on surface.
Sandy Soil is light tan in color.
Some of the organic material present has been partially incinerated, and other material is extremely dry and crumbly.
Soil dry throughout.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-6B * 2-4:6B
TESTING DATE: 3-21-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-6B * 2-4:6B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	357.95	g
4. WEIGHT OF UNTREATED SOIL + TARE	1357.95	g
5. WEIGHT OF UNTREATED SOIL	1000.00	g
6. WEIGHT OF TREATED SOIL + TARE	1177.80	g
7. WEIGHT OF TREATED SOIL		g
8. WEIGHT LOSS		g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	50	°C
2 MINUTES	64	°C
3 MINUTES	70	°C
5 MINUTES	95	°C
10 MINUTES	99	°C
15 MINUTES	112	°C
20 MINUTES	143	°C
30 MINUTES	211	°C
40 MINUTES	292	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	205	°C
2 MINUTES	— N/A	°C
3 MINUTES	238	°C
5 MINUTES	263	°C
10 MINUTES	323	°C
15 MINUTES	257	°C
20 MINUTES	257	°C
30 MINUTES	258	°C
40 MINUTES	231	°C
60 MINUTES	134	°C
120 MINUTES	34	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-68 * 2-4:6B
TESTING DATE: 3-21-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN, SANDY SOIL
SMALL, CLAY-LIKE CHUNKS THROUGHOUT
MOIST
SMALL PIECES OF ORGANIC MATERIAL

VISUAL OBSERVATIONS - AFTER TREATMENT

Upon removal from furnace, sample cooled down somewhat and then it gained in temperature for 10 min. It then held a high temp for 25 min before it showed signs of normal cool down.

Appearance and characteristics very much the same as TS* B-68 * 2-4:5B, with more incinerated organic material.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymack IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*2-4:7C
TESTING DATE: 3-23-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*2-4:7C	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	~~344.64~~ 365.08	g
4. WEIGHT OF UNTREATED SOIL + TARE	~~347.59~~ 1365.92	g
5. WEIGHT OF UNTREATED SOIL	~~1000.65~~ 1000.84	g
6. WEIGHT OF TREATED SOIL + TARE	1267.41	g
7. WEIGHT OF TREATED SOIL	902.33	g
8. WEIGHT LOSS	98.51	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	N/A	°C
2 MINUTES	87	°C
3 MINUTES	94	°C
5 MINUTES	119	°C
10 MINUTES	173	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	112	°C
2 MINUTES	109	°C
3 MINUTES	N/A	°C
5 MINUTES	100	°C
10 MINUTES	87	°C
15 MINUTES	77	°C
20 MINUTES	67	°C
30 MINUTES	53	°C
40 MINUTES	43	°C
50 MINUTES	37	°C
60 MINUTES	32	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-68 * 2-4:7C
TESTING DATE: 3-23-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN SANDY SOIL.
SMALL, CLAY-LIKE CHUNKS THROUGHOUT
MOIST

VISUAL OBSERVATIONS - AFTER TREATMENT

COMPLETELY DRY.
TOP LAYER IS LIGHT TAN.
LOWER LAYER IS RELATIVELY UNAFFECTED (VISUALLY)
EXCEPT FOR BEING DRY.
BLACK SPOTS ON SURFACE (ORGANICS BURNING OFF)

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-68*2-4:8C
TESTING DATE: 3-23-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*2-4:8C	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	360.23	g
4. WEIGHT OF UNTREATED SOIL + TARE	1360.81	g
5. WEIGHT OF UNTREATED SOIL	1000.58	g
6. WEIGHT OF TREATED SOIL + TARE	1211.48	g
7. WEIGHT OF TREATED SOIL	851.25	g
8. WEIGHT LOSS	149.33	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	58	°C
2 MINUTES	83	°C
3 MINUTES	95	°C
5 MINUTES	105	°C
10 MINUTES	158	°C
15 MINUTES	220	°C
20 MINUTES	276	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	203	°C
2 MINUTES	200	°C
3 MINUTES	191	°C
5 MINUTES	175	°C
10 MINUTES	151	°C
15 MINUTES	141	°C
20 MINUTES	134	°C
30 MINUTES	115	°C
40 MINUTES	94	°C
60 MINUTES	61	°C
100 MINUTES	33	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*2-4:8C
TESTING DATE: 3-23-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN SANDY SOIL.
SMALL, CLAY-LIKE CHUNKS THROUGHOUT.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Completely Dry.
Light tan color on surface, but more than 7C.
Soil on very bottom relatively unaffected (visually).
Dark spots where organics have burned (charred).

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*2-4:9C
TESTING DATE: 3-23-92
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*2-4:9C	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	348.44	g
4. WEIGHT OF UNTREATED SOIL + TARE	1349.33	g
5. WEIGHT OF UNTREATED SOIL	1000.89	g
6. WEIGHT OF TREATED SOIL + TARE	1165.95	g
7. WEIGHT OF TREATED SOIL	817.51	g
8. WEIGHT LOSS	183.38	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	65	°C
2 MINUTES	87	°C
3 MINUTES	95	°C
5 MINUTES	112	°C
10 MINUTES	171	°C
15 MINUTES	238	°C
20 MINUTES	292	°C
30 MINUTES	414	°C
40 MINUTES	532	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	400	°C
2 MINUTES	422	°C
3 MINUTES	423	°C
5 MINUTES	417	°C
10 MINUTES	397	°C
15 MINUTES	376	°C
20 MINUTES	352	°C
30 MINUTES	313	°C
40 MINUTES	281	°C
60 MINUTES	163	°C
120 MINUTES	33	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: KAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS ✱ B-68 ✱ Z-4:9C
TESTING DATE: 3-23-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN SANDY SOIL.
SMALL, CLAY-LIKE CHUNKS THROUGHOUT.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Completely dry
Appears well-heated (Organic material has charred, sand is light tan in color)

THERMAL DESORPTION DATA

REPORT FORM

PAGE 1 OF 2

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS*B-7* 4-6:1A
TESTING DATE: 3-17-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7* 4-6:1A	
2. OVEN TEMPERATURE	371°	°C
3. WEIGHT OF PAN (tare weight)	358.00	g
4. WEIGHT OF UNTREATED SOIL + TARE	1356.53	g
5. WEIGHT OF UNTREATED SOIL	998.53	g
6. WEIGHT OF TREATED SOIL + TARE	1287.61	g
7. WEIGHT OF TREATED SOIL	929.61	g
8. WEIGHT LOSS	68.92	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES	83	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	79	°C
2 MINUTES	74	°C
3 MINUTES	72	°C
5 MINUTES	63	°C
10 MINUTES	N/A	°C
15 MINUTES	46	°C
20 MINUTES	44	°C
30 MINUTES	35	°C
40 MINUTES	31	°C
__ MINUTES		°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.

PROJECT No.: 854

MATERIAL TYPE: TSK B-7 # 4-6:1A

TESTING DATE: 3-17-94

TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK SILTY CLAY W/ GRANULAR MATERIAL THROUGHOUT.
WHITE SPECS AND SAND CRYSTALS.
MODERATELY MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

SOIL STEAMED UPON REMOVAL FROM OVEN.
SMALL PORTIONS OF TOP LAYER DRY, THE REST W/ SOME RESIDUAL MOISTURE.
CLAY MATERIAL BALLED UP SOMEWHAT.
TAR-LIKE ODOR.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-7* 4-6:2A

TESTING DATE: 3-18-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-7* 4-6: 24	
2. OVEN TEMPERATURE	371	°C
3. WEIGHT OF PAN (tare weight)	~~341.35~~ 550 334.27	g
4. WEIGHT OF UNTREATED SOIL + TARE	1333.85	g
5. WEIGHT OF UNTREATED SOIL	999.58	g
6. WEIGHT OF TREATED SOIL + TARE	1186.51	g
7. WEIGHT OF TREATED SOIL	852.24	g
8. WEIGHT LOSS	147.34	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES		°C
15 MINUTES		°C
20 MINUTES	95	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	88	°C
2 MINUTES	84	°C
3 MINUTES	79	°C
5 MINUTES	74	°C
10 MINUTES	60	°C
15 MINUTES	49	°C
20 MINUTES	45	°C
30 MINUTES	37	°C
40 MINUTES	32	°C
__ MINUTES		°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT:	RAYMARK IND.
PROJECT No.:	854
MATERIAL TYPE:	TS # 8-7 # 4-6 :2A
TESTING DATE:	3-28-94
TESTED BY:	TSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK SILTY CLAY W/ GRANULAR MATERIAL THROUGHOUT.
WHITE SPECS AND SAND CRYSTALS.
MODERATELY MOIST.
SOME SMALL ROCKS W/N MATERIAL

VISUAL OBSERVATIONS - AFTER TREATMENT

VISIBLY MUCH DRIER THAN 10 MIN R-TIME
TAR-LIKE OILY SUBSTANCE IN CORNER OF PAN. HOT & BUBBLING
TAR ODOR
MATERIAL MORE CRUMBLY AND LESS COHESIVE

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS* B-7* 4-6:3A
TESTING DATE: 3-18-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-7* 4-6:3A	
2. OVEN TEMPERATURE	371	°C
3. WEIGHT OF PAN (tare weight)	357.74	g
4. WEIGHT OF UNTREATED SOIL + TARE	1358.12	g
5. WEIGHT OF UNTREATED SOIL	1000.38	g
6. WEIGHT OF TREATED SOIL + TARE	1101.15	g
7. WEIGHT OF TREATED SOIL		g
8. WEIGHT LOSS		g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES		°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES	194	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	113	°C
2 MINUTES	93	°C
3 MINUTES	80	°C
5 MINUTES	62	°C
10 MINUTES	50	°C
15 MINUTES	44	°C
20 MINUTES	40	°C
30 MINUTES	34	°C
40 MINUTES	31	°C
__ MINUTES		°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAY MARK IND.
PROJECT No.: 854
MATERIAL TYPE: TS* B-7*4-6:3A
TESTING DATE: 3-18-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK SILTY CLAY W/ GRANULAR MATERIAL THROUGHOUT
WHITE SPECS / SMALL ROCKS
SOME PIECES OF FIBROUS MATERIAL.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

SMOKE COMING FROM SAMPLE UPON REMOVAL FROM FURNACE
TAR ODOR, BUT NOT BUBBLY TAR AS NOTICABLE ON PRIOR TEST
MATERIAL VISIBLY DRIER THAN 10 OR 20 MIN

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-7*4-6:4B
TESTING DATE: 3-22-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7*4-6:4B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	363.67	g
4. WEIGHT OF UNTREATED SOIL + TARE	1361.12	g
5. WEIGHT OF UNTREATED SOIL	997.45	g
6. WEIGHT OF TREATED SOIL + TARE	1232.33	g
7. WEIGHT OF TREATED SOIL	868.66	g
8. WEIGHT LOSS	128.79	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	50	°C
2 MINUTES	68	°C
3 MINUTES	79	°C
5 MINUTES	94	°C
10 MINUTES	100	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	95	°C
2 MINUTES	92	°C
3 MINUTES	89	°C
5 MINUTES	84	°C
10 MINUTES	70	°C
15 MINUTES	61	°C
20 MINUTES	54	°C
30 MINUTES	42	°C
40 MINUTES	35	°C
50 MINUTES	30	°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS* B-7* 4-6.4B

TESTING DATE: 3-22-94

TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK SILTY CLAY (VERY GRAINY)
SOME PIECES OF ORGANIC MATERIAL.
FIBROUS MATERIAL & SMALL ROCKS
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

MUCH DRIER IN APPEARANCE.
SOME SPOTS THAT LOOK LIKE MOLTEN TAR.
SOIL ON BOTTOM STILL SOMEWHAT MOIST.
SMOKED UPON REMOVAL FROM FURNACE.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: PAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-7*46:5B
TESTING DATE: 3-22-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7*4-6:5B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	347.33	g
4. WEIGHT OF UNTREATED SOIL + TARE	1348.18	g
5. WEIGHT OF UNTREATED SOIL	1000.85	g
6. WEIGHT OF TREATED SOIL + TARE	1082.52	g
7. WEIGHT OF TREATED SOIL	735.19	g
8. WEIGHT LOSS	265.66	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	57	°C
2 MINUTES	57	°C
3 MINUTES	65	°C
5 MINUTES	82	°C
10 MINUTES	100	°C
15 MINUTES	100	°C
20 MINUTES	100	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	~~550~~ 98	°C
2 MINUTES	95	°C
3 MINUTES	93	°C
5 MINUTES	88	°C
10 MINUTES	78	°C
15 MINUTES	69	°C
20 MINUTES	61	°C
30 MINUTES	50	°C
40 MINUTES	40	°C
50 MINUTES	35	°C
60 MINUTES	31	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS * B-7 * 4-6 : SB
TESTING DATE: 3-22-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black silty clay (grainy)
SMALL CLAY-LIKE CHUNKS OF ORGANIC MATERIAL THROUGHOUT
FIBROUS MATERIAL & SMALL ROCKS
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Flame present upon removal from furnace.
Soil is completely dry and stuck together.
Hard to the touch.
Fibrous organic material oozes tar-like substance which burns. Fibrous substance is left over.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind
PROJECT No.: 854
MATERIAL TYPE: TS* B-7 * 4-6: 6B
TESTING DATE: 3-22-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-7 * 4-6: 6B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	340.23	g
4. WEIGHT OF UNTREATED SOIL + TARE	1339.70	g
5. WEIGHT OF UNTREATED SOIL	999.47	g
6. WEIGHT OF TREATED SOIL + TARE	955.34	g
7. WEIGHT OF TREATED SOIL	615.11	g
8. WEIGHT LOSS	384.36	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	48	°C
2 MINUTES	56	°C
3 MINUTES	69	°C
5 MINUTES	85	°C
10 MINUTES	99	°C
15 MINUTES	99	°C
20 MINUTES	100	°C
30 MINUTES	195	°C
40 MINUTES	353	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	255	°C
2 MINUTES	300	°C
3 MINUTES	328	°C
5 MINUTES	380	°C
10 MINUTES	450	°C
15 MINUTES	475	°C
20 MINUTES	481	°C
30 MINUTES	474	°C
40 MINUTES	421	°C
60 MINUTES	152	°C
125 MINUTES	28	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAY MARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-7* 4-6.6B
TESTING DATE: 3-22-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black Silty Clay (graing)
Small clay-like chunks of organic material
Small rocks
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Flaming as it came out of the furnace.
Heat increased for the first 20 min. out.
Soil much more ashen or cinder-like in appearance
Completely dry.

THERMAL DESORPTION DATA

REPORT FORM

*NITROGEN PURGE

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-7*4-6:7C

TESTING DATE: 3-24-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7*4-6:7C	
2. OVEN TEMPERATURE *	649	°C
3. WEIGHT OF PAN (tare weight)	364.24	g
4. WEIGHT OF UNTREATED SOIL + TARE	1364.99	g
5. WEIGHT OF UNTREATED SOIL	1000.75	g
6. WEIGHT OF TREATED SOIL + TARE	1182.04	g
7. WEIGHT OF TREATED SOIL	817.8	g
8. WEIGHT LOSS	182.95	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	64	°C
2 MINUTES	88	°C
3 MINUTES	96	°C
5 MINUTES	102	°C
10 MINUTES	101	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	96	°C
2 MINUTES	92	°C
3 MINUTES	88	°C
5 MINUTES	80	°C
10 MINUTES	68	°C
15 MINUTES	58	°C
20 MINUTES	50	°C
30 MINUTES	39	°C
40 MINUTES	33	°C
__ MINUTES		°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS#B-7#4-6:7C
TESTING DATE: 3-24-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black, silty clay w/ clay-like chunks of organic material.
Small rocks throughout.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Smoking slightly upon removal from oven.
Visibly more dry.
Bottom layer relatively unaffected. Still moist and organic materials are still pliable.
Top layer dry & brittle. Organic material charred on surface.

THERMAL DESORPTION DATA

REPORT FORM

*NITROGEN PURGE

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-7*4-6:8C
TESTING DATE: 3-24-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7*4-6:8C	
2. OVEN TEMPERATURE *	649	°C
3. WEIGHT OF PAN (tare weight)	361.38	g
4. WEIGHT OF UNTREATED SOIL + TARE	1362.26	g
5. WEIGHT OF UNTREATED SOIL	1000.88	g
6. WEIGHT OF TREATED SOIL + TARE	~~1068.40~~ ~~.38~~ .54 1068.24	g
7. WEIGHT OF TREATED SOIL	706.86	g
8. WEIGHT LOSS	294.02	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	55	°C
2 MINUTES	72	°C
3 MINUTES	82	°C
5 MINUTES	97	°C
10 MINUTES	101	°C
15 MINUTES	103	°C
20 MINUTES	133	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	112	°C
2 MINUTES	109	°C
3 MINUTES	105	°C
5 MINUTES	101	°C
10 MINUTES	96	°C
15 MINUTES	93	°C
20 MINUTES	87	°C
30 MINUTES	71	°C
40 MINUTES	57	°C
60 MINUTES	40	°C
80 MINUTES	32	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS * B-7 * 4.6-8
TESTING DATE: 3-24-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black, silty clay w/ clay-like chunks of organic material.
Small rocks throughout.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Smoking upon removal from oven
Dry throughout.
Organic materials on surface charred & those on the bottom are dry and brittle.

THERMAL DESORPTION DATA

REPORT FORM

*Nitrogen Purge

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-7*4-6:9C
TESTING DATE: 3-24-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7*4-6:9C	
2. OVEN TEMPERATURE *	649	°C
3. WEIGHT OF PAN (tare weight)	347.54	g
4. WEIGHT OF UNTREATED SOIL + TARE	1348.09	g
5. WEIGHT OF UNTREATED SOIL	1000.55	g
6. WEIGHT OF TREATED SOIL + TARE	955.83	g
7. WEIGHT OF TREATED SOIL	608.29	g
8. WEIGHT LOSS	392.26	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	49	°C
2 MINUTES	66	°C
3 MINUTES	80	°C
5 MINUTES	94	°C
10 MINUTES	101	°C
15 MINUTES	101	°C
20 MINUTES	117	°C
30 MINUTES	298	°C
40 MINUTES	510	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	405	°C
2 MINUTES	510	°C
3 MINUTES	530	°C
5 MINUTES	533	°C
10 MINUTES	516	°C
15 MINUTES	487	°C
20 MINUTES	459	°C
30 MINUTES	390	°C
40 MINUTES	353	°C
60 MINUTES	226	°C
120 MINUTES	28	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-7*4-6:9C
TESTING DATE: 3-24-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black, silty clay w/ clay-like chunks of organic material.
Small rocks throughout.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Soil Completely dry.
Glowing embers apparent upon removal from furnace.
Appears lighter in color and charred throughout.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Rymark Inl
PROJECT No.: # 854
MATERIAL TYPE: TS*B-60*6-8:1A
TESTING DATE: 3/19/94
TESTED BY: SGH

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*6-8:1A	
2. OVEN TEMPERATURE	371°	°C
3. WEIGHT OF PAN (tare weight)	341.35	g
4. WEIGHT OF UNTREATED SOIL + TARE	1341.88	g
5. WEIGHT OF UNTREATED SOIL	1000.53	g
6. WEIGHT OF TREATED SOIL + TARE	1287.88	g
7. WEIGHT OF TREATED SOIL	946.53	g
8. WEIGHT LOSS	54.00	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES	75	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	71	°C
2 MINUTES	71	°C
3 MINUTES	71	°C
5 MINUTES	69	°C
10 MINUTES	SGH ~~100~~ 65	°C
15 MINUTES	59	°C
20 MINUTES	53	°C
30 MINUTES	46	°C
40 MINUTES	40	°C
50 MINUTES	36	°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind

PROJECT No.: #554

MATERIAL TYPE: TS#B-68 #6-8:1A

TESTING DATE: 3/15/94

TESTED BY: SGH

VISUAL OBSERVATIONS - BEFORE TREATMENT

Material is very dark brown / black color. Appears to be moist and feels moist. Small, granular pieces of soil with larger, clay-like chunks throughout. Some debris (~~rocks~~ SGH (small rocks and organic material)

VISUAL OBSERVATIONS - AFTER TREATMENT

Material is grey with black chunks throughout. Appears to be dryer than before treatment. Crystal-like objects are visible.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind

PROJECT No.: #554

MATERIAL TYPE: TS#B-68 #6-8 2A

TESTING DATE: 3/19/94

TESTED BY: SOH

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS#B-68 #6-8 : 2A	
2. OVEN TEMPERATURE	371°	°C
3. WEIGHT OF PAN (tare weight)	357.84	g
4. WEIGHT OF UNTREATED SOIL + TARE	1358.65	g
5. WEIGHT OF UNTREATED SOIL	1000.81	g
6. WEIGHT OF TREATED SOIL + TARE	1220.16	g
7. WEIGHT OF TREATED SOIL	862.32	g
8. WEIGHT LOSS	138.49	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE		°C
2 MINUTES		°C
3 MINUTES		°C
5 MINUTES		°C
10 MINUTES		°C
15 MINUTES	(95°)	°C
20 MINUTES	(96°) 97°	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	94	°C
2 MINUTES	92	°C
3 MINUTES	88	°C
5 MINUTES	84	°C
10 MINUTES	71	°C
15 MINUTES	64	°C
20 MINUTES	57	°C
30 MINUTES	48	°C
40 MINUTES	43	°C
50 MINUTES	37	°C
__ MINUTES		°C

-> # in paranthesis indicates thermocouple probe used to measure Temp of soil in the oven. # was not very stable - varied from 88° -> 100° (20 min # varied from 95° - 97°)

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Roymark Ind
PROJECT No.: #554
MATERIAL TYPE: TS+B-68 x 6-8' 2A
TESTING DATE: 3/19/97
TESTED BY: SGrl

VISUAL OBSERVATIONS - BEFORE TREATMENT

Material is very dark/black in color with grey patches throughout. Soil is moist, with small granular pieces and larger pieces of clay like material. Small crystal like pieces can be seen throughout, as well as bits of debris.

VISUAL OBSERVATIONS - AFTER TREATMENT

Material was smoking after removed from oven. Material is mostly grey in color, with a few black chunks. Crystal like objects are still visible.

THERMAL DESORPTION DATA

REPORT FORM
PAGE 1 OF 2

PROJECT: Raymark Ind
PROJECT No.: #554
MATERIAL TYPE: TSXB-6SX6-8: 3A
TESTING DATE: 3/15/94
TESTED BY: SOM

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TSXB-6SX6-8: 3A	
2. OVEN TEMPERATURE	371	°C
3. WEIGHT OF PAN (tare weight)	354.69	g
4. WEIGHT OF UNTREATED SOIL + TARE	1355.44	g
5. WEIGHT OF UNTREATED SOIL	1000.75	g
6. WEIGHT OF TREATED SOIL + TARE	1113.60	g
7. WEIGHT OF TREATED SOIL	758.91	g
8. WEIGHT LOSS	241.84	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE (Thermocouple in oven)	(34°)	°C
2 MINUTES	(42°)	°C
3 MINUTES	(48°)	°C
5 MINUTES	(56°)	°C
10 MINUTES	(97°)	°C
15 MINUTES	(100°)	°C
20 MINUTES	(100°)	°C
30 MINUTES	(100°)	°C
40 MINUTES	(100°) —98°	°C → 95° as measured previously (Outside oven)
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	91	°C
2 MINUTES	89	°C
3 MINUTES	86	°C
5 MINUTES	82	°C
10 MINUTES	74	°C
15 MINUTES	66	°C
20 MINUTES	60	°C
30 MINUTES	51	°C
40 MINUTES	43	°C
50 MINUTES	39	°C
__ MINUTES		°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind

PROJECT No.: #54

MATERIAL TYPE: TS+B-68+6-8:3A

TESTING DATE: 3/16/94

TESTED BY: SGM

VISUAL OBSERVATIONS - BEFORE TREATMENT

Material is dark in color with chunks of blue/grey material throughout. Sandy, moist soil with chunks of blue + dark clay-like material. Crystal-like specks throughout.

VISUAL OBSERVATIONS - AFTER TREATMENT

Material was smoking upon removal from oven. Unpleasant odor. Material is grey in color and drier, with a few black chunks

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS* B-68*6-8:43

TESTING DATE: 3-22-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*6-8:43	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	364.28	g
4. WEIGHT OF UNTREATED SOIL + TARE	1364.14	g
5. WEIGHT OF UNTREATED SOIL	999.86	g
6. WEIGHT OF TREATED SOIL + TARE	1235.56	g
7. WEIGHT OF TREATED SOIL	871.28	g
8. WEIGHT LOSS	128.58	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	52	°C
2 MINUTES	69	°C
3 MINUTES	77	°C
5 MINUTES	95	°C
10 MINUTES	102	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	97	°C
2 MINUTES	94	°C
3 MINUTES	92	°C
5 MINUTES	88	°C
10 MINUTES	76	°C
15 MINUTES	68	°C
20 MINUTES	60	°C
30 MINUTES	49	°C
40 MINUTES	41	°C
50 MINUTES	35	°C
60 MINUTES	31	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT:	RAYMARK IND
PROJECT No.:	8541
MATERIAL TYPE:	TS*B-68*6-8:4B
TESTING DATE:	3-22-94
TESTED BY:	JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL WITH TAR-LIKE FIBROUS MATERIAL.
MOIST.
OTHER ORGANIC MATERIAL (WHEAT STRAW) PRESENT.
WHITE SPECS.

VISUAL OBSERVATIONS - AFTER TREATMENT

APPEARS MORE DRY, BUT HAS RETAINED SOME MOISTURE
ORGANIC MATERIAL RELATIVELY UNAFFECTED

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: ~~TS*B-68*68:5B~~
TESTING DATE: 3-22-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*68:5B	
2. OVEN TEMPERATURE	528	°C
3. WEIGHT OF PAN (tare weight)	346.90	g
4. WEIGHT OF UNTREATED SOIL + TARE	1346.80	g
5. WEIGHT OF UNTREATED SOIL	999.90	g
6. WEIGHT OF TREATED SOIL + TARE	1128.68	g
7. WEIGHT OF TREATED SOIL	781.78	g
8. WEIGHT LOSS	218.12	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	49	°C
2 MINUTES	63	°C
3 MINUTES	75	°C
5 MINUTES	93	°C
10 MINUTES	101	°C
15 MINUTES	101	°C
20 MINUTES	104	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	101	°C
2 MINUTES	99	°C
3 MINUTES	96	°C
5 MINUTES	92	°C
10 MINUTES	81	°C
15 MINUTES	70	°C
20 MINUTES	61	°C
30 MINUTES	49	°C
40 MINUTES	40	°C
50 MINUTES	35	°C
60 MINUTES	30	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*6-8:5B
TESTING DATE: 3-27-94
TESTED BY: SSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL WITH TAR-LIKE FIBROUS MATERIAL
MOIST.
OTHER ORGANIC MATERIAL PRESENT.
WHITE SPECS.

VISUAL OBSERVATIONS - AFTER TREATMENT

APPEARS MORE DRY BUT HAS RETAINED SOME MOISTURE.
TAR-LIKE FIBROUS MATERIAL HAS BECOME VERY DRY & HARD.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Paymark IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-68 * 6-8:6B
TESTING DATE: 3-27-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-68 * 6-8:6B	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	360.39	g
4. WEIGHT OF UNTREATED SOIL + TARE	1360.09	g
5. WEIGHT OF UNTREATED SOIL	999.70	g
6. WEIGHT OF TREATED SOIL + TARE	1051.27	g
7. WEIGHT OF TREATED SOIL	690.88	g
8. WEIGHT LOSS	308.82	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	45	°C
2 MINUTES	63	°C
3 MINUTES	76	°C
5 MINUTES	92	°C
10 MINUTES	101	°C
15 MINUTES	102	°C
20 MINUTES	110	°C
30 MINUTES	167	°C
40 MINUTES	233	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	149	°C
2 MINUTES	150	°C
3 MINUTES	148	°C
5 MINUTES	143	°C
10 MINUTES	129	°C
15 MINUTES	~~119~~ N/A	°C
20 MINUTES	119	°C
30 MINUTES	111	°C
40 MINUTES	100	°C
60 MINUTES	70	°C
95 MINUTES	30	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-68 *6-8:6B
TESTING DATE: 3-22-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL WITH TAR-LIKE FIBROUS MATERIAL
MOIST.
OTHER ORGANIC MATERIAL PRESENT.
WHITE SPECS

VISUAL OBSERVATIONS - AFTER TREATMENT

APPEARS DRY THROUGHOUT.
TOP LAYER IS LIGHT TAN.
ORGANIC MATERIAL VERY DRY & SLIGHTLY CRUMBLY
SLIGHT SMOKE UPON FURNACE REMOVAL

THERMAL DESORPTION DATA

REPORT FORM

* NITROGEN PURGE

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS * B-68 * 6-8: 7C
TESTING DATE: 3-23-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS * B-68 * 6-8: 7C	
2. OVEN TEMPERATURE *	649	°C
3. WEIGHT OF PAN (tare weight)	360.63	g
4. WEIGHT OF UNTREATED SOIL + TARE	1360.81	g
5. WEIGHT OF UNTREATED SOIL	1000.18	g
6. WEIGHT OF TREATED SOIL + TARE	1203.01	g
7. WEIGHT OF TREATED SOIL	842.38	g
8. WEIGHT LOSS	157.80	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	10	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	79	°C
2 MINUTES	93	°C
3 MINUTES	99	°C
5 MINUTES	101	°C
10 MINUTES	112	°C
15 MINUTES		°C
20 MINUTES		°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	100	°C
2 MINUTES	98	°C
3 MINUTES	96	°C
5 MINUTES	90	°C
10 MINUTES	78	°C
15 MINUTES	68	°C
20 MINUTES	60	°C
30 MINUTES	48	°C
40 MINUTES	41	°C
50 MINUTES	36	°C
60 MINUTES	32	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Ray Mark Ind

PROJECT No.: 854

MATERIAL TYPE: TS* B-68*6-8:7C

TESTING DATE: 3-23-94

TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL W/ TAC-LIKE FIBROUS MATERIAL
WHITE SPECS.

MOIST.

SOME EXTRANEOUS ORGANIC MATERIAL.

VISUAL OBSERVATIONS - AFTER TREATMENT

Visibly more dry, but has retained moisture
Organic chunks still pliable (not too dried out)
Slight spots of tan on very top surface.
Not very effective treatment (visually).

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS* B-68*6-8:8C

TESTING DATE: 3-23-94

TESTED BY: JSD

*NITROGEN PURGE

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*6-8:8C	
2. OVEN TEMPERATURE *	649	°C
3. WEIGHT OF PAN (tare weight)	364.41	g
4. WEIGHT OF UNTREATED SOIL + TARE	1364.63	g
5. WEIGHT OF UNTREATED SOIL	1000.22	g
6. WEIGHT OF TREATED SOIL + TARE	1088.54	g
7. WEIGHT OF TREATED SOIL	724.13	g
8. WEIGHT LOSS	276.09	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	20	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	72	°C
2 MINUTES	88	°C
3 MINUTES	96	°C
5 MINUTES	102	°C
10 MINUTES	103	°C
15 MINUTES	136	°C
20 MINUTES	184	°C
30 MINUTES		°C
40 MINUTES		°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	105	°C
2 MINUTES	104	°C
3 MINUTES	103	°C
5 MINUTES	101	°C
10 MINUTES	89	°C
15 MINUTES	81	°C
20 MINUTES	70	°C
30 MINUTES	58	°C
40 MINUTES	47	°C
50 MINUTES	40	°C
65 MINUTES	32	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-6B*6-8: EC
TESTING DATE: 3-23-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL w/ TAR-LIKE FIBROUS MATERIAL.
WHITE SPECS.
MOIST.
SOME EXTRANEOUS ORGANIC MATERIAL

VISUAL OBSERVATIONS - AFTER TREATMENT

Appears dry throughout.
Light tan color on surface (indicative of high temp exposure)
Organic material dry & brittle.

THERMAL DESORPTION DATA

REPORT FORM

*Nitrogen Purge

PROJECT: Raymack Ind
PROJECT No.: 854
MATERIAL TYPE: TS* B-68* 6-8:9C
TESTING DATE: 3-23-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-68* 6-8:9C	
2. OVEN TEMPERATURE *	649	°C
3. WEIGHT OF PAN (tare weight)	341.02	g
4. WEIGHT OF UNTREATED SOIL + TARE	1341.95	g
5. WEIGHT OF UNTREATED SOIL	1000.93	g
6. WEIGHT OF TREATED SOIL + TARE	986.37	g
7. WEIGHT OF TREATED SOIL	645.35	g
8. WEIGHT LOSS	355.58	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	40	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	78	°C
2 MINUTES	88	°C
3 MINUTES	96	°C
5 MINUTES	101	°C
10 MINUTES	101	°C
15 MINUTES	131	°C
20 MINUTES	196	°C
30 MINUTES	286	°C
40 MINUTES	363	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	125	°C
2 MINUTES	180	°C
3 MINUTES	198	°C
5 MINUTES	235	°C
10 MINUTES	287	°C
15 MINUTES	307	°C
20 MINUTES	314	°C
30 MINUTES	320	°C
40 MINUTES	336	°C
60 MINUTES	204	°C
150 MINUTES	33	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS * B-68 * 6-8:9C
TESTING DATE: 3-23-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL W/ TAR-LIKE FIBROUS MATERIAL.
WHITE SPECS.
MOIST.
SOME EXTRANEOUS ORGANIC MATERIAL.

VISUAL OBSERVATIONS - AFTER TREATMENT

Much more tan colored soil than 8C.
Organic material charred, dry & brittle.
Completely dry.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*6-8
TESTING DATE: 4-7-94
TESTED BY: JSD

Initial Treatment

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*6-8:FT-B60	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	347.69	g
4. WEIGHT OF UNTREATED SOIL + TARE	1347.90	g
5. WEIGHT OF UNTREATED SOIL	1000.21	g
6. WEIGHT OF TREATED SOIL + TARE	1006.80	g
7. WEIGHT OF TREATED SOIL		g
8. WEIGHT LOSS		g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	60	°C
2 MINUTES	76	°C
3 MINUTES	88	°C
5 MINUTES	100	°C
10 MINUTES	102	°C
15 MINUTES	109	°C
20 MINUTES	138	°C
30 MINUTES	167	°C
40 MINUTES	232	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	N/A	°C
2 MINUTES	322	°C
3 MINUTES	328	°C
5 MINUTES	328	°C
10 MINUTES	318	°C
15 MINUTES	308	°C
20 MINUTES	297	°C
30 MINUTES	274	°C
40 MINUTES	257	°C
60 MINUTES	233	°C
135 MINUTES	33	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-68*6-8

TESTING DATE: 4-7-94

TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black, sandy soil w/ black, spongy rubber (tar)-like material.
White specs.
Extraneous organic material.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 min: 409°C
Soil did not burn or smoke upon removal from oven.
Completely dry.
Light tan on top layer, dark brown beneath.
Lightly charred on top.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymack Ind
PROJECT No.: 854
MATERIAL TYPE: TS* B-68 * 6-8:FT-B90
TESTING DATE: 4-7-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-68 * 6-8:FT-B90	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	364.53	g
4. WEIGHT OF UNTREATED SOIL + TARE	1365.33	g
5. WEIGHT OF UNTREATED SOIL	1000.80	g
6. WEIGHT OF TREATED SOIL + TARE	1027.17	g
7. WEIGHT OF TREATED SOIL	662.64	g
8. WEIGHT LOSS	338.16	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	90	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	60	°C
2 MINUTES	72	°C
3 MINUTES	83	°C
5 MINUTES	101	°C
10 MINUTES	102	°C
15 MINUTES	105	°C
20 MINUTES	119	°C
30 MINUTES	166	°C
40 MINUTES	245	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	445	°C
2 MINUTES	462	°C
3 MINUTES	460	°C
5 MINUTES	448	°C
10 MINUTES	411	°C
15 MINUTES	384	°C
20 MINUTES	357	°C
30 MINUTES	320	°C
40 MINUTES	300	°C
60 MINUTES	197	°C
135 MINUTES	35	°C

THERMAL DESORPTION DATA

REPORT FORM

PAGE 2 OF 2

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*6-8
TESTING DATE: 4-7-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black, sandy soil w/ black, spongy tar (rubber)-like material.
White specs.
Extraneous organic material.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 min: 446
Temp @ 75 min: 519
Temp @ 90 min: 547

Soil did not burn or smoke upon removal from oven.
Completely dry.
Light tan color mostly, but bottom layer is dark.
Charred but not incinerated.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*6-8
TESTING DATE: 4-6-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*6-8 : FT-C 60	
2. OVEN TEMPERATURE	649°	°C
3. WEIGHT OF PAN (tare weight)	340.61	g
4. WEIGHT OF UNTREATED SOIL + TARE	1341.57	g
5. WEIGHT OF UNTREATED SOIL	1000.96	g
6. WEIGHT OF TREATED SOIL + TARE	947.90	g
7. WEIGHT OF TREATED SOIL	607.29	g
8. WEIGHT LOSS	393.67	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	81	°C
2 MINUTES	94	°C
3 MINUTES	101	°C
5 MINUTES	102	°C
10 MINUTES	127	°C
15 MINUTES	158	°C
20 MINUTES	220	°C
30 MINUTES	270	°C
40 MINUTES	398	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	421	°C
2 MINUTES	433	°C
3 MINUTES	439	°C
5 MINUTES	439	°C
10 MINUTES	406	°C
15 MINUTES	375	°C
20 MINUTES	350	°C
30 MINUTES	316	°C
40 MINUTES	298	°C
60 MINUTES	237	°C
150 MINUTES	31	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND.
PROJECT No.: 854
MATERIAL TYPE: TS* B-68*6-8
TESTING DATE: 4-6-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL w/ BLACK SPONGY, TAR-LIKE MATERIAL.
WHITE SPECS.
SOME EXTRANEOUS ORGANIC MATERIAL.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp in Oven @ 60 minutes: 588°
Glowing red embers upon removal from oven.
No smoking or slow burning as noticed before.
Material is completely dry.
Charred in appearance (does not appear fully incinerated though)
Mostly light tan in color w/ dark spots throughout (spongy material)

THERMAL DESORPTION DATA

REPORT FORM
PAGE 1 OF 2

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*6-8
TESTING DATE: 4-6-94
TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION	
1. SAMPLE No.	TS*B-68*6-8:FT-L75
2. OVEN TEMPERATURE	649 °C
3. WEIGHT OF PAN (tare weight)	348.20 g
4. WEIGHT OF UNTREATED SOIL + TARE	1348.36 g
5. WEIGHT OF UNTREATED SOIL	1000.16 g
6. WEIGHT OF TREATED SOIL + TARE	982.56 g
7. WEIGHT OF TREATED SOIL	634.36 g
8. WEIGHT LOSS	365.80 g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	75 Min.
10. SOIL TEMPERATURE - WHILE IN OVEN	
1 MINUTE	85 °C
2 MINUTES	97 °C
3 MINUTES	101 °C
5 MINUTES	102 °C
10 MINUTES	117 °C
15 MINUTES	168 °C
20 MINUTES	227 °C
30 MINUTES	382 °C
40 MINUTES	517 °C
11. SOIL TEMPERATURE - WHILE COOLING	
1 MINUTE	502 °C
2 MINUTES	501 °C
3 MINUTES	501 °C
5 MINUTES	474 °C
10 MINUTES	401 °C
15 MINUTES	374 °C
20 MINUTES	~~371~~ 339 °C
30 MINUTES	296 °C
40 MINUTES	269 °C
60 MINUTES	187 °C
135 MINUTES	31 °C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* R-68* 6-2
TESTING DATE: 4-6-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL w/ BLACK SPONGY RUBBER-LIKE MATERIAL
WHITE SPECS.
EXTRANEOUS ORGANIC MATERIAL.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 min: 616°
Temp @ 75 min: 636°

Glowing red embers upon removal from oven.
No smoking or slow burning.
Completely Dry.
Charred, but not fully incinerated.
Mostly light tan but dark in spots where organic material was.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-68*6-8

TESTING DATE: 4-6-94

TESTED BY: JSD

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*6-8:FT-C90	
2. OVEN TEMPERATURE	649	°C
3. WEIGHT OF PAN (tare weight)	361.88	g
4. WEIGHT OF UNTREATED SOIL + TARE	1362.44	g
5. WEIGHT OF UNTREATED SOIL	1000.56	g
6. WEIGHT OF TREATED SOIL + TARE	986.95	g
7. WEIGHT OF TREATED SOIL	625.07	g
8. WEIGHT LOSS	375.49	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	90	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	86	°C
2 MINUTES	97	°C
3 MINUTES	101	°C
5 MINUTES	102	°C
10 MINUTES	115	°C
15 MINUTES	152	°C
20 MINUTES	202	°C
30 MINUTES	282	°C
40 MINUTES	355	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	515	°C
2 MINUTES	540	°C
3 MINUTES	535	°C
5 MINUTES	515	°C
10 MINUTES	461	°C
15 MINUTES	428	°C
20 MINUTES	390	°C
30 MINUTES	344	°C
40 MINUTES	314	°C
60 MINUTES	202	°C
137 MINUTES	35	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMACK IND
PROJECT No.: 854
MATERIAL TYPE: TS*B-68*6-8
TESTING DATE: 4-6-94
TESTED BY: JSD

VISUAL OBSERVATIONS - BEFORE TREATMENT

BLACK, SANDY SOIL w/ BLACK, SPONGY ~~RUBBER~~-LIKE MATERIAL.
WHITE SPECS.
EXTRANEOUS ORGANIC MATERIAL.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 min: 582
Temp @ 75 min: 628
Temp @ 90 min: 640
Glowing red embers upon removal from oven.
No smoking or slow burning
Completely dry
Charred more than C75 or C60, but still not fully incinerated.
Mostly light tan w/ some dark areas from organic material.

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40362

- Seven soil samples were submitted for analysis on 3/18/94 at 1655 hours. The samples arrived at room temperature and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*	*Instrument*
Total PCBs	SW-846 Methods: 3550 and 8080	Hewlett Packard 5890 GC/ECD

Total PCBs

A dilution was required prior to sample analysis due to the nature of the sample extracts. As a result, the surrogate and matrix spike recoveries were unable to be determined and the report is flagged "DO" for diluted out. Also, aroclors 1262 and 1268 were found to coelute. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

K McClemmons
QA Authorization

3/29/94
Date

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 12:58, DLL

DATE REPORTED: 3/29/94

Quant Factor: 33.28
Extract Method: 3550
% Solid: 99.8

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	3328	ND	ND
Aroclor-1221	11104-28-2	6656	ND	ND
Aroclor-1232	11141-16-5	3328	ND	ND
Aroclor-1242	53469-21-9	3328	ND	ND
Aroclor-1248	12672-29-6	3328	ND	ND
Aroclor-1254	11097-69-1	3328	ND	ND
Aroclor-1260	11096-82-5	3328	ND	ND
Aroclor-1262	37324-23-5	3328	27,000E	ND
Aroclor-1268	11100-14-4	3328	12,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 2A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 16:56, DLL

DATE REPORTED: 3/29/94

Quant Factor: 66.12 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	6612	ND	ND
Aroclor-1221	11104-28-2	13223	ND	ND
Aroclor-1232	11141-16-5	6612	ND	ND
Aroclor-1242	53469-21-9	6612	ND	ND
Aroclor-1248	12672-29-6	6612	ND	ND
Aroclor-1254	11097-69-1	6612	ND	ND
Aroclor-1260	11096-82-5	6612	ND	ND
Aroclor-1262	37324-23-5	6612	37,000E	ND
Aroclor-1268	11100-14-4	6612	21,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 3A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/24/94, 13:01, DLL

DATE REPORTED: 3/29/94

Quant Factor: 3.35
Extract Method: 3550
% Solid: 100

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	335	ND	ND
Aroclor-1221	11104-28-2	670	ND	ND
Aroclor-1232	11141-16-5	335	ND	ND
Aroclor-1242	53469-21-9	335	ND	ND
Aroclor-1248	12672-29-6	335	ND	ND
Aroclor-1254	11097-69-1	335	ND	ND
Aroclor-1260	11096-82-5	335	ND	ND
Aroclor-1262	37324-23-5	335	1,600E	ND
Aroclor-1268	11100-14-4	335	900E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 14:50, DLL

DATE REPORTED: 3/29/94

Quant Factor: 208.4 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 79.8

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	20844	ND	ND
Aroclor-1221	11104-28-2	41688	ND	ND
Aroclor-1232	11141-16-5	20844	ND	ND
Aroclor-1242	53469-21-9	20844	ND	ND
Aroclor-1248	12672-29-6	20844	ND	ND
Aroclor-1254	11097-69-1	20844	ND	ND
Aroclor-1260	11096-82-5	20844	ND	ND
Aroclor-1262	37324-23-5	20844	120,000E	ND
Aroclor-1268	11100-14-4	20844	65,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-5
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 2A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 15:46, DLL

DATE REPORTED: 3/29/94

Quant Factor: 210.4 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 79.6

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	21043	ND	ND
Aroclor-1221	11104-28-2	42086	ND	ND
Aroclor-1232	11141-16-5	21043	ND	ND
Aroclor-1242	53469-21-9	21043	ND	ND
Aroclor-1248	12672-29-6	21043	ND	ND
Aroclor-1254	11097-69-1	21043	ND	ND
Aroclor-1260	11096-82-5	21043	ND	ND
Aroclor-1262	37324-23-5	21043	140,000E	ND
Aroclor-1268	11100-14-4	21043	85,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-6
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 3A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 16:42, DLL

DATE REPORTED: 3/29/94

Quant Factor: 167.3 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 98.5

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	16731	ND	ND
Aroclor-1221	11104-28-2	33462	ND	ND
Aroclor-1232	11141-16-5	16731	ND	ND
Aroclor-1242	53469-21-9	16731	ND	ND
Aroclor-1248	12672-29-6	16731	ND	ND
Aroclor-1254	11097-69-1	16731	ND	ND
Aroclor-1260	11096-82-5	16731	ND	ND
Aroclor-1262	37324-23-5	16731	110,000E	ND
Aroclor-1268	11100-14-4	16731	64,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40362-7
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 17:38, DLL

DATE REPORTED: 3/29/94

Quant Factor: 180.7
Extract Method: 3550
% Solid: 91.6

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	18075	ND	ND
Aroclor-1221	11104-28-2	36149	ND	ND
Aroclor-1232	11141-16-5	18075	ND	ND
Aroclor-1242	53469-21-9	18075	ND	ND
Aroclor-1248	12672-29-6	18075	ND	ND
Aroclor-1254	11097-69-1	18075	ND	ND
Aroclor-1260	11096-82-5	18075	ND	ND
Aroclor-1262	37324-23-5	18075	57,000E	ND
Aroclor-1268	11100-14-4	18075	34,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 854-40362-1
MS & MSD

PCB MATRIX SPIKE RESULTS

SAMPLE # TS*B-10*1.5-4, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 08:32, DLL

DATE REPORTED: 3/29/94

Sample Matrix: SOLID
Analysis Method: 8080

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS(Date/Time/Init): 3/26/94, 09:28, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	DO	NA

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out, NA: Not Applicable

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40368

- Eight soil samples were submitted for analysis on 3/21/94 at 1415 hours. The samples arrived at room temperature and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*	*Instrument*
Total PCBs	SW-846 Methods: 3550 and 8080	Hewlett Packard 5890 GC/ECD

Total PCBs

A dilution was required prior to sample analysis due to the nature of the sample extracts. As a result, the surrogate and matrix spike recoveries were unable to be determined and the report is flagged "DO" for diluted out. Also, aroclors 1262 and 1268 were found to coelute. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

The project manager approved the Batch matrix spike and matrix spike duplicate analyses. Raymark projects 40362 and 40368 were extracted in one batch. The Batch QC were performed on project 40362.

KMClemmons
QA Authorization

3/29/94
Date

The above referenced data has been reviewed for compliance with all applicable portions of Kiber Environmental Services, Inc. QA/QC Program and all methodologies. Any anomalies encountered during analyses are noted by the analyst above.

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 2A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 18:34, DLL

DATE REPORTED: 3/29/94

Quant Factor: 176.5 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 93.5

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	17649	ND	ND
Aroclor-1221	11104-28-2	35298	ND	ND
Aroclor-1232	11141-16-5	17649	ND	ND
Aroclor-1242	53469-21-9	17649	ND	ND
Aroclor-1248	12672-29-6	17649	ND	ND
Aroclor-1254	11097-69-1	17649	ND	ND
Aroclor-1260	11096-82-5	17649	ND	ND
Aroclor-1262	37324-23-5	17649	57,000E	ND
Aroclor-1268	11100-14-4	17649	32,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 3A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/25/94, 19:30, DLL

DATE REPORTED: 3/29/94

Quant Factor: 67.12 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 98.8

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	6712	ND	ND
Aroclor-1221	11104-28-2	13424	ND	ND
Aroclor-1232	11141-16-5	6712	ND	ND
Aroclor-1242	53469-21-9	6712	ND	ND
Aroclor-1248	12672-29-6	6712	ND	ND
Aroclor-1254	11097-69-1	6712	ND	ND
Aroclor-1260	11096-82-5	6712	ND	ND
Aroclor-1262	37324-23-5	6712	35,000E	ND
Aroclor-1268	11100-14-4	6712	20,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 01:05, DLL

DATE REPORTED: 3/29/94

Quant Factor: 204.4 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 81.4

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	20441	ND	ND
Aroclor-1221	11104-28-2	40882	ND	ND
Aroclor-1232	11141-16-5	20441	ND	ND
Aroclor-1242	53469-21-9	20441	ND	ND
Aroclor-1248	12672-29-6	20441	ND	ND
Aroclor-1254	11097-69-1	20441	ND	ND
Aroclor-1260	11096-82-5	20441	ND	ND
Aroclor-1262	37324-23-5	20441	160,000E	ND
Aroclor-1268	11100-14-4	20441	84,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 2A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 02:01, DLL

DATE REPORTED: 3/29/94

Quant Factor: 201.8 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 82.4

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	20179	ND	ND
Aroclor-1221	11104-28-2	40359	ND	ND
Aroclor-1232	11141-16-5	20179	ND	ND
Aroclor-1242	53469-21-9	20179	ND	ND
Aroclor-1248	12672-29-6	20179	ND	ND
Aroclor-1254	11097-69-1	20179	ND	ND
Aroclor-1260	11096-82-5	20179	ND	ND
Aroclor-1262	37324-23-5	20179	190,000E	ND
Aroclor-1268	11100-14-4	20179	100,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-5
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 3A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 02:57, DLL

DATE REPORTED: 3/29/94

Quant Factor: 180.2 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 92.3

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	18021	ND	ND
Aroclor-1221	11104-28-2	36042	ND	ND
Aroclor-1232	11141-16-5	18021	ND	ND
Aroclor-1242	53469-21-9	18021	ND	ND
Aroclor-1248	12672-29-6	18021	ND	ND
Aroclor-1254	11097-69-1	18021	ND	ND
Aroclor-1260	11096-82-5	18021	ND	ND
Aroclor-1262	37324-23-5	18021	150,000E	ND
Aroclor-1268	11100-14-4	18021	83,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-6
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 4B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 03:53, DLL

DATE REPORTED: 3/29/94

Quant Factor: 6.75
Extract Method: 3550
% Solid: 99.2

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	([illegible] umber	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	[illegible]4-11-2	675	ND	ND
Aroclor-1221	[illegible]104-28-2	1350	ND	ND
Aroclor-1232	11141-16-5	675	ND	ND
Aroclor-1242	53469-21-9	675	ND	ND
Aroclor-1248	12672-29-6	675	ND	ND
Aroclor-1254	11097-69-1	675	ND	ND
Aroclor-1260	11096-82-5	675	ND	ND
Aroclor-1262	37324-23-5	675	4,500E	ND
Aroclor-1268	11100-14-4	675	2,300E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-7
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 5B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 04:49, DLL

DATE REPORTED: 3/29/94

Quant Factor: 0.67 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	67	ND	ND
Aroclor-1221	11104-28-2	133	ND	ND
Aroclor-1232	11141-16-5	67	ND	ND
Aroclor-1242	53469-21-9	67	ND	ND
Aroclor-1248	12672-29-6	67	ND	ND
Aroclor-1254	11097-69-1	67	ND	ND
Aroclor-1260	11096-82-5	67	ND	ND
Aroclor-1262	37324-23-5	67	360E	ND
Aroclor-1268	11100-14-4	67	170E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	97	83

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40368-8
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 6B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/21/94, 13:55, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 05:45, DLL

DATE REPORTED: 3/29/94

Quant Factor: 0.34 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.8

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	34	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	34	ND	ND
Aroclor-1242	53469-21-9	34	ND	ND
Aroclor-1248	12672-29-6	34	ND	ND
Aroclor-1254	11097-69-1	34	ND	ND
Aroclor-1260	11096-82-5	34	ND	ND
Aroclor-1262	37324-23-5	34	ND	ND
Aroclor-1268	11100-14-4	34	ND	ND
Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]		104	83

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 854-40362-1
MS & MSD

PCB MATRIX SPIKE RESULTS

SAMPLE # TS*B-10*1.5-4, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 08:32, DLL

Sample Matrix: SOLID
Analysis Method: 8080

DATE REPORTED: 3/29/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS(Date/Time/Init): 3/26/94, 09:28, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	DO	NA

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out, NA: Not Applicable

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40381

- Twelve soil samples were submitted for analysis on 3/23/94 at 1050 hours. The samples arrived at room temperature and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*	*Instrument*
Total PCBs	SW-846 Methods: 3550 and 8080	Hewlett Packard 5890 GC/ECD

Total PCBs

For some of the sample extracts a dilution was required prior to analysis due to the nature of those extracts. As a result, the surrogate and matrix spike recoveries were unable to be determined and the report is flagged "DO" for diluted out. Also, aroclors 1262 and 1268 were found to coelute. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

KM Clemens
QA Authorization

3/31/94
Date

The above referenced data has been reviewed for compliance with all applicable portions of Kiber Environmental Services, Inc. QA/QC Program and all methodologies. Any anomalies encountered during analyses are noted by the analyst above.

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 4B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 06:41, DLL

DATE REPORTED: 3/31/94

Quant Factor: 170.2 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 96.8

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	17019	ND	ND
Aroclor-1221	11104-28-2	34038	ND	ND
Aroclor-1232	11141-16-5	17019	ND	ND
Aroclor-1242	53469-21-9	17019	ND	ND
Aroclor-1248	12672-29-6	17019	ND	ND
Aroclor-1254	11097-69-1	17019	ND	ND
Aroclor-1260	11096-82-5	17019	ND	ND
Aroclor-1262	37324-23-5	17019	33,000E	ND
Aroclor-1268	11100-14-4	17019	19,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 5B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 07:36, DLL

DATE REPORTED: 3/31/94

Quant Factor: 168.0
Extract Method: 3550
% Solid: 99.1

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	16796	ND	ND
Aroclor-1221	11104-28-2	33591	ND	ND
Aroclor-1232	11141-16-5	16796	ND	ND
Aroclor-1242	53469-21-9	16796	ND	ND
Aroclor-1248	12672-29-6	16796	ND	ND
Aroclor-1254	11097-69-1	16796	ND	ND
Aroclor-1260	11096-82-5	16796	ND	ND
Aroclor-1262	37324-23-5	16796	28,000E	ND
Aroclor-1268	11100-14-4	16796	16,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 6B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/28/94, 12:50, DLL

DATE REPORTED: 3/31/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	160E	ND
Aroclor-1268	11100-14-4	33	36E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	102	83

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 4B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 15:04, DLL

DATE REPORTED: 3/31/94

Quant Factor: 206.5 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 80.0

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	20654	ND	ND
Aroclor-1221	11104-28-2	41309	ND	ND
Aroclor-1232	11141-16-5	20654	ND	ND
Aroclor-1242	53469-21-9	20654	ND	ND
Aroclor-1248	12672-29-6	20654	ND	ND
Aroclor-1254	11097-69-1	20654	ND	ND
Aroclor-1260	11096-82-5	20654	ND	ND
Aroclor-1262	37324-23-5	20654	150,000E	ND
Aroclor-1268	11100-14-4	20654	82,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-5
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 5B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 16:00, DLL

DATE REPORTED: 3/31/94

Quant Factor: 179.6 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 92.2

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	17963	ND	ND
Aroclor-1221	11104-28-2	35926	ND	ND
Aroclor-1232	11141-16-5	17963	ND	ND
Aroclor-1242	53469-21-9	17963	ND	ND
Aroclor-1248	12672-29-6	17963	ND	ND
Aroclor-1254	11097-69-1	17963	ND	ND
Aroclor-1260	11096-82-5	17963	ND	ND
Aroclor-1262	37324-23-5	17963	130,000E	ND
Aroclor-1268	11100-14-4	17963	73,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	83

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-6
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 6B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 11:07, DLL

DATE REPORTED: 3/31/94

Quant Factor: 169.3 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.7

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	16926	ND	ND
Aroclor-1221	11104-28-2	33851	ND	ND
Aroclor-1232	11141-16-5	16926	ND	ND
Aroclor-1242	53469-21-9	16926	ND	ND
Aroclor-1248	12672-29-6	16926	ND	ND
Aroclor-1254	11097-69-1	16926	ND	ND
Aroclor-1260	11096-82-5	16926	ND	ND
Aroclor-1262	37324-23-5	16926	110,000E	ND
Aroclor-1268	11100-14-4	16926	46,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-7
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 4B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 16:18, DLL

DATE REPORTED: 3/31/94

Quant Factor: 213.6 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 78.9

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	21359	ND	ND
Aroclor-1221	11104-28-2	42717	ND	ND
Aroclor-1232	11141-16-5	21359	ND	ND
Aroclor-1242	53469-21-9	21359	ND	ND
Aroclor-1248	12672-29-6	21359	ND	ND
Aroclor-1254	11097-69-1	21359	ND	ND
Aroclor-1260	11096-82-5	21359	ND	ND
Aroclor-1262	37324-23-5	21359	110,000E	ND
Aroclor-1268	11100-14-4	21359	61,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-8
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 5B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 17:10, DLL

DATE REPORTED: 3/31/94

Quant Factor: 366.8 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 92.1

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	36682	ND	ND
Aroclor-1221	11104-28-2	73363	ND	ND
Aroclor-1232	11141-16-5	36682	ND	ND
Aroclor-1242	53469-21-9	36682	ND	ND
Aroclor-1248	12672-29-6	36682	ND	ND
Aroclor-1254	11097-69-1	36682	ND	ND
Aroclor-1260	11096-82-5	36682	ND	ND
Aroclor-1262	37324-23-5	36682	280,000E	ND
Aroclor-1268	11100-14-4	36682	170,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-9
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 6B
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 18:54, DLL

DATE REPORTED: 3/31/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	66	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	44E	ND
Aroclor-1268	11100-14-4	33	<MDL	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	132	100

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-10
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 7C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 19:47, DLL

DATE REPORTED: 3/31/94

Quant Factor: 3.37 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.6

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	337	ND	ND
Aroclor-1221	11104-28-2	674	ND	ND
Aroclor-1232	11141-16-5	337	ND	ND
Aroclor-1242	53469-21-9	337	ND	ND
Aroclor-1248	12672-29-6	337	ND	ND
Aroclor-1254	11097-69-1	337	ND	ND
Aroclor-1260	11096-82-5	337	ND	ND
Aroclor-1262	37324-23-5	337	3,200E	ND
Aroclor-1268	11100-14-4	337	1,400E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-11
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 8C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 20:38, DLL

DATE REPORTED: 3/31/94

Quant Factor: 0.34 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	34	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	34	ND	ND
Aroclor-1242	53469-21-9	34	ND	ND
Aroclor-1248	12672-29-6	34	ND	ND
Aroclor-1254	11097-69-1	34	ND	ND
Aroclor-1260	11096-82-5	34	ND	ND
Aroclor-1262	37324-23-5	34	ND	ND
Aroclor-1268	11100-14-4	34	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	134	100

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40381-12
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, 9C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/22/94, 18:30, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 21:30, DLL

DATE REPORTED: 3/31/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	ND	ND
Aroclor-1268	11100-14-4	33	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	128	100

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 854-40362-1
MS & MSD

PCB MATRIX
SPIKE RESULTS

SAMPLE # TS*B-10*1.5-4, 1A
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/18/94, 16:45, JD
EXTRACTED (Date / Init) : 3/23/94, JG
ANALYSIS (Date/Time/Init): 3/26/94, 08:32, DLL

Sample Matrix: SOLID
Analysis Method: 8080

DATE REPORTED: 3/29/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS(Date/Time/Init): 3/26/94, 09:28, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	DO	NA

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out, NA: Not Applicable

KIBER Environmental Services

LAB SAMPLE # 854-40392-1
MS & MSD

PCB MATRIX
SPIKE RESULTS

SAMPLE # TS*B-68*2-4, 7C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 09:37, DLL

DATE REPORTED: 3/31/94

Sample Matrix: SOLID
Analysis Method: 8080

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS(Date/Time/Init): 3/30/94, 10:29, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	DO	NA

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out, NA: Not Applicable

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-40392

- Nine soil samples were submitted for analysis on 3/24/94 at 1530 hours. The samples arrived at room temperature and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*	*Instrument*
Total PCBs	SW-846 Methods: 3550 and 8080	Hewlett Packard 5890 GC/ECD

Total PCBs

For some of the sample extracts a dilution was required prior to analysis due to the nature of those extracts. As a result, the surrogate and matrix spike recoveries were unable to be determined and the report is flagged "DO" for diluted out. Also, aroclors 1262 and 1268 were found to coelute. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

K M Clemens　　　　3/31/94

QA Authorization　　　　Date

The above referenced data has been reviewed for compliance with all applicable portions of Kiber Environmental Services, Inc. QA/QC Program and all methodologies. Any anomalies encountered during analyses are noted by the analyst above.

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 7C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 22:22, DLL

DATE REPORTED: 3/31/94

Quant Factor: 71.9 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 93.6

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	7192	ND	ND
Aroclor-1221	11104-28-2	14384	ND	ND
Aroclor-1232	11141-16-5	7192	ND	ND
Aroclor-1242	53469-21-9	7192	ND	ND
Aroclor-1248	12672-29-6	7192	ND	ND
Aroclor-1254	11097-69-1	7192	ND	ND
Aroclor-1260	11096-82-5	7192	ND	ND
Aroclor-1262	37324-23-5	7192	45,000E	ND
Aroclor-1268	11100-14-4	7192	21,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 8C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 23:14, DLL

DATE REPORTED: 3/31/94

Quant Factor: 33.4 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.7

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	3337	ND	ND
Aroclor-1221	11104-28-2	6673	ND	ND
Aroclor-1232	11141-16-5	3337	ND	ND
Aroclor-1242	53469-21-9	3337	ND	ND
Aroclor-1248	12672-29-6	3337	ND	ND
Aroclor-1254	11097-69-1	3337	ND	ND
Aroclor-1260	11096-82-5	3337	ND	ND
Aroclor-1262	37324-23-5	3337	19,000E	ND
Aroclor-1268	11100-14-4	3337	8,100E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, 9C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 04:26, DLL

DATE REPORTED: 3/31/94

Quant Factor: 0.34 Sample Matrix: SOLID
Extract Method: ' 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	34	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	34	ND	ND
Aroclor-1242	53469-21-9	34	ND	ND
Aroclor-1248	12672-29-6	34	ND	ND
Aroclor-1254	11097-69-1	34	ND	ND
Aroclor-1260	11096-82-5	34	ND	ND
Aroclor-1262	37324-23-5	34	ND	ND
Aroclor-1268	11100-14-4	34	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	120	100

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404020-6
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, UNT
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/12/94, 09:36, DLL

DATE REPORTED: 4/12/94

Quant Factor: 227.3 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 72.8

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	22727	ND	ND
Aroclor-1221	11104-28-2	45454	ND	ND
Aroclor-1232	11141-16-5	22727	ND	ND
Aroclor-1242	53469-21-9	22727	ND	ND
Aroclor-1248	12672-29-6	22727	ND	ND
Aroclor-1254	11097-69-1	22727	ND	ND
Aroclor-1260	11096-82-5	22727	ND	ND
Aroclor-1262	37324-23-5	22727	92,000E	ND
Aroclor-1268	11100-14-4	22727	56,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	133

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 854-404020-1
MS & MSD

PCB MATRIX
SPIKE RESULTS

SAMPLE # TS*B-68*6-8, FT-C60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/12/94, 11:19, DLL

Sample Matrix: SOLID
Analysis Method: 8080

DATE REPORTED: 4/12/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	115

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	132

ANALYSIS(Date/Time/Init): 4/12/94, 12:10, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	108	6.3

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	126

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 7C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 05:18, DLL

DATE REPORTED: 3/31/94

Quant Factor: 195.2 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 84.9

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	19520	ND	ND
Aroclor-1221	11104-28-2	39041	ND	ND
Aroclor-1232	11141-16-5	19520	ND	ND
Aroclor-1242	53469-21-9	19520	ND	ND
Aroclor-1248	12672-29-6	19520	ND	ND
Aroclor-1254	11097-69-1	19520	ND	ND
Aroclor-1260	11096-82-5	19520	ND	ND
Aroclor-1262	37324-23-5	19520	170,000E	ND
Aroclor-1268	11100-14-4	19520	91,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-5
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 8C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 06:10, DLL

DATE REPORTED: 3/31/94

Quant Factor: 173.6 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 96.4

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	17364	ND	ND
Aroclor-1221	11104-28-2	34729	ND	ND
Aroclor-1232	11141-16-5	17364	ND	ND
Aroclor-1242	53469-21-9	17364	ND	ND
Aroclor-1248	12672-29-6	17364	ND	ND
Aroclor-1254	11097-69-1	17364	ND	ND
Aroclor-1260	11096-82-5	17364	ND	ND
Aroclor-1262	37324-23-5	17364	140,000E	ND
Aroclor-1268	11100-14-4	17364	77,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-6
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, 9C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/29/94, 07:30, DLL

DATE REPORTED: 3/31/94

Quant Factor: 3.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	333	ND	ND
Aroclor-1221	11104-28-2	666	ND	ND
Aroclor-1232	11141-16-5	333	ND	ND
Aroclor-1242	53469-21-9	333	ND	ND
Aroclor-1248	12672-29-6	333	ND	ND
Aroclor-1254	11097-69-1	333	ND	ND
Aroclor-1260	11096-82-5	333	ND	ND
Aroclor-1262	37324-23-5	333	3,200E	ND
Aroclor-1268	11100-14-4	333	1,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-7
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 7C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 07:02, DLL

DATE REPORTED: 3/31/94

Quant Factor: 206.1 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 79.9

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	20605	ND	ND
Aroclor-1221	11104-28-2	41211	ND	ND
Aroclor-1232	11141-16-5	20605	ND	ND
Aroclor-1242	53469-21-9	20605	ND	ND
Aroclor-1248	12672-29-6	20605	ND	ND
Aroclor-1254	11097-69-1	20605	ND	ND
Aroclor-1260	11096-82-5	20605	ND	ND
Aroclor-1262	37324-23-5	20605	160,000E	ND
Aroclor-1268	11100-14-4	20605	94,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-8
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 8C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 07:54, DLL

DATE REPORTED: 3/31/94

Quant Factor: 187.6 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 87.5

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	18760	ND	ND
Aroclor-1221	11104-28-2	37520	ND	ND
Aroclor-1232	11141-16-5	18760	ND	ND
Aroclor-1242	53469-21-9	18760	ND	ND
Aroclor-1248	12672-29-6	18760	ND	ND
Aroclor-1254	11097-69-1	18760	ND	ND
Aroclor-1260	11096-82-5	18760	ND	ND
Aroclor-1262	37324-23-5	18760	160,000E	ND
Aroclor-1268	11100-14-4	18760	93,000E	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	DO	100

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 40392-9
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, 9C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 08:45, DLL

DATE REPORTED: 3/31/94

Quant Factor: 0.34 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	34	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	34	ND	ND
Aroclor-1242	53469-21-9	34	ND	ND
Aroclor-1248	12672-29-6	34	ND	ND
Aroclor-1254	11097-69-1	34	ND	ND
Aroclor-1260	11096-82-5	34	ND	ND
Aroclor-1262	37324-23-5	34	<MDL	ND
Aroclor-1268	11100-14-4	34	<MDL	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	135	100

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 854-40392-1
MS & MSD

PCB MATRIX
SPIKE RESULTS

SAMPLE # TS*B-68*2-4, 7C
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 3/24/94, 13:55, JD
EXTRACTED (Date / Init) : 3/25/94, JG
ANALYSIS (Date/Time/Init): 3/30/94, 09:37, DLL

DATE REPORTED: 3/31/94

Sample Matrix: SOLID
Analysis Method: 8080

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Aroclor-1254	11096-82-5	39-154	DO

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

ANALYSIS(Date/Time/Init): 3/30/94, 10:29, DLL

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	RPD
Aroclor-1254	11096-82-5	39-154	DO	NA

Tetrachloro-m-xylene (surrogate std)	% Recovery	[OK = 60-150]	DO

DO: Diluted Out, NA: Not Applicable

KIBER ENVIRONMENTAL SERVICES, INC.

ANALYTICAL CASE NARRATIVE
FOR:

Raymark Industries

Project No. 854-4034020

- Six soil samples were submitted for analysis on 4/7/94 at 1500 hours. The samples arrived at room temperature and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*	*Instrument*
Total PCBs	SW-846 Methods: 3550 and 8080	Hewlett Packard 5890 GC/ECD

Total PCBs

The QC recoveries were within the method specified limits. Aroclors 1262 and 1268 were found to coelute. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

KM Clemens
QA Authorization

4/14/94
Date

The above referenced data has been reviewed for compliance with all applicable portions of Kiber Environmental Services, Inc. QA/QC Program and all methodologies. Any anomalies encountered during analyses are noted by the analyst above.

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404020-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, FT-C60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/11/94, 20:35, DLL

DATE REPORTED: 4/12/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	66	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	ND	ND
Aroclor-1268	11100-14-4	33	ND	ND
Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]		128	133

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404020-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, FT-C75
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/11/94, 21:27, DLL

DATE REPORTED: 4/12/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	65	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	ND	ND
Aroclor-1268	11100-14-4	33	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	133	133

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404020-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, FT-C90
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/11/94, 22:19, DLL

DATE REPORTED: 4/12/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	66	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	ND	ND
Aroclor-1268	11100-14-4	33	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	132	133

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404020-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, FT-B90
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/11/94, 23:11, DLL

DATE REPORTED: 4/12/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.7

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	67	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	ND	ND
Aroclor-1268	11100-14-4	33	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	134	133

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404020-5
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/7/94, 14:25, JD
EXTRACTED (Date / Init) : 4/11/94, JG
ANALYSIS (Date/Time/Init): 4/12/94, 00:03, DLL

DATE REPORTED: 4/12/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33	ND	ND
Aroclor-1221	11104-28-2	66	ND	ND
Aroclor-1232	11141-16-5	33	ND	ND
Aroclor-1242	53469-21-9	33	ND	ND
Aroclor-1248	12672-29-6	33	ND	ND
Aroclor-1254	11097-69-1	33	ND	ND
Aroclor-1260	11096-82-5	33	ND	ND
Aroclor-1262	37324-23-5	33	ND	ND
Aroclor-1268	11100-14-4	33	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	132	133

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

THERMAL DESORPTION DATA

REPORT FORM

Nitrogen Purge

PROJECT: Raymark Ind
PROJECT No.: 854
MATERIAL TYPE: TS*B-10*1.5-4
TESTING DATE: 4-18-94
TESTED BY: JSD/SGH

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-10*1.5-4:FT-860	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	360.77	g
4. WEIGHT OF UNTREATED SOIL + TARE	1362.34	g
5. WEIGHT OF UNTREATED SOIL	1001.57	g
6. WEIGHT OF TREATED SOIL + TARE	1316.32	g
7. WEIGHT OF TREATED SOIL	955.55	g
8. WEIGHT LOSS	46.02	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	65	°C
2 MINUTES	80	°C
3 MINUTES	96	°C
5 MINUTES	114	°C
10 MINUTES	179	°C
15 MINUTES	260	°C
20 MINUTES	348	°C
30 MINUTES	449	°C
40 MINUTES	486	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	N/A	°C
2 MINUTES	N/A	°C
3 MINUTES	406	°C
5 MINUTES	420	°C
10 MINUTES	349	°C
15 MINUTES	307	°C
20 MINUTES	264	°C
30 MINUTES	198	°C
40 MINUTES	150	°C
60 MINUTES	90	°C
145 MINUTES	30	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS * B-10 * 1.5-4

TESTING DATE: 4-18-94

TESTED BY: JSD/SGH

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reddish brown sandy soil.
Small rocks throughout.
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 minutes: 506

Soil is completely dry.

More reddish in appearance.

THERMAL DESORPTION DATA

REPORT FORM
PAGE 1 OF 2

NITROGEN PURGE

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS * B-68 * 2-4
TESTING DATE: 4-18-94
TESTED BY: JSD/SGH

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-68*2-4: FT-B60	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	347.60	g
4. WEIGHT OF UNTREATED SOIL + TARE	1348.15	g
5. WEIGHT OF UNTREATED SOIL	1000.55	g
6. WEIGHT OF TREATED SOIL + TARE	1173.44	g
7. WEIGHT OF TREATED SOIL	825.84	g
8. WEIGHT LOSS	174.71	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	59	°C
2 MINUTES	73	°C
3 MINUTES	87	°C
5 MINUTES	101	°C
10 MINUTES	131	°C
15 MINUTES	185	°C
20 MINUTES	228	°C
30 MINUTES	303	°C
40 MINUTES	405	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	446	°C
2 MINUTES	442	°C
3 MINUTES	N/A	°C
5 MINUTES	424	°C
10 MINUTES	397	°C
15 MINUTES	368	°C
20 MINUTES	342	°C
30 MINUTES	301	°C
40 MINUTES	246	°C
60 MINUTES	139	°C
165 MINUTES	31	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-6B * 2-4

TESTING DATE: 4-18-94

TESTED BY: JSD/564

VISUAL OBSERVATIONS - BEFORE TREATMENT

DARK BROWN SANDY SOIL w/ SMALL CLAY-LIKE CHUNKS.
MOIST.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 minutes : 522
Light tan at the surface, and dark brown underneath
Completely dry.
Small chunks have become brittle & friable.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND
PROJECT No.: 854
MATERIAL TYPE: TS* B-7* 4-6
TESTING DATE: 4-18-94
TESTED BY: JSD/SGH

NITROGEN PURGE

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-7* 4-6: FT-860	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	365.29	g
4. WEIGHT OF UNTREATED SOIL + TARE	1365.25	g
5. WEIGHT OF UNTREATED SOIL	999.96	g
6. WEIGHT OF TREATED SOIL + TARE	994.82	g
7. WEIGHT OF TREATED SOIL	629.53	g
8. WEIGHT LOSS	370.43	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	47	°C
2 MINUTES	58	°C
3 MINUTES	66	°C
5 MINUTES	80	°C
10 MINUTES	87	°C
15 MINUTES	89	°C
20 MINUTES	92	°C
30 MINUTES	270	°C
40 MINUTES	474	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	464	°C
2 MINUTES	502	°C
3 MINUTES	512	°C
5 MINUTES	512	°C
10 MINUTES	494	°C
15 MINUTES	472	°C
20 MINUTES	450	°C
30 MINUTES	414	°C
40 MINUTES	394	°C
60 MINUTES	304	°C
135 MINUTES	34	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK WD

PROJECT No.: 854

MATERIAL TYPE: TS*B-7* 4-6

TESTING DATE: 4-18-94

TESTED BY: JSD/SGH

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black silty clay (grainy).
Small rocks throughout.
Some extraneous organic material.
moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 minutes: 596°
Light tan/grey in appearance.
Completely dry.
Organic material friable.

Note: sample showed low numbers while heating up, but recovered towards the end of testing time.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymack Ind
PROJECT No.: 854
MATERIAL TYPE: TS # B-68 # 6-8
TESTING DATE: 4-18-94
TESTED BY: JSD/SGH

Nitrogen Purge

~~Dup~~ SGH
Final Treatment

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS* B-68 * 6-8: FT-860 ~~Dup~~ SGH	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	340.80	g
4. WEIGHT OF UNTREATED SOIL + TARE	1340.99	g
5. WEIGHT OF UNTREATED SOIL	1000.19	g
6. WEIGHT OF TREATED SOIL + TARE	978.24	g
7. WEIGHT OF TREATED SOIL	637.44	g
8. WEIGHT LOSS	362.75	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	47	°C
2 MINUTES	59	°C
3 MINUTES	71	°C
5 MINUTES	89	°C
10 MINUTES	101	°C
15 MINUTES	101	°C
20 MINUTES	111	°C
30 MINUTES	177	°C
40 MINUTES	243	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	318	°C
2 MINUTES	N/A	°C
3 MINUTES	316	°C
5 MINUTES	306	°C
10 MINUTES	290	°C
15 MINUTES	280	°C
20 MINUTES	272	°C
30 MINUTES	256	°C
40 MINUTES	246	°C
60 MINUTES	228	°C
140 MINUTES	34	°C

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: RAYMARK IND

PROJECT No.: 854

MATERIAL TYPE: TS*B-68*G-8

TESTING DATE: 4-18-94

TESTED BY: JSD / SGH

VISUAL OBSERVATIONS - BEFORE TREATMENT

Black sandy Soil w/ black spongy rubber-like material

White specs.

Extraneous organic material

Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 minutes: 395

Completely dry.

Light tan on top, dark underneath.

All organic material brittle & friable.

THERMAL DESORPTION DATA

REPORT FORM

PROJECT: Raymark Ind

PROJECT No.: 854

MATERIAL TYPE: TS* B-7* 4-6

TESTING DATE: 4-19-94

TESTED BY: JSD

Nitrogen Purge

SET-UP, MONITORING and TESTING INFORMATION		
1. SAMPLE No.	TS*B-7*4-6:FT-860 DUP	
2. OVEN TEMPERATURE	538	°C
3. WEIGHT OF PAN (tare weight)	360.84	g
4. WEIGHT OF UNTREATED SOIL + TARE	1361.59	g
5. WEIGHT OF UNTREATED SOIL	1000.75	g
6. WEIGHT OF TREATED SOIL + TARE	1012.67	g
7. WEIGHT OF TREATED SOIL	651.83	g
8. WEIGHT LOSS	348.92	g
9. LENGTH OF TREATMENT (RESIDENCE TIME)	60	Min.
10. SOIL TEMPERATURE - WHILE IN OVEN		
1 MINUTE	62	°C
2 MINUTES	77	°C
3 MINUTES	87	°C
5 MINUTES	100	°C
10 MINUTES	102	°C
15 MINUTES	102	°C
20 MINUTES	116	°C
30 MINUTES	268	°C
40 MINUTES	447	°C
11. SOIL TEMPERATURE - WHILE COOLING		
1 MINUTE	442	°C
2 MINUTES	478	°C
3 MINUTES	482	°C
5 MINUTES	476	°C
10 MINUTES	442	°C
15 MINUTES	408	°C
20 MINUTES	376	°C
30 MINUTES	326	°C
40 MINUTES	260	°C
60 MINUTES	112	°C
150 MINUTES	28	°C

THERMAL DESORPTION DATA

REPORT FORM

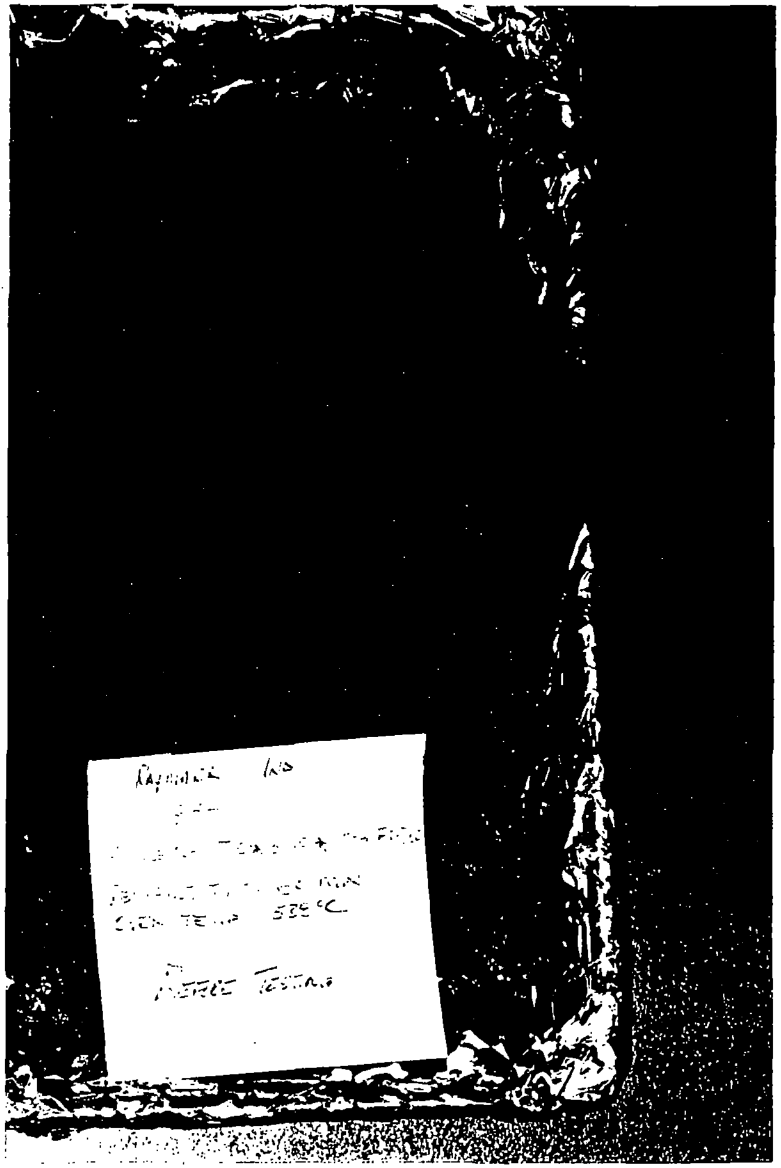
PROJECT: Raymack Ind
PROJECT No.: 854
MATERIAL TYPE: TS# R-7 #4-6
TESTING DATE: 4-19-94
TESTED BY: JJD

VISUAL OBSERVATIONS - BEFORE TREATMENT

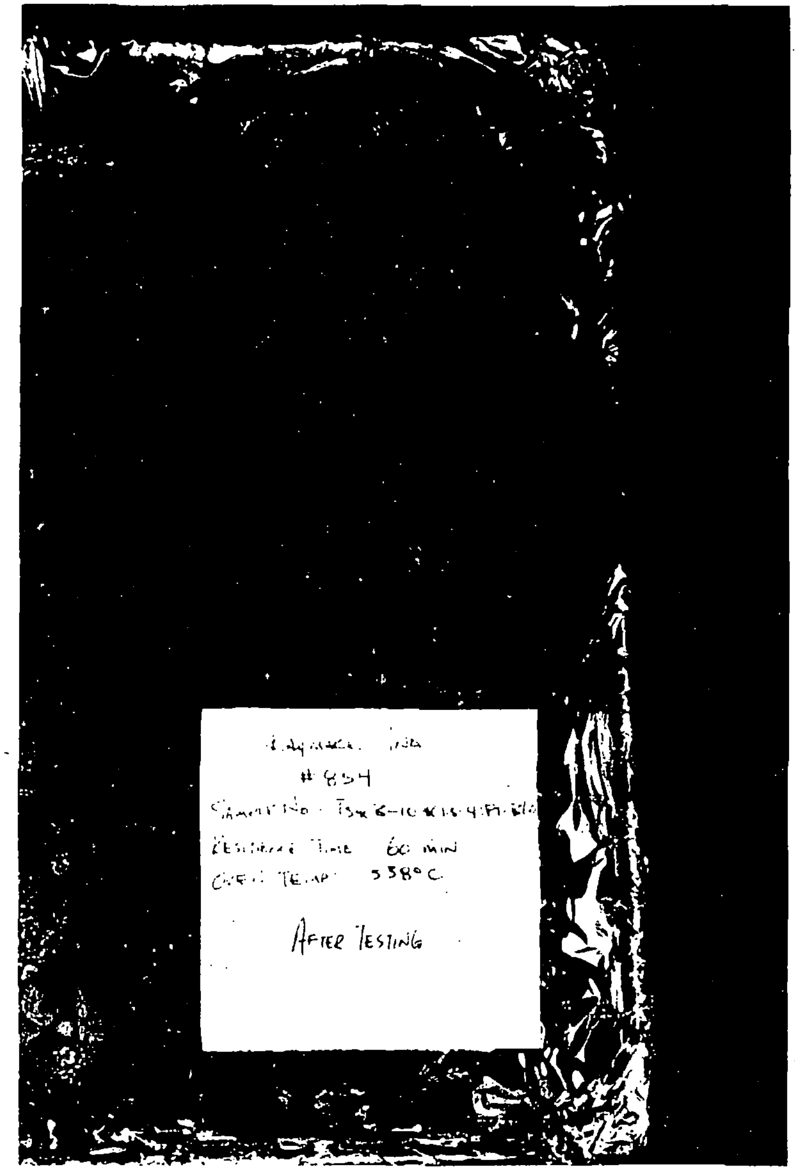
Black silty clay (very grainy).
Small rocks throughout
Extraneous organic material
Moist.

VISUAL OBSERVATIONS - AFTER TREATMENT

Temp @ 60 minutes: 538
Light tan/grey in appearance.
Completely dry.
Organic material has become brittle and very friable



SAMPLE NUMBER: TS*B-10*1.5-4:FT-B60
BEFORE LTTD TREATMENT



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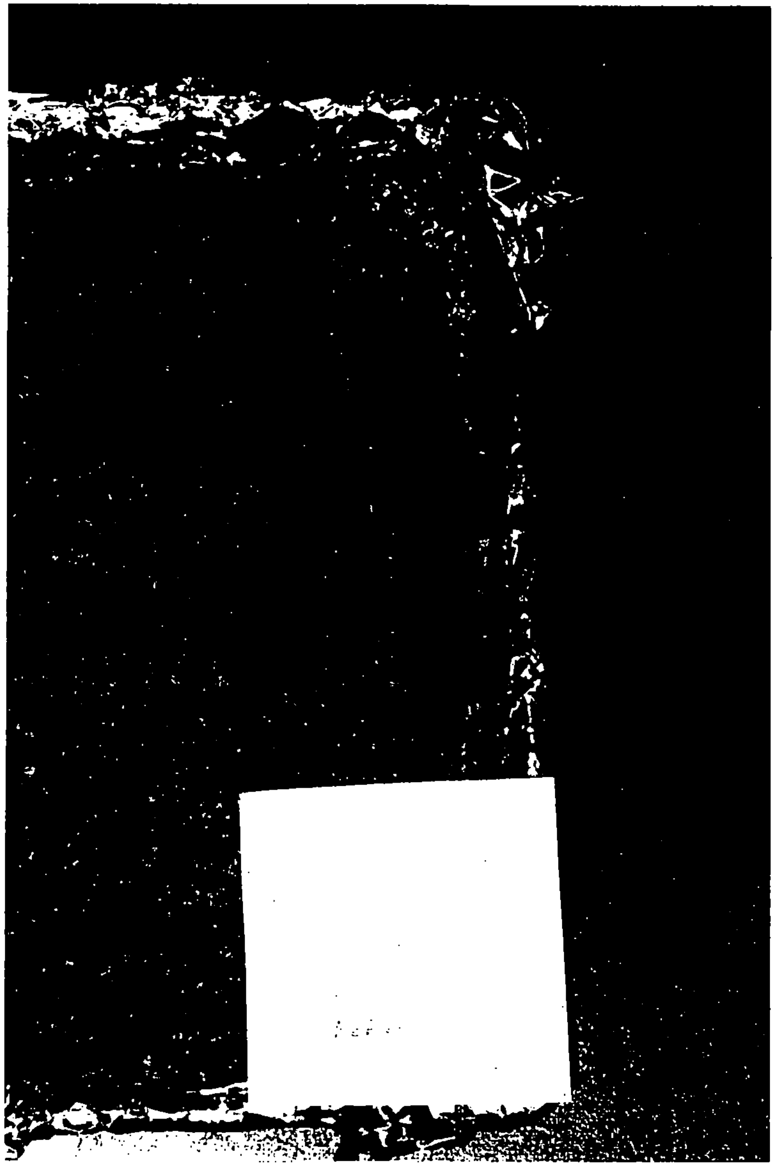

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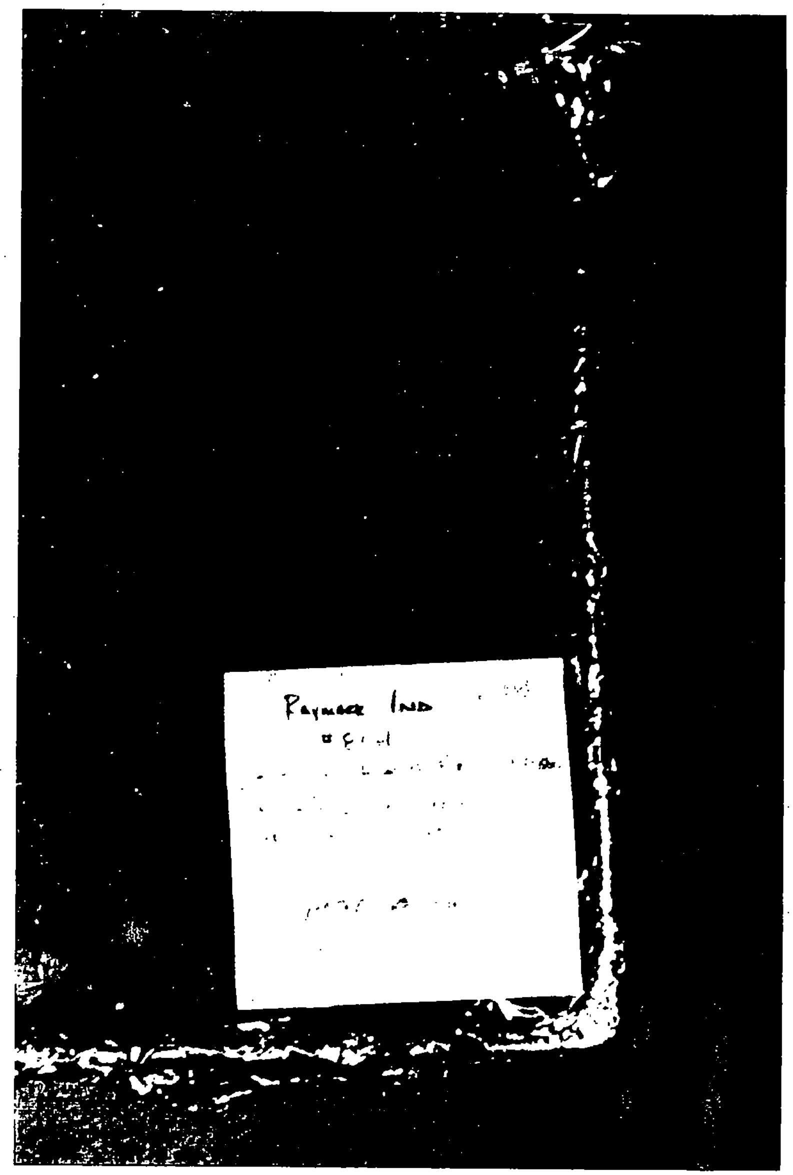

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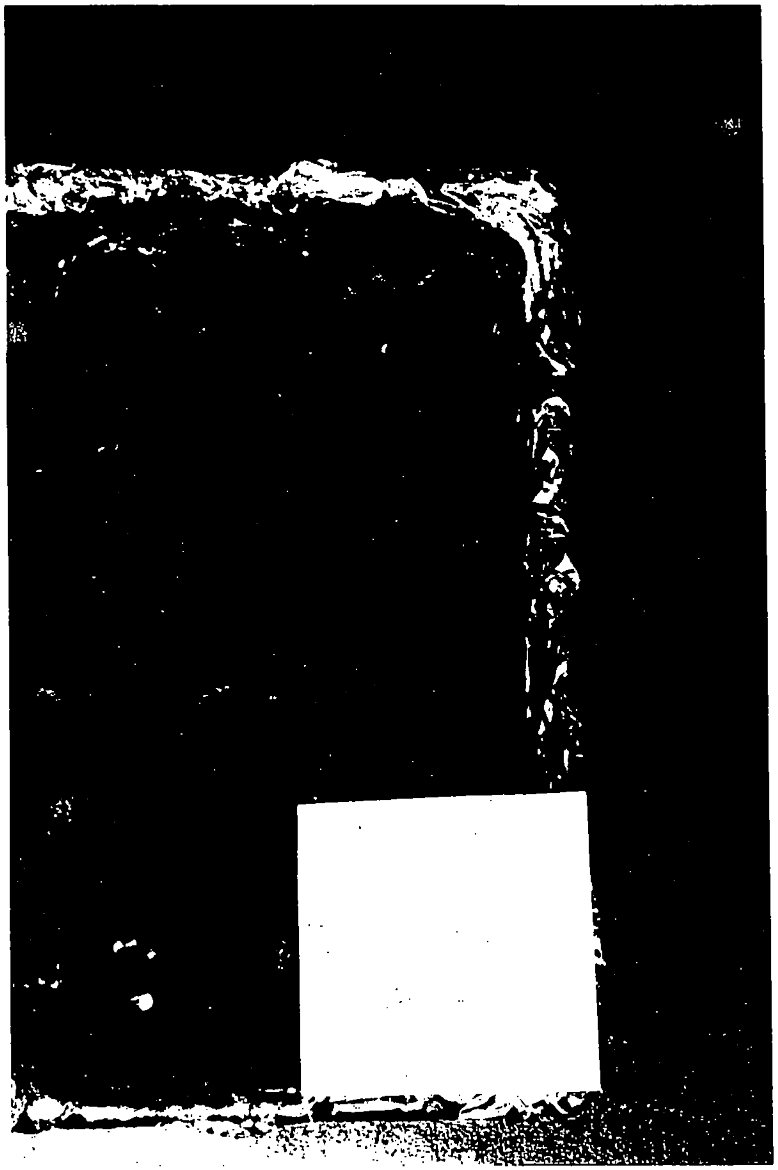
AFTER LTTD TREATMENT



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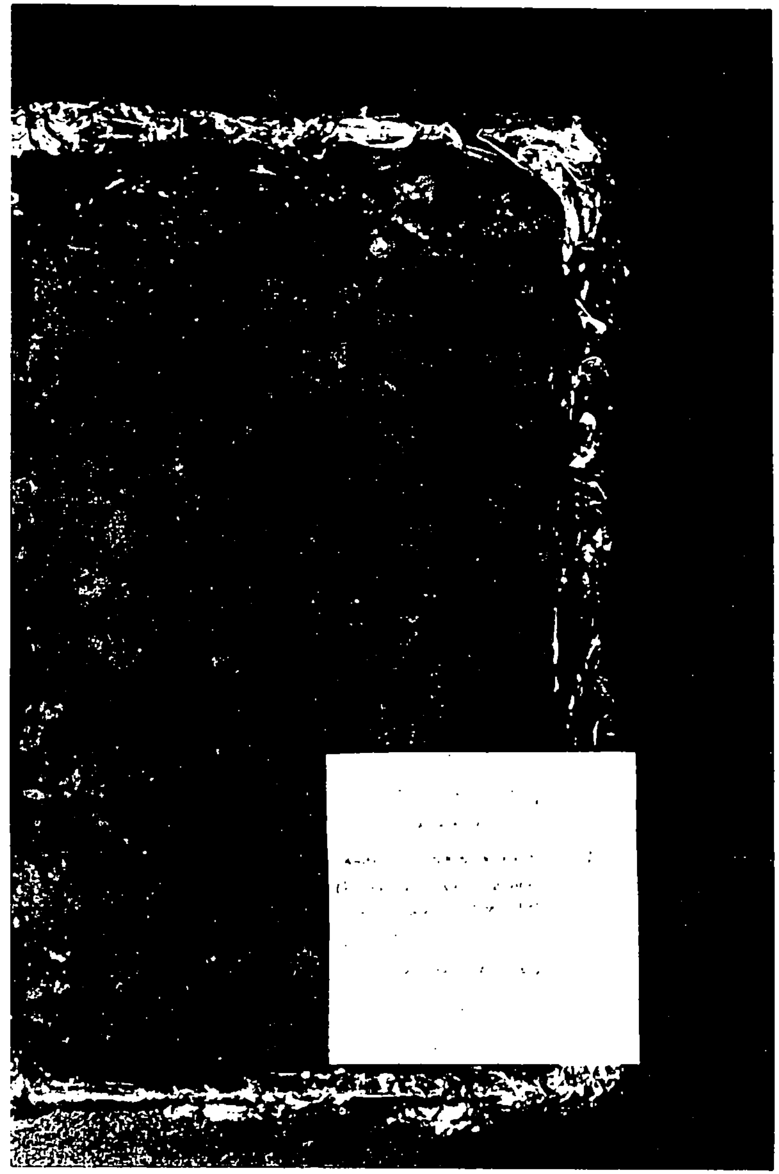
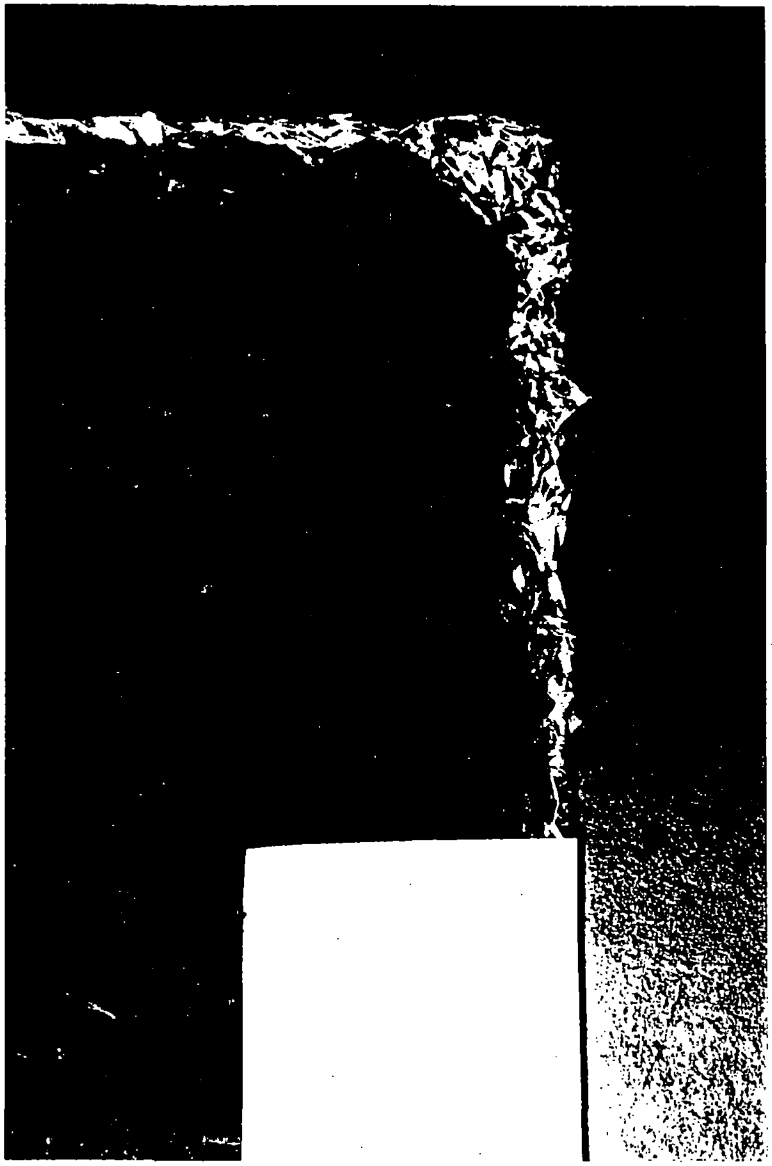
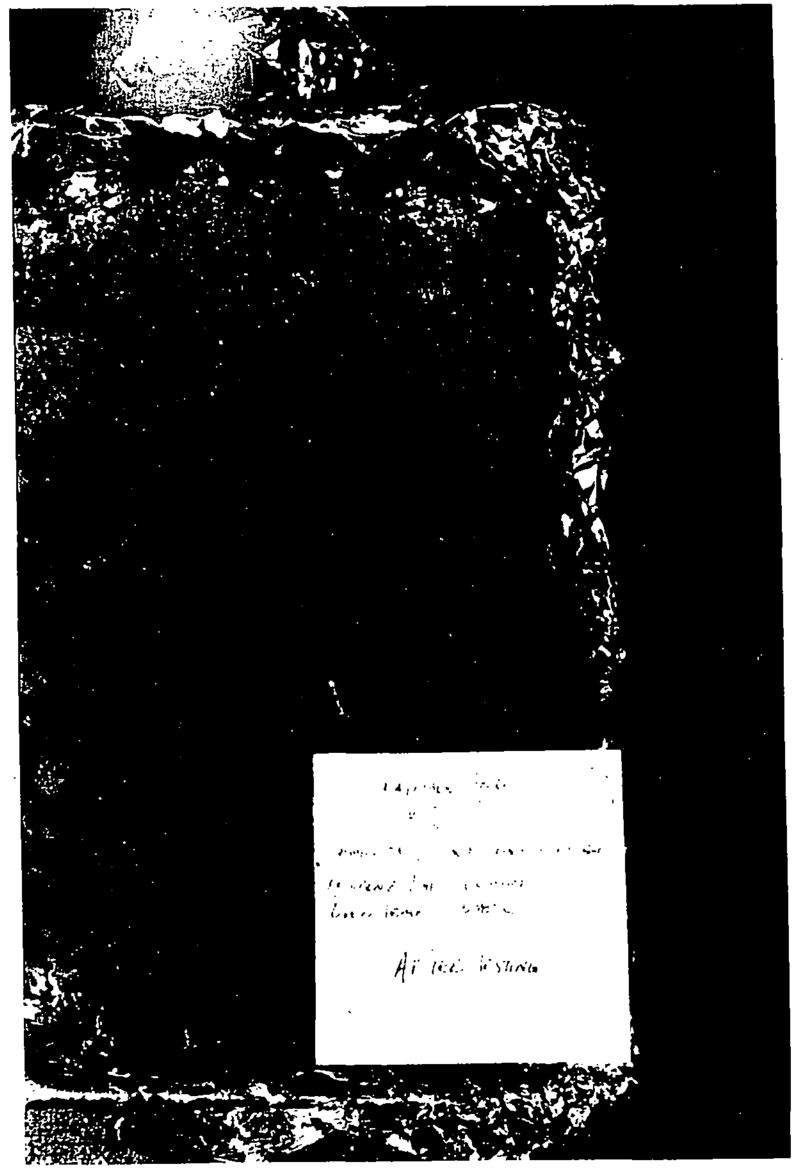
BEFORE LTTD TREATMENT



SAMPLE NUMBER: TS*B-7*4-6:FT-B60
AFTER LTTD TREATMENT



SAMPLE NUMBER: TS*B-68*6-8:FT-B60
BEFORE LTTD TREATMENT



SAMPLE NUMBER: TS*B-68*6-8:FT-B60
AFTER LTTD TREATMENT

KIBER ENVIRONMENTAL SERVICES, INC.
ANALYTICAL CASE NARRATIVE

KIBER - Raymark
854-404039

- Nine soil samples were submitted for analysis on 4/19/94 at 1350. The samples arrived at 25°C and in good condition.

- The requested analyses and corresponding methods are as follows:

Analysis	*Method*
Total Volatiles	SW-846 Method 8260
Total BNA Semivolatiles	SW-846 Methods: 3550 and 8270
Total Pesticides	SW-846 Methods: 3550 and 8080
Total PCBs + 1262 & 1268	SW-846 Methods: 3550 and 8080
Total RCRA Metals (except Mercury)	SW-846 Methods: 3051 and 6010
Total Mercury	SW-846 Method 7471
Total Organic Carbon (TOC)	SW-846 Method 9060
Total Dioxin Semivolatiles	SW-846 Methods: 3550 and 8270

Total Volatiles:

The QC recoveries were within the method specified limits. Samples TS*B-68*2-4 FT-B60, TS*B-7*4-6 FT-B60, TS*B-68*6-8 FT-B60, and TS*B-7*4-6 FT-B60 DUP had a very dry matrix which made analysis very difficult and almost impossible. When the surrogate and internal spiking standards were added to the sample, the dry matrix absorbed them almost immediately. As a result, quantitation by the internal standard method was not accurate. To circumvent the dry sample matrix, a high level methanol extraction was performed. The analyses did not exhibit the same problems as the initial analyses and quantitation was accurate. There were no further difficulties during the analyses.

KIBER ENVIRONMENTAL SERVICES, INC.
ANALYTICAL CASE NARRATIVE

KIBER - Raymark
854-404039

Total BNA Semivolatiles:

The QC recoveries were within the method specified limits. The extracts of samples TS*B-68*2-4, TS*B-7*4-6, and TS*B-68*6-8 were very oily and therefore a dilution was necessary prior to analysis. There were no further difficulties during the analyses.

Total Pesticides:

The QC recoveries were within the method specified limits. There were no difficulties during the analyses.

Total PCBs:

The QC recoveries were within the method specified limits. The analyses exhibited coelution of Aroclors 1262 and 1268. Therefore, the reported results for aroclors 1262 and 1268 are flagged with an "E" for estimated. There were no further difficulties during the analyses.

Total RCRA Metals:

The QC recoveries were within the method specified limits except for the following:

1) The Silver Laboratory Control Standard (LCS) recovery was low. This is typically the case for Silver. Silver precipitates when combined with Hydrochloric acid. This acid is used in the metals glassware cleaning procedures. Any trace levels will cause Silver precipitation and is therefore the likely cause for the low recovery.

There were no further difficulties during the analyses.

Total Organic Carbon (TOC):

The QC recoveries were within the method specified limits. There were no reported difficulties during the analyses.

Total Dioxins:

The TLH reports contains flags to note the following items:

KIBER ENVIRONMENTAL SERVICES, INC.
ANALYTICAL CASE NARRATIVE

KIBER - Raymark
854-404039

1) Flag Y: indicates that the recoveries of the QC standard are only slightly below the suggested QC advisory limit and that they meet the required 10:1 signal to noise ratio for the peak and therefore TLH regards the data as valid.

2) Flag X: indicates that TCDD and TCDF compounds contained interferants during analysis from the labeled internal or recovery standards that were apparent within the respective retention time windows.

The QC recoveries were within the method specified limits except for those note above for flag Y. There were no other difficulties reported by THL.

Kim Clemons
QA Authorization

5/12/94
Date

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-1

RAYMARK IND.
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/22/94, 17:00, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 4/ 28/94

Dilution Factor: 1.050
%Solids: 96

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	2.70	11.60	ND	ND
Benzene	71-43-2	0.30	1.30	0.6 E	<MDL
Bromodichloromethane	75-27-4	0.60	2.30	ND	ND
Bromoform	75-25-2	0.60	2.60	ND	ND
Bromomethane	74-83-9	1.90	7.40	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	12.60	49.40	ND	ND
Carbon Disulfide	75-15-0	1.20	4.70	ND	ND
Carbon Tetrachloride	56-23-5	0.70	2.70	ND	ND
Chlorobenzene	108-90-7	0.60	2.10	1.0 E	ND
Chloroethane	75-00-3	1.40	5.60	ND	ND
Chloroform	67-66-3	0.70	2.90	ND	ND
Chloromethane	74-87-3	1.80	7.10	ND	ND
Dibromochloromethane	124-48-1	0.60	2.50	ND	ND
1,1-Dichloroethane	75-34-3	0.80	3.20	ND	ND
1,2-Dichloroethane	107-06-2	0.50	2.00	ND	ND
1,1-Dichloroethene	75-35-4	0.90	4.10	ND	ND
1,2-Dichloroethene (total)	540-59-0	1.40	5.30	<MDL	ND
1,2-Dichloropropane	78-87-5	0.50	2.20	ND	ND
cis-1,3-Dichloropropene	10061-01-5	0.80	3.20	ND	ND
trans-1,3-Dichloropropene	10061-02-6	0.70	2.90	ND	ND
Ethylbenzene	100-41-4	1.00	4.10	ND	ND
2-Hexanone	591-78-6	1.40	5.70	ND	ND
Methylene Chloride	75-9-2	2.90	11.60	6.5 E	6.9 E
4-Methyl-2-pentanone (MIBK)	108-10-1	2.30	9.30	ND	ND
Styrene	100-42-5	0.40	1.50	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	0.70	2.80	ND	ND
Tetrachloroethene	127-18-4	0.90	3.70	1.8 E	ND
Toluene	108-88-3	0.90	3.70	ND	ND
1,1,1-Trichloroethane	71-55-6	0.40	1.60	ND	ND
1,1,2-Trichloroethane	79-00-5	0.90	3.60	ND	ND
Trichloroethene	79-01-6	0.60	2.50	56	ND
Vinyl Acetate	108-05-4	0.80	3.30	ND	ND
Vinyl Chloride	75-01-4	1.80	7.00	ND	ND
Xylene (total)	10061-01-5	0.20	1.60	ND	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		89	94
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		104	104
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		81	94

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-2

RAYMARK IND.
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/22/94, 17:28, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 4/ 28/94

Dilution Factor: 1.149
%Solids: 87

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	3.00	12.60	ND	ND
Benzene	71-43-2	0.40	1.40	ND	<MDL
Bromodichloromethane	75-27-4	0.60	2.50	ND	ND
Bromoform	75-25-2	0.70	2.90	ND	ND
Bromomethane	74-83-9	2.10	8.00	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	13.80	54.00	<MDL	ND
Carbon Disulfide	75-15-0	1.30	5.20	ND	ND
Carbon Tetrachloride	56-23-5	0.80	3.00	ND	ND
Chlorobenzene	108-90-7	0.70	2.30	ND	ND
Chloroethane	75-00-3	1.50	6.10	ND	ND
Chloroform	67-66-3	0.80	3.20	ND	ND
Chloromethane	74-87-3	2.00	7.80	ND	ND
Dibromochloromethane	124-48-1	0.70	2.80	ND	ND
1,1-Dichloroethane	75-34-3	0.90	3.40	ND	ND
1,2-Dichloroethane	107-06-2	0.60	2.20	ND	ND
1,1-Dichloroethene	75-35-4	1.00	4.50	ND	ND
1,2-Dichloroethene (total)	540-59-0	1.50	5.70	ND	ND
1,2-Dichloropropane	78-87-5	0.60	2.40	ND	ND
cis-1,3-Dichloropropene	10061-01-5	0.90	3.40	ND	ND
trans-1,3-Dichloropropene	10061-02-6	0.80	3.20	ND	ND
Ethylbenzene	100-41-4	1.10	4.50	ND	ND
2-Hexanone	591-78-6	1.50	6.20	ND	ND
Methylene Chloride	75-9-2	3.20	12.60	130	7.6 E
4-Methyl-2-pentanone (MIBK)	108-10-1	2.50	10.20	ND	ND
Styrene	100-42-5	0.40	1.60	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	0.80	3.10	ND	ND
Tetrachloroethene	127-18-4	1.00	4.00	ND	ND
Toluene	108-88-3	1.00	4.00	ND	ND
1,1,1-Trichloroethane	71-55-6	0.40	1.70	ND	ND
1,1,2-Trichloroethane	79-00-5	1.00	3.90	ND	ND
Trichloroethene	79-01-6	0.70	2.80	ND	ND
Vinyl Acetate	108-05-4	0.90	3.60	ND	ND
Vinyl Chloride	75-01-4	2.00	7.70	ND	ND
Xylene (total)	10061-01-5	0.30	1.70	ND	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		89	94
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		137	104
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		79	94

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-3

RAYMARK IND.
SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/22/94, 17:56, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 4/ 28/94

Dilution Factor: 1.634
%Solids: 61

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	4.20	18.00	ND	ND
Benzene	71-43-2	0.50	2.00	1.9 E	<MDL
Bromodichloromethane	75-27-4	0.90	3.60	ND	ND
Bromoform	75-25-2	1.00	4.10	ND	ND
Bromomethane	74-83-9	2.90	11.40	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	19.60	76.80	ND	ND
Carbon Disulfide	75-15-0	1.80	7.40	33	ND
Carbon Tetrachloride	56-23-5	1.10	4.20	ND	ND
Chlorobenzene	108-90-7	1.00	3.30	11	ND
Chloroethane	75-00-3	2.10	8.70	11	ND
Chloroform	67-66-3	1.10	4.60	ND	ND
Chloromethane	74-87-3	2.80	11.10	ND	ND
Dibromochloromethane	124-48-1	1.00	3.90	ND	ND
1,1-Dichloroethane	75-34-3	1.20	4.90	ND	ND
1,2-Dichloroethane	107-06-2	0.80	3.10	ND	ND
1,1-Dichloroethene	75-35-4	1.50	6.40	ND	ND
1,2-Dichloroethene (total)	540-59-0	2.10	8.20	7.0 E	ND
1,2-Dichloropropane	78-87-5	0.80	3.40	ND	ND
cis-1,3-Dichloropropene	10061-01-5	1.20	4.90	ND	ND
trans-1,3-Dichloropropene	10061-02-6	1.20	4.60	ND	ND
Ethylbenzene	100-41-4	1.60	6.40	10	ND
2-Hexanone	591-78-6	2.10	8.80	ND	ND
Methylene Chloride	75-9-2	4.60	18.00	150	11 E
4-Methyl-2-pentanone (MIBK)	108-10-1	3.60	14.50	ND	ND
Styrene	100-42-5	0.60	2.30	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	1.10	4.40	ND	ND
Tetrachloroethene	127-18-4	1.40	5.70	ND	ND
Toluene	108-88-3	1.40	5.70	8.9	ND
1,1,1-Trichloroethane	71-55-6	0.60	2.50	ND	ND
1,1,2-Trichloroethane	79-00-5	1.40	5.60	ND	ND
Trichloroethene	79-01-6	1.00	3.90	6.5	ND
Vinyl Acetate	108-05-4	1.30	5.10	ND	ND
Vinyl Chloride	75-01-4	2.80	10.90	ND	ND
Xylene (total)	10061-01-5	1.20	4.60	60	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		94	94
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		129	104
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		75	94

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-4

RAYMARK, IND.
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 15:28, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 4/ 28/94
Dilution Factor: 6.206
%Solids: 75

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	16.10	68.30	ND	ND
Benzene	71-43-2	1.90	7.40	4.4 E	ND
Bromodichloromethane	75-27-4	3.40	13.70	ND	ND
Bromoform	75-25-2	3.80	15.50	ND	ND
Bromomethane	74-83-9	11.20	43.40	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	74.50	291.70	ND	ND
Carbon Disulfide	75-15-0	6.80	27.90	120	ND
Carbon Tetrachloride	56-23-5	4.10	16.10	ND	ND
Chlorobenzene	108-90-7	3.80	12.40	ND	ND
Chloroethane	75-00-3	8.10	32.90	ND	ND
Chloroform	67-66-3	4.30	17.40	ND	ND
Chloromethane	74-87-3	10.60	42.20	ND	ND
Dibromochloromethane	124-48-1	3.70	14.90	ND	ND
1,1-Dichloroethane	75-34-3	4.70	18.60	ND	ND
1,2-Dichloroethane	107-06-2	3.00	11.80	ND	ND
1,1-Dichloroethene	75-35-4	5.60	24.20	ND	ND
1,2-Dichloroethene (total)	540-59-0	8.10	31.00	ND	ND
1,2-Dichloropropane	78-87-5	3.20	13.00	ND	ND
cis-1,3-Dichloropropene	10061-01-5	4.60	18.60	ND	ND
trans-1,3-Dichloropropene	10061-02-6	4.40	17.40	ND	ND
Ethylbenzene	100-41-4	6.10	24.20	ND	ND
2-Hexanone	591-78-6	8.10	33.50	ND	ND
Methylene Chloride	75-9-2	17.40	68.30	130	92
4-Methyl-2-pentanone (MIBK)	108-10-1	13.70	55.20	ND	ND
Styrene	100-42-5	2.20	8.70	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	4.20	16.80	ND	ND
Tetrachloroethene	127-18-4	5.50	21.70	ND	ND
Toluene	108-88-3	5.40	21.70	8.1 E	ND
1,1,1-Trichloroethane	71-55-6	2.40	9.30	ND	ND
1,1,2-Trichloroethane	79-00-5	5.30	21.10	ND	ND
Trichloroethene	79-01-6	3.70	14.90	ND	ND
Vinyl Acetate	108-05-4	4.80	19.20	ND	ND
Vinyl Chloride	75-01-4	10.60	41.60	ND	ND
Xylene (total)	10061-01-5	4.40	17.40	50	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		106	103
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		119	94
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		86	104

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-5

RAYMARK IND.
SAMPLE # TS*B-10*1.5-4 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/22/94, 18:52, ALH

DATE REPORTED: 4/ 28/94

Dilution Factor: 0.995
%Solids: 99

Sample Matrix SOLID
Analysis Method: 8260

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	2.60	10.90	16	ND
Benzene	71-43-2	0.30	1.20	0.7 E	<MDL
Bromodichloromethane	75-27-4	0.50	2.20	ND	ND
Bromoform	75-25-2	0.60	2.50	ND	ND
Bromomethane	74-83-9	1.80	7.00	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	11.90	46.80	27 E	ND
Carbon Disulfide	75-15-0	1.10	4.50	ND	ND
Carbon Tetrachloride	56-23-5	0.70	2.60	ND	ND
Chlorobenzene	108-90-7	0.60	2.00	ND	ND
Chloroethane	75-00-3	1.30	5.30	ND	ND
Chloroform	67-66-3	0.70	2.80	ND	ND
Chloromethane	74-87-3	1.70	6.80	ND	ND
Dibromochloromethane	124-48-1	0.60	2.40	ND	ND
1,1-Dichloroethane	75-34-3	0.80	3.00	ND	ND
1,2-Dichloroethane	107-06-2	0.50	1.90	ND	ND
1,1-Dichloroethene	75-35-4	0.90	3.90	ND	ND
1,2-Dichloroethene (total)	540-59-0	1.30	5.00	ND	ND
1,2-Dichloropropane	78-87-5	0.50	2.10	ND	ND
cis-1,3-Dichloropropene	10061-01-5	0.70	3.00	ND	ND
trans-1,3-Dichloropropene	10061-02-6	0.70	2.80	ND	ND
Ethylbenzene	100-41-4	1.00	3.90	1.4 E	ND
2-Hexanone	591-78-6	1.30	5.40	<MDL	ND
Methylene Chloride	75-9-2	2.80	10.90	28	6.5 E
4-Methyl-2-pentanone (MIBK)	108-10-1	2.20	8.90	ND	ND
Styrene	100-42-5	0.30	1.40	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	0.70	2.70	ND	ND
Tetrachloroethene	127-18-4	0.90	3.50	<MDL	ND
Toluene	108-88-3	0.90	3.50	1.9 E	ND
1,1,1-Trichloroethane	71-55-6	0.40	1.50	ND	ND
1,1,2-Trichloroethane	79-00-5	0.80	3.40	ND	ND
Trichloroethene	79-01-6	0.60	2.40	ND	ND
Vinyl Acetate	108-05-4	0.80	3.10	ND	ND
Vinyl Chloride	75-01-4	1.70	6.70	ND	ND
Xylene (total)	10061-01-5	0.70	2.80	7.7	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		92	94
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		103	104
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		83	94

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-6

RAYMARK IND.
SAMPLE # TS*B-68*2-4 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/26/94, 16:33, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 4/ 28/94

Dilution Factor: 49.46
%Solids: 100

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	128.60	544.00	ND	ND
Benzene	71-43-2	15.30	59.30	21 E	ND
Bromodichloromethane	75-27-4	27.20	108.80	ND	ND
Bromoform	75-25-2	30.20	123.60	ND	ND
Bromomethane	74-83-9	89.00	346.20	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	593.50	2324.50	780 E	<MDL
Carbon Disulfide	75-15-0	54.40	222.60	ND	ND
Carbon Tetrachloride	56-23-5	32.60	128.60	ND	ND
Chlorobenzene	108-90-7	30.20	98.90	<MDL	ND
Chloroethane	75-00-3	64.30	262.10	ND	ND
Chloroform	67-66-3	34.60	138.50	ND	ND
Chloromethane	74-87-3	84.10	336.30	ND	ND
Dibromochloromethane	124-48-1	29.70	118.70	ND	ND
1,1-Dichloroethane	75-34-3	37.60	148.40	ND	ND
1,2-Dichloroethane	107-06-2	24.20	94.00	ND	ND
1,1-Dichloroethene	75-35-4	44.50	192.90	ND	ND
1,2-Dichloroethene (total)	540-59-0	64.30	247.30	ND	ND
1,2-Dichloropropane	78-87-5	25.70	103.90	ND	ND
cis-1,3-Dichloropropene	10061-01-5	36.60	148.40	ND	ND
trans-1,3-Dichloropropene	10061-02-6	35.10	138.50	ND	ND
Ethylbenzene	100-41-4	48.50	192.90	ND	ND
2-Hexanone	591-78-6	64.30	267.10	ND	ND
Methylene Chloride	75-9-2	138.50	544.00	400 E	<MDL
4-Methyl-2-pentanone (MIBK)	108-10-1	108.80	440.20	ND	ND
Styrene	100-42-5	17.30	69.20	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	33.10	133.50	ND	ND
Tetrachloroethene	127-18-4	43.50	173.10	<MDL	ND
Toluene	108-88-3	43.00	173.10	<MDL	ND
1,1,1-Trichloroethane	71-55-6	18.80	74.20	ND	ND
1,1,2-Trichloroethane	79-00-5	42.00	168.20	ND	ND
Trichloroethene	79-01-6	29.20	118.70	ND	ND
Vinyl Acetate	108-05-4	38.10	153.30	ND	ND
Vinyl Chloride	75-01-4	84.10	331.40	ND	ND
Xylene (total)	10061-01-5	11.40	74.20	ND	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		101	98
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		97	88
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		100	103

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-7

RAYMARK IND. SAMPLED (Date/Time/Init): 4/18/94, JD

SAMPLE # TS*B-7*4-6 FT-B60 ANALYSIS (Date/Time/Init): 4/26/94, 17:01, ALH

Sample Matrix SOLID

DATE REPORTED: 4/ 28/94 Dilution Factor: 50.25 Analysis Method: 8260

%Solids: 100

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	130.70	552.80	ND	ND
Benzene	71-43-2	15.60	60.30	65	ND
Bromodichloromethane	75-27-4	27.60	110.60	ND	ND
Bromoform	75-25-2	30.70	125.60	ND	ND
Bromomethane	74-83-9	90.50	351.80	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	603.00	2361.80	800 E	<MDL
Carbon Disulfide	75-15-0	55.30	226.10	ND	ND
Carbon Tetrachloride	56-23-5	33.20	130.70	ND	ND
Chlorobenzene	108-90-7	30.70	100.50	<MDL	ND
Chloroethane	75-00-3	65.30	266.30	ND	ND
Chloroform	67-66-3	35.20	140.70	ND	ND
Chloromethane	74-87-3	85.40	341.70	92 E	ND
Dibromochloromethane	124-48-1	30.20	120.60	ND	ND
1,1-Dichloroethane	75-34-3	38.20	150.80	ND	ND
1,2-Dichloroethane	107-06-2	24.60	95.50	ND	ND
1,1-Dichloroethene	75-35-4	45.20	196.00	ND	ND
1,2-Dichloroethene (total)	540-59-0	65.30	251.30	ND	ND
1,2-Dichloropropane	78-87-5	26.10	105.50	ND	ND
cis-1,3-Dichloropropene	10061-01-5	37.20	150.80	ND	ND
trans-1,3-Dichloropropene	10061-02-6	35.70	140.70	ND	ND
Ethylbenzene	100-41-4	49.20	196.00	ND	ND
2-Hexanone	591-78-6	65.30	271.40	ND	ND
Methylene Chloride	75-9-2	140.70	552.80	560	<MDL
4-Methyl-2-pentanone (MIBK)	108-10-1	110.60	447.20	ND	ND
Styrene	100-42-5	17.60	70.40	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	33.70	135.70	ND	ND
Tetrachloroethene	127-18-4	44.20	175.90	ND	ND
Toluene	108-88-3	43.70	175.90	<MDL	ND
1,1,1-Trichloroethane	71-55-6	19.10	75.40	ND	ND
1,1,2-Trichloroethane	79-00-5	42.70	170.90	ND	ND
Trichloroethene	79-01-6	29.60	120.60	ND	ND
Vinyl Acetate	108-05-4	38.70	155.80	ND	ND
Vinyl Chloride	75-01-4	85.40	336.70	ND	ND
Xylene (total)	10061-01-5	11.60	75.40	32 E	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		96	98
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		98	88
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		97	103

E: Estimated, ND: Not detected

MDL: Method Detection Limit

PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-8

RAYMARK IND.
SAMPLE # TS*B-68*6-8 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/26/94, 17:29, ALH

Sample Matrix SOLID
Analysis Method: 8260

DATE REPORTED: 4/ 28/94

Dilution Factor: 50.05
%Solids: 100

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	130.10	550.60	ND	ND
Benzene	71-43-2	15.50	60.10	540	ND
Bromodichloromethane	75-27-4	27.50	110.10	ND	ND
Bromoform	75-25-2	30.50	125.10	ND	ND
Bromomethane	74-83-9	90.10	350.40	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	600.60	2352.40	<MDL	<MDL
Carbon Disulfide	75-15-0	55.10	225.20	ND	ND
Carbon Tetrachloride	56-23-5	33.00	130.10	ND	ND
Chlorobenzene	108-90-7	30.50	100.10	150	ND
Chloroethane	75-00-3	65.10	265.30	ND	ND
Chloroform	67-66-3	35.00	140.10	ND	ND
Chloromethane	74-87-3	85.10	340.30	ND	ND
Dibromochloromethane	124-48-1	30.00	120.10	ND	ND
1,1-Dichloroethane	75-34-3	38.00	150.20	ND	ND
1,2-Dichloroethane	107-06-2	24.50	95.10	ND	ND
1,1-Dichloroethene	75-35-4	45.00	195.20	ND	ND
1,2-Dichloroethene (total)	540-59-0	65.10	250.30	ND	ND
1,2-Dichloropropane	78-87-5	26.00	105.10	ND	ND
cis-1,3-Dichloropropene	10061-01-5	37.00	150.20	ND	ND
trans-1,3-Dichloropropene	10061-02-6	35.50	140.10	ND	ND
Ethylbenzene	100-41-4	49.00	195.20	<MDL	ND
2-Hexanone	591-78-6	65.10	270.30	ND	ND
Methylene Chloride	75-9-2	140.10	550.60	2100	<MDL
4-Methyl-2-pentanone (MIBK)	108-10-1	110.10	445.40	ND	ND
Styrene	100-42-5	17.50	70.10	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	33.50	135.10	ND	ND
Tetrachloroethene	127-18-4	44.00	175.20	ND	ND
Toluene	108-88-3	43.50	175.20	93 E	ND
1,1,1-Trichloroethane	71-55-6	19.00	75.10	ND	ND
1,1,2-Trichloroethane	79-00-5	42.50	170.20	ND	ND
Trichloroethene	79-01-6	29.50	120.10	ND	ND
Vinyl Acetate	108-05-4	38.50	155.20	ND	ND
Vinyl Chloride	75-01-4	85.10	335.30	ND	ND
Xylene (total)	10061-01-5	11.50	75.10	33 E	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		92	98
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		96	88
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		96	103

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-9

RAYMARK, IND. SAMPLED (Date/Time/Init): 4/18/94, JD

SAMPLE # TS*B-7*4-6 FT-B60 DUP ANALYSIS (Date/Time/Init): 4/27/94, 11:11, ALH

Sample Matrix SOLID

DATE REPORTED: 4/ 28/94 Dilution Factor: 49.80 Analysis Method: 8260

%Solids: 100

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acetone	67-64-1	129.50	547.80	ND	ND
Benzene	71-43-2	15.40	59.80	37 E	ND
Bromodichloromethane	75-27-4	27.40	109.60	ND	ND
Bromoform	75-25-2	30.40	124.50	ND	ND
Bromomethane	74-83-9	89.60	348.60	ND	ND
2-Butanone (Methyl ethyl ketone)	78-93-3	597.60	2340.60	740 E	ND
Carbon Disulfide	75-15-0	54.80	224.10	ND	ND
Carbon Tetrachloride	56-23-5	32.90	129.50	ND	ND
Chlorobenzene	108-90-7	30.40	99.60	<MDL	ND
Chloroethane	75-00-3	64.70	263.90	ND	ND
Chloroform	67-66-3	34.90	139.40	ND	ND
Chloromethane	74-87-3	84.70	338.60	ND	ND
Dibromochloromethane	124-48-1	29.90	119.50	ND	ND
1,1-Dichloroethane	75-34-3	37.80	149.40	ND	ND
1,2-Dichloroethane	107-06-2	24.40	94.60	ND	ND
1,1-Dichloroethene	75-35-4	44.80	194.20	ND	ND
1,2-Dichloroethene (total)	540-59-0	64.70	249.00	ND	ND
1,2-Dichloropropane	78-87-5	25.90	104.60	ND	ND
cis-1,3-Dichloropropene	10061-01-5	36.90	149.40	ND	ND
trans-1,3-Dichloropropene	10061-02-6	35.40	139.40	ND	ND
Ethylbenzene	100-41-4	48.80	194.20	ND	ND
2-Hexanone	591-78-6	64.70	268.90	160 E	<MDL
Methylene Chloride	75-9-2	139.40	547.80	800	270 E
4-Methyl-2-pentanone (MIBK)	108-10-1	109.60	443.20	ND	ND
Styrene	100-42-5	17.40	69.70	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	33.40	134.50	<MDL	ND
Tetrachloroethene	127-18-4	43.80	174.30	ND	ND
Toluene	108-88-3	43.30	174.30	<MDL	<MDL
1,1,1-Trichloroethane	71-55-6	18.90	74.70	ND	ND
1,1,2-Trichloroethane	79-00-5	42.30	169.30	ND	ND
Trichloroethene	79-01-6	29.40	119.50	ND	ND
Vinyl Acetate	108-05-4	38.30	154.40	ND	ND
Vinyl Chloride	75-01-4	84.70	333.70	ND	ND
Xylene (total)	10061-01-5	11.50	74.70	41 E	ND
1,2-Dichloroethane-d4 (surrogat	%Recovery	[OK=70-121]		103	101
Toluene-d8 (surrogate std)	%Recovery	[OK=84-138]		99	88
Bromofluorobenzene (surrogate	%Recovery	[OK=59-113]		95	100

E: Estimated, ND: Not detected

MDL: Method Detection Limit

PQL: Practical Quantitation Limit

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039 -BS

ANALYSIS (Date/Time/Init): 4/22/94, 12:49, ALH

DATE REPORTED: 4/ 27/94

Analysis Method: 8260 (SOLID)

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
1,1-Dichloroethene	75-35-4	59-172	96
Trichloroethene	79-01-6	62-137	94
Benzene	71-43-2	66-142	98
Toluene	108-88-3	59-139	94
Chlorobenzene	108-90-7	60-133	103
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	99
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	102
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	97

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-5MS

RAYMARK IND. SAMPLED (Date/Time/Init): 4/18/94, JD

SAMPLE #: TS*B-10*1.5-4 FT-B60 ANALYSIS (Date/Time/Init): 4/22/94, 19:48, ALH

Sample Matrix: SOLID

DATE REPORTED: 4/ 28/94

Analysis Method: 8260 (SOIL)

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
1,1-Dichloroethene	75-35-4	59-172	104
Trichloroethene	79-01-6	62-137	95
Benzene	71-43-2	66-142	97
Toluene	108-88-3	59-139	93
Chlorobenzene	108-90-7	60-133	102
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	93
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	106
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	81

CI: COELUTING INTERFERENCE

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-BS

ANALYSIS (Date/Time/Init): 4/25/94, 11:17, ALH

DATE REPORTED: 4/27/94

Analysis Method: 8260 (SOLID)

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
1,1-Dichloroethene	75-35-4	59-172	84
Trichloroethene	79-01-6	62-137	85
Benzene	71-43-2	66-142	94
Toluene	108-88-3	59-139	95
Chlorobenzene	108-90-7	60-133	93
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	106
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	95
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	108

KIBER Environmental Services

BATCH
GC/MS VOA RESULTS

LAB SAMPLE # 404043-8MS

SAMPLED (Date/Time/Init): 4/20/94, JV
ANALYSIS (Date/Time/Init): 4/25/94, 15:56, ALH
Sample Matrix: SOLID
Analysis Method: 8260 (SOIL)

DATE REPORTED: 4/ 27/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
1,1-Dichloroethene	75-35-4	59-172	148
Trichloroethene	79-01-6	62-137	90
Benzene	71-43-2	66-142	92
Toluene	108-88-3	59-139	97
Chlorobenzene	108-90-7	60-133	92
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	92
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	104
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	87

ANALYSIS (Date/Time/Init): 4/25/94, 16:24, ALH

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery	RPD
1,1-Dichloroethene	75-35-4	59-172	105	34
Trichloroethene	79-01-6	62-137	90	0
Benzene	71-43-2	66-142	95	3
Toluene	108-88-3	59-139	96	1
Chlorobenzene	108-90-7	60-133	95	3
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	105	
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	102	
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	95	

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-BS

ANALYSIS (Date/Time/Init): 4/26/94, 16:06, ALH

DATE REPORTED: 4/27/94

Analysis Method: 8260 (SOLID)

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
1,1-Dichloroethene	75-35-4	59-172	92
Trichloroethene	79-01-6	62-137	101
Benzene	71-43-2	66-142	102
Toluene	108-88-3	59-139	98
Chlorobenzene	108-90-7	60-133	102
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	95
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	97
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	97

KIBER Environmental Services

BATCH GC/MS VOA RESULTS

LAB SAMPLE # 404042-3MS

SAMPLED (Date/Time/Init): 4/20/94, 10:29, JF
ANALYSIS (Date/Time/Init): 4/26/94, 19:49, ALH
Sample Matrix: SOLID
Analysis Method: 8260 (SOIL)

DATE REPORTED: 4/27/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
1,1-Dichloroethene	75-35-4	59-172	86
Trichloroethene	79-01-6	62-137	94
Benzene	71-43-2	66-142	98
Toluene	108-88-3	59-139	106
Chlorobenzene	108-90-7	60-133	99
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	87
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	100
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	88

ANALYSIS (Date/Time/Init): 4/26/94, 20:16, ALH

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery	RPD
1,1-Dichloroethene	75-35-4	59-172	93	8
Trichloroethene	79-01-6	62-137	84	11
Benzene	71-43-2	66-142	95	3
Toluene	108-88-3	59-139	94	12
Chlorobenzene	108-90-7	60-133	99	0
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	97	
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	103	
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	91	

KIBER Environmental Services | GC/MS VOA RESULTS | LAB SAMPLE # 404039-BS

ANALYSIS (Date/Time/Init): 4/27/94, 10:15, ALH

DATE REPORTED: 4/28/94

Analysis Method: 8260 (SOLID)

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
1,1-Dichloroethene	75-35-4	59-172	89
Trichloroethene	79-01-6	62-137	90
Benzene	71-43-2	66-142	95
Toluene	108-88-3	59-139	87
Chlorobenzene	108-90-7	60-133	100
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	99
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	97
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	100

KIBER Environmental Services

BATCH
GC/MS VOA RESULTS

LAB SAMPLE # 404054-4MS

SAMPLED (Date/Time/Init): 4/46/94, 08:00, JV
ANALYSIS (Date/Time/Init): 4/27/94, 14:03, ALH
Sample Matrix: SOLID
Analysis Method: 8260 (SOIL)

DATE REPORTED: 4/28/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
1,1-Dichloroethene	75-35-4	59-172	116
Trichloroethene	79-01-6	62-137	92
Benzene	71-43-2	66-142	101
Toluene	108-88-3	59-139	106
Chlorobenzene	108-90-7	60-133	105
1,2-Dichloroethane-d4 (surrogate)	% Recovery	[OK=70-121]	93
Toluene-d8 (surrogate)	% Recovery	[OK=84-138]	115
Bromofluorobenzene (surrogate)	% Recovery	[OK=59-113]	85

CI: COELUTING INTERFERENCE

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-1

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/26/94, 1:25 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 34.64
Extract Method: 3550
%Solids: 96.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	27.70	110.90	ND	ND
Acenaphthylene	208-96-8	27.70	107.40	ND	ND
Anthracene	120-12-7	17.30	72.70	ND	ND
Benzo(a)anthracene	56-55-3	20.80	79.70	ND	ND
Benzo(b)fluoranthene	205-99-2	31.20	121.20	ND	ND
Benzo(k)fluoranthene	207-08-9	31.20	128.20	ND	ND
Benzoic acid	65-85-0	263.30	1060.00	ND	ND
Benzo(g,h,i)perylene	191-24-3	17.30	72.70	ND	ND
Benzo(a)pyrene	193-39-5	17.30	69.30	ND	ND
Benzyl alcohol	100-51-6	20.80	86.60	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	34.60	135.10	ND	ND
bis(2-Chloroethyl)ether	111-44-4	27.70	103.90	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	72.70	287.50	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	31.20	121.20	510	ND
4-Bromophenyl-phenylether	101-55-3	24.20	93.50	ND	ND
Butylbenzylphthalate	85-68-7	27.70	114.30	ND	ND
4-Chloroaniline	106-47-8	17.30	69.30	ND	ND
4-Chloro-3-methylphenol	59-50-7	24.20	97.00	ND	ND
2-Chloronaphthalene	91-58-7	27.70	117.80	ND	ND
2-Chlorophenol	95-57-8	24.20	100.50	ND	ND
4-Chlorophenyl-phenylether	59-50-7	27.70	110.90	ND	ND
Chrysene	218-01-9	17.30	65.80	ND	ND
Dibenz(a,h)anthracene	53-70-3	20.80	79.70	ND	ND
Dibenzofuran	132-64-9	27.70	103.90	ND	ND
Di-n-butylphthalate	84-74-2	24.20	103.90	27 E	ND
1,2-Dichlorobenzene	95-50-1	27.70	107.40	ND	ND
1,3-Dichlorobenzene	541-73-1	24.20	97.00	ND	ND
1,4-Dichlorobenzene	106-46-7	24.20	103.90	ND	ND
3,3'-Dichlorobenzidine	91-94-1	31.20	128.20	ND	ND
2,4-Dichlorophenol	120-83-2	31.20	117.80	ND	ND
Diethylphthalate	84-66-2	20.80	86.60	ND	ND
2,4-Dimethylphenol	105-67-9	48.50	187.10	55 E	ND
Dimethylphthalate	131-11-3	24.20	100.50	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	20.80	86.60	ND	ND
2,4-Dinitrophenol	51-28-5	852.20	3405.20	ND	ND
2,4-Dinitrotoluene	121-14-2	48.50	200.90	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-1

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/26/94, 1:25 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 34.64
Extract Method: 3550
%Solids: 96.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	24.20	90.10	ND	ND
Di-n-octylphthalate	117-84-0	45.00	176.70	ND	ND
Fluoranthene	206-44-0	24.20	93.50	ND	ND
Fluorene	7782-41-4	24.20	103.90	ND	ND
Hexachlorobenzene	118-74-1	20.80	90.10	ND	ND
Hexachlorobutadiene	87-68-3	27.70	114.30	ND	ND
Hexachlorocyclopentadiene	77-47-4	20.80	83.10	ND	ND
Hexachloroethane	67-72-1	24.20	97.00	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	20.80	79.70	ND	ND
Isophorone	78-59-1	31.20	121.20	ND	ND
2-Methylnaphthalene	91-57-6	34.60	131.60	ND	ND
2-Methylphenol	95-48-7	31.20	124.70	ND	ND
3-,4-Methylphenol	106-44-5	13.90	52.00	130	ND
Naphthalene	91-57-6	31.20	124.70	ND	ND
2-Nitroaniline	88-74-4	20.80	83.10	ND	ND
3-Nitroaniline	99-09-3	83.10	339.50	ND	ND
4-Nitroaniline	100-01-6	34.60	135.10	ND	ND
Nitrobenzene	98-95-3	31.20	121.20	ND	ND
2-Nitrophenol	88-75-5	24.20	100.50	ND	ND
4-Nitrophenol	100-01-6	256.30	1025.40	<MDL	ND
N-Nitrosodiphenylamine*	86-30-6	34.60	131.60	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	27.70	27.70	ND	ND
Pentachlorophenol	87-86-5	20.80	90.10	ND	ND
Phenanthrene	85-01-8	24.20	90.10	<MDL	ND
Phenol	108-95-2	13.90	65.80	ND	ND
Pyrene	129-00-0	24.20	100.50	ND	ND
1,2,4-Trichlorobenzene	120-82-1	27.70	114.30	ND	ND
2,4,5-Trichlorophenol	95-95-4	27.70	117.80	ND	ND
2,4,6-Trichlorophenol	88-06-02	27.70	103.90	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		75	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		79	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		75	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		74	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		92	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		106	99

E: Estimated, ND: Not detected   *as Diphenylamine   CI: Coeluting Interference
MDL: Method Detection Limit   DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 404039-2

RAYMARK INDUSTRIES

SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init): 4/18/94, JD

ANALYSIS (Date/Time/Init): 4/26/94, 0:43 , TAG

EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 770.0

Extract Method: 3550

%Solids: 86.7

Sample Matrix: SOLID

Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	616.00	2463.90	ND	ND
Acenaphthylene	208-96-8	616.00	2386.90	ND	ND
Anthracene	120-12-7	385.00	1616.90	ND	ND
Benzo(a)anthracene	56-55-3	462.00	1770.90	1100 E	ND
Benzo(b)fluoranthene	205-99-2	693.00	2694.90	2000 E	ND
Benzo(k)fluoranthene	207-08-9	693.00	2848.90	<MDL	ND
Benzoic acid	65-85-0	5851.70	23560.80	ND	ND
Benzo(g,h,i)perylene	191-24-3	385.00	1616.90	ND	ND
Benzo(a)pyrene	193-39-5	385.00	1539.90	1200 E	ND
Benzyl alcohol	100-51-6	462.00	1924.90	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	770.00	3002.80	ND	ND
bis(2-Chloroethyl)ether	111-44-4	616.00	2309.90	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	1616.90	6390.70	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	693.00	2694.90	ND	ND
4-Bromophenyl-phenylether	101-55-3	539.00	2078.90	ND	ND
Butylbenzylphthalate	85-68-7	616.00	2540.90	ND	ND
4-Chloroaniline	106-47-8	385.00	1539.90	ND	ND
4-Chloro-3-methylphenol	59-50-7	539.00	2155.90	ND	ND
2-Chloronaphthalene	91-58-7	616.00	2617.90	ND	ND
2-Chlorophenol	95-57-8	539.00	2232.90	ND	ND
4-Chlorophenyl-phenylether	59-50-7	616.00	2463.90	ND	ND
Chrysene	218-01-9	385.00	1462.90	1400 E	ND
Dibenz(a,h)anthracene	53-70-3	462.00	1770.90	ND	ND
Dibenzofuran	132-64-9	616.00	2309.90	ND	ND
Di-n-butylphthalate	84-74-2	539.00	2309.90	ND	ND
1,2-Dichlorobenzene	95-50-1	616.00	2386.90	ND	ND
1,3-Dichlorobenzene	541-73-1	539.00	2155.90	ND	ND
1,4-Dichlorobenzene	106-46-7	539.00	2309.90	ND	ND
3,3'-Dichlorobenzidine	91-94-1	693.00	2848.90	ND	ND
2,4-Dichlorophenol	120-83-2	693.00	2617.90	ND	ND
Diethylphthalate	84-66-2	462.00	1924.90	ND	ND
2,4-Dimethylphenol	105-67-9	1077.90	4157.80	ND	ND
Dimethylphthalate	131-11-3	539.00	2232.90	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	462.00	1924.90	ND	ND
2,4-Dinitrophenol	51-28-5	18941.00	75687.10	ND	ND
2,4-Dinitrotoluene	121-14-2	1077.90	4465.80	ND	ND

E:Estimated, ND: Not detected

MDL: Method Detection Limit

PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-2

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/26/94, 0:43 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 770.0
Extract Method: 3550
%Solids: 86.7

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	539.00	2001.90	ND	ND
Di-n-octylphthalate	117-84-0	1000.90	3926.80	ND	ND
Fluoranthene	206-44-0	539.00	2078.90	2200	ND
Fluorene	7782-41-4	539.00	2309.90	ND	ND
Hexachlorobenzene	118-74-1	462.00	2001.90	ND	ND
Hexachlorobutadiene	87-68-3	616.00	2540.90	ND	ND
Hexachlorocyclopentadiene	77-47-4	462.00	1847.90	ND	ND
Hexachloroethane	67-72-1	539.00	2155.90	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	462.00	1770.90	ND	ND
Isophorone	78-59-1	693.00	2694.90	ND	ND
2-Methylnaphthalene	91-57-6	770.00	2925.80	ND	ND
2-Methylphenol	95-48-7	693.00	2771.90	ND	ND
3-,4-Methylphenol	106-44-5	308.00	1154.90	ND	ND
Naphthalene	91-57-6	693.00	2771.90	ND	ND
2-Nitroaniline	88-74-4	462.00	1847.90	ND	ND
3-Nitroaniline	99-09-3	1847.90	7545.60	ND	ND
4-Nitroaniline	100-01-6	770.00	3002.80	ND	ND
Nitrobenzene	98-95-3	693.00	2694.90	ND	ND
2-Nitrophenol	88-75-5	539.00	2232.90	ND	ND
4-Nitrophenol	100-01-6	5697.70	22790.80	ND	ND
N-Nitrosodiphenylamine*	86-30-6	770.00	2925.80	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	616.00	616.00	ND	ND
Pentachlorophenol	87-86-5	462.00	2001.90	ND	ND
Phenanthrene	85-01-8	539.00	2001.90	1100 E	ND
Phenol	108-95-2	308.00	1462.90	ND	ND
Pyrene	129-00-0	539.00	2232.90	2100 E	ND
1,2,4-Trichlorobenzene	120-82-1	616.00	2540.90	ND	ND
2,4,5-Trichlorophenol	95-95-4	616.00	2617.90	ND	ND
2,4,6-Trichlorophenol	88-06-02	616.00	2309.90	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		77	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		82	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		66	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		94	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		77	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		99	99

E: Estimated, ND: Not detected | *as Diphenylamine | CI: Coeluting Interference
MDL: Method Detection Limit | DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 404039-3

RAYMARK INDUSTRIES

SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init): 4/18/94, JD

ANALYSIS (Date/Time/Init): 4/26/94, 0:01 , TAG

EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 2739

Extract Method: 3550

%Solids: 61.2

Sample Matrix: SOLID

Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	2191.00	8764.20	ND	ND
Acenaphthylene	208-96-8	2191.00	8490.30	ND	ND
Anthracene	120-12-7	1369.40	5751.50	<MDL	ND
Benzo(a)anthracene	56-55-3	1643.30	6299.20	3100 E	ND
Benzo(b)fluoranthene	205-99-2	2464.90	9585.80	4800 E	ND
Benzo(k)fluoranthene	207-08-9	2464.90	10133.60	ND	ND
Benzoic acid	65-85-0	20814.90	83807.30	ND	ND
Benzo(g,h,i)perylene	191-24-3	1369.40	5751.50	ND	ND
Benzo(a)pyrene	193-39-5	1369.40	5477.60	ND	ND
Benzyl alcohol	100-51-6	1643.30	6847.00	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	2738.80	10681.30	ND	ND
bis(2-Chloroethyl)ether	111-44-4	2191.00	8216.40	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	5751.50	22732.00	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	2464.90	9585.80	ND	ND
4-Bromophenyl-phenylether	101-55-3	1917.20	7394.80	ND	ND
Butylbenzylphthalate	85-68-7	2191.00	9038.00	ND	ND
4-Chloroaniline	106-47-8	1369.40	5477.60	ND	ND
4-Chloro-3-methylphenol	59-50-7	1917.20	7668.60	ND	ND
2-Chloronaphthalene	91-58-7	2191.00	9311.90	ND	ND
2-Chlorophenol	95-57-8	1917.20	7942.50	ND	ND
4-Chlorophenyl-phenylether	59-50-7	2191.00	8764.20	ND	ND
Chrysene	218-01-9	1369.40	5203.70	3200 E	ND
Dibenz(a,h)anthracene	53-70-3	1643.30	6299.20	ND	ND
Dibenzofuran	132-64-9	2191.00	8216.40	ND	ND
Di-n-butylphthalate	84-74-2	1917.20	8216.40	ND	ND
1,2-Dichlorobenzene	95-50-1	2191.00	8490.30	ND	ND
1,3-Dichlorobenzene	541-73-1	1917.20	7668.60	ND	ND
1,4-Dichlorobenzene	106-46-7	1917.20	8216.40	ND	ND
3,3'-Dichlorobenzidine	91-94-1	2464.90	10133.60	ND	ND
2,4-Dichlorophenol	120-83-2	2464.90	9311.90	ND	ND
Diethylphthalate	84-66-2	1643.30	6847.00	ND	ND
2,4-Dimethylphenol	105-67-9	3834.30	14789.50	20000	ND
Dimethylphthalate	131-11-3	1917.20	7942.50	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	1643.30	6847.00	ND	ND
2,4-Dinitrophenol	51-28-5	67374.50	269224.00	ND	ND
2,4-Dinitrotoluene	121-14-2	3834.30	15885.00	ND	ND

E:Estimated, ND: Not detected

MDL: Method Detection Limit

PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-3

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/26/94, 0:01 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 2739
Extract Method: 3550
%Solids: 61.2

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	1917.20	7120.90	ND	ND
Di-n-octylphthalate	117-84-0	3560.40	13967.90	ND	ND
Fluoranthene	206-44-0	1917.20	7394.80	5900 E	ND
Fluorene	7782-41-4	1917.20	8216.40	<MDL	ND
Hexachlorobenzene	118-74-1	1643.30	7120.90	ND	ND
Hexachlorobutadiene	87-68-3	2191.00	9038.00	ND	ND
Hexachlorocyclopentadiene	77-47-4	1643.30	6573.10	ND	ND
Hexachloroethane	67-72-1	1917.20	7668.60	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	1643.30	6299.20	ND	ND
Isophorone	78-59-1	2464.90	9585.80	ND	ND
2-Methylnaphthalene	91-57-6	2738.80	10407.40	<MDL	ND
2-Methylphenol	95-48-7	2464.90	9859.70	ND	ND
3-,4-Methylphenol	106-44-5	1095.50	4108.20	3800 E	ND
Naphthalene	91-57-6	2464.90	9859.70	<MDL	ND
2-Nitroaniline	88-74-4	1643.30	6573.10	ND	ND
3-Nitroaniline	99-09-3	6573.10	26840.20	ND	ND
4-Nitroaniline	100-01-6	2738.80	10681.30	ND	ND
Nitrobenzene	98-95-3	2464.90	9585.80	ND	ND
2-Nitrophenol	88-75-5	1917.20	7942.50	ND	ND
4-Nitrophenol	100-01-6	20267.10	81068.50	ND	ND
N-Nitrosodiphenylamine*	86-30-6	2738.80	10407.40	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	2191.00	2191.00	ND	ND
Pentachlorophenol	87-86-5	1643.30	7120.90	ND	ND
Phenanthrene	85-01-8	1917.20	7120.90	5500 E	ND
Phenol	108-95-2	1095.50	5203.70	ND	ND
Pyrene	129-00-0	1917.20	7942.50	6400 E	ND
1,2,4-Trichlorobenzene	120-82-1	2191.00	9038.00	ND	ND
2,4,5-Trichlorophenol	95-95-4	2191.00	9311.90	ND	ND
2,4,6-Trichlorophenol	88-06-02	2191.00	8216.40	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		DO	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		DO	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		DO	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		DO	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		DO	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		DO	99

E: Estimated, ND: Not detected | *as Diphenylamine | CI: Coeluting Interference
MDL: Method Detection Limit | DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-4

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 23:19 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 906.3
Extract Method: 3550
%Solids: 74.6

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	725.10	2900.30	ND	ND
Acenaphthylene	208-96-8	725.10	2809.70	ND	ND
Anthracene	120-12-7	453.20	1903.30	ND	ND
Benzo(a)anthracene	56-55-3	543.80	2084.60	ND	ND
Benzo(b)fluoranthene	205-99-2	815.70	3172.20	ND	ND
Benzo(k)fluoranthene	207-08-9	815.70	3353.50	ND	ND
Benzoic acid	65-85-0	6888.20	27734.00	ND	ND
Benzo(g,h,i)perylene	191-24-3	453.20	1903.30	ND	ND
Benzo(a)pyrene	193-39-5	453.20	1812.70	ND	ND
Benzyl alcohol	100-51-6	543.80	2265.80	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	906.30	3534.70	ND	ND
bis(2-Chloroethyl)ether	111-44-4	725.10	2719.00	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	1903.30	7522.60	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	815.70	3172.20	ND	ND
4-Bromophenyl-phenylether	101-55-3	634.40	2447.10	ND	ND
Butylbenzylphthalate	85-68-7	725.10	2990.90	ND	ND
4-Chloroaniline	106-47-8	453.20	1812.70	ND	ND
4-Chloro-3-methylphenol	59-50-7	634.40	2537.80	ND	ND
2-Chloronaphthalene	91-58-7	725.10	3081.60	ND	ND
2-Chlorophenol	95-57-8	634.40	2628.40	ND	ND
4-Chlorophenyl-phenylether	59-50-7	725.10	2900.30	ND	ND
Chrysene	218-01-9	453.20	1722.00	ND	ND
Dibenz(a,h)anthracene	53-70-3	543.80	2084.60	ND	ND
Dibenzofuran	132-64-9	725.10	2719.00	ND	ND
Di-n-butylphthalate	84-74-2	634.40	2719.00	ND	ND
1,2-Dichlorobenzene	95-50-1	725.10	2809.70	ND	ND
1,3-Dichlorobenzene	541-73-1	634.40	2537.80	ND	ND
1,4-Dichlorobenzene	106-46-7	634.40	2719.00	ND	ND
3,3'-Dichlorobenzidine	91-94-1	815.70	3353.50	ND	ND
2,4-Dichlorophenol	120-83-2	815.70	3081.60	ND	ND
Diethylphthalate	84-66-2	543.80	2265.80	ND	ND
2,4-Dimethylphenol	105-67-9	1268.90	4894.20	ND	ND
Dimethylphthalate	131-11-3	634.40	2628.40	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	543.80	2265.80	ND	ND
2,4-Dinitrophenol	51-28-5	22296.00	89093.20	ND	ND
2,4-Dinitrotoluene	121-14-2	1268.90	5256.80	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-4

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 23:19 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 906.3
Extract Method: 3550
%Solids: 74.6

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	634.40	2356.50	ND	ND
Di-n-octylphthalate	117-84-0	1178.20	4622.30	ND	ND
Fluoranthene	206-44-0	634.40	2447.10	900 E	ND
Fluorene	7782-41-4	634.40	2719.00	ND	ND
Hexachlorobenzene	118-74-1	543.80	2356.50	ND	ND
Hexachlorobutadiene	87-68-3	725.10	2990.90	ND	ND
Hexachlorocyclopentadiene	77-47-4	543.80	2175.20	ND	ND
Hexachloroethane	67-72-1	634.40	2537.80	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	543.80	2084.60	ND	ND
Isophorone	78-59-1	815.70	3172.20	ND	ND
2-Methylnaphthalene	91-57-6	906.30	3444.10	<MDL	ND
2-Methylphenol	95-48-7	815.70	3262.80	ND	ND
3-,4-Methylphenol	106-44-5	362.50	1359.50	ND	ND
Naphthalene	91-57-6	815.70	3262.80	<MDL	ND
2-Nitroaniline	88-74-4	543.80	2175.20	ND	ND
3-Nitroaniline	99-09-3	2175.20	8882.10	ND	ND
4-Nitroaniline	100-01-6	906.30	3534.70	ND	ND
Nitrobenzene	98-95-3	815.70	3172.20	ND	ND
2-Nitrophenol	88-75-5	634.40	2628.40	ND	ND
4-Nitrophenol	100-01-6	6706.90	26827.70	ND	ND
N-Nitrosodiphenylamine*	86-30-6	906.30	3444.10	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	725.10	725.10	ND	ND
Pentachlorophenol	87-86-5	543.80	2356.50	ND	ND
Phenanthrene	85-01-8	634.40	2356.50	1000 E	ND
Phenol	108-95-2	362.50	1722.00	ND	ND
Pyrene	129-00-0	634.40	2628.40	1200 E	ND
1,2,4-Trichlorobenzene	120-82-1	725.10	2990.90	ND	ND
2,4,5-Trichlorophenol	95-95-4	725.10	3081.60	ND	ND
2,4,6-Trichlorophenol	88-06-02	725.10	2719.00	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		77	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		82	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		67	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		102	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		85	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		142	99

E: Estimated, ND: Not detected — *as Diphenylamine — CI: Coeluting Interference
MDL: Method Detection Limit — DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-5

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 22:37 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 33.60
Extract Method: 3550
%Solids: 99.3

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	26.90	107.50	ND	ND
Acenaphthylene	208-96-8	26.90	104.20	ND	ND
Anthracene	120-12-7	16.80	70.60	ND	ND
Benzo(a)anthracene	56-55-3	20.20	77.30	ND	ND
Benzo(b)fluoranthene	205-99-2	30.20	117.60	ND	ND
Benzo(k)fluoranthene	207-08-9	30.20	124.30	ND	ND
Benzoic acid	65-85-0	255.40	1028.20	ND	ND
Benzo(g,h,i)perylene	191-24-3	16.80	70.60	ND	ND
Benzo(a)pyrene	193-39-5	16.80	67.20	ND	ND
Benzyl alcohol	100-51-6	20.20	84.00	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	33.60	131.00	ND	ND
bis(2-Chloroethyl)ether	111-44-4	26.90	100.80	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	70.60	278.90	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	30.20	117.60	ND	ND
4-Bromophenyl-phenylether	101-55-3	23.50	90.70	ND	ND
Butylbenzylphthalate	85-68-7	26.90	110.90	ND	ND
4-Chloroaniline	106-47-8	16.80	67.20	ND	ND
4-Chloro-3-methylphenol	59-50-7	23.50	94.10	ND	ND
2-Chloronaphthalene	91-58-7	26.90	114.20	ND	ND
2-Chlorophenol	95-57-8	23.50	97.40	ND	ND
4-Chlorophenyl-phenylether	59-50-7	26.90	107.50	ND	ND
Chrysene	218-01-9	16.80	63.80	ND	ND
Dibenz(a,h)anthracene	53-70-3	20.20	77.30	ND	ND
Dibenzofuran	132-64-9	26.90	100.80	ND	ND
Di-n-butylphthalate	84-74-2	23.50	100.80	ND	ND
1,2-Dichlorobenzene	95-50-1	26.90	104.20	ND	ND
1,3-Dichlorobenzene	541-73-1	23.50	94.10	ND	ND
1,4-Dichlorobenzene	106-46-7	23.50	100.80	ND	ND
3,3'-Dichlorobenzidine	91-94-1	30.20	124.30	ND	ND
2,4-Dichlorophenol	120-83-2	30.20	114.20	ND	ND
Diethylphthalate	84-66-2	20.20	84.00	ND	ND
2,4-Dimethylphenol	105-67-9	47.00	181.50	ND	ND
Dimethylphthalate	131-11-3	23.50	97.40	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	20.20	84.00	ND	ND
2,4-Dinitrophenol	51-28-5	826.60	3303.10	ND	ND
2,4-Dinitrotoluene	121-14-2	47.00	194.90	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-5

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 22:37 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 33.60
Extract Method: 3550
%Solids: 99.3

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	23.50	87.40	ND	ND
Di-n-octylphthalate	117-84-0	43.70	171.40	ND	ND
Fluoranthene	206-44-0	23.50	90.70	ND	ND
Fluorene	7782-41-4	23.50	100.80	ND	ND
Hexachlorobenzene	118-74-1	20.20	87.40	ND	ND
Hexachlorobutadiene	87-68-3	26.90	110.90	ND	ND
Hexachlorocyclopentadiene	77-47-4	20.20	80.60	ND	ND
Hexachloroethane	67-72-1	23.50	94.10	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	20.20	77.30	ND	ND
Isophorone	78-59-1	30.20	117.60	ND	ND
2-Methylnaphthalene	91-57-6	33.60	127.70	ND	ND
2-Methylphenol	95-48-7	30.20	121.00	ND	ND
3-,4-Methylphenol	106-44-5	13.40	50.40	ND	ND
Naphthalene	91-57-6	30.20	121.00	ND	ND
2-Nitroaniline	88-74-4	20.20	80.60	ND	ND
3-Nitroaniline	99-09-3	80.60	329.30	ND	ND
4-Nitroaniline	100-01-6	33.60	131.00	ND	ND
Nitrobenzene	98-95-3	30.20	117.60	ND	ND
2-Nitrophenol	88-75-5	23.50	97.40	ND	ND
4-Nitrophenol	100-01-6	248.70	994.60	ND	ND
N-Nitrosodiphenylamine*	86-30-6	33.60	127.70	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	26.90	26.90	ND	ND
Pentachlorophenol	87-86-5	20.20	87.40	ND	ND
Phenanthrene	85-01-8	23.50	87.40	ND	ND
Phenol	108-95-2	13.40	63.80	ND	ND
Pyrene	129-00-0	23.50	97.40	ND	ND
1,2,4-Trichlorobenzene	120-82-1	26.90	110.90	ND	ND
2,4,5-Trichlorophenol	95-95-4	26.90	114.20	ND	ND
2,4,6-Trichlorophenol	88-06-02	26.90	100.80	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		46	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		48	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		47	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		48	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		59	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		74	99

E: Estimated, ND: Not detected | *as Diphenylamine | CI: Coeluting Interference
MDL: Method Detection Limit | DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-6

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 21:55 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 33.02
Extract Method: 3550
%Solids: 99.9

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	26.40	105.60	ND	ND
Acenaphthylene	208-96-8	26.40	102.30	ND	ND
Anthracene	120-12-7	16.50	69.30	ND	ND
Benzo(a)anthracene	56-55-3	19.80	75.90	ND	ND
Benzo(b)fluoranthene	205-99-2	29.70	115.60	ND	ND
Benzo(k)fluoranthene	207-08-9	29.70	122.20	ND	ND
Benzoic acid	65-85-0	250.90	1010.30	ND	ND
Benzo(g,h,i)perylene	191-24-3	16.50	69.30	ND	ND
Benzo(a)pyrene	193-39-5	16.50	66.00	ND	ND
Benzyl alcohol	100-51-6	19.80	82.50	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	33.00	128.80	ND	ND
bis(2-Chloroethyl)ether	111-44-4	26.40	99.00	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	69.30	274.00	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	29.70	115.60	ND	ND
4-Bromophenyl-phenylether	101-55-3	23.10	89.10	ND	ND
Butylbenzylphthalate	85-68-7	26.40	108.90	ND	ND
4-Chloroaniline	106-47-8	16.50	66.00	ND	ND
4-Chloro-3-methylphenol	59-50-7	23.10	92.40	ND	ND
2-Chloronaphthalene	91-58-7	26.40	112.30	ND	ND
2-Chlorophenol	95-57-8	23.10	95.70	ND	ND
4-Chlorophenyl-phenylether	59-50-7	26.40	105.60	ND	ND
Chrysene	218-01-9	16.50	62.70	ND	ND
Dibenz(a,h)anthracene	53-70-3	19.80	75.90	ND	ND
Dibenzofuran	132-64-9	26.40	99.00	ND	ND
Di-n-butylphthalate	84-74-2	23.10	99.00	<MDL	ND
1,2-Dichlorobenzene	95-50-1	26.40	102.30	ND	ND
1,3-Dichlorobenzene	541-73-1	23.10	92.40	ND	ND
1,4-Dichlorobenzene	106-46-7	23.10	99.00	ND	ND
3,3'-Dichlorobenzidine	91-94-1	29.70	122.20	ND	ND
2,4-Dichlorophenol	120-83-2	29.70	112.30	ND	ND
Diethylphthalate	84-66-2	19.80	82.50	ND	ND
2,4-Dimethylphenol	105-67-9	46.20	178.30	ND	ND
Dimethylphthalate	131-11-3	23.10	95.70	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	19.80	82.50	ND	ND
2,4-Dinitrophenol	51-28-5	812.20	3245.40	ND	ND
2,4-Dinitrotoluene	121-14-2	46.20	191.50	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-6

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 21:55 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 33.02
Extract Method: 3550
%Solids: 99.9

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	23.10	85.80	ND	ND
Di-n-octylphthalate	117-84-0	42.90	168.40	ND	ND
Fluoranthene	206-44-0	23.10	89.10	ND	ND
Fluorene	7782-41-4	23.10	99.00	ND	ND
Hexachlorobenzene	118-74-1	19.80	85.80	ND	ND
Hexachlorobutadiene	87-68-3	26.40	108.90	ND	ND
Hexachlorocyclopentadiene	77-47-4	19.80	79.20	ND	ND
Hexachloroethane	67-72-1	23.10	92.40	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	19.80	75.90	ND	ND
Isophorone	78-59-1	29.70	115.60	ND	ND
2-Methylnaphthalene	91-57-6	33.00	125.50	ND	ND
2-Methylphenol	95-48-7	29.70	118.90	ND	ND
3-,4-Methylphenol	106-44-5	13.20	49.50	ND	ND
Naphthalene	91-57-6	29.70	118.90	ND	ND
2-Nitroaniline	88-74-4	19.80	79.20	ND	ND
3-Nitroaniline	99-09-3	79.20	323.50	ND	ND
4-Nitroaniline	100-01-6	33.00	128.80	ND	ND
Nitrobenzene	98-95-3	29.70	115.60	ND	ND
2-Nitrophenol	88-75-5	23.10	95.70	ND	ND
4-Nitrophenol	100-01-6	244.30	977.20	ND	ND
N-Nitrosodiphenylamine*	86-30-6	33.00	125.50	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	26.40	26.40	ND	ND
Pentachlorophenol	87-86-5	19.80	85.80	ND	ND
Phenanthrene	85-01-8	23.10	85.80	ND	ND
Phenol	108-95-2	13.20	62.70	ND	ND
Pyrene	129-00-0	23.10	95.70	ND	ND
1,2,4-Trichlorobenzene	120-82-1	26.40	108.90	ND	ND
2,4,5-Trichlorophenol	95-95-4	26.40	112.30	ND	ND
2,4,6-Trichlorophenol	88-06-02	26.40	99.00	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		55	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		56	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		57	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		56	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		66	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		91	99

E: Estimated, ND: Not detected | *as Diphenylamine | CI: Coeluting Interference
MDL: Method Detection Limit | DO: Diluted Out
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-7

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 19:50 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 33.07
Extract Method: 3550
%Solids: 99.5

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	26.50	105.80	ND	ND
Acenaphthylene	208-96-8	26.50	102.50	ND	ND
Anthracene	120-12-7	16.50	69.40	ND	ND
Benzo(a)anthracene	56-55-3	19.80	76.10	ND	ND
Benzo(b)fluoranthene	205-99-2	29.80	115.70	ND	ND
Benzo(k)fluoranthene	207-08-9	29.80	122.40	ND	ND
Benzoic acid	65-85-0	251.30	1012.00	ND	ND
Benzo(g,h,i)perylene	191-24-3	16.50	69.40	ND	ND
Benzo(a)pyrene	193-39-5	16.50	66.10	ND	ND
Benzyl alcohol	100-51-6	19.80	82.70	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	33.10	129.00	ND	ND
bis(2-Chloroethyl)ether	111-44-4	26.50	99.20	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	69.40	274.50	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	29.80	115.70	ND	ND
4-Bromophenyl-phenylether	101-55-3	23.10	89.30	ND	ND
Butylbenzylphthalate	85-68-7	26.50	109.10	ND	ND
4-Chloroaniline	106-47-8	16.50	66.10	ND	ND
4-Chloro-3-methylphenol	59-50-7	23.10	92.60	ND	ND
2-Chloronaphthalene	91-58-7	26.50	112.40	ND	ND
2-Chlorophenol	95-57-8	23.10	95.90	ND	ND
4-Chlorophenyl-phenylether	59-50-7	26.50	105.80	ND	ND
Chrysene	218-01-9	16.50	62.80	ND	ND
Dibenz(a,h)anthracene	53-70-3	19.80	76.10	ND	ND
Dibenzofuran	132-64-9	26.50	99.20	ND	ND
Di-n-butylphthalate	84-74-2	23.10	99.20	<MDL	ND
1,2-Dichlorobenzene	95-50-1	26.50	102.50	ND	ND
1,3-Dichlorobenzene	541-73-1	23.10	92.60	ND	ND
1,4-Dichlorobenzene	106-46-7	23.10	99.20	ND	ND
3,3'-Dichlorobenzidine	91-94-1	29.80	122.40	ND	ND
2,4-Dichlorophenol	120-83-2	29.80	112.40	ND	ND
Diethylphthalate	84-66-2	19.80	82.70	ND	ND
2,4-Dimethylphenol	105-67-9	46.30	178.60	ND	ND
Dimethylphthalate	131-11-3	23.10	95.90	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	19.80	82.70	ND	ND
2,4-Dinitrophenol	51-28-5	813.50	3250.90	ND	ND
2,4-Dinitrotoluene	121-14-2	46.30	191.80	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 404039-7

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 19:50 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 33.07
Extract Method: 3550
%Solids: 99.5

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	23.10	86.00	ND	ND
Di-n-octylphthalate	117-84-0	43.00	168.70	ND	ND
Fluoranthene	206-44-0	23.10	89.30	ND	ND
Fluorene	7782-41-4	23.10	99.20	ND	ND
Hexachlorobenzene	118-74-1	19.80	86.00	ND	ND
Hexachlorobutadiene	87-68-3	26.50	109.10	ND	ND
Hexachlorocyclopentadiene	77-47-4	19.80	79.40	ND	ND
Hexachloroethane	67-72-1	23.10	92.60	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	19.80	76.10	ND	ND
Isophorone	78-59-1	29.80	115.70	ND	ND
2-Methylnaphthalene	91-57-6	33.10	125.70	ND	ND
2-Methylphenol	95-48-7	29.80	119.10	ND	ND
3-,4-Methylphenol	106-44-5	13.20	49.60	ND	ND
Naphthalene	91-57-6	29.80	119.10	ND	ND
2-Nitroaniline	88-74-4	19.80	79.40	ND	ND
3-Nitroaniline	99-09-3	79.40	324.10	ND	ND
4-Nitroaniline	100-01-6	33.10	129.00	ND	ND
Nitrobenzene	98-95-3	29.80	115.70	ND	ND
2-Nitrophenol	88-75-5	23.10	95.90	ND	ND
4-Nitrophenol	100-01-6	244.70	978.90	ND	ND
N-Nitrosodiphenylamine*	86-30-6	33.10	125.70	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	26.50	26.50	ND	ND
Pentachlorophenol	87-86-5	19.80	86.00	ND	ND
Phenanthrene	85-01-8	23.10	86.00	ND	ND
Phenol	108-95-2	13.20	62.80	ND	ND
Pyrene	129-00-0	23.10	95.90	ND	ND
1,2,4-Trichlorobenzene	120-82-1	26.50	109.10	ND	ND
2,4,5-Trichlorophenol	95-95-4	26.50	112.40	ND	ND
2,4,6-Trichlorophenol	88-06-02	26.50	99.20	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		71	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		73	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		69	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		67	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		69	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		89	99

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

*as Diphenylamine
DO: Diluted Out

CI: Coeluting Interference

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 404039-8

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 19:08 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 32.29
Extract Method: 3550
%Solids: 99.7

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	25.80	103.30	ND	ND
Acenaphthylene	208-96-8	25.80	100.10	ND	ND
Anthracene	120-12-7	16.10	67.80	ND	ND
Benzo(a)anthracene	56-55-3	19.40	74.30	ND	ND
Benzo(b)fluoranthene	205-99-2	29.10	113.00	ND	ND
Benzo(k)fluoranthene	207-08-9	29.10	119.50	ND	ND
Benzoic acid	65-85-0	245.40	988.00	ND	ND
Benzo(g,h,i)perylene	191-24-3	16.10	67.80	ND	ND
Benzo(a)pyrene	193-39-5	16.10	64.60	ND	ND
Benzyl alcohol	100-51-6	19.40	80.70	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	32.30	125.90	ND	ND
bis(2-Chloroethyl)ether	111-44-4	25.80	96.90	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	67.80	268.00	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	29.10	113.00	<MDL	ND
4-Bromophenyl-phenylether	101-55-3	22.60	87.20	ND	ND
Butylbenzylphthalate	85-68-7	25.80	106.60	ND	ND
4-Chloroaniline	106-47-8	16.10	64.60	ND	ND
4-Chloro-3-methylphenol	59-50-7	22.60	90.40	ND	ND
2-Chloronaphthalene	91-58-7	25.80	109.80	ND	ND
2-Chlorophenol	95-57-8	22.60	93.60	ND	ND
4-Chlorophenyl-phenylether	59-50-7	25.80	103.30	ND	ND
Chrysene	218-01-9	16.10	61.30	ND	ND
Dibenz(a,h)anthracene	53-70-3	19.40	74.30	ND	ND
Dibenzofuran	132-64-9	25.80	96.90	<MDL	ND
Di-n-butylphthalate	84-74-2	22.60	96.90	<MDL	ND
1,2-Dichlorobenzene	95-50-1	25.80	100.10	27 E	ND
1,3-Dichlorobenzene	541-73-1	22.60	90.40	ND	ND
1,4-Dichlorobenzene	106-46-7	22.60	96.90	ND	ND
3,3'-Dichlorobenzidine	91-94-1	29.10	119.50	ND	ND
2,4-Dichlorophenol	120-83-2	29.10	109.80	ND	ND
Diethylphthalate	84-66-2	19.40	80.70	ND	ND
2,4-Dimethylphenol	105-67-9	45.20	174.40	ND	ND
Dimethylphthalate	131-11-3	22.60	93.60	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	19.40	80.70	ND	ND
2,4-Dinitrophenol	51-28-5	794.30	3174.00	ND	ND
2,4-Dinitrotoluene	121-14-2	45.20	187.30	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services

GC/MS SVO RESULTS

LAB SAMPLE # 404039-8

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 19:08 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 32.29
Extract Method: 3550
%Solids: 99.7

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	22.60	84.00	ND	ND
Di-n-octylphthalate	117-84-0	42.00	164.70	ND	ND
Fluoranthene	206-44-0	22.60	87.20	ND	ND
Fluorene	7782-41-4	22.60	96.90	ND	ND
Hexachlorobenzene	118-74-1	19.40	84.00	ND	ND
Hexachlorobutadiene	87-68-3	25.80	106.60	ND	ND
Hexachlorocyclopentadiene	77-47-4	19.40	77.50	ND	ND
Hexachloroethane	67-72-1	22.60	90.40	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	19.40	74.30	ND	ND
Isophorone	78-59-1	29.10	113.00	ND	ND
2-Methylnaphthalene	91-57-6	32.30	122.70	ND	ND
2-Methylphenol	95-48-7	29.10	116.20	ND	ND
3-,4-Methylphenol	106-44-5	12.90	48.40	ND	ND
Naphthalene	91-57-6	29.10	116.20	<MDL	ND
2-Nitroaniline	88-74-4	19.40	77.50	ND	ND
3-Nitroaniline	99-09-3	77.50	316.40	ND	ND
4-Nitroaniline	100-01-6	32.30	125.90	ND	ND
Nitrobenzene	98-95-3	29.10	113.00	ND	ND
2-Nitrophenol	88-75-5	22.60	93.60	ND	ND
4-Nitrophenol	100-01-6	238.90	955.80	ND	ND
N-Nitrosodiphenylamine*	86-30-6	32.30	122.70	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	25.80	25.80	ND	ND
Pentachlorophenol	87-86-5	19.40	84.00	ND	ND
Phenanthrene	85-01-8	22.60	84.00	ND	ND
Phenol	108-95-2	12.90	61.30	ND	ND
Pyrene	129-00-0	22.60	93.60	ND	ND
1,2,4-Trichlorobenzene	120-82-1	25.80	106.60	ND	ND
2,4,5-Trichlorophenol	95-95-4	25.80	109.80	ND	ND
2,4,6-Trichlorophenol	88-06-02	25.80	96.90	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		61	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		62	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		63	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		62	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		75	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		74	99

E: Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit
*as Diphenylamine
DO: Diluted Out
CI: Coeluting Interference

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-9

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6 FT-B60 DUP

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 18:26 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 32.87
Extract Method: 3550
%Solids: 100.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
Acenaphthene	83-32-9	26.30	105.20	ND	ND
Acenaphthylene	208-96-8	26.30	101.90	ND	ND
Anthracene	120-12-7	16.40	69.00	ND	ND
Benzo(a)anthracene	56-55-3	19.70	75.60	ND	ND
Benzo(b)fluoranthene	205-99-2	29.60	115.10	ND	ND
Benzo(k)fluoranthene	207-08-9	29.60	121.60	ND	ND
Benzoic acid	65-85-0	249.80	1005.90	ND	ND
Benzo(g,h,i)perylene	191-24-3	16.40	69.00	ND	ND
Benzo(a)pyrene	193-39-5	16.40	65.70	ND	ND
Benzyl alcohol	100-51-6	19.70	82.20	ND	ND
bis(2-Chloroethoxy)methane	111-91--1	32.90	128.20	ND	ND
bis(2-Chloroethyl)ether	111-44-4	26.30	98.60	ND	ND
bis(2-Chloroisopropyl)ether	108-60-1	69.00	272.80	ND	ND
bis(2-Ethylhexyl)phthalate	117-81-7	29.60	115.10	800	ND
4-Bromophenyl-phenylether	101-55-3	23.00	88.80	ND	ND
Butylbenzylphthalate	85-68-7	26.30	108.50	ND	ND
4-Chloroaniline	106-47-8	16.40	65.70	ND	ND
4-Chloro-3-methylphenol	59-50-7	23.00	92.00	ND	ND
2-Chloronaphthalene	91-58-7	26.30	111.80	ND	ND
2-Chlorophenol	95-57-8	23.00	95.30	ND	ND
4-Chlorophenyl-phenylether	59-50-7	26.30	105.20	ND	ND
Chrysene	218-01-9	16.40	62.50	ND	ND
Dibenz(a,h)anthracene	53-70-3	19.70	75.60	ND	ND
Dibenzofuran	132-64-9	26.30	98.60	ND	ND
Di-n-butylphthalate	84-74-2	23.00	98.60	<MDL	ND
1,2-Dichlorobenzene	95-50-1	26.30	101.90	ND	ND
1,3-Dichlorobenzene	541-73-1	23.00	92.00	ND	ND
1,4-Dichlorobenzene	106-46-7	23.00	98.60	ND	ND
3,3'-Dichlorobenzidine	91-94-1	29.60	121.60	ND	ND
2,4-Dichlorophenol	120-83-2	29.60	111.80	ND	ND
Diethylphthalate	84-66-2	19.70	82.20	ND	ND
2,4-Dimethylphenol	105-67-9	46.00	177.50	ND	ND
Dimethylphthalate	131-11-3	23.00	95.30	ND	ND
4,6-Dinitro-2-methylphenol	534-52-1	19.70	82.20	ND	ND
2,4-Dinitrophenol	51-28-5	808.70	3231.40	ND	ND
2,4-Dinitrotoluene	121-14-2	46.00	190.70	ND	ND

E:Estimated, ND: Not detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

Kiber Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-9

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6 FT-B60 DUP

SAMPLED (Date/Time/Init): 4/18/94, JD
ANALYSIS (Date/Time/Init): 4/25/94, 18:26 , TAG
EXTRACTION (Date/Init): 4/21/94, JG

DATE REPORTED: 4/28/94

Dilution Factor: 32.87
Extract Method: 3550
%Solids: 100.0

Sample Matrix: SOLID
Analysis Method: 8270

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis ug/Kg Concentration	Apparent ug/Kg Blank Conc.
2,6-Dinitrotoluene	606-20-2	23.00	85.50	ND	ND
Di-n-octylphthalate	117-84-0	42.70	167.70	ND	ND
Fluoranthene	206-44-0	23.00	88.80	ND	ND
Fluorene	7782-41-4	23.00	98.60	ND	ND
Hexachlorobenzene	118-74-1	19.70	85.50	ND	ND
Hexachlorobutadiene	87-68-3	26.30	108.50	ND	ND
Hexachlorocyclopentadiene	77-47-4	19.70	78.90	ND	ND
Hexachloroethane	67-72-1	23.00	92.00	ND	ND
Indeno(1,2,3-cd)pyrene	193-39-5	19.70	75.60	ND	ND
Isophorone	78-59-1	29.60	115.10	ND	ND
2-Methylnaphthalene	91-57-6	32.90	124.90	ND	ND
2-Methylphenol	95-48-7	29.60	118.30	ND	ND
3-,4-Methylphenol	106-44-5	13.10	49.30	ND	ND
Naphthalene	91-57-6	29.60	118.30	ND	ND
2-Nitroaniline	88-74-4	19.70	78.90	ND	ND
3-Nitroaniline	99-09-3	78.90	322.20	ND	ND
4-Nitroaniline	100-01-6	32.90	128.20	ND	ND
Nitrobenzene	98-95-3	29.60	115.10	ND	ND
2-Nitrophenol	88-75-5	23.00	95.30	ND	ND
4-Nitrophenol	100-01-6	243.30	973.00	ND	ND
N-Nitrosodiphenylamine*	86-30-6	32.90	124.90	ND	ND
N-Nitroso-di-n-propylamine	621-64-7	26.30	26.30	ND	ND
Pentachlorophenol	87-86-5	19.70	85.50	ND	ND
Phenanthrene	85-01-8	23.00	85.50	ND	ND
Phenol	108-95-2	13.10	62.50	ND	ND
Pyrene	129-00-0	23.00	95.30	ND	ND
1,2,4-Trichlorobenzene	120-82-1	26.30	108.50	ND	ND
2,4,5-Trichlorophenol	95-95-4	26.30	111.80	ND	ND
2,4,6-Trichlorophenol	88-06-02	26.30	98.60	ND	ND
2-Fluorophenol (surrogate std)	%Recovery	[OK=25-121]		67	56
Phenol-d6 (surrogate std)	%Recovery	[OK=24-113]		70	60
Nitrobenzene-d5 (surrogate std)	%Recovery	[OK=23-120]		65	60
2-Fluorobiphenyl (surrogate std)	%Recovery	[OK=30-115]		65	62
2,4,6-Tribromophenol (surrogate std)	%Recovery	[OK=19-122]		78	73
Terphenyl-d14 (surrogate std)	%Recovery	[OK=18-137]		87	99

E: Estimated, ND: Not detected | *as Diphenylamine | CI: Coeluting Interference
MDL: Method Detection Limit | DO: Diluted Out
PQL: Practical Quantitation Limit

KIBER Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-EBS

EXTRACTION (Date/Init): 4/21/94, JG
ANALYSIS (Date/Time/Init): 4/25/94, 16:11, TAG

DATE REPORTED: 4/27/94

Analysis Method: 8270

BLANK SPIKE	CAS Number	QC LIMITS % Recovery	Actual BS % Recovery
Phenol	108-95-2	29-90	50
2-Chlorophenol	95-57-8	25-102	58
1,4-Dichlorobenzene	106-46-7	28-104	59
N-Nitroso-di-n-propylamine	621-64-7	41-126	73
1,2,4-Trichlorobenzene	120-82-1	38-107	63
4-Chloro-3-methylphenol	59-50-7	26-103	51
Acenaphthene	83-32-9	31-137	62
4-Nitrophenol	100-02-7	11-114	70
2,4-Dinitrotoluene	121-14-2	28-89	70
Pentachlorophenol	87-86-5	17-109	73
Pyrene	129-00-0	35-142	74
2-Fluorophenol	% Recovery	[OK=25-121]	58
Phenol-d6	% Recovery	[OK=24-113]	58
Nitrobenzene-d5	% Recovery	[OK=23-120]	61
2-Fluorobiphenyl	% Recovery	[OK=30-115]	59
2,4,6-Tribromophenol	% Recovery	[OK=19-122]	73
Terphenyl-d14	% Recovery	[OK=18-137]	71

KIBER Environmental Services | GC/MS SVO RESULTS | LAB SAMPLE # 404039-7MS

RAYMARK INDUSTRIES
SAMPLE #: TS*B-7*4-6 FT-B60

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/21/94, JG
ANALYSIS (Date/Time/Init): 4/25/94, 20:31, TAG

Sample Matrix: SOLID
Analysis Method: 8270

DATE REPORTED: 4/27/94

MATRIX SPIKE	CAS Number	QC LIMITS % Recovery	Actual MS % Recovery
Phenol	108-95-2	29-90	60
2-Chlorophenol	95-57-8	25-102	65
1,4-Dichlorobenzene	106-46-7	28-104	72
N-Nitroso-di-n-propylamine	621-64-7	41-126	73
1,2,4-Trichlorobenzene	120-82-1	38-107	64
4-Chloro-3-methylphenol	59-50-7	26-103	71
Acenaphthene	83-32-9	31-137	70
4-Nitrophenol	100-02-7	11-114	67
2,4-Dinitrotoluene	121-14-2	28-89	70
Pentachlorophenol	87-86-5	17-109	60
Pyrene	129-00-0	35-142	84
2-Fluorophenol	% Recovery	[OK=25-121]	68
Phenol-d6	% Recovery	[OK=24-113]	66
Nitrobenzene-d5	% Recovery	[OK=23-120]	64
2-Fluorobiphenyl	% Recovery	[OK=30-115]	66
2,4,6-Tribromophenol	% Recovery	[OK=19-122]	74
Terphenyl-d14	% Recovery	[OK=18-137]	78

ANALYSIS (Date/Time/Init): 4/25/94, 21:13, TAG

MATRIX SPIKE DUPLICATE	CAS Number	QC LIMITS % Recovery	Actual MSD % Recovery	%RPD
Phenol	108-95-2	29-90	57	6
2-Chlorophenol	95-57-8	25-102	69	5
1,4-Dichlorobenzene	106-46-7	28-104	78	7
N-Nitroso-di-n-propylamine	621-64-7	41-126	83	12
1,2,4-Trichlorobenzene	120-82-1	38-107	68	6
4-Chloro-3-methylphenol	59-50-7	26-103	75	6
Acenaphthene	83-32-9	31-137	79	12
4-Nitrophenol	100-02-7	11-114	78	15
2,4-Dinitrotoluene	121-14-2	28-89	81	14
Pentachlorophenol	87-86-5	17-109	66	10
Pyrene	129-00-0	35-142	79	6
2-Fluorophenol	% Recovery	[OK=25-121]	72	
Phenol-d6	% Recovery	[OK=24-113]	70	
Nitrobenzene-d5	% Recovery	[OK=23-120]	68	
2-Fluorobiphenyl	% Recovery	[OK=30-115]	67	
2,4,6-Tribromophenol	% Recovery	[OK=19-122]	78	
Terphenyl-d14	% Recovery	[OK=18-137]	94	

CI: Coeluting Interference

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-1
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/21/94, 20:40, DLL

DATE REPORTED: 4/25/94

Quant Factor: 34.0 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 96.0

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	3404	ND	ND
Aroclor-1221	11104-28-2	6808	ND	ND
Aroclor-1232	11141-16-5	3404	ND	ND
Aroclor-1242	53469-21-9	3404	ND	ND
Aroclor-1248	12672-29-6	3404	ND	ND
Aroclor-1254	11097-69-1	3404	ND	ND
Aroclor-1260	11096-82-5	3404	ND	ND
Aroclor-1262	37324-23-5	3404	18,000E	ND
Aroclor-1268	11100-14-4	3404	10,000E	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	DO	119

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-2
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/21/94, 21:32, DLL

DATE REPORTED: 4/25/94

Quant Factor: 75.9 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 86.7

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	7586	ND	ND
Aroclor-1221	11104-28-2	15171	ND	ND
Aroclor-1232	11141-16-5	7586	ND	ND
Aroclor-1242	53469-21-9	7586	ND	ND
Aroclor-1248	12672-29-6	7586	ND	ND
Aroclor-1254	11097-69-1	7586	ND	ND
Aroclor-1260	11096-82-5	7586	ND	ND
Aroclor-1262	37324-23-5	7586	36,000E	ND
Aroclor-1268	11100-14-4	7586	23,000E	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	DO	119

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-3
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/21/94, 22:24, DLL

DATE REPORTED: 4/25/94

Quant Factor: 53.6 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 61.2

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	5361	ND	ND
Aroclor-1221	11104-28-2	10722	ND	ND
Aroclor-1232	11141-16-5	5361	ND	ND
Aroclor-1242	53469-21-9	5361	ND	ND
Aroclor-1248	12672-29-6	5361	ND	ND
Aroclor-1254	11097-69-1	5361	ND	ND
Aroclor-1260	11096-82-5	5361	ND	ND
Aroclor-1262	37324-23-5	5361	13,000E	ND
Aroclor-1268	11100-14-4	5361	8,600E	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	DO	119

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-4
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/21/94, 23:16, DLL

DATE REPORTED: 4/25/94

Quant Factor: 223.3 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 74.6

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	22326	ND	ND
Aroclor-1221	11104-28-2	44653	ND	ND
Aroclor-1232	11141-16-5	22326	ND	ND
Aroclor-1242	53469-21-9	22326	ND	ND
Aroclor-1248	12672-29-6	22326	ND	ND
Aroclor-1254	11097-69-1	22326	ND	ND
Aroclor-1260	11096-82-5	22326	ND	ND
Aroclor-1262	37324-23-5	22326	77,000E	ND
Aroclor-1268	11100-14-4	22326	47,000E	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	DO	119

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-5
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-10*1.5-4, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 00:08, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.3

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33.0	ND	ND
Aroclor-1221	11104-28-2	66.1	ND	ND
Aroclor-1232	11141-16-5	33.0	ND	ND
Aroclor-1242	53469-21-9	33.0	ND	ND
Aroclor-1248	12672-29-6	33.0	ND	ND
Aroclor-1254	11097-69-1	33.0	ND	ND
Aroclor-1260	11096-82-5	33.0	ND	ND
Aroclor-1262	37324-23-5	33.0	ND	ND
Aroclor-1268	11100-14-4	33.0	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	118	119

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-6
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*2-4, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 01:01, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.9

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	32.7	ND	ND
Aroclor-1221	11104-28-2	65.4	ND	ND
Aroclor-1232	11141-16-5	32.7	ND	ND
Aroclor-1242	53469-21-9	32.7	ND	ND
Aroclor-1248	12672-29-6	32.7	ND	ND
Aroclor-1254	11097-69-1	32.7	ND	ND
Aroclor-1260	11096-82-5	32.7	ND	ND
Aroclor-1262	37324-23-5	32.7	ND	ND
Aroclor-1268	11100-14-4	32.7	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	122	119

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-7
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date /.Init) : 4/22/94, KK
ANALYSIS (Date/Time/Init): 4/22/94, 17:52, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.5

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33.0	ND	ND
Aroclor-1221	11104-28-2	66.1	ND	ND
Aroclor-1232	11141-16-5	33.0	ND	ND
Aroclor-1242	53469-21-9	33.0	ND	ND
Aroclor-1248	12672-29-6	33.0	ND	ND
Aroclor-1254	11097-69-1	33.0	ND	ND
Aroclor-1260	11096-82-5	33.0	ND	ND
Aroclor-1262	37324-23-5	33.0	ND	ND
Aroclor-1268	11100-14-4	33.0	ND	ND

Tetrachloro-m-xylene (surrogate std)	% Recovery [OK = 60-150]	133	128

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-8
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-68*6-8, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 02:44, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 99.7

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33.2	ND	ND
Aroclor-1221	11104-28-2	66.3	ND	ND
Aroclor-1232	11141-16-5	33.2	ND	ND
Aroclor-1242	53469-21-9	33.2	ND	ND
Aroclor-1248	12672-29-6	33.2	ND	ND
Aroclor-1254	11097-69-1	33.2	ND	ND
Aroclor-1260	11096-82-5	33.2	ND	ND
Aroclor-1262	37324-23-5	33.2	<MDL	ND
Aroclor-1268	11100-14-4	33.2	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	127	119

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-9
PROJECT # 854

GC/ECD-PCB RESULTS

SAMPLE # TS*B-7*4-6, FT-B60, DUP
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTED (Date / Init) : 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 07:03, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33 Sample Matrix: SOLID
Extract Method: 3550 Analysis Method: 8080
% Solid: 100

TARGET COMPOUND LIST	CAS Number	MDL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aroclor-1016	12674-11-2	33.0	ND	ND
Aroclor-1221	11104-28-2	66.0	ND	ND
Aroclor-1232	11141-16-5	33.0	ND	ND
Aroclor-1242	53469-21-9	33.0	ND	ND
Aroclor-1248	12672-29-6	33.0	ND	ND
Aroclor-1254	11097-69-1	33.0	ND	ND
Aroclor-1260	11096-82-5	33.0	ND	ND
Aroclor-1262	37324-23-5	33.0	ND	ND
Aroclor-1268	11100-14-4	33.0	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	119	119

E: Estimated , ND: Not Detected
MDL: Method Detection Limit

KIBER Environmental Services

LAB SAMPLE # 404039-1
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-10*1.5-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 17:10, DLL

DATE REPORTED: 4/25/94

Quant Factor: 34.0
Extract Method: 3550
% Solids: 96.0

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	681	2,723	ND	ND
alpha-BHC	319-84-6	681	2,723	ND	ND
beta-BHC	319-85-7	681	2,723	ND	ND
gamma-BHC (Lindane)	58-89-9	681	2,723	ND	ND
delta-BHC	319-86-8	681	2,723	ND	ND
alpha-Chlordane	5103-71-9	681	2,723	ND	ND
gamma-Chlordane	5103-74-2	681	2,723	ND	ND
4,4'-DDD	72-54-8	1,362	5,447	ND	ND
4,4'-DDE	72-55-9	1,362	5,447	ND	ND
4,4'-DDT	50-29-3	1,362	5,447	ND	ND
Dieldrin	60-57-1	1,362	5,447	ND	ND
Endosulfan I	959-98-8	681	2,723	ND	ND
Endosulfan II	33213-65-9	1,362	5,447	ND	ND
Endosulfan sulfate	1031-07-8	1,362	5,447	ND	ND
Endrin	72-20-8	1,362	5,447	ND	ND
Endrin aldehyde	7421-93-4	1,362	5,447	ND	ND
Endrin ketone	53494-70-5	1,362	5,447	ND	ND
Heptachlor	76-44-8	681	2,723	ND	ND
Heptachlor epoxide	1024-57-3	681	2,723	ND	ND
Methoxychlor	72-43-5	6,808	27,233	ND	ND
Toxaphene	8001-35-2	34,041	136,166	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery	[OK = 60-150]	DO	98

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-2
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-68*2-4
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 17:48, DLL

DATE REPORTED: 4/25/94

Quant Factor: 75.9
Extract Method: 3550
% Solids: 86.7

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	1,517	6,069	ND	ND
alpha-BHC	319-84-6	1,517	6,069	ND	ND
beta-BHC	319-85-7	1,517	6,069	ND	ND
gamma-BHC (Lindane)	58-89-9	1,517	6,069	ND	ND
delta-BHC	319-86-8	1,517	6,069	ND	ND
alpha-Chlordane	5103-71-9	1,517	6,069	ND	ND
gamma-Chlordane	5103-74-2	1,517	6,069	ND	ND
4,4'-DDD	72-54-8	3,034	12,137	ND	ND
4,4'-DDE	72-55-9	3,034	12,137	ND	ND
4,4'-DDT	50-29-3	3,034	12,137	ND	ND
Dieldrin	60-57-1	3,034	12,137	ND	ND
Endosulfan I	959-98-8	1,517	6,069	ND	ND
Endosulfan II	33213-65-9	3,034	12,137	ND	ND
Endosulfan sulfate	1031-07-8	3,034	12,137	ND	ND
Endrin	72-20-8	3,034	12,137	ND	ND
Endrin aldehyde	7421-93-4	3,034	12,137	ND	ND
Endrin ketone	53494-70-5	3,034	12,137	ND	ND
Heptachlor	76-44-8	1,517	6,069	ND	ND
Heptachlor epoxide	1024-57-3	1,517	6,069	ND	ND
Methoxychlor	72-43-5	15,171	60,685	ND	ND
Toxaphene	8001-35-2	75,857	303,427	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery	[OK = 60-150]	DO	98

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-3
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-7*4-6
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 18:25, DLL

DATE REPORTED: 4/25/94

Quant Factor: 53.6
Extract Method: 3550
% Solids: 61.2

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	1,072	4,289	ND	ND
alpha-BHC	319-84-6	1,072	4,289	ND	ND
beta-BHC	319-85-7	1,072	4,289	ND	ND
gamma-BHC (Lindane)	58-89-9	1,072	4,289	ND	ND
delta-BHC	319-86-8	1,072	4,289	ND	ND
alpha-Chlordane	5103-71-9	1,072	4,289	ND	ND
gamma-Chlordane	5103-74-2	1,072	4,289	ND	ND
4,4'-DDD	72-54-8	2,144	8,577	ND	ND
4,4'-DDE	72-55-9	2,144	8,577	ND	ND
4,4'-DDT	50-29-3	2,144	8,577	ND	ND
Dieldrin	60-57-1	2,144	8,577	ND	ND
Endosulfan I	959-98-8	1,072	4,289	ND	ND
Endosulfan II	33213-65-9	2,144	8,577	ND	ND
Endosulfan sulfate	1031-07-8	2,144	8,577	ND	ND
Endrin	72-20-8	2,144	8,577	<MDL	ND
Endrin aldehyde	7421-93-4	2,144	8,577	ND	ND
Endrin ketone	53494-70-5	2,144	8,577	ND	ND
Heptachlor	76-44-8	1,072	4,289	ND	ND
Heptachlor epoxide	1024-57-3	1,072	4,289	ND	ND
Methoxychlor	72-43-5	10,722	42,887	ND	ND
Toxaphene	8001-35-2	53,609	214,434	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	DO	98

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-4
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-68*6-8
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 19:03, DLL

DATE REPORTED: 4/25/94

Quant Factor: 223.3
Extract Method: 3550
% Solids: 74.6

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	4,465	17,861	ND	ND
alpha-BHC	319-84-6	4,465	17,861	ND	ND
beta-BHC	319-85-7	4,465	17,861	ND	ND
gamma-BHC (Lindane)	58-89-9	4,465	17,861	ND	ND
delta-BHC	319-86-8	4,465	17,861	ND	ND
alpha-Chlordane	5103-71-9	4,465	17,861	ND	ND
gamma-Chlordane	5103-74-2	4,465	17,861	ND	ND
4,4'-DDD	72-54-8	8,931	35,722	ND	ND
4,4'-DDE	72-55-9	8,931	35,722	ND	ND
4,4'-DDT	50-29-3	8,931	35,722	ND	ND
Dieldrin	60-57-1	8,931	35,722	ND	ND
Endosulfan I	959-98-8	4,465	17,861	ND	ND
Endosulfan II	33213-65-9	8,931	35,722	ND	ND
Endosulfan sulfate	1031-07-8	8,931	35,722	ND	ND
Endrin	72-20-8	8,931	35,722	ND	ND
Endrin aldehyde	7421-93-4	8,931	35,722	ND	ND
Endrin ketone	53494-70-5	8,931	35,722	ND	ND
Heptachlor	76-44-8	4,465	17,861	ND	ND
Heptachlor epoxide	1024-57-3	4,465	17,861	ND	ND
Methoxychlor	72-43-5	44,653	178,612	ND	ND
Toxaphene	8001-35-2	223,265	893,060	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	DO	98

E: Estimated , ND: Not Detected, DO: Diluted Out
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-5
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-10*1.5-4, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 19:40, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33
Extract Method: 3550
% Solids: 99.3

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	6.6	26	ND	ND
alpha-BHC	319-84-6	6.6	26	ND	ND
beta-BHC	319-85-7	6.6	26	ND	ND
gamma-BHC (Lindane)	58-89-9	6.6	26	ND	ND
delta-BHC	319-86-8	6.6	26	ND	ND
alpha-Chlordane	5103-71-9	6.6	26	ND	ND
gamma-Chlordane	5103-74-2	6.6	26	ND	ND
4,4'-DDD	72-54-8	13	53	ND	ND
4,4'-DDE	72-55-9	13	53	ND	ND
4,4'-DDT	50-29-3	13	53	ND	ND
Dieldrin	60-57-1	13	53	ND	ND
Endosulfan I	959-98-8	6.6	26	ND	ND
Endosulfan II	33213-65-9	13	53	ND	ND
Endosulfan sulfate	1031-07-8	13	53	ND	ND
Endrin	72-20-8	13	53	ND	ND
Endrin aldehyde	7421-93-4	13	53	ND	ND
Endrin ketone	53494-70-5	13	53	ND	ND
Heptachlor	76-44-8	6.6	26	ND	ND
Heptachlor epoxide	1024-57-3	6.6	26	ND	ND
Methoxychlor	72-43-5	66	264	ND	ND
Toxaphene	8001-35-2	330	1,322	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery	[OK = 60-150]	97	98

E: Estimated, ND: Not Detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-6
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-68*2-4, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/22/94, 23:27, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33
Extract Method: 3550
% Solids: 99.9

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	6.5	26	ND	ND
alpha-BHC	319-84-6	6.5	26	ND	ND
beta-BHC	319-85-7	6.5	26	ND	ND
gamma-BHC (Lindane)	58-89-9	6.5	26	ND	ND
delta-BHC	319-86-8	6.5	26	ND	ND
alpha-Chlordane	5103-71-9	6.5	26	ND	ND
gamma-Chlordane	5103-74-2	6.5	26	ND	ND
4,4'-DDD	72-54-8	13	52	ND	ND
4,4'-DDE	72-55-9	13	52	ND	ND
4,4'-DDT	50-29-3	13	52	ND	ND
Dieldrin	60-57-1	13	52	ND	ND
Endosulfan I	959-98-8	6.5	26	ND	ND
Endosulfan II	33213-65-9	13	52	ND	ND
Endosulfan sulfate	1031-07-8	13	52	ND	ND
Endrin	72-20-8	13	52	ND	ND
Endrin aldehyde	7421-93-4	13	52	ND	ND
Endrin ketone	53494-70-5	13	52	ND	ND
Heptachlor	76-44-8	6.5	26	ND	ND
Heptachlor epoxide	1024-57-3	6.5	26	ND	ND
Methoxychlor	72-43-5	65	261	ND	ND
Toxaphene	8001-35-2	327	1,307	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery	[OK = 60-150]	106	98

E: Estimated , ND: Not Detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-7
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-7*4-6, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/22/94, KK
ANALYSIS (Date/Time/Init): 4/23/94, 00:05, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33
Extract Method: 3550
% Solids: 99.5

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	6.6	26	ND	ND
alpha-BHC	319-84-6	6.6	26	ND	ND
beta-BHC	319-85-7	6.6	26	ND	ND
gamma-BHC (Lindane)	58-89-9	6.6	26	ND	ND
delta-BHC	319-86-8	6.6	26	ND	ND
alpha-Chlordane	5103-71-9	6.6	26	ND	ND
gamma-Chlordane	5103-74-2	6.6	26	ND	ND
4,4'-DDD	72-54-8	13	53	ND	ND
4,4'-DDE	72-55-9	13	53	ND	ND
4,4'-DDT	50-29-3	13	53	ND	ND
Dieldrin	60-57-1	13	53	ND	ND
Endosulfan I	959-98-8	6.6	26	ND	ND
Endosulfan II	33213-65-9	13	53	ND	ND
Endosulfan sulfate	1031-07-8	13	53	ND	ND
Endrin	72-20-8	13	53	ND	ND
Endrin aldehyde	7421-93-4	13	53	ND	ND
Endrin ketone	53494-70-5	13	53	ND	ND
Heptachlor	76-44-8	6.6	26	ND	ND
Heptachlor epoxide	1024-57-3	6.6	26	ND	ND
Methoxychlor	72-43-5	66	264	ND	ND
Toxaphene	8001-35-2	330	1,321	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery	[OK = 60-150]	130	100

E: Estimated , ND: Not Detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-8
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-68*6-8, FT-B60
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/23/94, 00:43, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33
Extract Method: 3550
% Solids: 99.7

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	6.6	27	ND	ND
alpha-BHC	319-84-6	6.6	27	ND	ND
beta-BHC	319-85-7	6.6	27	ND	ND
gamma-BHC (Lindane)	58-89-9	6.6	27	ND	ND
delta-BHC	319-86-8	6.6	27	ND	ND
alpha-Chlordane	5103-71-9	6.6	27	ND	ND
gamma-Chlordane	5103-74-2	6.6	27	ND	ND
4,4'-DDD	72-54-8	13	53	ND	ND
4,4'-DDE	72-55-9	13	53	ND	ND
4,4'-DDT	50-29-3	13	53	ND	ND
Dieldrin	60-57-1	13	53	ND	ND
Endosulfan I	959-98-8	6.6	27	ND	ND
Endosulfan II	33213-65-9	13	53	ND	ND
Endosulfan sulfate	1031-07-8	13	53	ND	ND
Endrin	72-20-8	13	53	ND	ND
Endrin aldehyde	7421-93-4	13	53	ND	ND
Endrin ketone	53494-70-5	13	53	ND	ND
Heptachlor	76-44-8	6.6	27	ND	ND
Heptachlor epoxide	1024-57-3	6.6	27	ND	ND
Methoxychlor	72-43-5	66	265	ND	ND
Toxaphene	8001-35-2	332	1,327	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	108	98

E: Estimated , ND: Not Detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER Environmental Services

LAB SAMPLE # 404039-9
PROJECT # 854

GC-ECD CHLORINATED PESTICIDE RESULTS

SAMPLE # TS*B-68*7*4-6, FT-B60, DUP
RAYMARK INDUSTRIES

SAMPLED (Date/Time/Init): 4/18/94, JD
EXTRACTION (Date/Init): 4/20/94, KK, JG
ANALYSIS (Date/Time/Init): 4/23/94, 01:21, DLL

DATE REPORTED: 4/25/94

Quant Factor: 0.33
Extract Method: 3550
% Solids: 100

Sample Matrix: SOLID
Analysis Method: 8080

TARGET COMPOUND LIST	CAS Number	MDL	PQL	Dry-weight Basis Concentration ug/Kg	Apparent Blank Conc. ug/Kg
Aldrin	309-00-2	6.6	26	ND	ND
alpha-BHC	319-84-6	6.6	26	ND	ND
beta-BHC	319-85-7	6.6	26	ND	ND
gamma-BHC (Lindane)	58-89-9	6.6	26	ND	ND
delta-BHC	319-86-8	6.6	26	ND	ND
alpha-Chlordane	5103-71-9	6.6	26	ND	ND
gamma-Chlordane	5103-74-2	6.6	26	ND	ND
4,4'-DDD	72-54-8	13	53	ND	ND
4,4'-DDE	72-55-9	13	53	ND	ND
4,4'-DDT	50-29-3	13	53	ND	ND
Dieldrin	60-57-1	13	53	ND	ND
Endosulfan I	959-98-8	6.6	26	ND	ND
Endosulfan II	33213-65-9	13	53	ND	ND
Endosulfan sulfate	1031-07-8	13	53	ND	ND
Endrin	72-20-8	13	53	ND	ND
Endrin aldehyde	7421-93-4	13	53	ND	ND
Endrin ketone	53494-70-5	13	53	ND	ND
Heptachlor	76-44-8	6.6	26	ND	ND
Heptachlor epoxide	1024-57-3	6.6	26	ND	ND
Methoxychlor	72-43-5	66	264	ND	ND
Toxaphene	8001-35-2	330	1,319	ND	ND

Decachlorobiphenyl (surrogate std)	% Recovery [OK = 60-150]	116	98

E: Estimated , ND: Not Detected
MDL: Method Detection Limit
PQL: Practical Quantitation Limit

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-1
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/21/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 109

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	14.3	57.1	<DL	<DL
Total Barium (Ba)	6010	0.218	0.872	41	0.003 E
Total Cadmium (Cd)	6010	0.327	1.31	<DL	<DL
Total Chromium (Cr)	6010	2.07	8.28	7.5 E	<DL
Total Lead (Pb)	6010	4.03	16.1	30	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.87	27.5	<DL	<DL
Total Silver (Ag)	6010	0.327	1.31	0.74 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-2
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 105

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.8	55.0	<DL	<DL
Total Barium (Ba)	6010	0.210	0.840	2,200	0.003 E
Total Cadmium (Cd)	6010	0.315	1.26	<DL	<DL
Total Chromium (Cr)	6010	2.00	7.98	40	<DL
Total Lead (Pb)	6010	3.89	15.5	4,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.62	26.5	<DL	<DL
Total Silver (Ag)	6010	0.315	1.26	0.89 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-3
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 157

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	20.6	82.3	<DL	<DL
Total Barium (Ba)	6010	0.314	1.26	1,800	0.003 E
Total Cadmium (Cd)	6010	0.471	1.88	1.2 E	<DL
Total Chromium (Cr)	6010	2.98	11.9	69	<DL
Total Lead (Pb)	6010	5.81	23.2	14,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	9.89	39.6	<DL	<DL
Total Silver (Ag)	6010	0.471	1.88	2.5	<DL

MDL : Method Detection Limit

PQL : Practical Quantitation Limit

E : Estimated

*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-4
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 129

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	16.9	67.6	<DL	<DL
Total Barium (Ba)	6010	0.258	1.03	1,400	0.003 E
Total Cadmium (Cd)	6010	0.387	1.55	0.39 E	<DL
Total Chromium (Cr)	6010	2.45	9.80	63	<DL
Total Lead (Pb)	6010	4.77	19.1	13,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	8.13	32.5	<DL	<DL
Total Silver (Ag)	6010	0.387	1.55	1.3 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-5
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-10*1.5-4, FT-B60

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 101

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.2	52.9	<DL	<DL
Total Barium (Ba)	6010	0.202	0.808	37	0.003 E
Total Cadmium (Cd)	6010	0.303	1.21	<DL	<DL
Total Chromium (Cr)	6010	1.92	7.68	4.9 E	<DL
Total Lead (Pb)	6010	3.74	14.9	35	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.36	25.5	<DL	<DL
Total Silver (Ag)	6010	0.303	1.21	0.44 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-6
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*2-4, FT-B60

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 104

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.6	54.5	<DL	<DL
Total Barium (Ba)	6010	0.208	0.832	1,100	0.003 E
Total Cadmium (Cd)	6010	0.312	1.25	0.47 E	<DL
Total Chromium (Cr)	6010	1.98	7.90	49	<DL
Total Lead (Pb)	6010	3.85	15.4	6,300	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.55	26.2	<DL	<DL
Total Silver (Ag)	6010	0.312	1.25	0.80 E	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-7
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6, FT-B60

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 103

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.5	54.0	<DL	<DL
Total Barium (Ba)	6010	0.206	0.824	670	0.003 E
Total Cadmium (Cd)	6010	0.309	1.24	1.8	<DL
Total Chromium (Cr)	6010	1.96	7.83	75	<DL
Total Lead (Pb)	6010	7.62	30.5	18,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.49	26.0	<DL	<DL
Total Silver (Ag)	6010	0.309	1.24	2.8	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-8
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-68*6-8, FT-B60

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 102

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.4	53.4	<DL	<DL
Total Barium (Ba)	6010	0.204	0.816	830	0.003 E
Total Cadmium (Cd)	6010	0.306	1.22	0.75 E	<DL
Total Chromium (Cr)	6010	1.94	7.75	68	<DL
Total Lead (Pb)	6010	7.55	30.2	17,000	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.43	25.7	<DL	<DL
Total Silver (Ag)	6010	0.306	1.22	1.5	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

KIBER ENVIRONMENTAL SERVICES

LAB SAMPLE # 404039-9
PROJECT # 854

RCRA METALS RESULTS

RAYMARK INDUSTRIES
SAMPLE # TS*B-7*4-6, FT-B60 DUP

SAMPLED (Date/Time/Init) : 4/18/94, JD
ICP ANALYSIS (Date/Init) : 4/25/94, LD
CV ANALYSIS (Date/Init) : 4/22/94, EC

DATE REPORTED : 4/25/94

MATRIX : SOIL
Digestion Method : 3051
Quant Factor : 100

ANALYTE	EPA Method	MDL	PQL	Results mg/Kg	Blank* mg/L
Total Arsenic (As)	6010	13.1	52.4	<DL	<DL
Total Barium (Ba)	6010	0.200	0.800	820	0.003 E
Total Cadmium (Cd)	6010	0.300	1.20	1.3	<DL
Total Chromium (Cr)	6010	1.90	7.60	56	<DL
Total Lead (Pb)	6010	3.70	14.8	9,200	<DL
Total Mercury (Hg)	7471	0.521	2.08	<DL	<DL
Total Selenium (Se)	6010	6.30	25.2	<DL	<DL
Total Silver (Ag)	6010	0.300	1.20	2.1	<DL

MDL : Method Detection Limit
PQL : Practical Quantitation Limit
E : Estimated
*Blank Values As Reported By Instrument

:IBER ENVIRONMENTAL SERVICES PROJECT # 854-404039

ANALYTICAL RESULTS

PROJECT NAME: Raymark Industries
MATRIX : Soil
SAMPLED (Date/Time/Init) : 4/18/94, JD
PARAMETER: Total Organic Carbon
EPA METHOD: 9060
ANALYSIS (Date/Init): 4/22/94, MCB

DATE REPORTED: 4/22/94

SAMPLE ID #	LAB ID #	DL	Result	Units
TS*B-10*1.5-4	404039-1	450	1,000	mg/Kg
TS*B-68*2-4	404039-2	990	30,000	mg/Kg
TS*B-7*4-6	404039-3	820	40,000	mg/Kg
TS*B-68*6-8	404039-4	700	38,000	mg/Kg
TS*B-10*1.5-4:FT-B60	404039-5	560	<DL	mg/Kg
TS*B-68*2-4:FT-B60	404039-6	625	6,100	mg/Kg
TS*B-7*4-6:FT-B60	404039-7	1195	38,000	mg/Kg
TS*B-68*6-8:FT-B60	404039-8	1555	35,000	mg/Kg
TS*B-7*4-6:FT-B60 dup	404039-9	1275	28,000	mg/Kg

DL : Detection Limit

SUMMARY REPORTS

PCDD/PCDF SUMMARY REPORT

SAMPLE: 404039-5
PROJECT ID: 570

SPECIFIC ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
2,3,7,8-TCDD	ND	0.066	ND
1,2,3,7,8-PeCDD	ND	0.12	ND
1,2,3,4,7,8-HxCDD	ND	0.19	ND
1,2,3,6,7,8-HxCDD	ND	0.095	ND
1,2,3,7,8,9-HxCDD	ND	0.16	ND
1,2,3,4,6,7,8-HpCDD	ND	0.19	ND
OCDD	ND	0.25	ND
2,3,7,8-TCDF	ND	0.058	ND
1,2,3,7,8-PeCDF	ND	0.091	ND
2,3,4,7,8-PeCDF	ND	0.094	ND
1,2,3,4,7,8-HxCDF	ND	0.11	ND
1,2,3,6,7,8-HxCDF	ND	0.083	ND
2,3,4,6,7,8-HxCDF	ND	0.15	ND
1,2,3,7,8,9-HxCDF	ND	0.2	ND
1,2,3,4,6,7,8-HpCDF	ND	0.16	ND
1,2,3,4,7,8,9-HpCDF	ND	0.17	ND
OCDF	ND	0.32	ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

BLANK – The concentration of the method blank.

ND – (Non-Detect) The concentration of the analyte is less than the detection limit.

NR – (Non-Reportable) The concentration is not reportable due to a matrix effect or interference

TOTAL ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
TOTAL TCDD	ND	0.07	ND
TOTAL PeCDD	ND	0.12	ND
TOTAL HxCDD	ND	0.19	ND
TOTAL HpCDD	ND	0.19	ND
TOTAL TCDF	ND	0.06	ND
TOTAL PeCDF	ND	0.09	ND
TOTAL HxCDF	ND	0.20	ND
TOTAL HpCDF	ND	0.17	ND

TOTAL DIOXINS/FURANS: ND

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

For information, please reference the following when contacting our Technical Services Department:

TLH Project:	P027698
TLH Batch:	B027698S
TLH File:	T942089

TRIANGLE LABS.

801 Capitola Dr. • Durham, NC 27713

Phone: (919) 544-5729 • FAX: (919) 544-5491

PCDD/PCDF SUMMARY REPORT

SAMPLE: 40439-6
PROJECT ID: 570

SPECIFIC ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
2,3,7,8-TCDD	ND	0.064	ND
1,2,3,7,8-PeCDD	ND	0.11	ND
1,2,3,4,7,8-HxCDD	ND	0.18	ND
1,2,3,6,7,8-HxCDD	ND	0.092	ND
1,2,3,7,8,9-HxCDD	ND	0.15	ND
1,2,3,4,6,7,8-HpCDD	ND	0.19	ND
OCDD	ND	0.24	ND
2,3,7,8-TCDF	ND	0.056	ND
1,2,3,7,8-PeCDF	ND	0.087	ND
2,3,4,7,8-PeCDF	ND	0.091	ND
1,2,3,4,7,8-HxCDF	ND	0.1	ND
1,2,3,6,7,8-HxCDF	ND	0.08	ND
2,3,4,6,7,8-HxCDF	ND	0.15	ND
1,2,3,7,8,9-HxCDF	ND	0.19	ND
1,2,3,4,6,7,8-HpCDF	ND	0.15	ND
1,2,3,4,7,8,9-HpCDF	ND	0.16	ND
OCDF	ND	0.3	ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

BLANK – The concentration of the method blank.

ND – (Non-Detect) The concentration of the analyte is less than the detection limit.

NR – (Non-Reportable) The concentration is not reportable due to a matrix effect or interference

TOTAL ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
TOTAL TCDD	ND	0.06	ND
TOTAL PeCDD	ND	0.11	ND
TOTAL HxCDD	ND	0.18	ND
TOTAL HpCDD	ND	0.19	ND
TOTAL TCDF	ND	0.06	ND
TOTAL PeCDF	ND	0.09	ND
TOTAL HxCDF	ND	0.19	ND
TOTAL HpCDF	ND	0.16	ND

TOTAL DIOXINS/FURANS: ND

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

For information, please reference the following when contacting our Technical Services Department:

TLH Project: P027698
TLH Batch: B027698S
TLH File: T942090

801 Capitola Dr. • Durham, NC 27713
Phone: (919) 544-5729 • FAX: (919) 544-5491

PCDD/PCDF SUMMARY REPORT

SAMPLE: 404039-7
PROJECT ID: 570

SPECIFIC ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
2,3,7,8-TCDD	ND	0.067	ND
1,2,3,7,8-PeCDD	ND	0.12	ND
1,2,3,4,7,8-HxCDD	ND	0.19	ND
1,2,3,6,7,8-HxCDD	ND	0.096	ND
1,2,3,7,8,9-HxCDD	ND	0.16	ND
1,2,3,4,6,7,8-HpCDD	ND	0.19	ND
OCDD	ND	0.26	ND
2,3,7,8-TCDF	0.438	0.058	ND
1,2,3,7,8-PeCDF	0.115	0.091	ND
2,3,4,7,8-PeCDF	0.299	0.095	ND
1,2,3,4,7,8-HxCDF	0.37	0.11	ND
1,2,3,6,7,8-HxCDF	ND	0.083	ND
2,3,4,6,7,8-HxCDF	ND	0.15	ND
1,2,3,7,8,9-HxCDF	ND	0.2	ND
1,2,3,4,6,7,8-HpCDF	0.731	0.16	ND
1,2,3,4,7,8,9-HpCDF	ND	0.17	ND
OCDF	ND	0.32	ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

BLANK – The concentration of the method blank.

ND – (Non-Detect) The concentration of the analyte is less than the detection limit.

NR – (Non-Reportable) The concentration is not reportable due to a matrix effect or interference

TOTAL ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
TOTAL TCDD	ND	0.07	ND
TOTAL PeCDD	ND	0.12	ND
TOTAL HxCDD	ND	0.19	ND
TOTAL HpCDD	ND	0.19	ND
TOTAL TCDF	1.91	0.06	ND
TOTAL PeCDF	3.02	0.10	ND
TOTAL HxCDF	0.71	0.20	ND
TOTAL HpCDF	0.731	0.17	ND

TOTAL DIOXINS/FURANS: 6.371 PPB

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 0.24 PPB

For information, please reference the following when contacting our Technical Services Department:

TLH Project: P027698
TLH Batch: B027698S
TLH File: T942091

PCDD/PCDF SUMMARY REPORT

SAMPLE: 404039-8
PROJECT ID: 570

SPECIFIC ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
2,3,7,8-TCDD	ND	0.068	ND
1,2,3,7,8-PeCDD	ND	0.12	ND
1,2,3,4,7,8-HxCDD	ND	0.19	ND
1,2,3,6,7,8-HxCDD	ND	0.098	ND
1,2,3,7,8,9-HxCDD	ND	0.17	ND
1,2,3,4,6,7,8-HpCDD	ND	0.2	ND
OCDD	ND	0.26	ND
2,3,7,8-TCDF	0.141	0.059	ND
1,2,3,7,8-PeCDF	ND	0.093	ND
2,3,4,7,8-PeCDF	ND	0.097	ND
1,2,3,4,7,8-HxCDF	ND	0.11	ND
1,2,3,6,7,8-HxCDF	ND	0.085	ND
2,3,4,6,7,8-HxCDF	ND	0.16	ND
1,2,3,7,8,9-HxCDF	ND	0.2	ND
1,2,3,4,6,7,8-HpCDF	ND	0.16	ND
1,2,3,4,7,8,9-HpCDF	ND	0.17	ND
OCDF	ND	0.33	ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

BLANK – The concentration of the method blank.

ND – (Non-Detect) The concentration of the analyte is less than the detection limit.

NR – (Non-Reportable) The concentration is not reportable due to a matrix effect or interference

TOTAL ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
TOTAL TCDD	ND	0.07	ND
TOTAL PeCDD	ND	0.12	ND
TOTAL HxCDD	ND	0.19	ND
TOTAL HpCDD	ND	0.20	ND
TOTAL TCDF	0.576	0.06	ND
TOTAL PeCDF	0.216	0.10	ND
TOTAL HxCDF	ND	0.20	ND
TOTAL HpCDF	ND	0.17	ND

TOTAL DIOXINS/FURANS: 0.792 PPB

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 0.014 PPB

For information, please reference the following when contacting our Technical Services Department:

TLH Project: P027698
TLH Batch: B027698S
TLH File: T942092

PCDD/PCDF SUMMARY REPORT

SAMPLE: 40439-6
PROJECT ID: 570

SPECIFIC ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
2,3,7,8-TCDD	ND	0.064	ND
1,2,3,7,8-PeCDD	ND	0.11	ND
1,2,3,4,7,8-HxCDD	ND	0.18	ND
1,2,3,6,7,8-HxCDD	ND	0.092	ND
1,2,3,7,8,9-HxCDD	ND	0.15	ND
1,2,3,4,6,7,8-HpCDD	ND	0.19	ND
OCDD	ND	0.24	ND
2,3,7,8-TCDF	ND	0.056	ND
1,2,3,7,8-PeCDF	ND	0.087	ND
2,3,4,7,8-PeCDF	ND	0.091	ND
1,2,3,4,7,8-HxCDF	ND	0.1	ND
1,2,3,6,7,8-HxCDF	ND	0.08	ND
2,3,4,6,7,8-HxCDF	ND	0.15	ND
1,2,3,7,8,9-HxCDF	ND	0.19	ND
1,2,3,4,6,7,8-HpCDF	ND	0.15	ND
1,2,3,4,7,8,9-HpCDF	ND	0.16	ND
OCDF	ND	0.3	ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

BLANK – The concentration of the method blank.

ND – (Non-Detect) The concentration of the analyte is less than the detection limit.

NR – (Non-Reportable) The concentration is not reportable due to a matrix effect or interference

TOTAL ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
TOTAL TCDD	ND	0.06	ND
TOTAL PeCDD	ND	0.11	ND
TOTAL HxCDD	ND	0.18	ND
TOTAL HpCDD	ND	0.19	ND
TOTAL TCDF	ND	0.06	ND
TOTAL PeCDF	ND	0.09	ND
TOTAL HxCDF	ND	0.19	ND
TOTAL HpCDF	ND	0.16	ND

TOTAL DIOXINS/FURANS: ND

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

For information, please reference the following when contacting our Technical Services Department:

TLH Project: P027698
TLH Batch: B027698S
TLH File: T942090

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Phone: (919) 544-5729 • FAX: (919) 544-5491

PCDD/PCDF SUMMARY REPORT

SAMPLE: DFBLK27698 BLANK
PROJECT ID: 570

SPECIFIC ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
2,3,7,8-TCDD	ND	0.069	-
1,2,3,7,8-PeCDD	ND	0.12	-
1,2,3,4,7,8-HxCDD	ND	0.2	-
1,2,3,6,7,8-HxCDD	ND	0.099	-
1,2,3,7,8,9-HxCDD	ND	0.17	-
1,2,3,4,6,7,8-HpCDD	ND	0.2	-
OCDD	ND	0.26	-
2,3,7,8-TCDF	ND	0.06	-
1,2,3,7,8-PeCDF	ND	0.094	-
2,3,4,7,8-PeCDF	ND	0.098	-
1,2,3,4,7,8-HxCDF	ND	0.11	-
1,2,3,6,7,8-HxCDF	ND	0.086	-
2,3,4,6,7,8-HxCDF	ND	0.16	-
1,2,3,7,8,9-HxCDF	ND	0.21	-
1,2,3,4,6,7,8-HpCDF	ND	0.16	-
1,2,3,4,7,8,9-HpCDF	ND	0.18	-
OCDF	ND	0.33	-

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

BLANK – The concentration of the method blank.

ND – (Non-Detect) The concentration of the analyte is less than the detection limit.

NR – (Non-Reportable) The concentration is not reportable due to a matrix effect or interference

TOTAL ANALYTES	CONC (PPB)	DL (PPB)	BLANK (PPB)
TOTAL TCDD	ND	0.07	-
TOTAL PeCDD	ND	0.12	-
TOTAL HxCDD	ND	0.20	-
TOTAL HpCDD	ND	0.20	-
TOTAL TCDF	ND	0.06	-
TOTAL PeCDF	ND	0.10	-
TOTAL HxCDF	ND	0.21	-
TOTAL HpCDF	ND	0.18	-

TOTAL DIOXINS/FURANS: ND

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

For information, please reference the following when contacting our Technical Services Department:

TLH Project: P027698
TLH Batch: B027698S
TLH File: T942073

SAMPLE REPORTS

PROJECT: P027698
BATCH: B027698S
FILE: T942089

PCDD/PCDF ANALYSIS REPORT

SAMPLE: 404039-5

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-1
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.3766 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.066	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.12	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.19	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.095	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.16	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.19	-	-	-	U
OCDD	458/460	ND	0.25	-	-	-	U
2,3,7,8-TCDF	304/306	ND	0.058	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	0.091	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	0.094	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	0.11	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	0.083	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.15	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.2	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	0.16	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.17	-	-	-	U
OCDF	442/444	ND	0.32	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.07	0.493	22.11 – 26.21	X
TOTAL PeCDD	0	ND	0.12	1.81	28.11 – 32.26	X
TOTAL HxCDD	0	ND	0.19	-	30.71 – 33.39	U
TOTAL HpCDD	0	ND	0.19	-	36.17 – 37.63	U
TOTAL TCDF	0	ND	0.06	0.198	20.91 – 26.24	X
TOTAL PeCDF	0	ND	0.094	-	26.30 – 32.47	U
TOTAL HxCDF	0	ND	0.2	-	33.74 – 38.61	U
TOTAL HpCDF	0	ND	0.17	-	40.89 – 43.25	U

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: AMANDA LESLIE 5/10/94

KIBER & ASSOCIATES

PROJECT: P027698

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B027698S

SAMPLE: 404039-5

FILE: T942089

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-1
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.3766 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	1.65	34%	40%-120%	0.79	24.03	Y
13C12-2,3,7,8-TCDD	332/334	1.9	39%	40%-120%	0.77	24.87	Y
13C12-1,2,3,6,7,8-HxCDD	402/404	2.31	48%	40%-120%	1.25	37.42	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	4.32	45%	40%-120%	1.05	40.88	-
13C12-OCDD	470/472	4.87	51%	25%-120%	0.90	48.17	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.78	24.65	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.27	37.93	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	1.05	44%	40%-120%	NA	24.88	-

Flags:

U – The compound was analyzed for but not detected at or above the detection limit.

J – The analyte was detected at concentrations between the calibrated range and the detection limit.

E – The analyte was detected at concentrations greater than the calibrated range.

B – The analyte was found in the associated blank.

D – The analyte was identified in the analysis at a secondary dilution factor.

S – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

EMPC – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

RATIO – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT – The retention time of an analyte, given decimal minutes.

NO – The total number of peaks identified as analytes within the retention time window.

% REC – The percent recovery of the indicated standard.

KIBER & ASSOCIATES

PROJECT: P027698 — **PCDD/PCDF ANALYSIS REPORT**

BATCH: B027698S — SAMPLE: 40439-6

FILE: T942090

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-2
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.7943 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.064	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.11	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.18	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.092	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.15	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.19	-	-	-	U
OCDD	458/460	ND	0.24	-	-	-	U
2,3,7,8-TCDF	304/306	ND	0.056	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	0.087	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	0.091	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	0.1	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	0.08	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.15	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.19	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	0.15	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.16	-	-	-	U
OCDF	442/444	ND	0.3	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.06	0.526	22.09 – 26.19	X
TOTAL PeCDD	0	ND	0.11	2.33	28.09 – 32.24	X
TOTAL HxCDD	0	ND	0.18	-	30.71 – 33.39	U
TOTAL HpCDD	0	ND	0.19	-	36.17 – 37.63	U
TOTAL TCDF	0	ND	0.06	0.524	20.91 – 26.24	X
TOTAL PeCDF	0	ND	0.091	0.102	26.30 – 32.47	X
TOTAL HxCDF	0	ND	0.19	-	33.76 – 38.63	U
TOTAL HpCDF	0	ND	0.16	-	40.91 – 43.27	U

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: AMANDA LESLIE 5/10/94

PROJECT: P027698

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B027698S

SAMPLE: 40439-6

FILE: T942090

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-2
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.7943 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	1.3	28%	40%-120%	0.79	24.03	Y
13C12-2,3,7,8-TCDD	332/334	1.47	32%	40%-120%	0.79	24.85	Y
13C12-1,2,3,6,7,8-HxCDD	402/404	1.93	42%	40%-120%	1.26	37.42	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	3.85	42%	40%-120%	1.05	40.90	-
13C12-OCDD	470/472	4.27	46%	25%-120%	0.89	48.20	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.78	24.65	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.26	37.92	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	0.841	36%	40%-120%	NA	24.87	Y

Flags:

- U – The compound was analyzed for but not detected at or above the detection limit.
- J – The analyte was detected at concentrations between the calibrated range and the detection limit.
- E – The analyte was detected at concentrations greater than the calibrated range.
- B – The analyte was found in the associated blank.
- D – The analyte was identified in the analysis at a secondary dilution factor.
- S – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- X – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- Y – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- DL – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- EMPC – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- RATIO – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- RT – The retention time of an analyte, given decimal minutes.
- NO – The total number of peaks identified as analytes within the retention time window.
- % REC – The percent recovery of the indicated standard.

KIBER & ASSOCIATES

PROJECT: P027698

PCDD/PCDF ANALYSIS REPORT

BATCH: B027698S

SAMPLE: 404039-7

FILE: T942091

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-3
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.3133 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.067	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.12	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.19	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.096	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.16	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.19	-	-	-	
OCDD	458/460	ND	0.26	-	-	-	U
2,3,7,8-TCDF	304/306	0.438	0.058	-	0.75	24.08	J
1,2,3,7,8-PeCDF	340/342	0.115	0.091	-	1.64	29.43	J
2,3,4,7,8-PeCDF	340/342	0.299	0.095	-	1.52	30.60	J
1,2,3,4,7,8-HxCDF	374/376	0.37	0.11	-	1.24	35.83	J
1,2,3,6,7,8-HxCDF	374/376	ND	0.083	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.15	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.2	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	0.731	0.16	-	1.02	40.88	J
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.17	-	-	-	U
OCDF	442/444	ND	0.32	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.07	0.544	22.11 – 26.21	X
TOTAL PeCDD	0	ND	0.12	1.71	28.11 – 32.26	X
TOTAL HxCDD	0	ND	0.19	-	30.71 – 33.39	U
TOTAL HpCDD	0	ND	0.19	-	36.17 – 37.63	U
TOTAL TCDF	12	1.91	0.06	2.43	20.91 – 26.24	-
TOTAL PeCDF	11	3.02	0.095	-	26.30 – 32.47	-
TOTAL HxCDF	2	0.71	0.2	-	33.74 – 38.61	-
TOTAL HpCDF	1	0.731	0.17	-	40.89 – 43.25	-

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: AMANDA LESLIE 5/10/94

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PROJECT: P027698

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B027698S

SAMPLE: 404039-7

FILE: T942091

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-3
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.3133 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	1.85	38%	40%-120%	0.79	24.03	Y
13C12-2,3,7,8-TCDD	332/334	2.11	44%	40%-120%	0.78	24.87	-
13C12-1,2,3,6,7,8-HxCDD	402/404	2.77	57%	40%-120%	1.26	37.42	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	5.06	52%	40%-120%	1.05	40.88	-
13C12-OCDD	470/472	5.8	60%	25%-120%	0.91	48.15	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.78	24.65	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.26	37.93	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	1.29	53%	40%-120%	NA	24.87	-

Flags:

U – The compound was analyzed for but not detected at or above the detection limit.

J – The analyte was detected at concentrations between the calibrated range and the detection limit.

E – The analyte was detected at concentrations greater than the calibrated range.

B – The analyte was found in the associated blank.

D – The analyte was identified in the analysis at a secondary dilution factor.

S – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1

X – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.

Y – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

DL – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

EMPC – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).

RATIO – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.

RT – The retention time of an analyte, given decimal minutes.

NO – The total number of peaks identified as analytes within the retention time window.

% REC – The percent recovery of the indicated standard.

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PROJECT: P027698

PCDD/PCDF ANALYSIS REPORT

BATCH: B027698S

SAMPLE: 404039-8

FILE: T942092

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-4
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.0862 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.068	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.12	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.19	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.098	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.17	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.2	-	-	-	U
OCDD	458/460	ND	0.26	-	-	-	U
2,3,7,8-TCDF	304/306	0.141	0.059	-	0.75	24.07	J
1,2,3,7,8-PeCDF	340/342	ND	0.093	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	0.097	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	0.11	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	0.085	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.16	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.2	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	0.16	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.17	-	-	-	U
OCDF	442/444	ND	0.33	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.07	0.519	22.09 – 26.19	X
TOTAL PeCDD	0	ND	0.12	2	28.09 – 32.24	X
TOTAL HxCDD	0	ND	0.19	-	30.71 – 33.39	U
TOTAL HpCDD	0	ND	0.2	-	36.17 – 37.63	U
TOTAL TCDF	6	0.576	0.06	0.839	20.91 – 26.24	-
TOTAL PeCDF	1	0.216	0.097	0.34	26.30 – 32.47	-
TOTAL HxCDF	0	ND	0.2	-	33.76 – 38.63	U
TOTAL HpCDF	0	ND	0.17	-	40.91 – 43.27	U

NOTE: Concentrations, EMPCs, and EDLs are calculated on a DRY weight basis.

Reviewed by: AMANDA LESLIE 5/10/94

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PROJECT: P027698

PCDD/PCDF QUALITY CONTROL REPORT

BATCH: B027698S

SAMPLE: 404039-8

FILE: T942092

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-4
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.0862 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	1.5	30%	40%-120%	0.79	24.03	Y
13C12-2,3,7,8-TCDD	332/334	1.8	36%	40%-120%	0.77	24.85	Y
13C12-1,2,3,6,7,8-HxCDD	402/404	2.04	41%	40%-120%	1.27	37.42	-
13C12-1,2,3,4,6,7,8-HpCDF	420/422	4.02	41%	40%-120%	1.05	40.90	-
13C12-OCDD	470/472	5.01	51%	25%-120%	0.90	48.22	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.78	24.63	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.27	37.93	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	1.05	42%	40%-120%	NA	24.87	-

Flags:

- U – The compound was analyzed for but not detected at or above the detection limit.
- J – The analyte was detected at concentrations between the calibrated range and the detection limit.
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- S – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- X – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- Y – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

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- DL – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- EMPC – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- RATIO – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- RT – The retention time of an analyte, given decimal minutes.
- NO – The total number of peaks identified as analytes within the retention time window.
- % REC – The percent recovery of the indicated standard.

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PROJECT: P027698

PCDD/PCDF ANALYSIS REPORT

BATCH: B027698S

SAMPLE: DFBLK27698

FILE: T942073

BLANK

QUOTE NO:	200001209	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	570	DATE RECEIVED:	NA	RETCHECK:	T942065
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942064
SAMPLE ORIGIN:	B027698S	DATE ANALYZED:	5/6/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	IONS	CONC (PPB)	DL (PPB)	EMPC (PPB)	RATIO	RT (min)	FLAGS
2,3,7,8-TCDD	320/322	ND	0.069	-	-	-	U
1,2,3,7,8-PeCDD	356/358	ND	0.12	-	-	-	U
1,2,3,4,7,8-HxCDD	390/392	ND	0.2	-	-	-	U
1,2,3,6,7,8-HxCDD	390/392	ND	0.099	-	-	-	U
1,2,3,7,8,9-HxCDD	390/392	ND	0.17	-	-	-	U
1,2,3,4,6,7,8-HpCDD	424/426	ND	0.2	-	-	-	U
OCDD	458/460	ND	0.26	-	-	-	U
2,3,7,8-TCDF	304/306	ND	0.06	-	-	-	U
1,2,3,7,8-PeCDF	340/342	ND	0.094	-	-	-	U
2,3,4,7,8-PeCDF	340/342	ND	0.098	-	-	-	U
1,2,3,4,7,8-HxCDF	374/376	ND	0.11	-	-	-	U
1,2,3,6,7,8-HxCDF	374/376	ND	0.086	-	-	-	U
2,3,4,6,7,8-HxCDF	374/376	ND	0.16	-	-	-	U
1,2,3,7,8,9-HxCDF	374/376	ND	0.21	-	-	-	U
1,2,3,4,6,7,8-HpCDF	408/410	ND	0.16	-	-	-	U
1,2,3,4,7,8,9-HpCDF	408/410	ND	0.18	-	-	-	U
OCDF	442/444	ND	0.33	-	-	-	U

TOTAL ANALYTES	NUMBER	CONC (PPB)	DL (PPB)	EMPC (PPB)	RT WINDOW (min)	FLAGS
TOTAL TCDD	0	ND	0.07	0.606	21.94 – 25.99	X
TOTAL PeCDD	0	ND	0.12	1.78	27.84 – 31.96	X
TOTAL HxCDD	0	ND	0.2	-	30.53 – 33.24	U
TOTAL HpCDD	0	ND	0.2	-	35.95 – 37.41	U
TOTAL TCDF	0	ND	0.06	0.52	20.76 – 26.00	X
TOTAL PeCDF	0	ND	0.098	-	26.05 – 32.16	U
TOTAL HxCDF	0	ND	0.21	-	33.55 – 38.41	U
TOTAL HpCDF	0	ND	0.18	-	40.65 – 42.96	U

NOTE: Concentrations, EMPCs, and EDLs are calculated on a WET weight basis.

Reviewed by: AMANDA LESLIE 5/10/94

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PROJECT: P027698 — **PCDD/PCDF QUALITY CONTROL REPORT**

BATCH: B027698S — SAMPLE: DFBLK27698

FILE: T942073 — BLANK

QUOTE NO:	200001209	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	570	DATE RECEIVED:	NA	RETCHECK:	T942065
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942064
SAMPLE ORIGIN:	B027698S	DATE ANALYZED:	5/6/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

INTERNAL STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-2,3,7,8-TCDF	316/318	1.5	30%	40%-120%	0.79	23.82	Y
13C12-2,3,7,8-TCDD	332/334	1.74	35%	40%-120%	0.78	24.67	Y
13C12-1,2,3,6,7,8-HxCDD	402/404	1.91	38%	40%-120%	1.27	37.18	Y
13C12-1,2,3,4,6,7,8-HpCDF	420/422	4.15	42%	40%-120%	1.06	40.65	-
13C12-OCDD	470/472	4.41	44%	25%-120%	0.90	47.78	-

RECOVERY STANDARDS	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
13C12-1,2,3,4-TCDD	332/334	NA	NA	NA	0.78	24.45	-
13C12-1,2,3,4,7,8,9-HxCDD	402/404	NA	NA	NA	1.27	37.70	-

CLEAN-UP STANDARD	IONS	CONC (PPB)	% REC.	QC LIMITS	RATIO	RT	FLAGS
37Cl4-TCDD	328/NA	0.889	36%	40%-120%	NA	24.67	Y

Flags:

- U – The compound was analyzed for but not detected at or above the detection limit.
- J – The analyte was detected at concentrations between the calibrated range and the detection limit.
- E – The analyte was detected at concentrations greater than the calibrated range.
- B – The analyte was found in the associated blank.
- D – The analyte was identified in the analysis at a secondary dilution factor.
- S – The analyte in question is, in the opinion of the reviewer, a PCDD/PCDF, even though the fragment ion due to the loss of COCl did not meet the signal- to-noise ratio criterion of 2.5:1
- X – An interferent peak or peaks were observed within the retention window that may obscure otherwise detectable peaks.
- Y – The recovery of the indicated standard is outside of QC advisory limits.

Definitions:

- CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).
- DL – The detection limit based on a 2.5:1 signal-to-noise criteria, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- EMPC – The estimated maximum possible concentration, which is the concentration of an interference or interferences expressed equivalent to an analyte concentration, given in parts per billion (ppb), parts per trillion (ppt), or in nanograms (ng).
- RATIO – The ratio of the low- to high-mass ion areas for the confirmation and quantitation ions.
- RT – The retention time of an analyte, given decimal minutes.
- NO – The total number of peaks identified as analytes within the retention time window.
- % REC – The percent recovery of the indicated standard.

TOXICITY EQUIVALENCE REPORTS

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PROJECT: P027698 **PCDD/PCDF TOXICITY EQUIVALENTS REPORT**

BATCH: B027698S SAMPLE: 404039-5

FILE: T942089

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-1
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.3766 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

KIBER & ASSOCIATES

PROJECT: P027698 **PCDD/PCDF TOXICITY EQUIVALENTS REPORT**

BATCH: B027698S SAMPLE: 40439-6

FILE: T942090

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-2
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.7943 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

PROJECT: P027698 **PCDD/PCDF TOXICITY EQUIVALENTS REPORT**

BATCH: B027698S SAMPLE: 404039-7

FILE: T942091 -

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-3
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.3133 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	0.438		0.1	=	0.044
1,2,3,7,8-PeCDF	0.115	×	0.05	=	0.0058
2,3,4,7,8-PeCDF	0.299	×	0.5	=	0.15
1,2,3,4,7,8-HxCDF	0.37	×	0.1	=	0.037
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	0.731	×	0.01	=	0.0073
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 0.24 PPB

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

KIBER & ASSOCIATES

PROJECT: P027698 **PCDD/PCDF TOXICITY EQUIVALENTS REPORT**

BATCH: B027698S SAMPLE: 404039-8

FILE: T942092

QUOTE NO:	200001209	DATE COLLECTED:	4/18/94	ACCESSION NO:	80-83-4
PROJECT ID:	570	DATE RECEIVED:	4/20/94	RETCHECK:	T942088
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942087
SAMPLE ORIGIN:	GA	DATE ANALYZED:	5/7/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10.0862 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	0.141		0.1	=	0.014
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: 0.014 PPB

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.

PROJECT: P027698 PCDD/PCDF TOXICITY EQUIVALENTS REPORT

BATCH: B027698S SAMPLE: DFBLK27698
FILE: T942073 BLANK

QUOTE NO:	200001209	DATE COLLECTED:	NA	ACCESSION NO:	DFBLK
PROJECT ID:	570	DATE RECEIVED:	NA	RETCHECK:	T942065
PROJECT P.O.:	570	DATE EXTRACTED:	5/10/94	CONCAL:	T942064
SAMPLE ORIGIN:	B027698S	DATE ANALYZED:	5/6/94	ICAL:	I000115T
SAMPLE MATRIX:	SOIL	DATE PROCESSED	5/10/94	INSTRUMENT:	VG 70T
SAMPLE SIZE:	10 G	DETECTION LIMIT:	MDL	GC COLUMN:	DB-5 0.25 mm
DILUTION FACTOR:	1	METHOD:	8280	GC COLUMN SN:	#32

SPECIFIC ANALYTES	CONC (PPB)		TEF		TEF-ADJUSTED CONC (PPB)
2,3,7,8-TCDD	ND	×	1	=	-
1,2,3,7,8-PeCDD	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDD	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDD	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDD	ND	×	0.01	=	-
OCDD	ND	×	0.001	=	-
2,3,7,8-TCDF	ND		0.1	=	-
1,2,3,7,8-PeCDF	ND	×	0.05	=	-
2,3,4,7,8-PeCDF	ND	×	0.5	=	-
1,2,3,4,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,6,7,8-HxCDF	ND	×	0.1	=	-
2,3,4,6,7,8-HxCDF	ND	×	0.1	=	-
1,2,3,7,8,9-HxCDF	ND	×	0.1	=	-
1,2,3,4,6,7,8-HpCDF	ND	×	0.01	=	-
1,2,3,4,7,8,9-HpCDF	ND	×	0.01	=	-
OCDF	ND	×	0.001	=	-

TOTAL 2,3,7,8-TCDD TOXICITY (1989 ITEF) EQUIVALENTS: ND

Definitions:

CONC – The concentration, given in parts per billion (ppb) or parts per trillion (ppt).

TEF – The toxicity equivalency factors, adopted from the 1989 international values.