

REVISED
REMEDIATION WORK PLAN
FOR
KUHLMAN ELECTRIC PLANT SITE

Kuhlman Electric Corporation
Crystal Springs, Mississippi

FILE COPY



Prepared for

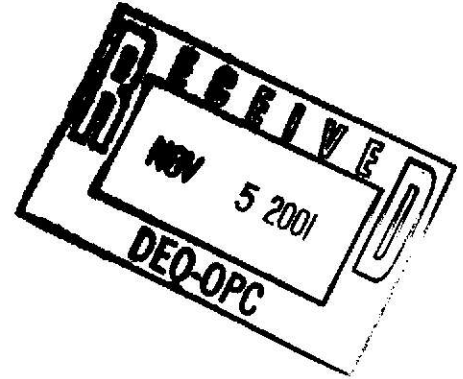
BorgWarner Inc.

Revised
November 2001

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Prepared for

BorgWarner Inc.

Prepared by

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Revised November 2001

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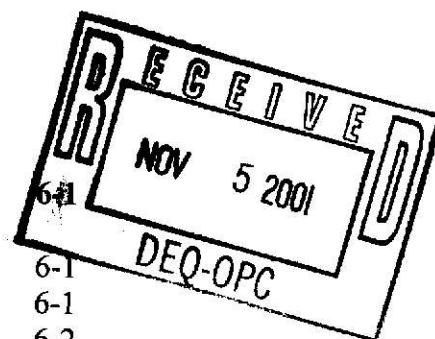


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1.0 INTRODUCTION

Kuhlman Electric Corporation (KEC) owns and operates a transformer manufacturing plant in Crystal Springs, Mississippi (Figure 1). Previous environmental assessments conducted at this site indicate that soil contaminated with PCB (Aroclor 1260) and various chlorinated benzenes is present on-site. Martin & Slagle GeoEnvironmental Associates, L.L.C. prepared this remediation work plan for review and approval by Mississippi Department of Environmental Quality (MDEQ) and the United States Environmental Protection Agency (USEPA) on behalf of BorgWarner Inc. and KEC. The work described in this work plan involves the excavation and disposal of soil and demolition debris that is contaminated with Aroclor 1260 and chlorinated benzenes.

KEC plans to continue with construction of a plant expansion that was started in 2000. The expansion includes the construction of a new 25,340 ft² plant building addition, new underground utilities including sewer lines and electrical conduits, and new paved parking areas.

This work plan describes the processes and procedures to be implemented during the plant property remediation. The work plan is written with attention directed toward construction of the expansion and the remediation activities proceeding concurrently.

Remediation of this site will be conducted in accordance with Toxic Substance Control Act (TSCA) 40 CFR 761.61(a) "Self-Implementing" PCB site clean-up criteria.

1.1 Site Description

The Kuhlman plant is located at 101 Kuhlman Drive, Crystal Springs, Copiah County, MS 39059, at latitude N 31° 15' 20" and longitude W 90° 21' 20". The site is located within the town limits of Crystal Springs. The town center is located south of the plant approximately 0.25 miles (Figure 1). The Kuhlman property is bordered to the south by commercial businesses and residences located across Lee Street, to the west by a railroad line and residences. Across Fulgham Avenue to the northwest is a vacant lot formerly occupied by an icehouse and to the northeast, residences. East of the plant and abutted to the property are residences and one funeral home. The residences are all single-family dwellings with individual yards. The single-family dwellings extend for several blocks in all directions except north. At least one church and a public swimming pool are located within two blocks of the site to the east. The predominant land-uses in the surrounding area are commercial, former industrial, institutional, and residential.

The KEC property consists of a manufacturing plant building situated on about 15 acres of land. Plastic sheeting to prevent erosion of contaminated surface soils currently covers approximately 4.6 acres. Other than the area covered by plastic and the plant building, asphalt and concrete paving cover the site.

The 25,340 ft² expansion and appurtenant structures are planned for the east and north side of the plant property. The building expansion will be located adjacent to the east wall of the existing plant building and immediately north of the secondary containment for the above ground storage tank farm. The building dimensions are approximately 123 ft by 206 ft. The paved parking and truck access will cover the majority of the eastern portion of the property with the employee parking located northeast of the plant. Figure 2 shows the site layout including the expansion, utilities trenches, and new parking areas.

The foundations and floor of the building are reinforced concrete. The footings are spread footings set from 3 to 7 feet below ground surface (bgs). The elevation of the 6-

inch thick finished floor is 469.3 ft above means sea level (msl). The existing grade in the area of the expansion ranges from 463 ft to 468 ft msl.

New underground utilities will be installed across much of the east and northeast portion of the site. New utilities include storm drain drop inlets and sewer lines, water main and lines, sanitary sewer, and electrical lines for outdoor lighting. The depth of utility installation will range from ground surface to approximately 6 feet bgs.

1.2 Background

KEC's facility was constructed and has been operated as a transformer manufacturing plant since the 1950s by KEC or its predecessor, a corporate entity also named Kuhlman Electric Corporation. KEC continued to own and operate the plant in March 1999 when BorgWarner Inc. purchased Kuhlman Corporation, the parent of KEC, and thereafter as well. Seven months later, on October 1, 1999, BorgWarner and Kuhlman Corporation sold KEC's stock to KEC Acquisition Corporation. BorgWarner and Kuhlman Corporation indemnified KEC, KEC Acquisition Corporation and their affiliates for historic contamination at the site and may, under the purchase agreement, control any remediation of such contamination. None of r BorgWarner, Kuhlman Corporation, or KEC Acquisition Corporation has ever owned or operated the plant.

On April 19, 2000, BorgWarner received notification from KEC, in accordance with the purchase agreement, that areas of contaminated soil had been found in Crystal Springs, Mississippi. BorgWarner responded by sending a representative to meet with KEC plant representatives and a representative from MDEQ, Eric Dear, on April 25, 2000. During this meeting all parties were briefed on the existing situation at the plant and MDEQ's expectations regarding assessment of the site.

Soil assessments conducted on the KEC property and surrounding residential properties confirmed that the PCB Aroclor 1260 and chlorinated benzenes were present in site soils

and that offsite areas have been impacted by PCBs through the transport of contaminated soils by stormwater runoff from the KEC property.

1.3 Summary of Previous Work Performed at the KEC Plant

Since April 25, 2000, two major assessments have been conducted on and around the KEC property. The first assessment was conducted in May, June, and September 2000 on the KEC property. The purpose of this assessment was to determine the sources of PCB contamination, the horizontal and vertical extent of soil contamination, and the potential for off-site migration of PCBs via wind-blown dust, stormwater runoff, and transport off-site by grading contractors and plant personnel.

Results from previous site assessments indicate that the KEC plant is the primary source of PCB contamination on site, on adjacent properties, and on properties along an adjacent drainageway. Immediate actions were taken to control future stormwater runoff from the site and wind erosion of site soils. Ultraviolet-resistant plastic sheeting was placed over the 4.6 acres of the KEC site that were disturbed during construction activities, and Silt fences were placed around the periphery of the plastic cover.

Results of the plant site assessments are included in the *Preliminary Site Characterization Report* (July 2000) and the *Addendum to the Site Characterization Report* (February 2001) submitted to MDEQ and USEPA. The reports contain detailed descriptions of:

- The nature and extent of contamination,
- Procedures used to sample contaminated and adjacent areas,
- Tables and site maps showing PCB concentrations measured in all pre-cleanup characterization samples,
- Sampling and analysis dates.

1.3.1 Assessment Summary

Direct push soil sampling was conducted over approximately 15 acres of open and paved land on the Kuhlman property. Soil, sediment, and surface water samples were collected over two one-month periods and analyzed by a field laboratory. At least 10% of the total number of soil samples were split and sent to a fixed-base lab for confirmation of field lab results.

The field laboratory determined, after comparing the analytical results against all Aroclor standards, that the particular Aroclor present on site is 1260. The unrestricted Target Remediation Goal (TRG) for Aroclor 1260 is 1.0 mg/kg. The restricted TRG for Aroclor 1260 is 2.86 mg/kg. Of the total number of shallow samples collected, 318 had detectable levels of Aroclor 1260. A total of 206 shallow soil samples exceeded the restricted TRG for Aroclor 1260, and 252 samples exceeded the unrestricted TRG for Aroclor 1260.

A total of 296 deep soil samples were collected from depths of 4 feet bgs to 18 feet bgs with most being collected from 4 feet bgs. Of the total number of deep samples analyzed, 99 samples had detectable levels of Aroclor 1260. A total of 33 samples had concentrations above the unrestricted TRG.

Soil sampling results also indicate that several chlorinated benzenes are present at concentrations above the TRGs and are associated with areas of high PCB concentration. PAHs are present at concentrations above the TRGs in some soil samples although the coverage is sporadic.

Shallow soils have been extensively impacted by PCBs to a depth of less than 3 feet bgs across the site. The depth of contamination extends to a depth of 8 feet in some areas of the site, however no PCBs were detected in soils at depths greater than 18 feet.

Perched ground water has been impacted by PCBs at a depth of approximately 12 feet. Samples of the shallow aquifer were not obtained during this preliminary investigation. An assessment of the ground water will be performed following completion of the construction activities.

Figures 3 and 4 show the concentrations of PCBs at various depths across the KEC property.

1.4 Remediation Objectives and Rationale

This site has been used for industrial manufacturing purposes since the mid-1950s. The future use of the property is anticipated to remain industrial since KEC has recently purchased the property beneath the plant building from the City of Crystal Springs. The remediation objectives will be met through implementation of 40 CFR Part 761.61(a) *Self implementing on-site cleanup and disposal of PCB remediation waste*. Remediation options utilizing active remediation, engineering controls, and administrative controls were selected since the future use of the property is anticipated to be industrial, access to the property and the exposure of humans to contaminants can be reasonably controlled.

The general objectives for remediation of this site are to:

1. Conduct active remediation by removal and proper disposal of contaminated materials with concentrations of PCBs in excess of 100 ppm;
2. Employ engineering controls to isolate contamination preventing human contact with contaminants;
3. Employ regulatory remediation goals based on the continuation of industrial land-use scenarios for the site;
4. Place restrictions in the deed to ensure that future land use remains consistent with the current land-use.

The objective of this remedial action is to remove and dispose of contamination with concentrations above the remedial goals, leave in place soil with residual concentrations of contaminants, and to cover the contaminated soil with clean soil to protect construction workers during the new construction activities and installation of new utilities. At completion of construction, all areas on the property with remaining residual contaminants will be covered by permanent structures, such as buildings and concrete or asphalt pavement, or will be remediated to site specific risk based goals. The soil with PCB concentrations greater than the designated remedial goals and soil excavated to enable construction activities will be the only soil managed by removal. Soil beneath the existing buildings, parking lots, and driveways with PCB concentrations less than the remedial goals will remain undisturbed.

The following sections of this cleanup plan for the site include the conceptual plan, detailed remediation plan, schedule, remediation goals, maintenance plans, quality assurance protocols, and health and safety plans.

2.0 CONCEPTUAL PLAN

The basic remediation concept for the KEC plant site is based on the criteria established in 40 CFR 761.61(a). The areas to be remediated qualify as “low occupancy areas” as defined in 761.3. Therefore, the RGs will be met through a combination of 1) removal and disposal in a Subtitle “C” landfill of soil with PCB concentrations greater than 100 ppm; 2) removal and disposal in a Subtitle “C” landfill of soil designated as construction spoil with PCB concentrations greater than 50 ppm; 3) removal and disposal in a Subtitle “D” landfill of soil designated as construction spoil with PCB concentrations between 25 and 50 ppm; 4) the use of engineering controls such as capping of all remaining soil with PCB concentrations between 25 and 100 ppm to prevent human exposure. The remediation will be accomplished under the basic assumptions that the maximum PCB concentration to remain on-site will not exceed 100 ppm. No PCBs will remain at the surface. The entire surface of the site will be covered by buildings, asphalt and concrete paving, and/or clean structural backfill or common fill depending on the concentrations of PCBs remaining after excavation.

Conceptually, the remediation plan is based on the following conditions:

1. All soil exceeding remedial goals will be excavated and removed to disposal facilities based on their concentrations of PCBs.
2. Remedial goals are based on the regulatory remedial goal of 100 ppm as established in 40 CFR 761.61(a).
3. All soil containing greater than 25 ppm PCBs will be effectively capped with structures and composite closure caps consisting of asphalt or concrete paving with an underlayment of 60 mil high density polyethylene (HDPE) overlain by lime treated clayey sand or sandy clay that meets or exceeds the technical standards for engineered caps as defined in the TSCA rules.
4. Areas that are not capped by structures and asphalt paving (less than 10% of the total site area) will have no remaining concentrations of PCBs exceeding 25 ppm.

All exposed areas will be excavated to a minimum of 10 inches. Clean soil will be placed, compacted, and seeded to prevent human exposure and stormwater and wind erosion.

5. A 2-foot wide and 2-foot deep trench will be excavated along the east perimeter of the plant site to remove residual PCB impacted soil, forming a buffer between the plant site and the residential properties. The trench will be backfilled with clean soil, graded to control runoff, and seeded to further assure no off-site migration of soil from the site.
6. All areas capped by buildings, asphalt and concrete paving and common backfill will be subject to the operations and maintenance requirements detailed in Section 6 of this work plan.

The remediation process will begin with the removal of contaminated soil within the plant expansion area. All initial grading activities will be accomplished by OSHA hazardous waste operations (HAZWOPER) trained workers in accordance with the construction documents for the plant expansion. Areas will be graded to the depths and dimensions required for construction of foundations, concrete floors slabs, parking areas, and driveways. Contaminated soil will be removed and disposed of by trained HAZWOPER workers. When the specified elevation is reached and PCB concentrations are determined to be below 100 mg/kg, the HAZWOPER trained workers will place a geotextile fabric over the excavated area. The geotextile-covered area will then be backfilled with 6 to 9 inches of certified clean backfill of the general contractor's choosing. All initial grading of the site will continue in this manner until the building areas are covered with a geo-textile and clean soil. The general contractor will then be allowed to place workers in the construction area without risk of exposure to PCBs. The HAZWOPER contractor will install stormwater collection/detention structures to control runoff from the site, and will be responsible for dust control during the initial excavation activities.

Other areas of the site will be remediated following completion of the grading for the new construction. The site is approximately 15 acres with about 10.5 acres covered by buildings and paving. When new construction is completed the capped area will increase to over 90% of the site. Therefore, the impacted soil will be effectively capped, eliminating on-site worker long-term exposure.

Any soil located under the existing plant and pavement, and impacted with PCBs at concentrations less than 25 ppm, will not be disturbed since these structures will provide adequate capping of the contamination. Details of the implementation of this Workplan are included in Section 3. The plant operator, KEC, will inspect and maintain the capped and grassed areas as described in Section 6.0.

3.0 REMEDIATION PLAN

The contaminants of concern (CoC) are PCBs (Aroclor1260), and chlorinated benzenes: specifically, 1,3,5-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trichlorobenzene, 1,2,3,5-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, 1,2,3,4-tetrachlorobenzene, pentachlorobenzene, and hexachlorobenzene. The “principle threat chemical” is PCB (Aroclor 1260). The chlorinated benzenes are associated with the solvent used to liquefy PCBs and were detected during the assessment at low concentrations in areas where PCB concentrations were high. Therefore, when the PCB remedial goals (RGs) are achieved, the chlorinated benzenes remedial goals will also be met.

RGs for PCBs at this site are based on the regulatory remedial goal of 100 ppm as established in 40 CFR 761.61(a). The remediation will be accomplished under the basic assumption that the maximum PCB concentration in soils that will remain on-site will not exceed 100 ppm, unless their removal threatens the foundation and structural integrity of the existing buildings on-site.

Since this remediation will be conducted in conjunction with a plant expansion/construction project, soil with PCB concentrations lower than the remedial goal will also be removed from the site as construction spoil. The RGs will be met through a combination of 1) removal and disposal in a Subtitle “C” landfill of soil with PCB concentrations greater than 100 ppm; 2) removal and disposal in a Subtitle “C” landfill of soil designated as construction spoil with PCB concentrations greater than 50 ppm; 3) removal and disposal in a Subtitle “D” landfill of soil designated as construction spoil with PCB concentrations between 25 and 50 ppm; and 4) the use of engineering controls such as capping of all remaining soil with PCB concentrations between 25 and 100 ppm to prevent human exposure.

All soil excavated during the site remediation will be disposed of in accordance with applicable state and federal requirements. All soil destined for disposal and containing concentrations of PCBs greater than 50 mg/kg will be segregated, accumulated, and disposed of as a hazardous waste in a Subtitle “C” landfill. All soil destined for disposal and containing concentrations of PCBs less than 50 mg/kg will be disposed of as a non-hazardous waste in a Subtitle “D” landfill.

3.1 Remediation Activities Related to Construction

This remediation is being conducted in conjunction with construction activities related to the expansion of the KEC plant. This remediation plan describes engineering controls that eliminate the exposure pathway for construction workers during grading and foundation construction activities. The controls include excavation of all soils with concentrations of PCBs greater than 100 mg/kg and the installation of a fabric and soil barrier on top of the finished subgrade to eliminate the exposure pathway.

All of the construction areas will be graded prior to construction of foundations and parking surfaces. Excavation of these areas is necessary to prepare a subgrade that will be suitable as a foundation for the building and parking areas. Areas that will be sown in grass will be graded in order to improve surface drainage and prevent erosion.

3.1.1 Work Progression

The remediation work on-site will begin with sampling and analysis of asphalt and concrete samples to be collected from paved areas and Stockpile #5 (asphalt debris pile, Figure 2) where these existing materials will be removed in order to begin site-grading activities. The results, which will be transmitted to U.S. EPA and MDEQ following QA/QC review, will be used to profile asphalt and concrete demolition debris for disposal.

Concurrently with the sampling of demolition debris, the six remaining stockpiles of contaminated soil will be excavated and appropriately disposed of at regulated facilities. Sample results obtained from the stockpile during the site assessment activities will be used to profile the waste material into appropriate waste management facilities. Stockpile #s 2, 4, 6, and 7 will be disposed of at a Subtitle “C” landfill since they contain concentrations of PCBs in excess of 50 ppm. Stockpile #s 1 and 3 have PCB concentrations below 50 ppm and will be disposed of at a Subtitle “D” landfill.

Site remediation will begin with grading of limited areas around construction zones and construction of a storm water retention pond to control storm water and sediment transport of PCBs during construction activities. Excavation of utility trenches for storm sewers and water mains will be the first remediation activity since these structures are set deeper below existing grade than any of the other structures (Figure 2). Demolition of the east wall of the plant and excavation of the subgrade for the plant expansion will begin after the utility trenches are excavated. After the building subgrade is complete, the parking areas will be excavated. Last, all areas that will remain unpaved will be graded in accordance with the construction drawings, covered with clean soil, compacted, and seeded with grass.

3.1.2 Utility Trench

The portion of the site designated as the construction area will be cordoned off with construction fencing and the trench area will be laid-out by OSHA trained land surveyors. The asphalt, concrete and plastic sheeting covering the ground will be removed to the extent necessary for the remediation crew to access the trench site with equipment. All areas not actively being remediated will remain covered to control wind and water erosion.

The utility trench for the storm sewer and the water main will be over excavated to accommodate the piping and construction workers. The trench will be excavated to a minimum base width of 8 feet with side slopes cut back to a 1:1 slope. The floor of the trench will be covered with a non-woven geotextile to provide a barrier between the cut-slope soil and the construction workers. The base of the trench will be covered with 6 inches of clean sand for setting the sewer pipe and protecting the fabric liner.

When the storm sewer line installation is complete, the trench will be back filled with clean soil. The water line will be installed at a later date in the clean backfill.

The storm sewer trench extends north from a head wall located on the southeast corner of the site across a grassed area then turns northwest, north, then west before terminating at a headwall in a drainage ditch on the north side of the property. The depth of trench excavation ranges from 1.5 feet bgs to 5.5 feet bgs. The sewer line extends through areas of relatively low PCB concentrations over much of its length before it reaches an area of relatively high PCB concentrations near the north side of the property. Most of the soil excavated from the trench will contain less than 50 mg/kg PCBs although soil excavated from the northern most portion of the line will have concentrations of PCBs as high as 6000 mg/kg.

3.1.3 Building Expansion Site

The 25,340 ft² expansion and appurtenant structures are planned for the east and north side of the plant property (Figure 2). The building expansion will be located adjacent to the east wall of the existing plant building and immediately north of the secondary containment for the aboveground storage tank farm. The building dimensions are approximately 123 feet by 206 feet. The paved parking and truck access will cover the majority of the eastern portion of the property with the employee parking located northeast of the plant.

The foundations and floor of the building are reinforced concrete. The spread footings are set from 3 to 7 feet below ground surface (bgs) at approximate elevation 460 feet msl. The elevation of the 6-inch thick finished floor is 469.3 feet msl. The existing grade in the area of the expansion ranges from elevation 463 feet to 468 feet msl.

Prior to removal of the plastic liner covering this portion of the site, the general contractor will stake out the building corners through the plastic. The remedial contractor will then remove the liner to prepare for work. The remedial contractor will remove contaminated soil located next to the east wall of the plant building. Removal will proceed laterally and vertically to a maximum depth of 6 feet or to the top of the existing footing until soil with PCB concentrations greater than 100 mg/kg are removed and loaded into roll-off boxes for disposal at the Subtitle "C" landfill.

Excavation will then proceed across the rest of the building pad area to an elevation of approximately 459.5 feet msl. The general contractor will inspect the base of the excavation for structural integrity. Local areas of additional soil may be removed at the direction of the inspector. Any additional soil will be placed in a roll-off box for analytical testing and disposal, if necessary.

After the general contractor has inspected the subgrade and the analytical testing confirms that all soil above 100 mg/kg has been removed, the remedial contractor will install a geotextile fabric over the entire excavation area and will place 8 to 12 inches of clean soil provided by the general contractor over the fabric.

After placement of the soil layer, the general contractor will be able to enter the site with equipment to complete the backfilling process. At completion this portion of the site will be capped by a permanent building.

3.1.4 Parking and Driveways

Prior to removal of the plastic sheeting covering this portion of the site, the general contractor will stake out the parking lot and driveway corners through the plastic and existing asphalt. The remedial contractor will then remove the cover to prepare for work. All subsequent grade surveying conducted during remediation will be done by OSHA HAZWHOPER trained surveyors.

The remedial contractor will excavate existing asphalt, concrete and contaminated soil within the staked areas. Removal will proceed laterally and vertically until soil with PCB concentrations greater than 100 mg/kg are removed and loaded into roll-off boxes for disposal at the Subtitle "C" landfill. Refer to Section 3.1.1 for a description of the sampling to be conducted on concrete and asphalt.

Excavation will proceed to a maximum depth of 6 to 9 inches below subgrade elevation or to a shallower level as determined by the general contractor. After the general contractor has inspected the subgrade and the analytical testing confirms that all soil above 100 mg/kg has been removed, the remedial contractor will install a geotextile fabric over the entire excavation area and will place 6 to 9 inches of clean soil provided by the general contractor over the fabric.

After placement of the soil layer, the general contractor will be able to enter the site with equipment to complete the backfilling process. At completion this portion of the site will be capped by a permanent asphalt and concrete paving at least 6 inches thick.

3.1.5 Grassed Areas

Areas of grass will remain along the east side of the property abutting the property line (Figure 2). The site grading will result in improved drainage. Several locations along the

property line have elevated concentrations of PCBs (Figure 3). In order to eliminate the probability of storm water transporting PCBs off-site, the surface soils to 10 inches bgs in the grassed areas will be removed and replaced with clean topsoil and seeded. Additionally, soil located immediately along the property line will be removed to a depth of 2 feet bgs and 2 feet wide to ensure that the PCB impacted soils are not uncovered by adjacent property owners.

No soils with PCB concentrations greater than 25 ppm will remain beneath the grassed areas. Two locations where soils with PCB concentrations in the range of 2 ppm will remain are located on the east property line adjacent to the new asphalt parking lot and in the grass median strip on the north property line. These areas will be covered with at least 6 inches of clean soil and topsoil then seeded. Even though regulations allow soil containing PCB concentrations of less than 25 ppm to remain uncovered, all soils with PCB concentrations greater than 1 ppm and less than 25 ppm at the KEC site will be covered and planted.

3.2 Prevention of Off-Site Migration

Migration of PCB contaminated soil and dust will be managed during remediation and following completion of remediation.

3.2.1 Migration Control During Remediation

Runoff will be controlled during remediation activities by collection and disposal of storm water. A storm water retention basin will be constructed in an open area on the east side of the property (Figure 2). The basin and the drainage channel leading to the basin will be lined with plastic. During and after each storm event the rainwater collected in the basin will be pumped into tanks. Storm water samples will be collected from the retention basin and analyzed for PCB concentrations by a certified laboratory. Storm water with concentrations less than 3µg/l PCB will be discharged to the storm sewer

under a State of Mississippi temporary discharge permit. Storm water with concentrations greater than 3µg/l PCB will be disposed of at a PCB permitted disposal facility. Water will be removed from the site after each event to provide the maximum retention capacity at all times during remediation.

Dust will be controlled at all times during remediation activities. Dust control will include leaving as much of the plastic cover in place, minimizing the area of exposed ground during remediation activities, and spraying the ground surface when airborne dust is observed or active air monitoring action levels are exceeded. Air monitoring for airborne dust will be conducted using a Personal Data RAM, Model PDR-1000AN “Airborne Particulates Monitor”. Monitors will be set upwind and downwind of remedial activities and in the active breathing zone inside the exclusion zone. Action levels for implementing dust suppression procedures are given in the Site Specific Health and Safety Plan included in Section 8 of this work plan.

3.3.2 Post-Remediation Migration Control

The surface area of the plant site will be capped with structures or covered with clean soil. The cap will be a combination of plant buildings and paved surfaces consisting of at least 6 inches of asphalt or concrete with an underlayment of 60 mil HDPE sheeting. A review of Fig. 2 indicates that four areas of the plant site have soils at depth with PCB concentrations greater than 25 ppm that may possibly be left in-place. If the soils remain in-place, an engineered cap of asphalt or concrete will be installed over the areas.

The parking and driveway structures are intended to meet two different use requirements in those areas where soil with greater than 25 ppm PCBs are to remain in-place. The structures must support vehicular traffic as well as prevent the migration of water into and through the PCB impacted soil.

The basic components and construction of the asphalt cap as required by 40 CFR 761.75(b)(1)(ii) involve the placement of 6 inches of asphalt over soils to remain in-place with PCB concentrations greater than 25 ppm. To meet the additional technical requirements established by MDEQ, the basic paving design has been augmented to include the installation of 60 mil HDPE beneath the required 6 inches of asphalt. The permeability of the HDPE liner will exceed the basic permeability requirement of 1.0×10^{-7} cm/sec required by the regulations.

Designated grassed areas will be covered with at least 6 inches of clean topsoil and grass. The cap and cover will prevent erosion, sedimentation, sediment transport, and airborne dust generation. The cap and covered areas will be inspected and maintained in accordance with the plans presented in Section 6.0.

3.3 Confirmation Sampling Plan

Following excavation, all excavated areas will be sampled to confirm that impacted soil with concentrations of PCBs above the remedial goal has been removed. The sampling program is based on criteria established in the *State of Michigan Department of Environmental Quality, Waste Management Division, Guidance Document, Verification of Soil Remediation, April 1994, Revision 1*, as adopted by Mississippi DEQ for use on projects of this nature.

The guidance document provides a statistically based procedure for establishing a soil-sampling grid for confirmation that cleanup goals have been met or exceeded. The procedure applies to “large sites” with a surface area greater than 130,680 square feet. The grid spacing is determined by the following equation:

$$((A * \pi)/SF)^{1/2} = GI$$

where: A = area to be gridded (ft²)

GI = grid interval

SF= Site Factor (length of area to be gridded,
unitless)

π = 3.14159

Based on a total remediation area of 208,000 ft² and a Site Factor of 900 the maximum grid sampling grid spacing is determined to be 27 ft. A conservative average spacing of 25 ft will be used to confirm that impacted soil has been removed from the site. The 25 ft grid spacing will be applied to the excavation floor samples as well as the excavation sidewall samples.

Grab samples will be collected at all nodes of the grid that will be laid out within the remediated area of the site. If a grab sample concentration exceeds the cleanup criteria, excavation will continue to a depth of at least 1 foot below the node and laterally to a distance of ½ the grid spacing in all directions from the node. Two samples will then be collected from the base of the excavation and analyzed by the on-site laboratory. Only the re-excavated area will be re-sampled if the initial result exceeds the clean-up criteria.

All samples will be collected in accordance with EPA Region IV EISOPQAM. The Quality Assurance Plan is included in Section 6.0. Sample locations and remediation limits will be referenced to the Mississippi State Plane Coordinate System (horizontally) and the North American Vertical Datum - 1988 (vertically). Sample locations will be depicted on a scaled site map. Surveying and mapping will be performed under the direction of a licensed Mississippi Professional Land Surveyor.

4.0 SCHEDULE

Fieldwork will be conducted in accordance with the following schedule. The remediation report will be submitted to MDEQ and U.S. EPA 90 days following receipt of the final analytical results.

5.0 INSPECTION AND MAINTENANCE PLAN

Inspection and maintenance of the capped and covered areas of the site are necessary in order to prevent erosion and wind blown transport of soil and dust with PCBs.

5.1 Plant Buildings

The floors, pits, sumps, interior and exterior expansion joints, and construction joints inside and outside of all buildings on-site will be inspected on a quarterly basis in all areas of the plant including process, maintenance, warehousing, shipping, and office areas. Where visible, all concrete structures will be inspected for breakage, cracking, collapse, settlement, deterioration, chemical erosion, and vandalism. All expansion and construction joints will be inspected for separation, displacement, loss of mastic or other joint material, and seepage of liquids out of or into joints.

The field inspector will fill out an inspection checklist for all inspections conducted. An example of the checklist is included in this section. The completed checklists will be kept on file at the KEC plant. Any deficiencies observed by the inspector will be reported to the plant manager. Repairs/corrections of any deficiencies will be started within 72 hours of discovery.

All repairs made beneath the new construction areas may be accomplished by plant personnel as long as repairs are limited to the new cap material and clean soil above the geotextile. All repairs made beneath floor slabs in the previously existing plant areas should be made by OSHA 40 hour trained personnel.

Repairs shall be made with a minimum of 6 inches of concrete as the final cover.

5.2 Paved Areas

The asphalt and concrete paved areas will be inspected monthly for breakage, cracking, collapse, settlement, deterioration, chemical erosion, and vandalism. All expansion and construction joints will be inspected for separation, displacement, loss of mastic or other joint material, and seepage of liquids out of or into joints. Asphalt parking areas will be inspected for deterioration resulting for leakage or spillage of gasoline, oil, etc.

The field inspector will fill out an inspection checklist for all inspections conducted. The completed checklists will be kept on file at the KEC plant. Any deficiencies observed by the inspector will be reported to the plant manager. All deficiencies will be corrected within 72 hours of discovery.

All repairs made beneath the new construction areas may be accomplished by plant personnel as long as repairs are limited to the new cap material and clean soil above the geotextile. All repairs made beneath the previously existing parking areas should be made by OSHA 40 hour trained personnel.

Repairs shall be made with a minimum of 6 inches of concrete as the final cover.

5.3 Grass Covered Areas

Any areas of the site not capped by concrete or asphalt structures will be graded smooth, sloped to drain and sown with grass or other vegetative cover to prevent erosion. The vegetation will be maintained in good condition and will be inspected on a monthly basis. Based on the site assessment results and construction plans, no areas designated for grass cover have any PCB concentrations greater than 25 ppm. Therefore, no clay cap will be required in these areas; however, all soils with PCB concentrations greater than 1 ppm will be covered to prevent erosion.

The inspection will note dry or dead areas, damage caused by vehicular traffic, ponding or standing water, erosion, and soil raveling from around or beneath pavements and buildings. Stormwater discharge outfalls will be inspected for sediment deposits in the pipes and beneath the outfalls. Discharges from storm events will be observed for turbidity and cloudy discharges. PCB analysis will be included for all stormwater discharge permit compliance monitoring events.

The field inspector will fill out an inspection checklist for all inspections conducted. The completed checklists will be kept on file at the KEC plant. Any deficiencies observed by the inspector will be reported to the plant manager. Repair or correction of all deficiencies will begin within 72 hours of discovery.

All repairs in newly grassed areas may be made by plant personnel. Erosion areas will be backfilled with soil and compacted. Bare areas will be reseeded. Areas with standing water will be graded to drain and reseeded. Vehicles will refrain from driving or parking on grassed areas.

If sediments are observed in the storm sewer, they will be sampled and analyzed for PCBs. If PCBs are detected, a detailed inspection of the storm sewer will be conducted to determine the source of the sediment if soils are raveling through joints or if eroded soil is entering through drop inlets. Sources of PCBs entering the sewer system will be eliminated within 48 hours.

5.4 Training

Training will be provided for all persons working in positions of responsibility regarding performance of inspections and recognition of conditions requiring maintenance. Training will be performed at initiation of employment and once per year thereafter.

INSPECTION CHECKLIST

KUHLMAN ELECTRIC CORPORATION

CRYSTAL SPRINGS, MISSISSIPPI

Parking Areas and Driveways

	Broken or Cracked		Collapse, Settlement		Deterioration, Erosion		Apparent Vandalism		Location/Final Disposition
	Yes	No	Yes	No	Yes	No	Yes	No	
Concrete									
Asphalt									

Concrete Joints Concrete to Asphalt Joints

	Separations		Displacement		Loss of Joint Material		Seepage		Location/Final Disposition
	Yes	No	Yes	No	Yes	No	Yes	No	
Concrete Joints									
Concrete to Asphalt Joints									

Grass Covered Areas

	Erosion		Bare Spots		Standing Water		Location/Final Disposition
	Yes	No	Yes	No	Yes	No	

Storm Sewer

	Sediment in Pipe		Sample Collected		Location/Final Disposition
	Yes	No	Yes	No	

Stormwater Discharge

	Turbid Discharge		Sample Collected		Location/Final Disposition
	Yes	No	Yes	No	

6.0 QUALITY ASSURANCE PLAN

As established by the Mississippi Department of Environmental Quality (MDEQ) guidelines, all work related to the confirmation of remedial actions at KEC facility will be performed in accordance with the *Environmental Protection Agency (EPA), Region IV “Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual”, May 1996 (EISOPQAM)*. Copies of relevant and applicable portions of the EISOPQAM will be maintained on site during all field activities and all field personnel will be trained in its implementation.

6.1 Sampling Objectives

The soil-sampling objective for the remedial work is to confirm the effectiveness of the remediation. Soil samples will be collected by the field geologist at the frequency prescribed in Section 3 of this work plan.

6.2 Analytical Methods

Samples will be analyzed for PCBs by the on-site mobile laboratory, Environmental Chemistry Consulting Services (ECCS) of Madison, Wisconsin. At least 10% of all samples will be split and sent to a fixed-base laboratory, Paradigm Analytical Laboratories, Inc. (PAL) in Wilmington, North Carolina for analysis of the same parameters as the on-site mobile laboratory. This measure is taken to corroborate the results of field laboratory analyses.

The on-site laboratory will analyze the soil samples using a mini-extraction procedure based on EPA Method 8082/8141 for PCBs. The procedure incorporates all the quality control rigors of the full 8082 method including quantification based on 6-point calibration with continuing calibration verification, surrogate method performance

monitoring, method blanks, laboratory control samples (LCS), and matrix spike/matrix spike replicate samples.

The fixed-base laboratory will analyze all soil samples using EPA method 8082 for PCBs.

6.3 Key Personnel

The following is the list of key personnel dedicated to this project:

Project Manager: Robert Martin, L.G., Martin & Slagle GeoEnvironmental Associates, LLC

Duties: Responsible for overall management of project including all field coordination efforts.

Field Manager: Charles Peel, P.G., Peel Consulting, PLLC

Duties: Field oversight of remedial activities. Collection of samples. Maintenance of all field logs and records.

Field Laboratory

Manager: Richard Johnson, ECCS

Duties: Responsible for accepting custody of samples from the field personnel. Maintenance of laboratory records. Analyze samples.

QA/QC

Coordinator: Christine Slagle, Martin & Slagle GeoEnvironmental Associate, LLC

Duties: Review daily sample logs. Confirm that QC samples are collected and sampling protocols are met. Assure that data quality objectives are met.

6.4 Quality Assurance Objectives for Data

The data quality objectives are pre-defined for the ECCS data in that Mississippi considers all mobile lab data screening level data. ECCS uses the same equipment and methodology as the fixed-base lab with the exception of the mini extraction modification. At least 10% of the samples collected will be split and submitted to Paradigm Analytical for confirmation analysis. Following this procedure, the data will qualify as screening data with definitive confirmation under EPA region IV EISOPQAM guidelines.

Samples designated for further analysis by Paradigm will be thoroughly homogenized by the field geologist then delivered to the mobile lab where ECCS will take their aliquot for analysis. Due to the limited sample volume required by the ECCS mini extraction and the low volatility of the contaminants of concern, the jar will be resealed, refrigerated, and the same container will then be sent to Paradigm for analysis. Paradigm will be thus analyzing the exact same sample as ECCS.

Equipment rinsates will be collected for evaluation of cross-contamination potential. These will be prepared by pouring distilled water over the sampling equipment after decontamination of equipment, and collecting and preserving the rinsate generated.

Field blanks will be collected. This will be prepared by filling sampling containers which have been kept in the transition zone with distilled water.

Blind duplicate soil samples will be collected for analysis and sent to both labs. Blind duplicates will be collected by homogenizing an aliquot of sample in a disposable plastic container and splitting the homogenized sample into 2 containers. After ECCS retains

their aliquot of these samples, the remainder of the sample will be sent to Paradigm for analysis.

6.5 Sample Control and Field Records

6.5.1 Sample Identification

Each sample will be assigned a unique alpha-numeric identifier that will be clearly recognizable by both laboratories. Sample labels will conform to the labeling requirements under section 3.2.1 of the EISOPQAM.

6.5.2 Chain of Custody Procedures

The field geologist will record the sample ID, date, and time sampled in the field logbook at the time of collection. Samples will be placed in a cooler and transferred by the field geologist to the field laboratory. Upon arrival at the lab, the samples will be transferred to the ECCS laboratory manager who will log each sample on ECCS chains of custody. Each sample will be assigned a unique ECCS internal ID for tracking purposes. After analysis, the samples will be transferred to a sample refrigerator in the mobile lab until they are either sent to Paradigm for confirmation analysis or disposed of on-site. For samples sent to Paradigm, a new chain of custody will be filled out by field geologist for the sample transfer.

6.5.3 Field Records

Field records will be kept in accordance with procedures specified in section 3.5 of EISOPQAM.

6.6 Laboratory QA/QC

QA/QC for both labs is identical. Summaries of each lab's procedures follow.

ECCS:

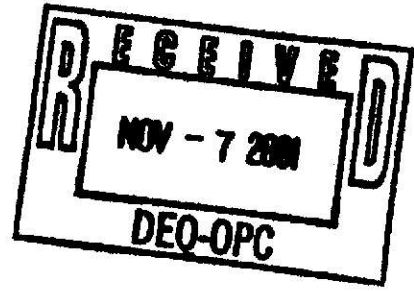
- Continuing calibration standards analyzed every ten samples or less and at the end of a run.
- Blank and LCS samples analyzed every twenty sample or less with a minimum of one per day.
- MS/MSD samples analyzed every twenty samples or less with a minimum of one per day.

Paradigm:

- Continuing calibration standards analyzed at least once every 12 hour shift plus a minimum of every 20 samples (GC/MS criteria follows method specific tuning requirements per EPA 8270).
- Blank and LCS samples analyzed every twenty sample or less with a minimum of one per day.
- MS/MSD samples analyzed every twenty samples or less with a minimum of one per day.

6.7 Data Review and Validation

All laboratory reports will be reviewed for reporting accuracy and consistency with laboratory QA/QC protocols. The primary validation of the mobile lab data will be accomplished through comparison with the data from Paradigm. The relative percent difference (RPD) between the laboratory's results for split samples will be calculated and compared to a 50 % RPD acceptability threshold.



**Kuhlman Electric Corporation
Crystal Springs, Mississippi
Health and Safety Plan
November 2001**

REVIEW AND APPROVALS

Charles O. M. Peel
Project Field Manager

Date

Robert L. Martin
Project Manager

Date

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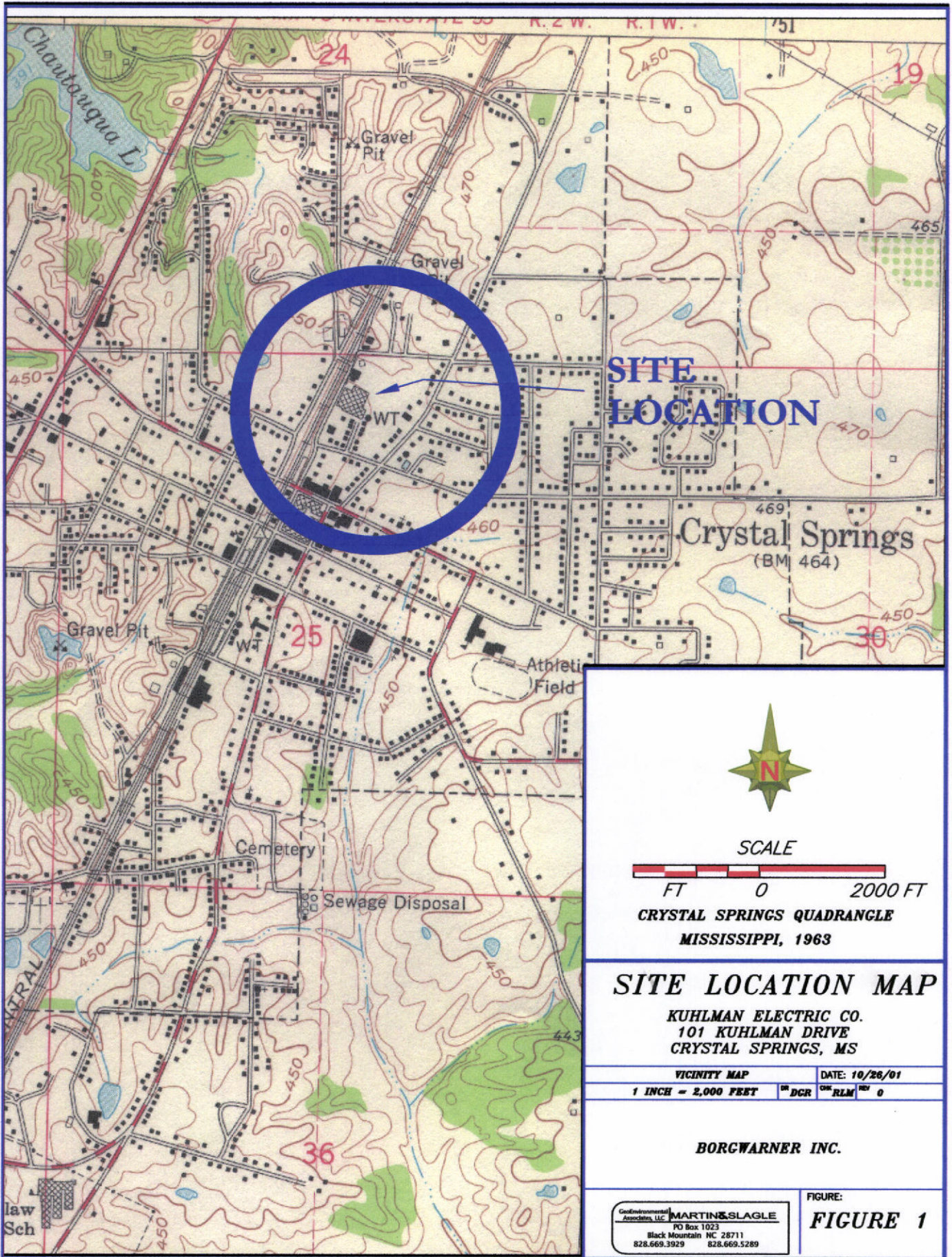
<u>NUMBER</u>	<u>TITLE</u>
1	MSDSs and Selected Chemical Data Sheets
2	Project Forms <ol style="list-style-type: none">Employee/Visitor Daily RosterVisitor and Subcontractor health and Safety Orientation FormMartin & Slagle Tailgate Safety Meeting ReportRecord of Change

RESPONDING EMERGENCY AGENCIES

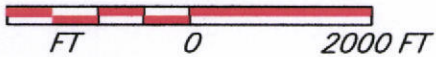
SERVICE	NAME	TELEPHONE NUMBER
Ambulance	Local EMS	911
Fire Department	Local Fire	911
Police Department	Local Police	911
Poison Control Center	(Jackson is closest)	(601) 354-7660
Civil Defense		

MSGE CALL LIST:

TITLE	NAME	TELEPHONE NUMBER
Project Manager	Robert L. Martin	(828) 669-3929 (office) (828) 712-1115 (mobile)
Field Manager	Charles O. M. Peel	(601) 898-2792 (office) (601) 955-8531 (mobile)
Site HSC	Keith Warren	(601) 892-6987 (field office) (601) 953-3364 (mobile)
Plant Contact	Allen Thomas	(601) 892-6408
State or Federal OSHA Office	Dept of Labor	1-800-522-6762



SCALE



CRYSTAL SPRINGS QUADRANGLE
MISSISSIPPI, 1963

SITE LOCATION MAP

KUHLMAN ELECTRIC CO.
101 KUHLMAN DRIVE
CRYSTAL SPRINGS, MS

VICINITY MAP	DATE: 10/26/01
1 INCH = 2,000 FEET	DR DCR DR RLM REV 0

BORGWARNER INC.

GeoEnvironmental Associates, LLC
MARTIN & SLAGLE
PO Box 1023
Black Mountain NC 28711
828.669.3929 828.669.5289

FIGURE:
FIGURE 1

*Remediation Work Plan for Kuhlman Electric Plant Site
Kuhlman Electric Corporation – Crystal Springs, Mississippi
November 2001*

LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
BGS	Below Ground Surface
BZ	Breathing Zone
CDL	Commercial Drivers License
CFR	Code of Federal Regulations
CHSD	Corporate Health and Safety Director
CHSO	Corporate Health and Safety Officer
CPR	Cardiopulmonary Resuscitation
CRC	Contamination Reduction Corridor
CRZ	Contamination Reduction Zone
CSE	Confined Space Entry
dBA	Decibels on the A-scale of a Sound Level Meter
DECON	Decontamination
DOSH	Department of Safety and Health
DOT	Department of Transportation
DRI	Direct Reading Instrument
EC	Emergency Coordinator
ECP	Exposure Control Plan
EMT	Emergency Medical Technician
EOD	Explosive Ordnance Disposal e V Electron volt
EZ	Exclusion Zone
f/cc	fibers per cubic centimeter
FID	Flame Ionization Detector
FM	Field Manager
GFCI	Ground-fault Circuit-interrupter
H: V	Horizontal to vertical
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HEPA	A High Efficiency Particulate Apparatus
HIV	Human Immunodeficiency Virus
HSC	Health and Safety Coordinator
HSP	Health and Safety Plan
IDLH	Immediately Dangerous to Life or Health
IDW	Investigation-Derived Waste
IP	Ionization Potential
IPA	Isopropyl Alcohol
LEL	Lower Explosive Limit
LOTO	Lockout/Tagout
mg/m ³	milligrams per cubic meter
Mod.	Modified
MSDS	Material Safety Data Sheet
MSG&A	Martin & Slagle GeoEnvironmental Associates
NIOSH	National Institute for Occupational Safety and Health
O.D.	Optical Density
O ₂	Oxygen
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
PCB	Polychlorinated Biphenyl
PCSA	Power Crane and Shovel Association
PE	Polyethylene
PEL	Pemissible Exposure Limit
PID	Photoionization Detector

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PM	Project Manager
PM10	Particular matter <10 microns
PPE	Personal Protective Equipment
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
ROC	Record of Change
ROPS	Rollover Protective Structure
SCBA	Self-contained Breathing Apparatus
SHSC	Site Health and Safety Coordination
SLM	Sound Level Meter
STEL	Short-term Exposure Limit
SZ	Support Zone
TLV	Threshold Limit Value
TWA	Time-weighted Average
TZ	Transition Zone
UEL	Upper Explosive Limit
USA	Underground Service Alert
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank UV Ultraviolet
UXO	Unexploded Ordnance
ZMS	Zero Mechanical State

1.0 INTRODUCTION

This Health and Safety Plan was prepared for use during field operations related to remediation of PCB containing soil at Kuhlman Electric Corporation in Crystal Springs, Mississippi. It was prepared in accordance with the requirements for Hazardous Waste Operations and Emergency Response under 10 CFR 1910.120.

1.1 GENERAL INFORMATION:

<u>Client:</u> Borg Warner	<u>Client Contact:</u> Anastasia Hamel
-------------------------------	---

<u>Site Name & Location:</u> Kuhlman Electric Corporation 101 Kuhlman Drive Crystal Springs, MS 39059	<u>Site Contact</u> Al Thomas (601) 892-6408
--	--

<u>Field Manager:</u> Charles O. M. Peel	<u>Project Manager:</u> Robert L. Martin
---	---

<u>Mobile Tel.#:</u> (601) 955-8531	<u>Telephone #</u> (828) 669-3929
--	--------------------------------------

(See also Emergency Call List)

1.2 SITE DESCRIPTION AND FEATURES:

Kuhlman Electric Corporation is located at 101 Kuhlman Drive in Crystal Springs, Mississippi. The location of the site is presented in the Site Location Map (Figure 1). Two areas of concern have been discovered at the site. One contaminated location was discovered during trenching for installation of a new storm sewer. Workers observed a black fluid seeping from the sidewalls of the excavation. The suspected source of the contamination is a tanker truck containing PCB/benzene compound mixture used as dielectric fluid, which was parked in the area from 1950-1970. The second location of contamination was discovered during excavation for a proposed building foundation. Similarly, a black fluid was observed seeping from the sidewalls of the excavation. The source of this contamination is unknown. PCB (Aroclor 1268) and several chlorobenzene compounds have been detected at both locations. The Site Map, presented as Figure 2, illustrates the potential areas of concern.

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The areas of concern have been covered with plastic and surrounded with caution tape. The investigation area is mostly flat and void of major logistical obstacles. Several AST's containing transformer oils and mineral spirits are located at the facility. These AST's are location on the opposite side of the factory and at a safe distance from the investigation area.

The prevailing wind direction is from the southwest and variable. Temperatures will range from 50 degrees at night to 85 degrees in the day for the initial investigation. Precipitation is likely during the fieldwork.

The site is located in close proximity to residential areas. Therefore, offsite migration of contaminants in any form will be frequently monitored. Electricity will be provided by the plant onsite as needed. Large volumes of water are available onsite for decontamination procedure and dust suppression (as needed).

1.3 BACKGROUND/SITE HISTORY:

Refer to Sections 1.2, 1.3 and 1.3.1 in this work plan.

1.4 SCOPE OF WORK/PLANNED SITE ACTIVITIES:

The goal of this contamination investigation is to delineate soil and groundwater contamination at two suspected locations. It is anticipated that the project will run for an undetermined period of time, with the initial field investigation lasting 10 days. Planned site activities include the following tasks, listed in the sequence of occurrence:

*Remediation Work Plan for Kuhlman Electric Plant Site
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- 1 Collection of soil and groundwater samples using a truck-mounted hydraulic direct push rig. Anticipated total depth of the borings is 30 feet bgs or depth to groundwater. Ground water depth is unknown.
- 2 Heavy equipment decontamination using a steam cleaner and a process of detergent wash, water rinse, solvent rinse, water rinse, and deionized water rinse, according to the SAP.
- 3 Management of investigation-derived waste (IDW), including collection, segregation, labeling, handling, and inventorying of drums containing generated wastes and sample spoils.
- 4 Onsite laboratory sample analysis for contaminants of concern.

1.5 SCHEDULED ONSITE PERSONNEL: *

NAME	COMPANY	PROJECT TITLE
Robert L. Martin	Martin & Slagle GeoEnvironmental Associates	Project Manager
Stephanie Guderath	Martin & Slagle GeoEnvironmental Associates	Field Technician
Charles O. M. Peel	Peel Consulting	Field Manager
Charles O. M. Peel.	Peel Consulting	Geologist
Keith Warren	Venture Industries	Site H & S Coordinator
TBD	Probe Technology	Direct Push Subcontractor
TBD	Environmental Chemistry Consulting Services, Inc. (ECCS)	Onsite Laboratory

* Note that all personnel arriving or departing the site should log in and out on the Daily Employee/Visitor Roster (Appendix 2). Substitutions will be made with similarly qualified personnel; the Record of Change (ROC) must reflect all personnel changes. All personnel requiring access to controlled work areas must have completed the training and medical administrative control requirements.

1.6 PERSONNEL RESPONSIBILITIES

Site Health and Safety Coordinator (SHSC)

- Reports jointly to the Project Manager (PM) and the Field Manager (FM) for all aspects of the project and is the primary contact for health and safety during all field activities.
- Establishes work zones, evacuation routes, and assembly areas.

- Makes the day-to-day decision to modify levels of protection provided in the HSP based on site conditions or monitoring data.
- Provides necessary support to the Emergency Coordinator (see Project or Field Manager below).
- Has the authority to stop all work if conditions are judged to be hazardous to onsite personnel or the public, and reports and investigates accidents and near misses.
- The SHSC or designee must carefully document the implementation of this HSP by maintaining the Project Health and Safety Files.

Project or Field Manager (PM or FM)

- The project or field manager (PM or FM), also referred to as the Site Superintendent, has responsibility for all field activities, enforcement of safe work practices, and ensuring that daily tailgate meetings are conducted (either by the PM or FM, SHSC, or a rotation of field team members and subcontractor team members).
- Serves as the Emergency Coordinator (EC) in emergency situations. The PM or FM assumes (or assigns to a qualified person) the SHSC duties and responsibilities when the SHSC is not onsite.

Technical Staff

- All MSGA and subcontracted personnel are responsible for compliance with this HSP in its entirety.
- Responsible for taking all reasonable precautions to prevent injury to themselves and to fellow employees
- Responsible for being alert to potentially harmful situations.
- Technical staff members are expected to perform only those tasks that they believe can be done safely
- Immediately report any accidents, near misses, and/or unsafe conditions to the SHSC or the FM.

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Subcontractors

- Responsible for the conduct of personnel while onsite and ensuring compliance with this HSP.
- Notifying the SHSC of any special medical conditions that could be affected by site conditions (e.g., allergies, diabetes, etc.)
- Correcting any unsafe acts/conditions that are identified by the PM or FM or SHSC.

2.0 PERSONNEL PROTECTION

The prescribed methods and procedures used to protect personnel (site workers and adjacent community) from overexposure to hazardous materials and hazardous conditions posed by site operations are grouped into three primary categories: Administrative Controls, Engineering Controls, and Personal Protective Equipment (PPE).

2.1 ADMINISTRATIVE CONTROLS

2.1.1 Medical Surveillance

Periodic Comprehensive Exam:

All personnel requiring access to controlled work areas will have completed a pre-assignment medical examination and a periodic (usually annual) update examination prior to assignment, in accordance with OSHA 29 CFR 1910.120(f). An Occupational Health Physician, who will provide a written clearance for hazardous waste site work and for respirator usage, must perform the exam.

Emergency Medical Treatment:

Personnel who exhibit signs and symptoms of chemical or heat overexposure, or have been injured on the job, might also seek medical services. See also the Emergency Response (Section 9.3) for specific information regarding emergency services and logs, reports, and record keeping; Section 2.1.5, for required report submittals. Subcontractors should provide internal Workers' Compensation information to the SHSC or PM/FM during the pre-work meeting, for emergency use.

Special:

Tetanus inoculations, heavy metal screenings, liver enzyme panels, etc. as required by the contract or additional OSHA regulations.

2.1.2 Training

Comprehensive:

All routine onsite general site workers performing intrusive activity or having potential to receive exposures

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exceeding permissible limits will have completed the OSHA 40-hour Hazardous Waste Operations Training. Three days of onsite supervised training must be completed upon initial assignment. Appropriate annual refresher (within 12 months) updates must be completed by all HAZWOPER personnel. Supervisors will have completed the above and an additional 8 hours of OSHA Supervisory Training. All MSGA staff will have completed training in First Aid/CPR and fire extinguisher usage. In accordance with 49 CFR 172, DOT HM126F training is required for all employees who handle, transport, or prepare to transport hazardous materials.

Occasional site workers that are not expected to receive exposures exceeding permissible exposure limits (e.g., geophysical and land surveyors) require only 24 hours of OSHA Hazardous Waste Operations Training and 1 day of onsite training and supervision.

Specialized:

Prior to the initiation of site activities, the SHSC and PM/FM will conduct a H&S "kick-off" meeting. At this time the site-specific Health and Safety Plan (HSP) will be discussed in detail with special attention being given to site chemical and physical hazards, PPE, emergency procedures, etc. Upon completion of this briefing, all routine field personnel, including subcontractors, will be required to read and sign the acceptance sheet of this HSP.

Site visitors and nonroutine subcontractors who do not attend this meeting will be required to undergo a specialized health and safety orientation, as documented on the Visitor and Subcontractor Orientation Form in Appendix 2.

Daily:

"Tailgate" safety meetings will be conducted each morning by the PM/FM, SHSC, or a rotation of MSGA and subcontractor team members for all phases of work. Topics of discussion will include work tasks and designated PPE, emergency procedures, evacuation routes, instruction in use of safety equipment (as required), prior safety problems, recognition of signs and symptoms of overexposure, importance of proper decontamination, and personal hygiene, etc. These meetings must be documented; forms are provided in Appendix 2.

2.1.3 Accident Prevention

- Accident prevention measures are as follows:

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- The buddy system will be adhered to at all time. All crews will consist of a minimum of two people.
- Exclusion Zone limits will be clearly marked. Only essential and authorized personnel will be allowed inside the Exclusion Zone and only with proper equipment.
- Good house keeping practices will be used at all times.
- Air monitoring will be performed and recorded on an hourly basis. Air monitoring will consist of Flame Ionization Detector (FID), dust monitor, and Sensidyne colorimetric tubes.
- All personnel will use proper lifting techniques.

2.1.4 Safe Work Practices:

- 1) Unauthorized personnel are not allowed onsite, particularly in the Exclusion Zone (EZ).
- 2) Work groups will always consist of at least two (2) team members.
- 3) Wind-flags will be positioned onsite so that work can be performed upwind as much as possible.
- 4) A high standard of personal hygiene will be observed. Smoking, eating, drinking, chewing gum or tobacco, taking medication, and applying cosmetics will not be permitted within any restricted or exclusion zone.
- 5) Wearing of contact lenses in contaminated atmospheres is prohibited.
- 6) Open flames are not allowed anywhere onsite without a hot-work permit.
- 7) Personnel under the obvious influence of alcohol or controlled substances are not allowed onsite; those taking medications must notify the SHSC.
- 8) Personnel will avoid skin contact with contaminated or potentially contaminated media. If such contact occurs, the affected areas should be washed thoroughly with soap and water.
- 9) Personnel will discard and replace any damaged or heavily soiled protective clothing. Discarded PPE will be drummed at the end of each day.

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- 10) Personnel should notify the SHSC of any defective monitoring, emergency, or other protective/safety equipment.
- 11) A supply of potable water, electrolyte replacement solutions, shaded break area, and sufficient lighting will be maintained onsite; sanitary facilities will be accessible to personnel.
- 12) Owners/operators of heavy equipment will ensure that they are in good working order by performing daily inspections and routine maintenance. Deficiencies affecting health and safety shall be corrected prior to equipment use.
- 13) All unsafe conditions shall be made safe immediately. All unsafe conditions not in the scope of the project shall be reported to the PM and the condition corrected.
- 14) All site personnel will familiarize themselves with these and all other emergency procedures during daily tailgate and pre-work safety meetings.
- 15) Following safe work practices reduces the likelihood of an accident, illness, or injury during field activities.
- 16) Loose-fitting clothing or loose long hair is prohibited near moving machinery.
- 17) Workers who are passengers or drivers of vehicles (both offsite and onsite) will wear their seat belts any time the vehicle is in motion.
- 18) All internal combustion engines must have spark arrestors that meet the requirements for hazardous atmospheres if they are to be used in such areas.
- 19) Do not fuel engines while vehicle is running.
- 20) Install adequate onsite roads, signs, lights, and devices.
- 21) Where portable electric tools and appliances can be used (where there is no potential for flammable or explosive conditions), they will be equipped only with 3-wire grounded power and extension cords to prevent electrical shock.
- 22) Store tools in clean, secure areas so they will not be damaged, lost, or stolen.

2.1.5 Logs, Reports, and Record Keeping

Submittal of Certification:

Proof of health and safety training and medical certifications must be submitted to the PM or FM and SHSC by the subcontractor prior to the mobilization of field crews. The SHSC will maintain a copy of the certifications (and all ROCs for revisions of personnel additions and substitutions) certifying that all MSGA and subcontracted personnel have satisfied the minimum training and medical requirements listed above. Supporting documentation and certificates will remain on file with the HSC in the home office. Field projects will not be allowed to take place in the absence of adequate documentation.

Site Monitoring, Reports, and Records

The health and safety field files maintained by the SHSC, or his/her designee, will be the primary form of record keeping and documentation of site health and safety activities. These documents will be completed in sufficient detail to document the work performed; any unusual or significant circumstances under which the work was performed; any unanticipated/unplanned action taken to mitigate or to otherwise cope with unexpected field conditions; and pertinent comments about site-specific conditions that could have a bearing on the work performed. Documentation is required for all phases of work. See also the SHSC duties listed under Personnel Responsibilities. Record keeping practices will follow 29 CFR 1910.20.

The Health and Safety Binder will contain the following documents; all blank forms (designated by an asterisk) are provided in Appendix 2 to this HSP:

- Signed acceptance sheet of this HSP (signed by all routine onsite personnel)
- Safety inspection records including violations and remedial action plans
- Health and safety notations made in the Site Log Book that is held by the PM or FM
- Employee/Visitor Daily Roster
- Visitor and Subcontractor Health and Safety Orientation forms
- Daily Tailgate Safety Meeting reports

- Instrument Calibration Log

- Daily Drill Rig Checklist

- Daily Backhoe Checklist

- Air Surveillance records
- Supervisors Report of Injury or Illness and First-aid Incident reports
- Accident/First-Aid Incident Summary Log
- HBV Vaccination Declination form
- Incident Report (for environmental incidents, equipment damage, and work stoppages)
- Completed Record of Change forms (ROCs) to this HSP

2.2 ENGINEERING CONTROLS

2.2.1 Barriers

Barricades

Barricades, traffic cones, and/or marking/caution tape will be erected at a safe distance from excavations, pits, hazardous areas, and moving equipment to prevent unauthorized access to work areas from vehicular and pedestrian traffic. Barriers will be appropriate for the level of work activities and anticipated traffic. Signs will be conspicuously posted as

("CONSTRUCTION AREA -Authorized Personnel Only"), or equivalent.

2.2.2 Dust Suppression

When necessary, dust suppression techniques will be employed to minimize the generation of dust/particulates and associated contaminants into the atmospheres, to the greatest extent possible. The water tap should be fitted with a nozzle or other device to create a water spray or curtain to contain dusts. Also, stationary sources of dusts, e.g., stockpiles, should be covered with a plastic (visqueen) or canvas tarping. Trenching operations have the largest dust-generating potential; therefore, modification (reduction) of work pace may be necessary to reduce visible emissions dust screens shall be moved as needed. Monitoring of the work areas and the fence-lines shall be conducted on a regular, frequent basis with the portable PM₁₀ or equivalent dust monitor to ensure engineering controls are effectively reducing concentrations below action levels.

2.2.3 Rinseate Collection/Containment

A system for collection of rinseate from decontamination operations (heavy equipment, sampling equipment, and personnel decon) will be required. The system will be as complex or simple as necessary to collect and contain spent decon fluids, including over spray from steam-cleaning operations. Construction of the "permanent" heavy equipment decon area and all areas where steam cleaning of sampling equipment (augers, spoons, etc.) will be the responsibility of the equipment contractor. Construction of the temporary stations for personnel and other sampling equipment will be the responsibility of the SHSC and FM. Decon buckets should be placed in larger, plastic bins to contain splash. All spent fluids will be containerized in accordance with procedures/guidelines referenced in this HSP (see Decontamination Procedures, Section 8.0).

2.2.4 Noise Reduction

Site activities in proximity to welding, construction, and heavy equipment often expose workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed the OSHA Action Level of 85 dBA in an 8-hour time-weighted average (TWA). An example of this possibility is working in close proximity to the subcontractor during drilling or trenching activities onsite. If excessive noise levels occur, efforts will be made to control this by issuance of ear plugs to all personnel and by implementing a system of hand signals understood by all (see Section 5.4).

2.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)

2.3.1 Levels of Protection

Initial levels of protection for this site may vary depending on the task. All personnel entering controlled work zones will initially be required to wear the Level of Protection as specified in the Task Hazard Analyses section and summarized in Table 1 below.

Protection may be upgraded or downgraded depending on monitoring data (compared with action levels) and site conditions, as determined by the SHSC. All changes must be noted in this HSP and documented on

ROCs (Appendix 2). The following outlines the minimum requirements for each level of protection that is assigned or potentially assigned.

Level D PPE:

- Work shirt and full-length cotton pants or coveralls

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- ANSI standard safety-toed work boots
- ANSI standard hard hat (when working around heavy equipment or overhead “bump” hazards)
- ANSI standard safety glasses
- USEPA-approved hearing protectors (when working in high noise areas, e.g., steam cleaners and heavy equipment)

Table 1

**INITIAL* ASSIGNMENTS OF PROTECTION LEVELS,
 TRAINING, AND: MEDICAL SURVEILLANCE
 ASSIGNMENTS FOR SITE WORK TASKS**

Task Name <i>List in same order as in Task Hazard Evaluation Section 3.2</i>	Level of Protection	HAZWOPER		
		40-hour Classroom Training	24-hour Classroom Training	Medical Surveillance
Direct Push Sampling	Mod. D	Yes	Yes	Yes
Heavy equipment Decontamination	Mod. D	Yes	Yes	Yes
IDW Management	Mod. D	Yes	Yes	Yes
Onsite Laboratory Analysis	Mod. D	No	No	No

* Initial assignments may be modified by the SHSC as additional data are received from monitoring data and compared to action levels (Table 5), or as warranted by site conditions. Any changes will be noted in this HSP and/or documented on ROCs (Appendix 2).

** Modified Level D PPE indicates the use of protective clothing but no respiratory protection.

Level D PPE:

- Level D equipment
- Cotton coveralls, work clothes or Tyvek® suits (upgrade to PE or Saranex-coated Tyvek® as needed)
- Outer chemical-resistant gloves and inner nitrile gloves
- Boot covers or chemical-resistant boots

Level C PPE:

- Tyvek® suits (upgrade to PE or Saranex-coated Tyvek® as needed), with taping of suits to boots and gloves as necessary
- NIOSH-approved, half-face or full-face air-purifying respirator with organic vapor/acid gas cartridges and particulate pre-filters.

Level B PPE:

- Level C equipment, use of chemical-resistant suits, taped to boots and gloves
- NIOSH-approved, pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape-SCBA (additional employee training is required for Level B operations)

Level A PPE:

- Use of fully encapsulating suit.
- NIOSH-approved, pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape-SCBA (additional employee training is required for Level B operations)

2.3.2 PPE Donning/Doffing Procedure

The following procedures are given as a guide. Failure to adhere to these procedures may result in the PPE being ineffective against contaminants. These may be altered by the SHSC if improvements can be made to the procedures and these changes are warranted in the field. Also, some articles of PPE may not be necessary for all site tasks.

PPE Donning Procedure (for Mod. Level D and greater):

- Inspect all protective gear before donning.
- Don Tyvek® suit, inner gloves and outer gloves, secure w/tape, as required, leave pull-tab. If Tyvek® is loose secure w/tape to avoid capture in moving or rotating equipment.
- Don respirator. If not in Level C, maintain respirator in a sealed plastic bag onsite in case of an upgrade.

PPE Doffing Procedure:

- Wash/rinse (if necessary) excess mud or other debris from outer boots, gloves, and clothing.
- Remove tape using pull tab and remove outer clothing in the order of boots, outer gloves, and Tyvek® suits. Place disposable and reusable PPE in designated (separate) containers.
- Remove respirator (if applicable). Decon and fit-check prior to reuse.
- Remove inner gloves.
- Enter the clean zone, wash face, neck and hands.

2.3.3 PPE Failure/Chemical Exposure

In the event of PPE failure, worker and buddy will cease work, perform personal decon procedures, and exit to the CZ/SZ. Refer to the MSDS and emergency actions section if emergency medical response is needed. If chemicals contact the eyes, irrigate for 15 minutes and consult a physician.

3.0 HAZARD EVALUATION

Chemical, physical, energy, biological, and operational safety hazards anticipated during this project will be evaluated in the tables and sections that follow Section 3.1. The tables provide the details that support the task-specific hazard analyses. Table 2 provides a general overview of the contaminants of concern; Table 3 provides chemical properties and exposure assessment data; and Table 4 summarizes the physical and operational safety hazards and control measures identified for this project. A complete hazard analysis of each site work task and the list of protective measures complete this section of Hazard Evaluation. Further details of specific control measures for these hazards are presented under the section heading: "Personnel Protection."

3.1 CHEMICAL EXPOSURE

The primary entry routes of potential contaminants and hazardous materials onsite include inhalation of vapors and dusts; skin contact with contaminated materials; and ingestion of airborne dusts or materials from hand-to-mouth contact due to inadequate personal hygiene. To minimize these exposure pathways, dust suppression techniques will be employed by the onsite subcontractor and the SHSC will periodically monitor for airborne contaminants in the work and perimeter areas. In addition, all required PPE as specified in the Hazard Analysis of Site Work Tasks section will be worn, and personal hygiene will be carefully monitored.

The following categories of contaminants of concern under investigation may be present at the site:

• Aroclor 1260 (PCB)	•	•
• Trichlorobenzene	•	•
• Tetrachlorobenzene	•	•
• Pentachlorobenzene	•	•
• Hexachlorobenzene	•	•
•	•	•

In addition to the contaminants of concern, the following hazardous substances are anticipated to be brought onsite to supplement investigation activities:

- Isopropyl alcohol (IPA)
 - Alconox detergent
- Others _____

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- Gasoline _____
- Calibration gas (Methane) _____

These hazardous materials are subject to the Hazard Communication Standard; required MSDSs are presented in Appendix 1. The hazardous materials must also be properly labeled with the identity of the hazardous chemical(s) contained therein and the appropriate hazardous warning information. The list above must be updated and MSDSs obtained and filed for any other hazardous substances brought onsite.

Table 2
SITE CHARACTERIZATION

ANTICIPATED STATE OF CONTAMINANT (S):

- | | | |
|--|------------------------------------|--------------------------------------|
| <input checked="" type="checkbox"/> Liquid | <input type="checkbox"/> Sludge | <input type="checkbox"/> unknown |
| <input type="checkbox"/> solid | <input type="checkbox"/> Gas/Vapor | <input type="checkbox"/> Other _____ |

Notes: _____

MATRIX:

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Surface Soils | <input type="checkbox"/> Surface Water | <input checked="" type="checkbox"/> Free Product |
| <input checked="" type="checkbox"/> Soils at depth | <input type="checkbox"/> Ground Water | <input type="checkbox"/> Other _____ |

Notes: _____

POTENTIAL HAZARDOUS PROPERTIES:

- | | | |
|---|--|--------------------------------------|
| <input type="checkbox"/> Corrosive | <input type="checkbox"/> flammable/Combust. | <input type="checkbox"/> Radioactive |
| <input checked="" type="checkbox"/> Toxic | <input type="checkbox"/> Volatile | <input type="checkbox"/> Reactive |
| <input type="checkbox"/> Inert | <input checked="" type="checkbox"/> Carcinogenic | <input type="checkbox"/> Unknown |
| <input type="checkbox"/> Asphyxiant | <input type="checkbox"/> Compressed gas | <input type="checkbox"/> Other _____ |

Notes: _____

CONTAINERS/STORAGE SYSTEM INFORMATION:

- | | | |
|--------------------------------------|--|---|
| <input type="checkbox"/> Tanks _____ | <input type="checkbox"/> Landfills/Dumps | <input type="checkbox"/> Subsurface |
| <input type="checkbox"/> Drums _____ | <input type="checkbox"/> Impoundments | <input checked="" type="checkbox"/> Uncontainerized |
| <input type="checkbox"/> Pipes _____ | <input type="checkbox"/> Size/capacity _____ | <input type="checkbox"/> In-Service |
| <input type="checkbox"/> Quantity | <input type="checkbox"/> Surface | <input type="checkbox"/> Other _____ |

Notes: _____

CONDITIONS OF CONTAINER/STORAGE SYSTEM (S):

- | | | |
|---|--|---|
| <input type="checkbox"/> Sound/Undamaged | <input type="checkbox"/> Confirmed leaks | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Deteriorated/Unsound | <input type="checkbox"/> Suspected leaks | <input type="checkbox"/> Unknown |
| <input type="checkbox"/> Other _____ | | |

Notes: _____

ORIGIN OR INDUSTRIAL APPLICATION OF CHEMICALS OF CONCERN:

Industrial Process

- | | |
|---|---|
| <input type="checkbox"/> Manufacturing | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Maintenance/Repair | <input checked="" type="checkbox"/> Prev. Use |
| <input type="checkbox"/> Painting/Coating | <input type="checkbox"/> Storage |
| <input type="checkbox"/> Power Generation | <input type="checkbox"/> Other _____ |

Notes: _____

Chemicals Used or Identified

- | | | |
|---|--|--|
| <input type="checkbox"/> Acids | <input type="checkbox"/> Metals | <input type="checkbox"/> Phenols |
| <input type="checkbox"/> Caustics | <input type="checkbox"/> Pesticides | <input checked="" type="checkbox"/> Paints |
| <input checked="" type="checkbox"/> Halogen | <input checked="" type="checkbox"/> PCBs | <input checked="" type="checkbox"/> Solvents |
| <input type="checkbox"/> Other: _____ | | |

Notes: _____

Oils/Fuels

- | | | |
|--|-----------------------------------|--------------------------------------|
| <input type="checkbox"/> Fuel Oil | <input type="checkbox"/> AVGAS | <input type="checkbox"/> Gasoline |
| <input type="checkbox"/> Waste Oil | <input type="checkbox"/> MOGAS | <input type="checkbox"/> Leaded |
| <input type="checkbox"/> Hydraulic Oil | <input type="checkbox"/> Jet Fuel | <input type="checkbox"/> Other _____ |

Notes: (N/A) _____

Sludges

- | | | |
|--|---------------------------------------|---|
| <input type="checkbox"/> Metal sludges | <input type="checkbox"/> Oily sludges | <input type="checkbox"/> Septic Sludges |
| <input type="checkbox"/> Other _____ | | |

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Notes: _____

Solids

Asbestos

Sandblast grit

Landfill refuse

Other _____

Notes: (N/A) _____

General Notes: _____

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Table 3
 CHEMICAL HAZARD PROPERTIES AND EXPOSURE INFORMATION

CHEMICAL NAME/ SYNONYM	ACGIH TLV/ OSHA PEL	STEL/ IDLH	IP (eV)	LEL/ UEL	ROUTE/SYSTEMS**		PROPERTIES/ CHARACTERISTICS
					ROUTE	SYMPTOMS	
Chlorobenzene	10ppm/	None/	9.1	1.30%	Inh	irrit eyes, skin nose; drow, inco;	colorless liquid with an almond-like odor
	75 ppm	1000 ppm		9.60%	Ing	CNS depres; in animals; liver,lung	
					Con	kidney inj.	
						Liquid can irritate and burn skin,	
						Vapors cn irritate eyes, nose and	
						throat at 3-5 ppm	
Arochlor	0.5 mg/m ³ /	None/	ND	NA/NA	Inh	irriteyes, chloracne, liver damage,	Nonflammable liquid, but exposure to a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans & chlorinated dibenzo-p-dioxins
	0.5 mg/m ³ /	5 mg/m ³			Abs	repro effects (carc)	
Polychlorinated Biphenyl (PCB) (as 60% chlorine)	(skin)				Ing		
					Con		
Dioxin (aka: Tetrachlorodibenzo-p-dioxin, TCDD)	All route of exposure	N.D.	N.D.	N.D.	Inh	Irrit eyes; allergic derm,chlor-acne; porhyris; GI dist; possible	Colorless to white, crystalline solid
	shall be avoided				Ing	repro, terato effects;in animals;	
					Con	liver, kidney damage; hemorr, (carc)	
Trichlorobenzene	-	C 5 ppm/	NE	2.5%/	Inh	Irrit eyes skin, nose, headache;	Low-melting point solid or liquid with pleasant aroma
		None		6.60%	Abs	nervousness, tremors, weakness;	
					Ing	digestive disorder weight loss	
					Con		
Tetra-, penta-, and Hexachlorobenzene	NE	NE	NE	NE	Inh	In general, chlorinated benzenes	
					Abs	are irritating to the skin,	
					Ing	conjunctive, mucous membranes	
					Con	of the upper resp. tract	

*C	OSHA Ceiling Limit	PEL	OSHA Permissible Exposure Limit	IP	Ionization potential
IDLH	Immediately dangerous to life or death	NE	None Established	STEL	Short-term exposure limit
LEL	Lower explosive limit	ppm	Parts per million	UEL	Upper explosive limit
Mg/m ³	Milligrams per cubic Meter	STEL	Short term exposure limit	TLV	ACGIH Threshold Limit Values
NA	Not applicable	TWA	Time Weighted Average	ND	None determined

Sources: The above information was derived from NIOSH Pocket Guide to Chemical hazards, (June 1997). ACGIH

Threshold limit Values (1998). Handbook of Toxic and Hazardous Chemicals and Carcinogens (1991). Permissible Exposure Limits OSHA (1996).

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**abd=abdominal	BP+bloodpressure	constip+constipation	dist=disturbance
Abs=skin absorption	bron=bronchitis	convuls=convulsions	dizz=dizziness
Anes=anesthesia	carc=carcinogen	cyan=cyanosis	drow=drowsiness
Anor=anorexia	card=cardiac	decrs=decrease	dysp=dyspnea
Arrhy=arrhythmias	CNS=central nervous system	depress=depressant	emphy=emphysema
Asb=asbestosis	Con=contact	derm=dermatitis	equi=equilibrium
Asphy=asphyxia	conf=confusion	diarr=diarrhea	eryt=erythema
Euph=euphoria	inflam=inflammation	muc memb=mucous membrane	retster=retrosternal
Extrim=extrimities	Ing=ingestion	musc=muscle	salv=salivation
Fauk=failure	inh=inhalation	nau=nausea	sens=sensation
Fash=fasciculation	inj=injury	nerv=nervous	dez=seizure
FEV=forced expiratory volume	insom=insomnia	palp=palpitations	som=somnolence
Fib=fibrosis	irreg=irregular	para=paralysis	subs=substantial
Ftg=fatigue	irri=irritant	pare=paresthesia	sweat=sweating
Func=function	jaun=jaundice	perf=perrforation	swell=swelling
GI=gastrointestinal	kera=keratitis	perineur=peripheral neuropathy	sys=system
Gidd=giddiness	lac=lacrimation	periob=periorbital	tacar=tachycardia
Haul=hallucinations	lar=laryngeal	phar=pharyngeal	tend=tenderness
Head=headache	lass=lassitude	photo=photophobia	tght=tight
Hermato=hemotopoietic	leucyt=leukocytosis	pig=pigmentation	uncom=unconsciousness
Hempg=hemoglobinuria	leupen=lukopenia	pneu=pneumonia	verti=vertigo
Hemor=hemorrhage	li-head=lightheadedness	pneuitis=pneumonitis	vesic=vesicuation
Hyper=hypersensitivity	low-wgt=weightloss	PNS=peripheral nervous system	vomit=vomiting
Hypox=hypoxemia	mal=malaise	polyneuro-pathy	weak=weakness
Ict=icterus	malnut=malnutrition	prot=proteninuria	wgt=weightloss
Inco=incoordination	ment=mental	pilm=polmonary	
Incr=increase	monocy=monocytosis	resp=respirator	

- ACGIH TLVs and OSHA PELs are “Time Weighted Average” (TWA) concentrations that must be exceeded during any 8-hour shift or a 40-hour work week.
- Ceiling concentrations must be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure.
- IDLH represent the maximum concentration from which, in the event of respiratory failure, one could escape within 30 minutes without respirator and without experiencing any escape-impairing (e.g., severe irritation) or irreversible health effects.

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- (Skin) designates the potential for dermal absorption; skin exposure should be prevented. The value only represents inhalation hazards.
- “ppm” is parts per million by volume and is not equivalent to a ppm by weight in soil value, e.g., mg/kg.
- IPs (given in electron volt (eV) units) are presented for PID usefulness evaluation. The PID lamp should have an eV value greater than the analyte it is detecting.

† Exceeds PID detection capabilities.

**Table 4
 SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS**

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Physical hazards Associated with drill Rigs and other heavy equipment	<ul style="list-style-type: none"> • See also Excavation, Trenching, and Shoring SOP S-6, Drilling Safety SOP S-4, Appendix 3. • Equipment will be inspected on a daily basis by the owner/operator, daily logs will be maintained. All discrepancies shall be corrected prior to placing the equipment in service. • Blades, buckets, and other heavy equipment will be kept fully lowered when not in use; parking brakes must be engaged. • Drill rods or core barrels shall not be left balancing, leaning, or otherwise unsecured on the rig. • Equipment parked on inclines shall have the wheel chocked or blocked and the parking brake set. • Equipment shall not be used on unstable or unsafe inclines. • Increase communication effectiveness with operators using hand signals, radios (as appropriate), and line-of-sight confirmation.
Entanglement in Rotating or moving equipment	<ul style="list-style-type: none"> • Equipment shall not be operated without guards. • Loose fitting or dangling clothes, hair jewelry are prohibited. • Stay clear of rotating augers and pinch points, such as cables and pulleys. • Passage under, or stopping over, a moving stem or auger is prohibited. • Drill crews are not allowed on the mast while the drill bit/auger is in operation or during transport. • Long-handled shovels will be used to remove cuttings from the auger. • Only the drill crew and the SHSC will be aware of the location and proper operation of the rig's emergency shutdown equipment (kill-switches, etc.), and procedures.

Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Back injuries due to Improper lifting of drums, augers, etc	<ul style="list-style-type: none"> • Workers will use proper lifting techniques, lifting with the legs and not the back. Load >50 lbs. Require a second person or mechanical device. • Whenever possible, mechanical devices such as drum dollies, hand trucks and tool hoists (for lifting augers) should be used to lift or move heavy loads.
Slips, trips, and falls	<ul style="list-style-type: none"> • Clear work area of obstructions and debris prior to set-up. • Whenever possible, slip, trip and fall hazards will be eliminated or clearly identified with caution tape, barricades, or equivalent means. • Level and stabilize the rig prior to raising the mast. • Keep drill platforms, stairs, and immediate work areas clear; do not allow oil/grease and excessive mud to accumulate in these areas. • A safety harness and shock absorbing lifeline or adequate fall protection shall be provided and its use required for each employee working >6 ft. above the platform or main work deck. • Open boreholes should be immediately backfilled, or be capped and flagged; open excavations will be barricaded or be covered with steel traffic plates.
Noise	<ul style="list-style-type: none"> • Hearing protection shall be worn during operation of heavy equipment, pneumatic power tools, steam cleaners and other equipment that potentially generates >85 dBA.
Biological agents	<ul style="list-style-type: none"> • Workers will not be exposed to infectious agents or wastes with the current scope of work; however, responders to first-aid incidents may contact bloodborne pathogens, and will follow the Bloodborne Pathogen Control Plan in this HSP. • Workers shall be protected from hazards of irritant and toxic plants and be suitably instructed in the first-aid treatment available. • Workers shall be instructed regarding poisonous plants by reviewing the "Poison Ivy, Oak, and Sumac Field Guide,"

Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Biological agents (Continued)	<ul style="list-style-type: none"> • Personnel with known reactions to insect bites or stings should be identified during the “kickoff” meeting so that the appropriate emergency treatment can be made available onsite. • Workers should not attempt to capture any wild or semi wild animals due to the possibility of a bite or parasitic infection.
Fire and Explosion	<ul style="list-style-type: none"> • ABC fire extinguishers must be accessible in the work area. • Flammables must be stored in UL- and OSHA-approved metal safety cans with spark arrestors. • Flammable containers must be stored >50ft. from the rig; portable (flammable) tanks must be >100 ft. from the rig. • The exhausts of equipment powered by internal combustion engines will be located well away from flammables and combustibles. • Hot work permits/approvals must be secured prior to welding or cutting (Appendix 2) • Compressed gases must be stored and used in a safe manner. • Equipment, e.g., generators, shall not be refueled while in operation, or while hot enough to ignite fuel vapors. • Operations that pose fire hazards should be conspicuously marked: “No Smoking” or “No Open Flames” • Complete an Incident Report (Appendix 2) within 24 hrs. for all work shutdowns.

Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

Electrocution	<ul style="list-style-type: none">• Locate all overhead and underground power lines by geophysical methods (as feasible), reviewing engineering drawings, and by discussion with the appropriate activity and/or utility personnel. Confirm exact location of lines with hand tools, not heavy equipment; workers(s) should wear rubber insulated protective gloves.• Lower the drilling mast prior to moving the rig any distance.• Lock-out and tagging of controls that are to be deactivated for maintenance/work on energized or de-energized equipment or circuits.• Extension cords, power/electric tools, pumps floodlights, and generators that are not doubly insulated must have functional grounding conductors.• Ground-Fault circuit-interrupters (GFCIs) must be used on all 120-volt, 120-amp circuits.
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Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Electrocution (continued)	<ul style="list-style-type: none"> • The minimum distance required between drilling masts and overhead power lines <50 kv is 15 ft., unless the lines have been de-energized and visibly grounded at the point of work, or equipped with insulated barriers to prevent physical contact. • Site work will not be conducted when there is a threat of lightning storms.
Explosive ordnance	<ul style="list-style-type: none"> • With an encounter of suspected or detected explosive ordnance (EOD or UXO): • Stop work. • Mark suspected/confirmed explosive ordnance with tape, traffic cone, or other easily visible marker. • Evacuate the area at least 100ft. from the ordnance, as possible. • Call 911 to assess whether the EOC/UXO unit should be called. • Conduct a Visitor Health & Safety Orientation and escort visitor to marked area. • Complete an Incident Report (Appendix 2) within 24-hrs. for all work shutdowns.

Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

Trench Collapse or Cave-in	<ul style="list-style-type: none">• Whenever possible, workers shall not enter trenches or test pits to collect samples, but use remote equipment or devices, e.g., backhoe buckets, hand augers, shovels, or equivalent.• If entry is required at depths >4 ft., then the procedures in the Excavation, Trenching and Shoring proper OSHA procedures will be followed, including use of OSHA sloping or shoring; a “competent” person to inspect the trench prior to entry permit as required to ensure safe atmospheres.• All simple slopes in excavations to 20 ft. shall have a maximum allowable slope of 1.5:1 Horizontal:Vertical (H:V) or 34° as measured from the horizontal.• Excavated materials will be stored >2 ft. from the edge and/or have retaining devices.• All trenches/excavations shall be properly signed and barricaded to restrict unauthorized pedestrian and vehicular traffic.• Unattended open trenches are prohibited and should be back-filled upon completion or covered by steel traffic plates.
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**Table 4 (Continued)
 SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS**

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Heat Stress	<ul style="list-style-type: none"> • Workers will be trained to recognize signs and symptoms of heat illnesses. • Provide shelter or shaded area for work tasks (as feasible) and break areas. • Adjust work schedules by rotation of personnel or alternate job functions to minimize heat stress or overexertion at one task. • Perform work during cooler hours of the day (or night) as feasible. • Maintain normal body fluid levels by consuming 16 oz. (2 cups) of water prior to each shift and about 8 oz. (1 cup) every 15-20 minutes. Two gallons of water should be consumed over an 8 hour period. • Wear nonbinding cotton clothing, e.g., medical scrubs and cotton undergarments under PPE to absorb moisture and to help prevent heat rash. • As feasible, provide field “showers” or hose-down areas to cool down body.

Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

<p>Cold Stress</p>	<p>Train workers to recognize the signs and symptoms of cold stress illnesses:</p> <ul style="list-style-type: none"> • Frostbite-Skin color changes to white to reddish, pain followed by cold and numbness in the affected area(s), blisters may appear later. • Hypothermia-Uncontrollable shivering, a sensation of feeling cold, a slowed and sometimes irregular heartbeat, a weakened pulse, and changes in blood pressure. More severe cases can result in slurred speech, memory lapses, incoherence, and drowsiness. <p><u>First Aid</u></p> <ul style="list-style-type: none"> • Frostbite -Cover the frozen body part, provide extra clothing and blankets, bring the victim indoors ASAP , place the frozen body part in warm water (~100°F) or rewarm with warm packs. Seek medical assistance as soon as possible. • Hypothermia -Get victim out of wind, snow, and rain. Keep person awake. Remove any wet clothing and replace with dry, warm clothing. Wrap blanket around victim. If conscious, give victim sweet warm beverages. Seek medical attention ASAP. <p><u>Prevention</u></p> <ul style="list-style-type: none"> • Provide shelter away from rain, snow, or wind for breaks. • Institute a work-rest schedule in accordance with the SOP. • Increase fluid intake to prevent dehydration. Drink warm, sweet, caffeine-free, non-alcoholic drinks or soup periodically.
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Table 4 (Continued)
SUMMARY OF PHYSICAL AND OPERATIONAL SAFETY HAZARDS

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES																								
Cold Stress (Continued)	<ul style="list-style-type: none"> • Dress in layers to avoid overheating. Choose an absorbent fabric for next to the skin to absorb perspiration. • Cover the feet, hands, head, and face to prevent frostbite. 																								
Inclement weather	<p>Work shutdown conditions:</p> <ul style="list-style-type: none"> • Poor visibility. • Precipitation severe enough to impair safe movement or travel. • Lightning in the immediate area. Steady winds >40 mph. • Other conditions as determined by the SHSC, FM or HSM. • Imminent threat of severe tropical storm or hurricane. • Complete an Incident Report (Appendix 2) within 24 hrs. for all work shutdowns. 																								
Oxygen deficiency	<ul style="list-style-type: none"> • Prior to personnel entry for work, an attendant shall test confined spaces for oxygen deficient atmospheres, defined as <19.5 percent oxygen by volume in air (see also Table 5 of this HSP). These results will be verified by a supervisor onsite. • Whenever equipment powered with internal combustion engines (rigs, backhoes, generators, etc.) are used in enclosed spaces, atmospheres will be tested for LEL/O₂, as well as carbon monoxide and hydrocarbons. 																								
Key	<table border="0"> <tr> <td>EOD</td> <td>Explosive Ordinance Disposal</td> </tr> <tr> <td>FM</td> <td>Field Manager</td> </tr> <tr> <td>FP</td> <td>Field Procedure</td> </tr> <tr> <td>GFCI</td> <td>Ground-Fault Circuit-Interrupter</td> </tr> <tr> <td>HSP</td> <td>Health and Safety Plan</td> </tr> <tr> <td>KV</td> <td>Kilovolt</td> </tr> <tr> <td>LEL</td> <td>Lower Explosive Limit</td> </tr> <tr> <td>O₂</td> <td>Oxygen</td> </tr> <tr> <td>SHSC</td> <td>Site health and Safety Coordinator</td> </tr> <tr> <td>SOP</td> <td>Standard Operating Procedure</td> </tr> <tr> <td>UL</td> <td>Underwriters Laboratories</td> </tr> <tr> <td>UXO</td> <td>Unexploded Ordinance</td> </tr> </table>	EOD	Explosive Ordinance Disposal	FM	Field Manager	FP	Field Procedure	GFCI	Ground-Fault Circuit-Interrupter	HSP	Health and Safety Plan	KV	Kilovolt	LEL	Lower Explosive Limit	O ₂	Oxygen	SHSC	Site health and Safety Coordinator	SOP	Standard Operating Procedure	UL	Underwriters Laboratories	UXO	Unexploded Ordinance
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3.2 HAZARD ANALYSIS OF EACH SITE WORK TASK (List For Each Task In SOW)

TASK NAME: DIRECT PUSH SAMPLING

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Rotating Machinery | <input type="checkbox"/> Projectiles | <input type="checkbox"/> Confined Space |
| <input checked="" type="checkbox"/> Heat Stress | <input checked="" type="checkbox"/> Physical Exertion | <input type="checkbox"/> Biological (plants, rodent viruses, |
| <input type="checkbox"/> Cold Stress | <input checked="" type="checkbox"/> Noise (.85dBA) | Marine species, soilborne or |
| <input checked="" type="checkbox"/> Heavy Equipment | <input checked="" type="checkbox"/> Vehicle Traffic | waterborne fungi/bacteria, insects, |
| <input checked="" type="checkbox"/> Intrusive Activities (underline) | <input type="checkbox"/> Fire/Explosion (underline) | arachnids, snakes, wild animals) |
| • Trenching | • Flam. Materials | <input checked="" type="checkbox"/> Electrical (utilities) |
| • Drilling | • Low-lying Areas | <input checked="" type="checkbox"/> Chemical Exposure |
| • Soil Vapor Survey | • Fuel lines | <input type="checkbox"/> Ergonomics |
| • Sampling | <input type="checkbox"/> Work over water (lagoons, | <input type="checkbox"/> Other (list) |
| <input checked="" type="checkbox"/> Uneven terrain | streambeds, ravines, bay | |
| <input checked="" type="checkbox"/> Trench/excavation collapse | ocean) | |

Control or Protective Measures: (see also Table 4)

- | | |
|---|--|
| <input checked="" type="checkbox"/> Tailgate Meetings | <input checked="" type="checkbox"/> PPE, level D |
| <input checked="" type="checkbox"/> Operator Training | <input checked="" type="checkbox"/> Site Control |
| <input checked="" type="checkbox"/> Engineering Controls: | See Engineering Controls _____ |
| <input type="checkbox"/> Other | _____ |

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the onsite health and safety coordinator (SHSC). Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

- | | | | |
|--|---|--|--------------------------------------|
| <u>Level Of Protection:</u> | <input type="checkbox"/> A | <input type="checkbox"/> B | <input type="checkbox"/> C |
| | <input type="checkbox"/> Modified level D | <input checked="" type="checkbox"/> D | |
| <u>Respirator:</u> (Level C and above) | <input type="checkbox"/> SCBA, Airline | <input checked="" type="checkbox"/> Purif. Resp. | <input type="checkbox"/> Escape Mask |
| | <input checked="" type="checkbox"/> OV/AG Cart. | <input checked="" type="checkbox"/> Other | <u>Dust Prefilter</u> |

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- Protective Clothing: Encap. Suit Tyvek® PE Tyvek®
 Saranex Splash Suit
 Other Coveralls
- Head/Eye/Ear: Hard Hat Safety Glasses Goggles
 Splash Shield Ear Plugs/Muffs Other
- Gloves: (outer) Nitrile Neoprene PVC (inner)
 (inner) N-dex® Nitrile Vinyl Other
- Footwear: Safety-toed Leather Overboots
 Safety-toed Rubber Other

Modifications Permitted: Change Tyvek when soiled. Upgrade to PE Tyvek as needed to keep materials off of skin and inner clothing

X = required PPE; * = modifications permitted; † = in case of upgrade.

TASK NAME: HEAVY EQUIPMENT DECONTAMINATION

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

- | | | |
|---|---|---|
| <input type="checkbox"/> Rotating Machinery | <input type="checkbox"/> Projectiles | <input type="checkbox"/> Confined Space |
| <input checked="" type="checkbox"/> Heat Stress | <input checked="" type="checkbox"/> Physical Exertion | <input type="checkbox"/> Biological (plants, rodent viruses, |
| <input type="checkbox"/> Cold Stress | <input checked="" type="checkbox"/> Noise(.85dBA) | Marine species, soilborne or |
| <input checked="" type="checkbox"/> Heavy Equipment | <input type="checkbox"/> Vehicle Traffic | waterborne fungi/bacteria, insects, |
| <input type="checkbox"/> Intrusive Activities (underline) | <input type="checkbox"/> Fire/Explosion (underline) | arachnids, snakes, wild animals) |
| • Trenching | • Flam. Materials | <input type="checkbox"/> Electrical (utilities) |
| • Drilling | • Low-lying Areas | <input checked="" type="checkbox"/> Chemical Exposure |
| • Soil Vapor Survey | • Fuel lines | <input checked="" type="checkbox"/> Ergonomics |
| • Sampling | <input type="checkbox"/> Work over water (lagoons, | <input type="checkbox"/> Other (list) |
| <input type="checkbox"/> Uneven terrain | streambeds, ravines, bay | |
| <input type="checkbox"/> Trench/excavation collapse | ocean) | |

Control or Protective Measures: (see also Table 4)

- | | |
|---|---|
| <input checked="" type="checkbox"/> Tailgate Meetings | <input checked="" type="checkbox"/> PPE, level Mod. D |
| <input checked="" type="checkbox"/> Operator Training | <input checked="" type="checkbox"/> Site Control |

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- Soil Vapor Survey
- Fuel lines
- (x) Ergonomics
- Sampling
- () Work over water (lagoons, streambeds, ravines, bay
- (x) Other (list) Handling drums, heavy objects
- () Uneven terrain
- () Trench/excavation collapse
- () ocean)

Control or Protective Measures: (see also Table 4)

- (x) Tailgate Meetings
- (x) PPE, level Mod. D
- (x) Air Monitoring
- (x) Operator Training
- (x) Site Control
- (x) Decontamination
- (x) Engineering Controls: See Engineering Controls _____

(x) Other use forklift to move drums. Where possible, ensure two people lift loads > 50 lbs.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the onsite health and safety coordinator (SHSC). Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

- Level Of Protection:**
 - () A
 - () B
 - () C
 - (x) Modified D
 - () D
- Respirator:** (Level C and above)
 - () SCBA, Airline
 - (†) Purif. Resp.
 - () Escape Mask
 - (†) OV/AG Cart.
 - (†) Other Cart.
 - Dust Prefilter
- Protective Clothing:**
 - () Encap. Suit
 - (x) Tyvek®
 - (†) PE Tyvek®
 - () Saranex
 - () Splash Suit
 - () Other _____
- Head/Eye/Ear:**
 - (x) Hard Hat
 - (x) Safety Glasses
 - (x) Goggles
 - () Splash Shield
 - () Ear Plugs/Muffs
 - () Other
- Gloves:** (outer)
 - (x) Nitrile
 - () Neoprene
 - () PVC (inner)
 - (inner)
 - (x) N-dex® Nitrile
 - () Vinyl
 - () Other
- Footwear:**
 - (x) Safety-toed Leather
 - () Overboots
 - (x) Safety-toed Rubber
 - () Other

Modifications Permitted: Wear Heavy leather gloves when handling to prevent cuts from sharp edges

X = required PPE; * = modifications permitted; † = in case of upgrade.

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TASK NAME: ONSITE LABORATORY ANALYSIS

Potential Hazards: (Check all that apply to either existing conditions or that result from site operations)

- | | | |
|--|--|---|
| <input type="checkbox"/> Rotating Machinery | <input type="checkbox"/> Projectiles | <input type="checkbox"/> Confined Space |
| <input checked="" type="checkbox"/> Heat Stress | <input checked="" type="checkbox"/> Physical Exertion | <input checked="" type="checkbox"/> Biological (plants, rodent viruses,
Marine species, soilborne or
waterborne fungi/bacteria, insects,
arachnids, snakes, wild animals) |
| <input type="checkbox"/> Cold Stress | <input type="checkbox"/> Noise(.85dBA) | |
| <input checked="" type="checkbox"/> Heavy Equipment | <input type="checkbox"/> Vehicle Traffic | |
| <input type="checkbox"/> Intrusive Activ's (underline) | <input type="checkbox"/> Fire/Explosion (underline) | <input type="checkbox"/> Electrical (utilities) |
| • Trenching | • Flam. Materials | <input checked="" type="checkbox"/> Chemical Exposure |
| • Drilling | • Low-lying Areas | <input checked="" type="checkbox"/> Ergonomics |
| • Soil Vapor Survey | • Fuel lines | <input type="checkbox"/> Other (list) |
| • Sampling | <input type="checkbox"/> Work over water (lagoons,
streambeds, ravines, bay
ocean) | |
| <input type="checkbox"/> Uneven terrain | | |
| <input type="checkbox"/> Trench/excavation collapse | | |

Control or Protective Measures: (see also Table 4)

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings | <input checked="" type="checkbox"/> PPE, level D | <input checked="" type="checkbox"/> Air Monitoring |
| <input checked="" type="checkbox"/> Operator Training | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination |
| <input checked="" type="checkbox"/> Engineering Controls: See Engineering Controls _____ | | |

Other use forklift to move drums. Where possible, ensure two people lift loads > 50 lbs.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Initial levels of protection have been assigned for this work task based on the potential risk of exposure. Levels may be upgraded or downgraded depending on monitoring data (see Action Levels, Table 5) and site conditions, as determined by the onsite health and safety coordinator (SHSC). Any modification to the levels of PPE below must be noted here and documented with a completed ROC form (Appendix 2).

- | | | | |
|--|--|--|---|
| <u>Level Of Protection:</u> | <input type="checkbox"/> A | <input type="checkbox"/> B | <input type="checkbox"/> C |
| | <input type="checkbox"/> Modified D | <input checked="" type="checkbox"/> D | |
| <u>Respirator:</u> (Level C and above) | <input type="checkbox"/> SCBA, Airline | <input type="checkbox"/> Purif. Resp. | <input type="checkbox"/> Escape Mask |
| | <input type="checkbox"/> OV/AG Cart. | <input type="checkbox"/> Other Cart. | <u>Dust Prefilter</u> |
| <u>Protective Clothing:</u> | <input type="checkbox"/> Encap. Suit | <input type="checkbox"/> Tyvek® | <input type="checkbox"/> PE Tyvek® |
| | <input type="checkbox"/> Saranex | <input type="checkbox"/> Splash Suit | <input type="checkbox"/> Other _____ |
| <u>Head/Eve/Ear:</u> | <input type="checkbox"/> Hard Hat | <input checked="" type="checkbox"/> Safety Glasses | <input checked="" type="checkbox"/> Goggles |

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	<input checked="" type="checkbox"/> Splash Shield	<input type="checkbox"/> Ear Plugs/Muffs	<input type="checkbox"/> <u>Other</u>
<u>Gloves:</u> (outer)	<input checked="" type="checkbox"/> Nitrile	<input type="checkbox"/> Neoprene	<input type="checkbox"/> PVC (inner)
(inner)	<input checked="" type="checkbox"/> N-dex® Nitrile	<input type="checkbox"/> Vinyl	<input type="checkbox"/> <u>Other</u>
<u>Footwear:</u>	<input type="checkbox"/> Safety-toed Leather	<input type="checkbox"/> Overboots	
	<input checked="" type="checkbox"/> Safety-toed Rubber	<input type="checkbox"/> <u>Other</u>	

Modifications Permitted: Work in well-ventilated area. Use exhaust hood.

X = required PPE; * = modifications permitted; † = in case of upgrade.

4.0 PHYSICAL HAZARD DESCRIPTION AND CONTROL MEASURES

Potential hazards on site include the following (List, as appropriate):

- Physical hazards associated with heavy equipment operation.
- Back injuries due to improper lifting. .Slips, trips, and falls.
- Noise.
- Fire and explosion.
- Electrocutation.
- Inclement weather.

Control measures of these hazards are described in the sections below (see also Table 4).

4.1 HEAVY EQUIPMENT

Hazards arising from heavy equipment include:

- Noise.
- Physical injury from moving or breaking parts of machinery . .
- Physical injury from improper operation of equipment. .
- Ground collapse.
- Nuisance dust emissions.
- Electrical hazard

Heavy equipment inspection consists of the following:

- Daily inspection by the operator of equipment and completion of a daily equipment check list is required.
- Immediate reporting of all mechanical problems
- Wearing of seat belts at all times.
- Motion alarm in proper working order.
- Fire extinguisher in working order .
- Lights and horn in working condition.
- All manufactures safety requirements for the safe operation of each piece of equipment shall be read and adhered to.

4.2 BACK INJURIES

- Workers will use proper lifting techniques, lifting with legs and not the back. Loads greater than 50 lbs. require a second person or mechanical device.
- Whenever possible, mechanical devices such as drum dollies, hand trucks and tool hoist (for lifting augers), should be used to lift or move heavy loads.

4.3 SLIPS, TRIPS, AND FALLS

- Good housekeeping practices will be used to avoid slips, trips, and falls around the sampling areas.
- Equipment will be kept in an orderly fashion and not left where it will impede access.
- If a sampling area is covered with brush and trees, the area will be cleared prior to beginning work in that area.

4.4 NOISE

Site activities in proximity to drill rigs, generators, compressors, steam cleaners, other machinery, construction activities, and heavy equipment often expose workers to excessive noise. The effect can be:

- psychological effects: workers startled, annoyed, or distracted
- physiological effects: pain, temporary and/or permanent hearing loss, reduced muscular control (when exposure is severe); and
- communication interference: increase in potential hazard due to the inability to warn of danger or properly issue instructions.

Excessive noise environments may be created by heavy equipment during drilling operations or by other machinery operating in proximity to project operations. All personnel will be required to wear hearing protection for any activity where there is an expected noise hazard.

4.5 FIRE AND EXPLOSION

4.5.1 Fire

Fire can emanate from a variety of sources and can spread rapidly. Safe practices shall be observed at all

times including:

- Good housekeeping.
- Spark arrest on all internal combustion equipment shall be in place.
- Open flames are not allowed anywhere in the work area.
- Engines off while fueling.
- Observe grounding and bonding practices when fueling.
- Extinguishers will be accessible in all vehicles of site.
- Flammable liquids shall be stored in approved safety cans.

4.5.2 Explosions

- Compressed gasses must be stored, restrained and upright, and used in a safe manner.
- Equipment (e.g., generators) shall not be fueled while in operation, or while hot enough to ignite fuel vapors.

4.5.3 Reporting Fire

- A. Sound alarm.
- B. Notify Fire Department, state type of fire, location and any other associated hazards or injuries.
- C. Make decision to use fire extinguisher.
- D. Ensure that all site occupants are safe.
- E. Proceed to safe meeting area.

4.6 ELECTROCUTION

Control measures for electrocution include the following:

- Locate all overhead and underground utility power lines.
- Confirm exact location of lines with hand tools, not heavy equipment; workers should be equipped with insulated protective gloves.
- Lock-out and tagging of controls that are to be deactivated for maintenance/work on energized or de-energized equipment or circuits.
- Ground-fault circuit-interrupters must be used at all times on all 120-volt circuits.
- The minimum distance between drilling masts and overhead power lines 50 kV is 15 feet, unless the lines have been de-energized and visible grounded at the point of work, or equipped with insulated barriers to prevent physical contact.

4.7 INCLEMENT WEATHER

Site work will not be conducted when there is a threat of lightning storms. Procedures for inclement weather include:

1. Lower booms and derricks when possible.
2. Seek shelter in vehicle (i.e., support van or pick-up truck).
3. Stay clear of high or elevated ground objects (e.g., trees, towers, etc.).
4. Return to support area if time permits.
5. Wait out passing storm or further direction from site safety personnel.
6. Assess site conditions and damage prior to commencement of work.

5.0 SITE CONTROL

5.1 VISITOR ACCESS:

All site visitors (except OSHA inspectors) must receive prior approval from the FM, PM, and client, and may do so only for the purposes of observing site conditions or operations. Upon arrival, visitors will report to the SHSC where he/she will receive and sign the Visitor H&S Orientation Form. All visitors, regardless of their rank or professional level, will not be allowed into controlled work areas unless training and medical requirements have been met and documented.

5.2 WORK ZONES:

(See Figure 3 for suggested zone demarcations, use site map as the base map).

Support/Clean Zone (SZ/CZ):

The SZ/CZ will be upwind or crosswind and away from the contaminated area. Vehicles, emergency equipment, telephone and break area, and any nonessential personnel will be maintained in this area.

Contamination Reduction Zone (CRZ):

Two separate decontamination lines shall be established for personnel and sampling equipment in the CRZ. The CRZ should be marked as narrow corridors through which personnel and equipment pass from the EZ to the SZ/CZ.

Transition Zone (TZ):

An additional buffer or TZ will be established upwind or crosswind of the contaminated I zones and serve as support for sample *QA/QC* and packing. Coolers in this zone will be protected from contamination using polyethylene sheeting and decontaminated prior to leaving the site.

Exclusion Zone (EZ):

The EZ is defined as an area with an approximately 30-foot radius around intrusive activities. Access should be restricted to field sampling crews and necessary equipment

5.3 SITE SECURITY

Access will be limited to all controlled areas via the prescribed administrative (certifications) and engineering (barricades) controls. All site staff and visitors will note arrival and departure times on the Employee/Visitor Roster. All equipment, tools, and property shall be secured at the end of the day.

5.4 COMMUNICATIONS

The "buddy system" will be enforced for field activities involving potential exposure to hazardous or toxic materials, and during any work within the exclusion zone. Each person will observe his/her buddy for symptoms of chemical or heat overexposure and provide first aid or emergency assistance when warranted. A mobile phone will be maintained onsite for emergency use.

The following emergency hand signals will be used:

- | | | |
|--------------------------|---|---------------------------|
| • Thumbs up | = | OK; understand |
| • Thumbs down | = | No; negative |
| • Grasping buddy's wrist | = | Leave site now |
| • Hands on top of head | = | Need assistance |
| • Horn -one long blast | = | Evacuate site |
| • Horn -two short blasts | = | All clear, return to site |

6.0 SANITATION AND ILLUMINATION

Potable drinking water shall be supplied in tightly closed containers and shall be clearly marked for its intended use. If vehicles are available for use by field crews, restrooms and a field washing area with potable water will be available within a reasonable distance from the site. If such facilities are not located within a reasonable distance, portable facilities will be installed for use by field employees. If the nature of the project is mobile and of duration less than 6 months, no permanent onsite shower/change facility will be provided.

It is anticipated that all site work will be conducted during daylight hours. If circumstances arise in which fieldwork is to be conducted before or after daylight, or sunlight is obstructed, illumination within all general site areas will be maintained at or above 5 foot-candles for general site areas.

7.0 AIR SURVEILLANCE

7.1 TYPE AND FREQUENCY OF MONITORING:

TYPE	Minimum Recommended Frequency
Background:	Once per day in the work area and perimeter using direct-reading instruments, prior to any intrusive activities or equipment startup.
Perimeter:	Once per hour using direct-reading instruments during intrusive activities.
Personnel:	At least twice per day in the breathing zone of those with the highest anticipated exposure during intrusive activities.
Area:	At least twice per day in each work zone and at the onset of any new intrusive activities or at new locations.
Environmental:	Periodic field screening of selected samples as per the Sampling and Analysis Plan.

7.2 MONITORING INSTRUMENTS:

The SHSC will maintain equipment information onsite that specify calibration, general use, and troubleshooting procedures. All monitoring equipment will be field calibrated on a daily basis according to the manufacturer's instructions, and will be recorded on the calibration log (Appendix 2).

EQUIPMENT	CONTAMINANT	WORK ACTIVITY
FID	Chlorobenzene Compounds	Entire Field Activity
Dust Monitor	Airborne PCB's (adhered to particulates)	Entire Field Activity
Sensidyne Colorimetric Tubes	Chlorobenzene (low range tube, 0.5-43 ppm)	Entire Field Activity

7.3 PERSONAL SAMPLING:

This is not to be applicable to this project.

7.4 ACTION LEVELS:

Action levels should be established for upgrading/downgrading PPE, work stoppages, and evacuation (see Appendix 3) for justification of Action Levels Calculations). The decision to upgrade/downgrade the level of PPE must be based upon instrument readings measured in the breathing zone of site personnel and comparison of the results to the information contained in Table 5. Record readings on Air Surveillance Record forms in Appendix 2.

**Table 5
ACTION LEVELS**

EQUIPMENT	ACTION LEVEL	ACTION TO BE TAKEN
FID	>5 units in worker's BZ	Check colorimetric tubes for chlorobenzene. If below action level, maintain modified level D
	>25 units in worker's BZ	Upgrade to Level C (OV/AG cartridges w/ dust prefilters)
	>5 units outside of the EZ	Cease operations until levels reduce
Dust Monitor	>1 mg/m ³ in worker's BZ	Upgrade to level C
	>5 mg/l ³ in the EZ	Cease operations and suppress dusts until levels reduce.
	>0.3 mg/m ³ outside of the EZ	Cease operations and suppress dusts until levels reduce.
Chlorobenzene Sensidyne Tube	<5 ppm in worker's BZ	Maintain modified level D.
	> 5 ppm in worker's BZ	Upgrade to Level C.
	>1 ppm outside of the EZ	Cease operations until levels reduce.

8.0 DECONTAMINATION PROCEDURES

(Procedures for the decontamination of sampling tools and other related equipment are specified in the sampling plan. Note that separate areas should be established for personnel, sampling, and heavy equipment decontamination; see also the Engineering Controls of this HSP).

8.1 PERSONNEL DECONTAMINATION:

Equipment

Long-handled soft-bristled brushes, galvanized washtubs or equivalent, pump-activated sprayer, garbage cans with plastic liners and drums with liners, visqueen, paper towels, and duct tape.

Decon Solution

Isopropyl alcohol (IPA)

Alconox® (biodegradable lab-grade detergent); tap water for rinsing.

Procedures

Two stages of decon have been designated:

- 1) **Intermediate:** For periodic exits out of the exclusion zone during sample transport and management, or for short heat stress mitigation breaks.

Steps: Outer boot and glove wash with Alconox® solution, outer boot and glove rinse, removal of outer glove and storage for later use, entering transition zone for sample management, return to exclusion zone wearing new or cleaned outer gloves.

- 2) **Final:** For use prior to taking cool down breaks, lunch, and exiting the site.

Steps: Segregated equipment drop (for instruments and equipment requiring special decon as outlined in the sampling plan), outer boot and glove wash with Alconox® solution, outer boot and glove rinse, removal or disposal of outer boots, removal and disposal (if not cleaned to "like new" condition) of outer gloves, removal and disposal of coverall, removal and disposal of inner gloves in designated receptacles, and

general field wash for personal hygiene. Exit to support zone.

8.2 EQUIPMENT DECONTAMINATION:

All equipment that will potentially contact samples will be decontaminated prior to, and following, sampling events according to procedures specified in the sampling plan and field procedure. Heavy equipment in direct contact with soil and/or ground water, such as the drill rig augers and backhoe buckets, shall be steam cleaned onsite and inspected by the PM or FM prior to leaving the site. The permanent decon area (for steam cleaning) will be located at the northeast side of the site, and will be constructed by the drilling subcontractor (see also Engineering Controls). Temporary decon stations (bucket wash) will be located near work areas and will be positioned upwind or crosswind of operations.

8.3 DISPOSAL PROCEDURES:

All discarded materials that accumulate from onsite activities (PPE, decon fluids, supplies, etc.) will be segregated by matrix and by source location; placed in labeled, DOT-approved, 55-gallon drums; and stored in a secure, designated location at the constructed enclosure at the site. Analytical results will be evaluated prior to disposal. All IDW will be handled, labeled, stored, inventoried and disposed of in accordance with all applicable regulations.

9.0 EMERGENCY ACTIONS

9.1 PREPLANNING AND GENERAL PROCEDURES:

General Emergency Information

Site personnel should be constantly alert to recognize potentially unsafe work practices, hazardous work environments, and IDLH conditions, and they should be routinely reminded of signs and symptoms of chemical and heat overexposure. Emergency response procedures (this section) should be reviewed daily; and should be updated, as necessary, following incidents. Prearrange access for emergency crews when necessary.

In the event of a large-scale spill, fire/explosion, or major emergency, the FM is expected to notify the PM; PM notifies the client, evacuates the area, and lets appropriately trained emergency staff respond to the situation. The safety and well-being of site personnel, visitors, and the adjacent community will be of utmost importance in determining the appropriate response to a given emergency. An Employee Emergency Action and Fire Prevention Plan has been prepared in accordance with OSHA 29 CFR 1910.38; annual training is required for all MSGA personnel.

Emergency Coordinator (EC)

The PM or FM will serve as the EC during an actual emergency response situation. The PM or FM will serve as the primary EC at all times; first-aid and rescue duties are shared between the first-aid/CPR trained team members. All foreseeable first-aid and rescue equipment should be stored onsite in an accessible area. The EC will contact off site emergency response agencies and serve as the main spokesperson when the responders arrive onsite.

Site Maps

An updated site map (see Site Control, Section 5.0) that is used during daily tailgate meetings will be used to inform the staff of hazardous areas, zone boundaries, site terrain, evacuation routes, work crew locations, and any site changes. In the unlikely event that an emergency occurs, the problem areas will be pinpointed on the site map, and pertinent information, such as weather and wind direction, temperature, and forecast, will be added as obtained. This map will be provided to the responding agencies.

Emergency Decontamination

For first aid of non-life-threatening injuries, evacuate to decontamination line and decontaminate as much as possible or practical; contaminated clothing should be removed. For life-threatening injuries/exposures, field decontaminate as much as possible for his/her own safety, wrap in a blanket or polyethylene sheeting, and immediately transport to the designated medical facility. Also, phone ahead and bring this HSP for informational purposes and MSDS access by medical staff (see Emergency Response).

Safe Refuge Area

TBD and will be discussed in the tailgate meetings by the ECs daily, once onsite. It will be set up in the Support Zone or at an off site location in the event of a site wide evacuation. This area will be upwind, and the location and escape routes will be designated on site control maps. It will contain emergency equipment, escape route maps, communications and the Emergency Reference (call) List. This is required for all phases of work. In an emergency, the EC (PM or FM) will take a "headcount" against the Employee Visitor Daily Roster (Appendix 2), initiate search/account for missing persons, notify the emergency crews (as applicable), and limit access into the hazardous emergency area to necessary rescue and response personnel in order to prevent additional injury and possible exposures.

Emergency Equipment

Maintained in field vehicle (V), in the Clean Zone (CZ), except for * items that will be kept in the Exclusion Zone (EZ) and as applicable in the field trailer (FT). All items must be checked and maintained by the SHSC at least weekly and after each use.

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> First-aid Kit, V/FT | <input checked="" type="checkbox"/> Fire Extinguisher, V/EZ | <input type="checkbox"/> Field showers, FT or V |
| <input type="checkbox"/> SCBA, V/FT | <input type="checkbox"/> Escape Packs | <input type="checkbox"/> Alarms *, V/EZ |
| <input type="checkbox"/> Spill Equipment, V | <input checked="" type="checkbox"/> Mobile Phone, V/FT | <input type="checkbox"/> Fire Blanket *, V/EZ |
| <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Hospital Route Map, V/FT | |

Evacuation Procedures

Expeditious evacuation routes to the safe refuge area(s) will be established daily for all work area locations, with respect to the wind direction. Evacuation notification will be a **continuous blast on a canned siren, vehicle horn, or direct verbal communication**. Emergency drills should be performed periodically; update plan.

In the unlikely event that an evacuation is necessary, all personnel will immediately proceed to the predetermined safe refuge area, decontaminating to the extent possible for personal safety, based on the emergency. The EC should then begin the Site Security and Control Measures.

9.2 SITE-SPECIFIC RESPONSE SCENARIOS:

9.2.1 Natural Disasters

Tornado:

Alarm: Three short bursts of a vehicle horn.

Action: Proceed to suitable cover.

Hurricane:

Alarm: Extremely high winds, usually accompanied by heavy rain or hail.

Action: Evacuate prior to arrival of storm.

Weather-Related Emergencies

All work will cease should any of the following weather conditions arise:

- Poor visibility
- Precipitation severe enough to impair safe movement/travel .Lightning in the immediate area
- Winds in excess of 40 miles per hour
- Flooding
- Other conditions as determined by the SHSC, or PM or FM

Fire or Explosion

Sound the emergency alarm (continuous blast on a canned siren, vehicle horn, or direct oral communication) to summon the EC who will decide whether to call the Fire Department for outside assistance (see Preplanning). Any team member who has received training should extinguish small-scale fires (less than one-half of the responder's height) with an accessible, ABC fire extinguisher. Fires in boreholes may be smothered with a fire blanket. Trained emergency crews will be summoned to control any large-scale or potentially unmanageable incident. Any offsite responding agencies will be given the Site Map and briefed about the site-specific hazards so that they can be optimally helpful in an emergency situation. The EC will evacuate all nonresponse personnel and visitors to the Safe Refuge Area; will notify the PM, as applicable, and the client, (see call list); and will complete the appropriate reports.

See also Table 3 of this HSP.

9.3 MEDICAL EMERGENCY RESPONSE

(See Hospital Route Map, Figure 2.)

HOSPITAL NAME	HOSPITAL ADDRESS
Hardy Wilson Memorial Hospital	233 Magnolia Street, Hazelhurst, MS 39083
HOSPITAL TELEPHONE	DIRECTIONS
(601) 894-4541	Take I-5 South Exit MS 28 (Exit #61) toward Hazelhurst/Fayette Turn Left onto MS-28 East Turn Slight Right onto US-51

Hospital Route:

Drive South on I-55. Take exit MS-28 (Exit # 61) toward Hazlehurst/Fayette. Turn left onto MS-28 East. Turn slight right onto US-51.

Site Personnel Response Action:

Sound emergency alarm (continuous blast on a vehicle horn, or direct verbal communication) to summon the EC's who will assess the situation, taking first necessary precautions for personal safety. The EC's will determine whether to transport the injured party to Hardy Wilson Memorial Hospital, or summon an ambulance by calling 911. The Site Control Measures will be implemented. Any offsite responding agencies will be given the Site Map and informed about the site-specific hazards so that they can be optimally helpful in an emergency situation.

The EC will direct that the employees responding follow the Emergency Decon procedures and provide first aid to the extent possible while awaiting medical attention. In emergencies, the injuries and illnesses that may arise will vary from incident to incident; check Tables 2 and 3 and the MSDSs (Appendix I) or contact the Poison Control Center for emergency first-aid procedures. Medical treatment may range from bandaging of minor cuts and abrasions to lifesaving techniques; therefore, first-aid/CPR training is required for all MSGA staff. The SHSC will serve as the primary caregiver and bloodborne pathogen officer (see also Bloodborne Pathogen Control Plan), but these duties are shared between qualified team members. It is essential that all site personnel in need of emergency care receive treatment. Appropriate documentation and notification will be discussed later in this section.

9.3.1 Bloodborne Pathogen Exposure Control Plan

Exposure Determination:

First-aid responders have the potential to be exposed to bloodborne pathogens. The potential for exposure

to bloodborne pathogens outside of emergency response is not anticipated.

Exposure Control

Universal precautions

Use of the Center for Disease Control "Universal Precautions" as an approach to infection control, which assumes that all human blood and certain human body fluids are treated as if known to be infectious for HIV, and other bloodborne pathogens.

Personal Protection Equipment

While rendering first aid where exposure to blood may occur, MSGA employees will don, at a minimum, latex or blue nitrile gloves. Gloves will be available in the field first-aid kit in a packet. Other items included in the packet that are to be used to control the "spill" are absorbent beads, a plastic scooper, a biohazard bag for waste, and surface disinfecting and hand-cleaning towelettes. Other suggested PPE in the event of a serious blood-producing injury includes safety glasses, Tyvek® coveralls, boot covers, and nitrile outer gloves -all of which should be available onsite. In addition, a disposable, one-way CPR mask to prevent direct contact between the rescuer and recipient will also be available in the first-aid kit should the need arise.

Hepatitis B Vaccination

First-aid providers to jobsite injuries do not need to receive a pre-exposure Hepatitis B vaccine but are encouraged to do so. All first-aid providers assisting in any exposure incident must be offered the full Hepatitis B immunization series no later than 24 hours after an incident. In Hazelhurst (10 miles south of Crystal Springs), this immunization series can be obtained by calling the Hardy Wilson Memorial Hospital or going directly to the clinic at 233 Magnolia Street, Hazelhurst, MS 39083).

Exposure Incident Evaluation

All first-aid incidents involving exposures must be reported to the HSC before the end of the work shift in which the incident occurs. A First-aid Incident Report (Appendix 2) must be completed describing the circumstances of the accident and response in addition to the Supervisor's Report of Injury or Illness form. Following a report of an exposure incident, MSGE shall provide to the exposed employee monitoring for HIV or HBV antibodies and medical counseling in cases of positive tests for HIV or HBV.

Waste Disposal

Should biohazardous waste be generated as a result of a field related injury, the "contaminated" waste and area will be cleaned to the extent possible with items provided in the packet, and arrangements for the pickup and final disposal of the waste will be made by calling Browning Ferris Industries, 1716 N. County Line Road, Ridgeland, MS; 601-939-2221.

HBV Vaccination Declination

For whatever reason (religious, personal, or otherwise), employees may decline or refuse the HBV vaccination by contacting the SHSC. In instances where the vaccination is required, the employee will be required to sign a waiver (Appendix 2) indicating he/she has chosen at that time to refuse the vaccination, but may elect to receive it in the future at no expense to him/her.

9.4 SPILL OF HAZARDOUS MATERIALS

There is a low probability of small quantity spillage/leakage of hazardous materials (fuels, grouts, and detergents) that are brought onsite to implement site activities. These materials will be properly stored, and the appropriate spill response equipment will be located, or easily accessible to, the area where the materials are used/stored. In case of a spill, notify the SHSC and PM or FM, select appropriate PPE and response equipment, contain the spill to the extent possible, neutralize or contain the liquid as per the MSDS, transfer to an IDW container, document with an Incident Report (Appendix 2), and notify the FM or PM and client, as appropriate.

9.5 ACCIDENT REPORTING AND RECORD KEEPING

The SHSC will contact the PM and conduct an investigation jointly with the PM or FM. The FM or PM will complete the Supervisor's Report of Injury or Illness and First-aid Incident Report (Appendix 2). These completed reports must be transmitted to the MSGA office in Black Mountain, NC within 24 hours of an occurrence; a fax is acceptable. The foreman or field supervisor of subcontracting crews will investigate and complete an injury/illness report (similar in content to the MSGA report) in accordance with their internal company policy. This report must be transmitted to the MSGA PM within 24 hours.

In case of environmental incidents, property damage, power disruption, or mandated work "shutdowns," an Incident Report (Appendix 2) will be prepared by the FM or PM. Any damage, loss, or theft of MSGA property (items/tools/equipment) will be reported to the MSGE office in Black Mountain, NC.

Any release of information to unauthorized persons or agencies in these reports is prohibited unless it is

*Remediation Work Plan for Kuhlman Electric Plant Site
Kuhlman Electric Corporation – Crystal Springs, Mississippi
November 2001*

first approved by the client. Certain agencies or persons, such as OSHA or OSHA inspectors, can request this information and its release will be permitted. Review the Emergency Call List for additional contact names and phone numbers.

9.6 EMERGENCY REFERENCE LIST

(Keep posted in vehicles and near communication system)

RESPONDING EMERGENCY AGENCIES

SERVICE	NAME	TELEPHONE NUMBER
Ambulance	Local EMS	911
Fire Department	Local Fire	911
Police Department	Local Police	911
Poison Control Center	(Jackson is closest)	(601) 354-7660
Civil Defense		

MSGE CALL LIST:

TITLE	NAME	TELEPHONE NUMBER
Project Manager	Robert L. Martin	(828) 669-3929 (office) (828) 712-1115 (mobile)
Field Manager	Charles O. M. Peel	(601) 898-2792 (office) (601) 955-8531 (mobile)
Site HSC	Keith Warren	(601) 892-6987 (field office) (601) 953-3364 (mobile)
Plant Contact	Allen Thomas	(601) 892-6408
State or Federal OSHA Office	Dept of Labor	1-800-522-6762

VISITORS AND SUBCONTRACTORS HEALTH AND SAFETY

ORIENTATION FORM

SITE _____ DATE _____
SITE HEALTH AND SAFETY COORDINATOR _____
SITE DESCRIPTION _____

POSSIBLE SITE CONTAMINANTS AND HAZARDS _____

The information summarized below is important for you to read and fully understand. This information has been extracted from the site-specific Health and Safety Plan, and has been compiled to help ensure your health and safety onsite. If you have any questions regarding the information presented below, please ask your escort for clarification.

HEALTH, SAFETY AND SECURITY INFORMATION

1. All visitors and subcontracting personnel must acknowledge their presence onsite by checking in with the Site Health and Safety Coordinator. This assists in identifying all the personnel at the site in the event of an emergency.
2. All visitors and subcontracting personnel will be restricted to their designated or "contracted" area(s). Do not enter any of the contaminated areas (marked with yellow-and-black caution tape) unless you have been authorized by the site management and are wearing the proper protective equipment.
3. Hard hats, safety glasses, and safety boots are **REQUIRED** to be worn while you are working onsite.
4. Please read and heed all safety signs onsite. These signs are there to alert you to possible physical and chemical hazards.
5. Eating and smoking is not allowed onsite. You may eat or smoke in designated clean areas or in your vehicle.

MSGA TAILGATE SAFETY MEETING REPORT

Date _____ Site _____

Attendees _____

ORDER OF BUSINESS

Topic(s) discussed _____

Action taken on previous meeting suggestions _____

Emergency information _____

Injuries and accidents since previous meeting _____

Additional comments _____

Meeting conducted by _____ Title _____

Signature _____ Date/Time _____

(MSGA SHSC or FM)

RECORD OF CHANGE

Date: _____

Field H&S Coordinator: _____

Name of Person Initiating Change: _____

H&S Plan Section and Page Number: _____

Reason for Change: _____

Description of Change: _____

Authorizations

Field Health and Safety Coordinator: _____

Field Manager: _____

Project Manager: _____

8.0 REFERENCES

Ogden Environmental and Engineering Services, *Preliminary Site Characterization Report, Kuhlman Electric Corporation, Crystal Springs Mississippi*. July 2000.

Martin & Slagle GeoEnvironmental Associates, L.L.C., *Addendum to the Preliminary Site Characterization Report, Kuhlman Electric Corporation, Crystal Springs Mississippi*. February 2001.

State of Michigan, Department of Environmental Quality, *Guidance Document, Verification of Soil Remediation, Environmental Response Division, Waste Management Division*. April 1994, Revision 1.

State of Mississippi, Water Quality Criteria for Intrastate, Interstate, and Coastal Waters. November 16, 1995.

U.S. Code of Federal Regulations, 40 CFR 761.61. (7-1-99 Edition).

Correspondence from Burns Cooley Dennis, Inc. Geotechnical Consultants, to Usry Architects, P.A., September 17, 2001.

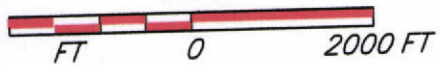


**SITE
LOCATION**

Crystal Springs
(BM 464)



SCALE



CRYSTAL SPRINGS QUADRANGLE
MISSISSIPPI, 1963

SITE LOCATION MAP

KUHLMAN ELECTRIC CO.
101 KUHLMAN DRIVE
CRYSTAL SPRINGS, MS

VICINITY MAP DATE: 8/01/01
1 INCH = 2,000 FEET OR DCR OR RLM REV 0

BORGWARNER INC.

Ceoenvironmental Associates, LLC
MARTIN & SLAGLE
PO Box 1023
Black Mountain NC 28711
828.669.3929 828.669.5289

FIGURE:
FIGURE 1

KUHLMAN ELECTRIC

CRYSTAL SPRINGS, MISSISSIPPI

LEE AVENUE

FULGHAM AVENUE

SW CORNER OF LOT 4, BLOCK 10, STOWELL MAP OF CRYSTAL SPRINGS

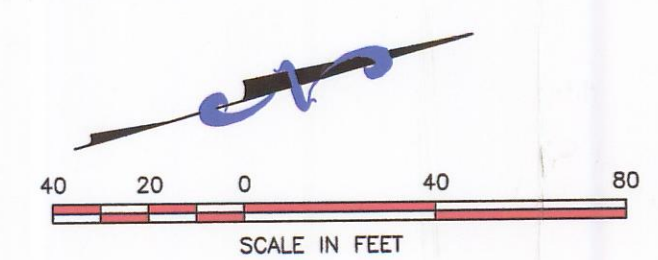
ILLINOIS CENTRAL RAILROAD TO KUHLMAN ELECTRIC CORPORATION DB 14G, PAGE 311

KUHLMAN ELECTRIC 1-STORY BRICK

LOCATION OF 12" R.C.P.I.P.E. DRAWN PER 1988 PLANS

LEGEND

- NEW CONSTRUCTION
- DP-681 DIRECT PUSH SOIL SAMPLE WITH PCB CONCENTRATION
- 20 PCB ISOCONCENTRATION CONTOUR mg/kg
- x FENCE
- STOCKPILE
- GRASS
- CONCRETE
- ASPHALT
- BUILDINGS
- ENGINEERED CAP



THIS IS A CLASS "A" SURVEY ACCORDING TO MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF MISSISSIPPI ESTABLISHED BY THE AUTHORITY OF SECTION 73-13-15(1), MISSISSIPPI CODE OF 1972 AS AMENDED.

REFERENCE MERIDIAN - TRUE NORTH BASED ON RECORDED PLATS.

○ INDICATES FERROUS METAL ROD ALONG PROPERTY LINES OR @ PROPERTY CORNERS.

ONLY VISIBLE UTILITIES ARE SHOWN ON THIS PLAN.

SURVEYED & MAPPED BY
ROBERT B. BARNES
 CIVIL ENGINEER
 LAND SURVEYOR
 4 OLD RIVER PLACE
 JACKSON, MISSISSIPPI 39202
 NOVEMBER 3, 1998

DRAWING NAME: Reports\Kuhlman Workplan R1\KEC F2R0

REV	DATE	BY	CHK	APP
1				
2				
3				
4				
5				
6				
7				

PREPARED FOR:
BorgWarner Inc.

GeoEnvironmental Associates, LLC
MARTIN & SLAGLE
 PO Box 1023
 Black Mountain NC 28711
 828.669.3929 828.669.5289

KUHLMAN ELECTRIC

CRYSTAL SPRINGS, MISSISSIPPI

LEE AVENUE

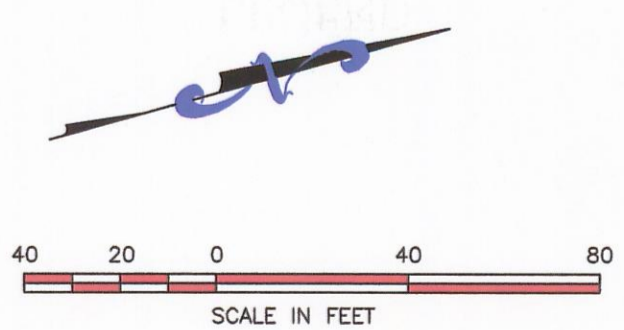
FULGHAM AVENUE

KUHLMAN ELECTRIC
1-STORY BRICK

ILLINOIS CENTRAL RAILROAD TO
KUHLMAN ELECTRIC CORPORATION
DB 14G, PAGE 311

SW CORNER OF LOT 4,
BLOCK 10, STOWELL MAP
OF CRYSTAL SPRINGS

- LEGEND**
- DP-681 DIRECT PUSH SOIL SAMPLE WITH PCB CONCENTRATION
 - 20 PCB ISOCONCENTRATION CONTOUR mg/kg
 - FENCE
 - SOIL STOCKPILE
 - ASPHALT DEBRIS STOCKPILE
 - STOCKPILE
 - NEW CONSTRUCTION
 - TEMPORARY CONSTRUCTION TO BE REMOVED WHEN REMEDIATION IS COMPLETE



THIS IS A CLASS "A" SURVEY ACCORDING TO "MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF MISSISSIPPI" ESTABLISHED BY THE AUTHORITY OF SECTION 73-13-15(7), MISSISSIPPI CODE OF 1972 AS AMENDED.
REFERENCE MERIDIAN - TRUE NORTH BASED ON RECORDED PLATS.
O INDICATES FERROUS METAL ROD ALONG PROPERTY LINES OR PROPERTY CORNERS.
ONLY VISIBLE UTILITIES ARE SHOWN ON THIS PLAN.

SURVEYED & MAPPED BY
ROBERT B. BARNES
CIVIL ENGINEER
&
LAND SURVEYOR
4 OLD RIVER PLACE
JACKSON, MISSISSIPPI 39202
NOVEMBER 3, 1998

3 **FIGURE**

PCB CONCENTRATIONS
0'-2'

KUHLMAN ELECTRIC CORPORATION
TO: KUHLMAN ELECTRIC CORPORATION
CRYSTAL SPRINGS, MS

SCALE: 1"=40'

DR: DRR	4
CHK: RLM	5
REV: 0	6
DATE: 10/26/01	7

DRAWING NAME: Reports\Kuhlman Workplan R1\KECF3R0.dwg

PREPARED FOR:
BorgWarner Inc.

GeoEnvironmental Associates, LLC
MARTIN & SLAGLE
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Black Mountain NC 28711
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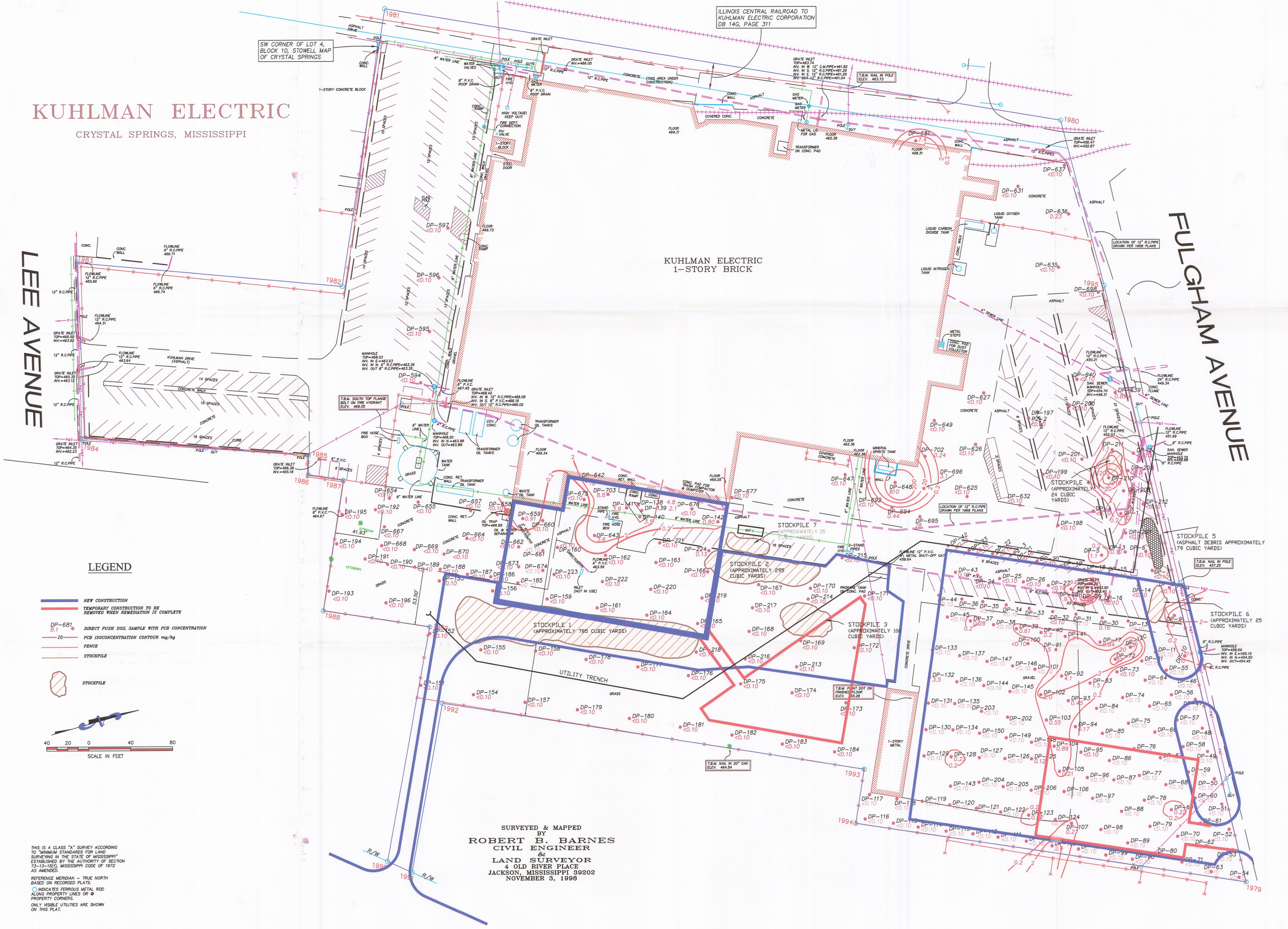
KUHLMAN ELECTRIC

CRYSTAL SPRINGS, MISSISSIPPI

KUHLMAN ELECTRIC
1-STORY BRICK

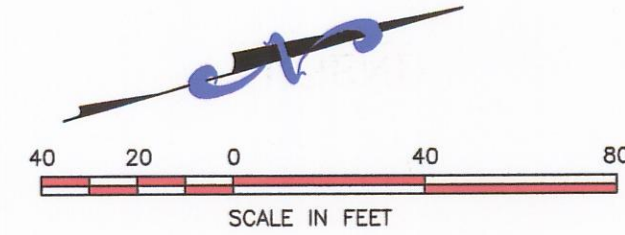
LEE AVENUE

FULGHAM AVENUE



LEGEND

- NEW CONSTRUCTION
- TEMPORARY CONSTRUCTION TO BE REMOVED WHEN REMEDIATION IS COMPLETE
- DP-681
8.1 DIRECT PUSH SOIL SAMPLE WITH PCB CONCENTRATION
- 20 PCB ISOCONCENTRATION CONTOUR mg/kg
- FENCE
- STOCKPILE
- STOCKPILE



THIS IS A CLASS "A" SURVEY ACCORDING TO "MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF MISSISSIPPI" ESTABLISHED BY THE AUTHORITY OF SECTION 73-15-150, MISSISSIPPI CODE OF 1972 AS AMENDED.
REFERENCE MERIDIAN - TRUE NORTH BASED ON RECORDED PLATS.
O INDICATES FERROUS METAL ROD ALONG PROPERTY LINES OR PROPERTY CORNERS.
ONLY VISIBLE UTILITIES ARE SHOWN ON THIS PLAN.

SURVEYED & MAPPED BY
ROBERT B. BARNES
CIVIL ENGINEER &
LAND SURVEYOR
4 OLD RIVER PLACE
JACKSON, MISSISSIPPI 39202
NOVEMBER 3, 1998

4 **FIGURE**

PCB CONCENTRATION
4'-6"
KUHLMAN ELECTRIC CORPORATION
101 KUHLMAN DRIVE
CRYSTAL SPRINGS, MS

DRAWING NAME: Reports\MDDQ Response 9-10-01\KEC F5R0.DWG

REV	DATE	BY	CHK	APP
1				
2				
3				

SCALE 1"=40'
DR: DGR
CHK: RUM
REV: 0
DATE: 10/26/01

PREPARED FOR:
BorgWarner Inc.

GeoEnvironmental | **MARTIN & SLAGLE**
Associates, LLC
PO Box 1023
Black Mountain NC 28711
828.669.3929 828.669.5289

KUHLMAN ELECTRIC

CRYSTAL SPRINGS, MISSISSIPPI

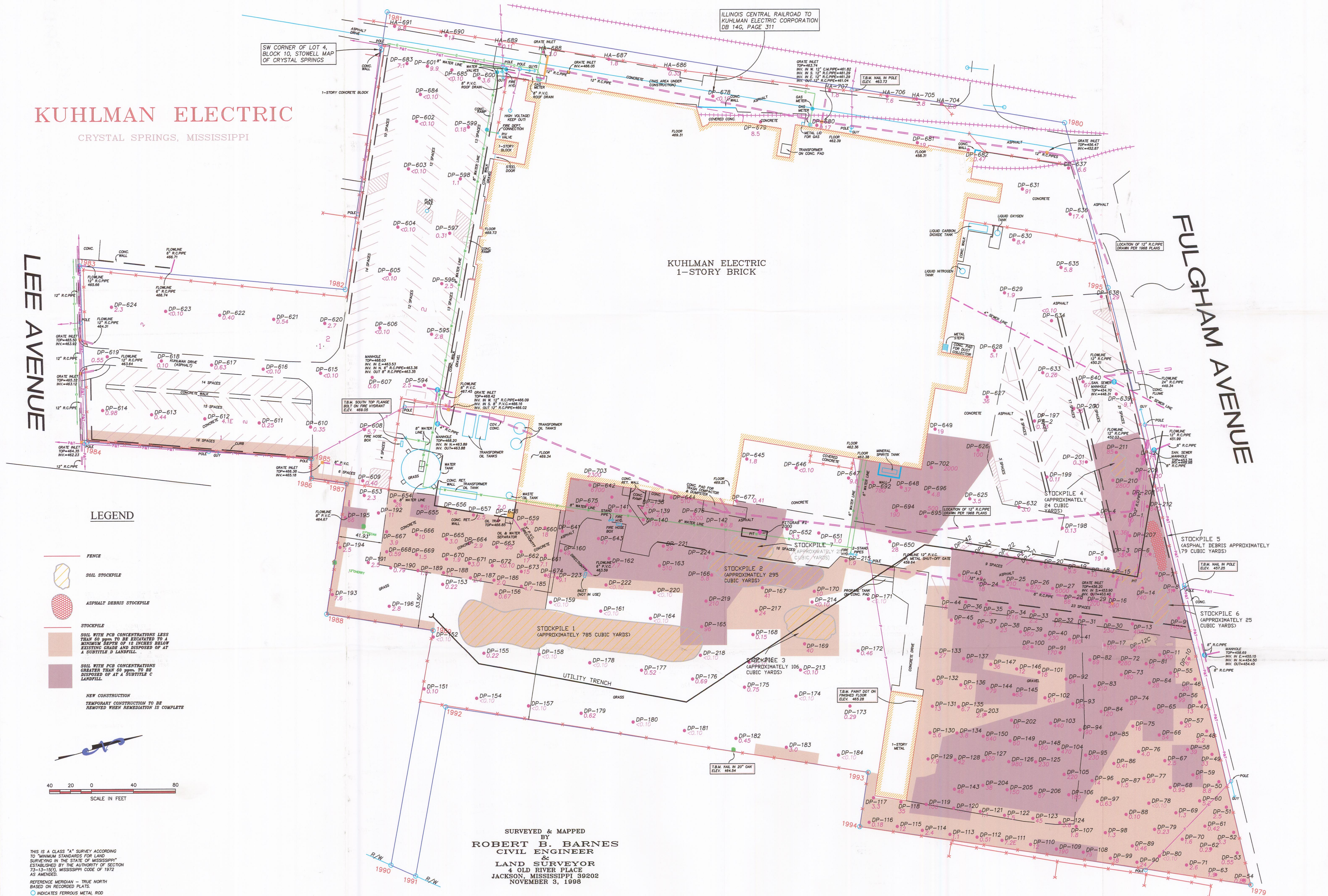
LEE AVENUE

FULGHAM AVENUE

KUHLMAN ELECTRIC
1-STORY BRICK

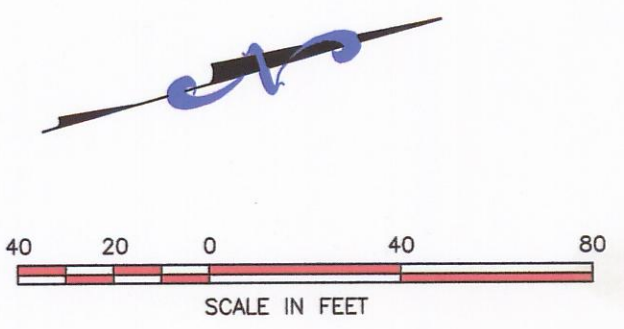
ILLINOIS CENTRAL RAILROAD TO
KUHLMAN ELECTRIC CORPORATION
DB 14G, PAGE 311

SW CORNER OF LOT 4,
BLOCK 10, STOWELL MAP
OF CRYSTAL SPRINGS



LEGEND

- FENCE
- SOIL STOCKPILE
- ASPHALT DEBRIS STOCKPILE
- STOCKPILES
 - SOIL WITH PCB CONCENTRATIONS LESS THAN 50 PPM TO BE EXCAVATED TO A MINIMUM DEPTH OF 12 INCHES BELOW EXISTING GRADE AND DISPOSED OF AT A SUBTITLE D LANDFILL.
 - SOIL WITH PCB CONCENTRATIONS GREATER THAN 50 PPM TO BE DISPOSED OF AT A SUBTITLE C LANDFILL.
- NEW CONSTRUCTION
- TEMPORARY CONSTRUCTION TO BE REMOVED WHEN REMEDIATION IS COMPLETE



SURVEYED & MAPPED
BY
ROBERT B. BARNES
CIVIL ENGINEER
&
LAND SURVEYOR
4 OLD RIVER PLACE
JACKSON, MISSISSIPPI 39202
NOVEMBER 3, 1998

THIS IS A CLASS "A" SURVEY ACCORDING TO "MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF MISSISSIPPI" ESTABLISHED BY THE AUTHORITY OF SECTION 73-13-15(1), MISSISSIPPI CODE OF 1972 AS AMENDED.
REFERENCE MERIDIAN - TRUE NORTH BASED ON RECORDED PLATS.
O INDICATES FERROUS METAL ROD ALONG PROPERTY LINES OR PROPERTY CORNERS.
ONLY VISIBLE UTILITIES ARE SHOWN ON THIS PLAT.

5 **FIGURE**

**PCB REMEDIATION
WASTE DELINEATION**
KUHLMAN ELECTRIC CORPORATION
101 KUHLMAN DRIVE
CRYSTAL SPRINGS, MS

SCALE 1"=40'
DR: DGR
CHK: RLM
REV: 0
DATE: 10/26/01

DRAWING NAME: Reports \Kuhlman\Workplan_R1\KECFGR0.dwg

REV	1	2	3	4	5	6	7
DR							
CHK							
REV							
DATE							

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