

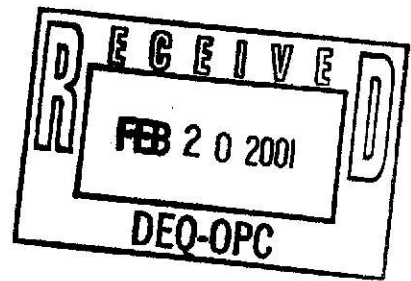
# DRAINAGE CHANNEL MASTER PLAN

**Kuhlman Electric Corporation  
Crystal Springs, Mississippi**

Prepared for

**BorgWarner Inc.**

February 2001



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**FILE COPY**

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February 2001

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## **1.0 INTRODUCTION**

This Master Plan was prepared by Martin & Slagle GeoEnvironmental Associates, L.L.C. for BorgWarner Inc. at the request of the Mississippi Department of Environmental Quality (MDEQ) to assess a drainage channel extending from the Kuhlman Electric Corporation (KEC) transformer manufacturing plant in Crystal Springs, Mississippi to the headwater of Chautauqua Lake prior to remediating the properties along the drainage channel. The drainage channel carries stormwater runoff from the KEC plant to Chautauqua Lake located approximately 0.66 miles northwest of the KEC plant.

This Master Plan provides a general approach for remediation of the properties along the drainage channel by sequencing activities designed to protect sampled and remediated properties from recontamination as a result of reintroduction of PCBs during stormwater flooding events. Specific workplans and designs will be prepared from individual components of this Master Plan based on the results of previously completed activities.

### **1.1 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 the Carlyle Group. BorgWarner and Kuhlman Corporation indemnified KEC and the Carlyle Group for historic contamination at the site and may, under the purchase agreement, control any remediation of such contamination. Neither BorgWarner nor Kuhlman 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 from Ogden Environmental and Engineering Services, Inc. (Ogden) 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 through the transport of PCB contaminated soils by stormwater runoff from the KEC property.

## **1.2 Summary of Previous Work Performed**

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 PCBs 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.

During this first assessment, surface water samples were collected during dry weather and rain events. One storm water runoff sample was collected during a rain event from a culvert on the north side of the property. The total suspended solids (TSS) concentration was 23 milligrams per liter (mg/l). Aroclor 1260 concentration was 12 µg/l.

Thirteen sediment samples were collected from the drainage ditch bordering the property on the north side of the property and from a dry ditch that leads from the property and

discharges into Chautauqua Lake. Aroclor 1260 was detected in all sediment samples with concentrations ranging from 0.32 mg/kg in SW-SS-9 taken near Chautauqua Lake, to 74 mg/kg in SW-SS-1 taken at the culvert headwall on the north property line.

Two sediment samples, designated Lakeside #1 and #2, were taken on the shoreline at the headwaters of Chautauqua Lake and sent to the field laboratory and the fixed-base laboratory. The fixed-base laboratory detected no constituents above MDLs. Aroclor 1260 was detected at 0.55 mg/kg by the field laboratory in Lakeside #1.

The second assessment, conducted in August and September 2000, involved the analysis of soil samples collected from 19 residential properties located immediately adjacent to the KEC plant property. The purpose of this assessment was to determine if PCBs were present on these properties, and to develop an analytical and regulatory basis for performing remediation of the contaminated soils. Seven properties were found to have PCB concentrations in excess of 1 mg/kg. Remediation was completed on three properties. Remediation is pending on the remaining four sites.

The sampling continued in November 2000 on nine residential properties located along the drainageway northwest of the Kuhlman plant. The purpose of this portion investigation was to determine if PCBs have been transported down the drainageway by stormwater and have been deposited on the residential properties during flood events. Several residential properties along the drainageway have been impacted by PCBs.

Results from these two assessments indicate that the plant site is the primary source of PCB contamination on-site, on adjacent properties, and on properties along the drainageway. Results also indicate that PCBs have historically been transported down the drainageway by stormwater and have been deposited on the floodplain surface by floodwaters.

Immediate actions were taken to control future stormwater runoff from the site and wind erosion of site soils. The actions included placement of ultraviolet-resistant plastic sheeting over the 4.6 acres of the KEC site that was disturbed during construction activities and placement of silt fences around the periphery of the plastic cover.

### **1.3 Issues Affecting Assessment**

Contaminated sediment has been confirmed in the drainageway down gradient of the plant site on the former icehouse site. Additionally PCBs have been detected on several residential properties that border the drainageway. These properties represent secondary and potentially on-going sources of contamination in the drainageway as stormwater during high rainfall storm events moves sediment downstream. It is necessary to understand the peak flow of stormwater in the drainage way during precipitation events and to develop engineering controls that will prevent additional deposition of PCB contaminated sediment within the drainage basin before assessment activities can be completed.

When sources of contamination and stormwater are controlled, assessment and remediation of the residential and undeveloped properties along the drainage way can proceed. This Workplan addresses the basic issues concerning control of stormwater runoff that results in PCB transport downstream of KEC during storm events. The basic elements of these issues are given below.

- PCBs are transported in stormwater discharges and floodwaters within this drainage basin. In order to eliminate this contaminant transport mechanism, an evaluation of the drainage basin hydrology and hydraulics is necessary to design and implement stormwater detention and eliminate erosion and transport of sediment downstream.

- Control of flows may require structures to be placed in the vicinity of the drainage channel. Regulations requiring sediment and erosion control, Corps of Engineers permits, and wetlands protection may affect this project.
- The KEC site has been identified as the primary source of contamination. Engineering controls have been implemented to control soil erosion from the site through stormwater runoff and wind. Secondary sources of contamination exist downstream of the KEC plant that could result in continued deposition of PCB contaminated sediments in the drainageway during the assessment. Engineering controls to detain stormwater flow and control flooding during heavy precipitation events are critical to assure accurate assessment of the drainageway.
- Temporary flood control should be incorporated to prevent further contamination of properties already assessed if flooding cannot be controlled upstream.
- Following resolution of these issues, sampling and analysis of soils and remediation of contaminated soils along the drainage way can proceed.



## **2.0 DRAINAGE BASIN CHARACTERISTICS**

The area to be assessed is a drainage ditch and its associated floodplain. The head of the drainage basin extends east and south of the KEC plant and collects stormwater from the KEC property which is located at 101 Kuhlman Drive, Crystal Springs, Copiah County, Mississippi 39059, at latitude N 31° 15' 20" and longitude W 90° 21' 20". The KEC plant site is located within the town limits of Crystal Springs on approximately 15 acres located two blocks north of the Crystal Springs central business district.

The unnamed drainageway is an intermittent stream that extends from the northwest portion of the KEC property for approximately 2/3 miles toward Chautauqua Lake, bordering some residential properties and flowing through others. The drainage winds through a heavily wooded area before discharging beneath U.S. Highway 51 into Chautauqua Lake. The main drainage channel shape and size vary throughout its length. Near the KEC plant the channel is shallow, from 1 foot to 2 feet deep, and narrow, 3 feet to 4 feet wide, with a poorly defined floodplain. It collects stormwater from street drainage around the KEC plant as well as runoff from the plant. As the drainage passes west under the railroad track and through the residential community along McPherson Street and Forrest Street, the channel size increases to approximately 8 to 10 feet deep and about 8 feet wide before becoming shallower with a wider, better defined floodplain. A reach of about 1300 feet flows through a relatively flat area with a wide floodplain, in excess of 500 feet wide. Because the grade is very flat, the stream through this area is braided. The floodplain is heavily wooded and overgrown.

The drainage channel terminates at the headwater of Chautauqua Lake on the west side of U.S. Highway 51. Thick sediments are evident along the shoreline of the lake at the discharge point.

The upper reaches of the drainage basin include wooded, residential, and industrially developed areas.

### **3.0 WORKPLAN**

A hydrological assessment of the drainage basin will be conducted prior to sampling and analysis of the remaining properties along the drainage channel. Assessment and remediation of the properties along the drainage channel will proceed based on the assumption that access to all properties potentially affected by PCB contamination and/or stormwater impact within the drainageway is obtained. Assessment can only commence when engineering controls are in place. Without engineering controls continued deposition of PCB contaminated sediment as a result of flooding during the environmental assessment or the remediation activities would render the analytical data invalid.

The assessment will involve a reconnaissance of the stream channel and determination of the quantity of water discharged during specific storm events. This information will be used to locate and design stormwater detention facilities for control of peak flows and associated flooding. Control of flooding is critical to controlling the transport of PCBs in sediments.

#### **3.1 Photogrammetric Mapping**

A search will be made for available topographic maps and aerial photography. If suitable maps and photography are available, they will be used to prepare base maps for the hydrologic study. If current detailed topographic maps of the study area are not available then new aerial photography will be produced and maps of the drainage area from KEC downstream to Chautauqua Lake will be generated from the new aerial photography. The aerial photography will show existing land use, stream geometry, and provide the basis for topographic mapping. These maps will be the base maps for the basin study as well as design of stormwater detention structures, and the assessment and remediation of properties along the drainage channel. If new aerial photography is required, the following steps will be completed:

- Flights will be scheduled to fly over the drainageway for the purpose of shooting the aerial photographs. The flights will be flown at an altitude low enough to provide sufficient detail for the development of the topographic maps.
- From the aerial photographs, detailed topographic maps will be developed showing elevations at 5-foot contour intervals or less.

### **3.2 Area Reconnaissance and Field Mapping**

A reconnaissance will be conducted of the drainage channel to locate and map features that would have an effect on flow, and determine the extent of the floodplain. establish a survey baseline, identify constrictions that may impede flow, verify the aerial survey and determine the width of the floodplain along the drainage channel. The floodplain and the channel are areas that are most likely to have PCB contamination. The reconnaissance will provide data to:

- Establish a project survey baseline along the trace of the channel;
- Document in detail the trace of the drainage channel through the basin;
- Locate constrictions such as downed trees, debris, rubbish, debris dams across the channel and any other objects that may impede flow of stormwater and cause flooding;
- Identify locations for flood control structures;
- Identify areas where sediment accumulation is expected to occur during flooding events which will aid in planning for environmental sampling of soils within the floodplain;
- Layout sampling locations.

### **3.3 Hydrology and Hydraulics Evaluation**

An evaluation of the drainage basin will be conducted to determine the flow discharge and water surface elevations associated with a specific design storm event. Information

collected during the previous mapping activities will be used in this evaluation to determine the rate of stormwater discharge and to identify locations for stormwater detention. The hydrology and hydraulics evaluation will include:

- Collection of precipitation data for the region and review of the standard design storm criteria;
- Calculation of the maximum potential discharge in the basin for the established design storm;
- Calculation of the time to concentration for the basin;
- Evaluation of the tractive force for the upper, middle and lower portions of the drainageway to understand those areas most susceptible to erosion and deposition;
- Determination of the best stormwater detention controls in the drainageway;

### **3.4 Temporary Stormwater Detention**

Temporary stormwater detention measures will be designed and implemented near the upper reaches of the drainage channel to control runoff from the KEC property and attenuate flow into the channel. The stormwater detention controls are necessary to prevent PCB contaminated sediments from moving into the drainageway during the sampling and analysis portion of the assessment. Stormwater detention controls will be designed and placed in the drainageway to most effectively reduce erosion of PCB contaminated sediments based on the reconnaissance and hydrology and hydraulics study.

Upon completion of the remediation of the KEC plant site, drainageway, and associated floodplain, the stormwater detention controls will be removed, returning the drainageway to its natural state.

As part of the program to control stormwater flows and flooding, removal of debris and rubbish from the drainage channel is necessary. This material blocks flow paths causing

flooding upstream of the constriction. The Town of Crystal Springs will be responsible for removal and disposal of this debris.

### **3.5 Sampling and Analysis**

Upon completion of the drainage basin study and construction of the temporary stormwater detention controls, assessment of the vertical and horizontal extent of PCB contamination in the drainageway and associated floodplain will be performed. The assessment will include the collection of soil and sediment samples for analysis of PCBs by a field laboratory with fixed base laboratory confirmation. The assessment will be performed in the same manner as the previous assessments implementing all appropriate sampling and analysis protocols. Preliminary samples will be collected in the base of the drainage channel and in areas, as determined by flood plain mapping, to be most likely to retain sediments following a flood. The additional assessment will involve expanded sampling of areas surrounding impacted soils.

### **3.6 Concurrent work**

To the extent possible, work will be performed concurrently to expedite completion of the assessment so that remediation can commence. Regulatory permitting requirements will be determined and all necessary permit applications will be prepared and submitted to the appropriate agencies. Concurrently, photogrammetric mapping of the drainageway will be completed and detailed topographic maps of the will be generated. Field reconnaissance activities will commence immediately upon receipt of maps so that detailed evaluations of drainageway constrictions resulting from debris deposits can be reported to the City of Crystal Springs for removal and the flood plain dimensions can be verified.

#### **4.0 SCHEDULE**

Completion of the investigations described in this workplan is dependant upon availability of aerial photography and mapping services. If new aerial photography is necessary, a flight service will be contracted and preparation of aerial photos and maps should take approximately 30 days. While the base maps are being prepared, permit requirements will be identified and to the extent possible without base maps, applications will be prepared and submitted for regulatory review and approval, if necessary. Permission will be sought from landowners for access to properties included in this study within this same period of time.

At completion of basin mapping, workplans with layouts for environmental soil sampling will be prepared. Property owners will be contacted to schedule dates for sampling.

The hydrologic evaluation of the drainage basin will begin within the 30-day period with field reconnaissance and preliminary mapping. Depending on permit requirements and regulatory approvals, construction of stormwater detention structures can begin within 60 days. Immediately upon completion of the stormwater control facilities, sampling of properties can begin and remediation of properties with known contamination can begin concurrently with sampling on other properties as long as access is obtained from property owners.