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Phase II Environmental Site Assessment 200 Magnolia Street Winchester, Kentucky

Prepared For:

***Milgrom Group
Lexington, Kentucky***

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**Phase II Environmental Site Assessment
200 Magnolia Street
Winchester, Kentucky**

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Section 1 - Executive Summary

This report represents the findings of a Phase II Environmental Site Assessment (ESA) carried out on property at 200 Magnolia Street, Winchester, Kentucky. The assessment was carried out by Hall & Associates, Inc., in conjunction with Commonwealth Technology, Inc., under the guidelines of the American Society for Testing and Materials Standard E1903-97 and 1527.

The scope of work of this ESA included records review, employee interviews, field sampling and laboratory analysis. The focus was largely on soil investigations and to a lesser degree, groundwater investigations.

While a previous assessment had indicated the potential for recognized environmental conditions was very low, this ESA concludes that the property has soil and groundwater impacted by arsenic, chromium, and copper presumably derived from historical CCA wood preserving activities.

Section 2 – Introduction

Purpose

The purpose of this Phase II assessment was to identify significant environmental conditions associated with CCA wood preserving activities. Based on the information collected to date, this ESA attempts to make a preliminary assessment of the media affected and the extent and concentrations of contamination in the media.

Special Terms, Limitations, and Implied Conditions

ASTM Standard E 1527 defines recognized environmental conditions as “the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property, or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies.”

This assessment did not attempt to investigate the possibility of environmental conditions included in the previous Phase I ESA with the exception of environmental conditions associated with CCA wood preserving activities. That is recognized environmental conditions discovered, if any, by the Phase I ESA have not been addressed with the exception of onsite activities related to CCA wood preserving.

The evaluation of this data was limited to RCRA/CERCLA concerns and at no time were attempts made to investigate OSHA considerations with respect to CCA activities.

Hall & Associates, Inc., shall not be responsible for the accuracy, truthfulness or completeness of statements made by persons interviewed or information received from agencies contacted.

Throughout this report, metals are implied to be "total metals" as defined in EPA methodology. Also, all soil and sediment analytical data is presented on a dry weight basis with the exception of the sole Toxicity Characteristic Leachate Procedure (TCLP) result.

Section 3 – Background

Previous Investigations

Milgrom Group, the current property owner, contracted with ESA, Environmental Site Assessments, Inc. of Louisville, Kentucky, to perform a Phase I ESA in early 1998. We will not reproduce the report here but will default to its contents for background information contained in it. The Phase I is titled "Phase I Environmental Assessment – 200 Magnolia Street – Winchester, Kentucky – ESA Project 8KY-2ACE" and was provide to Hall & Associates, Inc. by the owners (client).

Although the Phase I ESA found no significant recognized environmental conditions, information on past practices led the owner to contract with Hall & Associates, Inc. to determine if a Phase II ESA was indicated.

Site History and Description

The site has a history of wood preserving operations since the 1950's. Steam treatment and chromated-copper-arsenate (CCA) processes were and continue to be used to treat lumber at the site. In the mid-1980's a drip pad and new treatment works were constructed on the southern portion of the property. This portion of the facility is constructed in a fashion typical of a modern CCA facility. The current owner of the business, Kentucky Wood Preserving, is the Milgrom Group. They purchased the property in early 1998 from the previous owner, Kenwood Land, Inc. A more complete history may be found in the Phase I ESA.

Although not discussed in the Phase I ESA, the structure that currently serves as a maintenance shed and steam treatment facility was the location of a CCA treatment works prior to construction of the modern CCA facility. That is, the current maintenance

shed was the CCA treatment facility from the mid-1950's to the mid-1980's. In this ESA, the term maintenance shed will be synonymous with the old treatment work since the structures were one in the same.

Interviews by Hall & Associates, Inc. with employees who worked under the previous owner indicated frequent past releases of CCA to the environment from this building. This finding by the current owners was largely responsible for their proceeding to Phase II activities.

Section 4 – Phase II Assessment Plan

Records Review and Employee Interviews

In order to investigate past activities and possible past releases, a file search was to be made at the Division of Waste Management (DWM) and Division of Water (DOW), Kentucky Natural Resources and Environmental Protection Cabinet. Also, as mentioned previously, the Phase I assessment report was to be reviewed.

Employees were to be interviewed regarding current and past operations practices as well as land use issues. Previous employees, if available were intended to be interviewed as well. Employee interviews were to take place prior to developing the sampling plans detailed below.

Sampling Plan

The sampling plan was divided into three tasks that are described below:

Task 1 - Initial screening by way of four shallow (0" to 4") samples near the maintenance building. This sampling was undertaken at the request of the client to establish the need for a Phase II ESA.

Task 2 – A sampling event to consist of twelve soil borings, two stream sediments and one groundwater sample.

Task 3 – Shallow sampling (0" to 4") of two soils near the maintenance building. This event was undertaken to determine if any contamination existed from a previous diesel fuel tank and to establish whether any cresols or chlorophenolic preparations may have been introduced to the site.

Chemical Testing Plan

Chemical testing for each of the three tasks was decided to consist of the following:

Table 4.1 – Sampling Task Descriptions

Task	Media	Parameters
Task #1	Shallow and surface soil	Arsenic, chromium, hexavalent chromium, copper. TCLP arsenic and chromium on a composite of the two highest level samples.
Task #2	Soil borings and stream sediments	Arsenic, chromium, and copper. Hexavalent chromium on the two highest total chromium samples.
	Groundwater	Total and dissolved arsenic, chromium and copper.
Task #3	Shallow and surface soil	Semivolatile organic compounds

Samples were to be tested by EPA test procedures from "Methods for Evaluating Solid Waste – Physical/Chemical Methods (SW-846)." Quality assurance and quality control (QA/QC) procedures were to be taken directly from the methods.

Table 4.2 – EPA Test Methods Utilized

Items	EPA Test Method
Heavy Metals Preparations	
Arsenic, Chromium or Copper, Total Digestion for Soil	3050B
Arsenic, Chromium or Copper, Total Digestion for Groundwater	3010A
Arsenic, Chromium or Copper, Dissolved Filtration and Digestion for Groundwater	3010A
Arsenic, Chromium or Copper, TCLP Digestion	3010A
Arsenic or Chromium TCLP Extraction	1311
Hexavalent Chromium, Soil Extraction	3060A*
Heavy Metals Measurements	
Arsenic, Chromium or Copper, Dissolved or Total, Groundwater	6010B
Arsenic, Chromium or Copper, Total, Soil	6010B
Arsenic, Chromium or Copper, TCLP	6010B
Chromium, Hexavalent, Soil	7196A
Miscellaneous	
Solids, Total	160.3
Semivolatiles Extraction, Soils	3541
Semivolatiles Analysis, Soils	8270B

* Method 3060A is a draft method. However, no other fully approved method is available.

Section 5 – Phase II Assessment

Implementation

Records Review and Employee Interviews

Records were found at the DOW and DWM relating to permit applications, site inspections and disposal records dating from 1980 to the present. While most records deal with evaluations as to the small quantity or limited quantity generator status of the site, at least two deal with complaints against Kentucky Wood Preserving. In August 11, 1986, correspondence from DWM, a comment was made that "it would appear that little or no contamination occurred" relating to a complaint. However, no additional correspondence regarding follow up on this event could be found. This occurred under the previous owner ship.

Under current ownership, a complaint was investigated by DWM on November 4, 1998. The investigation noted "no evidence of improper disposal of hazardous wastes on site" and "no evidence of poor house keeping (sic) practices."

Three current employees were interviewed including the current owner and plant manager. All interviews were conducted by the Hall & Associates, Inc. Project Manager. Although previous employees were not available to be interviewed, the plant manager under previous ownership was contacted by the current plant manager and the conversations were related to Hall & Associates, Inc. through the current manager. The most significant information from these interviews was the use of the current maintenance building as the treatment building from the mid-1950s to the mid-1980s. These interviews were critical in developing the sampling plan discussed in the previous section.

Surface Soil and Sediment Sampling

Surface soil sampling was performed using an aluminum trowel at depths no greater than 4 inches. The trowel was decontaminated with a commercial preparation of mild detergent and distilled water between samples. Surface soil and sediment sampling was performed by Hall & Associates, Inc., personnel. In all cases, samples were collected in duplicate in clear, precleaned glass 4 ounce jars provided by the contract laboratory.

In Task 1, sampling locations were chosen on the sides, in back, and under a drain pipe in the rear of the maintenance building. In this task, discolored soil was favored for sampling. The surface soils were all poorly sorted, sandy, with varying amounts of gravel and rock. Discoloration in the worst case, drain pipe and back samples was a light to bright grass green, characteristic of CCA preparations.

In Task 2, sediment samples were collected in the unnamed creek that receives stormwater from the site. Sampling was performed at the Magnolia Street bridge near the Freeman Company about ¼ mile downstream and at the I-64 culvert approximately 1 mile downstream. Sediment consisted of well sorted quart and limestone gravel about 0.5 to 2 millimeters in diameter.

In Task 3, samples were taken from the area near the drain of the pad which previously housed a 500 gallon diesel tank and from the drain pipe at the rear of the maintenance building. As before, discolored soil was favored for sampling.

Field Borings

For Task 2, American Drilling Services (ADS) of Louisville, Kentucky, was contracted to provide direct push borings for sampling. Hall & Associates, Inc., Project Manager and

Manager of Field Services, a Registered Geologist from Commonwealth Technology, Inc, and a certified driller from ADS were present for the sampling on October 14, 1999.

Soils encountered varied widely and in many cases represented fill material from historic activities at the site. Native soils were often silty and locally rich in clay ranging from a dark olive to light yellow color. In some instances, the olive color of the soil was thought to be caused by CCA contamination, especially in the near surface samples. Boring locations may be found as part of Attachment B, the site detail map, and boring logs may be found as Attachment C.

At least two samples were taken from each boring representing a shallow and deep sample. No samples were taken at depths greater than 12 feet and all but one boring encountered rock refusal at depths less than 12 feet. Sample intervals (see Figure 4) were based on the depth of boring and soil conditions at the discretion of the Project Manager or Registered Geologist. The drive shoe on the geoprobe was decontaminated by detergent wash and deionized water rinse between borings.

Groundwater Sampling

Located near the stormwater outfall at a topographic low for the site, boring SB-04 was suspected of also representing a structural low point. Within 5 minutes of making the boring it had filled with water to within 1 inch of the surface. Samples were collected for total and dissolved metals. While total metals were preserved with nitric acid, dissolved metals were filtered by the laboratory a few hours after collection and then preserved.

Chemical Analysis

As mentioned in the previous section, samples were to be analyzed by the EPA methods that are currently approved by DWM. The contract laboratory, EnviroData Group, LLC, of Lexington, Kentucky, received all samples within 24 hours of collection

and analyzed all samples within acceptable hold times when applicable. QA/QC issues encountered included high duplicate variability, a common phenomena in poorly sorted soils due to the difficulty in obtaining representative samples. Because of the acceptable laboratory control sample results, this was not determined to have a significant impact on data quality for this investigation.

Section 6 – Presentation of Results

Subsurface Conditions

Soils are largely mixed soil and clay with occasional non-bedrock floaters encountered in borings. Bedrock is relatively shallow with a very gentle dip of < 1 degree of horizontal. Drainage, both surface and subsurface appears to be to the west to a structural and topographic low near a drain leading under the railroad to a stream on adjacent property. Only two borings (SB-04 and SB-06), both in this vicinity, produced any groundwater. Some borings indicate an abundance of fill material. While City storm sewers cross the site it is not clear whether they follow actual right-of-ways and it is also unclear where they enter and exit the property.

Analytical Data: Task #1

As mentioned, Task 1 was undertaken at the request of the client in order to establish the need for a Phase II ESA. As such, the samples were taken nearest the maintenance building at locations where the soil was discolored and are not representative of the site as a whole. This screening sampling not only included total metals and hexavalent chromium but also a TCLP test to screen the leachability of contaminants. The results are presented below in Tables 6-1 and 6-2 and laboratory data sheets are included as Attachment D.

Table 6.1 – Screening Surface Sample Test Results*

Sample ID	Arsenic	Chromium (Total)	Chromium (Hexavalent)	Copper
0916-01 (Left Rear of Maint. Bldg.)	36,000	14,000	18	25,000
0916-02 (Left Side of Maint. Bldg.)	2,600	1,600	<4.2	1,600
0916-03 (Right Side of Maint. Bldg.)	610	580	<4.3	330
0916-04 (Maint. Bldg. Rear Drain Pipe)	34,000	11,000	14	19,000

* All results in milligrams per kilogram (mg/Kg) dry weight basis.

**Table 6.2 – Comparison of TCLP and Total Results for a
Surface Soil Composite Sample***

Parameter	Total Result (mg/Kg)	TCLP Result (mg/L)
Arsenic	36,000	8.1
Chromium	14,000	0.03

* Sample a composite of surface soil samples 0916-01 and 0916-04.

Analytic Data: Task #2

Results of total metals analysis are presented in Table 6.3. As can be seen, the sample identifier indicates the boring number and the sample interval depth in feet. Plots of the results on a site map for each metal can be found as Figures 1, 2, and 3.

Table 6.3 – Soil Boring Analytical Results*

Sample ID	Arsenic	Chromium	Copper
SB01-0'-1'	290	320	160
SB01-8'-9'	< 6	24	18
SB02-0'-2'	< 5	31	14
SB02-4'-6.5'	8	35	19
SB03-0'-2'	130	66	100
SB03-7'-7.5'	300	330	16
SB03-11'-12'	39	170	11
SB04-3'-3.5'	560	360	17
SB04-8'-9'	31	42	16
SB05-2.5'-3.5'	< 5	25	18
SB05-5.5'-6.5'	< 6	32	16
SB06-2'-4'	1,100	1,100	910
SB06-8'-10.5'	550	320	210
SB07-2'-4'	66	63	25
SB07-6'-7'	< 6	31	13
SB08-1'-3'	< 5	33	14
SB08-6'-7'	< 5	32	17
SB09-0'-2'	< 7	25	15
SB09-5'-6'	< 6	48	10
SB10-0'-2'	< 6	33	16
SB10-4'-6.2'	< 7	34	17
SB11-2'-3.5'	13	24	16
SB11-10'-12'	< 6	22	14
SB12-2'-4'	17	34	21
SB12-7'-8'	< 5	20	9
SB12-11'-12'	62	75	46

* All results in milligrams per kilogram (mg/Kg) dry weight basis.

Based on results from Task 1 and the inherent instability of hexavalent chromium in many environments, not all samples were tested for this parameter. However, the two samples with highest total chromium values were tested for hexavalent chromium due to the high toxicity of the hexavalent form. The results are presented in Table 6.4.

Table 6.4 – Comparison of Analytical Results for Hexavalent and Total Chromium in Soil Borings*

Sample ID	Total Chromium	Hexavalent Chromium
SB04-3'-3.5'	360	< 0.8
SB06-2'-4'	1,100	< 0.8

* All results in milligrams per kilogram (mg/Kg) dry weight basis.

As discussed before, Boring #4 produced groundwater quickly to within 1 inch of the surface. It was sampled for both total and dissolved metals. The high turbidity in the sample led to the on-site decision to test the dissolved fraction in order to eliminate the metals contribution from sediments. The results are presented in Table 6.5.

Table 6.5 – Groundwater Analytical Results from Boring #4*

Parameter	Total Result	Dissolved Result
Arsenic	87	0.11
Chromium	37	< 0.01
Copper	24	< 0.006

* All results in milligrams per liter (mg/L).

Finally, in Task 2, sediment test results were obtained from the laboratory for the two off site stream sediments. The results are shown in Table 6.6.

Table 6.6 – Analytical Results for Off-Site Stream Sediments*

Sample ID	Arsenic	Chromium	Copper
Magnolia Street Bridge	17	56	20
I-64 Culvert	35	49	21

* All results in milligrams per kilogram (mg/Kg) dry weight basis.

Laboratory data sheets for all Task 2 analyses can be found as Attachment D.

Analytic Data: Task #3

While employee interviews indicated that creosote and chlorophenolic preparations had never been used at this site and that the treatment equipment has been specifically designed for CCA use, two soil samples were analyzed for SVOCs. One location was at the drain from the old treatment area (highest metals concentrations were found here) and the other near the location of a 500 gallon diesel tank. SVOC testing at the second site would also reveal any releases of diesel fuel. Results from the SVOC testing are presented in Table 6.7. For brevity, compounds not detected are not listed. Copies of laboratory data sheets can be found as Attachment D.

**Table 6.7 – Semivolatile Organic Compounds Detected in
Surface Soil Samples***

Sample ID	Compound Detected**	Concentration
Right Front of Maint. Bldg.	Bis(2-Ethylhexyl) Phthalate	1
Left Rear of Maint. Bldg.	Bis(2-Ethylhexyl) Phthalate	5

* All results in milligrams per kilogram (mg/Kg) dry weight basis.

** Di-n-Butyl Phthalate detected in first sample but results rejected because the compound was detected in the laboratory blank.

Section 7 – Discussion of Findings and Conclusions

Recognized Environmental Conditions

Beyond those noted in the Phase I ESA, the most significant environmental conditions recognized are elevated levels of arsenic, chromium, and copper. Although originally present in CCA used at the site, hexavalent chromium seems to have been naturally attenuated.

Semivolatile organics such as polynuclear aromatic hydrocarbons associated with diesel fuel and cresols and chlorophenols associated with other type of wood preserving were not detected in samples collected at the site.

Affected Media

Affected media at the site includes soil/sediments and groundwater. As can be seen in Figures 1, 2, and 3, contaminant levels seem to originate at the maintenance shed. Because of the low levels seen in off-site stream sediments and because background levels have not been adequately established in this area, it is uncertain whether these sediments are affected. If affected it is also uncertain if other sources of contaminants are present in the drainage basin of the stream.

No air samples were taken as no significant amount of airborne particulates was noted under the conditions seen. The heavy metals of concern are not volatile in the forms expected to be present.

Evaluation of Media Quality

Levels of contaminants in the soil show elevated levels of arsenic, chromium and copper. The chromium appears to be almost exclusively in the trivalent form. Based on the sole TCLP result, the chromium and arsenic appear to be well bound in the soils and relatively non-leachable. As expected, levels fall off with depth and distance from the maintenance building. However, near the building, significant levels are noted down to bedrock.

Based on the nature of the activities that appear to be responsible for the contamination, some the material, if disturbed, will likely be considered an F035 waste. The extent of the F035 waste will be subject to a "contained-in" determination to delineate where the F035 boundary will be. A legal opinion has been obtained regarding this matter. Although classed as F035 waste, disposal costs will be affected by whether the material meets EPA Universal Treatment Standards (UTS) for such waste. It may be possible that much of the material contains non-leachable arsenic and chromium and may meet the treatment standards (5.0 mg/L arsenic TCLP and 0.6 mg/L chromium TCLP) as it exists allowing for somewhat reduced disposal costs.

Groundwater at the site has not been adequately characterized because of the drought conditions during the investigation. While total metals in the single sample appear very high, dissolved levels show that these numbers are largely due to sediment in the sample. Dissolved levels of copper and chromium are less than drinking water standards. Dissolved arsenic, however, is approximately twice the regulatory maximum contaminant level (MCL).

Section 8 – Recommendations

The following recommendations are made regarding the Kentucky Wood Preserving site at 200 Magnolia Street, Winchester, Kentucky. Many of the recommendations are part of a Remedial Investigation/Feasibility Study (RI/FS) which should be the next step in CCA investigations.

- 1) In-situ stabilization or removal of contaminated soils should take place.
- 2) Site based goals for immobilization or cleanup must be first determined. These levels will guide activities.
- 3) For the near future, the soils at the site should not be excavated or disturbed in any way. This should help prevent the generation of any wastes derived from them.
- 4) A health and safety plan should be developed for future activities.
- 5) Additional soil testing will be needed prior to commencing future activities to delineate the boundary of site based levels.
- 6) If material is removed, it may need additional TCLP testing to determine if any treatment is needed prior to disposing as an F035 waste.
- 7) A Groundwater Protection Plan needs to be developed for the site regardless of decisions involving contaminated media. This is a Kentucky DOW requirement which applies to wood preserving activities.
- 8) Treatment of affected groundwater may be necessary. Additional testing will need to be undertaken in non-drought conditions to evaluate this.





