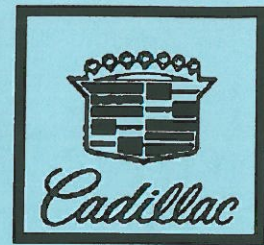
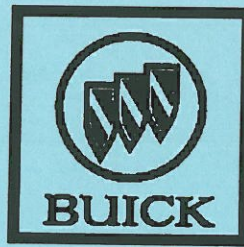


LEEDS- ENVIRONMENTAL
SITE ASSESSMENT- 8/92

LEEDS002952

FRED RINDHAGE



General Motors Corporation
Buick-Oldsmobile-Cadillac Group
Leeds Assembly Plant
Kansas City, Missouri

Environmental Site Assessment Study

Privileged And Confidential
Prepared At GM Counsel's Request

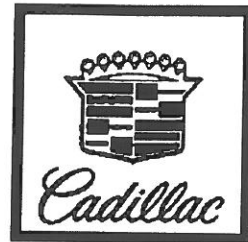
Project No. 8283
August, 1992



Argonaut AEC

Architecture • Engineering • Construction

LEEDS002953



General Motors Corporation
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Environmental Site Assessment Study

Privileged And Confidential
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Project No. 8283
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APPENDIX A.

Environmental Site Assessment Report of Findings, Vols. I - III, Burns & McDonnell, Inc., February, 1992

Attachment A - Environmental Site Assessment Phase II Report of Findings, Burns & McDonnell Waste Consultants, Inc., February, 1992 and April, 1992

APPENDIX B.

Report on the Site Characterization of the Former Waste Disposal Site, Vols. I - II, Burns & McDonnell, Inc., January, 1992

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1.0 EXECUTIVE SUMMARY

1.1 Purpose of Report

The BOC Leeds Assembly Plant was idled in April, 1988, and has been closed since October, 1990. The purpose of this study was to conduct an environmental site assessment to determine if operations at the site have caused an adverse environmental impact. Also, recommendations have been developed to address potential problem areas that were identified in this environmental assessment. Since the Powerhouse and Waste Treatment facilities are still in use, assessment of those areas was limited to an operational review, with no sampling or analytical work.

1.2 General Hydrogeology

The BOC Leeds site consists primarily of wet clay with some silt. The medium to high plasticity of the clay soils is indicative of soils that have low permeability to groundwater. The first zone of saturation ranges from 8 to 18 feet below ground surface. The groundwater flow direction is generally to the south-southwest, toward the Blue River.

1.3 Findings

Organic contamination was found under the plant floor near the site of a vault that contains paint and solvent tanks installed in 1928 as part of the original plant construction (Referred to as the Enamel Storage Pit (ESP)). Also, an underground kerosene pipeline that extended from this vault to the powerhouse may have contributed to the organic contamination.

Lead from deposits on the roof of the plant has migrated into the roofing material. Approximately one-half of the total surface area is contaminated and exceeds RCRA TCLP limits for lead. Some visible deposits remain on the roof.

Residues in the plant sewers contain high levels of lead and other heavy metals, in addition to Total Petroleum Hydrocarbons (TPH). These residues will be tested further to determine if TCLP limits are exceeded.

PCB contamination was discovered in several substations where leaks occurred in the past.

Several process equipment systems have residues that were tested and found to exceed RCRA TCLP limits. This includes residues in stage three of the phosphate system, material in the elpo dip and rinse system, and in interior booth exhaust stacks. Residues that are contained in drip pans under conveyor drives contained high levels of halogenated organic compounds, and will be tested

further to determine if TCLP limits are exceeded.

Wood block flooring installed near the solder grind booths has lead grindings embedded in it. Corings from these wood blocks were analyzed and exceeded the RCRA TCLP lead level.

1.4 Recommendations

1.4.1 Short Term Remedial Activities

A remediation work plan must be prepared and implemented to address the buried tanks and pipeline in the Enamel Storage Pit area. During the site assessment, an organic solvent was discovered floating on the groundwater next to the ESP. A spill report was filed with the Missouri DNR. Additional investigative borings determined that the tanks are still in place, but buried in sand and covered with the concrete floor. The source of the floating organic layer is most likely the tank and piping system, and this area will be remediated.

PCB contamination that was discovered in several substations must now be addressed by implementing a clean up plan in conformance with 40 CFR Part 761 Subpart G.

Friable asbestos insulation was discovered in the powerhouse basement and miscellaneous areas throughout the manufacturing

building and should be repaired as soon as possible.

1.4.2 Remediation Prior to Property Transfer

Prior to transferring ownership or demolition, several process equipment systems, such as the elpo system, conveyor lubricant catch pans and selected exhaust stacks, may have to be addressed with clean up or recycling plans. Removal of roofing material, PCB transformers, some wood block flooring and asbestos insulation would be required if demolition is planned. Sewer cleaning in body grinding, paint mix and maintenance areas is also required.

Documentation of all remediation activities will be undertaken, in accordance with General Motors corporate recommendations for facility closures.

1.4.3 Further Investigations

Additional sampling and analysis is recommended in several areas to confirm or negate inconclusive results. These areas include sewer and pit residues that had high organic and metals levels, but have not been tested for RCRA characteristics. Also, some groundwater samples showed potential contaminants in only one of the two rounds of samples. Residue samples from sealer at Bay ZQ-3 on the second floor and the battery charge area at Bay E-24,

mezzanine level, had laboratory quality control problems and will be resampled and reanalyzed.

Areas where trace chemicals or unverified contamination has been detected will be investigated further. Additional hydrogeological studies and/or risk assessments may be required to determine if migration of chemicals could have an adverse impact on human health.

Since the Powerhouse and Wastewater Treatment facilities are still in use, they were assessed by performing an operational review, with no sampling or testing. It is recommended that these areas be reviewed after the operations cease, and any unknown residues be sampled at that time.

1.4.4 Other Remedial Activities

BOC Leeds submitted a RCRA Closure Plan for the hazardous waste storage pad area to the Missouri DNR, on May 26, 1992.

Implementation of the Closure Plan will begin as soon as regulatory officials approve the Plan, and proper notifications are made.

2.0 INTRODUCTION

2.1 Objective of Environmental Site Assessment

Argonaut AEC was retained to provide environmental engineering consulting services to the BOC Group - Leeds Assembly Plant, to conduct an Environmental Site Assessment. The purpose of the Site Assessment is to determine if there are any environmental hazards existing on the Leeds Plant site that would impact the future sale, lease or demolition of the property.

The Site Assessment was divided into phases to facilitate project control. Phase 0 included a review of plant facility drawings and environmental records to determine the areas where environmentally sensitive operations occurred. Sampling and analytical efforts were then planned to determine if the environment was impacted. In addition, plant employee interviews were conducted to gain additional information. A bid document package was prepared to solicit proposals from Laboratory/Consultants.

Phase 1 was the implementation of the sampling and analytical plan, along with the environmental consulting needed to supervise the site work, review and interpret results and make recommendations for further necessary action. This report identifies areas of environmental concern by reporting

analytical results from the Phase 1 study and making recommendations for further action. The consulting firm of Burns & McDonnell, Inc. was retained to coordinate the sample collection, documentation, laboratory analysis, and results reporting. Data and documentation from Burns & McDonnell, Inc. is included in appendices to this report.

Phase 2 consists of additional sampling and analytical work to further characterize potential problems found in Phase 1. Phase 2 work has been completed, the results of which are summarized in this report. Data and documentation from Burns & McDonnell, Inc. is presented in Supplement A, which is also appended to this report.

Phase 3 will consist of site clean up activities. The scope of work for Phase 3 will necessarily depend on the decision that is made to either sell the property as is, or demolish the buildings prior to property sale. For example, if the buildings and property are to be sold, potential buyers may be offered an option for asbestos or PCB transformer removal. However, if the buildings are to be demolished, the asbestos and PCB transformer removal are not optional. General Motors plant closure guidelines also require that an independent consultant review and certify closure activities, which would occur under Phase 3.

2.2 Site History and Background

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The BOC Leeds Assembly Plant is located in the Leeds Township industrial district on the east side of Kansas City, Missouri. Figure 1 shows the site orientation, and the general geographic area.

The original plant buildings were constructed in 1928 by General Motors. Numerous additions to the original building were constructed, in 1933, 1934, 1935, 1940, 1941 and 1942. During World War II, the east part of the plant, then known as the Fisher Body side, was used for production of shell casings. Expansions continued in 1951, 1954, and each year from 1958 through 1965. The area currently referred to as the trim annex, was the paint shop up until 1973, when a new paint shop was built. A truck dock was added in 1977. The last major expansion of the Leeds plant was in 1981, when a new body shop was built, expanding the southeast part of the main manufacturing building. A new wastewater treatment plant was completed on the Leeds site in 1985.

The facility was originally divided into a Fisher Body side and a Chevrolet side. These two business units were eventually combined at the Leeds plant, to form one of the plants under the General Motors Assembly Division (GMAD). When GMAD was dissolved, the Leeds plant came under the Buick-Oldsmobile-Cadillac Group (BOC), who currently has responsibility for the facility.

Refer to Figure 2, for a general chronology of the manufacturing plant and powerhouse expansion.

Production ceased at the Leeds plant in April, 1988 and the plant was officially closed in October, 1990. Argonaut Realty now has responsibility to dispose of the property, under the direction of BOC management. Currently a small maintenance crew, powerhouse operators, plant security forces, and administrative personnel are handling day to day operations at Leeds.

2.3 Scope of Site Assessment

2.3.1 Environmental Site Assessment

Besides the main manufacturing/assembly plant, there are several other buildings on the site that were included in the environmental assessment. These include the paint mix/paint sludge building, the drum storage facility and the caustic strip house. The powerhouse and the wastewater treatment plant operations were reviewed, but assessment of these operations was limited by the fact that these facilities are still in operation.

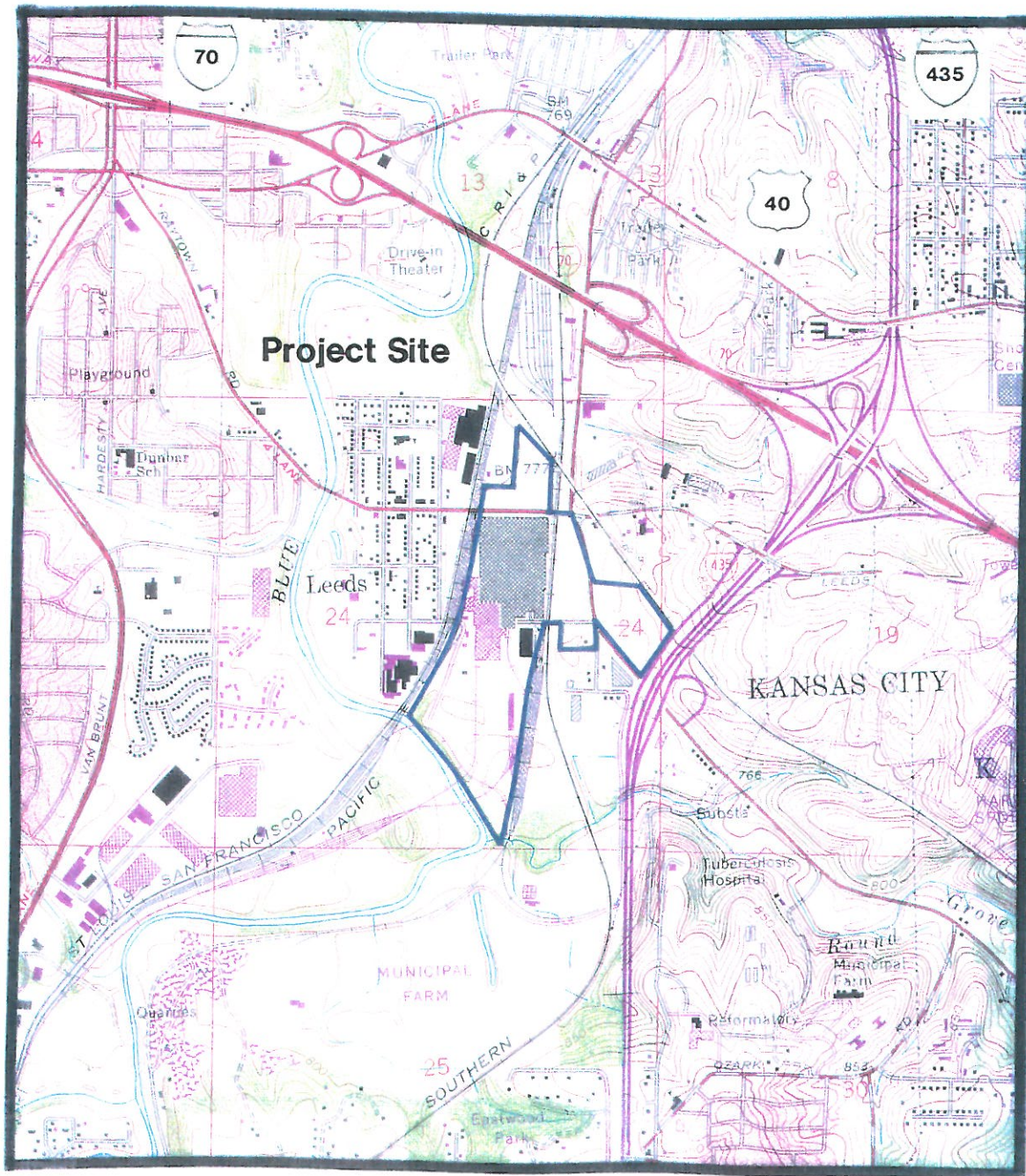
All parcels of property owned by BOC Leeds were included in this assessment, including parcels that were used as a new car shipping facility, employee parking lots, or have been left undeveloped.

Table 1, at the end of this section, lists all the monitoring wells, samples and analyses that were originally comprehended for this study.

2.3.2 Site Characterization Study

A Site Characterization Study was conducted by Burns & McDonnell, Inc. for a historical waste disposal site on the southern-most part of the BOC Leeds property. Figure 3 presents the estimated boundary of the waste disposal site. The report on the site characterization is included as an appendix to this report.

The Site Characterization Study concluded that, given the nature of the site geology, hydrogeology, and contaminant characteristics, no significant migration of contaminants is likely to occur. Further, a baseline risk assessment concluded that no complete exposure pathways exist, and therefore no significant health risk exists to on-site or off-site populations.



Site Location Map
Environmental Site Assessment
BOC Group, Leeds Assembly Plant
Kansas City, MO

Project No.
8283

Scale
1" = 2000'

Figure No.
1



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SYMBOL	CHANGES	BY	DATE
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	TRACES & REMOVED TO DATE	S.M.K.	11-28-62

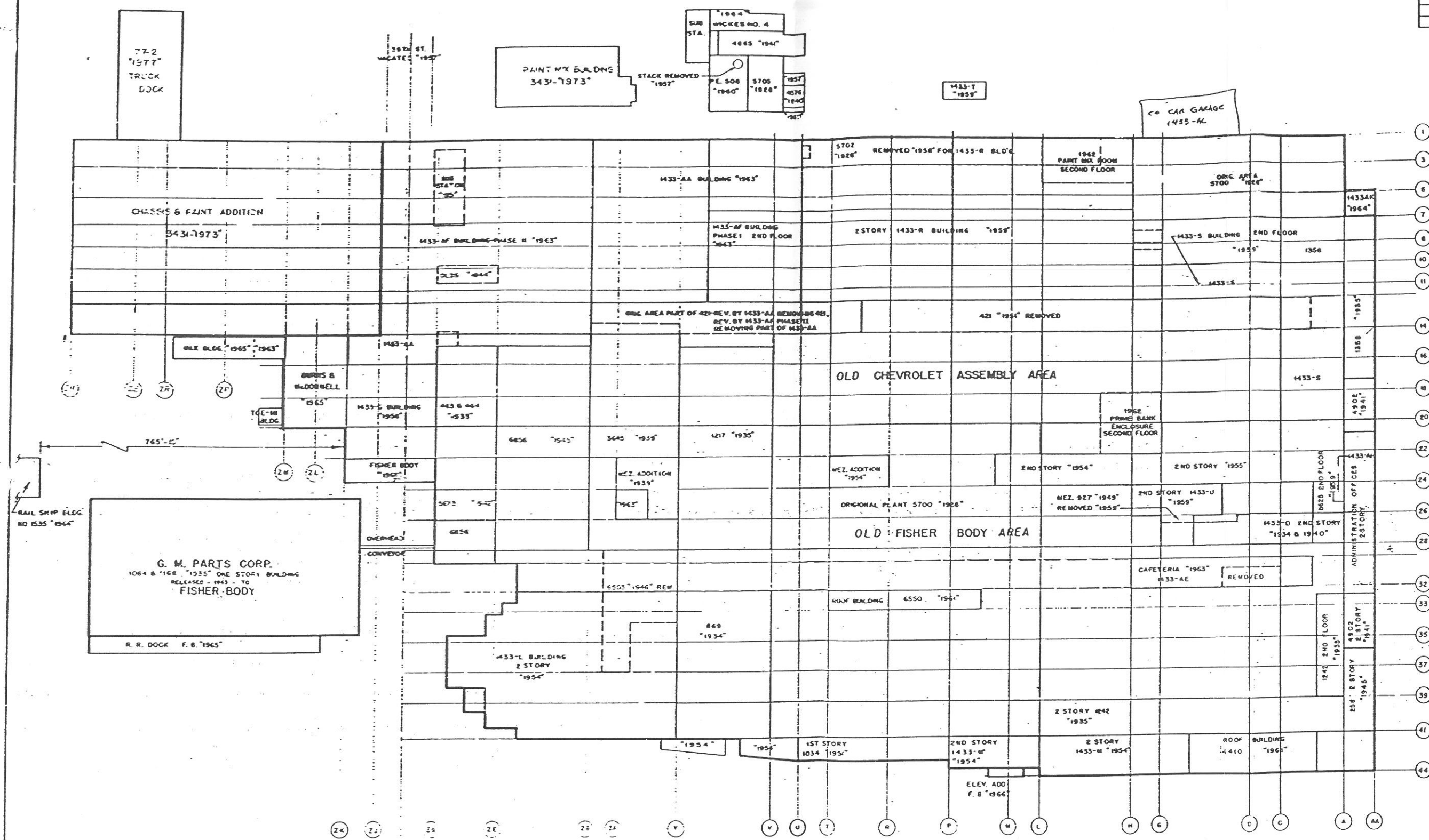


Figure 2

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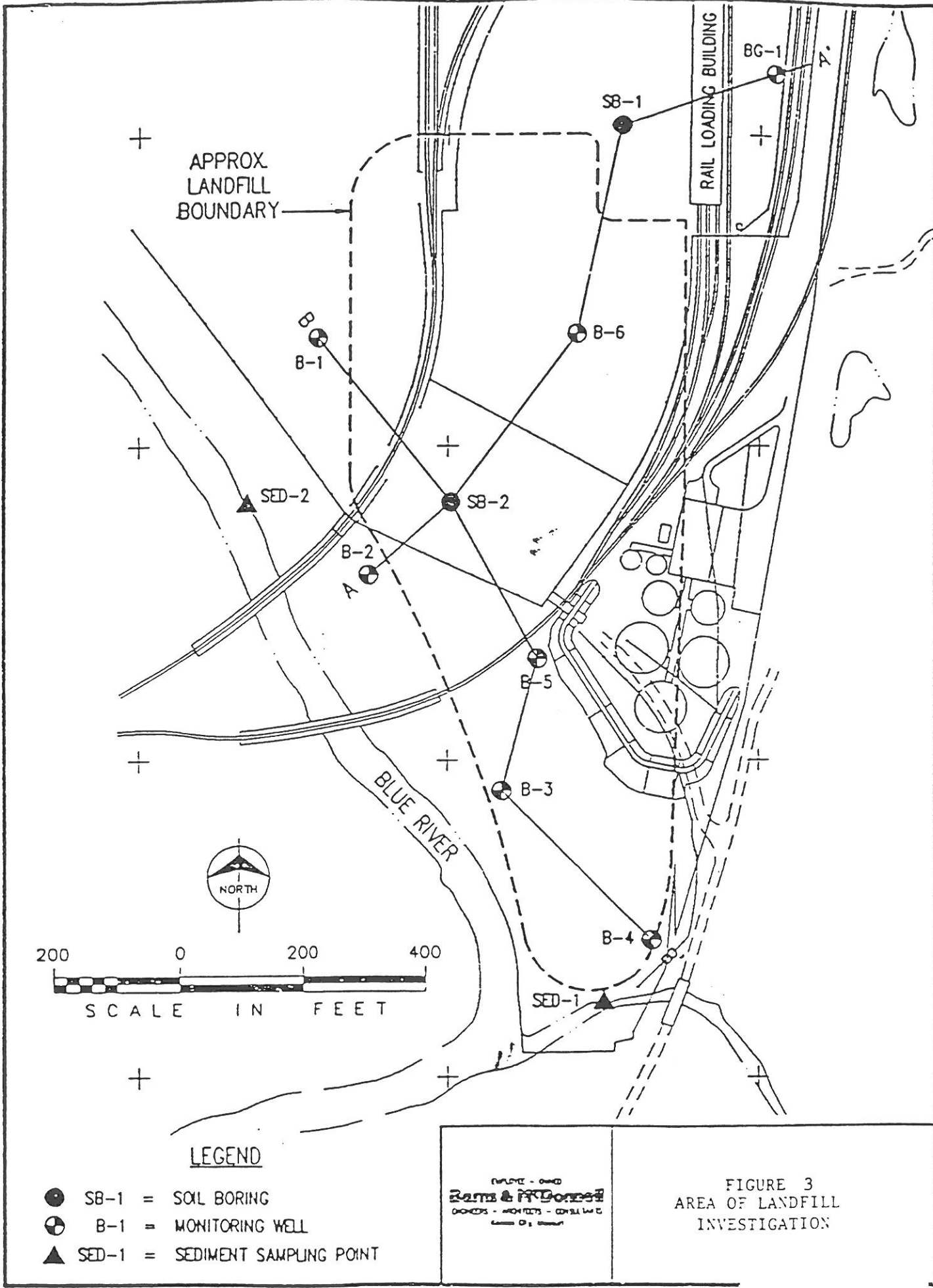


TABLE NO. 1 SOIL BORING AND MONITORING WELL PROGRAM

SECTION 1 - GROUNDWATER MONITORING WELLS

SAMPLE ID	DESCRIPTION	SOIL SAMPLES		GROUNDWATER SAMPLES	
		DEPTHS	ANALYSIS REQUIRED	NO.	ANALYSIS REQUIRED
MW-101 A,B,C GW-101 A,B	WEST PLANT BOUNDARY BETWEEN PAINT SLUDGE BUILDING AND BARREL STORAGE	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-102 A,B,C GW-102 A,B	NORTHWEST PLANT BOUNDARY NEAR COMPANY CAR GARAGE	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-103 A,B,C GW-103 A,B	NORTH PLANT BOUNDARY IN EMPLOYEE PARKING AREA	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-104 A,B,C GW-104 A,B	NORTH-EAST PROPERTY BOUNDARY NEAR RAYTOWN ROAD PARKING LOT	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-105 A,B,C GW-105 A,B	EAST PROPERTY BOUNDARY NEAR RAYTOWN ROAD PARKING LOT	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-106 A,B,C GW-106 A,B	EAST PLANT BOUNDARY AT 39TH STREET & KC SOUTHERN RR TRACKS	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-107 A,B,C GW-107 A,B	SOUTH EAST PROPERTY BOUNDARY	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-108 A,B,C GW-108 A,B	SOUTH EAST PROPERTY BOUNDARY NEAR WASTE TREATMENT PLANT	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-109 A,B,C GW-109 A,B	SOUTH PROPERTY BOUNDARY NEAR FORMER JACK COOPER UST AREA	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-110 A,B,C GW-110 A,B	SOUTH PROPERTY BOUNDARY NEAR FORMER JACK COOPER UST AREA	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-111 A,B,C GW-111 A,B	OUTSIDE BAY 20-ZQ NEAR END OF ASSEMBLY LINE BETWEEN BODY AND PAINT SHOP	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
MW-112 A,B,C GW-112 A,B	CENTER OF WESTERN PLANT BOUNDARY NEAR NORTH SIDE OF PROPANE BUILDING	0'-5', 5'-15', 15'-25' OR BOTTOM	M+, VOC, SVO	2 @30days Intervals	M+, VOC, SVO
P-1	NORTH EAST CORNER OF FAR EAST PARKING LOT	N.A.	N.A.	N.A.	N.A.
P-2	SOUTH WEST CORNER OF INTERSECTION OF 39TH STREET AND RAYTOWN ROAD	N.A.	N.A.	N.A.	N.A.
P-3	NORTHEAST PARKING LOT	N.A.	N.A.	N.A.	N.A.
P-4	ROLL TEST AREA 1ST FLOOR BAY	N.A.	N.A.	N.A.	N.A.

TABLE NO. 1 SOIL BORING AND MONITORING WELL PROGRAM - CONT'D.

BOC LEEDS ASSEMBLY PLANT - KANSAS CITY, MO

SECTION 2 - FACILITY SAMPLING

SAMPLE ID	FLOOR	COLUMN	AREA OF CONCERN	ANALYSIS REQUIRED	NO. SAMPLED MEDIUM
PCB-1	1		Z-LOADA, COMPOSITE OF 2	PCB	1 OIL
PCB-2	1		TRUCK LEVELERS AT DOCKS 5,10,15,& PAINT DEL. AREA - COMPOSITE OF 4	PCB	1 OIL
PCB-3	1		DRAWBRIDGES, COMPOSITE OF 4	PCB	1 OIL
PCB-4 A,B	R	20 ZH	SUBSTATION NO. 4 FLOOR, CHASSIS SUB C FED PACIFIC 1500 KVA ITE 1500 KVA	PCB	2 CORES
PCB-5 A,B,C	2	37 Y	SUBSTATION NO. 5 FLOOR, BODY SUB A	PCB	3 WIPE
PCB-6 A,B	R	20 Q	SUBSTATION NO. 8 FLOOR, CHASSIS SUB B GEN ELECT 2000 KVA GEN ELECT 2000 KVA	PCB	2 WIPE
PCB-7 A,B	R	12 N	SUBSTATION NO. 9 FLOOR, CHASSIS SUB A FED PACIFIC 1500 KVA FED PACIFIC 1500 KVA	PCB	2 CORES
PCB-8 A	2	18 A	SUBSTATION NO. 11 FLOOR, CHASSIS SUB O FED PACIFIC 1500 KVA	PCB	1 WIPE
PCB-9 A,B	1		POWERHOUSE SUBSTATION	PCB	2 WIPE
MF-1	1	38 ZE	2 WASH OFF BOOTHS & TRENCHES	TC-M+,TC-ORG	1 RESIDUE
MF-2	1	29 P	FLANGE GRIND BOOTH DUCTWORK	TC-Pb	1 RESIDUE
MF-3	1	29 T	ROUGH GRIND BOOTH DUCTWORK	TC-Pb	1 RESIDUE
MF-4	1	29 X	FINISH GRIND BOOTH DUCTWORK	TC-Pb	1 RESIDUE
BOND-1	2	29 ZC	CHROME REDUCTION TANK	TC-M+	1 RESIDUE
BOND-2	2	29 ZC	FILTER PRESS	TC-M+	1 RESIDUE
BOND-3	2	20 ZD	BONDERITE BOOTH, STAGE 3	TC-M+	1 RESIDUE UNDER STAGE
BOND-4	2	18 ZD	BONDERITE BOOTH, STAGE 4	TC-M+	1 RESIDUE UNDER STAGE
BOND-5	2	14 ZD	BONDERITE BOOTH, STAGE 5	TC-M+	1 RESIDUE UNDER STAGE
BOND-6	2	14 ZE	BONDERITE BOOTH, STAGE 6	TC-M+	1 RESIDUE UNDER STAGE
ELPO-1	2	6 ZP	ELPO DRAIN/RINSE DECK	TC-Pb	1 RESIDUE
ELPO-2	1	1 ZU	PIGMENT DUPLEX PUMP(S)	TC-Pb	1 RESIDUE
ELPO-3	1	1 ZT	RESIN DUPLEX PUMP(S)	TC-ORG	1 RESIDUE

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TABLE NO. 1 SOIL BORING AND MONITORING WELL PROGRAM - CONT'D.

BOC LEEDS ASSEMBLY PLANT - KANSAS CITY, MO

SECTION 2 - FACILITY SAMPLING

SAMPLE ID	FLOOR	COLUMN	AREA OF CONCERN	ANALYSIS REQUIRED	NO. SAMPLED MEDIUM
SEAL-1	2	3 ZQ	55 GALLON DRUM SEALER PUMPS, 30	TC-ORG	1 RESIDUE
SEAL-2	2	3 ZQ	5 GALLON PAIL SEALER PUMPS	TC-ORG	1 RESIDUE
SEAL-3	2	10 D	BODY TRUCK LUBE STATION	TC-M+, TC-ORG	1 RESIDUE
SEAL-4	2	10 G	PUMP (UB SEALER?)	TC-M+, FP	1 RESIDUE
PLST-1	2	1 XY	OLD PLASTISOL BOOTH (40 ft)	TC-M+, TC-ORG, FP	1 RESIDUE
PRM-1	R	1 UX	PRIME BOOTH FANS (15)	TC-M+, TC-ORG, FP	1 RESIDUE
PINT-1	R	4 ZH-ZE	INTERIOR BOOTH FANS	TC-M+, TC-ORG, FP	1 RESIDUE
1COL-1	R	8 ZH-ZC	1st COLOR BOOTH FANS (32)	TC-M+, TC-ORG, FP	1 RESIDUE
1COL-2	R	8 ZH-ZC	1st COLOR ROOF RESIDUE	TC-M+	1 RESIDUE
MJAC-1	2	4 X	MAST JACKET PAINT OVERSPRAY (AREA)	TC-M+, TC-ORG, FP	1 RESIDUE
URTH-1	2	24 D	URETHANE FANS	TC-M+, TC-ORG, FP	1 RESIDUE
SLSY-1	1	02 ZB	SLUDGE SYSTEM	TC-M+, TC-ORG	1 RESIDUE
WPNT-1	1	3 K	WHEEL PAINT BOOTH	TC-M+, TC-ORG	1 RESIDUE
WPNT-2	1	3 K	PAINT MIX POT LIQUID	TC-M+, TC-ORG	1 LIQUID
RPNT-1	2	03 ZB	DRUMMED LIQUID FROM PAINT POTS	TC-M+, TC-ORG	1 LIQUID
PXPT-1	R	12 ZP-ZQ	PAINT REPAIR BOOTH & FANS, PX	TC-M+, TC-ORG, FP	1 RESIDUE
RPNT-2	R	11 ZM-ZP	PAINT REPAIR BOOTH & FANS #1	TC-M+, TC-ORG, FP	1 RESIDUE
RPNT-3	2	6 ZK	PAINT REPAIR MIX POTS	TC-M+, TC-ORG, FP	1 LIQUID
AOVN-1	R	37 ZC	ABANDONED OVENS (2ND LACQUER)	TC-M+	1 RESIDUE
AAIR-1 A,B	R	37 ZC	ABANDONED AIR HOUSE (5A)	TC-M+, ASBESTOS	2 RESIDUE FROM FLOOR
BCHG-1	2	26 F	BATTERY CHARGING AREA	TC-M+, pH	1 RESIDUE
BCHG-2	1	10 ZV	MAIN BATTERY CHARGING AREA	TC-M+, pH	1 RESIDUE
WB-1	1	29 Q	WOOD BLOCK FLOORING BODY SHOP	TC-Pb, TC-ORG	1 BLOCK
WB-2	1	29 V	WOOD BLOCK FLOORING BODY SHOP		1 BLOCK
WB-3	1	20 L	1ST FLOOR WOOD BLOCK FLOORING	TC-ORG	1 BLOCK
WB-4	1	3 F	1ST FLOOR WOOD BLOCK FLOORING		1 BLOCK
WB-5	2	1-12 H - V	IP AREA WOOD BLOCK FLOORING	TC-ORG	1 BLOCK
WB-6	2	1-12 H - V	IP AREA WOOD BLOCK FLOORING	TC-ORG	1 BLOCK
WB-7	2	1-12 H - V	IP AREA WOOD BLOCK FLOORING	TC-ORG	1 BLOCK
WB-8	2	39-44 A - L	CUSHION ROOM WOOD BLOCKS	TC-ORG	1 BLOCK
WB-9	2	39-44 A - L	CUSHION ROOM WOOD BLOCKS	TC-ORG	1 BLOCK

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TABLE NO. 1 SOIL BORING AND MONITORING WELL PROGRAM - CONT'D.

SECTION 2 - FACILITY SAMPLING

SAMPLE ID	FLOOR	COLUMN	AREA OF CONCERN	ANALYSIS REQUIRED	NO. SAMPLED MEDIUM
CONC-1	1	29 X	CONCRETE FLOOR CHIPS	TC-Pb	1 CHIP
CONC-2	1	29 X	CONCRETE FLOOR CHIPS	TC-Pb	1 CHIP
CSTL-1			CAUSTIC BUILDING TANK 1	pH	1 LIQUID
CSTS-1			CAUSTIC BUILDING TANK 1	TC-M+, TC-ORG, pH	1 SLUDGE
CSTL-2			CAUSTIC BUILDING TANK 2	pH	1 LIQUID
CSTS-2			CAUSTIC BUILDING TANK 2	TC-M+, TC-ORG, pH	1 SLUDGE
CSTL-3			CAUSTIC BUILDING TANK 3	pH	1 LIQUID
CSTS-3			CAUSTIC BUILDING TANK 3	TC-M+, TC-ORG, pH	1 SLUDGE
MPNT-1			MAINTENANCE PAINT BOOTH	TC-M+, TC-ORG, FP	1 RESIDUE
PSBS-1			PITS AND SUMPS - BODY SHOP	HOC, TC-M+	2 RESIDUE COMPOSITES
PSBS-2					
PSMF-1			PITS AND SUMPS - METAL FINISHING	HOC, TC-M+	2 RESIDUE COMPOSITES
PSMF-2					
PSP-1			PITS AND SUMPS - PAINT	HOC, TC-M+, TC-ORG	2 RESIDUE COMPOSITES
PSP-2					
PSR-1			PITS AND SUMPS - REPAIR	HOC, TC-M+, TC-ORG	2 RESIDUE COMPOSITES
PSR-2					
PST-1			PITS AND SUMPS - TRIM	HOC, TC-ORG	2 RESIDUE COMPOSITES
PST-2					
BS-1	2	14 W	BLUE SURF RESERVOIR	TC-M+	1 RESIDUE/SLUDGE
BS-2	R	18 W	BLUE SURF BAGHOUSE	TC-M+	1 RESIDUE
DPNT-1	3	20 F	DUCCO BOOTH	TC-M+	1 RESIDUE
RF-1 THROUGH RF-30			ROOFING	TC-M+	30 ROOF CORE
RFG-1 THROUGH RFG-15			ROOF GRAVEL	TC-M+	15 GRAVEL
RFA-1 THROUGH RFA-5			ROOF AND GUTTER ACCUMULATIONS	TC-M+	5 RESIDUE
CONV-1	M	20 B	CONVEYOR DRIP PANS AND GUARDS	TC-M+, HOC	1 RESIDUE
CONV-2	2	10 Z	CONVEYOR DRIP PANS AND GUARDS	TC-M+, HOC	1 RESIDUE
CONV-3	R	37 ZC	CONVEYOR DRIP PANS AND GUARDS	TC-M+, HOC	1 RESIDUE
TINC-1		6 ZV	TRASH INCINERATOR AREA	TC-M+	1 RESIDUE
HZDR-1	OUTSIDE		HAZARDOUS DRUM STORAGE AREA	TCLP SERIES	1 CONC CHIP
HZDR-2			HAZARDOUS DRUM STORAGE AREA	TCLP SERIES	1 CONC CHIP
HZDR-3			HAZARDOUS DRUM STORAGE AREA	TCLP SERIES	1 CONC CHIP
STSP-1 THROUGH STSP-5			STORM SEWER/C.B.S/ IN PLANT	M+, TPH	5 SOLIDS
STSS-1 THROUGH STSS-5			STORM SEWER/C.B.S/ ON SITE	M+, TPH	5 SOLIDS
STSB-1 AND STSB-2			STORM WATER RETENTION BASIN	M+, TPH	2 SOLIDS

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TABLE NO. 1 SOIL BORING AND MONITORING WELL PROGRAM - CONT'D BOC LEEDS ASSEMBLY PLANT - KANSAS CITY, MO

SECTION 3 - SOIL BORING SAMPLING

SAMPLE ID	AREA OF CONCERN	ANALYSIS REQUIRED	BORINGS	SAMPLE DEPTHS
WEST SIDE OF ASSEMBLY BUILDING				
SB-101 A,B,C	CAUSTIC TANK BUILDING	TCLP, pH, TPH	2	0' - 5'
SB-102 A,B,C				5' - 15'
				15' - 25'
SB-103 A,B,C	PAINT SLUDGE BUILDING	M+, VOA, pH	1	0' - 5'
				5' - 15'
				15' - 25'
SB-104 A,B,C	HAZARDOUS DRUM STORAGE AREA	TCLP, TPH	1	0' - 5'
				5' - 15'
				15' - 25'
NORTH SIDE OF ASSEMBLY BUILDING				
SB-105 A,B,C	FORMER GAS STATION AREA	TOTAL Pb, TPH	3	0' - 5'
SB-106 A,B,C				5' - 15'
SB-107 A,B,C				15' - 25'
EASTSIDE OF ASSEMBLY BUILDING				
SB-108 A,B,C	EAST PARKING LOT	TOTAL Pb, TPH	2	0' - 5'
SB-109 A,B,C	(AT RAYTOWN & 39TH STREET)			5' - 15'
				15' - 25'
SG-1	ANNEXED "KENNEL" PROPERTY	PCB, TPH, M+	2	SURFACE GRABS
SG-2				
SW-1	"KENNEL" PROPERTY SPRING	BOD, TP, TKN COLIFORM	1	SURFACE WATER
1ST FLOOR WITHIN ASSEMBLY BUILDING				
SB-110 A,B,C	MAIN BATTERY CHARGING AREA	TC-M+, pH	2	0' - 2' BELOW SLAB
SB-111 A,B,C				2' - 5' BELOW SLAB
				5' - 10' BELOW SLAB
SB-112 35 L	PITS AND SUMPS - METAL FINISHING	TPH, M+	1	1' BELOW PIT BOTTOM
SB-113 18 B	PITS AND SUMPS - TRIM	TPH	1	1' BELOW PIT BOTTOM
SB-114 14 V	PITS AND SUMPS - TRIM	TPH	1	1' BELOW TUNNEL BOT
SB-115A 39 N	OLD BONDERITE SYSTEM SUMP	M+, pH	1	5' - 10' BELOW SLAB
-115B				10' - 15' BELOW SLAB
SB-116A 32 ZA	1930'S STORAGE TANKS (UNDERGROUND)	HOC, VOA	2	5' - 10' BELOW SLAB
-116B,C,D				10' - 15' BELOW SLAB
SB-117A				15' - 20' BELOW SLAB
-117B,C,D				20' - 25' BELOW SLAB

TABLE NO. 1 SOIL BORING AND MONITORING WELL PROGRAM - CONT'D

SECTION 3 - SOIL BORING SAMPLING

SAMPLE ID	AREA OF CONCERN	ANALYSIS REQUIRED	BORINGS	SAMPLE DEPTHS
SB-118A -118B,C,D SB-119A -119B,C,D	33 ZC 1940'S - 50'S STORAGE TANKS (UNDERGROUND)	HOC, VOA	2	5' - 10' BELOW SLAB 10' - 15'BELOW SLAB 15' - 20'BELOW SLAB 20' - 25'BELOW SLAB
SB-120A -120B,C,D SB-121A -121B,C,D	35 ZE 1954 STORAGE TANKS (UNDERGROUND)	HOC, VOA	2	5' - 10' BELOW SLAB 10' - 15'BELOW SLAB 15' - 20'BELOW SLAB 20' - 25'BELOW SLAB
SB-122A -122B,C,D	16 K PAINT TANK PIT AREA	HOC, VOA	1	15' - 20'BELOW SLAB 20' - 25'BELOW SLAB 25' - 30'BELOW SLAB 30' - 35'BELOW SLAB
SB-123A -123B,C,D	10 Q 1958 STORAGE TANK (POSSIBLY UNDERGROUND)	HOC, VOA	1	5' - 10' BELOW SLAB 10' - 15'BELOW SLAB 15' - 20'BELOW SLAB 20' - 25'BELOW SLAB
SB-124A -124B	8 Q 1958 THINNER STORAGE TANK (ABOVEGROUND)	HOC, VOA	1	5' - 10' BELOW SLAB 10' - 15'BELOW SLAB

LEGEND	TCLP = TCLP EXTRACTION PROCEDURE AND ALL ANALYTICAL EXCEPT HERBICIDES AND PESTICIDES
	TC- = TCLP EXTRACTION PROCEDURE WITH SPECIFIC ANALYTICAL AS INDICATED
	M+ = PRIORITY POLLUTANT METALS
	ORG = ORGANICS (VOLATILE AND SEMIVOLATILE COMPOUNDS)
	VOA = VOLATILE ORGANICS
	FP = FLASH POINT, PENSKEY MARTENS CLOSED CUP
	HOC = HALOGENATED ORGANIC CARBON
	TPH = TOTAL PETROLEUM HYDROCARBONS, METHOD 418 FOR SOLIDS/SLUDGES
	SVO = SEMI-VOLATILE ORGANICS
	PCP = PENTACHLOROPHENOL
	PCB = POLYCHLORINATED BIPHENYLS
	BOD = BIOLOGICAL OXYGEN DEMAND
	TP = TOTAL PHOSPHORUS
	TKN = TOTAL KJELDAHL NITROGEN
	Pb = LEAD
	R = ROOF
	M = MEZZANINE

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3.0 HYDROGEOLOGICAL FINDINGS

3.1 Geology of the Site

The geology of the area in which the BOC Leeds Plant is located is dominated by limestone, sandstone, and shale bluffs that have been eroded and partially covered with loess and river sedimentation. The limestone, sandstone and shale rock formations were left behind in the Pennsylvanian Period of geologic history, about 300 million years ago. Subsequent deposition of silty, dusty wind borne material formed dunes and bluffs of clay rich sediments, called loess. The Kansas City, Missouri area is near the border of the furthest advance of ice age glaciers that occurred in the Quaternary Period between 10,000 and 2 million years ago. Glacial drift and river silt left by the glacial retreat contributed to the wind blown silt.

Deep underlying rock layers of limestone, sandstone and dolomite were deposited early in the Paleozoic Era during the Mississippian and Cambrian-Ordovician Periods. Approximately one-half to one mile deep in the Kansas City, Missouri and Kansas City, Kansas areas are Precambrian granite, igneous and metamorphic rocks formed more than 600 million years ago.

Site specific geologic features are consistent with the area geology. Limestone and sandstone rock outcroppings are visible

in bluffs and hills surrounding the site, and the clay-silt loess and river sediments are typically found in the soil borings on the plant site. The surface elevation at the BOC Leeds plant varies from 761 feet above sea level on the west side of the site to 781 feet on the east side.

Table 2 summarizes the log sheets for the soil borings which were completed in August and September, 1991. The borings with greatest distance drilled were 29.5 ft for MW-110 and 27.5 ft for P-1. The average distance drilled was 20.6 feet. Because of the variation in surface elevation, the lowest elevation reached does not always correspond to the greatest distance drilled. The lowest elevations reached were at MW-110, MW-108, SB-104, SB-103 and MW-112. These deepest borings consistently show wet clay with some silt and medium plasticity characteristics.

The predominant soil classification at the BOC Leeds site is a wet clay with medium to high plasticity. The exceptions were borings SB-116, SB-117, and SB-118, which are located in areas that were highly disturbed because of plant construction activities, where sand and gravel fills were encountered. Also noteworthy are several borings on the east side of the site that encountered clay and a thin (6 in to 1.5 ft thick) limestone layer at 7 to 11 foot depth. The coloration of the clay is typically dark olive gray, or blackish gray, and occasionally a mottled yellowish brown is reported.

3.2 Hydrology of the Site

Groundwater is first encountered at the BOC Leeds site at a shallow eight to eighteen feet below ground surface. The surface elevation changes considerably across the site as does the groundwater elevation. The change in water elevation across the site is from 774 feet on the west side to 744 feet on the south side, a substantial 30 foot drop. In almost every soil boring, damp and moist conditions were encountered in the unsaturated top layers of the soil borings. It was noted that the weather conditions during the boring program were normal for the time of year, and no unusual precipitation events occurred.

The 30 foot drop in groundwater elevation over the BOC Leeds site occurs between P-1 and MW-108, which are approximately 2800 feet apart. This indicates a site average flow gradient of .01 feet per foot. It is known that the clay soils are very impervious and difficult to drain. Hydraulic conductivity tests were done by Burns & McDonnell for the Site Characterization Study and estimated horizontal groundwater flow rates between .2 to .9 feet/year.

3.3 Groundwater Flow Direction

Drawing EP-5 shows groundwater contours based on water level measurements for sixteen monitoring wells and four piezometers

installed as part of this site assessment study. The water level measurements were made on September 3-8, 1991 and on October 7-11, 1991 and are summarized on Table 3. The heavy contour lines represent constant groundwater elevations. The groundwater flow direction in this uppermost zone of saturation is toward the south-southwest, toward the Blue River.

TABLE NO. 2 SOIL BORING SUMMARY

LOCATION NO.	TOTAL DEPTH (FT)	PREDOMINANT STRATIGRAPHY	WATER CONTENT
MW- 101	23	CLAY, MED TO HIGH PLASTICITY	DAMP TO MOIST
MW- 102	24.9	SILT, CLAYEY, LOW PLASTICITY	DAMP TO WET
MW- 103	24	CLAY, SILTY, HIGH TO MED PLASTICITY	MOIST TO WET
MW- 105	20.6	CLAY, SOME SILT, HIGH TO MED PLASTICITY	MOIST TO WET @ 13 FT
MW- 106X	22	FILL TO 10 FT, CLAY, TRACE SILT MED TO HIGH PLASTICITY	MOIST TO WET @ 17 FT
MW- 107	24.5	CLAY, TRACE SILT, MED TO HIGH PLASTICITY	MOIST TO WET @ 21 FT
MW- 108	26	CLAY TRACE SILT, HIGH PLASTICITY 1.5 FT THICK LIMESTONE LAYER @ 12 FT	MOIST TO WET @ 17 FT
MW- 109	24.5	CLAY, TRACE TO SOME SILT, HIGH PLASTICITY	DAMP TO WET @ 18 FT
MW- 110	29.5	CLAY, TRACE SILT TO SILTY, HIGH PLASTICITY	DAMP TO WET @ 19 FT
MW- 111	21	CLAY, SILTY, MED TO LOW PLASTICITY	DAMP
MW- 112	24.5	CLAY, SILTY, MED TO LOW PLASTICITY	MOIST TO WET @ 15
P- 1	27.5	CLAY, SILTY, LOW PLASTICITY LESS SILT W/ DEPTH, HIGHER PLASTICITY	DAMP/MOIST TO WET @ 23 FT
P- 2	14	CLAY, LOW TO MED PLASTICITY < 2 FT THICK LIMESTONE LAYER @ 7 FT	MOIST
P- 3	17	CLAY, MORE SILT W/ DEPTH, LOW TO MED PLASTICITY	MOIST TO WET @ 13
P- 4	20	CLAY, SOME SILT AT TOP, HIGH PLASTICITY	DAMP/MOIST TO WET @ 11
SB- 101	14	CLAY, SILTY AT TOP, HIGH PLASTICITY HIT METAL OBSTRUCTION @	DAMP
SB- 102	24.5	CLAY, LESS SILT W/ DEPTH, MED TO HIGH PLASTICITY	MOIST TO WET @ 13 FT
SB- 103	25	CLAY, SLIGHT SILT, MEDIUM PLASTICITY	DAMP TO WET @ 15 FT
SB- 104	25	CLAY, SILTY AT BOTTOM, MEDIUM PLASTICITY	DAMP TO WET @ 15 FT
SB- 105	24.5	CLAY, SOME SILT, HIGH PLASTICITY	DAMP TO WET @ 13 FT
SB- 106	24.5	CLAY, SOME TO TRACE SILT, HIGH PLASTICITY	DAMP/MOIST TO WET @ 12 FT
SB- 107	24.5	CLAY, SOME TO TRACE SILT, HIGH PLASTICITY 6 IN THICK LIMESTONE LAYER @ 10 FT	DAMP/MOIST TO WET @ 11 FT
SB- 108	25	CLAY, MEDIUM TO LOW PLASTICITY	MOIST TO WET @ 12 FT
SB- 110	10	SAND TO 2.5 FT, CLAY, TRACE SILT, HIGH PLASTICITY	DAMP
SB- 111	10	CLAY, RICH IN ORGANICS, MED TO LOW PLASTICITY	
SB- 113	7	CLAY, SOME SILT, HIGH PLASTICITY	DAMP
SB- 114	10	CLAY, MEDIUM PLASTICITY	MOIST
SB- 115	15	CLAY, TRACE SILT, MED TO HIGH PLASTICITY	MOIST TO WET @ 12 FT
SB- 116	5	SAND TO 5 FT, HIT OBSTRUCTION, SUSPECT RR TIE	
SB- 117	14	SAND, PEA GRAVEL, WELL SORTED	WET @ 11 FT
SB- 118	25	SAND SILT GRAVEL TO 6 FT, CLAY TRACE SILT HIGH PLASTICITY	WET @ 8 FT
SB- 119	25	SAND TO 1.5 FT, CLAY, SILTY HIGH TO MED PLASTICITY 6 IN THICK LIMESTONE LAYER @ 11 FT	MOIST TO WET @ 10 FT
SB- 120	25	SAND TO 1 FT, CLAY W/ TRACE SILT, HIGH PLASTICITY 1 FT THICK LIMESTONE LAYER @ 7.5 FT	MOIST TO WET @ 13 FT
SB- 121	25	GRAVEL TO 1 FT, CLAY, SILTY, SANDY, LOW PLASTICITY CLAY AND HIGH PLASTICITY AFTER 17 FT	DAMP TO WET @ 10 FT
SB- 122	24.5	CLAY, SOME SILT, HIGH PLASTICITY CONCRETE OBSTRUCTION @ 24 FT	DAMP TO WET @ 6 FT
SB- 123	24.5	CLAY, SOME SILT, TRACE SAND, HIGH PLASTICITY	MOIST TO WET @ 12 FT
SB- 124	15	CLAY, SLIGHT SILT, MEDIUM TO LOW PLASTICITY	MOIST

SOIL BORINGS, PIEZOMETERS AND MONITORING WELLS INSTALLED DURING AUGUST AND SEPTEMBER, 1991

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PRIVELEGED & CONFIDENTIAL
PREPARED AT GM COUNSEL'S REQUEST

TABLE NO. 3 GROUNDWATER ELEVATION DATA

BOC LEEDS, KANSAS CITY, MO

Well	Surface Elevation	Water Depth (ft)		Average Water Depth (ft)	Groundwater Elevation
MW 101	761.64	8.31 8.12	8.68	8.37	753.27
MW 102	765.35	9.84 8.98	9.63 12.30	10.19	755.16
MW 103	772.23	18.02 17.64	17.53 19.12	18.08	754.15
MW 105	781.35	10.45 10.13	10.27 10.65	10.38	770.98
MW 106	761.92	10.59 10.66	10.70 13.88	11.46	750.46
MW 107	762.88	14.50 14.28	15.34	14.71	748.17
MW 108	759.74	16.09 16.11	16.17	16.12	743.62
MW 109	761.35	17.18 17.19	17.06	17.14	744.21
MW 110	761.27	15.92 17.53	17.66	17.04	744.23
MW 111	761.67	8.52 8.28	8.37 8.62	8.45	753.22
MW 112	761.45	8.65 7.33	7.59	7.86	753.59
P-1	777.52	3.72 3.77		3.75	773.78
P-2	772.23	11.74 12.08		11.91	760.32
P-3	765.59	9.32 9.46		9.39	756.20
P-4	759.51	4.88 4.96		4.92	754.59

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4.0 UNIT DESCRIPTIONS AND ANALYTICAL FINDINGS

This section presents the findings of the process and facility residue sampling portion of the environmental site assessment. The order of presentation of the process equipment findings generally follows the manufacturing sequence, beginning with the body shop areas, proceeding to the paint shop and then the assembly areas. Following that are sections pertaining to maintenance areas, building facilities, and specific site features. The final sections describe the site perimeter soils and groundwater. Table 1 presented all samples and analyses that were originally comprehended for this study.

4.1 Process Equipment

4.1.1 Metal Finish and Solder Grind

The walls of the wash off booths and trenches, and grind booths are visually clean. The plenums and stacks of the grind booths, including blower housings, have light residue on the interior. Pits underneath the booths were visually inspected and are free of deposits. Ductwork from the grind booths to the exhaust stacks have variable accumulations from visually clean to light residue. Sewers in the area are typically coated with residue. In one case, as reported by plant operating personnel, a sewer line was completely plugged with solder grinding residue, and has

been abandoned.

Samples MF-1, MF-2, MF-3 and MF-4 were used to assess conditions in the grinding and wash off booths.

Barium and Cadmium were detected in the TCLP extract for MF-1, at levels well below the RCRA hazardous waste regulatory level. The other metals and volatile organics were analyzed for, but not detected in the TCLP extract for MF-1.

Lead was analyzed for and detected in the TCLP extract for MF-2 at .5 mg/l, which is well below the 5 mg/l RCRA regulatory level.

Lead was analyzed for and not detected in MF-3.

Lead was analyzed for and detected in the TCLP extract for MF-4 at 1.39 mg/l, which is well below the 5 mg/l RCRA regulatory level.

4.1.2 Phosphate System

The phosphate system (also called Bonderite) that was most recently used for production was built as part of the 1972 paint shop expansion. Most of the sheet metal housings, piping and tankage are visually clean. Many pumps have been removed.

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However, small accumulations of dried residues remain in containment pits and on floors.

Samples BOND-1 through BOND-7 were used to assess conditions in the phosphate system. All samples were subjected to TCLP extraction, with the extract analyzed for metals.

In sample BOND-1, Barium, Chromium, Lead and Selenium were detected, but all were below the RCRA regulatory level.

In sample BOND-2, Barium, Cadmium, Chromium, Lead and Selenium were detected, but all were below the RCRA regulatory level.

In sample BOND-3, Arsenic, Barium and Cadmium were detected, but all were below the RCRA regulatory level. Also, in the extract for BOND-3, Lead was detected at 1940 mg/l, well above the RCRA regulatory level of 5 mg/l.

In sample BOND-4, Arsenic, Barium, Chromium and Lead were detected, but all were below the RCRA regulatory level.

In sample BOND-5, Arsenic, Barium and Lead were detected, but all were below the RCRA regulatory level.

In sample BOND-6, Barium, Chromium, and Lead were detected, but all were below the RCRA regulatory level.

Sample BOND-7 was a concrete floor chip sample, taken from the stained concrete containment area near the last stage of the phosphate system. The concrete had been stained green by phosphate solutions that were rinsed into the plant waste treatment system. A chip sample is representative of the worst case since it would be the most highly concentrated accumulation of any potential contaminants. In BOND-7, only Barium and Chromium were detected in the TCLP extract, at levels well below their respective RCRA regulatory levels.

Historical Bonderite Operations

The phosphate (Bonderite) operation associated with the 1954 Paint Shop was located along the east exterior wall from column 43Q to 43U on the second floor. This location is now a traffic aisle. The sewer that served the phosphate system is still in place and is located below in the trusswork of the first floor.

Another system for small parts phosphate has been dismantled but according to historical drawings was located along the west exterior wall of the soft trim area from columns 1N to 1S. The process waste drain piping that served it is still in place and is located in the trusswork of the first floor.

No visible residues from these past operations is existing, thus no sampling was done.

4.1.3 Elpo System

The elpo circulation pumps, filter tanks, dip tank grillage, drain deck, the incline to the elpo oven and the decline from the elpo oven have dried paint drippings on many surfaces. The curbed containment area around the elpo tank has dried and semi-dried residues. There is additional dried elpo at the resin and pigment pumps in the elpo storage room.

The dump tanks and pump room have minimal amounts of dried paint from piping leaks.

Samples ELPO-1, ELPO-2 and ELPO-3 were used to assess conditions in the elpo area.

Lead was analyzed for and detected in the TCLP extract for ELPO-1 at 550 mg/l, well above the RCRA regulatory level of 5 mg/l.

Lead was analyzed for and detected in the TCLP extract for ELPO-2 at 213 mg/l, well above the RCRA regulatory level of 5 mg/l for Lead.

The TCLP extract from ELPO-3 was analyzed for metals and volatile organics. Lead, Barium, Cadmium and Chromium were detected, but only Lead at 86 mg/l exceeded the RCRA regulatory level.

4.1.4 Paint Shop Equipment and Exhaust Stacks

Paint Spray Booths

The interiors of the Plastisol, Prime, Interior, First Color, Second Color, Third Color, Urethane and Repair Booths are visually clean. The paint lines have been purged. No adverse environmental concerns at these booths were noted.

The interior of the old Duco Booth next to the Urethane Booth is visually clean, however, the eliminator section under this booth has thick residues. Sample DPNT-1 was used to assess conditions in the Duco Booth, and it was subjected to TCLP extraction. The extract was analyzed for metals. Only Barium was detected, at a level well below the RCRA regulatory level.

The wall panels of the Mast Jacket paint booth are covered with varying thickness of overspray which has a whitish appearance and is a dry semi-friable solid. Sample MJAC-1 was subjected to TCLP extraction and the extract analyzed for metals and volatile organics. Only Barium was detected, well below RCRA regulatory level. The flash point of this material is greater than 200 F.

Sample PLST-1 was taken to assess residue around the Plastisol spray booth area. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Only Chromium was

detected, well below RCRA regulatory levels. The flash point was greater than 200 F.

The Wheel paint booth is generally free of paint and sludge, but a petroleum jelly type booth compound has been smeared on some of the booth surfaces. Sample WPNT-1 was collected to assess this booth residue, and subjected to TCLP extraction. The extract was analyzed for metals and volatile organics. Only Barium and Chromium were detected, at well below RCRA regulatory levels.

Exhaust Stacks

The interior of nearly all paint shop exhaust stacks are coated with a layer of residue that varies in thickness from a thin film up to an inch thick.

Sample PRM-1 was used to assess conditions in the prime booth exhaust system. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Only Barium, Cadmium and Chromium were detected, well below RCRA regulatory levels. The flash point was greater than 200 F.

Sample PINT-1 was used to assess conditions in the interior booth exhaust system. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Barium and Chromium were detected, well below RCRA regulatory levels. Also Lead was

detected at 5.37 mg/l, which marginally exceeds the RCRA regulatory level of 5.0 mg/l. The flash point was greater than 200 F, thus the material is not ignitable.

Sample 1COL-1 was used to assess conditions in the first color booth exhaust system. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Only Barium, Cadmium and Chromium were detected, well below RCRA regulatory levels. The flash point was greater than 200 F, thus the material is not ignitable.

Sample UPTH-1 was used to assess conditions in the urethane booth exhaust system. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Only Barium was detected at a level well below RCRA regulatory levels. The flash point was greater than 200 F, thus the material is not ignitable.

Sample PXPT-1 was used to assess conditions in the PX paint repair booth exhaust system. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Barium, Cadmium and Chromium were detected, well below RCRA regulatory levels. Also Lead was detected at 3.92 mg/l, which is marginally below the RCRA regulatory level of 5.0 mg/l. The flash point was greater than 200 F, thus the material is not ignitable.

Sample RPNT-2 was used to assess conditions in the no. 1 paint repair booth exhaust system. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics.

Barium, Cadmium, Chromium and Lead were detected, well below RCRA regulatory levels. The flash point was greater than 200 F, thus the material is not ignitable.

Paint Mix Areas

Paint mix pots have been cleaned of paint residue, however the vast majority contain a few gallons of a water/ethylene glycol mixture in bottom. The paint lines have been purged of paint and the lines have been cut off at their termination in the paint booths.

Samples RPNT-1 and RPNT-3 were used to assess the residual material from the paint mix pots in the main paint mix room and the paint repair area on the second floor. TCLP extraction was followed by analysis for volatile organics. Methyl ethyl ketone (MEK) was detected at 1.46 mg/l and 1.41 mg/l respectively, which is well below the 200 mg/l RCRA regulatory level.

Also, sample WPNT-2 was obtained from paint mix pots near the wheel paint booth on the first floor. The sample was subjected to TCLP extraction and analyzed for metals and volatile organics. Arsenic and Barium were detected at levels well below the RCRA

regulatory limit. Also MEK was detected at 107 mg/l, which is about half the RCRA regulatory level of 200 mg/l.

4.1.5 Paint Sludge Systems

Central Sludge Equipment

The Hoffman filter equipment on the second floor is visually clean. The first floor pumps and circulation tank are empty and free of paint sludge but the tank has a dry thin residue of river mud on the bottom. The river mud residue was left when the Blue River overflowed and the area was flooded in May, 1990. Sample SLSY-1 was taken to assess the residue. The sample was subjected to TCLP extraction, and analyzed for metals, volatile and semi-volatile organics. Of all the parameters, only Barium was detected, at well below the RCRA regulatory level.

Urethane Sludge Equipment

The urethane sludge tank has been drained but paint sludge residue exists at the water line and the sludge drag out area. This material is essentially the same as residue found in the Urethane booth exhaust system which was assessed with sample URTH-1. The TCLP extract was analyzed for metals and volatile organics and only Barium was detected, well below the RCRA regulatory level. More details on URTH-1 are found in section

4.1.4.

4.1.6 Sealer Systems

Drum pumping stations for application of sealers to the vehicles have residues in piping, hoses and on follower plates. Samples SEAL-1 through SEAL-4 were collected to assess these systems.

Sample SEAL-1 was taken from a 55 gallon drum pumping station on the second floor at Bay ZQ-3. The sample was subjected to TCLP extraction and analyzed for volatile organics. No parameters were detected.

Sample SEAL-2 was taken from a 5 gallon pail pumping station also on the second floor at Bay ZQ-3. The sample was subjected to TCLP extraction and analyzed for volatile organics. Benzene and Chlorobenzene detections were reported by the laboratory, but the quantities are estimated because they are below the laboratory quantification limit. The laboratory's estimated quantity of Benzene is well above the RCRA regulatory level, while the estimated quantity of Chlorobenzene is well below the RCRA regulatory level. Since no conclusion may be drawn on the status of this material, resampling and reanalysis is recommended.

Sample SEAL-3 was taken from a 55 gallon drum pumping station also on the second floor at Bay ZQ-3. The sample was subjected

to TCLP extraction and analyzed for metals and volatile organics. Only Barium was detected in the extract. At .416 mg/l, Barium is well below the RCRA regulatory level of 100 mg/l.

Sample SEAL-4 was taken from bay G-10 on the second floor. It was subjected to TCLP extraction and analyzed for metals. Only Barium and Cadmium were detected in the extract at well below the respective RCRA regulatory levels.

4.1.7 Battery Charge Areas

Besides the main battery charging room on the first floor at the south end of the plant, there are several remote charging areas, as listed below. A related installation is the battery rack in Substation #5, which was probably used as an uninterruptible power supply (UPS) system.

43S, first floor

4ZG, first floor

22R, first floor

24E, mezzanine level (this one sampled)

28B, mezzanine level

4W, second floor

41R, second floor

Sample BCHG-1 was taken of residue on the mezzanine at bay 24-E

and subjected to TCLP extraction followed by analysis for metals. Barium, Cadmium, Chromium, Lead, Selenium and Silver were all detected in the extract. Barium, Chromium and Silver were below their respective RCRA regulatory levels. Cadmium, at 1.21 mg/l is slightly above the RCRA regulatory level of 1.0 mg/l. Lead at 4.58 mg/l is marginally below the RCRA regulatory level of 5.0 mg/l. Selenium is listed at 1 mg/l, but this quantity is estimated because it is below the laboratory quantification limit. Since the RCRA regulatory limit for Selenium is also 1.0 mg/l, no conclusion may be drawn on the status of this analytical fraction. Resampling and reanalysis is recommended.

Sample BCHG-2 was taken by compositing residues in the main battery charging room at bay 10-ZV. The sample was subjected to TCLP extraction, followed by metal analysis. Cadmium, Chromium, Lead and Silver were detected at levels well below their respective RCRA regulatory levels.

4.1.8 Conveyor Lubricant Catch Pans

Throughout the manufacturing building, shallow sheet metal troughs were used under conveyors and drive units to catch dripping lubricants. Some of these catch pans contain residues of greases and oils, along with occasional nuts, bolts and other debris. Three sites were selected and sampled to assess the situation. CONV-1, CONV-2, and CONV-3 were analyzed for

halogenated organic compounds (HOC) and TCLP extraction with metals analysis.

Sample CONV-1 was taken on the mezzanine level near bay 20-B. Barium and Cadmium were detected, at well below the RCRA regulatory level. Lead was also detected at 3.44 mg/l, which is below the 5.0 mg/l RCRA regulatory level. HOC was detected at 104 ppm.

Sample CONV-2 was taken on the second floor near bay 10-Z. Barium and Cadmium were detected, at well below the RCRA regulatory level. Lead was also detected at 25.1 mg/l, which is well above the 5.0 mg/l RCRA regulatory level. HOC was detected at 722 ppm.

Sample CONV-3 was taken in a roof mounted conveyor housing near bay 37-ZC. Barium, Cadmium, Chromium, and Lead were detected, at well below their respective RCRA regulatory level. HOC was detected at 48 ppm.

Since a high level of halogenated organic compounds exists (relative to the TCLP limits), residues from these conveyor lubricant catch pans should be resampled and analyzed for RCRA TCLP organics.

4.2 Tank Systems

Sites of historical USTs have been investigated as part of this project. Three sites exist under the current building floor in the proximity of the robotic welding line in the body shop. Another site exists under the current building floor in the assembly area. Two other sites are outside the manufacturing building. Underground tank systems were investigated with subsurface borings and in some cases with groundwater monitoring wells. Aboveground tanks at the Powerhouse and Waste Treatment were reviewed but not sampled, as discussed below.

The sampling and analytical program is discussed in this section. The results of the analytical work are included in section 5.2 with the rest of the site borings and groundwater monitoring wells.

4.2.1 Underground Storage Tanks

Table 4, Historical Underground and Below Grade Storage Tanks, presents known information on location, use and disposition of the tanks.

Five underground oil tanks were shown on drawings for the original powerhouse construction in 1928. These original tanks must have been removed, although the date is not known, and replaced by the current process fluid tank farm in the powerhouse basement.

A pair of USTs existed immediately northwest of column 32-ZA. Notations on historical drawings make reference to the tanks, but it is not known what material was stored in the tanks. Boring SB-117 was placed so that the tanks would be hit if they were still in place. The boring passed through granular backfill and hit refusal at 14 feet below the plant floor, which is where a tank cradle or hold down pad would be expected. Boring SB-116 was placed to evaluate the soils surrounding the tanks. The boring passed through sand backfill and hit a railroad tie at 5 feet below the plant floor. The auger was unable to pass this obstruction and the boring was terminated.

A pair of USTs existed at, or just east of, column 32-ZC. These tanks were found on two historical drawings, one of which implies that the tanks would have been removed to construct the footing for column 32-ZC. The locations of these tanks were marked on the plant floor according to both drawings. Borings SB-118 & 119 were placed where the tank outlines overlapped. Both borings were drilled to a depth of 25 feet without encountering any obstructions.

A pair of USTs were installed as part of the paint shop addition of 1954. This area is currently the south end of the robotic welding area near Bay 32-ZF. Removal of those tanks was witnessed by plant personnel during the construction of the J-Car addition of 1981. Borings SB-120 and SB-121 were installed to

assess this area and were drilled to 25 feet each.

Another tank installation under the plant floor in the assembly area was found during the historical drawing review. The area was referred to as the Enamel Storage Pit, and also as the Duco Paint Storage Pit since Dupont paint products were used there. This 1928 installation consisted of six large tanks that stored paint and primer, six smaller mixing tanks, and pumps, piping, walkways and sprinkler system in a subfloor concrete vault. Various subfloor trenches that connected to the pit were probably used to route piping out of the way of the workers and production equipment. Boring SB-122 was installed, and soil samples were analyzed for halogenated organic compounds, and volatile organic compounds. A floating layer of colorless organic solvent-type liquid was found in boring SB-122 on the groundwater at approximately 7 feet below the plant floor level.

Five USTs existed at the south end of the land parcel leased to Jack Cooper Transport. The tanks were removed by Jack Cooper Transport in 1988 but no documentation exists on the condition of the excavation, and no comment was recorded on any leaks or the condition of the tanks themselves. Monitoring wells MW-109 and MW-110 were installed in the immediate vicinity of this site.

In 1988 BOC Leeds closed the process fluid tank farm. As part of that project, Burns & McDonnell, Inc. documented the removal of

ten USTs. Also removed was the piping that ran from the tanks to the pumphouse and from the pumphouse to the west wall of the manufacturing building. The associated aboveground piping from the west wall of the manufacturing building to delivery points in the plant has been drained but has not been removed.

4.2.2 Aboveground Storage Tanks

Three aboveground fuel oil storage tanks, located outdoors north of the powerhouse, are in service. The storage capacity of the tanks are 200,000 gallons, 100,000 gallons and 60,000 gallons. It is estimated that there is a total of 8,330 gallons of oil currently contained in the three tanks. The concrete walled containment areas appear visually clean.

Five 12,000 gallon virgin process fluid storage tanks exist in the basement of the powerhouse. The tanks and piping are empty but have not been purged or cleaned. The concrete floor and walls in the tank containment room appear free of oil but are covered with a layer of dried river mud that was left from the May 1990 flood.

No samples were taken since manufacturer's material safety data sheets (MSDSs) are adequate to describe the properties of the non-hazardous chemical residues in these aboveground tanks.

4.2.3 Wastewater Treatment Tanks

The wastewater treatment plant is operating, although unattended while accumulating water in the batch tanks. A contracted analytical laboratory tests each batch. If all parameters are in conformance with the Kansas City Sewer Ordinance, the water is released to the sanitary sewer.

The lime storage containment area, the sulfuric acid transfer pumps and the waste solids separator grit discharge chute area contain small amounts of residue. No samples were taken for this assessment study, since manufacturer's material safety data sheets (MSDSs) are adequate to describe the properties of these chemical residues.

4.3 Maintenance Areas

Hazardous Waste Drum Storage Area

The Hazardous Waste Drum Storage Area consists of a concrete slab with a sheet metal canopy where RCRA regulated wastes are temporarily stored prior to shipment for disposal. It is located on the west side of the site, south of the Powerhouse. Three concrete chip samples were taken from the storage slab to assess it's condition. A concrete chip sample represents the worst case scenario, since it would be the point of maximum impact if any

material ever spilled, and the most highly concentrated accumulation of residue, if any residue were present. All the samples were subjected to TCLP extraction and analyzed for the full list of TCLP parameters.

In sample HZDR-1, only Barium and Cresol were detected, at well below the RCRA regulatory level.

In sample HZDR-2, only Barium, Chromium and Cresol were detected, at well below their respective RCRA regulatory levels.

In sample HZDR-3, only Barium and Chromium were detected, at well below the RCRA regulatory levels.

Caustic Building

The Caustic Building is located on the west side of the site, near the Hazardous Drum Storage Pad. Three tanks were used to soak paint covered equipment in caustic solutions in order to soften and remove the paint. The tanks contain a liquid over a semi-solid sludge layer. The liquid and sludge were sampled separately for each tank. Liquid samples CSTL-1, CSTL-2 and CSTL-3 were analyzed for pH and found to be 8.55, 8.47 and 8.71, respectively.

Sludge samples CSTS-1, CSTS-2 and CSTS-3 were analyzed for pH,

then subjected to TCLP extraction and analysis for metals, volatile organics and semivolatile organics. The pH of these samples was 7.8, 7.8, and 8.3 respectively.

In CSTS-1, Barium and Selenium were detected well below the RCRA regulatory levels.

In CSTS-2, Barium was detected, well below the RCRA regulatory level. Selenium was also detected at .98 mg/l which is marginally below the 1.0 mg/l RCRA regulatory level.

In CSTS-3 Barium and Lead were detected well below the RCRA regulatory level.

Blue Surf System

Besides the caustic tanks, another paint removal system called the Blue Surf system was used. The Blue Surf consists of a burn off chamber, water quench chamber and baghouse. This system is installed on the second floor, and roof in the vicinity of bay 14-W. Samples BS-1 and BS-2 were taken to assess residues in the Blue Surf equipment.

Sample BS-1 was taken of residue in the quench water reservoir and subjected to TCLP extraction and metals analysis. Barium, Cadmium, and Lead were detected at well below their respective

RCRA regulatory levels.

Sample BS-2 was taken of residue in the baghouse and subjected to TCLP extraction followed by metals analysis. Barium, Chromium, and Lead were detected at well below their respective RCRA regulatory levels. Cadmium was also detected at .791 mg/l, which is marginally below the RCRA regulatory level of 1.0 mg/l.

Maintenance Paint Booth

The maintenance paint booth is located adjacent to the caustic tank room, and sample MPNT-1 was taken of the dry residue on the paint booth surfaces. The sample was analyzed for flash point, then TCLP extraction was followed by analysis for metals and volatile organics. Barium, Chromium, Cadmium and Lead were detected at well below RCRA regulatory levels. The flash point was greater than 200F, therefore the material is not combustible.

Trash Incinerator

The south end of the plant on the first floor near Bay 2-ZV, is where plant trash was brought for compacting and disposal. A baler was used for consolidating cardboard containers. Also in this area are two incinerator units, only one of which was used for incinerating plant debris. Sample TINC-1 was obtained by scraping residue from the interior of the incinerator which had

been operated. The sample was extracted using the TCLP method, and analyzed for metals. Barium, Chromium, Cadmium and Lead were detected at well below their respective RCRA regulatory levels.

Abandoned Air Supply House

An abandoned roof mounted air supply house was found in the vicinity of bay 37-ZC with a variety of debris and residue on the floor. Samples AAIR-1A and AAIR-1B were used to assess this accumulation. The samples were extracted using the TCLP method, and analyzed for metals. Barium, Chromium and Lead were detected at well below the RCRA regulatory levels in Sample AAIR-1A. Lead was detected at well below the RCRA regulatory level in Sample AAIR-1B. The debris samples were also analyzed for asbestos, and found to contain 14% by volume total asbestos.

Abandoned Oven

An abandoned roof mounted paint bake oven was found in the vicinity of bay 37-ZC, with a variety of debris and residue on the floor. Sample AOVN-1 was taken and subjected to TCLP extraction, followed by metals analysis. Barium, Cadmium, Chromium, and Lead were detected, well below their respective RCRA regulatory levels. Insulation from this oven was analyzed for asbestos with negative results.

4.4 Roof

The amount of accumulated dirt and unidentified process residuals on the roof of the main manufacturing building varies greatly. The roof above the paint shop ovens has several places where small patches of purple colored deposits are observed. A limited number of rain gutters have accumulations of a grayish granular material. In some areas, cracks in the roofing material were embedded with a dull gray colored substance.

Roof corings were collected in 30 areas in a fan pattern around the body grinding booth exhaust stacks. In conjunction with the roof cores, 15 samples of the loose gravel topping were also collected. To assess the residue and rain gutter accumulations, 5 samples were collected.

The roof core samples were subjected to TCLP extraction, followed by metals analysis. Of the 30 roof cores, 23 have Lead detections that range from 7.68 mg/l to 904 mg/l, which are above the RCRA regulatory level of 5.0 mg/l. One sample at 4.92 mg/l of Lead is marginally below the RCRA regulatory level. Six samples had Lead detections which were well below the RCRA regulatory level. Other metals which were also detected include Arsenic, Barium, Cadmium, Chromium, Selenium and Silver, but none of these detections exceeded RCRA regulatory levels.

The roof gravel samples were subjected to TCLP extraction, followed by metals analysis. Of the 15 gravel samples, 11 have Lead levels that range from 5.53 mg/l to 708 mg/l, which are above the RCRA regulatory level of 5.0 mg/l. One sample at 4.49 mg/l of Lead is marginally below the RCRA regulatory level. Three samples had Lead detections which were well below the RCRA regulatory level. Other metals which were also detected include Arsenic, Barium, Cadmium, and Selenium, but none of these detections exceeded RCRA regulatory levels.

The five roof accumulation samples were subjected to TCLP extraction, followed by metals analysis. Of the 5 samples, 4 have Lead levels that range from 9.58 mg/l to 380 mg/l, which are above the RCRA regulatory level of 5.0 mg/l. One sample at 3.65 mg/l of Lead is below the RCRA regulatory level. Other metals which were also detected include Barium, Cadmium, and Mercury, but none of these detections exceeded RCRA regulatory levels.

A related sample, 1COL-2, was taken of the purple colored residue found on the roof near the first color paint booth exhaust stacks. This sample was extracted using the TCLP method and analyzed for metals. Lead was detected at 2.85 mg/l in 1COL-2, but a duplicate sample called 1COL-32 had Lead detected at 5.36 mg/l. This compares to the RCRA regulatory level of 5.0 mg/l for Lead. Also detected were Barium and Cadmium, but at well below RCRA regulatory levels.

4.5 Floors

Wood Block Flooring

Wood blocks used in flooring are treated with creosote type preservatives. Should these blocks become a waste, such as during building remodeling or demolition, it is necessary to know whether they would be considered a hazardous waste.

There is very little wood block flooring on the first floor. However, this section, which comprises approximately 3% of the first floor area, is installed around the body shop grinding booths. Over the years of production, lead solder grindings that were tracked out of the booths on worker's shoes, have become embedded in the wood block floor.

A much larger expanse of wood block flooring is installed on the second floor in bays 1 through 12-H through V, with other miscellaneous small patches on the first and second floors. These areas did not have metal debris tracked and embedded in the wood blocks.

Nine wood blocks were sampled to assess their hazardous characteristics. Analytical sampling was done by coring through wood blocks in the x, y, and z planes, and subjecting the pulverized corings to TCLP extraction. The extract was sampled

for organics. Also for the body shop wood blocks, WB-1 and WB-2, Lead analysis was done.

Cresols, including the ortho-cresol and para-cresol isomers, were detected in all the samples, but at levels well below RCRA regulatory levels. No other TCLP organic parameter was detected in the wood block samples.

Samples WB-1 and WB-2, from the body grinding booth area, had Lead detections of 98.5 mg/l and 41.1 mg/l, respectively. This compares to the RCRA regulatory level of 5.0 mg/l for Lead.

Concrete Floor

Concrete floor chip samples were collected in the body shop grinding booth wash off area, to assess whether lead from the operations could have impacted the flooring material. CONC-1 and CONC-2 were collected on the first floor in the vicinity of bay 29-X. Lead was undetected in both samples.

4.6 Sewers, Pits and Tunnels

Sewers

Plant sewers were assessed with three sets of samples. The first set consisted of a series of four samples from in-plant storm

sewers and catch basins. The second series of seven samples was from outdoor storm sewers and catch basins. The third set of samples was from the storm water retention basins located on the south-west corner of the site. The approximate locations of the sewer samples are shown on Drawing EP-6. Samples were collected by scraping residue from the walls or bottom of the manholes and any sewer piping that was readily accessible from the manhole. If no residues were present, as in the case of STSP-3, STSP-4, STSS-6 and STSB-1, water flowing through the manhole was collected. All samples were analyzed for Total Petroleum Hydrocarbons (TPH), and 13 Priority Pollutant Metals (PP Metals). Results that exceed Missouri Department of Health (DOH) recommendations for chemical content of soil are highlighted in the discussion.

Sample STSP-1 contained 6,000 mg/kg TPH and had 9 of the 13 PP Metals detected. Copper at 23,300 mg/kg, Lead at 2,700 mg/kg, and Cadmium at 28.7 mg/kg exceed Missouri DOH recommended levels for soil. Other PP Metals that were detected at less than DOH recommended levels include Chromium, Nickel, Silver, Zinc, Arsenic and Mercury. Undetected were Antimony, Beryllium, Selenium and Thallium.

Sample STSP-2 contained 970 mg/kg TPH and had 9 of 13 PP Metals detected. Lead at 32,400 mg/kg and Antimony at 440 mg/kg exceed Missouri DOH recommended levels for soils. Other PP Metals that

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were detected at less than DOH recommended levels include Cadmium, Chromium, Copper, Nickel, Silver, Zinc and Arsenic. Undetected were Beryllium, Mercury, Selenium and Thallium.

Sample STSP-3 was a water sample, since no residue was encountered in the manhole or sewer piping. This sample contained 2 mg/l TPH, and had only 3 of 13 PP Metals detected. Zinc at 1.2 mg/l was highest. Lead and Copper were detected at less than 0.5 mg/l.

Sample STSP-4 was also a water sample, since no residue was encountered in the manhole or sewer piping. TPH was undetected and this sample had 5 of 13 PP Metals detected. Zinc at 0.7 mg/l was highest. Antimony, Copper, Nickel and Lead were detected at less than 0.5 mg/l.

Outdoor sewer sample STSS-1 contained 215 mg/kg TPH and 5 of 13 PP Metals were detected. Lead at 510 mg/kg exceeded the Missouri DOH recommended level for soil. Other PP Metals that were detected at less than DOH recommended levels include Chromium, Copper and Nickel and Zinc.

Outdoor sewer sample STSS-2 was redesignated STSS-2A and STSS-2B since two distinct layers of residue were encountered in the manhole. STSS-2A contained 120,000 mg/kg TPH and 5 of 13 PP Metals were detected. None of the metals exceeded Missouri DOH

recommended levels for soils. The PP Metals that were detected include Chromium, Copper, Lead, Nickel and Zinc. STSS-2B contained 85,000 mg/kg TPH and 8 of 13 PP Metals were detected. Lead at 4,140 mg/kg and Chromium at 652 mg/kg exceeded Missouri DOH recommended levels for soils. Other PP Metals that were detected at less than DOH recommended levels include Cadmium, Copper, Nickel, Silver, Zinc and Arsenic.

Outdoor sewer sample STSS-3 contained 3,300 mg/kg TPH and 9 of 13 PP Metals were detected. Lead at 5,090 mg/kg and Chromium at 593 mg/kg exceeded Missouri DOH recommended levels for soils. Other PP Metals that were detected at less than DOH recommended levels include Cadmium, Copper, Nickel, Silver, Zinc, Arsenic and Mercury.

Outdoor sewer sample STSS-4 contained 7,800 mg/kg TPH and 8 of 13 PP Metals were detected. Lead at 831 mg/kg was the only metal that exceeded Missouri DOH recommended levels for soil. Other PP Metals that were detected at less than DOH recommended levels include Cadmium, Chromium, Copper, Nickel, Zinc, Arsenic and Mercury.

Outdoor sewer sample STSS-5 contained 9,600 mg/kg TPH and 11 of 13 PP Metals were detected. Lead at 13,500 mg/kg, Antimony at 91.4 mg/kg, Mercury at 29.3 mg/kg and Beryllium at 1.5 mg/kg exceeded Missouri DOH recommended levels for soils. Other PP

Metals that were detected at less than DOH recommended levels include Cadmium, Chromium, Copper, Nickel, Silver, Zinc and Arsenic. A duplicate sample, designated STSS-35 found very similar results, except Chromium at 575 mg/kg exceeded the DOH recommended level for soil, in addition to the four metals mentioned previously.

Outdoor sewer sample STSS-6 was a water sample, since no residue was encountered in the manhole or sewer piping. TPH was undetected, and this sample had only 1 of 13 PP Metals detected, Zinc at 0.0246 mg/l.

Stormwater retention basin sample STSB-1 was a sample of contained water, while STSB-2 was a residue sample. STSB-1 did not detect TPH, and detected only 3 of 13 PP Metals. Zinc was at 0.168 mg/l, Copper at 0.064 mg/l and Lead was at 0.013 mg/l.

Sample STSB-2 detected 3,600 mg/kg TPH, and 8 of 13 PP Metals. Lead at 4,310 mg/kg exceeded Missouri DOH recommended levels for soils. Other PP Metals that were detected at less than DOH recommended levels include Cadmium, Chromium, Copper, Nickel, Zinc, Arsenic and Selenium.

Pits and Sumps

Shallow pits exist all over the first floor. Some are conveyor drive pits with associated trenches for conveyor tracks, while some are for specific machinery such as roll test, or hydraulic elevators. Several historical press pits and conveyor pits have been filled in and paved over, especially on the east side of the manufacturing building. Sumps are commonly found near wash off booths, paint booths and containment areas. Samples were collected from 10 different pit and sump locations to determine the characteristics of the residues.

Samples PSBS-1 and PSBS-2 were taken from first floor body shop sumps and analyzed for Halogenated Organic Compounds (HOC), and 13 Priority Pollutant Metals (PP Metals). PSBS-1, from bay 29-ZC, contained 200 mg/kg HOC and detected 8 of 13 PP Metals. Lead at 3,290 mg/kg exceeded the Missouri DOH recommended level for soil. Other PP Metals that were detected at less than DOH recommended levels include Cadmium, Chromium, Copper, Nickel, Silver, Zinc and Arsenic. PSBS-2, from bay 32-Q, contained 160 mg/kg HOC and detected 8 of 13 PP Metals. Lead at 1,740 mg/kg exceeded DOH recommended levels for soil. Other PP Metals that were detected at less than DOH recommended levels include Cadmium, Chromium, Copper, Nickel, Silver, Zinc and Arsenic.

Samples PSMF-1 and PSMF-2 were taken from first floor metal finishing area sumps, extracted using the TCLP method and analyzed for metals. PSMF-1, from bay 33-L, had Barium, Cadmium

and Lead detections, at well below their respective RCRA regulatory levels. PSMF-2, from bay 37-ZC, contained 65 mg/kg HOC and also detected Barium, Cadmium, Lead and Selenium at well below the respective RCRA regulatory level.

PSP-1 and PSP-2 were taken from second floor paint area sumps. Subsequent to collecting sample PSP-1, it was noticed that a liquid seeped from the residue into the depressions that were created by collection of the initial sample. The initial sample was re-labelled PSP-1A, and the liquid was collected as sample PSP-1B.

PSP-1A, from bay 5-ZT in the Elpo area, contained 14 mg/kg HOC and was extracted with the TCLP method and analyzed for metals and volatile organics. Lead was detected at 34.5 mg/l which exceeds the RCRA regulatory level of 5.0 mg/l. Barium, Cadmium and Chromium were also detected, at well below the RCRA regulatory level. No organics were detected in the TCLP extract.

PSP-1B, also from bay 5-ZT, contained 13 mg/kg HOC and was analyzed for PP Metals. Of the 13 PP Metals, 7 were detected. Lead was the highest at 42.4 mg/kg, followed by Zinc at 6.3 mg/kg. Other PP Metals that were detected below 0.5 mg/kg include Antimony, Cadmium, Chromium, Copper and Nickel.

PSP-2, from bay 22-J, contained 67 mg/kg HOC and was extracted

with the TCLP method and analyzed for metals and volatile organics. Barium was the only parameter detected, at well below the RCRA regulatory level.

Samples PSR-1 and PSR-2 were taken from first floor repair area sumps. Both samples were analyzed for Halogenated Organic Compounds (HOC) and were subjected to TCLP extraction, followed by analysis for metals and volatile organics.

PSR-1, from bay 5-W, contained 25 mg/kg HOC. Only Barium and Cadmium were detected in the extract, at well below their respective RCRA regulatory levels.

PSR-2, from bay 41-S, contained 930 mg/kg HOC. Lead was detected at 8.34 mg/l, which is above the RCRA regulatory level of 5.0 mg/l. Barium was also detected at well below the RCRA regulatory level. No other metals or organic parameters were detected.

Samples PST-1 and PST-2 were taken from first floor trim and assembly areas. PST-1, from bay 32-F, was a water sample, since no residue was present. The sample was analyzed for HOC, which was detected at 0.02 mg/kg. Sample PST-2, from bay 5-H, was analyzed for HOC, and TCLP extraction followed by analysis for volatile organics. HOC was detected at 17 mg/kg, but no parameters were detected in the TCLP extract analysis.

Tunnels

The steam tunnel network under the lobby and hospital areas had been sealed off, reportedly so that no one would be exposed to friable asbestos insulation on the piping. The former body truck return tunnel (columns 18M to 18L to 21L to 21P) has been paved over. Two long tunnels running east from the powerhouse (on each side of column line "V") have been closed by formed concrete.

The accessible areas of these tunnels were visually inspected during this investigation, and found to contain a slight oily film and minor amounts of dried river mud left from the May, 1990 flood.

4.7 Asbestos

A superficial asbestos survey, was conducted for BOC Leeds by Stewart Industrial Hygiene and Safety, prior to 1989. Most of the report concerned particle counts. Information on bulk samples lacked documentation on location. The Stewart report was not used in the preparation of this site assessment report.

A comprehensive asbestos survey was conducted for BOC Leeds by Roth Asbestos Associates in 1988. The report and associated drawings provided by Roth was used in the preparation of an asbestos remediation cost estimate. Argonaut AEC supplemented

the Roth report by performing field investigations in areas that Roth did not inspect and by sampling non-friable asbestos containing materials (ACM) which were not included in the Roth report.

Part of Roth's work was to label ACM throughout the plant. The labelling may be misleading, since numerous labels were attached to block insulation (which is glass wool) with the intent of warning that the joint compound nearby is what is ACM. Essentially all block insulation on condensate return piping, cold water (i.e. potable/city water) piping and welding water piping is glass wool while joint compound on these piping systems are ACM.

Potential ACM such as roofing felts, vinyl floor tile, window glazing, oven insulation, wire insulation and fireproofing were sampled as part of this project. Of 5 roof cores, 3 were positive for asbestos. Of 12 floor tile samples, 10 were positive for asbestos. Window glazing on the roof west of the solder grind area was positive for asbestos. Fire door insulation at the cushion room, bay 39-D, was positive for asbestos.

Areas that were sampled and found negative for asbestos include fireproofing in the first floor paint mix room, pipe insulation joint compound in the Rail Shipping Building locker room,

insulation from an old paint bake oven at bay 35-ZC, and wiring insulation from infrared paint bake ovens.

4.8 Polychlorinated Biphenyl Sources

Sources of Polychlorinated Biphenyls (PCB or PCBs) were investigated as part of the environmental site assessment. Documentation maintained by BOC Leeds was reviewed and used in the selection of sampling locations.

4.8.1 Transformer Rooms

BOC Leeds has twelve (12) transformer rooms and one main substation room. Six (6) of the transformer rooms and the main substation have working PCB transformers in them. Transformer Room Nos. 4, 5, 9 and 11 are accessed from the second floor of the manufacturing building. Transformer Room No. 8 is accessed from the roof of the manufacturing building. Transformer Room No. 12 and the Main Substation room are accessed from the first floor of the Powerhouse. All PCB containing equipment is labelled, as are all entrance doors. No oil stains were noted on the floors of any of these rooms. Data on the volume of PCB fluids and sizes of the various transformers was compiled by BOC Leeds and is presented in Table 5. Figure 4 is a layout of the plant, designating the approximate locations of the transformer rooms that have PCB transformers installed.

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Plant inspection logs noted leaks from PCB transformers in Transformer Room Nos. 4, 9, 11 and the Main Substation. Work orders, repair reports and clean up debris disposal manifests were documented. As a result of these historical leak reports, each transformer room was sampled for PCB residue for this assessment. Table 6 summarizes the results of the PCB transformer room sampling, which is discussed below.

PCB-4A and PCB-4B were concrete cores from the floor in Transformer Room No. 4 located at bay 20-ZH. PCB was detected in PCB-4A at 19,000 ug/kg. PCB was detected in PCB-4B at 1,900 ug/kg.

PCB-5A, PCB-5B and PCB-5C were wipe samples from the floor in Transformer Room No. 5 located at bay 37-Y. PCB was detected in PCB-5A at 1,000 ug/100 sq cm. PCB was detected in PCB-5B at 1,000 ug/100 sq cm. PCB was detected in PCB-5C at 7,800 ug/100 sq cm.

PCB-6A and PCB-6B were wipe samples from the floor in Transformer Room No. 8 located at bay 20-Q. PCB was not detected in PCB-6A. PCB was detected in PCB-6B at 11 ug/100 sq cm.

PCB-7A and PCB-7B were concrete cores from the floor of Transformer Room No. 9 located at bay 12-N. PCB was detected in PCB-7A at 12,000 ug/kg. PCB was detected in PCB-7B at 2,300

ug/kg. The slurry from the concrete coring operation was also sampled, by scraping the dried residue and submitting for PCB analysis as sample PCB-7BA. PCB was not detected in PCB-7BA. A wipe sample of the floor where the coring residue was collected was analyzed under sample name PCB-7B1, but here again, no PCB was detected.

PCB-8A was a wipe sample from the floor of Transformer Room No. 11. located at bay 18-A. PCB was detected in PCB-8A at 11,000 ug/100 sq cm.

PCB-9A and PCB-9B were wipe samples from the floor of the Main Substation room in the powerhouse. PCB was detected in PCB-9A at 4.7 ug/100 sq cm. PCB was detected in PCB-9B at 13 ug/100 sq cm.

PCB-10A and PCB-10B were wipe samples from the floor of Transformer Room No. 12 in the powerhouse. PCB was detected in PCB-10A at 11,600 ug/100 sq cm. PCB was detected in PCB-10B at 12,600 ug/100 sq cm.

Since numerous positive result were obtained from the wipe and core samples, recommendations for cleaning and resampling are included in section 6.0.

4.8.2 PCB Capacitors

BOC Leeds has documented the removal of all known PCB capacitors. A capacitor housing is labelled and located in Transformer Room No. 6, but the capacitor has been removed. During the site assessment, no remaining capacitors were found, either labelled or unlabeled, that were suspected of containing PCB.

4.8.3 Lighting Ballasts

Fluorescent lighting fixtures may number 3,000 to 8,000 and virtually all are in service. There is an accumulation barrel at the powerhouse for PCB ballasts removed from fixtures that may be scrapped.

4.8.4 Hydraulic Fluids

Hydraulic oil reservoirs exist at conveyor drives, elevator power units, Z-Loda power units, dock levelers, drawbridges and maintenance department power machinery. Many of these hydraulic systems have been sampled for PCBs by BOC Leeds in 1988 and 1989. Hydraulic systems for which PCB analyses were not found were sampled as part of this project. PCB-1 was a composite of oil from Z-Loda equipment on the first floor. PCB was not detected in sample PCB-1. PCB-2 was a composite of oil from dock levellers on the first floor. PCB was not detected in sample PCB-2. PCB-3 was a composite of oil from drawbridges on the first floor. PCB was not detected in sample PCB-3.

4.9 Site Soil Boring Program

Surficial and subsurface soils from the BOC Leeds site were assessed with an extensive soil boring program. Soil samples were collected at thirty-six (36) discrete locations, with multiple depth intervals for each location, and multiple analytical parameters.

The locations for boring installation were chosen for two reasons. Initial locations for borings were chosen when it was determined that an environmentally sensitive operation occurred in an area. For example, all known underground storage tank areas were selected for boring sites. Secondly, boring locations were chosen to fill in data gaps around the site perimeter, and building perimeter. Selected soil boring locations had groundwater monitoring wells installed during the site assessment. In this manner, any potential contamination from known and unknown sources could be assessed.

Table 1 presented a detailed listing of the soil boring and monitoring well program that was comprehended for the BOC Leeds site. A detailed discussion and analysis of the soil and groundwater results is found in section 5.0. The analytical data is found in the appendices, in the Burns & McDonnell reports, along with location plans, boring logs and the chain of custody forms for all samples.

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Deviations from the soil boring program occurred when it was not possible to obtain samples due to auger refusal, or when the continuous sampler was withdrawn and it was discovered that there was no sample recovered. This situation occurred in the following instances:

MW-106	no sample recovery from 0 to 5 feet
SB-101	auger refusal at 14 feet, one sample recovered
SB-108	no sample recovery from 0 to 5 feet
SB-112	auger refusal at 1 foot
SB-116	auger refusal at 5 feet, no sample recovered
SB-117	no sample recovery from 0 to 5 feet, auger refusal at 14 feet, one sample recovered from 5 to 10 feet

The analytical plan was deviated from in SB-105, where TPH analysis was replaced with BTEX analysis, since a historical gasoline filling station site was being investigated. SB-105 is located on the north side of Stadium Drive.

Two borings, located on the west side of Raytown Road, were cancelled from the program. MW-104 and SB-109 were cancelled after a nearby boring, SB-108, was completed and no organic vapors were detected. It was also discovered that a previous report of a historical gasoline filling station in this area of Raytown Road was inaccurate. Further analysis, including a review of aerial photos showed no filling station in the area.

Thus, it was determined that MW-104 and SB-109 were not needed in the assessment.

4.10 Site Groundwater Program

Groundwater at the BOC Leeds site was assessed by installing twelve (12) groundwater monitoring wells and collecting samples for analysis in two rounds of sampling. Analysis for all Priority Pollutants was completed, including metals, volatile organics and semivolatile organics. Collection of samples for Groundwater Round 1 was done September 3,4,5, 1991. Collection of samples for Groundwater Round 2 was done October 7,8,11, 1991.

Refer to Table 1 for a summary of the monitoring well and groundwater analytical program that was completed at BOC Leeds. The only deviation from the groundwater program was that MW-104 was cancelled, as explained in section 4.9.

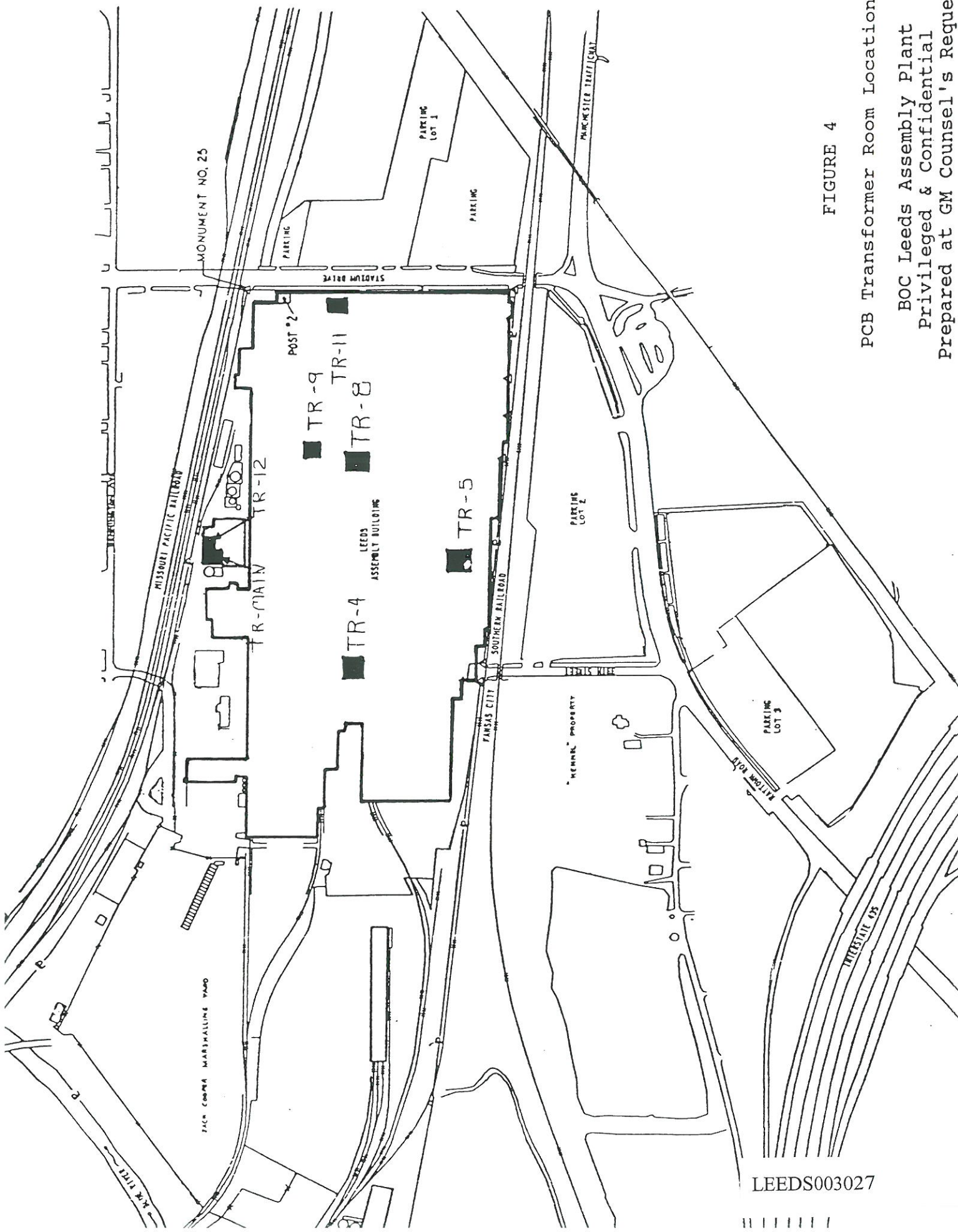
A detailed discussion and analysis of the results is found in section 5.0. The analytical results are found in the appendices, in the Burns & McDonnell reports, along with location plans, monitoring well installation logs and the chain of custody forms for all samples.

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TABLE NO. 4 HISTORICAL UNDERGROUND AND BELOW GRADE STORAGE TANKS
BOC LEEDS ASSEMBLY PLANT - KANSAS CITY, MISSOURI

Year Constructed	Present Day Location	Number of Tanks	Last Use	Year Removed
1928	Immediately north of Original Powerhouse	5 Underground	Fuel Oil	Unknown
1930's	NW of column 32-ZA	2 Underground	Unknown	Unknown
1934 Estimated	At column 32-ZC	2 Underground	Oleum & Thinner	Unknown
1954	At column 32-ZF	2 Underground	Paint Products	1980/81
1958	West of Pumphouse	7 Underground	Process Fluids	1988
Unknown	North of Powerhouse	2 Underground	Unleaded Gasoline	1988
Unknown	West of Executive Garage	1 Underground	Diesel Fuel	1988
1968 Estimated	Jack Cooper Marshalling Yard	5 Underground	Gasoline, Oil Diesel Fuel	1988
1928	Under Plant Floor near column 17-J	6 Below Grade	Duco Paint Products	Not Removed
Unknown	In Powerhouse Basement	5 Below Grade	Process Fluids	Not Removed

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FIGURE 4

PCB Transformer Room Locations

BOC Leeds Assembly Plant
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BOC LEEDS ASSEMBLY PLANT - KANSAS CITY, MO

TABLE NO. 5 PCB TRANSFORMER LIST

LOCATION (OLD NAME)	LOCATION (CURRENT NAME)	DATE INSTALLED	MANUFACTURER	TYPE DIELECTRIC	SIZE KVA	VOLUME FLUID (gal)
Chassis Sub A	Transformer Room 9	1959	Fed. Electric	Askarel	1500	521
Chassis Sub A	Transformer Room 9	1959	Fed. Electric	Askarel	1500	521
Chassis Sub B	Transformer Room 8	1968	General Electric	Pyranol	2000	315
Chassis Sub B	Transformer Room 8	1968	General Electric	Pyranol	2000	315
Powerhouse Sub	Transformer Room 12	1961	I.T.E.	Askarel	1500	500
Powerhouse Sub	Transformer Room 12	1957	General Electric	Pyranol	1500	500
Main Sub	1st Floor Powerhouse	UNKNOWN	I.T.E.	Askarel	1500	430
Main Sub	1st Floor Powerhouse	1966	General Electric	Pyranol	1500	225
Chassis Sub C	Transformer Room 4	UNKNOWN	Fed. Pacific	Askarel	1500	540
Chassis Sub C	Transformer Room 4	1961	I.T.E.	Askarel	1500	540
Body Sub A4	Transformer Room 5	1954	Wagner	Noflamol	1000	480
Body Sub A5	Transformer Room 5	1954	Wagner	Noflamol	1000	480
Body Sub A3	Transformer Room 5	1954	Wagner	Noflamol	1000	480
Chassis Sub O	Transformer Room 11	1965	Fed. Pacific	Askarel	1500	320
						=====
						6167
						TOTAL VOLUME OF PCB FLUID

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TABLE NO. 6 PCB ANALYSES - SUMMARY OF RESULTS
BOC LEEDS ASSEMBLY PLANT - KANSAS CITY, MISSOURI

NAME	LOCATION	SAMPLE	SAMPLE TYPE	RESULTS
Transformer Room No. 4	2nd Floor Bay 20-ZH	PCB-4A	Core	19,000 ug/kg
		PCB-4B	Core	1,900 ug/kg
Transformer Room No. 5	2nd Floor Bay 37-Y	PCB-5A	Wipe	1,000 ug/100 sq cm
		PCB-5B	Wipe	1,000 ug/100 sq cm
		PCB-5C	Wipe	7,800 ug/100 sq cm
Transformer Room No. 8	Roof at Bay 20-Q	PCB-6A	Wipe	ND (1 ug/100 sq cm)
		PCB-6B	Wipe	11 ug/100 sq cm
Transformer Room No. 9	2nd Floor Bay 12-N	PCB-7A	Core	12,000 ug/kg
		PCB-7B	Core	2,300 ug/kg
Transformer Room No. 11	2nd Floor Bay 18-A	PCB-8A	Wipe	11,000 ug/100 sq cm
Main Substation	1st Floor Powerhouse	PCB-9A	Wipe	4.7 ug/100 sq cm
		PCB-9B	Wipe	13 ug/100 sq cm
Transformer Room No. 12	1st Floor Powerhouse	PCB-10A	Wipe	11,600 ug/100 sq cm
		PCB-10B	Wipe	12,600 ug/100 sq cm

ND - Non Detected, Detection Level in Parentheses

5.0 INTERPRETATION OF RESULTS

Criteria have been developed to assist in evaluating the significance of the analytical findings in subsurface soils and groundwater. The criteria are not to be interpreted as clean up guidelines, but are used in this report to differentiate important analytical findings from those that are not considered significant. Table 7 presents the evaluation criteria.

All analytical findings for soil and groundwater samples which exceed the evaluation criteria will be highlighted in this section. The highlighted findings will then be reviewed and one or more of the following recommendations may be made:

- may require additional testing to confirm results
- look for man-made or natural sources of contamination
- finding is anomalous and may be disregarded
- may require risk assessment
- may require remediation

Analytical finding for process equipment residues were evaluated by comparing to RCRA regulatory levels for TCLP parameters, and are discussed in section 4.0. If the RCRA level was exceeded then the tested materials may be considered a hazardous waste at the time they are readied for disposal. The significant process equipment, soil and groundwater findings are summarized in

section 7.0.

5.1 Development of Evaluation Criteria

The evaluation criteria in Table 7 were developed by considering standards and recommendations for chemicals published by pertinent regulatory agencies. The following Local, State or Federal standards and recommendations have been used.

Missouri Department of Health Soil Recommendations
US EPA Drinking Water Standards
Missouri Water Quality Standards
RCRA Toxicity Characteristic Leachate Procedure Limits

When no regulatory standards exist, evaluation criteria are developed in a manner that is similar to the development of the regulatory standard. For example, it is noted that most Drinking Water Standards (DWS) are equal to the RCRA TCLP limit divided by 100. So when no Drinking Water Standard exists, but a RCRA TCLP limit exists, the groundwater evaluation criteria was set at the TCLP divided by 100.

Groundwater analytical results are compared to USEPA Drinking Water Standards (DWS), or the calculated equivalent if a TCLP limit exists. If no DWS or TCLP limit exists for a parameter, the Missouri Water Quality Standard for Groundwater (Class VII)

is used as the criteria. In one case, where none of the above standards list a value for a parameter, the Missouri Water Quality Standard for the Protection of Aquatic Life (Class I) was used as the criteria. All results that exceed the criteria are highlighted by discussion in section 5.2. This comparison is a conservative evaluation of the results, since this groundwater is not used for drinking water purposes. However, this evaluation criteria is chosen to be purposefully overprotective in highlighting analytical results for which further study may be recommended.

Soil analytical results are compared to Missouri Department of Health Recommendations. For all metals except Antimony, the Missouri DOH has provided guidance to Burns & McDonnell, Inc. by recommending "site specific" levels. For Antimony and the organic parameters, Missouri DOH recommendations for "any use" are used as the evaluation criteria. Any results that exceed the criteria are highlighted by discussion in section 5.2. This comparison is a conservative evaluation to highlight analytical results for which further study may be recommended. It is noted here that the constantly expanding body of knowledge on toxicology and environmental risk results in intermittent updates to lists such as the Missouri Department of Health Recommendations. It is anticipated that the Missouri State Legislature will promulgate standards for soil contaminant concentrations in 1993, which will be based on the most recent

Missouri Department of Health recommendations.

Some parameters that are analyzed for and reported by the laboratory are not found in the evaluation criteria. These parameters are analyzed and reported by the laboratory because they are part of a standard analytical matrix. Evaluation criterion were not developed for those chemicals since US EPA Drinking Water Standards, RCRA TCLP Limits, Missouri Department of Health or Missouri Water Quality Standards do not list them as chemicals of concern. However, any parameter that is detected but not listed on the evaluation criteria will be identified and the significance of the finding will be discussed in section 5.2.

Miscellaneous Criteria

The TPH (Total Petroleum Hydrocarbon) analytical method is a widely used indicator for the presence of organic contamination. This method was used for the BOC Leeds site assessment when no specific chemical of concern existed, but confirmation of the presence or absence of organic contamination was desired. The evaluation criteria for TPH was chosen to be 100 mg/kg for soil samples, and 25 mg/l for groundwater samples.

PCB samples were collected in two different forms, wipe samples, and bulk (core) samples, thus necessitating two evaluation criteria. Wipe samples will be compared to 10 ug/100 sq cm.

which is the EPA clean up criteria for indoor inaccessible areas. Core samples will be compared to 50 mg/l which is the EPA disposal cutoff. Soil samples will be compared to 0.649 mg/kg, which is the Missouri DOH recommended safe level for soil. Groundwater samples will be compared to the Missouri Class VII Water Quality Standard which is 0.000,045 ug/l.

5.2 Units Exceeding Evaluation Criteria

A summary table listing all the chemicals that were detected in the environmental site assessment is presented in the pertinent sections. Results of the soil boring and groundwater monitoring program which exceed the evaluation criteria are highlighted in the text. A discussion of the significance of the exceedences and a recommendation for further action follows each highlighted finding.

5.2.1 Soil Samples

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Following is a list of all parameters that were detected in soil boring samples. The number of times the parameter was detected is also listed after each chemical name.

<u>Inorganics</u>	<u>No. of</u> <u>Detections</u>	<u>Organics</u>	<u>No. of</u> <u>Detections</u>
Beryllium	2	Acetone	24
Cadmium	8	Methylene Chloride	25
Chromium	39	1,1-Dichloroethene	1
Copper	40	1,1-Dichloroethane	3
Nickel	41	1,1,1-Trichloroethane	27
Silver	8	Tetrachloroethene	4
Zinc	28	2-Butanone (MEK)	2
Arsenic	26	Toluene	1
Barium	16	4-Methyl-2-Pentanone (MIBK)	1
Lead	47	Benzo(a)Pyrene	1
Mercury	11	Di-n-Butylphthalate	1
Selenium	2	Total Petroleum Hydrocarbons (TPH)	6

As detailed below, there were two soil boring sample results that exceeded the soil evaluation criteria for Beryllium (a metal), and one soil boring sample that exceeded the criteria for Benzo(a)Pyrene (a semivolatile organic). Two soil sample results exceeded the evaluation criteria for Total Petroleum Hydrocarbons

(TPH).

None of the soil sample results exceeded the evaluation criteria for volatile organics.

Three chemicals were detected for which no evaluation criteria was developed.

Sample MW-110A, in the southwest part of the site in the Jack Cooper Marshalling Area, was taken at a 4 ft depth interval and detected 1.1 mg/kg of Beryllium. Also, Sample MW-111B, outside and half way along the south edge of the manufacturing building, was taken at a 13.5 ft depth interval detected 1 mg/kg of Beryllium. These two detections exceed the evaluation criteria of .176 mg/kg.

Sample MW-110C was taken from the 25 ft to 35 ft depth interval under the Jack Cooper Marshalling Area and detected 1.30 mg/kg of Benzo(a)Pyrene. This exceeds the evaluation criteria of .435 mg/kg.

Sample SB-101A was taken at 4.6 ft depth interval near the south-west corner of the paint mix room and detected 230 mg/kg TPH. Sample SB-114, which was taken from the 9 ft depth interval inside near the center of the manufacturing building, had 2,900 mg/kg TPH. These two findings exceeded the evaluation criteria

of 100 mg/kg.

Several soil boring samples had detections of organic chemical compounds for which soil evaluation criteria was not developed. Sample SB-122A, in Bay 16-K near the Enamel Storage Pit, was taken in the 5 ft to 10 ft depth interval, and detected 2.06 mg/kg of 4-Methyl-2-Pentanone, which is commonly known as Methyl-Isobutyl-Ketone (MIBK). Two samples, MW-101B and MW-111C, had detections of the volatile organic compound 1,1-Dichloroethane, at .044 mg/kg and .010 mg/kg respectively. Lastly, Acetone was detected in 21 soil boring samples and 3 duplicate samples. The highest Acetone concentration of the 24 samples was 5.6 mg/kg, the second highest concentration was .12 mg/kg.

Beryllium in two soil samples, one at MW-110 and one at MW-111, is not considered to be an immediate threat to human health or the environment because they are in the subsurface soil under a paved surface and no one is likely to come into contact with this soil. The two Beryllium detections are anomalous, out of a total of 41 soil boring samples that were analyzed for metals. Also, it is noted that Beryllium was not detected in either of the two groundwater sampling events for MW-110 and MW-111. In fact, Beryllium was not detected in any other groundwater sample. Therefore, the Beryllium findings will be disregarded from any further study at the BOC Leeds site.

The Benzo(a)Pyrene finding in the soil at MW-110 is not considered an immediate health or environmental hazard since it is 25 to 35 feet below the ground surface, and no one is likely to come into contact with this soil. The one isolated detection is anomalous, out of a total of 35 soil boring samples that were analyzed for semi-volatile organics. Also, it is noted that no volatile or semi-volatile organics are detected in either of the groundwater sampling events for MW-110. Therefore, the Benzo(a)Pyrene finding will be disregarded from any further study at the BOC Leeds site.

The two TPH exceedences are not considered to be an immediate health or environmental threat. Soil boring SB-114 was taken under the manufacturing building floor and at a depth of 9 feet, while soil boring SB-101A was taken under concrete paving at a depth of 4 feet. Therefore, no human exposure to potentially harmful chemicals is likely. The two TPH exceedences should be viewed in light of other findings of the site assessment, and it is recommended that additional sampling be done to determine if TPH contamination is a potential environmental problem.

Detections With No Evaluation Criteria

The three other compounds that were detected but had no evaluation criteria are now considered for discussion. These findings are not considered significant in terms of a health or

environmental hazard since these compounds are not listed by USEPA as being regulated by Drinking Water Standards (DWS) or under RCRA TCLP or by the State of Missouri.

Acetone detections are not believed to be indicative of any environmental contamination at BOC Leeds, even though they may seem to be pervasive. Acetone is a common laboratory artifact, was found in equipment rinseate blanks, and, in four of the duplicate subsurface soil samples, Acetone detections exceeded laboratory QA/QC guidelines.

It is noted that the detected concentration of 2.06 mg/kg for MIBK is far below allowable soil levels established by other states, such as 50 mg/kg in New Jersey. The Acetone concentrations (maximum 5.6 mg/kg) are far below the allowable soil level of 50 mg/kg in New Jersey. Lastly, the 1,1-Dichloroethane concentrations (.044 and .010 mg/kg) are far below the allowable soil level of 1 mg/kg in New Jersey. Therefore, these three compounds will be disregarded from further study relative to these soil borings.

5.2.2 Groundwater Samples

Table 8 presents a list of all parameters that were detected in Round 1 and Round 2 groundwater samples. The asterisks on Table 8 highlight the fact that in certain sample duplicates, the

compound was not detected. In the following discussion and in appendix data tables, the suffix A indicates a Round 1 sample, the suffix B indicates a Round 2 sample, while the suffix Z indicates a duplicate sample.

Round 1

In Round 1, one monitoring well produced results that exceeded the groundwater evaluation criteria for one volatile organic compound. A second monitoring well produced results that exceeded the evaluation criteria for one semivolatile organic compound. A third well had one volatile and one semivolatile result that exceeded the evaluation criteria.

None of the groundwater sample results from Round 1 exceeded the groundwater evaluation criteria for metals.

The volatile organic compound 1,1-Dichloroethene exceeded the evaluation criteria in sample GW-101A. The detected level of .108 mg/l of 1,1-Dichloroethene compares to the evaluation criteria of .007 mg/l. Monitoring well MW-101 is located near the southwest corner of the paint mix room, on the west side of the BOC Leeds site.

The semivolatile organic compound Bis(2-Ethylhexyl)Phthalate exceeded the evaluation criteria in sample GW-108A. The detected

level of .025 mg/l compares to the evaluation criteria of .0018 mg/l. It is noted that a duplicate sample of GW-108 was analyzed and did not detect Bis(2-ethylhexyl)Phthalate. Monitoring well MW-108 is located near the southeast side of the BOC Leeds wastewater treatment plant area.

Both the volatile organic compound 1,1-Dichloroethene and the semivolatile organic compound Bis(2-Ethylhexyl)Phthalate exceeded the evaluation criteria in sample GW-111A. The detected level of .011 mg/l of 1,1-Dichloroethene compares to the evaluation criteria of .007 mg/l. The detected level of .025 mg/l of Bis(2-Ethylhexyl)Phthalate compares to the evaluation criteria of .0018 mg/l. Monitoring well MW-111 is located outside, about half way along the south edge of the manufacturing building.

The referenced evaluation criteria for 1,1-Dichloroethene is the USEPA Drinking Water Standard, while the evaluation criteria for Bis(2-ethylhexyl)Phthalate is the Missouri Groundwater Quality Standard. The findings in the groundwater monitoring wells are not considered to be an immediate threat to human health or the environment, since the groundwater is not used for drinking water and according to the hydrogeological studies, is moving very slowly. The findings will be reviewed in conjunction with Round II groundwater samples, which are discussed in a later section.

Detections With No Evaluation Criteria - Round 1

The volatile organic compound 1,1-Dichloroethane was detected in GW-101A and GW-111A, but no evaluation criteria was developed. This compound is not regulated with either a USEPA Drinking Water Standard or a RCRA TCLP limit, and is also not listed in the Missouri Water Quality Standards. Sample GW-101A had .039 mg/l of 1,1-Dichloroethane, while GW-111A had .034 mg/l. It is however, not considered to be a threat to human health or the environment, and the detected levels are well below allowable groundwater levels established by other states, such as .070 mg/l in New Jersey. Therefore, this finding will be disregarded from further study.

Round 2

Groundwater sample results from one well in Round 2 exceeded the groundwater evaluation criteria for one metal and two volatile organic compounds. Results from another well exceeded the evaluation criteria for one semivolatile organic compound. A third well sample exceeded the evaluation criteria for one volatile and one semivolatile. A fourth well sample exceeded the evaluation criteria for two volatile organic compounds.

Groundwater sample GW-101B detected .169 mg/l of Arsenic. This compares to the evaluation criteria of .050 mg/l, which is the USEPA Drinking Water Standard. Also, sample GW-101B detected .146 mg/l of 1,1-Dichloroethene, which compares to the evaluation

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criteria of .007 mg/l. In addition, GW-101B detected .019 mg/l of Methylene Chloride, which compares to the evaluation criteria of .0047 mg/l. The Arsenic and 1,1-Dichloroethene results were confirmed in the duplicate sample, but the Methylene Chloride result was not. The Arsenic and 1,1-Dichloroethene evaluation criteria are both USEPA Drinking Water Standards. The Methylene Chloride criteria is the Missouri Groundwater Quality Standard. Monitoring well MW-101 is located outside the southwest corner of the paint mix room.

Groundwater sample GW-102BZ (duplicate sample of GW-102B) showed a result of .011 mg/l of Bis(2-ethylhexyl)Phthalate. This semivolatile compound was not detected in the original GW-102B sample. The evaluation criteria for Bis(2-ethylhexyl)Phthalate is .0018 mg/l, which is the Missouri Groundwater Quality Standard. Monitoring well MW-102 is located on the north side of Stadium Drive, in a parking lot across from the BOC Leeds plant.

Sample GW-106 detected .007 mg/l of Methylene Chloride and .016 mg/l of Bis(2-ethylhexyl)Phthalate. The evaluation criteria for these compounds are detailed above. Monitoring well MW-106 is located outside along the east side of the manufacturing building, in between the Kansas City Southern Railroad and the building.

GW-111B had .021 mg/l of 1,1-Dichloroethene, and .014 mg/l of

Methylene Chloride. The evaluation criteria for these compounds are detailed above. Monitoring well MW-111 is located outside about half way along the south side of the manufacturing building.

The 1,1-Dichloroethene findings are considered significant and are discussed below under the Summary section. Also, serious concern is posed by the Arsenic finding, and recommendations are discussed below under the Summary section.

The finding of Methylene Chloride and Bis(2-ethylhexyl)Phthalate are not considered significant, because both of these compounds were inconsistently detected. Both Methylene Chloride and Bis(2-ethylhexyl)Phthalate are recognized as common laboratory contaminants. Upon inspection of Table 8, it is seen that none of the detections were confirmed in the duplicates, and none of the detections were found in in the same monitoring well in both rounds of groundwater sampling. Therefore, Methylene Chloride and Bis(2-ethylhexyl)Phthalate are disregarded from further study.

Detections With No Evaluation Criteria - Round 2

The volatile organic compound 1,1-Dichloroethane was detected, but no evaluation criteria was developed. This compound is not regulated with either a USEPA Drinking Water Standard or a RCRA

TCLP Limit, and is also not listed in the Missouri Groundwater Quality Standards. Sample GW-101B had .051 mg/l of 1,1-Dichloroethane, while GW-111B had .057 mg/l. These findings are not considered to be a threat to human health or the environment, since the compound is not listed by USEPA or Missouri. Also the detections are well below allowable groundwater levels established by other states, such as .070 mg/l in New Jersey.

One other volatile organic compound, Acetone, was detected, but no evaluation criteria was developed. This compound is not regulated with either a USEPA Drinking Water Standard or a RCRA TCLP Limit, and is also not listed in the Missouri Groundwater Quality Standards. Sample GW-101BZ (a duplicate sample) had .017 mg/l of Acetone. It is however, not considered to be a significant finding, since Acetone is a common laboratory artifact, and it was not detected in the original GW-101B sample.

In view of the above reasons, both 1,1-Dichloroethane and Acetone are disregarded from further study.

Summary of Significant Groundwater Findings

One volatile organic compound, 1,1-Dichloroethene, exceeded the evaluation criteria in both rounds of groundwater sampling in both monitoring wells MW-101 and MW-111. It is noted that these

are the only two wells in which this compound was detected out of a total of 12 monitoring wells installed. However, since the same compound appeared in the same groundwater monitoring wells in both sampling rounds, further study is warranted. It is not considered to be an immediate threat to human health or the environment, since the groundwater is not used for drinking water, but an additional round of groundwater samples is recommended for MW-101 and MW-111. The samples should be analyzed for volatile organics. Should the presence of 1,1-Dichloroethene be reconfirmed, a study is recommended to assess the fate and transport, and health risk, of this compound.

An additional concern is posed by the finding of Arsenic in Round 2 in monitoring well MW-101. When the additional groundwater samples are taken, as recommended above, it is also recommended to sample and analyze for Arsenic. If the presence of Arsenic is confirmed, a study of it's fate and transport, and health risk assessment is also recommended.

The recommendations are discussed in more detail in Section 7.0.

TABLE NO. 7 EVALUATION CRITERIA

CHEMICAL CLASS	CHEMICAL COMPOUND	SOIL CRITERIA SITE SPECIFIC (mg/kg)	SOIL CRITERIA ANY USE (mg/kg)	GROUNDWATER CRITERIA (mg/l)	TCLP LIMIT (mg/l)
Metals	Arsenic	238 (MoDOH) SS	10 (MoDOH) AU	0.05 (DWS)	5.0
	Barium	4,670 (MoDOH) SS	5,100 (MoDOH) AU	1 (DWS)	100.0
	Cadmium	47.6 (MoDOH) SS	50 (MoDOH) AU	0.01 (DWS)	1.0
	Chromium	571 (MoDOH) SS	500 (MoDOH) AU	0.05 (DWS)	5.0
	Lead	238 (MoDOH) SS	238 (MoDOH) AU	0.05 (DWS)	5.0
	Mercury	14.3 (MoDOH) SS	30 (MoDOH) AU	0.002 (DWS)	0.2
	Selenium	47.6 (MoDOH) SS	300 (MoDOH) AU	0.01 (DWS)	1.0
	Silver	238 (MoDOH) SS	300 (MoDOH) AU	0.05 (DWS)	5.0
	Zinc	23,800 (MoDOH) SS	2,000 (MoDOH) AU	5.0 (DWS)	NA
	Antimony	NA	40 (MoDOH) AU	0.014 (MoVII)	NA
	Beryllium	0.176 (MoDOH) SS	50 (MoDOH) AU	0.1 (MoVII)	NA
	Copper	6,190 (MoDOH) SS	18,571 (MoDOH) AU	1 (DWS)	NA
	Nickel	714 (MoDOH) SS	2,000 (MoDOH) AU	0.2 (MoVII)	NA
	Thallium	62 (MoDOH) SS	7 (MoDOH) AU	0.0002 (MoVII)	NA
Volatile Organics	Acetone	NA	NA	NA	NA
	Benzene	NA	0.74 (MoDOH) AU	0.005 (DWS)	0.5
	Vinyl Chloride	NA	287 (MoDOH) AU	0.002 (DWS)	0.2
	Carbon Tetrachloride	NA	7 (MoDOH) AU	0.005 (DWS)	0.5
	1,2-Dichloroethane	NA	55 (MoDOH) AU	0.005 (DWS)	0.5
	Trichloroethylene	NA	70 (MoDOH) AU	0.005 (DWS)	0.5
	1,1-Dichloroethane	NA	NA	NA	NA
	1,1-Dichloroethylene	NA	90 (MoDOH) AU	0.007 (DWS)	0.7
	1,1,1-Trichloroethane	NA	9,000 (MoDOH) AU	0.2 (DWS)	30.0
	Trihalomethanes (THM's) Total	NA	NA	0.1 (DWS)	NA
	Chlorobenzene	NA	NA	0.02 (MoVII)	100.0
	Chloroform	NA	820 (MoDOH) AU	0.06 (TCLP/100)	6.0
	Ethylbenzene	NA	10,000 (MoDOH) AU	0.32 (MoI)	NA
	Methylene Chloride	NA	500 (MoDOH) AU	0.0047 (MoVII)	8.6
	Methyl Ethyl Ketone	NA	2,500 (MoDOH) AU	2 (TCLP/100)	200.0
	Tetrachloroethylene	NA	98 (MoDOH) AU	0.0008 (MoVII)	0.7
	Toluene	NA	30,000 (MoDOH) AU	10 (MoVII)	14.4
	1,1,2-Trichloroethane	NA	300 (MoDOH) AU	0.0006 (MoVII)	1.2
	Total Xylenes	NA	200,000 (MoDOH) AU	NA	NA

TABLE NO. 7 EVALUATION CRITERIA CONT'D

CHEMICAL CLASS	CHEMICAL COMPOUND	SOIL CRITERIA SITE SPECIFIC (mg/kg)	SOIL CRITERIA ANY USE (mg/kg)	GROUNDWATER CRITERIA (mg/L)	TCLP LIMIT (mg/L)
Semivolatile Organics	p-Dichlorobenzene	NA	1,000 (MoDOH) AU	0.075 (DWS)	7.5
	Cresol, or o-, m-, or p-	NA	NA	2 (TCLP/100)	200.0
	1,4-Dichlorobenzene	NA	1,000 (MoDOH) AU	0.075 (TCLP/100)	7.5
	2,4-Dinitrotoluene	NA	NA	0.0013 (TCLP/100)	0.13
	Hexachlorobenzene	NA	8 (MoDOH) AU	0.0013 (TCLP/100)	0.13
	Hexachlorobutadiene	NA	20 (MoDOH) AU	0.005 (TCLP/100)	0.5
	Hexachloroethane	NA	NA	0.03 (TCLP/100)	3.0
	Nitrobenzene	NA	NA	0.02 (TCLP/100)	2.0
	Pentachlorophenol	NA	300 (MoDOH) AU	1 (TCLP/100)	100.0
	Phenol	NA	60,000 (MoDOH) AU	0.144 (TCLP/100)	14.4
	Pyridine	NA	NA	0.05 (TCLP/100)	5.0
	2,3,4,6-Tetrachlorophenol	NA	NA	0.015 (TCLP/100)	1.5
	2,4,5-Trichlorophenol	NA	NA	4 (TCLP/100)	400.0
	2,4,6-Trichlorophenol	NA	NA	0.02 (TCLP/100)	2.0
	Bis(2-ethylhexyl)phthalate	NA	200 (MoDOH) AU	0.0018 (MoVII)	NA
Miscellaneous	Di-N-Butyl-Phthalate	NA	10,000 (MoDOH) AU	2.7 (MoVII)	NA
	Benzo(a)Pyrene	NA	0.435 (MoDOH) AU	0.000003 (MoVII)	NA
	Total Petroleum Hydrocarbons (TPH)	NA	100 (MoDOH) AU	25 (MoVII)	NA
	Polychlorinated Biphenyls (PCB)	NA	0.649 (MoDOH) AU	0.000045 (ug/L) (MoVII)	NA
			50 (Core)		
			10 (ug/100 sq cm) (Wipes)		

KEY TO ABBREVIATIONS					
(DWS)	US EPA Primary Drinking Water Standards				
(DWSS)	US EPA Secondary Drinking Water Standards				
(MoDOH)	Missouri Department of Health Recommended Levels for Subsurface Soils				
(TCLP/100)	Toxicity Characteristic Leachate Procedure Regulatory Limit Divided by 100				
(MoVII)	Missouri Water Quality Standards - Class VII - Groundwater				
(MoI)	Missouri Water Quality Standards - Class I - Protection of Aquatic Life				
AU	Any Use				
SS	Site Specific				
NA	Not Applicable - No Referenced Standard Exists				

TABLE NO. 8 PRIVILEGED & CONFIDENTIAL PREPARED AT GM COUNSEL'S REQUEST
CHEMICALS DETECTED IN GROUNDWATER
BOC LEEDS ASSEMBLY PLANT, KANSAS CITY MISSOURI

METALS								
NICKEL		ZINC		CADMIUM		ARSENIC		
LOCATION	LEVEL (ug/l)	LOCATION	LEVEL (ug/l)	LOCATION	LEVEL (ug/l)	LOCATION	LEVEL (ug/l)	
ROUND I	GW-103	18.8	GW-106	18.3	NOT DETECTED IN ROUND I	NOT DETECTED IN ROUND I		
	GW-106	13.7	GW-108	15.3				
	GW-108Z	19.1**	GW-108Z	22.3				
	GW-109	43.3	GW-109	16.6				
	GW-110	42.2	GW-110	53.3				
	GW-110Z	40.3	GW-110Z	39.6				
	GW-111	11.2	E.C.	5,000				
	E.C.	200						
ROUND II	GW-108	10.2	GW-106	10.9	GW-105	5.3	GW-101	169
	GW-108Z	13.1	GW-108	29.9	E.C.	10	GW-101Z	139
	GW-109	47.9	GW-108Z	32.3			GW-106	19.4
	GW-110	55.5	GW-109	48.8			GW-111	10.4**
	GW-110Z	53.9	GW-110	15			GW-112	10.6
	GW-111	10.1	GW-110Z	15.2			E.C.	50
	GW-111Z	10.3	GW-111	59.9				
	E.C	200	GW-111Z	60.2				
		E.C.	5,000					

NOTES

Z - Duplicate Sample
** - Results Not Confirmed by Duplicate Sample
E.C. - Evaluation Criteria

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TABLE NO. 8 CONT'D
 CHEMICALS DETECTED IN GROUNDWATER
 PRIVILEGED & CONFIDENTIAL PREPARED AT GM COUNSEL'S REQUEST
 BOC LEEDS ASSEMBLY PLANT, KANSAS CITY MISSOURI

VOLATILE ORGANICS										SEMIVOLATILE ORGANICS														
1,1-DICHLOROETHANE					1,1,1-TRICHLOROETHANE					METHYLENE CHLORIDE					ACETONE					bis(2-Ethylhexyl)Phthalate				
LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)	LOCATION	LEVEL (ug/L)					
ROUND I	108	GW-101	39	GW-101	80	GW-101	80	GW-101	80	GW-101	80	GW-101	80	GW-101	80	GW-108	25**	GW-108	25**					
	101	GW-101Z	39	GW-101Z	75	GW-101Z	75	GW-101Z	75	GW-101Z	75	GW-101Z	75	GW-101Z	75	GW-111	25	GW-111	25					
	11	GW-111	34	GW-111	200	GW-111	200	GW-111	200	GW-111	200	GW-111	200	GW-111	200	E.C.	1.8	E.C.	1.8					
	7	E.C.	None	E.C.		E.C.		E.C.		E.C.		E.C.		E.C.										
ROUND II	146	GW-101	51	GW-101	97**	GW-101	97**	GW-101	97**	GW-101	97**	GW-101	97**	GW-101	97**	GW-101Z	17**	GW-101Z	17**					
	145	GW-101Z	53	GW-101Z	200	GW-101Z	200	GW-101Z	200	GW-101Z	200	GW-101Z	200	GW-101Z	200	E.C.	None	GW-106	16					
	21	GW-111	57	GW-111	57	GW-111	57	GW-111	57	GW-111	57	GW-111	57	GW-111	57	E.C.	1.8	E.C.	1.8					
	17	GW-111Z	54	GW-111Z	54	GW-111Z	54	GW-111Z	54	GW-111Z	54	GW-111Z	54	GW-111Z	54									
	7	E.C.	None	E.C.		E.C.		E.C.		E.C.		E.C.		E.C.										

NOTES

- Z - Duplicate Sample
 ** - Results Not Confirmed by Duplicate Sample
 E.C. - Evaluation Criteria

6.0 PHASE II INVESTIGATION

When the laboratory analytical work from this Environmental Site Assessment was partially complete, a review meeting was held with General Motors and Burns & McDonnell. A particular concern had been the discovery of a floating organic layer on the groundwater at soil boring SB-122. Additional concern was posed by the TPH level of 2,900 mg/kg at soil boring SB-114. Also, low levels of organic compounds were found in other soil borings under the building floor. This information was coupled with the boring logs that indicated intermittent high readings on the organic vapor analyzer, which was used to screen samples and boreholes during the on-site work. A supplemental purchase order was issued to Burns and McDonnell for additional investigations related to the subsurface organic compounds, and other areas of the facility where further definition of potential environmental problems was needed. The Burns & McDonnell report titled Attachment A, Environmental Site Assessment Phase II Report of Findings, presents the detailed program and results, along with location drawings.

6.1 Enamel Paint Storage Pit

Soil boring SB-122 was intended to assess the area of a historical paint tank farm that was part of the original plant construction, circa 1928. Historical drawings indicated that

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this paint tank farm consisted of a subfloor concrete vault with 12 tanks of various sizes, ranging from 200 gallons to 5,300 gallons. Although the present day floor slab covers the area, no records were found that would indicate that the tanks had been removed. Boring SB-122 was drilled to a total depth of 24.5 feet. Upon completion of the boring, groundwater seeped in and leveled off at approximately 7 feet below the floor level. A mild petroleum solvent type odor was detected, and a probe of the accumulated liquid showed a floating organic solvent layer of approximately 1 inch thickness. The petroleum substance was clear, and resembled kerosene. The discovery of this historical spill was reported to the Missouri DNR by General Motors.

The historical drawings were referenced and it was noted that a kerosene pipeline extended from the powerhouse to the paint storage pit. The drawings indicate that the pipeline entered the pit through the side wall, and was terminated and capped at that point. It is likely that during operating periods, additional pipe fittings, valves and a hose were used to transfer kerosene for use as a solvent in the painting operations. When the kerosene pipeline route was superimposed on the soil boring location plan, it was noted that soil boring SB-114 was less than 100 feet away.

Additional borings were planned and completed along with monitoring wells, to determine the extent of organic chemical

contamination. Total Petroleum Hydrocarbon (TPH) was detected above the 100 mg/kg evaluation criteria in the four soil borings along the kerosine pipeline, and in three borings within 250 feet of the pipeline. None of the four borings on the north side of a line extending parallel to and through the north side of the enamel storage pit showed TPH in excess of the evaluation criteria. Four monitoring wells were installed in the vicinity of the enamel storage pit and kerosene pipeline. None of these groundwater samples exceeded the TPH evaluation criteria of 25 mg/l. However, in Round 2 of the groundwater sampling, one well, MW-202, detected TPH at 25 mg/l.

The pattern of findings seems to point to the enamel storage pit and underground kerosene pipeline as the source of the organic contaminants. It is recommended that the kerosene pipeline be excavated, and a section of the floor slab over the enamel storage pit be removed. If the paint tanks are still present, it is recommended that they be excavated also. Any obviously contaminated soil should be remediated, and additional samples taken to determine if residual contamination is present.

6.2 Historical UST Area

Three pairs of historical underground storage tank sites are in close proximity to each other under the floor of the robotic welding area. This area is roughly bounded by column lines ZA to

ZF and 30 to 33. Three pairs of soil borings were installed in this area as part of the Environmental Site Assessment, designated SB-116, SB-117, SB-118, SB-119, SB-120, and SB-121.

The results of the analyses on these borings were incongruous. No sample was obtained from SB-116, due to auger refusal. Only two samples were obtained from SB-117, again due to auger refusal at about 14 feet below the floor surface. Borings SB-118 through SB-121 were bored to 25 feet as planned. However, laboratory blank contamination rendered part of the data unusable in SB-118, SB-119 and SB-120 samples. Low levels of organic compounds such as Xylenes, Toluene and Ethylbenzene were detected at 14 feet below floor level in SB-119. It is also noted that only volatile organic compounds were analyzed in these borings, and no groundwater monitoring wells were near the area.

Upon a review of the inconsistent data, it was decided to plan and complete additional borings and a monitoring well to determine if contamination existed in this area. Seven soil borings, one to be completed as a monitoring well, were specified for this area.

Of the 27 soil samples analyzed for TPH, only two exceeded the 100 mg/kg evaluation criteria. SB-216 at a depth of 9 feet below floor level had 1,000 mg/kg of TPH, and MW-205 at a depth of 10 feet had 410 mg/kg of TPH. Soil from MW-205 boring showed trace

levels of three volatile organic compounds. However, no semivolatiles were detected at all in soil or groundwater in MW-205. Round 1 of the groundwater sampling found 1 mg/l of TPH in GW-205, while Round 2 was non-detect for TPH. This compares to the evaluation criteria of 25 mg/l for TPH.

In view of the above findings, no organic contamination is believed to exist in the historical UST area. The two incidental findings of TPH are not backed up by finding any regulated compound in the numerous other soil samples or the groundwater sample. Therefore, this area will be disregarded from any further study.

6.3 Roof

Of the 30 roof cores, 23 had Lead detections that range from 7.68 mg/l to 904 mg/l, which are above the RCRA regulatory level of 5.0 mg/l. One sample at 4.92 mg/l of Lead is marginally below the RCRA regulatory level. Also, 11 of 15 roof gravel samples exceeded the RCRA TCLP Limit for Lead, while 1 of the remainder was only marginally below the limit.

With such a high percentage of samples exhibiting positive results for Lead, it was noted that the boundary of the Lead impregnation into the roofing material may not have been defined. An additional 16 roof core samples were taken and analyzed for

TCLP Lead. Only 3 of the 16 samples exceeded the RCRA regulatory level of 5.0 mg/l of Lead.

The extent of lead impregnation into the roofing material was now more accurately estimated to be approximately two-thirds of the roof area.

6.4 Asphalt Block Flooring

Samples WB-1 and WB-2, were wood block flooring from the body grinding booth area of the first floor. These samples had TCLP Lead detections of 98.5 mg/l and 41.1 mg/l, respectively. This compares to the RCRA regulatory level of 5.0 mg/l for Lead. A concern was posed that asphalt block flooring in this same vicinity may also have Lead impregnated in it. However, of the 16 asphalt blocks that were sampled, not one exceeded the RCRA TCLP limit for Lead. The highest detected level was 3.51 mg/l of Lead, which is well below the RCRA regulatory limit of 5.0 mg/l.

6.5 PCB Transformer Rooms

Seven transformer rooms at BOC Leeds contain PCB transformers. During the Environmental Site Assessment, four transformer rooms were subjected to wipe sample testing of the floor near the PCB transformers. Two additional transformer rooms had concrete floor core samples taken near the PCB transformers. One

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transformer room was inadvertently omitted from the sampling program.

The results of the sampling program indicated that Transformer Room (TR) No. 5 and TR No. 11 were both far over the evaluation criteria of 10 ug/100 sq.cm., while TR No. 8 and the Main Substation only marginally exceeded the criteria. The core samples in TR No. 4 and TR No. 9 did not exceed the evaluation criteria of 50 mg/kg. Since no sampling was done in TR No. 12, it was not known whether PCBs were present on the floor.

Two additional wipe samples in TR No. 8 came out non-detect. Of the two additional wipe samples in the Main Substation, one marginally exceeded the evaluation criteria, while one was non-detect. Two wipe samples that were done in TR No. 12 showed result far in excess of the evaluation criteria.

PCB cleanup requirements in the transformer rooms can now be accurately estimated.

7.0 CONCLUSION

7.1 Potential Problem Summaries

Enamel Storage Pit

Organic contamination in the form of a floating product layer was found under the plant floor near the site of a sub-floor vault that contained several paint storage and mixing tanks. The "Enamel Storage Pit" was installed as part of the original plant construction in 1928. Historic blueprints also show an underground kerosene pipeline that extended from the powerhouse to the the enamel storage pit. A system of sub-floor trenches led from the pit to other floor mounted paint and dip process equipment. The likely source of the organic contamination is the tank and piping system.

Roof

Lead deposits on the roof of the plant have migrated into the roofing material. Some visible deposits remain on the roof.

Sewers

Residues in the plant sewers and storm sewers contain elevated levels of Total Petroleum Hydrocarbons (TPH), Lead and other

heavy metals.

Substations with PCB Transformers

PCB contamination was discovered in several substations where leaks occurred in the past. These PCB areas must now be addressed by implementing a clean up plan in conformance with 40 CFR Part 761.

Asbestos Containing Materials (ACM)

Friable asbestos insulation was discovered in the basement and tunnel under the powerhouse, and on numerous pipe joints and insulation throughout the plant. The majority of the friable ACM has been identified and labelled.

Process Equipment Residues

Several process equipment systems have residues that may be considered hazardous waste at the time the equipment is cleaned and prepared for disposal. This includes residues in some exhaust stacks, material in the elpo dip and rinse system, and residues that are contained in lubricant catch pans under the conveyor drives.

Wood Block Floor

Wood block floor near the solder grind booths have lead grindings embedded in them. Corings from these blocks failed the TCLP test for Lead, which would require that they be disposed of as RCRA hazardous, if they become a waste.

Soil Borings

Two soil boring sites had TPH levels that exceeded the project criteria. One sample, SB-114, was located in the vicinity of former underground storage tank installations. This area is currently covered by the body shop floor. Subsequent borings show this to be a very small isolated area. The second sample was soil collected at MW-101, located outside the paint mix and sludge building. This area is currently covered by concrete paving. Comparison with nearby borings show this to be a small isolated area.

Groundwater

One volatile organic compound, 1,1-Dichloroethene, exceeded the evaluation criteria in both rounds of groundwater sampling in both monitoring wells MW-101 and MW-111. An additional concern is posed by the finding of Arsenic in Round 2 in monitoring well MW-101.

7.2 Recommendations

Recommendations are divided into three main categories: those items which should be addressed with remediation plans as soon as practicable, items which will need remediation plans prior to sale or demolition of the buildings, and recommendations for further investigation.

7.2.1 Short Term Remediation Plans

It is recommended that a remediation plan be prepared and implemented to address the buried tanks and pipeline in the Enamel Storage Pit area. During the site assessment, when an organic solvent was discovered floating on the groundwater, a spill report was filed with the Missouri DNR. Additional investigative borings determined that the tanks are still in place, but buried in sand and covered with the concrete floor. Since the source of the floating organic layer is most likely the tank and piping system, it is recommended that this area be remediated.

PCB contamination was discovered in several substations where leaks occurred in the past. These PCB areas must now be addressed by implementing a clean up plan in conformance with 40 CFR Part 761. Solvent washing is the most cost effective first step in cleaning the substation floors, and effectiveness of the cleanup can be easily confirmed with low cost wipe tests.

Friable asbestos insulation was discovered in the powerhouse basement and tunnel and should be repaired as soon as possible.

BOC Leeds has submitted a RCRA Closure Plan for the hazardous waste storage pad area to the Missouri DNR. Implementation of the closure plan may begin as soon as regulatory officials give the approval.

7.2.2 Remediation Required Prior To Property Transfer

Current plans for the BOC Leeds facility include marketing the property for a period of time and then, if not sold, the buildings would be demolished.

Prior to transferring ownership or demolition, several process equipment systems, such as the elpo system, conveyor lubricant catch pans and selected exhaust stacks, have to be addressed with clean up or recycling plans. Removal of roofing material, PCB transformers and asbestos insulation would be required prior to demolition. Sewer cleaning in some areas, as mentioned earlier, is also required. Following decontamination, documentation of all remediation activities should be undertaken, in accordance with General Motors corporate recommendations for facility closures.

7.2.3 Further Investigations

One volatile organic compound, 1,1-Dichloroethene, exceeded the evaluation criteria in both rounds of groundwater sampling in both monitoring wells MW-101 and MW-111. It is noted that these are the only two wells in which this compound was detected out of a total of 12 monitoring wells installed. However, since the same compound appeared in the same groundwater monitoring wells in both sampling rounds, further study is warranted. An additional round of groundwater samples is recommended for MW-101 and MW-111. The samples should be analyzed for volatile organics. Should the presence of 1,1-Dichloroethene be reconfirmed, a study is recommended to assess the fate and transport, and health risk, of this compound.

Since Arsenic was found in Round 2 in monitoring well MW-101, when the additional groundwater samples are taken, as recommended above, it is also recommended to sample and analyze for Arsenic. If the presence of Arsenic is confirmed, a study of it's fate and transport, and health risk assessment is also recommended.

If it is necessary to complete the fate and transport analysis recommended above, additional hydrogeological studies will be performed. Soil permeability data will be reviewed, and the mobility of the contaminants of concern should also be studied. Subsequent to that, a health risk assessment may be done to determine if migration of chemicals could have an adverse impact on human health or the environment.

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Additional sampling and analysis is recommended in several areas to confirm or negate inconclusive results. These areas include sewer and pit residues that had high organic and metals levels, but have not been tested for RCRA characteristics. Residue samples from sealer at Bay ZQ-3 on the second floor and the battery charge area at Bay E-24, mezzanine level, had laboratory quality control problems and should be resampled and reanalyzed.

Areas that were subjected to a limited assessment at this time include the wastewater treatment facilities and the powerhouse since both of these facilities are still in use. It is anticipated that they will undergo a clean closure at the termination of their use by BOC Leeds. At that time, it is recommended that an investigation be undertaken to determine if unknown process residues exist that need sampling, analysis and/or remediation. Confirmatory sampling of soil and groundwater is recommended if there is evidence of contamination in these areas.

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