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International Specialists in the Environment

MEMORANDUM

TO: Paul Doherty, EPA DPO

FROM: Hieu Vu, E & E/ATATL (HQV)

THRU: Joe Chandler, E & E/TATL (HQV for J.C.

DATE: September 24, 1992

SUBJECT: Removal Funded: Kuhlman Diecasting Co., Stanley, KS
Removal Assessment Phase II.
TDD#: T07-9107-035D
PAN#: EKS0331FAA
EPA/OSC: Tim Curry

I. INTRODUCTION

The Ecology & Environment, Inc., Technical Assistance Team (TAT) was tasked by the U. S. Environmental Protection Agency Region VII, Emergency Planning and Response (EP&R) Branch to conduct a Removal Assessment Phase II at the Kuhlman Diecasting Company, Stanley, Kansas, under TDD T07-9107-035D, following a successful Removal Phase I at the site.

Removal Phase I activities began on July 22, 1991, and concluded on May 28, 1992. During that period, over 1 million gallons of water contaminated with metals and cyanide, including nearly 900,000 gallons that exceeded allowable discharge levels before treatment, were treated on site. This included bulking and treating contents of approximately 900 drums and containers. Wastes exhibiting high metal concentrations or which, for other reasons, could not be treated on site, were transported off site to recycling and/or disposal facilities. All special waste (e.g., trash, debris, used personal protective equipment (PPE), dust from HVAC system) was sent under a special permit to the Johnson County landfill. Once all wastes were removed from the site, the building was steam cleaned and the water treated.

The objectives for the Removal Assessment Phase II were as follows:

A. To evaluate the effectiveness of the Removal Phase I (removal and stabilization of wastes stored inside the building). This included collection of indoor air samples and dust samples from within the building; and

B. To determine whether further removal activity is required at the site. This included collection of concrete samples from wall and floor surfaces within the building; sediment samples from on-site lagoons; subsurface soil samples from on-site capped lagoons, surface soil samples from within the property, and ground water samples from on-site monitoring wells.

TAT member Hieu Vu was the project manager for the site.

II. BACKGROUND

A. Site Location/Description

Kuhlman Diecasting Company (KDC) is located at 164th Street and Mission Road, near Stanley, Kansas. The 39-acre site is on a floodplain 2 miles east and 1.5 miles south of Stanley in Johnson County, in a meander of the Blue River. The defunct electroplating facility consists of a 130,000-square-foot, single-story, concrete-block building and an assortment of waste treatment lagoons, storage ponds and tanks. Kuhlman Diecasting Company (KDC) began electroplating operations at the site in 1962, after the property had previously been used by an oil refiner.

Land use within a 3-mile radius of the site includes residential, recreational, and agricultural. The nearest residences are approximately 1,000 feet northeast of the site; the Blue River is approximately 50 feet west of the site. It is believed that nearby residents are using a public water supply for drinking; however, information regarding the use of private wells (if any exist) for irrigation or other purposes was not readily available.

B. Site History/Previous Investigation

The KDC facility produced aluminum alloy and zinc diecastings. In 1972, the Kansas Department of Health and Environment (KDHE) ordered the facility's owner to upgrade wastewater treatment facilities. A National Pollutant Discharge Elimination System (NPDES) permit was issued for a new wastewater treatment system in 1973. In 1976, KDHE again ordered the facility's owner to upgrade the wastewater treatment system. It continued with compliance inspections of the treatment plant through the 1980s.

In 1982, KDHE determined during a Resource Conservation and Recovery Act (RCRA) compliance inspection that hazardous wastes were being improperly stored at the site. Another RCRA inspection in 1986 led to documentation of illegal dumping of paint wastes and solvents on the site. EPA imposed a RCRA Administrative Penalty on the owners for those violations.

In November 1990, KDC, with its owner citing an ongoing economic recession as a cause, filed Chapter 11 bankruptcy. Subsequently, Congress Financial Corporation, Chicago, Illinois, a secured creditor with first mortgage rights on the facility at Stanley, Kansas, initiated an auction of the property's equipment and some inventory, which occurred in March 1991.

On March 24, 1991, EPA sent a notice letter to David E. Kuhlman, company president, under Section 107a of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), notifying him of potential financial liabilities associated with cleanup costs of the site. Kuhlman did not respond.

On April 18, 1991, individuals who had purchased inventory and equipment at the site ignited an unknown substance with sparks from a cutting torch, while cutting up a tank purchased as scrap salvage. The local HazMat team and fire department, KDHE, and the Johnson County Department of Environmental Control (JCDEC) responded to the fire. TAT, under EP&R's direction, also responded to the incident. TAT provided technical assistance to the local HazMat team and fire department during the extinguishment of the fire. A followup inspection of the site was conducted by EPA and TAT personnel on April 23, 1991. It revealed hundreds of drums/vats containing electroplating wastes that were improperly stored inside the facility's building (e.g., drums containing acids were stored adjacent to drums containing cyanide). Samples of liquid and sludge collected from some of the drums and from the floor at the plating area showed cyanide and metals present at percentage levels. A complete removal assessment was conducted by TAT in late June 1991.

C. Removal Phase I

On July 15, 1991, an Action Memorandum, with a $1.51-million ceiling, was signed for a removal and stabilization of the site. Removal activities began July 22, 1991. In addition to more than 1,000 drums and other containers holding electroplating chemicals and wastes, approximately 284,000 gallons of wastewater contaminated with cyanide and metals at levels above the NPDES discharge limits for the facility's permit remained at the site. In general, wastes at the site included organics, inorganics, acids, and bases. The major portion of the waste streams was contaminated with metals and cyanide. The concentrations detected were as high as 9,540,000 ug/l for chromium; 653,000 ug/l for hexavalent chromium; 28,000,000 ug/l for copper; 55,000,000 ug/l for nickel; 171,000 ug/l for lead; 2,690,000 ug/l for zinc; and 20,500 ug/l for cyanide. Other metals, such as arsenic and cadmium, were detected at trace levels.

During the Removal Phase I, approximately 900 drums/containers were bulked and treated on site. Wastewater was treated and discharged into Blue River in compliance with the facility's NPDES permit. Wastes with high levels of contamination were transported off site for disposal and/or recycling. Once all wastes had been removed from the site, the building's structures, floors, and walls were steam cleaned. The Removal Phase I was concluded on May 28, 1992.

III. ON-SITE ACTIVITIES

Activities pertaining to the Removal Assessment Phase II were conducted in several time periods, pending approval of the Quality Assurance Project Plan (QAPP, March 31, 1992 - Appendix A), Quality Assurance Sampling Plan (QASP, June 24, 1992 - Appendix B), and Analytical Services Request (ASR) forms; weather conditions, and availability of equipment. The assessment was conducted in three activity numbers as follows:

Activity Number BGGGK This activity assessment occurred from April 27, to May 8, 1992. During this period, 41 samples were collected and submitted to the Region VII EPA laboratory for

analysis, including 2 interior dust samples, 17 interior concrete samples, 6 interior air samples, 9 sediment samples, and 7 subsurface samples.

Activity Number BGJGK This activity assessment occurred from June 30, to July, 2, 1992. During this period, 38 samples were collected and submitted to the Region VII EPA laboratory for analysis, including 32 surface soil samples, 5 subsurface soil samples, and 1 water sample. In addition, TAT collected and field screened 220 surface soil samples and 36 subsurface soil samples for chromium, copper, and nickel, with the XRF.

Activity Number BGKGK This activity assessment occurred from July 14, to July 17, 1992. During this period, TAT collected and submitted 47 samples to the Region VII EPA laboratory for analysis, including 34 water samples, 5 sediment samples, and 8 surface soil samples. TAT also collected and field screened 9 surface soil samples for chromium, copper, and nickel, utilizing the XRF; and 22 water samples for hexavalent chromium, utilizing a HACH spectrophotometer.

A summary of samples submitted to the Region VII EPA laboratory is included in Appendix C of this report. A summary of field screening sample results is included in Appendix D of this report. Sampling locations inside the building are included in Figure 2. Sampling locations outside the building and within the property boundaries are included in Figure 4.

A. Interior Dust Sampling

April 27 - 28, 1992 Two dust samples were collected in two offices inside the building, in accordance with the approved QAPP. Each sample was obtained by vacuuming approximately a 100-square-foot area on the office's carpet with a dust buster. The dust buster was decontaminated and the filter changed before sampling and after collection of a sample to prevent cross-contamination. The samples were submitted to the Region VII EPA laboratory for total arsenic, cadmium, chromium, copper, nickel, lead, zinc, and cyanide analysis.

B. Interior Concrete Sampling

April 27, 1992, to May 7, 1992 During this period, TAT collected 17 concrete samples from eight areas within the building, including two duplicate samples. Each sample was a composite, which was obtained by drilling the concrete surface to a depth of approximately 1 inch, utilizing a rotary hammer drill and 1-inch diameter drill bit. The number of aliquots varied from area to area, depending on the size of the area. The wall sample aliquots were collected within 4 feet from the ground. The drill bit was decontaminated before sampling and after completion of a sample, in accordance with the approved QAPP, to prevent cross-contamination. All samples were submitted to the Region VII EPA laboratory for total arsenic, cadmium, chromium, copper, nickel, lead, zinc, and cyanide analysis.

C. Interior Air Sampling

May 8, 1992 An aggressive air sampling method was utilized and air samples were collected, in accordance with the approved QAPP. During the sampling period, a leaf blower was utilized hourly, for 15 minutes to disturb any dust in locations representing high traffic and activity areas. This method represents potential exposures by activities occurring inside the building. Five Hi-vol air samplers, consisting of either General Metal Worlds, Inc. Model GL2000 or Sierra Instruments, Inc. Model 305-

2000, were calibrated and utilized to collect five 8-hour samples. The five samples and one field blank were submitted to the Region VII EPA laboratory for total lead, chromium, hexavalent chromium, nickel, copper, and zinc analysis.

D. Sediment Sampling

April 27, 1992 Nine sediment samples, including one duplicate, were collected on site from two sanitary waste lagoons, two process water storage basins, and the pond located on the east side of the site. The sampling procedures followed the approved QAPP. Each sample was a composite, which was obtained by using the Eckman Dredge. The number of aliquots varied from area to area, depending on the size of the area. Because of the large sizes of the process water storage basins (approximately 2 acres each), each basin was subdivided into two sections for sampling -- north section and south section. The pond located in the east side of the site was also subdivided into two sections for sampling -- north section and south section -- because of its large size (approximately 3 acres). All nine samples were submitted to the Region VII EPA laboratory for total arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide analysis.

Of the above samples, only analytical results of samples collected from the north process water storage basin showed elevated levels of chromium and copper near levels of concern. Therefore, the north process water storage basin was resampled to define the contamination. Analytical results are addressed in the Results Section of this report.

July 14, 1992 TAT resampled the north process water storage basin. Sampling procedures followed the approved QASP. The north process water storage basin is a concrete basin approximately 150 feet wide and 300 feet long. At the time of sampling, the basin had approximately 2 to 3 feet of water. The basin was subdivided into four quadrants; and nine aliquots composing one sample were collected from each quadrant. Four samples and one duplicate were submitted to the Region VI EPA Laboratory for total arsenic, cadmium, chromium, copper, nickel, lead, zinc, and cyanide analysis.

E. Subsurface Soil Sampling

May 8, 1992 Seven samples, including one duplicate, were collected from three presently capped lagoons on site. These lagoons were former sludge storage impoundments, which were closed by a Kuhlman contractor in 1987. The contractor removed some soils from the impoundments and capped them with clean fill. The Resource Conservation and Recovery Act (RCRA) Branch reviewed the closure report and associated documents for the impoundments and did not consider them as adequate closure.

Sampling procedures followed the approved QAPP. A drill rig was utilized to obtain two core samples from each capped lagoon. The auger cuttings from each boring were inspected for changes in soil texture/material and color in order to determine the interface between the fill material and original soils. In addition, the XRF was utilized to screen the soil for nickel, copper, and chromium; and the Organic Vapor Analyzer (OVA) was utilized to monitor the soil for volatile organic vapors in order to aid in determining the interface between the fill material and original soils. It is noted that the site was used for an oil refinery operation prior to the diecasting operation; therefore, volatile organic compounds may be present in the former impoundments. On the section of the boring core, where the original soils were visually identified or suspected, a 2-foot core sample was then collected and XRF readings taken.

Decontamination procedures followed the QAPP. All seven samples were submitted to the Region VII EPA laboratory for total arsenic, cadmium, chromium, copper, nickel, zinc, and cyanide analysis.

Of the above samples, only analytical results of samples collected from the capped lagoon #3 - location #2 showed elevated levels of chromium, copper, and nickel. Therefore, the capped lagoon #3 was resampled to define the extent of the contamination. Analytical results are addressed in the Results Section of this report.

June 30, 1992 TAT collected 26 subsurface samples from eight borings that were developed in the capped lagoon #3. The samples were obtained at various depths, utilizing the Geoprobe, and were field screened for chromium, copper, and nickel, utilizing the XRF. Three of the 26 samples and one duplicate were submitted to the Region VII EPA laboratory for confirmatory analysis of total arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide.

July 1, 1992 In addition to the subsurface samples collected June 30, TAT collected 10 subsurface samples in Area #4 and #7 on site, utilizing the Geoprobe. Sampling procedures followed the approved QASP. The samples were field screened for chromium, copper, and nickel, utilizing the XRF. One of the 10 samples was submitted to the Region VII EPA laboratory for confirmatory analysis of total arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide.

F. Surface Soil Sampling

June 30, 1992 to July 2, 1992 The area within the Kuhlman property boundary was subdivided into eight areas (see Figure 3: Site Sketch of Sampling Strata), as described in the approved QASP. A total of 220 soil samples was collected and field screened for chromium, copper, and nickel, utilizing the XRF. Of the 220 soil samples, 32 samples were submitted to the Region VII EPA laboratory for confirmation analysis of total arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide. Sampling procedures generally followed the QASP. There were several deviations from the QASP, which were as follows:

1. Two samples were collected from Area #5 and submitted to the laboratory for analysis, instead of one as described in the QASP. The reason for this modification of the sampling plan was because of the large size of Area #5 (approximately 2 acres).

2. In accordance with the QASP, the 95% upper confidence limit (UCL) sampling protocol was to be implemented in Area #8. Area #8 was subdivided into 21 sections of approximately 5,000 square feet each. It was determined that the north-replicate of the 95% UCL samples would be collected from each section (50 aliquots), sieved, and field screened for chromium, copper, and nickel, utilizing the XRF. The other two replicate (south and west-replicate) from a section would be collected if the north-replicate exhibited a high XRF reading. Twenty sections of this area were completed during this sampling period. Because of the modification of the sampling plan, a total of 40 replicate samples was collected from the 20 sections for field screening, instead of 90 screening samples as described in the QASP.

3. July 15, 1992 TAT collected eight replicates from a background soil, instead of one background sample as described in the QASP. The sample results were used to calculate for the total field method precision for the analytes of concern, which is addressed in this report.

4. July 17, 1992 TAT collected 9 surface soil samples from section #21 of Area #8, and field screened for chromium, copper, and nickel, utilizing the XRF. The locations of these samples were randomly determined.

G. Water Sampling

July 1, 1992 A rinsate was collected from a decontaminated Geoprobe sampling probe (Activity BGJGK). The water sample was submitted for laboratory analysis of total arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide analysis.

July 14 - 17, 1992 TAT collected 34 water samples from 22 monitoring wells on site, two rinsates, nine replicates, and one field blank. Sampling procedures followed the approved QASP. Prior to sampling of a monitoring well, the well volume was measured and three well volumes were purged. All well samples were field screened for hexavalent chromium, utilizing a HACH spectrophotometer and reagents. Field screening results did not detect the presence of hexavalent chromium. All water samples were submitted to the Region VII EPA laboratory for total arsenic, cadmium, chromium, copper, lead, nickel, zinc, cyanide, and total petroleum hydrocarbon analysis.

VI. RESULTS

All analytical results and field sheets of samples submitted to the Region VII EPA laboratory as part of Phase II are included in Appendix E of this report. Results of particular concern or which address efficiency of Phase I efforts are included in this section. Analytical results of dust, concrete, soil, and sediment samples consistently showed traces, but not excessive levels, of arsenic and cadmium; therefore their concentrations were not included in this section.

A. Interior Dust Samples

Analytical results of the two dust samples collected inside the building showed high levels of chromium, copper, nickel, lead, and zinc and of cyanide. The dust samples were collected from the office carpets, which were not cleaned during the Removal Phase I. The results are summarized in Table 1 as follows:

TABLE 1
SUMMARY OF ANALYTICAL RESULTS FOR INTERIOR DUST SAMPLES

SAMPLE NO.	Cr	Cu	Ni	Pb	Zn	CN
BGGGK010	2,970	2,520	3,880	1,120	74,900	180
BGGGK017	1,140	1,170	1,660	410	235,000	2.36

Unit is milligrams/kilogram (mg/kg)

B. Interior Concrete Samples

Most of the 17 concrete samples collected inside the building exhibited low concentrations of metals and cyanide (e.g., from tens to hundreds mg/kg). A few samples, however, that exhibited high concentrations of chromium, copper, nickel, lead, and zinc (e.g., thousands mg/kg) and cyanide. Those are summarized in Table 2.

TABLE 2A
SUMMARY OF ANALYTICAL RESULTS OF INTERIOR CONCRETE
SAMPLES EXHIBITING HIGH CONCENTRATIONS

SAMPLE NO.	Cr	Cu	Ni	Pb	Zn	CN
BGGGK018	19.6	49.1	41.1	3.04	6,890	2.74
BGGGK020	328	318	1,110	28.3	682	0.64
BGGGK021	41.2	181	762	150	1,450	8.78
BGGGK022	15.0	16.1	20.0	9.74	1,990	0.20
BGGGK023	38.3	12.9	9.62	242	2,280	0.45
BGGGK024	12,300	14,600	85,400	1,850	3,940	700
BGGGK025	17,800	18,200	49,300	3,550	6,490	635
BGGGK026	50.4	32.3	1,720	62.0	910	6.64
BGGGK027	50.7	35.4	1,750	81.4	1,020	14.6
BGGGK034	3,460	155	439	39.9	2,490	4.23

Unit is mg/kg

TABLE 2B
SAMPLING LOCATIONS OF CONCRETE SAMPLES WITH
HIGH CONCENTRATIONS

SAMPLE NO.	FLOOR/WALL	LOCATION
BGGGK018	Floor	Area #4: Drums storage area
BGGGK020	Floor	Basement
BGGGK021	Wall	Basement
BGGGK022	Floor	Area #3: Diecasting area
BGGGK023	Wall	Area #3: Diecasting area
BGGGK024	Floor	Area #1: Plating area
BGGGK025	Floor (dup)	Area #1: Plating area
BGGGK026	Wall	Area #1: Plating area
BGGGK027	Wall (dup)	Area #1: Plating area
BGGGK034	Floor	Reduction zone

C. Interior Air Samples

All analytical results of indoor air samples showed traces of contaminants, which are below the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs) and the Occupational Safety and Health Act (OSHA) permissible exposure limits (PELs). Sample results are summarized in Table 3.

TABLE 3
SUMMARY OF ANALYTICAL RESULTS OF INTERIOR AIR SAMPLES

SAMPLE NO.	Cr	Cu	Ni	Zn	Cr(VI)	Pb
BGGGK028	9.82	4.86	10.8	23.6	0.168	0.73
BGGGK029	8.38	4.20	9.13	25.7	0.133	0.70
BGGGK030	5.68	2.17	5.03	27.9	0.023	0.63
BGGGK031	4.30	3.20	7.63	18.8	0.017	0.40
BGGGK032	1.61	1.28	2.41	22.4	0.002U	0.23
BGGGK033F	0.018	0.016U	0.033U	4.63	0.002U	0.082U
OSHA PEL	1,000	1,000	100	5,000*	100**	50
NIOSH REL	500	1,000	15	5,000*	1	100

Unit is micrograms/cubic meter (ug/m3)
* Zinc oxide fumes
** Cr(VI) as chromate (CrO3)

D. Sediment Samples

As mentioned previously, nine sediment samples were collected from on-site lagoons, basins, and a pond on April 27, 1992. Analytical results showed only two samples (BGGGK005 and BGGGK006 -- collected from the north process water storage basin -- with elevated levels of metals (e.g., chromium, copper, and zinc). This basin was resampled on July 14, 1992, to define the contamination. Four samples and one duplicate were collected (BGKGK033, 034 and 034D, 035, and 036). In general, analytical results of the latter samples showed similarity in metals concentrations between the two sampling efforts, but not for cyanide. The cyanide levels were significantly different between the two sampling efforts, as summarized in Table 4.

TABLE 4
SUMMARY OF ANALYTICAL RESULTS OF SEDIMENT SAMPLES

SAMPLE NO.	Cr	Cu	Ni	Pb	Zn	CN
BGGGK005	582	1,610	132	47.4	741	0.15U
BGGGK006	1,020	1,970	156	62.7	986	0.15U
BGKGK033	512	1,310	119	70.0	1,010	23.7
BGKGK034	639	1,440	131	74.3	1,090	4,480
BGKGK034D	1,100	1,990	140	120	1,220	4,760
BGKGK035	365	910	121	63.7	1,150	5,480
BGKGK036	2.16	4.35	1.8	6.8	35.4	7,750

Unit is mg/kg

E. Subsurface Soil samples

As mentioned previously, seven subsurface soil samples were collected May 8,1992, from three capped lagoons on site. Analytical results showed only one sample (BGGGK040 -- collected from the capped lagoon # 3) with elevated levels of metals. This lagoon was resampled on June 30, 1992, to define the contamination, when 26 subsurface soil samples were obtained from eight holes bored to and sampled at various depths. The samples were field screened for chromium, copper, and nickel with the XRF. XRF readings indicated only three borings having samples with elevated levels (CL3-01, CL3-04, CL3-07). XRF readings of other screening samples indicated low levels of chromium (< 100), copper (< 160), and nickel (< 170). The correlation coefficient between XRF and laboratory data is addressed in Section V of this report. The three borings with high levels are from an area approximately 40 feet long and 15 feet wide. The depth of the contamination is likely from 5 to 8 feet as summarized in Table 5, which includes laboratory and field XRF results.

TABLE 5
SUMMARY OF RESULTS OF SUBSURFACE SOIL SAMPLES
COLLECTED FROM THE CAPPED LAGOON 3

SAMPLE NO.	LABORATORY RESULTS			XRF VALUES			LOCATION
	Cr	Cu	Ni	Cr	Cu	Ni	
BGGGK040	5,980	3,090	7,990	850	1,250	9,260	LOC.#2,5-7'
BGGGK041	7,110	3,720	9,810	---	---	---	DUPLICATE
BGJGK022	2,250	1,230	3,130	570	1,150	4,470	CL3-07,7-8'
BGJGK022D	3,000	1,770	4,120	490	1,060	2,950	DUPLICATE
N/A	---	---	---	1,070	2,200	10,210	CL3-01,5-6.5'
N/A	---	---	---	480	970	1,820	CL3-04,5-6.5'

--- = Not Applicable
Laboratory results' unit is mg/kg.

In addition to subsurface samples collected from the capped lagoon #3, 10 subsurface soil samples were collected from Areas #4 and #7. XRF readings of those samples indicated low levels of chromium, copper, and nickel. One sample (BGJGK027) was submitted to the laboratory for confirmatory analysis. Analytical results showed low levels of metals and cyanide.

F. Surface Soil Samples

During the assessment Phase II at the site, 229 surface soil samples were screened for chromium, copper, and nickel, utilizing the XRF. A total of 40 surface soil samples was submitted to the laboratory for confirmatory analysis, including eight background replicates. Analytical results and XRF readings indicated only two small sections in Areas #3 and #7 that had elevated metals concentrations. The section in Area #3 that had samples with elevated metal concentrations is located immediately north of the north process water storage basin. Area #7 had samples with elevated metals concentrations in a section located west of the building. Laboratory and XRF results are summarized in Table 6. The correlation coefficient between laboratory and XRF data is addressed in Section V of this report.

TABLE 6
SUMMARY OF RESULTS OF SURFACE SOIL SAMPLES
EXHIBITING HIGH CONCENTRATIONS

SAMPLE NO.	LABORATORY RESULTS				XRF VALUES			LOCATION
	Zn	Cr	Cu	Ni	Cr	Cu	Ni	
BGJGK013	468	1,520	5,280	80.7	20	2,940	90	3-39
BGJGK015	32,100	343	1,130	886	400	1,290	600	3-58
BGJGK016	5,550	2,390	3,850	4,370	480	3,650	3,670	3-69
BGJGK026	3,110	381	378	1,400	350	380	1,560	7-3
N/A	---	---	---	---	410	2,520	2,150	3-65
N/A	---	---	---	---	320	3,130	920	3-66
N/A	---	---	---	---	1,180	1,040	45,130	3-67
N/A	---	---	---	---	800	2,000	4,080	3-75
N/A	---	---	---	---	770	800	6,280	7-9

--- = Not Applicable.
Laboratory results' unit is mg/kg.

Concentrations of the eight replicates of the background sample are summarized in Table 7. It is noted that concentrations of metals within those replicates are generally similar, except for BGKGK038. Concentrations of cyanide within the replicates are generally similar, except for BGKGK037.

TABLE 7
SUMMARY OF ANALYTICAL RESULTS OF BACKGROUND REPLICATES

SAMPLE NO.	Cr	Cu	Ni	Pb	Zn	CN
BGKGK037	13.5	16.8	22.3	41.5	239	1,460
BGKGK038	0.241	0.347	0.40U	1.0U	3.59	0.20U
BGKGK039	10.6	15.9	19.1	30.7	154	4.67
BGKGK040	12.7	16.2	21.1	33.1	183	0.206
BGKGK041	10.7	15.5	19.5	31.1	174	1.40
BGKGK042	10.7	15.5	19.5	31.1	174	1.03
BGKGK043	12.3	16.2	20.9	32.2	178	1.41
BGKGK044	10.8	15.3	19.7	32.5	176	1.39

Unit is mg/kg

G. Water Samples

A total of three rinsates (BGJGK038F, BGJGK014F, and BGJGK023F) was collected from decontaminated sampling equipment during the assessment. Metals and cyanide were not detected in any of the samples at the respective detection limits. One field blank was submitted to the laboratory. None of the requested analytes were detected in this sample, except for copper (13.8 ug/l). The laboratory detection limit for copper was 10.0 ug/l.

Water samples were collected from 22 monitoring wells on site. Analytical results did not detect cyanide in any of the wells at the detection limit of 0.004 mg/l. Furthermore, total petroleum hydrocarbon analysis showed either nondetect or trace levels (less than 7 mg/l) in all well samples. Metal analysis indicated some of the wells had metal levels above the respective maximum contaminant levels (MCLs). Table 8 summarizes analytical results of those wells.

TABLE 8
SUMMARY OF ANALYTICAL RESULTS OF MONITORING WELLS THAT HAD METAL CONCENTRATIONS ABOVE THE RESPECTIVE MCLs

SAMPLE NO.	As	Cd	Cr	Cu	Ni	Pb	Zn
BGKGK001	58.7	5U	10U	10U	20U	50U	20U
BGKGK003	63.3	5U	10U	10U	20U	50U	20U
BGKGK007	367	5U	10U	10U	20U	50U	46.2
BGKGK010	126	5U	10U	10U	20U	50U	73.2
BGKGK013	58.1	5U	10U	10U	20U	50U	20U
BGKGK016	277	5U	10U	10U	20U	50U	33.8
BGKGK021	50U	14.3	10U	10U	20U	50U	70.5
BGKGK024	52.8	9.27	115	117	113	123	1,320
MCL	50	5	100	1,300	100	15	---

--- = Not Applicable.
Unit is micrograms/liter (ug/l)

V. CORRELATION COEFFICIENT BETWEEN XRF AND LABORATORY DATA

The correlation coefficients between XRF and laboratory data were calculated and included in Appendix F. The correlation coefficients for chromium, copper, and nickel are 0.87, 0.92, and 0.97, respectively. The low correlation coefficient for chromium probably results from low chromium concentrations in samples that were collected for the XRF calibration. Soil samples around the building, where contamination levels were expected to be relatively high, were collected for calibration of the XRF. The highest chromium level detected in those samples was 607 mg/kg. The lowest chromium level detected in the calibration samples was 13.5 mg/kg. Therefore, any sample exhibiting a concentration beyond that concentration range would be out of the XRF's calibration range. In addition, samples collected from the parking lot (Area #8) consisted of gravel dirt, which had a different matrix compared to the calibration soil samples. This could interfere with XRF readings of the area and contribute to the low correlation coefficient for chromium.

VI. TOTAL FIELD METHOD ACCURACY AND PRECISION

Because the spiking solution was not available during the assessment, no field spiking samples were performed; thus, the total field method accuracy cannot be determined.

The total field method precisions were calculated for the eight soil replicates and eight water replicates collected on site, in accordance with the Quality Assurance/Quality Control Guidance For Removal Activities, OSWER Directive 9360.4-01, April 1990. The total field method precision is expressed as the relative mean standard deviation (percent). Table 9 and Table 10 summarizes the total field method precisions for soil and water, respectively.

TABLE 9
SUMMARY OF TOTAL FIELD METHOD PRECISIONS FOR SOIL (a)

SAMPLE NO.	Cr	Cu	Ni	Pb	Zn	CN
BGKGK037	13.5	16.8	22.3	41.5	239	1,460
BGKGK038	0.241	0.347	0.40U	1.0U	3.59	0.20U
BGKGK039	10.6	15.9	19.1	30.7	154	4.67
BGKGK040	12.7	16.2	21.1	33.1	183	0.206
BGKGK041	10.7	15.5	19.5	31.1	174	1.40
BGKGK042	10.7	15.5	19.5	31.1	174	1.03
BGKGK043	12.3	16.2	20.9	32.2	178	1.41
BGKGK044	10.8	15.3	19.7	32.5	176	1.39
PRECISION	40.9%	41.2%	39.9%	40.8%	42.3%	280.6%
PRECISION*	8.3%	14.3%	4.1%	3.0%	5.7%	91.1%

Unit is mg/kg

(a) - Total arsenic and cadmium were not detected in the above samples; therefore, they were excluded in the calculation of the total field method precision.

* The metal results of BGKGK038 showed significant differences compared to results of the other seven replicates. Also, the cyanide result of BGKGK037 showed significant difference from results of the other seven replicates. The total field method precision for each of the above analytes is significantly increased if the two samples (BGKGK037 and BGKGK038) were considered as outliers and were excluded from the calculation.

TABLE 10
SUMMARY OF TOTAL FIELD METHOD PRECISION FOR WATER (a)

SAMPLE NO.	As	Cd	Cr	Cu	Ni	Pb	Zn
BGKGK024	52.8	9.27	115	117	113	123	1,320
BGKGK026	61.0	16.4	125	184	125	97.2	1,380
BGKGK027	50.0U	14.2	105	285	112	86.4	1,300
BGKGK028	56.2	12.9	114	244	117	106	1,300
BGKGK029	61.7	14.4	115	171	119	115	1,350
BGKGK030	58.3	14.4	133	179	127	114	1,400
BGKGK031	50.0U	13.1	119	174	120	115	1,310
BGKGK032	55.1	13.9	121	175	123	114	1,390
PRECISION	8.2%	15.0%	7.0%	26.7%	4.5%	10.9%	3.1%

Unit is ug/l.

(a) - Cyanide was not detected in the above samples; therefore, it is excluded from the calculation of the total field method precision.

VII. SUMMARY

TAT was tasked to conduct a removal assessment Phase II at the Kuhlman Diecasting Company, following a successful removal Phase I at the site. The tasks included collecting multi-media samples to assess the effectiveness of the cleanup of the building, and assessing residual contamination remaining in the building's concrete, as well as the contamination of soil and ground water at the site. TAT has completed the assessment. The results of the assessment will be used to determine future removal activities at the site.

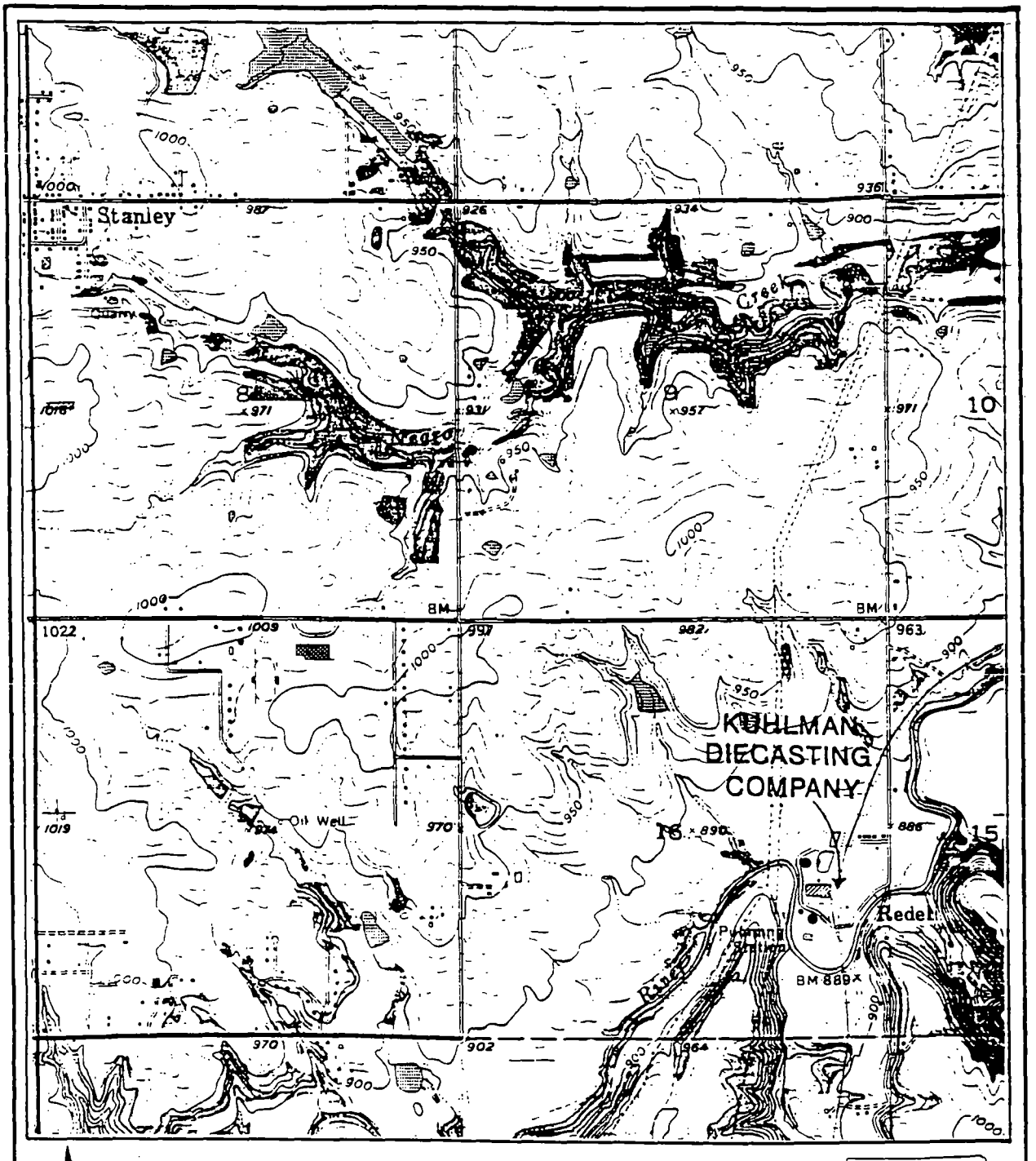
ATTACHMENTS

Figure 1: Site Location Map
Figure 2: Sampling Locations Inside The Building
Figure 3: Site Sketch of Sampling Strata
Figure 4: Site Map - Sampling Locations Within Kuhlman Property

Appendix A - Quality Assurance Project Plan, March 31, 1992
Appendix B - Quality Assurance Sampling Plan, June 24, 1992
Appendix C - Summary of Samples (Phase II) Submitted To The Region VII EPA Laboratory
Appendix D - Summary of Field Screening XRF Results
Appendix E - Laboratory Data Transmittals and Field Sheets
Appendix F - Calculation of Correlation Coefficient Between XRF and Laboratory Data

FIGURE 1: SITE LOCATION MAP

ecology and environment, inc.
OVERLAND PARK, KANSAS



KUHLMAN DIECASTING COMPANY

16400 MISSION ROAD

STANLEY, KANSAS

T07-9107-035D

EKS0331FAA

STILWELL

QUADRANGLE

FIG1: SITE LOCATION MAP

FIGURE 2: SAMPLING LOCATIONS INSIDE THE BUILDING

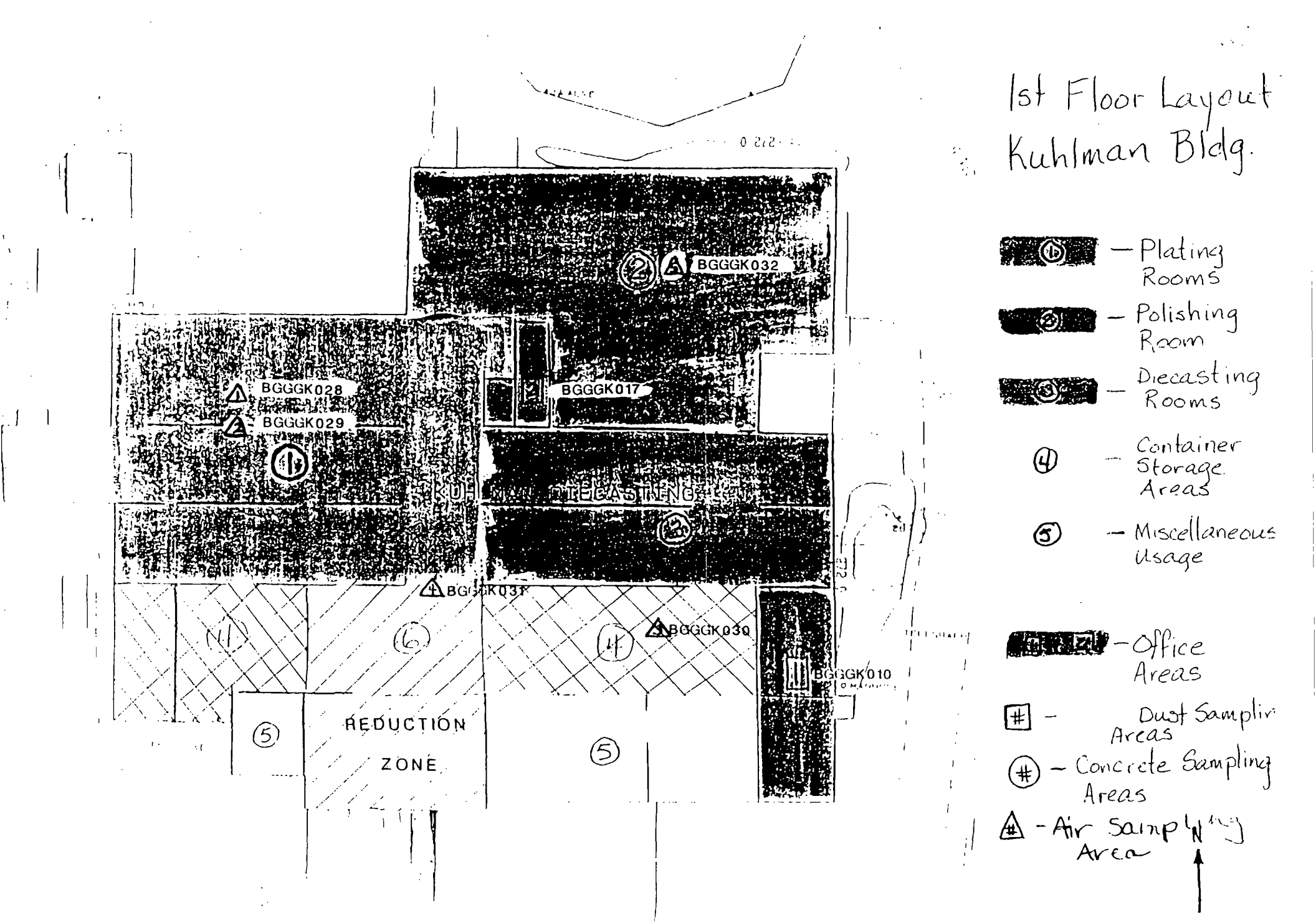


FIGURE 2: SAMPLING LOCATIONS INSIDE THE BUILDING

FIGURE 3: SITE SKETCH OF SAMPLING STRATA

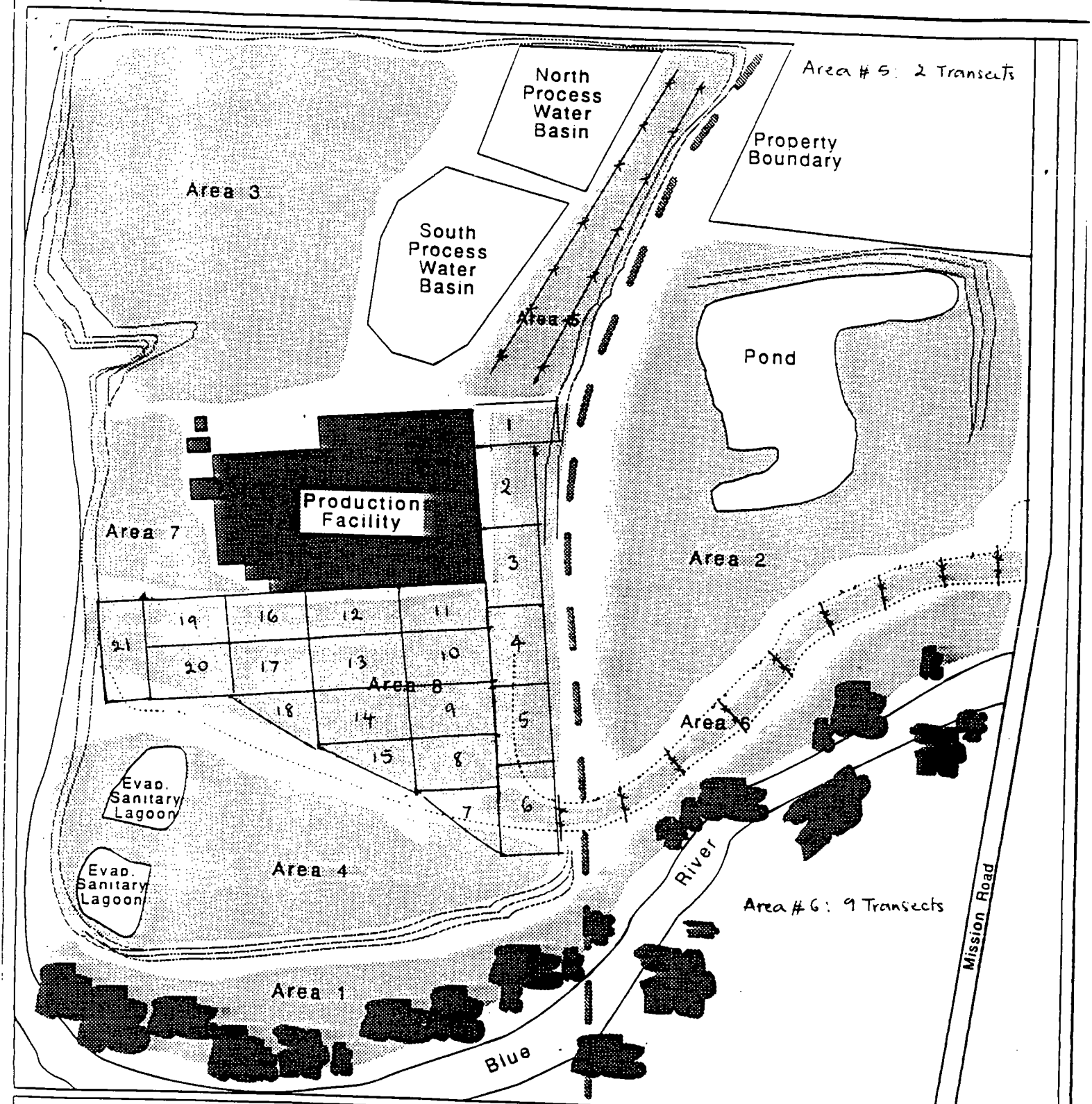
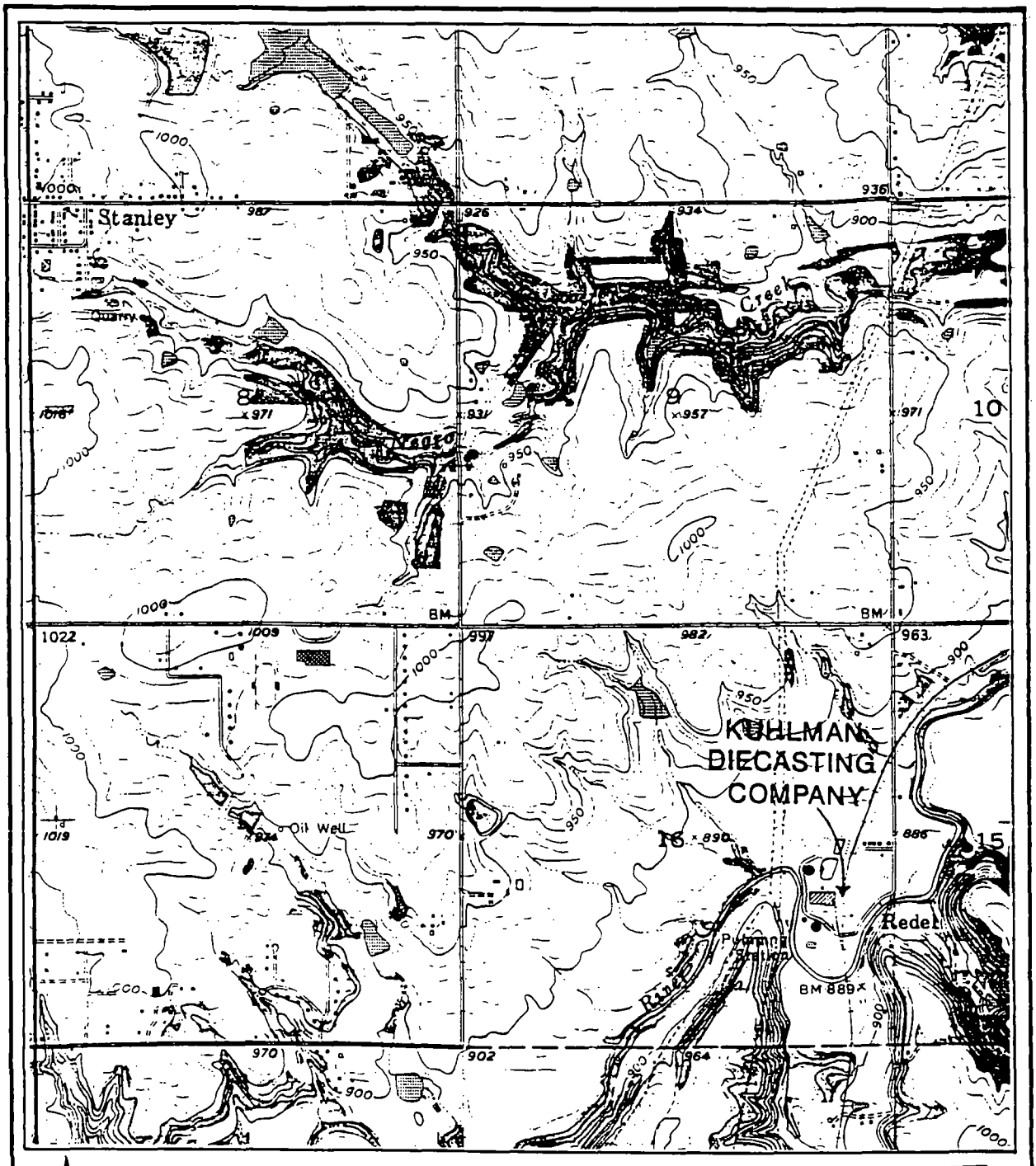


Figure 3: Site Sketch of Sampling Strata

FIGURE 1: SITE LOCATION MAP

ecology and environment, inc.
OVERLAND PARK, KANSAS



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KUHLMAN DIECASTING COMPANY

16400 MISSION ROAD

STANLEY, KANSAS

T07-9107-035D

EKS0331FAA

STILWELL

QUADRANGLE

FIG1: SITE LOCATION MAP

FIGURE 2: SAMPLING LOCATIONS INSIDE THE BUILDING

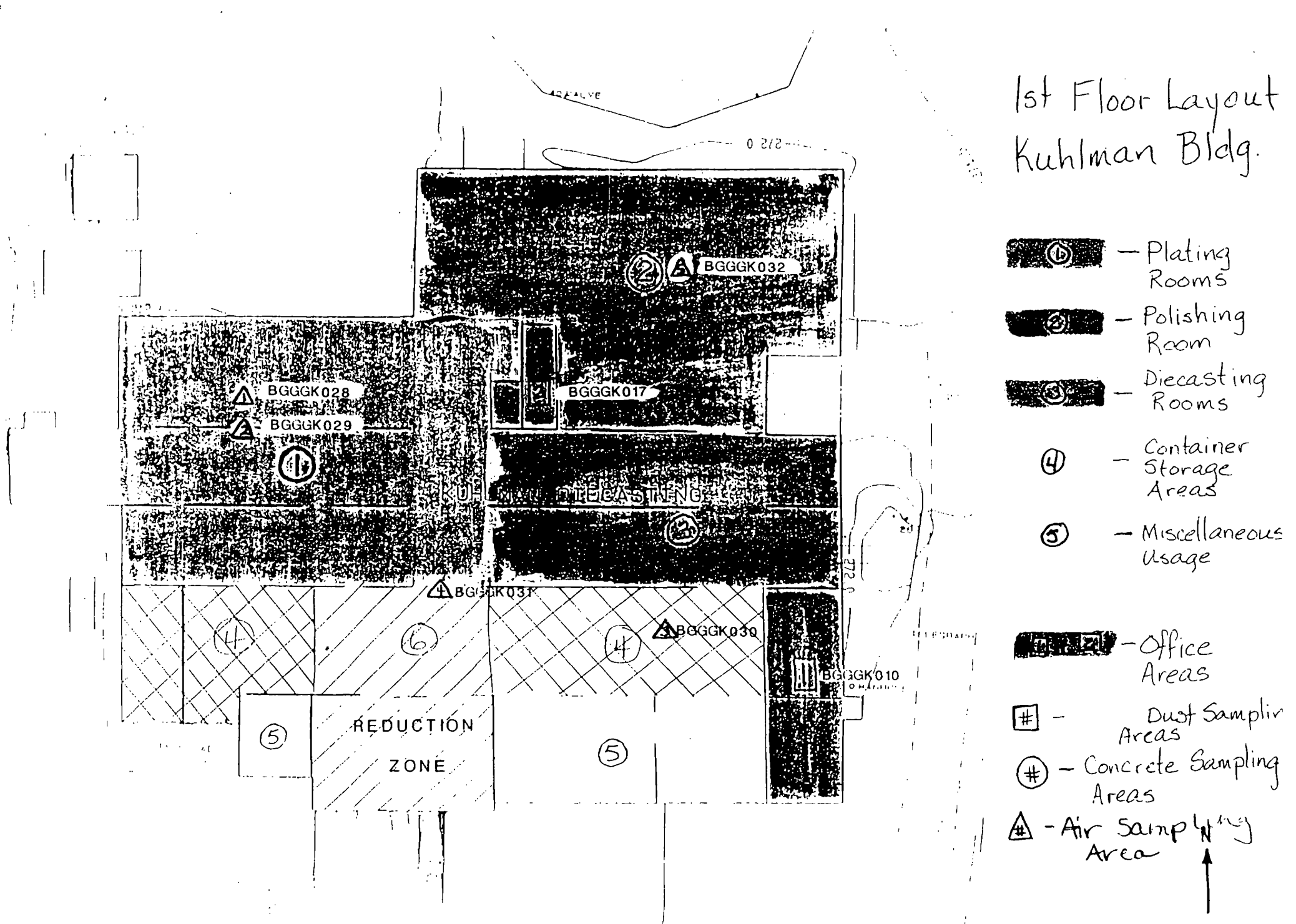


FIGURE 2: SAMPLING LOCATIONS INSIDE THE BUILDING

FIGURE 3: SITE SKETCH OF SAMPLING STRATA

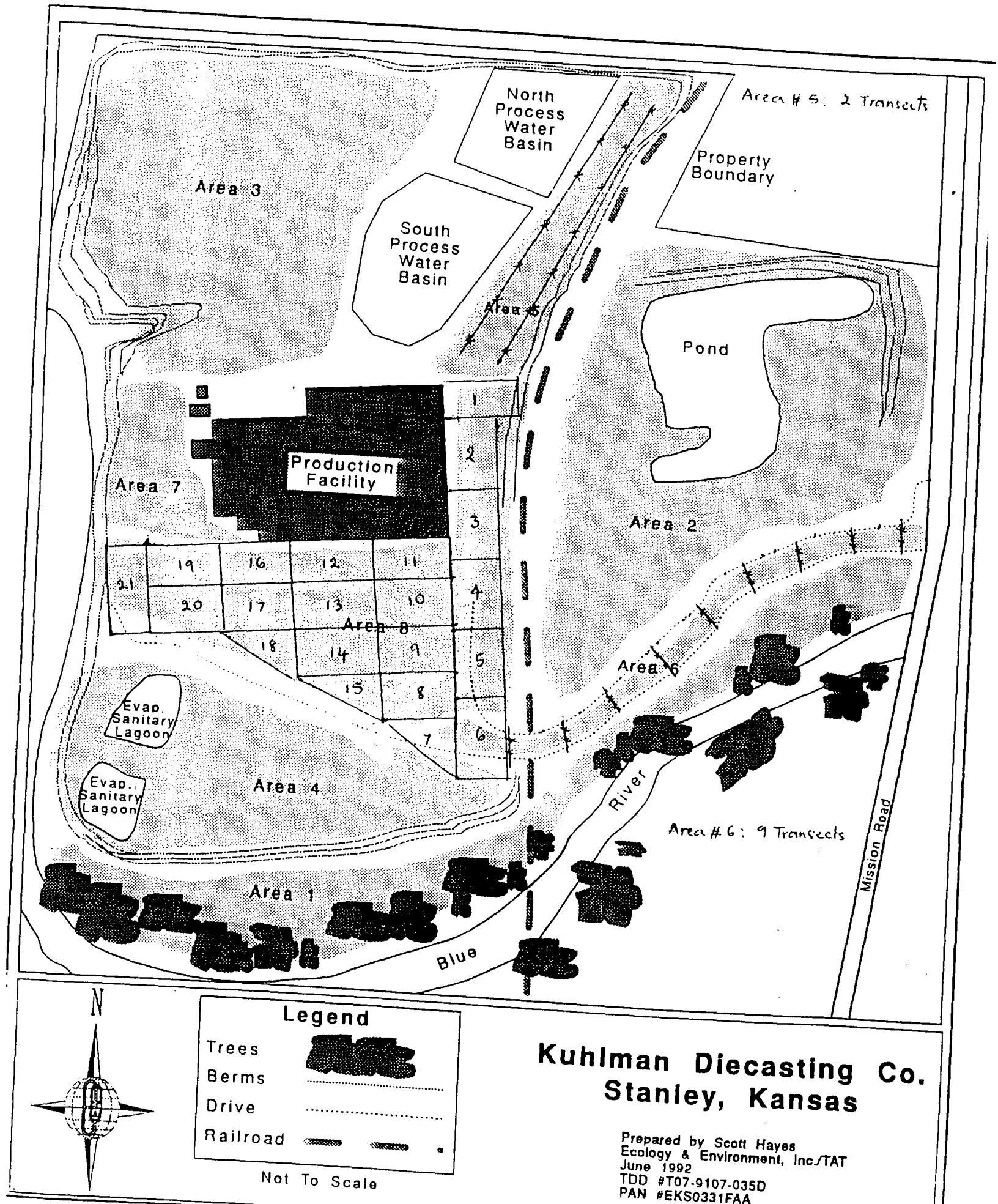


Figure 3: Site Sketch of Sampling Strata

FIGURE 4: SITE MAP - SAMPLING LOCATIONS WITHIN KUHLMAN PROPERTY

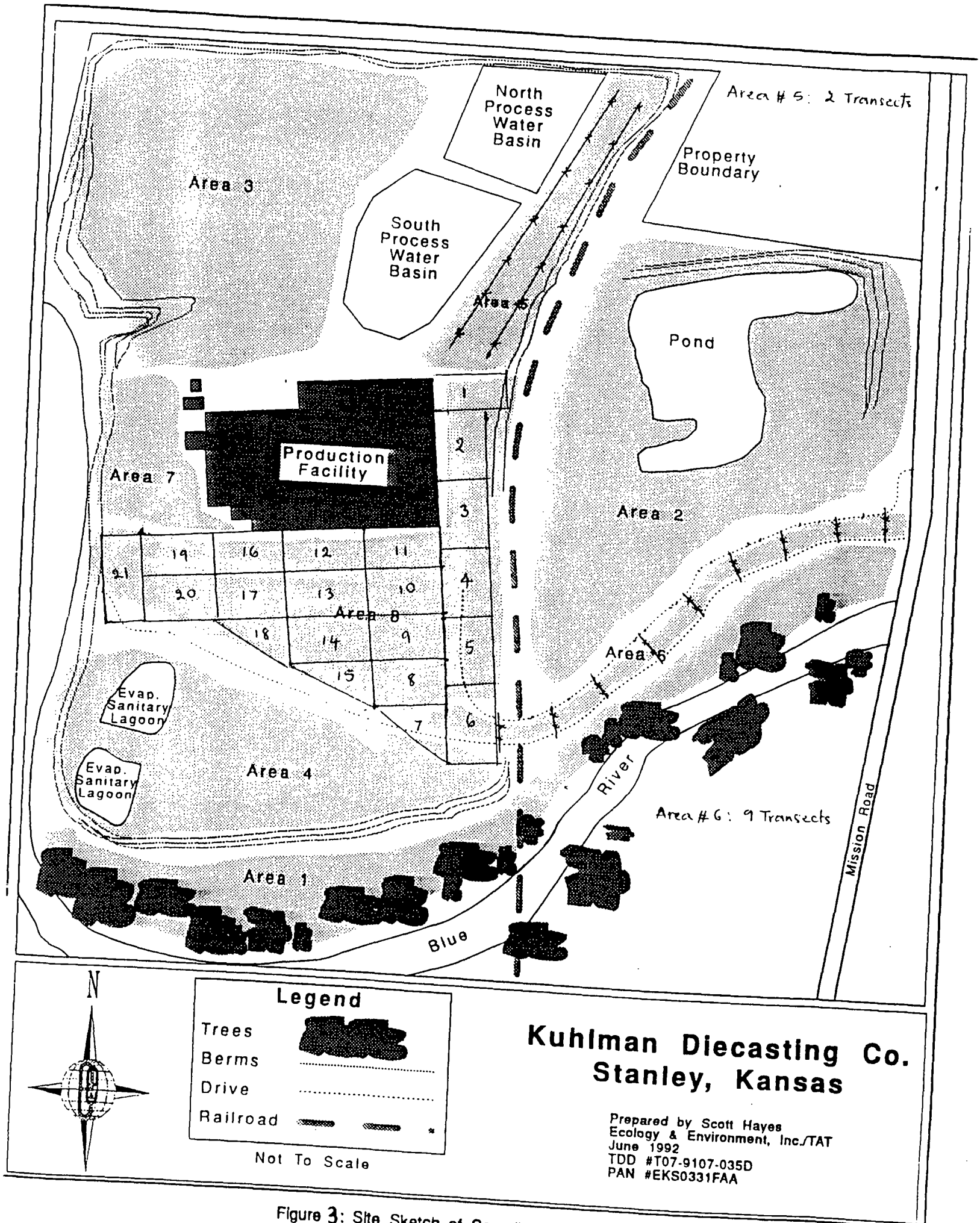


Figure 3: Site Sketch of Sampling Strata

APPENDIX A - QUALITY ASSURANCE PROJECT PLAN, MARCH 31, 1992

QUALITY ASSURANCE PROJECT PLAN FOR KUHLMAN DIECASTING CONTAMINATION STANLEY, KANSAS

ACTIVITY NUMBER BGGGK

Date: March 31, 1992

Approvals:

Project Officer/OSC	Date 3/31/92
Chief, Site Inv. Section	Date 4/20/92
Chief, Emer. Planing and Response Branch	Date
Quality Assurance Officer	Date 4/1/92

1.0 BACKGROUND

The [suspected] contamination is a result of:

Contamination of the building and sediments is suspected to have occurred by plant operations. Specifically the building would have been contaminated by spills during the manufacturing and plating of parts, lagoon sediments would have been contaminated by spills, dumping and normal operations of the treatment and storage lagoons.

The following information is known about the site:

The site is located south of the city of Overland Park in the county of Johnson in the state of Kansas. The nearest residents are located within 1000.0 feet of the site, in a northeast direction. Other significant environments in proximity to this site include the Blue River located 50 feet due west of the site.

It is a Metal Plating facility on 36 acres which has been operating for 22 years.

The types of material(s) handled by this facility are:

acids
bases
inorganics
organics
petroleum products

The volume(s) of contaminated materials previously addressed by a removal action include:

There were over 1000 containers of solid wastes including acids, bases, cyanides, heavy metal bearing solutions, flammables, and toxics.

There was a basement flooded with four feet of water (over 150,000 gals.) that contained levels of metals and cyanide over the NPDES discharge limit.

There were drainage sumps and waste water treatment tanks that contained sludges listed as F006 by RCRA (approx. 120 tons).

Areas of the facility that remain to be assessed by sampling are:

There are three lagoons on site used in the past for F006 sludge storage. These lagoons have been closed but may still contain levels of metals and cyanide that may leach into the groundwater. There are two sanitary sewage treatment lagoons on site that may have elevated levels of metals in the sediments. There is a 130,000 square foot building that was used in the manufacturing and plating of the parts.

The contaminants of concern are:

The principal contaminants of concern are: chromium, copper, nickel, zinc, cyanide and petroleum hydrocarbons.

The basis of this information may be found in:

Interviews with previous employees have indicated that numerous spills have occurred in the past inside the plant. NPDES compliance inspections and a RCRA facility assessment have documented the release of contaminants to the treatment and storage lagoons that discharge into the Blue River. Samples analyzed during the Removal phase have indicated that the inorganics may be found to be in high concentrations are arsenic, cadmium, chromium, copper, nickel, lead, zinc and cyanid

Plant personnel have also indicated that petroleum hydrocarbons m have been released during the facility's operation as a pipeline storage site. The potential hydrocarbon contamination will be evaluated during a seperate groundwater sampling investigation.

2.0 DATA USE OBJECTIVES

The objective of this project/sampling event is to determine:

the presence of contamination
the magnitude of contamination

For the purpose of:

Site characterization

The data may further be used in evaluating action levels:

Federal/State Action Levels

A trip report will be written for this sampling activity which will include a description of the collection of the samples and the analytical results. This information could be used by the Emergency Planning and Response Branch to evaluate the need for further removal actions at this site. EP&R will take into account the factors of land usage, contaminants, soil characteristics, groundwater depth and the potential for human and environmental exposure in their evaluation of the health threat posed by this site. Should their evaluation support further removal action the trip report will be used to develop site specific action levels. The Kansas Department of Health and Environment and the Agency for Toxic Substances and Disease Registry will be consulted during the development of the action levels to assure that each level will be protective of human health and the environment and address any Applicable Relevant and Appropriate Regulations (ARARs).

3.0 Quality Assurance Objectives

As identified in Sections 1.0 and 2.0 the objective of this project/event applies to the following parameters:

Parameters	Matrix	Intended Use Of Data	QA Objective
Cyanide	Concrete	Site Characterizatio	QA-3
Cyanide	Sediment	Site Characterizatio	QA-3
Cyanide	Soil	Site Characterizatio	QA-3
Metals	Air	Site Characterizatio	QA-3
Metals	Concrete	Site Characterizatio	QA-3
Metals	Dust	Site Characterizatio	QA-3
Metals	Sediment	Site Characterizatio	QA-3
Metals	Soil	Site Characterizatio	QA-3

4.0 Approach And Sampling Methodologies

4.1 Sampling Equipment

The following equipment will be utilized to obtain environmental samples from the respective media/matrix:

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Cyanide in Concrete	Drill	carbon steel	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Cyanide in Concrete	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Cyanide in Sediment	Eckman Dredge	stainless steel	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Cyanide in Sediment	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Cyanide in Soil	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Cyanide in Soil	Soil Coring Device	stainless steel	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Air	Hi-Vol Air Sampler	Fiber glass filter	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Air	Plastic bag	plastic/polyethyene	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Concrete	Drill	carbon steel	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Concrete	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Dust	Dustbuster	plastic/polyethyene	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Dust	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Sediment	Eckman Dredge	stainless steel	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Sediment	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Soil	Sample Bottle	glass	Yes

Parameter/Matrix	Sampling Equipment	Fabrication	Dedicated
Metals in Soil	Soil Coring Device	stainless steel	No

Decontamination Steps

1 Physical removal
2 Non-phosphate detergent wash
3 Distilled/deionized water rinse

4.2 Sampling Design

The sampling design is depicted on the attached Sample Locaton Map (Figure 4-1) and is based on the following rationale:

4.2.1. Sediment Sampling

Sediment samples will be collected from the sanitary wastewater lagoons, the pond on the east side of the site and the process water storage basins. An Eckman Dredge will be used to collect multiple aliquot samples from the north and south sanitary wastewater lagoons. Due to the sizes of the pond on the east side of the site and the process water storage basins each of these will

be divided into north and south ends. A grab sample will be collected from each end of the pond and basins using an Eckman Dredge. The samples will be homogenized prior to placing in the sample containers. There will be eight sediment samples plus one duplicate sample for a total of nine samples. These samples will be analyzed for the total levels of the inorganics Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Zinc and Cyanide.

4.2.2. Subsurface Soil Sampling

There are three former sludge storage impoundments at this site. During 1987 Kuhlman Diecasting hired a contractor to close these impoundments. The contractor removed some soils from the impoundments and capped them with clean fill. The Resource Conservation and Recovery Act (RCRA) Branch reviewed the closure report and its associated documents for the impoundments and did not consider them to be clean closed. In an effort to determine what levels of contaminants remain in the soils below the old surface impoundments samples of the soils will be collected at depth.

This plan proposes to collect two subsurface soil samples for each former surface impoundment. The samples will be collected using a drill rig, augering down two feet prior to collecting a six foot core sample. The auger cuttings will be screened with the XRF to determine what, if any, contaminants may exist in the fill material. Each foot of the core will also be screened with the XRF to aid in determining the interface between the fill material and the original soils. The uppermost foot of the original soils will be homogenized and collected in containers for analysis of the total inorganics previously mentioned plus a TCLP analysis for any metal exceeding 10 times the RCRA Characteristic limit. This would generate a total of six samples plus one duplicate.

4.2.3. BUILDING INTERIOR SAMPLES

4.2.3.1. Concrete Samples

4.2.3.1.1. Floor Samples

The plant will be divided into eight sections, grouping areas with similar past usages. These sections are located on three floors as indicated by the floor plans in Figures 2, 3 and 4. Each section will be overlain by a grid pattern, the spacing of which will be determined in the field and be based on the number of aliquots necessary to fill two 8 oz. sample jars. At the center of each grid a drill with a carbon steel concrete bit will be used to penetrate into the concrete to a depth of about two centimeters. The cuttings generated by the drilling will be collected as a multi-aliquot sample for each section. Prior to drilling each location will be swept clean of any surface debris to prevent potential contaminants in the dust from being incorporated into the sample. In each section a sampling location will be selected to drill from two centimeters to twenty centimeters in depth. The drill cuttings from this single location will be collected as a seperate sample. This concrete sampling design will generate approximately sixteen samples plus two duplicates, one for

the shallow depth and another for the deeper cuttings. The samples will be analyzed for the previously noted inorganics.

4.2.3.1.2. Wall Samples

A multi-aliquot sample from the concrete walls will be collected for each of the eight sections identified above. The spacing of the aliquots will be determined in the field and will depend on the available wall space. The aliquots will be collected from approximately five feet above the floor and will be from the first two centimeters of concrete. A drill with a concrete bit will again be used. Prior to sampling each location will be cleaned of any surface dust and paint. No depth samples of the walls will be collected. These samples will be analyzed for the same inorganics stated above. A total of eight wall samples plus one duplicate are anticipated.

4.2.3.1.3. Dust Samples

Dust samples will be collected from those areas of the building which are carpeted or have not undergone any cleanup activity. These areas are identified as the office area in the southeast corner of the building and the production office area between the polishing area, diecasting area and the plating area. The dusts will be collected using a dustbuster with a filter. In each area 100 square feet of high traffic area will be marked off and vacuumed with the dustbuster. Should the 100 square foot area generate less than two grams of dust for analysis, additional area will be vacuumed until the minimum sample quantity is reached. A minimum of two grams of the dust will be placed into 8 oz. glass jars and submitted for analyses of the level of the metallic inorganics, the cyanide analysis will not be conducted due to low levels previously detected in the dusts. It is anticipated that two dust samples plus one duplicate will be collected.

4.2.3.2. Interior Air Samples

An agressive air sampling method will be used inside the plant to collect an air sample that best represents potential exposures by activities occuring inside the building. Blowers will be operated in locations representing high traffic and activity areas. The air samples will be collected while conducting the exterior soil sampling activities and prior to the sampling of the building interior. The air samplers will be started at the beginning of a day and run for eight hours. These five samplers will consist of either of General Metal Works, Inc. Model GL2000 or Sierra Instruments, Inc. Model 305-2000 High volume air samplers. They will be set up inside the plant in four locations with one co-located sample point to collect a duplicate. The air samples will be collected according to 40 CFR Part 50, Appendix B, "Reference Method for the Determination of Lead in Suspended Particulate Matter From Ambient Air". Metorleogical data on wind speed and direction will not be necessary, however temperature and pressure readings will be recorded. These air samples will be analyzed for total levels of lead, chromium, hexavalent chromium, nickel, copper, and zinc. The sample results will be compared to the Occupational Health and Safety Administrations Permisible Exposure Limits. This sampling proposal will generate five samples for analysis.

4.3 Standard Operating Procedures

4.3.1 Sample Documentation

Sample documentation will be conducted in accordance with U.S. EPA Region VII Standard Operating Procedures 2130.2A and 2130.3A. These documents are titled, "Field Chain of Custody for Environmental Samples" and "Identification, Documentation and Tracking of Samples" respectively.

4.3.2 Sampling SOP's

Region VII Sediment Sample Col

Sediment samples collected at this site will follow the U.S. EPA Reion VII Standard Operating Procedure #2334.8A, titled "Sediment Sample Collection".

Wipe, Chip, and Sweep Sampling

Since surface situations vary widely, the sampling locations will be selected based upon the potential for contamination as a result of manufacturing processes or personnel practices.

Chip or drill sampling is appropriate for porous surfaces and is generally accomplished with either a hammer and chisel, or an electric drill. To collect the sample, a measured and marked off area is drilled to an even depth of 2 centimeters.

Sweep or vacuum sampling is an effective method for the collection of dust and/or residue on porous or non-porous surfaces. To collect such a sample, an appropriate area is measured off. Then, while wearing a new pair of disposable surgical gloves, a brush or hand held vacuum unit is used to collect material into a dust pan or cloth bag. The sample is then transferred to the proper sample container.

40 CFR Part 50, Appendix B

Reference Method for the Determination of Lead Suspended Particulate Matter Collected from Ambient Air.

4.3.3 Sample Handling and Shipment

Samples will be collected in the field according to Standard Operating Procedures described in the previous section. Samples will be placed in compatible containers that will meet the specifications found in the Regional Standard Operating Procedure 2130.4A, titled "Sample Containers". Preservation of samples will be in accordance with the Regional Standard Operating Procedure 2130.5A, titled "Sample Preservation". The samples collected will be accompanied by chain-of-custody forms and field sheets and hand delivered to the Regional Lab. Any further sample shipment will be coordinated by the lab.

5.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The EPA On-Scene Coordinator, Tim J. Curry, is responsible for the development of the Sampling QA/QC Plan and will provide overall direction to staff concerning project sampling needs, objectives and schedule.

The Task Leader, Hieu Vu, is the primary point of contact with the EPA On-Scene Coordinator. The Task Leader is responsible for the completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks, including reporting and deliverables.

The Site QC Coordinator, ENSV QA/QC Branch, is responsible for recordinc any deviations from the approved Sampling QA/QC Plan.
The Site QC Coordinator is also the primary project team contact with the lab.

The following sampling personnel will work on this project:

Personnel	Responsibility
Tim J. Curry	On Scene Coordinator
Bob Wiggans	Drill rig operator
Hieu Vu	TAT Team Leader
TAT Team (6)	Sample collection/document

The following laboratories will be providing the following analyses:

Lab Name / Location	Lab Type	Parameters
U.S. EPA Region VII 25 Funston Rd. Kansas City, Ks. 66115	Govt.	All

6.0 QUALITY ASSURANCE REQUIREMENTS

The following requirements apply to the respective QA Objectives and parameters identified in Section 3.0:

The following QA Protocols for QA-3 data are applicable for all matrices and include:

1. Provide sample documentation in the form of field logbooks, the appropriate field data sheets and chain of custody forms. Chain of custody sheets are optional for field screening locations.

2. All instrument calibration and/or performance check procedures/methods will be summarized and documented in the field/personal or instrument log notebook.

3. The detection limit will be determined and recorded, along with the data, where appropriate.

4. Document sample holding times; this includes documentation of sample collection and analysis dates.

5. Provide initial and continuing instrument calibration data.

6a. For soil, sediment and water samples, include rinsate blanks and trip blanks.

6b. For air samples, field blanks, co-located samples, and surrogate/matrix spikes.

7. Performance Evaluation - samples are required, if available.

8. Non-definitive quantitation (choose one):

a. Screened data - provide documentation of quantitative results from both the screening method and the EPA-approved verification method.

b. Unscreened data - provide documentation of quantitative results.

7.0 DELIVERABLES

The Task Leader, Hieu Vu, will maintain contact with the EPA On-Scene Coordinator, Tim J. Curry, to keep him/her informed about the technical and financial progress of this project. This communication will commence with the issuance of the work assignment and project scoping meeting. Activities under this project will be reported in status and trip reports and other deliverables (e.g., analytical reports, final reports) described herein. Activities will also be summarized in appropriate format for inclusion in monthly and annual reports.

The following deliverables will be provided under this project:

Trip Report

A trip report will be prepared to provide a detailed accounting of what occurred during each sampling mobilization. A draft trip repor will be prepared within [two weeks] of the last day of each sampling mobilization. Information will be provided on time of major events, dates, and personnel on-site (including affiliations and phone numbers). The trip report will be organized into three major section: Background, Observations and Activities, and Conclusions and Recommendations (if appropriate). The report will be finalized within two weeks of the transmittal of laboratory analytical data results.

Maps/Figures

The following illustrations will be provided:

Maps will include the location of samples collected. Drawings, not to scale will be provided of the building sampling locations.

Analysis

This sampling event requires analytical services. Documentation of lab selection, raw data, or results will be provided in the analytical report. A summary of the analytical report will be included on the trip report.

Data Review

A review of the data generated under this plan will be undertaken. The assessment of data acceptability or useability will be conducted by the ENSV Lab Branch and provided separately, or as part of the analytical report.

Analytical Report

An analytical report will be prepared for samples analyzed under this plan. Information regarding the analytical methods/procedures employed, sample results, QA/QC results, chain-of-custody documentation, laboratory correspondence, and raw data will be provided within this deliverable.

8.0 DATA VALIDATION

QA 3

Data generated under this QA/QC Sampling Plan will be evaluated accordingly with appropriate criteria contained in Removal Program Data Validation Procedures which accompany OSWER Directive #9360.4-1.

Specific ddata review activities for QA 3 should be performed by the following tiered approach:

1.a. For any one data package, review all elements for 10% of samples.
   b. For remaining 90% of the samples within the same data package, review holding times, blank contamination, spike (surrogate/matrix) recovery, detection capability, and confirmed identification thoroughly.
2. For every tenth data package, review all data quality elements for all samples in each parameter category (i.e. VOA's and PCB's)

Kuhlman Diecasting
Figure 1-1 Site Location Map

See attached Maps & Figures

Kuhlman Diecasting
Figure 4-1 Sample Location Map

INORGANIC TARGET ANALYTE LIST (TAL)

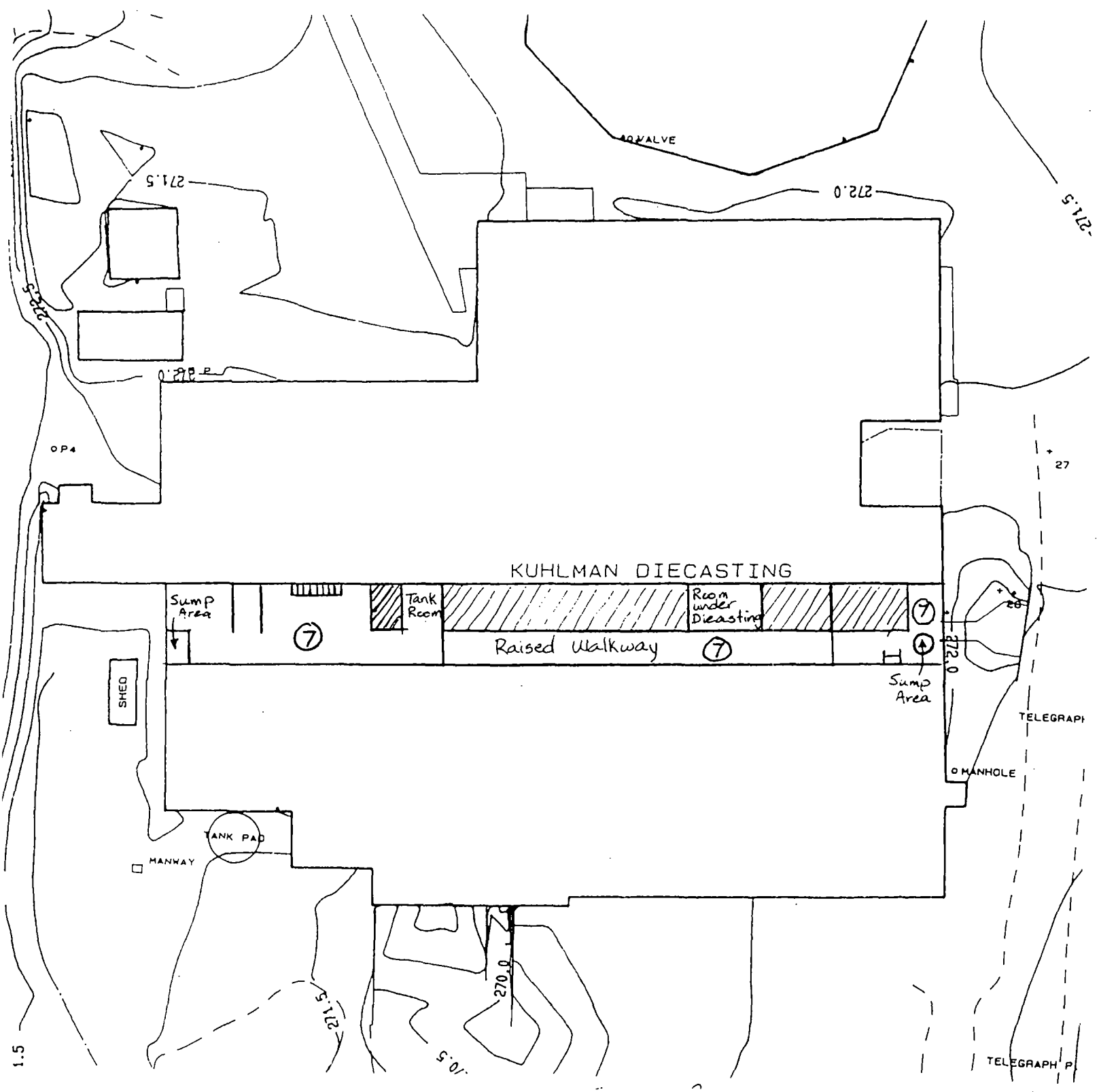
Analyte	Contract Required Detection Limit 1,2 (ug/L -- water*)
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadnium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

1 Subject to the restrictions specified in the first page of Part G. Section IV of Exhibit D (Alternate Methods - Catastrophic Failure) any analytical method specified in SOW Exhibit D may be utilized as long as the documented instrument or method detection limits meet the Contract Required Detection Limit (CRDL) requirements. Higher detection limits may only be used in the following circumstances:

If the sample concentration exceeds five times the detection limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the CRDL. This is illustrated in the example below:

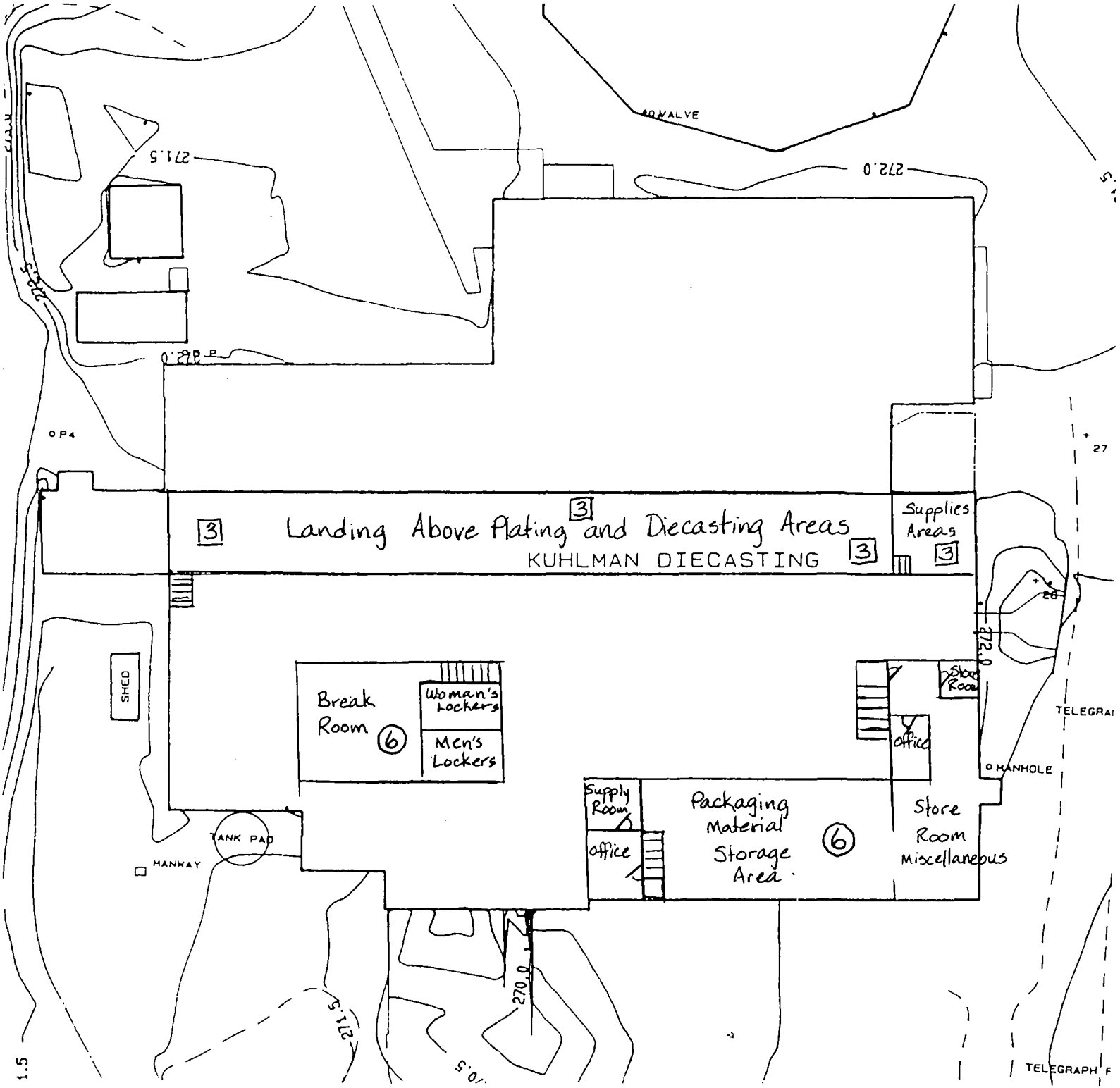
For lead:
Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample concentration = 220
Contract Required Detection Limit = 5

* Sediment detection limit 100x water



Basement of Kuhlman Bldg.

(#) - Concrete Sampling Areas


2nd Floor Layout
Kuhlman Bldg.
[#] - Sweep/Dust Sampling Areas
(#) - Concrete Sampling Areas
Landing Above Plating and Diecasting Areas
KUHLMAN DIECASTING
Supplies Areas
Break Room
Woman's Lockers
Men's Lockers
Supply Room
office
Packaging Material Storage Area
Store Room Miscellaneous
Stock Room
office
SHED
TANK PAD
MANHAY
MANHOLE
TELEGRAPH
N

APPENDIX B - QUALITY ASSURANCE SAMPLING PLAN, JUNE 24, 1992

QUALITY ASSURANCE SAMPLING PLAN
FOR
KUHLMAN DIECASTING CO. REMOVAL SITE - PHASE II
STANLEY, KANSAS

BY

ECOLOGY & ENVIRONMENT, INC.
TECHNICAL ASSISTANCE TEAM
TDD#: T07-9107-035C
PAN#: EKS0331FAA

JUNE 24, 1992

KUHLMAN DIECASTING CO. REMOVAL SITE - PHASE II
STANLEY, KANSAS
QUALITY ASSURANCE SAMPLING PLAN

I. INTRODUCTION

A. Site Location/Description

Kuhlman Diecasting Company (KDC) is located at 164th Street and Mission Road, near Stanley, Kansas. The 39-acre site is on a floodplain 2 miles east and 1.5 miles south of Stanley in Johnson County, in a meander of the Blue River. The defunct electroplating facility consists of a 130,000-square-foot, single-story, concrete-block building and an assortment of waste treatment lagoons, storage ponds and tanks. Electroplating operations at the site by Kuhlman Diecasting Company (KDC) began in 1962, after it had previously been used by an oil refiner.

Land use within 3-mile radius of the site includes residential, recreational, and agricultural. The nearest residences are approximately 1,000 feet northeast of the site and the Blue River is approximately 50 feet west of the site. It is believed that nearby residents are using a public water supply for drinking; however, information regarding the use of private wells (if any exist) for irrigation or any other purposes is unavailable.

B. Site History/Previous Investigation

In November 1990, Kuhlman Diecasting's owner filed a Chapter 11 bankruptcy petition, and the Environmental Protection Agency's Region VII Superfund Branch became involved with the site.

During its operations time, KDC was cited for a number of violations of the Resource Conservation and Recovery Act (RCRA) and NPDES related to waste management practices (e.g., wastewater operations, spillages, etc.).

On April 19, 1991, a fire was started at the defunct facility by a worker using a cutting torch during salvage of storage tanks. The local fire district responded and notified the Kansas Department of Health and Environment (KDHE), which asked for assistance from the EPA's Emergency Planning & Response (EP&R) Branch. On July 15, 1991, the U. S. EPA approved an action memorandum - Phase I - which included removal and stabilization of hazardous electroplating wastes remaining at the site.

Removal activities began July 22, 1991. In addition to more than 1,000 drums and other containers holding electroplating chemicals and wastes, approximately 284,000 gallons of wastewater

contaminated with cyanide and metals at levels above the NPDES discharge limits remained at the site. In general, wastes at the site included organics, inorganics, acids, and bases. The major portion of the waste streams was contaminated with metals and cyanide. The concentrations detected in some solution samples were 9,540,000 ug/l for chromium; 653,000 ug/l for hexavalent chromium; 28,000,000 ug/l for copper; 55,000,000 for nickel; 171,000 ug/l for lead; 2,690,000 ug/l for zinc; and 20,500 ug/l for cyanide. Other metals such as arsenic and cadmium were detected at trace levels.

During the removal - Phase I, approximately 900 drums/containers were bulked and treated on site; wastewater was treated and discharged into Blue River, in compliance with the site's NPDES permit; and wastes with high levels of contamination were transported off site to disposal facilities. Once all wastes have been removed from the site, the building's structures, floors, and walls were steam cleaned. In addition, indoor air quality was assessed, utilizing Hi-Vol air samplers.

At the conclusion of the removal - Phase I, multimedia samples were collected to determine whether further remediation of the site is required. These samples included subsurface soil samples at the presently capped lagoons on site, sediment samples at wastewater storage lagoons, and concrete chip samples of the building's floors and walls. The removal - Phase I was concluded on May 28, 1992.

II. OBJECTIVES

A. Objective of Removal Assessment - Phase II

Based on information collected during the Phase I removal action, in addition to several known spillages that have occurred on site, several presently capped lagoons and settling basins were used for F006 sludge storage during the diecasting operations. Metals and cyanide contained in the wastes may have contaminated surface soil, subsurface soil, and ground water. In addition, as previously described the facility was used for oil refinery operations prior to the electroplating operations; therefore, petroleum hydrocarbons may exist in the area's ground water.

The objective of the Removal Assessment - Phase II is to assess the surface soil, subsurface soil, and the area's ground water to determine the extent of the contamination and whether further remediation of the site is required.

B. Scope of Work

The objectives will be achieved by screening surface soil of the property for the above-mentioned metals, utilizing the Outokumpu X-Met 880 X-ray fluorescence (XRF) spectrophotometer, which is calibrated to a site-specific model. In addition, the Geoprobe and/or slam bar will be used to collect subsurface soil samples at points of special interest throughout the property (e.g. capped lagoon areas, spillage areas, settling basin areas, etc.). Where contamination is detected during the XRF survey, soil samples will be collected to provide quantitative analytical results. Twenty eight existing monitoring wells located throughout the property will be sampled for the contaminants of concern.

C. Data Quality Objectives

The QA objective for this project is to provide valid data of known and documented quality with confirmation laboratory analysis of field-screening results. Ground water and soil samples submitted to the EPA Laboratory for analysis will undergo a minimum of level 2 data review, as identified in the EPA Standard Operating Procedure (SOP) #1610.2A. The measurement method (field, analytical, and data reduction) for all samples submitted to EPA laboratory for analysis should give data with precision and accuracy for quality assurance level 2 (QA2) objectives in accordance with the Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures (OSWER Directive 9360.4-01, April 1990). This objective requires that the results of 10 percent of the samples reported in the analytical data package should be evaluated for all the elements listed in the QA2 requirements of the Sampling QA/QC Plan Directive. Definitive identification, quantitation, and analytical error will be determined by an EPA-approved method on 10 percent of all field-screened samples collected. Definitive identification, quantitation and analytical error will be determined on all unscreened samples.

Preparation of the XRF site-specific model was performed during the Phase I removal action, in accordance with the U.S. EPA/ERT SOP# 1707 (X-Met 880 Field Portable X-ray Fluorescence Operating Procedures). EPA accepts the XRF as a level 2 analytical method, according to the guidelines for Data Quality Objectives for Remedial Response Activities. The XRF field analysis and data validation will follow the quality assurance specified for QA2 for "Definitive Quantitation/Analytical Error" in OSWER Directive 9360.4-01, and the Removal Program: Representative Sampling Guidance, Vol. I: Soil, OSWER Directive 9360.4-10.

D. Action Levels

The site-specific action levels for soil and ground water have not been set for this site. Determination of action levels will be a collaborative decision among the Kansas Department of Health and Environment (KDHE), Agency of Toxic Substances and Diseases Registry (ATSDR), and EPA Region VII.

Analytical results of water samples will be evaluated against the removal action level (RAL) for each detected contaminant, if applicable.

The RAL values can be found from the U.S. EPA, Office of Solid Waste and Emergency Response, "Interim Final Guidance on Removal Action Levels at Contaminated Drinking Water Sites", OSWER Directive 9360.1-10, April 1991. It is noted that no usage of ground water in the vicinity of the site is known.

E. Target Detection Limits

The normal detection limits for total metals, EPA Method 6010, and cyanide, EPA Method 9010, will be adequate for soil samples. As previously mentioned, the XRF has been calibrated to a site-specific model, which can detect metals (i.e., chromium, copper, nickel) in soil at 100-200 parts per million (ppm).

The normal detection limits for total metals, EPA Method 6010, will be adequate for water samples, except for arsenic and lead. The metals will require analysis by the atomic absorption (AA) in order to achieve a detection level below their respective RALs. The normal detection limits for cyanide, EPA Method 9010, and total petroleum hydrocarbons, EPA Method 418.1 will be adequate for water samples.

III. PROPOSED FIELD ACTIVITIES

A. Sampling Rationale and Locations

1. Surface Sampling

The proposed study area is the Kuhlman's property, excluding the building, structures, and lagoons. The area to be assessed is approximately 22.5 acres in size. Earthen berms had been constructed around active areas during the diecasting operations (see Site Map). Based on past activities and site settings, the 22.5-acre site can be subdivided into eight separate areas (strata) listed below (refer to Site Sketch of Sampling Strata).

Each strata is more homogeneous than the site is a whole.

Different sampling approaches will be selected to address the different strata at the site.

Area 1: This 5.5-acre area is located immediately south of the southernmost berm, bordering Blue River to the south and west, and Mission Road to the east. Approximately 1.5 acres of this area consist of two capped lagoons and is overgrown with vegetation. Trees are sparse in the remaining 4-acre area. There are no records nor evidence indicating spillages or waste storage have occurred in the 4-acre wooded area.

Area 2: This area is located immediately east of the railroad tracks, bordering Mission Road to the east, residential area to the north, and the access road to the south.

The area is approximately 8 acres in size and consists of one 3-acre pond. The pond was constructed by Kuhlman in late 1980s. It was probably a borrow pit area for soils capping of old lagoons.

Area 3: This area is located in the northwest corner of the site, bordering two process water storage basins to the east, earthen berms to the west and north, and the on-site building to the south. The area is approximately 7.5 acres in size, including one 1.5-acre capped lagoon. There are also two former storage tank areas (each approximately 7,600 square feet and one had a concrete base), which were used for warehouse purposes.

Area 4: This area is located immediately north of the southernmost berm, bordering the gravel lot to the north, earthen berm to the west and the railroad tracks to the east. Approximately 1 acre of this 3-acre area consists of two sanitary sewage evaporation lagoons.

There is also two former storage tank areas (approximately 7,600 and 3,000 square feet), which were used for warehouse purposes and sludge storage.

Area 5: This area is located between the process water storage lagoons and the railroad tracks, extending from the northern edge of the building to the northernmost berm. This area is approximately 2 acres in size. No records indicate any usages of this area in the past.

Area 6: This area is the access road to the site from Mission Road. The area is approximately 1 acre in size. It is suspected that the road has been filled with gravel

numerous times. Migration of contaminants may have occurred on this road through vehicular traffic.

Area 7: This area is located west of the building and east of the east berm. The area is approximately 1 acre in size, including a one-half acre of settling basins and sheds, and a wastewater treatment plant. Spillages may have occurred on this area during shipping of plating materials in and out of the building through the east access door, and overflowing of waste liquids, etc.

Area 8: This area is the gravel lot, which is located immediately south of the building. The area is approximately 3 acres in size, including 2,400 square-foot paved loading docks. Spillages may have occurred on this area, as evidenced by stained spots on the paved concrete and gravel.

The areas that are targeted for sampling during this site assessment are summarized below. Other areas excluded in this site assessment were already assessed during the Phase I Removal Action.

Strata	Targeted Acreage	Other Acreage	Total Acreage
Area 1	1.5	4.0 (wooded area)	5.5
Area 2	5.0	3.0 (pond)	8.0
Area 3	7.5	---	7.5
Area 4	2.0	1.0 (sani. evap. lagoons)	3.0
Area 5	2.0	---	2.0
Area 6	0.6	---	0.6
Area 7	0.5	0.5 (WWTP basins/sheds)	1.0
Area 8	3.4	---	3.0
Building	---	3.0	3.4
Proc. Water Lagoons	---	5.0	5.0
Subtotal	22.5	16.5	39.0

Different sampling approaches will be utilized to address the surface contamination of each strata, which include:

Stratified Random Sampling: This approach places sample locations within each of the strata using random selection procedures (Ref. 1). Stratified random sampling is a useful and flexible design for estimating the pollutant concentration within an area of concern. There are no records indicating contamination has occurred at Area # 1, 2, 3, and 4. Furthermore, parts of Area # 3 and 4 are

covered with fill dirt. Area # 7 is likely to be more contaminated than the above four strata because plating materials have been shipped in and out of the building through this area. Stratified random sampling will be utilized to address surface contamination at the five strata. Ten random sampling locations will be selected for each acre sampled. The random locations will be pre-determined on the site map, in accordance with Reference #1. The number of random samples to be collected in Areas #1, 2, 3, 4, and 7 will be 15, 50, 75, 20, and 5, respectively. The XRF will be utilized to screen all samples for metals of concern.

Stratified Transect Sampling: This sampling involves establishing multiple parallel lines across the surface of each stratum. Surface samples will be collected at regular intervals along the transect lines (Ref. 1). This sampling approach is often used to delineate the extent of contamination and to define contaminant concentration gradients. It is also used, to a lesser extent, in compositing sampling schemes. There are no records indicating contamination has occurred at the long narrow Area # 5. This area is approximately 150 feet wide and 600 feet long. This sampling approach will be utilized to address contamination at this area. Two parallel lines 100 feet apart will be established along the length of this area. One composite sample will be collected at 100-foot intervals along each transect line for a total of 2 samples (6 aliquots each). The samples will be screened, utilizing the XRF, for metals of concern.

Area # 6 is the access road to the site; therefore, migration of contaminants via vehicle tracking may have occurred on this area during past operations. This sampling approach will be utilized to address the concentration gradients at this area. The area is approximately 30 feet wide and 900 feet long. Nine parallel lines 50 feet in from the edge and of 100 feet apart will be established across the access road. One composite sample comprised of two aliquots (20 feet apart and 5 feet in) will be collected on each transect line for a total of 9 samples. The samples will be screened, utilizing the XRF, for metals of concern.

95% UCL Sampling: This sampling approach will follow the EPA Region VII 95% UCL Sampling protocol. The sampling approach will be utilized to address contamination of Area #8, because this area is suspected to the most contaminated area of the site (e.g., spills, waste piles, etc.). It is estimated 30 grids will be established on the area. Three replicates will be collected in each grid for a total of 90 samples. The samples will be screened, utilizing the XRF, for metals of concern.

TABLE 1: SUMMARY OF SAMPLING STRATEGY AND NUMBER OF SAMPLES

Strata	Acreage	No. of Field Screening Samples	No. of Lab Samples	Sampling Approach
Area 1	1.5	15	2	Stratified Random Sampling
Area 2	5.0	50	5	"
Area 3	7.5	75	9*	"
Area 4	2.0	20	2	"
Area 7	0.5	5	1	"
Area 5	2.0	2	1	Stratified Transect Sampling
Area 6	0.6	9	1	"
Area 8	3.4	90	10*	95% UCL Sampling
Total	22.5	266	31	

* Including 1 duplicate sample

2. Subsurface Sampling

Based on the results of samples collected at capped lagoon areas during the Removal-Phase I, only the capped lagoon on the northwest corner of the site indicated the presence of contamination at levels of concern. Results of a soil sample collected at this lagoon at the 5-foot-to-7-foot depth is summarized below:

Sample Number	Chromium	Copper	Nickel	Zinc
BGGGK040	5,980	3,090	7,990	2,120
BGGGK041*	7,110	3,720	9,810	2,590

* Duplicate sample
Units are mg/kg

The lagoon area will be sampled to define the waste boundary under the surface. This can be accomplished by collecting samples from 5 to 7 feet deep and screening the samples for metals of concern, utilizing the XRF. Sample locations will be

established from the former sampling location of known concentrations. From this point, a systematic grid pattern (Ref. 1) will be established. The lagoon is estimated 1 acre in size, and it would take approximately 30 subsurface samples to define the waste boundary.

Subsurface contamination is suspected at the west side of Areas 4 and 7 because of known spills, which have occurred during past operations. Approximately 10 samples will be collected at these areas to determine the extent of contamination, utilizing the Geoprobe and the slam bar. The samples will be collected at various depth intervals from 0 - 12 inches or 4-6 feet depending on sampling locations. The judgmental sampling approach will be selected to determine sample locations, based on stained soil on the surface or topography.

In addition to the above subsurface sampling, one composite sample of 5 aliquots will be collected under the pavement of the loading dock, utilizing the Geoprobe, because spillages may have occurred on this dock during past plant operations.

3. Sediment Sampling

Based on results of samples collected at the on-site during the Removal Phase I, only the process water storage basin, north of the site, indicated the presence of contamination at or near levels of concern. The analytical results of the composite sample collected at the lagoon is summarized below:

Sample Number	Chromium	Copper	Nickel	Zinc
BGGGK006	1,020	1,970	156	986

Unit is in mg/kg

This basin was used to store process waters prior to treatment during past diecasting operations. The basin is approximately 150 feet wide and 300 feet long. The basin will be subdivided into 4 grids. Four sediment samples (9 aliquots each) will be collected from the basin. The sample points will be situated equidistant from the sides of each grid and each other (Ref. 1).

4. Ground Water

All 28 monitoring wells located on site will be sampled for the contaminants of concern. The sample results would be evaluated against the corresponding ~~MCLs or~~ RALs, if applicable.

B. Sampling Methods

1. Surface soil

As previously mentioned, approximately 266 surface samples will be screened for metals of concern, utilizing the XRF. The XRF will be applied In-situ for surface samples. In cases where sample points may occur in parking lots or on the gravel road, the sample will be sieved with the U.S.A. Standard Sieve # 10, before taking an XRF reading.

Soil samples will be collected from 10 percent of the above screened samples for laboratory confirmation for a total of 27 samples. The sample will be collected with a stainless-steel spoon, sieved, and homogenized in an aluminum pie pan. The samples will be placed in 8-ounce glass jars for transport to the laboratory. To prevent cross-contamination, samplers will wear new surgical gloves and use a new spoon and pie pan for each sample. The sieve will be decontaminated after each use.

2. Subsurface soil

As previously mentioned, approximately 40 subsurface samples will be collected at the northwest capped lagoon (30 samples) and Areas # 4 and 7 (10 samples). Ten percent of these samples will be collected for laboratory confirmation for a total of 4 samples. In addition, one composite sample will be collected at the loading dock and submitted for analysis.

The samples will be collected with a slam bar containing an acetate sleeve. Soil will be extruded from the sleeve at discrete increments, homogenized, and an XRF reading obtained.

For samples to be collected at depth (i.e. 5 to 7 feet), sampling procedures, utilizing the Geoprobe mounted on the back of a pickup truck, will follow the draft E & E SOP for "Geoprobe Operation" (revised draft, January, 1990). Each sample point will be collected by pushing an 8-inch sample tube with the 3-foot by 1-inch diameter steel rods into the ground, using the hydraulically driven Geoprobe, to desired sampling depth. After the sample tube is remotely activated with 1/4-inch extension rod, the sample tube is filled by driving it an additional 10- to 12-inches. The sample tube is returned to the surface and the soil extruded. The sample will be prepared; screened for metals of concern utilizing the XRF; and collected for submission to the laboratory, following the procedures mentioned above.

3. Sediment

A total of four sediment samples will be collected at the north process water storage basin. This is a concrete basin with approximately 12 inches deep of water. Each sample comprises nine aliquots and will be collected using a clean 5-gallon bucket. The bucket will be decontaminated after each sample is collected.

4. Ground Water

All 28 monitoring wells on site will be sampled utilizing the Waterra pump. A dedicated 1-inch polyethylene tube will be used for each well. The tube will be inserted into the well to its full depth, with a Waterra foot valve installed at the bottom of the tubing. After a water-level measurement is taken from a well, the tubing will be attached to a Waterra high-flow capacity (0 to 4 GPM) inertial pump, and approximately three well volumes will be purged from each well. In general, the stabilization of pH will be the most important indicator of adequate well purging.

Immediately after complete purging and recording field measurements (i.e., temperature, conductivity, and pH), a water sample will be collected directly into the sample containers. Ground water sampling procedures will follow the guidance "Compendium of ERT Ground Water Sampling Procedures", OSWER Directive EPA/540/P-91/007, January 1991. Purge and decontamination water will be directed into 55-gallon poly drums.

This water will be tested on site, using the Hach Spectrophotometer, for metals of concern to determine its disposition.

C. Decontamination Procedures

For the soil sampling spoons, pie pans, and gloves will be disposed of after each sample. The only equipment required to be decontaminated is the sieve. This sieve will be washed with an Alconox solution, followed by a tap water rinse and final deionized water rinse.

For the Geoprobe and slam bar sampling, each sample tube will be thoroughly decontaminated prior to use and after each sample. Decontamination of sampling tubes, and rods used for soil sampling will follow the above procedures.

The buckets used for sediment sampling will be thoroughly decontaminated before use and after each sample, following the above decontamination procedures.

The only equipment needing decontamination from sampling of monitoring wells will be the temperature and pH/conductivity meters. Decontamination of the probe and receptacle will consist of a distilled water rinse after each use.

All wastes derived on site, excluding purging and decontamination water, will be double-bagged in drum liners and properly disposed of as non-hazardous solid waste. The purging and decontamination water will be tested on site, utilizing the Hach Spectrophotometer. If the concentrations of metals of concern are below the NPDES limits, the water will be discharged

into the existing evaporation lagoons. Otherwise, a proper disposal method for disposal of the water will be arranged.

D. Sample Containers/Preservation/Holding Times

Sample containers, preservation, and holding times will be in accordance with the Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures (OSWER Directive 9360.4-01, April 1990).

E. Field Documentation/Sample Shipment/Chain-of-Custody

Field documentation, sample shipment, and chain-of-custody will be in accordance with EPA Region VII SOPs #2130.2A and #2130.3A "Field Chain-of-Custody for Environmental Samples", and "Identification, Documentation, and Tracking of Samples".

For soil and sediment samples, the time of collection, location, and sample depth will be recorded on each field sheet.

For water samples, the time of sample collection, location, available well log information, purging volumes, and field test results for temperature, conductivity, and pH will be recorded on each field sheet.

All samples will be packed in coolers, and a sampler will transport the samples to the EPA Region VII Lab.

F. Requested Analysis

The requested analysis for all soil, sediment, and water samples will be the aforementioned target compounds. An Analytical Services Request (ASR) form will be completed, to include at least 3 sampling media, and estimated date of delivery. The number of samples submitted will be dependent on on-site analytical results; however, it is not expected to exceed 75 samples. The possible number of samples is summarized as follows:

Media	# of Samples	Dup.	Rinsate	Field Blank	Back-ground	Total
Surface Soil	29	2			1	32
Subsurface	5	1	1			7
Sediment	4	1				5
Water	28	2		1		31
Subtotal	66	6	1	1	1	75

Soil samples will be analyzed for total arsenic, cadmium, chromium, copper, nickel, lead, zinc, and total cyanide. In addition to the above analyses, water samples will also be analyzed for total petroleum hydrocarbons.

The ASR will be submitted to the Laboratory Branch Chief upon approval of this sampling plan and prior to conducting sampling activity. Field sheets and tags will be produced using the Labor and Sample Tracking (LAST) computer program.

IV. LOGISTICS

A. Personnel Requirements

Six members of the Ecology & Environment, Inc. Technical Assistance Team (E & E/TAT), including the team leader, Hieu Vu, will be required to complete the field activities. The team will be subdivided into two groups: Group #1 will be responsible for soil sampling and sediment sampling, and Group #2 will be responsible for ground water sampling. Each group will keep a separate log book of field activities. There will be a main log book for the site, which will incorporate all site activities.

The EPA on-scene coordinator (OSC) will be Tim Curry.

B. Equipment Requirements

1. Personal Protective Equipment (PPE)

Level D, as described by the Agency's Standard Operating Safety Guides (November 1984) will be used by the field teams for most activities. Persons involved with sample collection and preparation (e.g., collecting samples, sieving samples, homogenizing samples) will be required to upgrade to level C.

Persons operating the Geoprobe will also be required to wear hearing protection, hard hats, and safety goggles. The PPE is itemized in the attached E & E Site Safety Plan (SSP) (Appendix A).

2. Decontamination Equipment

Decontamination equipment is itemized in the attached SSP (Appendix A). The PPE will be kept to a minimum. After use, PPE will be checked for contamination by visual inspection. After use all PPE will be rendered useless, double bagged, and disposed of appropriately.

3. Sampling Equipment

Soil, sediment, and ground water samples will be collected using equipment and methods previously described. All equipment is itemized in the attached SSP (Appendix A).

C. Schedule

Field mobilization will occur within one week after approval of this sampling plan, assuming approval of the ASR, availability of TAT members and the Geoprobe unit, and favorable weather for adequate operation of the Geoprobe and analytical equipment.

Field activities are expected to take no longer than four days.

Samples will be analyzed within 14 days after they are received by the laboratory. A report summarizing field activities and findings will be submitted by TAT to EPA within two weeks after receipt of all validated data.

D. Access

The EPA currently has access to the site.

E. Media/Public Inquiries

The property owner of the Kuhlman Diecasting Company has filed bankruptcy. All inquiries concerning the proposed assessment will be referred to the OSC or Region VII Office of Public Affairs for response.

V. ANALYTICAL METHODS

A. Analytical Procedures

Soil samples will be submitted to Region VII EPA Lab for total arsenic, cadmium, chromium, copper, nickel, lead, and zinc analysis by ICAP (EPA method 6010); and total cyanide (EPA Method 9010). The water samples submitted to the lab will also be analyzed for total petroleum hydrocarbons (MDNR Method 418.1).

B. Quality Control

The project's Quality Assurance (QA) program contains specific Quality Control (QC) practices designed to assess data precision and accuracy by detecting and measuring the degree of error in the measurement process. These QC practices include the use of field blanks (F), duplicates (D), performance evaluation (PE) samples, if available, and monitoring for contamination.

The number of QA/QC samples are previously mentioned in Section III.F. of this sampling plan. Laboratory quality control elements are included in Region VII SOP #1610.4A "Regional Laboratory Quality Control Policy".

Repeated field measurements utilizing the XRF and laboratory confirmation samples and PE samples, if available, will demonstrate precision and accuracy. A low chromium, copper, and nickel concentration will be read approximately each hour during the survey to establish instrument precision. Accuracy will be determined through the hourly measurement of a mid-range calibration sample. The laboratory confirmation samples will also be utilized to establish instrument's accuracy. In addition, a PE sample(s) will be taken, if available, and read twice each day to further determine instrument's accuracy.

C. Data Review, Validation, and Reporting

Data review, validation, and reporting procedures for samples submitted to the laboratory for analysis are included in SOP #1610.4A. For the XRF samples accuracy and precision values will be calculated and included with the report submitted under the Technical Directive Document tasking this assessment. In-situ readings will be recorded in the field and displayed in the same report.

ATTACHMENTS

Reference
Figure 1: Site Sketch of Sampling Strata
Figure 2: Site Survey Map
Analytical Services Request Form
Appendix A: E & E/TAT Site Safety Plan

REFERENCE

1. U.S. EPA, "Removal Program Representative Sampling Guidance - Volume 1: Soil", OSWER Directive 9360.4-10, November 1991.

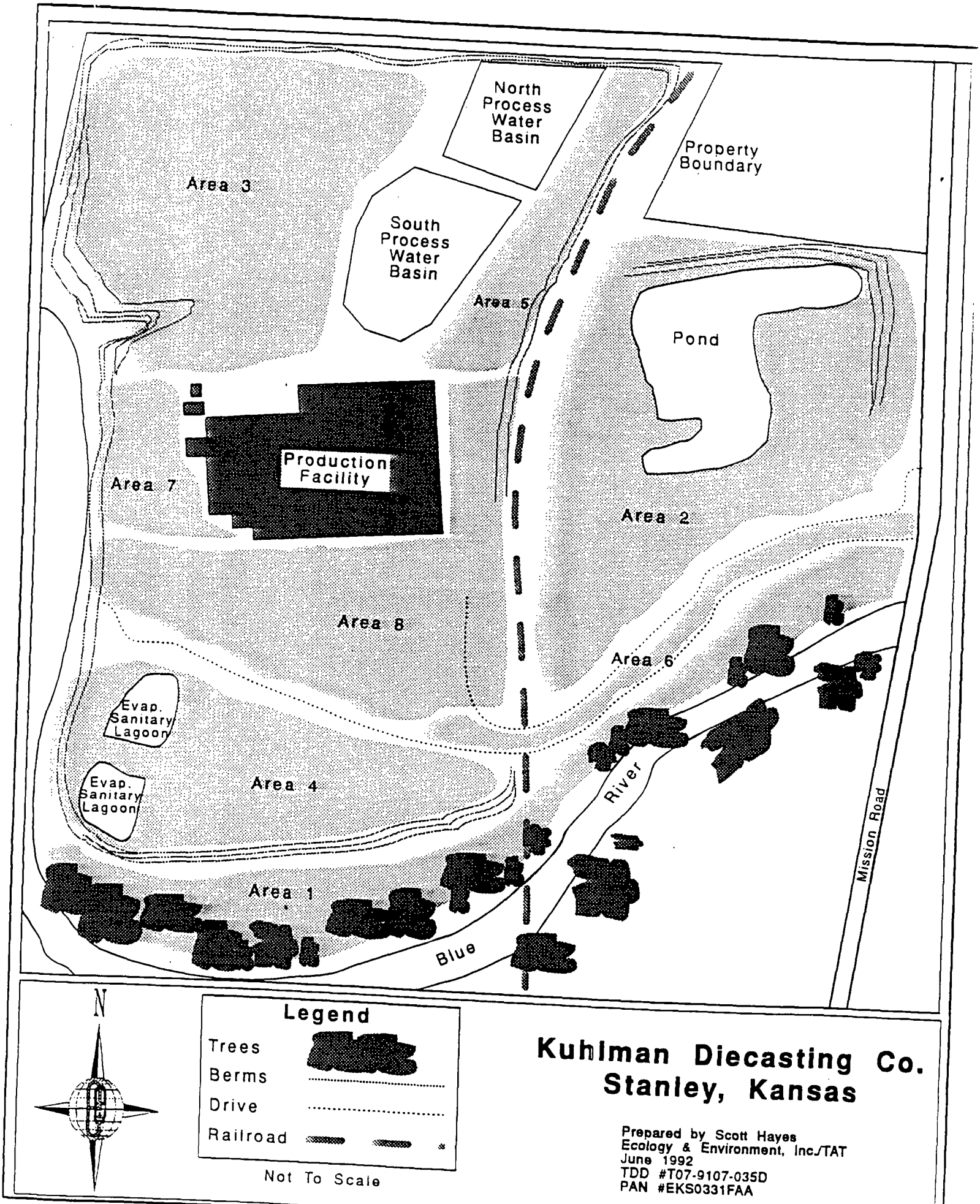


Figure 1: Site Sketch of Sampling Strata

US EPA REGION VII ANALYTICAL SERVICES REQUEST FORM

Activity Number: V BGNGK Date: V 6/29/92
Site Name, City, & State KUHLMAN DIECASTING CO, STANLEY, KS
EPA Project Leader: TIM CUARY
Section/Branch: ESD/EP&R Phone Number: 551-5017
Contractor Contact: HIEU VU
Contractor: E&E/TAT Phone Number: 432-9961
Projected Sample Delivery Date: ✓
Sampling Objective: REMOVAL ASSESSMENT

REQUEST SUMMARY

No. of Samples	MGP Code	Matrix	Parameters
34		SOIL	Total Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Zinc (ICAP 6010); Total Cyanide (EPA 9010)
5		SEDIMENT	SAME AS ABOVE
31		WATER	SAME AS ABOVE PLUS Total Petroleum Hydrocarbons

SPECIAL REQUIREMENTS OR COMMENTS

APPROVALS:

Tim J. Cuary 6/15/92
EPA Project Leader (Date)

DATA REVIEW OPTIONS:

☐ In-Depth (justification req'd.)
☒ Routine

Branch Chief or Section Chief (Date)

NOTE: SUBMIT TO RQAO/ENSV 30 DAYS PRIOR TO SAMPLE DELIVERY DATE

FOLLOWING TO BE COMPLETED BY ENVIRONMENTAL SERVICES DIVISION ONLY:

Concurrences: ☐ Generic ☐ Site Specific ☐ Other

RQAO _____ Comment: _____

LABO _____

Lab Assignment:
- ☐ Region VII _____
- ☐ CLP _____
- ☐ ESAT _____
- ☐ RECAP _____
- ☐ Other: _____

Scheduled Completion:
- ☐ Routine (In House: 4 weeks) (CLP: 8 weeks)
- ☐ Other: _____

Date: _____

Distribution:
- ☐ EPA Project Leader
- ☐ Chief, LABO/ENSV
- ☐ Chief, GNAN/LABO
- ☐ Chief, ORGN/LABO
- ☐ Chief, CLPM/LABO
- ☐ Data Coordinator
- ☐ RSCC
- ☐ EDSB
- ☐ EMCM
- ☐ EP&R Team Leader
- ☐ ESAT Team Leader
- ☐ Contractor: (above)
- ☐ Other: _____

NOTE: Sampling Supplies Request Form on Other Side

Form Revised 08/23/90

APPENDIX C - SUMMARY OF SAMPLES (PHASE II) SUBMITTED TO THE REGION VII EPA LABORATORY

SUMMARY OF LABORATORY SAMPLES

SAMPLE NO	LOCATION	COMMENTS
*********	********	********
** SAMPLE MEDIA 1. INTERIOR DUST SAMPLES		
BGGGK010	OFFICE BY THE POLISHING ROOM	COMPOSITE (~100 SQ FT) BOTH UPSTAIRS, DOWNSTAIRS
BGGGK017	EAST OFFICE	COMPOSITE (~100 SQ FT)
** SAMPLE MEDIA 2. INTERIOR CONCRETE SAMPLES		
BGGGK011	POLISHING ROOM	FLOOR COMPOSITE
BGGGK012	POLISHING ROOM	WALL COMPOSITE
BGGGK013	PACKAGING AND BREAK AREAS, 2ND FLOOR	FLOOR COMPOSITE
BGGGK014	PACKAGING AND BREAK AREAS, 2ND FLOOR	WALL COMPOSITE
BGGGK015	AREA #5: MICS. USAGE AREA	FLOOR COMPOSITE
BGGGK016	AREA #5: MISC. USAGE AREA	WALL COMPOSITE
BGGGK018	AREA #4: DRUMS STORAGE AREA	FLOOR COMPOSITE
BGGGK019	AREA #4: DRUMS STORAGE AREA	WALL COMPOSITE
BGGGK020	BASEMENT	FLOOR COMPOSITE
BGGGK021	BASEMENT	WALL COMPOSITE
BGGGK022	AREA #3: DIECASTING AREA	FLOOR COMPOSITE
BGGGK023	AREA #3: DIECASTING AREA	WALL COMPOSITE
BGGGK024	AREA #1: PLATING AREA	FLOOR COMPOSITE
BGGGK025	AREA #1: PLATING AREA	FLOOR (DUP) COMPOSITE
BGGGK026	AREA #1: PLATING AREA	WALL COMPOSITE
BGGGK027	AREA #1: PLATING AREA	WALL (DUP) COMPOSITE
BGGGK034	REDUCTION ZONE	FLOOR COMPOSITE
** SAMPLE MEDIA 3. INTERIOR AIR SAMPLES		
BGGGK028	SOUTH PLATING ROOM	CO-LOCATED WITH BGGGK029
BGGGK029	SOUTH PLATING ROOM	CO-LOCATED WITH BGGGK028
BGGGK030	EAST CONTAINERS STORAGE AREA	
BGGGK031	NORTH PLATING AREA	
BGGGK032	POLISHING ROOM	
BGGGK033F	FILTER BLANK	
** SAMPLE MEDIA 4. SEDIMENT SAMPLES		
BGGGK001	NORTH SANITARY WASTE LAGOON	COMPOSITE
BGGGK002	SOUTH SANITARY WASTE LAGOON	COMPOSITE
BGGGK003	SOUTH PROCESS WATER STORAGE BASIN	SOUTH SECTION COMPOSITE
BGGGK004	SOUTH PROCESS WATER STORAGE BASIN	NORTH SECTION COMPOSITE
BGGGK005	NORTH PROCESS WATER STORAGE BASIN	NORTH SECTION COMPOSITE
BGGGK006	NORTH PROCESS WATER STORAGE BASIN	SOUTH SECTION COMPOSITE
BGGGK007	EAST LAGOON	SOUTH SECTION COMPOSITE
BGGGK008	EAST LAGOON	SOUTH SECTION DUPLICATE COMPOSITE
BGGGK009	EAST LAGOON	NORTH SECTION COMPOSITE
BGKGK033	NORTH PROCESS WATER STORAGE BASIN	SW QUADRANT
BGKGK034	NORTH PROCESS WATER STORAGE BASIN	SE QUADRANT
BGKGK034D	NORTH PROCESS WATER STORAGE BASIN	DUPLICATE
BGKGK035	NORTH PROCESS WATER STORAGE BASIN	NW QUADRANT
BGKGK036	NORTH PROCESS WATER STORAGE BASIN	NE QUADRANT
** SAMPLE MEDIA 5. SUBSURFACE SOIL SAMPLES		
BGGGK035	CL1-01	DEPTH = 4.5'-6.5'. NO APPARENT CHANGE IN COLOR OF AUGER CUTTINGS WAS OBSV'D. OVA: 10-15 PPM > BKGD AT 6.5'. XRF: OR=120, CU=100, NI=260.

SUMMARY OF LABORATORY SAMPLES

SAMPLE NO	LOCATION	COMMENTS
BGGGK036	CL1-02	DEPTH = 7.5'-9.5'. NO APPARENT CHANGE IN COLOR OF AUGER CUTTINGS WAS OBSV'D. SOIL TEXTURE CHANGED AT 10'-12'. OVA: BKGD LEVEL. XRF: CR=120, CU=120, NI=280.
BGGGK037	CL2-01	DEPTH = 7.5'-9.5'. COLOR CHANGED FROM RED/BROWN TO GRAY/BLACK. OVA: BKGD. XRF: CR=70, CU=30, NI=180.
BGGGK038	CL2-02	DEPTH = 3.5'-5.0'. COLOR CHANGED FROM REDDISH BROWN TO DARK GRAY/BLACK AT 4'. OVA:BKGD LEVEL. XRF: CR=70, CU=50, NI=200.
BGGGK039	CL3-01	DEPTH = 6.0'-7.0'. NO APPARENT CHANGE IN COLOR OF AUGER CUTTINGS WAS OBSV'D. OVA: 7-9 PPM > BKGD AT 7'. XRF: CR=60, CU=20, NI=170.
BGGGK040	CL3-02	DEPTH = 5.0'-7.0'. A GREENISH POWDERY MATERIAL WAS OBSERVED AT 6.0'. XRF: CR=850, CU=1, NI=9,260.
BGGGK041	CL3-02	DEPTH = 5.0'-7.0'. DUPLICATE OF BGGGK040.
BGJGK021	CL3-05	DEPTH = 6.0'-7.0'.
BGJGK022	CL3-07	DEPTH = 7.0'-8.0'.
BGJGK022D	CL3-07	DEPTH = 7.0'-8.0' - DUPLICATE.
BGJGK024	CL3-08	DEPTH = 6.0'-7.0'.
BGJGK027	SS-09	DEPTH = 8"-20". AREA #7.
** SAMPLE MEDIA 6. SURFACE SOIL SAMPLES		
BGJGK001	1-14	AREA #1
BGJGK002	1-03	AREA #1
BGJGK003	2-08	AREA #2
BGJGK004	2-20	AREA #2
BGJGK005	2-29	AREA #2
BGJGK006	2-37	AREA #2
BGJGK007	2-48	AREA #2
BGJGK008	3-11	AREA #3
BGJGK009	3-23	AREA #3
BGJGK010	3-34	AREA #3
BGJGK011	3-37	AREA #3
BGJGK011D	3-37 D	AREA #3 - DUPLICATE.
BGJGK013	3-39	AREA #3
BGJGK014	3-52	AREA #3
BGJGK015	3-58	AREA #3
BGJGK016	3-69	AREA #3
BGJGK017	4-12	AREA #4
BGJGK018	4-16	AREA #4
BGJGK019	5-01	AREA #5
BGJGK020	5-02	AREA #5
BGJGK025	6-03	AREA #6
BGJGK026	7-03	AREA #7
BGJGK028	8-1S	AREA #8
BGJGK029	8-13N	AREA #8
BGJGK030	8-15N	AREA #8
BGJGK031	8-02N	AREA #8
BGJGK032	8-03N	AREA #8
BGJGK033	8-05N	AREA #8
BGJGK033D	8-05N D	AREA #8 - DUPLICATE.
BGJGK035	8-07N	AREA #8
BGJGK036	8-18N	AREA #8

SUMMARY OF LABORATORY SAMPLES

SAMPLE NO	LOCATION	COMMENTS
BGJGK037	8-19N	AREA #8
BGKGK037	MISSION RD & ACCESS RD	BACKGROUND 1 OF 8 REPLICATES
BGKGK038	MISSION RD & ACCESS RD	BACKGROUND 2 OF 8 REPLICATES
BGKGK039	MISSION RD & ACCESS RD	BACKGROUND 3 OF 8 REPLICATES
BGKGK040	MISSION RD & ACCESS RD	BACKGROUND 4 OF 8 REPLICATES
BGKGK041	MISSION RD & ACCESS RD	BACKGROUND 5 OF 8 REPLICATES
BGKGK042	MISSION RD & ACCESS RD	BACKGROUND 6 OF 8 REPLICATES
BGKGK043	MISSION RD & ACCESS RD	BACKGROUND 7 OF 8 REPLICATES
BGKGK044	MISSION RD & ACCESS RD	BACKGROUND 8 OF 8 REPLICATES
** SAMPLE MEDIA 7. WATER SAMPLES		
BGKGK001	WELL P2A	WELL P2A, PH=6.2, COND=771 OHMS/S
BGKGK002	WELL P2B	WELL P2B, PH=6.8, COND=512 OHMS/S
BGKGK003	WELL GM2	WELL GM2, PH=6.0, COND=643 OHMS/S
BGKGK004	WELL UNMK1	WELL UNMK1, PH=7.0, COND=628 OHMS/S
BGKGK005	WELL GM10	WELL GM10, PH=7.0, COND=621 OHMS/S
BGKGK006	WELL GM11	WELL GM11, PH=6.8, COND=1150 OHMS/S
BGKGK007	WELL P1B	WELL P1B, TEMP=70 DEG F, PH=7.14, COND=1196 OHMS/S
BGKGK008	WELL P1A	WELL P1A, TEMP=69 DEG F, COND=700 OHMS/S, PH=6.98
BGKGK009	WELL GM9	WELL GM9, TEMP=73 DEG F, PH=6.94, COND=827 OHMS/S
BGKGK010	WELL GM8	WELL GM8, TEMP=71 DEG F, PH=7.04, COND=603 OHMS/S
BGKGK011	WELL GM12	WELL GM12, TEMP=68 DEG F, COND=618 OHMS/S, PH=6.0
BGKGK012	WELL GM13	WELL GM13, TEMP=74 DEG F, COND=723 OHMS/S, PH=6.9
BGKGK013	WELL P5	WELL P5, TEMP=66 DEG F, COND=744 OHMS/S
BGKGK014	RINSATE	RINSATE OF BAILER
BGKGK015	WELL GM14	WELL GM14, TEMP=64 DEG F, COND=618 OHMS/S, PH=6.82
BGKGK015D	WELL GM14	WELL GM14, DUPLICATE OF BGKGK015
BGKGK016	WELL GMP4	WELL GM P4, TEMP=64 DEG F, COND=976 OHMS/S, PH=6.7
BGKGK017	WELL GM15	WELL GM15, TEMP=62 DEG F, COND=733 OHMS/S, PH=7.3
BGKGK018	WELL GM6	WELL GM6, TEMP=62 DEG F, PH=7.1, COND=956 OHMS/S
BGKGK018D	WELL GM6 D	DUPLICATE OF BGKGK018
BGKGK019	WELL P3B	WELL P3B, TEMP=64 DEG F, PH=7.1, COND=1185 OHMS/S
BGKGK020	WELL GM7	WELL GM7, TEMP=62 DEG F, PH=6.25, COND=864 OHMS/S
BGKGK021	WELL P6	WELL P6, TEMP=62 DEG F, COND=1308 OHMS/S, PH=6.27
BGKGK022	WELL GM4	WELL GM4, TEMP=66 DEG F, COND=1000 OHMS/S, PH=7.0
BGKGK023F	RINSATE	RINSATE
BGKGK024	WELL GM17	WELL GM17, TEMP=66 DEG F, COND=873 OHMS/S, PH=6.49, 1 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK025F	FIELD BLANK	FIELD BLANK
BGKGK026	WELL GM17	WELL GM17, 2 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK027	WELL GM17	WELL GM17, 3 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK028	WELL GM17	WELL GM17, 4 OF 8 REPLICATES (METALS AND CYANIDE ONLY)
BGKGK029	WELL GM17	WELL GM17, 5 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK030	WELL GM17	WELL GM17, 6 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK031	WELL GM17	WELL GM17, 7 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK032	WELL GM17	WELL GM17, 8 OF 8 REPLICATES (METALS AND CYANIDE ONLY).
BGKGK038F	RINSATE	FROM DECONNED SAMPLING EQUIP.

APPENDIX D - SUMMARY OF FIELD SCREENING XRF RESULTS

SUMMARY OF FIELD SCREENING XRF RESULTS
KUHLMAN DIECASTING COMPANY, STANLEY, KS.

LOCATION	CR	CU	NI	COMMENTS
********	**	**	**	********
1-01	50	70	120	
1-02	50	30	120	
1-03	80	20	110	SAMPLE #BGJGK002
1-04	100	0	170	
1-05	70	30	130	
1-06	50	60	120	
1-07	70	0	140	
1-08	90	0	170	
1-09	70	0	140	
1-10	60	10	130	
1-11	60	50	130	
1-12	70	10	140	
1-13	70	0	140	
1-14	70	0	140	SAMPLE #BGJGK001
1-15	50	20	130	
2-01	60	10	120	
2-02	60	0	120	
2-03	60	10	120	
2-04	60	0	120	
2-05	70	0	130	
2-06	90	0	150	
2-07	40	40	120	
2-08	70	40	140	SAMPLE #BGJGK003
2-09	60	50	130	
2-10	50	0	120	
2-11	70	0	130	
2-12	30	130	120	
2-13	80	0	140	
2-14	40	90	130	
2-15	30	100	120	
2-16	40	70	120	
2-17	70	0	140	
2-18	50	40	130	
2-19	70	0	140	
2-20	60	10	130	SAMPLE #BGJGK004
2-21	50	0	130	
2-22	70	10	140	
2-23	70	0	140	
2-24	30	40	120	
2-25	50	10	120	
2-26	50	20	120	
2-27	40	60	130	
2-28	70	0	140	
2-29	90	0	160	SAMPLE #BGJGK005
2-30	70	0	140	
2-31	60	60	130	
2-32	60	0	130	
2-33	50	10	130	

SUMMARY OF FIELD SCREENING XRF RESULTS
KUHLMAN DIECASTING COMPANY, STANLEY, KS.

LOCATION	CR	CU	NI	COMMENTS
2-34	60	0	130	
2-35	40	40	130	
2-36	40	50	120	
2-37	50	20	130	SAMPLE #BGJGK006
2-38	50	0	120	
2-39	20	90	130	
2-40	50	30	120	
2-41	90	0	150	
2-42	50	10	120	
2-43	50	0	130	
2-44	80	0	150	
2-45	50	10	130	
2-46	70	0	130	
2-47	60	0	120	
2-48	80	0	150	SAMPLE #BGJGK007
2-49	50	100	120	
2-50	50	40	120	
3-01	140	270	230	
3-02	180	340	290	
3-03	70	70	130	
3-04	50	50	120	
3-05	120	70	170	
3-06	90	30	110	
3-07	110	80	140	
3-08	180	0	400	
3-09	70	0	140	
3-10	70	0	130	
3-11	90	80	100	SAMPLE #BGJGK008
3-12	70	0	140	
3-13	60	130	110	
3-14	40	90	120	
3-15	70	100	120	
3-16	70	40	130	
3-17	80	20	130	
3-18	60	10	120	
3-19	60	20	130	
3-20	60	0	130	
3-21	80	0	150	
3-22	60	0	130	
3-23	50	0	130	SAMPLE #BGJGK009
3-24	50	40	120	
3-25	50	20	130	
3-26	50	0	120	
3-27	50	120	110	
3-28	50	60	120	
3-29	60	70	120	
3-30	30	70	120	
3-31	70	0	140	

SUMMARY OF FIELD SCREENING XRF RESULTS
KUHLMAN DIECASTING COMPANY, STANLEY, KS.

LOCATION	CR	CU	NI	COMMENTS
3-32	60	20	130	
3-33	60	70	120	
3-34	70	50	110	SAMPLE #BGJGK010
3-35	40	50	120	
3-36	30	14	120	
3-37	60	80	130	SAMPLE #BGJGK011
3-38	50	230	120	
3-39	20	2940	90	SAMPLE #BGJGK013 HIGH XRF READINGS
3-40	40	340	120	
3-41	70	0	130	
3-42	80	420	130	
3-43	50	1100	110	HIGH XRF READINGS
3-44	50	430	110	
3-45	160	340	270	
3-46	80	20	140	
3-47	60	0	130	
3-48	60	40	130	
3-49	70	0	140	
3-50	80	30	130	
3-51	90	30	160	
3-52	70	40	140	SAMPLE #BGJGK014
3-53	60	80	130	
3-54	40	0	120	
3-55	50	0	120	
3-56	80	40	140	
3-57	70	70	140	
3-58	400	1290	600	SAMPLE #BGJGK015 HIGH XRF READINGS
3-59	100	0	140	
3-60	90	0	120	
3-61	60	160	111	
3-62	170	0	210	
3-63	330	920	650	
3-64	270	640	510	
3-65	410	2520	2150	HIGH XRF READINGS
3-66	320	3130	920	HIGH XRF READINGS
3-67	1180	1040	45130	HIGH XRF READINGS
3-68	170	350	320	
3-69	480	3650	3670	SAMPLE #BGJGK016 HIGH XRF READINGS
3-70	130	150	210	
3-71	120	400	160	
3-72	110	170	120	
3-73	60	50	130	
3-74	80	30	140	
3-75	800	2000	4080	HIGH XRF READINGS
4-01	60	0	130	
4-02	70	0	140	
4-03	80	90	150	
4-04	70	0	140	

SUMMARY OF FIELD SCREENING XRF RESULTS
KUHLMAN DIECASTING COMPANY, STANLEY, KS.

LOCATION	CR	CU	NI	COMMENTS
********	**	**	**	********
4-05	80	110	150	
4-06	130	150	180	
4-07	70	0	140	
4-08	140	0	250	
4-09	70	0	140	
4-10	100	80	130	
4-11	70	0	130	SAMPLE #BGJGK017
4-12	170	240	260	
4-13	120	290	120	
4-14	80	200	110	
4-15	110	90	150	
4-16	170	70	250	SAMPLE #BGJGK018
4-17	70	40	120	
4-18	90	10	120	
4-19	90	0	140	
4-20	70	120	120	
5-01	70	80	120	SAMPLE #BGJGK019
5-02	110	0	110	SAMPLE #BGJGK020
6-01	90	10	150	
6-02	50	70	120	
6-03	40	140	120	SAMPLE #BGJGK025
6-04	50	110	120	
6-05	70	30	130	
6-06	80	40	140	
6-07	60	80	120	
6-08	60	200	120	
6-09	80	60	140	
7-01	50	90	100	
7-02	110	50	170	
7-03	350	380	1560	SAMPLE #BGJGK026 HIGH XRF READINGS
7-04	310	360	960	
7-05	130	50	180	
7-06	190	550	430	
7-07	60	140	120	
7-08	80	40	140	
7-09	770	800	6280	HIGH XRF READINGS
8-01	220	890	0	NORTH SAMPLE
8-01	320	1130	50	SOUTH SAMPLE
8-01	340	1090	170	WEST SAMPLE
8-02	210	130	170	NORTH SAMPLE
8-02	220	260	230	NORTH SAMPLE
8-03	180	290	300	NORTH SAMPLE
8-03	190	190	340	NORTH SAMPLE
8-04	70	140	110	NORTH SAMPLE
8-04	80	140	120	NORTH SAMPLE

SUMMARY OF FIELD SCREENING XRF RESULTS
KUHLMAN DIECASTING COMPANY, STANLEY, KS.

LOCATION	CR	CU	NI	COMMENTS
********	**	**	**	********
8-04	100	20	150	NORTH SAMPLE
8-05	50	80	110	NORTH SAMPLE
8-05	60	80	120	NORTH SAMPLE
8-05	50	100	110	NORTH SAMPLE
8-06	60	80	120	NORTH SAMPLE
8-06	90	20	130	NORTH SAMPLE
8-07	50	150	111	NORTH SAMPLE
8-07	70	80	120	NORTH SAMPLE
8-08	60	100	110	NORTH SAMPLE
8-08	80	90	120	NORTH SAMPLE
8-09	80	90	130	NORTH SAMPLE
8-09	50	160	120	NORTH SAMPLE
8-09	70	130	130	NORTH SAMPLE
8-10	100	90	120	NORTH SAMPLE
8-10	70	110	110	NORTH SAMPLE
8-11	70	140	110	NORTH SAMPLE
8-12	130	0	150	NORTH SAMPLE
8-13	120	40	150	NORTH SAMPLE
8-14	190	370	180	NORTH SAMPLE
8-14	170	360	160	SOUTH SAMPLE
8-14	230	140	370	WEST SAMPLE
8-15	60	90	190	NORTH SAMPLE
8-16	110	100	120	NORTH SAMPLE
8-16	120	40	140	NORTH SAMPLE
8-17	130	0	160	NORTH SAMPLE
8-17	140	100	180	NORTH SAMPLE
8-18	100	130	140	NORTH SAMPLE
8-18	140	20	200	NORTH SAMPLE
8-19	130	130	150	NORTH SAMPLE
8-19	170	150	260	NORTH SAMPLE
8-20	110	120	230	NORTH SAMPLE
8-21-1	60	120	130	30' N OF EVAP. LAGOON WEST OF FENCE
8-21-2	80	70	140	ACCESS ROAD, 25' N OF CENTER OF LAGOON FENCE
8-21-3	90	40	130	ROADWAY EAST END OF SECTION 21.
8-21-4	100	140	230	25' N. OF PT. 3
8-21-5	50	80	120	25' W. OF PT. 4
8-21-6	90	0	180	30' N. OF PT. 5
8-21-7	190	350	580	DRAINAGE DITCH, 25' E. OF PT. 6
8-21-8	200	340	590	DRAINAGE DITCH,20' N. OF PT. 7
8-21-9	80	90	140	ROADWAY 10' E. OF PT. 8
CL3-01	1070	2200	10210	.5" FR ORIGIN OF SAMPLE BGGG040. SAMPLE HAD GREEN PARTICLES W/RUST COLORED SOIL. DEPTH = 5-6.5.
CL3-01	60	100	130	BROWN SILTY CLAY, HIGH PLASTICITY. DEPTH = 8-9.5'.
CL3-02	70	90	130	30' NORTH OF CL-01. SOIL LIKE CL-01 - 8-9.5'. DEPTH = 5-6.5'.
CL3-02	0	0	0	COULD NOT GET PAST 7' ON TWO ATTEMPTS DUE TO REFUSAL. DEPTH 8-9.5'.
CL3-03	80	70	130	30' NORTH OF CL-02. BROWN DIRT. DEPTH 3-4.5'.
CL3-03	50	90	120	BROWN DIRT. DEPTH = 5-6.5'.
CL3-03	60	130	130	SILTY CLAY. DEPTH = 8-9.5'.

SUMMARY OF FIELD SCREENING XRF RESULTS
KUHLMAN DIECASTING COMPANY, STANLEY, KS.

LOCATION	CR	CU	NI	COMMENTS
CL3-04	90	160	160	20' W OF PT CL-01. BROWN DIRT. DEPTH = 3-4.5'.
CL3-04	480	970	1820	FEW GREEN PARTICLES - BLOCK MATERIAL, LOOKS LIKE FILL DIRT. DEPTH = 5-6.5'.
CL3-04	80	40	140	SILTY CLAY. DEPTH = 8.9.5'.
CL3-05	60	70	130	20' W OF PT CL-02. BROW DIRT. DEPTH = 3-4'.
CL3-05	50	160	120	BROWN DIRT. DEPTH = 5-6'. SAMPLE #BGJGK024.
CL3-05	100	80	170	BROWN DIRT. DEPTH = 6-7'.
CL3-05	90	30	150	BROWN DIRT. DEPTH = 7-8'.
CL3-05	90	20	150	BROWN DIRT, SOME GREY CLAY/SAND. DEPTH = 8-9'.
CL3-06	60	140	130	BROWN DIRT WITH SAMLL ROCKS (CHAT?), 20' SE OF CL-01.
CL3-06	50	90	120	BROWN SOIL WITH FINE RUST COLORED PARTICLES. DEPTH = 5-6'.
CL3-06	50	100	120	BROWN SOIL WITH GREY CLAY/SAND. DEPTH = 7-8'.
CL3-07	90	60	150	20' NW OF CL-01. BROWN DIRT. DEPTH = 3-4'.
CL3-07	60	70	130	BROWN SOIL. DEPTH = 5-6'.
CL3-07	1040	2140	13070	BROWN SOIL WITH SOME SMALL GREEN PARTICLES. DEPTH = 7-8'. SAMPLE #BGJGK022.
CL3-07	60	80	130	BROWN/BLACK MOTTLED SOIL. DEPTH = 9-10'.
CL3-08	60	110	120	20' NW OF CL-07, BROWN SOIL. DEPTH = 5-6'.
CL3-08	100	40	160	BROWN SOIL. DEPTH = 6-7'. SAMPLE #BGJGK024.
CL3-08	80	30	140	BROWN SOIL. DEPTH = 8-9'.
CL3-08	50	120	130	BROWN SOIL WITH CLAY. DEPTH = 8-9'.
SS-01	90	0	170	AREA #7. GREY SILTY CLAY. DEPTH = 10-11'.
SS-02	100	50	170	AREA #7. TOP SOIL COLLECTED WITH SHOVEL. DEPTH = 0-1'.
SS-03	150	20	300	AREA #7. LOOSE TOP SOIL. DEPTH = 2-3'.
SS-04	100	0	170	AREA #7. TOP SOIL WITH CLAY. DEPTH = 2-3'.
SS-05	80	20	140	AREA #4. BROWN SILTY CLAY. DEPTH = 4-5'.
SS-06	70	70	140	AREA #4. BROWN SILTY CLAY. DEPTH = 4-5'.
SS-07	30	130	120	AREA #4. BROWN SILTY CLAY. DEPTH = 3-4'.
SS-08	80	0	150	AREA #4. BROWN SILTY CLAY. DEPTH = 7-8'.
SS-09	140	140	240	AREA #7. TOP SOIL CHAT COLLECTED WITH SHOVEL. DEPTH = 6". SAMPLE #BGJGK027.
SS-10	100	0	180	LOADING DOCK

APPENDIX E - LABORATORY DATA TRANSMITTALS AND FIELD SHEETS

ANALYSIS REQUEST REPORT

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

FOR ACTIVITY: BGJGK

CURRY, T.

07/28/92 09:53:16

ALL REAL SAMPLES AND FIELD Q.C.

* LABO APPROVED

FY: 92 ACTIVITY: BGJGK DESCRIPTION: KUHLMAN DIECASTING LOCATION: STANLEY KANSAS

STATUS: ACTIVE TYPE: SAMPLING - IN HOUSE ANALYSIS PROJECT: A31

LABO DUE DATE IS 8/ 1/92. REPORT DUE DATE IS 7/ 2/93.

INSPECTION DATE: 7/ 2/92 ALL SAMPLES RECEIVED DATE: 07/02/92

ALL DATA APPROVED BY LABO DATE: 07/27/92 FINAL REPORT TRANSMITTED DATE: 00/00/00

EXPECTED LABO TURNAROUND TIME IS 30 DAYS EXPECTED REPORT TURNAROUND TIME IS 365 DAYS

ACTUAL LABO TURNAROUND TIME IS 25 DAYS ACTUAL REPORT TURNAROUND TIME IS 0 DAYS

SITE CODE: SITE:

SAMP. NO.	QCC	M	DESCRIPTION	SAMPLE STATUS	# CITY	STATE	AIRS/ STORET LOC NO	SECT	LAY-ER	BEG. DATE	BEG. TIME	END. DATE	END. TIME
001		S	AREA #1 - SCREENING SAMPLE #14	1	STANLEY	KANSAS				06/30/92	07:30	06/30/92	08:30
002		S	AREA #1 - SCREENING SAMPLE #3	1	STANLEY	KANSAS				06/30/92	07:30	06/30/92	08:30
003		S	AREA #2 - SCREENING SAMPLE #8	1	STANLEY	KANSAS				06/30/92	10:30	06/30/92	12:30
004		S	AREA #2 - SCREENING SAMPLE #20	1	STANLEY	KANSAS				06/30/92	10:30	06/30/92	12:30
005		S	AREA #2 - SCREENING SAMPLE #29	1	STANLEY	KANSAS				06/30/92	10:30	06/30/92	12:30
006		S	AREA #2 - SCREENING SAMPLE #37	1	STANLEY	KANSAS				06/30/92	10:30	06/30/92	12:30
007		S	AREA #2 - SCREENING SAMPLE #48	1	STANLEY	KANSAS				06/30/92	10:30	06/30/92	12:30
008		S	AREA #3 - SCREENING SAMPLE #11	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
009		S	AREA #3 - SCREENING SAMPLE #23	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
010		S	AREA #3 - SCREENING SAMPLE #34	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
011		S	AREA #3 - SCREENING SAMPLE #37	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
011	D	S	AREA #3 - SCREEN. SAMPLE #37/DUPLICATE	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
013		S	AREA #3 - SCREENING SAMPLE #39	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
014		S	AREA #3 - SCREENING SAMPLE #52	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
015		S	AREA #3 - SCREENING SAMPLE #58	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
016		S	AREA #3 - SCREENING SAMPLE #64	1	STANLEY	KANSAS				06/30/92	14:00	06/30/92	17:30
017		S	AREA #4 - SCREENING SAMPLE #12	1	STANLEY	KANSAS				06/30/92	08:30	06/30/92	10:30
018		S	AREA #4 - SCREENING SAMPLE #16	1	STANLEY	KANSAS				06/30/92	08:30	06/30/92	10:30
019		S	AREA #5 - SCREENING SAMPLE #1	1	STANLEY	KANSAS				06/30/92	13:30	06/30/92	14:00
020		S	AREA #5 - SCREENING SAMPLE #2	1	STANLEY	KANSAS				06/30/92	13:30	06/30/92	14:00
021		S	NORTH CAPPED LAGOON- LOCATION #5	1	STANLEY	KANSAS				06/30/92	15:00	06/30/92	17:30
022		S	NORTH CAPPED LAGOON - LOCATION #7	1	STANLEY	KANSAS				06/30/92	15:00	06/30/92	17:30
022	D	S	NORTH CAPPED LAGOON-LOCAL.#7/DUPLICATE	1	STANLEY	KANSAS				06/30/92	15:00	06/30/92	17:30

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

SAMP. NO.	QCC	M	DESCRIPTION	SAMPLE # STATUS	CITY	STATE	AIRS/ STORET LOC NO	SECT	LAY-ER	BEG. DATE	BEG. TIME	END. DATE	END. TIME
024		S	NORTH CAPPED LAGOON - LOCATION #8	1	STANLEY	KANSAS				06/30/92	15:00	06/30/92	17:30
025		S	AREA #6 - SCREENING SAMPLE #3	1	STANLEY	KANSAS				07/01/92	07:30	07/01/92	09:30
026		S	AREA #7 - SCREENING SAMPLE #1	1	STANLEY	KANSAS				07/01/92	10:30	07/01/92	11:00
027		S	SS-LOCATION #09	1	STANLEY	KANSAS				07/01/92	11:00	07/01/92	12:00
028		S	AREA #8 - GRID #1	1	STANLEY	KANSAS				07/01/92	14:30	07/01/92	15:30
029		S	AREA #8 - GRID #13	1	STANLEY	KANSAS				07/01/92	14:30	07/01/92	15:30
030		S	AREA #8 - GRID #15	1	STANLEY	KANSAS				07/01/92	14:00	07/01/92	15:30
031		S	AREA #8 - GRID #2	1	STANLEY	KANSAS				07/02/92	07:00	07/02/92	07:30
032		S	AREA #8 - GRID #3	1	STANLEY	KANSAS				07/02/92	07:30	07/02/92	07:45
033		S	AREA #8 - GRID #5	1	STANLEY	KANSAS				07/02/92	07:50	07/02/92	08:10
033	D	S	AREA #8 - GRID #5/DUPLICATE	1	STANLEY	KANSAS				07/02/92	07:50	07/02/92	08:10
035		S	AREA #8 - GRID #7	1	STANLEY	KANSAS				07/02/92	08:45	07/02/92	09:05
036		S	AREA #8 - GRID #18	1	STANLEY	KANSAS				07/02/92	09:00	07/02/92	09:20
037		S	AREA #8 - GRID #19	1	STANLEY	KANSAS				07/02/92	09:00	07/02/92	09:20
038	F	W	RINSATE SAMPLE FROM DECON. EQUIPMENT	1	STANLEY	KANSAS				07/01/92	11:00	07/01/92	12:00

EXPLANATION OF CODES AND INFORMATION ON ANALYSIS REQUEST DETAIL REPORT

SAMPLE INFORMATION:

SAMP. NO. = SAMPLE IDENTIFICATION NUMBER (A 3-DIGIT NUMBER WHICH IN COMBINATION WITH THE ACTIVITY NUMBER AND QCC, PROVIDES AN UNIQUE NUMBER FOR EACH SAMPLE FOR IDENTIFICATION PURPOSES)

QCC = QUALITY CONTROL CODE (A ONE-LETTER CODE USED TO DESIGNATE SPECIFIC QC SAMPLES. THIS FIELD WILL BE BLANK FOR ALL NON-QC OR ACTUAL SAMPLES):
- A = TRUE VALUE FOR CALIBRATION STANDARD
- B = CONCENTRATION RESULTING FROM DUPLICATE LAB SPIKE
- C = MEASURED VALUE FOR CALIBRATION STANDARD
- D = MEASURED VALUE FOR FILED DUPLICATE
- F = MEASURED VALUE FOR FIELD BLANK
- G = MEASURED VALUE FOR METHOD STANDARD
- H = TRUE VALUE FOR METHOD STANDARD
- K = CONCENTRATION RESULTING FROM DUPLICATE FIELD SPIKE
- L = MEASURED VALUE FOR LAB DUPLICATE
- M = MEASURED VALUE FOR LAB BLANK
- N = MEASURED VALUE FOR DUPLICATE FIELD SPIKE
- P = MEASURED VALUE FOR PERFORMANCE STANDARD
- R = CONCENTRATION RESULTING FROM LAB SPIKE
- S = MEASURED VALUE FOR LAB SPIKE
- T = TRUE VALUE OF PERFORMANCE STANDARD
- W = MEASURED VALUE FOR DUPLICATE LAB SPIKE
- Y = MEASURED VALUE FOR FIELD SPIKE
- Z = CONCENTRATION RESULTING FROM FIELD SPIKE

M = MEDIA CODE (A ONE-LETTER CODE DESIGNATING THE MEDIA OF THE SAMPLE):
- A = AIR
- H = OTHER (DOES NOT FIT ANY OTHER CATEGORY)
- S = SOLID (SOIL, SEDIMENT, SLUDGE)
- T = TISSUE (PLANT & ANIMAL)
- W = WATER (GROUND WATER, SURFACE WATER, WASTE WATER, DRINKING WATER)

DESCRIPTION = A SHORT DESCRIPTION OF THE LOCATION WHERE SAMPLE WAS COLLECTED

AIRS/STORET LOC. NO. = THE SPECIFIC LOCATION IDENTIFICATION NUMBER FOR EITHER OF THESE NATIONAL DATABASE SYSTEMS, AS APPROPRIATE

DATE/TIME INFORMATION = SPECIFIC INFORMATION REGARDING WHEN THE SAMPLE WAS COLLECTED
- BEG. DATE = DATE SAMPLING WAS STARTED
- BEG. TIME = TIME SAMPLING WAS STARTED
- END DATE = DATE SAMPLING WAS COMPLETED
- END TIME = TIME SAMPLING WAS COMPLETED
- NOTE: A GRAB SAMPLE WILL CONTAIN ONLY BEG. DATE/TIME
  A TIMED COMPOSITE SAMPLE WILL CONTAIN BOTH BEG AND END DATE/TIME TO DESIGNATE DURATION OF SAMPLE COLLECTION

OTHER CODES:
- V = VALIDATED

ANALYTICAL RESULTS/MEASUREMENTS INFORMATION:

COMPOUND = MGP (MEDIA-GROUP-PARAMETER) CODE AND NAME OF THE MEASURED CONSTITUENT OR CHARACTERISTIC OF EACH SAMPLE

UNITS = SPECIFIC UNITS IN WHICH RESULTS ARE REPORTED:
- C = CENTIGRADE (CELSIUS) DEGREES
- CFS = CUBIC FEET PER SECOND
- GPM = GALLONS PER MINUTE
- IN = INCHES
- I.D. = SPECIES IDENTIFICATION
- KG = KILOGRAM
- L = LITER
- LB = POUNDS
- MG = MILLIGRAMS (1 X 10-3 GRAMS)
- MGD = MILLION GALLONS PER DAY
- MPH = MILES PER HOUR
- MV = MILLIVOLT
- M/F = MALE/FEMALE
- M2 = SQUARE METER
- M3 = CUBIC METER
- NA = NOT APPLICABLE
- NG = NANOGRAMS (1 X 10-9 GRAMS)
- NTU = NEPHELOMETRIC TURBIDITY UNITS
- PC/L = PICO (1 X 10-12) CURRIES PER LITER
- PG = PICOGRAMS (1 X 10-12 GRAMS)
- P/CM2 = PICOGRAMS PER SQUARE CENTIMETER
- SCM = STANDARD CUBIC METER (1 ATM, 25 C)
- SQ FT = SQUARE FEET
- SU = STANDARD UNITS (PH)
- UG = MICROGRAMS (1 X 10-6 GRAMS)
- UMHOS = MICROMHOS/CM (CONDUCTIVITY UNITS)
- U/CC2 = MICROGRAMS PER 100 SQUARE CENTIMETERS
- U/CM2 = MICROGRAMS PER SQUARE CENTIMETER
- 1000G = 1000 GALLONS
- +/- = POSITIVE/NEGATIVE
- # = NUMBER

DATA QUALIFIERS = SPECIFIC CODES USED IN CONJUNCTION WITH DATA VALUES TO PROVIDE ADDITIONAL INFORMATION ON THE REPORTED RESULTS, OR USED TO EXPLAIN THE ABSENCE OF A SPCIFIC VALUE:
- BLANK = IF FIELD IS BLANK, NO REMARKS OR QUALIFIERS ARE PERTINENT. FOR FINAL REPORTED DATA, THIS MEANS THAT THE VALUES HAVE BEEN REVIEWED AND FOUND TO BE ACCEPTABLE FOR USE.
- I = INVALID SAMPLE/DATA - VALUE NOT REPORTED
- J = DATA REPORTED BUT NOT VALID BY APPROVED QC PROCEDURES
- K = ACTUAL VALUE OF SAMPLE IS < VALUE REPORTED
- L = ACTUAL VALUE OF SAMPLE IS > VALUE REPORTED
- M = DETECTED BUT BELOW THE LEVEL OF REPORTED VALUE FOR ACCURATE QUANTIFICATION
- O = PARAMETER NOT ANALYZED
- U = ACTUAL VALUE OF SAMPLE IS < THE MEASUREMENT DETECTION LIMIT (REPORTED VALUE)

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	001	002	003	004	005
SG07 SOLIDS, PERCENT	%	82.0	83.9	90.3	93.3	91.4
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	11.6	10.0 U	12.6	10.0 U	11.5
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	1.1	1.4	0.9	0.8	0.8
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	39.3	24.3	14.8	12.1	15.3
SM09 COPPER, TOTAL, BY ICAP	MG/KG	28.8	45.7	15.1	11.5	13.5
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	41.1	70.3	15.7	15.0	13.8
SM14 LEAD, TOTAL, BY ICAP	MG/KG	19.8	33.4	16.5	16.4	17.5
SM20 ZINC, TOTAL, BY ICAP	MG/KG	65.6	1380	59.8	43.7	55.8
ST09 CYANIDE, TOTAL	MG/KG	2.00	0.963	0.599	0.418	0.315
ZZ01 SAMPLE NUMBER	NA	001	002	003	004	005
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	006	007	008	009	010
SG07 SOLIDS, PERCENT	%	87.0	93.3	92.8	78.7	87.1
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	10.0	11.0	12.8	13.8	10.1
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	1.1	1.5	1.2	0.9	1.8
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	12.2	13.0	66.2	16.5	57.6
SM09 COPPER, TOTAL, BY ICAP	MG/KG	14.8	19.3	78.5	18.4	77.9
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	16.8	20.0	139	18.0	53.1
SM14 LEAD, TOTAL, BY ICAP	MG/KG	25.8	30.8	39.8	24.3	74.6
SM20 ZINC, TOTAL, BY ICAP	MG/KG	117	321	1860	92.6	762
ST09 CYANIDE, TOTAL	MG/KG	0.488	0.380	0.640	0.195	0.450
ZZ01 SAMPLE NUMBER	NA	006	007	008	009	010
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	011	011D	013	014	015
SG07 SOLIDS, PERCENT	%	86.6	86.6	89.6	94.8	92.4
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	12.9	10.0	14.5	12.6	25.3
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	0.9	0.9	2.4	1.0	3.8
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	191	200	1520	48.5	343
SM09 COPPER, TOTAL, BY ICAP	MG/KG	192	188	5280	45.2	1130
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	16.9	15.7	80.7	70.0	886
SM14 LEAD, TOTAL, BY ICAP	MG/KG	42.4	41.7	52.4	24.0	303
SM20 ZINC, TOTAL, BY ICAP	MG/KG	151	144	468	219	32100
ST09 CYANIDE, TOTAL	MG/KG	0.300	0.226	0.396	0.150 U	2.42
ZZ01 SAMPLE NUMBER	NA	011	011	013	014	015
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	016	017	018	019	020
SG07 SOLIDS, PERCENT	%	69.0	83.4	85.5	94.7	86.8
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	30.0	16.4	18.2	18.4	16.7
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	8.9	2.0	2.6	15.9	2.1
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	2390	670	281	13.2	29.1
SM09 COPPER, TOTAL, BY ICAP	MG/KG	3850	201	116	41.5	62.8
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	4370	448	331	23.8	45.5
SM14 LEAD, TOTAL, BY ICAP	MG/KG	692	78.9	104	178	71.2
SM20 ZINC, TOTAL, BY ICAP	MG/KG	5550	2280	3050	2950	855
ST09 CYANIDE, TOTAL	MG/KG	6.29	0.555	0.276	0.150 U	0.595
ZZ01 SAMPLE NUMBER	NA	016	017	018	019	020
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	021	022	022D	024	025
SG07 SOLIDS, PERCENT	%	82.4	75.2	73.6	82.8	99.1
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	26.2	31.3	32.4	21.8	10.0 U
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	0.8	0.9	0.6	0.9	0.8
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	17.7	2250	3000	46.8	4.8
SM09 COPPER, TOTAL, BY ICAP	MG/KG	15.1	1230	1770	33.2	8.6
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	16.5	3130	4120	59.0	7.3
SM14 LEAD, TOTAL, BY ICAP	MG/KG	15.1	24.4	32.6	54.4	5.8
SM20 ZINC, TOTAL, BY ICAP	MG/KG	59.9	797	1080	176	530
ST09 CYANIDE, TOTAL	MG/KG	0.150 U	0.259	0.208	0.279	0.300 U
ZZ01 SAMPLE NUMBER	NA	021	022	022	024	025
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	026	027	028	029	030
SG07 SOLIDS, PERCENT	%	92.8	86.6	96.5	99.6	99.8
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	17.4	19.2	19.9	10.0 U	10.0 U
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	2.9	0.9	6.6	1.5	2.5
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	381	13.1	179	41.2	65.2
SM09 COPPER, TOTAL, BY ICAP	MG/KG	378	16.9	193	67.6	136
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	1400	18.1	116	150	126
SM14 LEAD, TOTAL, BY ICAP	MG/KG	109	20.8	158	37.7	64.1
SM20 ZINC, TOTAL, BY ICAP	MG/KG	3110	79.7	23500	5140	8140
ST09 CYANIDE, TOTAL	MG/KG	3.47	0.178	1.46	0.192	0.338
ZZ01 SAMPLE NUMBER	NA	026	027	028	029	030
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	031	032	033	033D	035
SG07 SOLIDS, PERCENT	%	96.9	95.3	98.5	98.1	96.3
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	18.6	18.3	10.0 U	10.0 U	14.9
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	7.6	6.6	2.7	2.4	4.2
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	695	526	48.1	66.5	12.6
SM09 COPPER, TOTAL, BY ICAP	MG/KG	177	186	39.9	47.3	27.8
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	190	375	57.3	77.0	43.8
SM14 LEAD, TOTAL, BY ICAP	MG/KG	219	162	48.7	45.6	55.7
SM20 ZINC, TOTAL, BY ICAP	MG/KG	8790	2750	1040	1670	1900
ST09 CYANIDE, TOTAL	MG/KG	1.75	8.91	0.697	0.957	0.153
ZZ01 SAMPLE NUMBER	NA	031	032	033	033	035
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK	BGJGK	BGJGK

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 2-BGJGK

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

COMPOUND	UNITS	036	037	038F			
SG07 SOLIDS, PERCENT	%	95.5	94.5				
SM03 ARSENIC, TOTAL, BY ICAP	MG/KG	11.0	10.0	U			
SM06 CADMIUM, TOTAL, BY ICAP	MG/KG	1.5	2.00				
SM08 CHROMIUM, TOTAL, BY ICAP	MG/KG	136	135				
SM09 COPPER, TOTAL, BY ICAP	MG/KG	130	246				
SM13 NICKEL, TOTAL, BY ICAP	MG/KG	157	311				
SM14 LEAD, TOTAL, BY ICAP	MG/KG	208	281				
SM20 ZINC, TOTAL, BY ICAP	MG/KG	4330	3740				
ST09 CYANIDE, TOTAL	MG/KG	0.156	1.81				
WM03 ARSENIC, TOTAL, BY ICAP	UG/L			50.0	U		
WM06 CADMIUM, TOTAL, BY ICAP	UG/L			5.00	U		
WM08 CHROMIUM, TOTAL, BY ICAP	UG/L			10.0	U		
WM09 COPPER, TOTAL, BY ICAP	UG/L			10.0	U		
WM13 NICKEL, TOTAL, BY ICAP	UG/L			20.0	U		
WM14 LEAD, TOTAL, BY ICAP	UG/L			50.0	U		
WM20 ZINC, TOTAL, BY ICAP	UG/L			20.0	U		
WT09 CYANIDE, TOTAL	MG/L			0.003	U		
ZZ01 SAMPLE NUMBER	NA	036	037	038			
ZZ02 ACTIVITY CODE	NA	BGJGK	BGJGK	BGJGK			

LABORATORY APPROVED DATA
PROJECT LEADER APPROVAL PENDING

ACTIVITY BGJGK KUHLMAN DIECASTING

THE PROJECT LEADER SHOULD CIRCLE ONE - STORET, AIRS, OR ARCHIVE.

CIRCLE ONE: STORET AIRS ARCHIVE

DATA APPROVED BY LABO FOR TRANSMISSION TO PROJECT LEADER ON 07/28/92 09:53:16 BY _____.