

**FINAL**

**FORMER NATIONAL ZINC SITE  
BROWNFIELDS TARGETED ASSESSMENT (BTA)  
VOLUME V of V  
APPENDIX H-M  
KDHE Identification Number: C3-063-0026  
EPA Identification Number (CERCLIS): KSD980406698**



**Kansas Department of Health and Environment  
Bureau of Environmental Remediation  
Remedial Section/Site Assessment Unit  
Forbes Field, Building 740  
Topeka, Kansas 66620**

**February, 2000**

**BER SCANNED**

**JUL 30 2013**

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**FORMER NATIONAL ZINC SITE**  
**BROWNFIELDS TARGETED ASSESSMENT (BTA)**

**KDHE Identification Number**  
**C3-063-0026**

**February, 2000**

**KDHE/BER Site Assessment Project Manager:**

Randolph L. Brown, Environmental Geologist

**Site Reconnaissance and Field Activities:**

Randolph L. Brown, Environmental Geologist  
Farrell Dallen, Environmental Scientist  
Laura Rand, Environmental Scientist  
Jeff Neel, Environmental Scientist  
Tom Jones, Environmental Geologist  
John Cregan, Environmental Technician  
James Peterson, Environmental Technician  
Mike LaBuda, Environmental Technician

**Data Validation by:**

Travis Kogl, Environmental Geologist

**NATIONAL ZINC SITE  
CHERRYVALE, KANSAS**

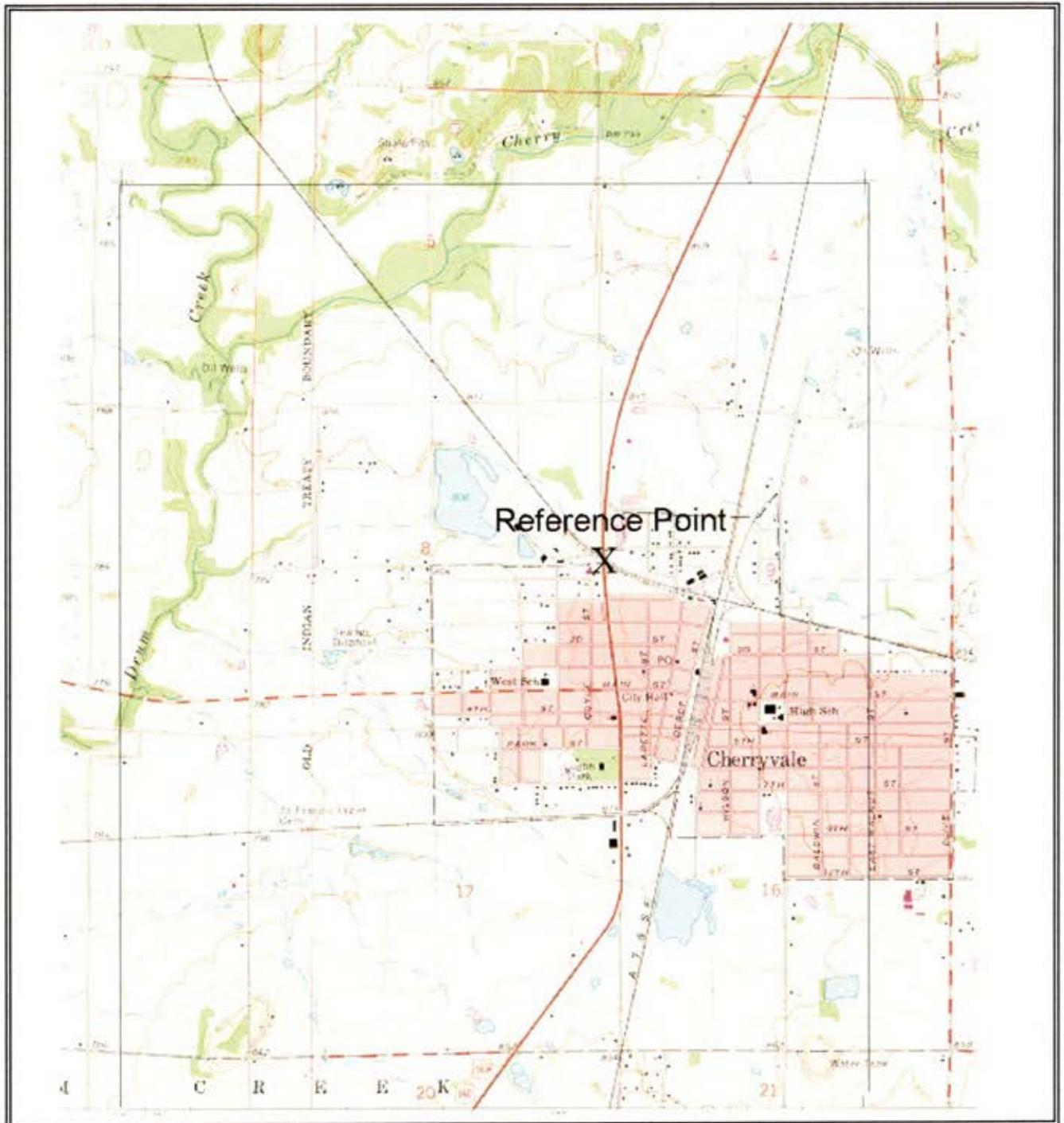
**APPENDIX H**

**Latitude/Longitude Worksheet**

# LATITUDE/LONGITUDE DOCUMENT RECORD FORM

SITE NAME: National Zinc

CERCLIS NUMBER: KSD980406698



TOPOGRAPHIC MAP QUADRANGLE NAME: Cherryvale, Kansas

SCALE: 1:24000

COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5 MINUTE GRID

LATITUDE: 37° 15' 00"

LONGITUDE: 95° 32' 30"

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #1  
 LI USING CUSTOM RULER OR COORDINATOR™

SITE NAME: National ZINC BTA Site CERCLIS #: KSD980406698  
 AKA: \_\_\_\_\_ SSID: \_\_\_\_\_  
 ADDRESS: R 17E T 32 S Sect. 8 NE  
 CITY: Cherryvale STATE: KS ZIP CODE: 67335  
 SITE REFERENCE POINT: Intersection of Railroad and Highway 169  
 USGS QUAD MAP NAME: Cherryvale , Kans. TOWNSHIP: 32 S. RANGE: 17 E.  
 SCALE: 1:24,000 MAP DATE: 1962 SECTION 8 NE 1/4 1/4 1/4  
 MAP DATUM: 1929 PHOTOREVISED: 1979 MERIDIAN: 6TH PRIME

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 95 ° 30' 00" LATITUDE: 37° 15' 00 "

COORDINATES FORM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 95° 32' 30 " LATITUDE: 37 ° 15' 00 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) ALIGN THE BOTTOM OF THE SCALE WITH BOTTOM OF GRID. ALIGN THE TOP OF THE SCALE WIT THE TOP OF THE GIRD. POSITION EDGE OF RULER OVER SITE REFERENCE POINT WHILE KEEPING TOP AND BOTTOM ALIGNED.

B) READ TICS ON RULER AT 1- OR 0.5-SECOND INTERVALS (INTERPOLATE).

C) EXPRESS IN MINUTES AND SECONDS (1' = 60"): 01' 27 . 5"

D) ADD TO STARTING LATITUDE: 37° 15' 00 . 0" + 01' 27 . 5" =

SITE LATITUDE: 37 ° 16' 27 . 5 "
----------------------------------

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) ALIGN THE BOTTOM OF THE SCALE WITH RIGHT SIDE OF GRID. ALIGN THE TOP OF THE SCALE WITH THE LEFT SIDE OF GRID. POSITION EDGE OF RULER OVER SITE REFERENCE POINT WHILE KEEPING TOP AND BOTTOM ALIGNED.

B) READ TICS ON RULER AT 1- OR 0.5-SECOND INTERVALS. (INTERPOLATE).

C) EXPRESS IN MINUTES AND SECONDS (1' = 60"): 0' 53 . 00"

D) ADD TO STARTING LONGITUDE: 95° 32' 30 . 0 " + 00 ' 53 . 0" =

SITE LONGITUDE: 95° 33' 23 . 0"
---------------------------------

INVESTIGATOR: \_\_\_\_\_ DATE: December 30, 1999

**NATIONAL ZINC SITE  
CHERRYVALE, KANSAS**

**APPENDIX I**

**Well Logs and Well Development Information**

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT  
BUREAU OF ENVIRONMENTAL REMEDIATION

MEMORANDUM

**DATE:** September 28, 1999  
**TO:** Randy Brown (Project Manager)  
**FROM:** John Cregan (Technician)  
**SUBJECT:** Natl. Zinc (Cherryvale)

On August 24, 1999 Brian Conrad and I drove to Natl. Zinc in Cherryvale, Ks. to develop, purge and sample nine (9) temporary wells. The wells had been installed by KDHE August 16<sup>th</sup> thru 19<sup>th</sup>. A minimum of three well volumes was purged from each well that had enough water in it. Calculations of purge volumes were based on the bore hole diameter, measurements of the static water level and measurements of the total depth of the well. The temperature, pH, conductivity and salinity of the purged ground water were ran until the parameters reached stabilization. Purge water was disposed of on the ground for all monitoring wells.

We sampled for heavy metals and cyanide. Samples were iced and brought back to our KDHE lab. for analyzing. We sampled temporary wells TW-1 thru TW-5 and TW-9. TW-6 thru TW-8 were dry. TW-4 bailed dry after 1 gallon of purge. We had to leave it overnight to hopefully recharge. The next morning we managed to get enough water for a sample and a parameter sample. All metals samples were filtered in the field before returning to the lab.

Page 2 shows the water parameters on the wells.

**Table 1 Water parameters for wells sampled**

Well	Date	Time	Vol. Purged (gal)	Temp. (C)	pH	Cond. (uS/cm)	Sp. Cond. (uS/cm)	Salinity (ppT)
TW-1	08/25/99	1050	4.5	21.8	6.57	990	1063	0.5
TW-1	08/25/99	1105	6.5	22.4	6.60	983	1046	0.5
TW-1	08/25/99	1115	8.0	22.1	6.59	979	1043	0.5
TW-2	08/25/99	905	5.0	20.9	6.42	5730	6200	3.4
TW-2	08/25/99	910	7.0	21.7	6.42	5640	6040	3.3
TW-2	08/25/99	920	8.0	20.9	6.48	5720	6200	3.4
TW-2	08/25/99	940	14.0	22.1	6.39	5710	6120	3.3
TW-3	08/24/99	1555	4.0	26.5	4.66	9100	8960	5.1
TW-3	08/24/99	1600	5.5	23.6	4.78	9210	9380	5.3
TW-3	08/24/99	1605	6.5	23.0	4.75	9090	9460	5.3
TW-4	08/25/99	1145	0.0	28.0	6.22	3950	3785	2.0
TW-5	08/24/99	1330	8.0	20.0	6.30	6140	6820	3.8
TW-5	08/24/99	1340	11.0	18.7	6.39	6010	6830	3.8
TW-5	08/24/99	1350	13.0	18.5	6.40	5980	6810	3.7

Note: Wells TW-6, TW-7, and TW-8 were dry. No parameters were taken for well TW-9 because well went dry after purging 1/2 gallon.

Well	Date	TD	Casing Diameter	SWL	Ft. Of Water	Need To Purge
TW-1	08/25/99	14.95'	2.00"	8.40'	6.55'	13.0 Gal
TW-2	08/25/99	15.00'	2.00"	5.70'	9.30'	18.4 Gal
TW-3	08/24/99	14.10'	2.00"	6.60'	7.30'	14.5 Gal
TW-4	08/25/99	9.14'	2.00"	5.40'	3.74'	7.4 Gal
TW-5	08/24/99	14.95'	2.00"	6.53'	8.42'	16.0 Gal
TW-6	08/24/99	9.00'	2.00"	DRY	DRY	
TW-7	08/24/99	6.45'	2.00"	DRY	DRY	
TW-8	08/24/99	6.65'	2.00"	DRY	DRY	
TW-9	08/25/99	13.80'	2.00"	11.48'	2.32'	4.5 Gal

Summary of Well Survey Information  
National Zinc BTA

Well I.D. #	Date Installed:	Vertical Survey Level from Ground Surface:	Vertical Survey Level from Top of Casing:	Static Water Level 08/19/99:
TW-#1	08/16/99	806.76	810.08	801.36
TW-#2	08/16/99	805.82	809.48	800.31
TW-#3	08/17/99	805.24	808.80	801.70
TW-#4	08/17/99	805.75	808.96	803.47
TW-#5	08/17/99	813.24	815.36	808.42
TW-#9	08/19/99	818.03	821.67	809.31
MW-#1	1978	802.85	805.52	797.01
MW-#2 S	1978	803.10	806.20	Dry
MW-#2 D	1978	803.16	806.08	Dry
MW-#3	1978	802.22	805.15	796.57
MW-#4	1978	803.02	804.47	Dry

Notes:

TW-#1 - TW-#9 surveyed by Randolph L. Brown and John Cregan, completed 08/19/99 with Wild NA-2 dumpy level

MW-#1 - MW-#4 surveyed by Carlson Surveying and Mapping, Inc., Hays, Kansas, completed 06/28/99 with total station survey of site.

LOG OF BORING NO.

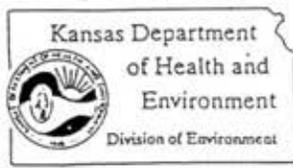
OWNER: KDHE  
 GEOLOGIST: Randy Brown  
 SITE: National Zinc TW-1 N7000 E5700  
 PROJECT: Nat. Zinc BTOF

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	0-1 Dark brown silty clay, dry. Hard layer at 1'		CL-ML						XRFL (Average) (mg/kg)
	1-4 Black clay trace cinders and slag, fat, slightly to moderately stiff, tr. moisture		CH						100.6
	4-8 Mottled dark gray to olive clay, trace of sandstone and shale inclusions		CH						89.4
	8-14 Tan to brown silty clay, wet, medium to high plasticity, moderately stiff		CH						97
	14- Sandstone refusal TO 14 5' 1010 Schaeble 40 Screen <sup>loose</sup> metal Sand to SS 3' Bentonite chips (3/8") <sup>stick-recover</sup> 1ft Abs								94

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: 4 9/8  
 WELL DIA: 2" PVC

WATER LEVEL OBSERVATIONS			
WL	7.8 TOC Abs	WD	6.8 SWL
WL			
WL	TOC 1ft Abs TO 15.1 TOC		



BORING STARTED	08/16/99
BORING COMPLETED	08/16/99
RIG	B-3300
FOREMAN	J. J. Regan
APPROVED	
JOB #	

LOG OF BORING NO.

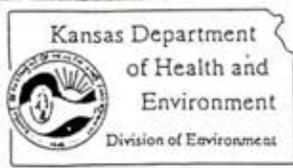
OWNER: KDHE  
 GEOLOGIST: Randy Brown  
 SITE: NATIONAL Zinc TW-2 N660 ES600  
 PROJECT: Nat. Zinc BTA

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS			
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPH)
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:									
	0-2 DK brown silty loam roots		1	ML						XCC Lead (A2) mg/kg! L81.5
	2-4.5 Tan to reddish brown to brown silty clay, slightly fat, very stiff, mostly dry, low plasticity			CL						L64.3
	4.5-9.5 Same, but with trace moisture			CL						
	9.5-11.1 Same, wet with shale and sand stone residuum			CL						
	11.1 Refusal TD 11.1 5' 0.10 schedule 40 PVC screen, TOC 317' ABS, sand to 35', Bentonite (38 chips) to 0.5, steel locked protective cover									L70.7

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: 4 1/8"  
 WELL DIA: 2 1/4"

WATER LEVEL OBSERVATIONS			
WL	8.12 TOC	WD	4.42 ABS
WL			
WL	TD 14.8 TOC		



BORING STARTED	08/16/99
BORING COMPLETED	08/16/99
RIG	B-3300
APPROVED	FOREMAN J. Ryan
	JOB #

LOG OF BORING NO.

OWNER: **KDHE** GEOLOGIST: **Randy Brown**  
 SITE: **National Zinc N6100 ESSCO TWR3** PROJECT: **Nat Zinc BTR**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	0-1 - Dark brown silty loam, roots		ML						XRF Lead Ave. in mg/kg 866
	2-5 Black, gritty moist clay cinders, high plasticity, <sup>very stiff</sup>		CH						451
	5-7 Same		CH						
	7-9 Dark brown silty clay, trace of sandstone residuum, very stiff, moderately moist, medium plasticity		CH						100,7
	9-10.2 Same, more sandstone residuum TD 10.2		CH						
	5' 1010 Schedule 40 PVC Screen installed Sand to 5' Bbs Bentonite (3/8" chips) to 0.6' Steel protective cover installed locked Top of casing 3.75' A6S TD								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. BOREHOLE DIA: 4.718" WELL DIA: 2"

WATER LEVEL OBSERVATIONS

WL	17.06 <sup>TC</sup>	WD	7.31 <sup>Abs</sup>	SWL
WL	TD 14.1 (JOC)			
WL				



BORING STARTED 08/17/99  
 BORING COMPLETED 08/17/99  
 RIG B-3300 FOREMAN S. Grayson  
 APPROVED JOB #

LOG OF BORING NO.

OWNER: KOHE  
 GEOLOGIST: Randy Brown  
 SITE: National Zinc <sup>TW-4</sup> NS 700 E5900  
 PROJECT: Nat Zinc BTA

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS			
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPM)
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:									
	0-1.5 Dark brown silty clay loam, plant roots		ML							XRF local ave. ppm/ft
	1.5-4 Cinders, gritty w/ clay black, wet at bottom		Ch							136.9
	4-7 Dark gray to black clay with cinders, wet		Ch							1316.3
	7-7.5 Dark gray clay, Sandstone residuum Actual 7.5 TD 7.5		Ch							2046
	5' ID 10 Schedule 40 PVC screen Sand to 1" Bentonite to 6.5. 38% chips Complete w/ steel above ground cover locked TOC 3.83' Abs									450 740 3

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.  
 BOREHOLE DIA: 4 7/8"  
 WELL DIA: 2"

WATER LEVEL OBSERVATIONS	
WL $\nabla$ 8.21 TOC	WD $\nabla$ 4.46 Abs SWL
WL	
WL	TD 10.74 from TOC



BORING STARTED 08/07/09	FOREMAN Silvegar
BORING COMPLETED 08/17/09	JOB #
RIG B-3500	
APPROVED	

LOG OF BORING NO.

OWNER: **KD HE** GEOLOGIST: **Randy Brown**  
 SITE: **National Zinc N 5600 E 6600 TW-5** PROJECT: **Nati Zinc BTA**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS			
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPM)
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:									
	0-2 Dark brown silty loam			MZ						86.3 <del>77.3</del>
	2-4.5 Dark brown silty clay, to clay, roots, trace of brick fragments			CL-CH						
	4.5-9 Dark brown to slightly reddish brown silty clay, fat, moderately stiff, medium to high plasticity, trace of sandstone residuum			CH						77.3 86.3
	9-13 Same, saturated TO 13			CH						
	5' @ 10 Schedule 40 PVC <sup>Screen</sup> casing Sand to 30.5' Bentonite to 0.5' ABS Completed with a above ground steel protective cover TOC 2.13' ABS									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. BOREHOLE DIA: 4.713" WELL DIA: 2"

WATER LEVEL OBSERVATIONS

WL	5.00	WD	2.87
WL	TD		
WL	100	15.00	from TOC



BORING STARTED	08/17/99
BORING COMPLETED	08/17/99
RIG	B-3300
FOREMAN	S. Gray
APPROVED	JOB #

LOG OF BORING NO.

OWNER: National Zinc / KDHE  
 GEOLOGIST: Randy Brown  
 SITE: National Zinc TW-6  
 PROJECT: National Zinc BTA

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS			
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPH)
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.: 300' Nat Martin Street									
	In visible right-of-way, East side									
	0-4 Dark brown silty loam, plant roots		ML							7615
	4-7 Dark brown to reddish brown silty clay, dry, low plasticity, trace sandstone residuum		CL							7617
	Refusal 710 Sandstone									
	5' 1010 Schedule 40 PVC screen									
	Sand filter Bentonite + 0									
	Ground surface completed w/ layered steel protective cover									
	TOL 36' Abs Dry at completion									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: 4 7/8"  
 WELL DIA: 2"

WATER LEVEL OBSERVATIONS		
WL	≡ Dry	WD ≡ Dry SWL
WL		
WL	TD 10.6 from TOL	



BORING STARTED	08/17/99
BORING COMPLETED	08/17/99
RIG B-3300	FOREMAN J. L. Regan
APPROVED	JOB #



LOG OF BORING NO.

OWNER: **KDHE** GEOLOGIST: **Randy Brown**  
 SITE: **National Zinc TW-8** PROJECT: **Nam Zinc BTA**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS			
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPM)
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:									
	In vs. 164 Right of Way, East Side 500' South of Intersection Road 5200 and New V. 6. 169									
	0-3.0 Reddish brown, clayey Silty abundant sandstone residuum		ML							
	3.0-3.5 light gray siltstone, weathered, friable		OP							L90
	3.5 Refusal Sandstone/siltstone									
	5' 0.10 Green trimmed schalite 40									
	Sand to 1.5' Bentonite to surface									
	TOC 3.68' Abs Completed with above ground steel protective cover Dry at completion									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. BOREHOLE DIA: 4" 7/8" WELL DIA: 2"

WATER LEVEL OBSERVATIONS			
WL	☒ Dry	WD	☒ Dry
WL			SWL
WL	at 7.2' TOC		



BORING STARTED	08/17/99
BORING COMPLETED	08/17/99
RIG	B-3300
FOREMAN	S. L. Ryan
APPROVED	JOB #

LOG OF BORING NO.

OWNER **KOHE**

GEOLOGIST **Randy Brown**

SITE **National Zinc TW-9 NS800 E7300**

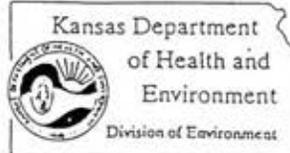
PROJECT **Nan Zinc BTA**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES					TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPM)
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:									
	0-2 Dark brown silty clay loam, plant roots, dry		ML							HP Lead Ave (marked)
	2-4 Dark brown silty clay, mottled, w/reddish brown silty clay, dry, friable		CL							L83
	4-6 Orange to reddish brown clay, fat, high plasticity, very stiff		CH							L85
	6-8 Same but with increasing sandstone residuum with depth		GM GP							L77
	Refusal @ 9' 5' .010 schedule 40 PVC Screen Sand to 2.5 Bentonite to 0.5 (1/8" chips) TOC 382 Abs TD 13.80 Dry at completion, although water filling screen section slowly.									L85

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: 4 7/8"  
WELL DIA: 2"

WATER LEVEL OBSERVATIONS		
WL	WD	SWL
	Dry	
WL		
WL	TD 13.80 from TOC	



BORING STARTED	08/19/99
BORING COMPLETED	08/19/99
RIG	B3300
FOREMAN	Strega
APPROVED	JOB #

KDHE/Bureau of Environmental Remediation/Site Assessment Program  
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 08/16/99 Site Name: Nut Zinc BTA Operator Name: Randy Bown

System Check, Warm-Up and Internal Calibration Notes:

Starting at 1633 warm-up 15 min Starting voltage  
10.20V, Res = 0.672 Ω

Method 6200 Utilized? Y    N    In-situ readings? Y    N    If N, briefly explain sample preparation/homogenization, sample drying time/temp, analytical variations from Method 6200, etc.:

Bugged settings from temporary cells 4pt average

Sample I.D. #	XRF Entry #:	Pb (mg/kg):	Run Time (sec.):	Comments:
Cal	116	0.0 ±	505s	Starting 10.20V
Re Cal	117	0.0	505s	Pos 0.672
Med STD	118	1092 ± 93	605s	
TW1 discard	119	2203	65s	slipped out bag
TW1/1-4	120	124 ± 46	615s	
TW1/1-4	121	99 ± 51	605s	
TW1/1-4	122	839 ± 47	605s	
TW1/1-4	123	95.5 ± 47	605s	Ave = 100.6
TW1/4-9	124	< 83	605s	
TW1/4-9	125	80.5 ± 48	605s	
TW1/4-9	126	< 68	605s	
TW1/4-9	127	126 ± 59	665s	Ave = 89.4
TW1/9-12	128	< 63	605s	
TW1/9-12	129	< 94	605s	
TW1/9-12	130	< 75	605s	
TW1/9-12	131	156 ± 49	855s	Ave = 97
TW1/12-14	132	123 ± 66	635s	
TW1/12-14	133	< 77	605s	
TW1/12-14	134	< 82	605s	Ave = 94
Med STD	135	1122 ± 96	605s	%RD = 27%
TW1/12-14	136	< 94	605s	
TW2/0-2	137	< 81	605s	
TW2/0-2	138	< 78	605s	
TW2/0-2	139	ERR	25s	bad reading
TW2/0-2	140	< 85	605s	Ave = < 81.5
TW2/0-2	141	818 ± 44	605s	

(A-10-101)

KDHE/Bureau of Environmental Remediation/Site Assessment Program  
 Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/17/99 Site Name: Nat Zinc BTA Operator Name: Brown  
 System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y x N \_\_\_ In-situ readings? Y x N \_\_\_ If N, briefly explain sample preparation/homogenization, sample drying time/temp, analytical variations from Method 6200, etc.:

Bagged cuttings from temporary wells 3pt average

Sample I.D. #	XRF Entry #:	Pb (mg/kg):	Run Time (sec.):	Comments:
TW2/2-4.5	142	<62	60Ss	
TW2/2-4.5	143	<66	60Ss	
TW2/2-4.5	144	<65	60Ss	Ave = <64.3
TW2/4.5-9	145	<74	60Ss	
TW2/4.5-9	146	<65	60Ss	
TW2/4.5-9	147	<73	60Ss	Ave = <70.7
Med STD	148	1106 ± 95	60Ss	%D = 1.4% off after STD
08/17/99				On 7:42 XRF Time
Cal	149	0.0	50Ss	Warm up 15 min 7:00 AM Pos = 0.66eV
High STD	150	5523 ± 233	60Ss	
TW3/1-3	151	914 ± 95	60Ss	
TW3/1-3	152	968 ± 96	60Ss	
TW3/1-3	153	716 ± 94	60Ss	Ave = 866
TW3/4-7	154	559 ± 78	60Ss	
TW3/4-7	155	328 ± 62	60Ss	
TW3/4-7	156	466 ± 73	60Ss	Ave = 451
TW3/7-9	157	<88	60Ss	
TW3/7-9	158	100 ± 52	60Ss	
TW3/7-9	159	114 ± 52	60Ss	Ave = 100.7
TW3/9-11	160	88.0 ± 50	60Ss	
TW3/9-11	161	<83	60Ss	
TW3/9-11	162	180 ± 55	60Ss	Ave = 117
High STD	163	5523 ± 233	60Ss	%D = 7.0 5.7
Cal	164	0.0	51Ss	Res 0.663eV on 14:01 warm up 15 min
Med STD	165	1223 ± 97	60Ss	

KDHE/Bureau of Environmental Remediation/Site Assessment Program  
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 08/17/99 Site Name: Nat. Zone Operator Name: Brown  
System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y \_\_\_ N \_\_\_ In-situ readings? Y \_\_\_ N \_\_\_ If N, briefly explain sample preparation/homogenization, sample drying time/temp, analytical variations from Method 6200, etc.:

Sample I.D. #	XRF Entry #:	Pb (mg/kg):	Run Time (sec.):	Comments:
TW4/0-1.5	166	81.7 ± 51	605s	
TW4/0-1.5	167	165 ± 52	605s	
TW4/0-1.5	168	164 ± 51	605s	Ave = 136.9
TW4/2-4	169	144 ± 118	625s	Zn 14.6 K ± 611, As 30.6 ± 130, Hg 26.0 ± 135
TW4/2-4	170	138 ± 116	625s	Ave = 1316.3
TW4/2-4	171	123 ± 103	625s	Zn 15.2 K ± 628, As 28.7 ± 128, Hg 26.0 ± 136
TW4/4-7.5	172	571 ± 87	605s	Zn 14.1 K ± 575, As 23.8 ± 114, Hg 28.2 ± 124
TW4/4-7.5	173	1020 ± 108	625s	As < 139, Hg < 141, Zn 9.7 ± 4.2
TW4/4-7.5	174	191 ± 58	625s	As 26.2 ± 119, Hg < 179, Zn 9.6 ± 5.56
TW4/4-7.5	175	780 ± 110	605s	As < 9.3, Zn 4.4 ± 3.64, Ave = 2790.3
Med STD	176	1201 ± 98	605s	As 17.8, Zn 8.5 ± 5.53
Cal	177	0.0	505s	off, 70D = 1.890, Res 06702 V, warm-up 30min
High STD	178	5718 ± 240	625s	on 2.156
TW7/0-4	179	< 87	605s	
TW7/0-4	180	< 87	605s	
TW7/0-4	181	< 103	605s	Ave = < 92.3 Low voltage 8.8V
High STD	182	5763 ± 244	605s	Change battery pack 9.0V = 0.8%
Cal	183	0.0	505s	on 2.251 V = 10.54V Res = 0.661 Warm-up 30min
High STD	184	5746 ± 243	635s	
TWS/9-13	185	< 72	605s	
TWS/9-13	186	< 74	605s	Zn 90.4 ± 132
TWS/9-13	187	< 74	605s	Zn 91.6 ± 128, Ave Pb = 73.3
TWS/4.5-7	188	< 60	605s	
TWS/4.5-7	189	< 72	605s	Pb Ave = 67.8
TWS/4.5-7	190	< 71	605s	Zn 105 ± 166

KDHE/Bureau of Environmental Remediation/Site Assessment Program  
 Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 08/17/09 Site Name: Nat. Zinc BTA Operator Name: Brown  
 System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y \_\_\_ N \_\_\_ In-situ readings? Y \_\_\_ N \_\_\_ If N, briefly explain sample preparation/homogenization, sample drying time/temp, analytical variations from Method 6200, etc.:

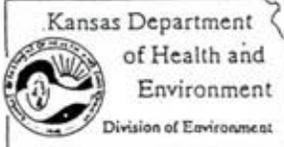
Sample I.D. #	XRF Entry #:	Pb (mg/kg):	Run Time (sec.):	Comments:
TWS/2-4.5	191	75.0 ± 43	6055	Zn 862 ± 109
TWS/2-4.5	192	< 85	6055	Zn 650 ± 131
TWS/2-4.5	193	< 72	6055	Zn 1544 ± 153 Ave 77.3
TWS/0-2	194	98.2 ± 46	6055	Zn 874 ± 110
TWS/0-2	195	85.2 ± 50	6055	Zn 839 ± 115
TWS/0-2	196	75.4 ± 49	6055	Zn 771 ± 113 Ave 86.3
TWS/7-9	197	< 69	6055	
TWS/7-9	198	< 79	6055	
TWS/7-9	199	< 93	6055	Ave = 86.3
TW6/0-4	200	< 64	6055	
TW6/0-4	201	76.5 ± 45	6055	
TW6/0-4	202	< 74	6055	Ave = 71.5
TW8/0-3.5	203	< 92	6055	
TW8/0-3.5	204	< 90	6055	
TW8/0-3.5	205	< 88	6055	Ave = 90
TW6/4-7	206	< 74	6055	
TW6/4-7	207	< 71	6055	
TW6/4-7	208	< 85	6055	Ave = 76.7
TW3/1-3 D	209	1013 ± 99	6055	Zn 10.9K
TW3/1-3 D	210	1238 ± 108	6055	Zn 12.0K
TW3/1-3 D	211	1006 ± 95	6055	Zn 12.3K Ave Pb = 1085.7
TW4/2-4 D	212	937 ± 109	6055	Zn = 17.7K
TW4/2-4 D	213	1220 ± 114	6055	Zn = 20.1K ± 563
TW4/2-4 D	214	1070 ± 107	6055	Zn = 15.1K ± 645 Ave = 1075.6
High STD	215	5424 ± 232	6055	

# LOG OF BORING NO.

OWNER: <i>K DHE</i>	GEOLOGIST: <i>Randy Brown</i>
SITE: <i>National Zinc WP-7 NS300 E6800</i>	PROJECT: <i>Nat. Zinc BTA</i>

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH (FT.)	SAMPLES				TESTS	
				USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	0-1.5 Hard, dark brown silt loam, fill, slag and fire brick fragments		ML						
	1.5 - 3.0 Same		ML						
	3.0-4.0 Olive to gray to reddish brown silty clay, moist, high plasticity, fat, very stiff		CH						
	4.0-6.0 Reddish brown to dark brown mottled silty clay, Trace sandstone pebbles, very stiff, medium to high plasticity, wet Fe nodules TO 6.0 Plugged w/ 3/8" boronite chips and cuttings		CH						

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

WATER LEVEL OBSERVATIONS WL <input checked="" type="checkbox"/> WD <input checked="" type="checkbox"/> SWL WL WL	 <p style="font-size: small;">Kansas Department of Health and Environment Division of Environment</p>	BOREHOLE DIA: <i>4 7/8"</i> WELL DIA: <i>Test hole - no well completion</i> BORING STARTED <i>08/18/99</i> BORING COMPLETED <i>08/19/99</i> RIG <i>3300</i> FOREMAN <i>S. Grayson</i> APPROVED      JOB #
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LOG OF BORING NO.

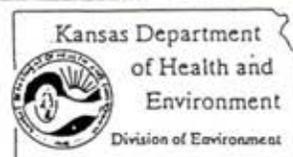
OWNER: *KDHE* GEOLOGIST: *Randy Brown*

SITE: *WP-2 NS400 E6100* PROJECT: *Nat Zone BTA*

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	<i>0-1 Silty loam, trace slag</i>		<i>ML</i>						
	<i>1-3 Silty clay loam, trace slag</i>		<i>CL</i>						
	<i>3-5 Olive to dark brown silty clay</i>		<i>CH</i>						
	<i>TO S.O</i>								
	<i>Plugged w/ 3/8" bentonite chips and cuttings</i>								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

WATER LEVEL OBSERVATIONS		
WL	WD	SWL
<i>∇</i>	<i>∇</i>	



BOREHOLE DIA: *4 7/8"*  
WELL DIA: *Test hole - no well*  
BORING STARTED: *08/18/99*  
BORING COMPLETED: *08/18/99*  
RIG: *3300* FOREMAN: *J. Cragan*  
APPROVED: \_\_\_\_\_ JOB # \_\_\_\_\_

LOG OF BORING NO.

OWNER: *KDHE* GEOLOGIST: *Randy Brown*

SITE: *Natur Fine WP-3 N 6000 E 610* PROJECT: *Natur Fine BTA*

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS			
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %	FIELD VAPOR TESTS (PPM)
	<i>0-1 Dark brown silty loam roots</i>			<i>ML</i>						
	<i>1-3 Same with trace of slag</i>			<i>a</i>						
	<i>3-5 Olive to dark brown silty clay, var, stiff, medium plasticity</i>			<i>CH</i>						
	<i>TD 5'</i>									
	<i>Plugged w/ cuttings and 3/8" bentonite chips</i>									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: *4 7/8"*  
WELL DIA: *No well - Test hole*

WATER LEVEL OBSERVATIONS		
WL	WD	SWL
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	



BORING STARTED: *08/18/99*  
BORING COMPLETED: *08/18/99*  
RIG: *B-3300* FOREMAN: *J. Gray*  
APPROVED: \_\_\_\_\_ JOB #: \_\_\_\_\_

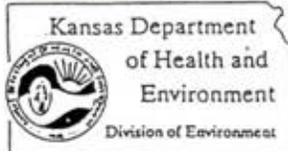
LOG OF BORING NO.

OWNER LDHE		GEOLOGIST Randy Brown							
SITE WP-4 N6000 E5400		PROJECT Natick BTA							
GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	0-0.4 Light brown to tan loam  0.4-7.5 Waste slag, gritty, wet  7.5-9.0 Dark gray clay, trace of sandstone residuum  TO 9.0  Plugged with cuttings and 3/8" bentonite chips		ML						
			GP						
			CH						

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: 4 7/8"  
 WELL DIA: Test hole - 4 inch

WATER LEVEL OBSERVATIONS		
WL	WD	SWL
✓	✓	



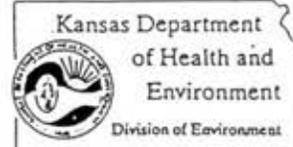
BORING STARTED	08/18/99
BORING COMPLETED	08/18/99
RIG	R-3300
FOREMAN	J. Lujan
APPROVED	
JOB #	

# LOG OF BORING NO.

OWNER <i>R D HE</i>	GEOLOGIST <i>Randy Brown</i>
SITE <i>Nat Zinc WP-5 NS700E5200</i>	PROJECT <i>Nat Zinc BTA</i>

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	<i>0-0.5 Loam</i>								
	<i>0.5-2.5 dark brown silty clay Trace roots and sandstone residuum, trace of slag</i>								
	<i>2.5-3.0 Hard layer</i>								
	<i>2.5-4.0 Dark brown silty clay more fine slag than 0.5-2.5</i>								
	<i>4-6 Reddish brown silty clay high plasticity, iron nodules moderately to very stiff</i>								
	<i>TD 6' Plugged w/ cuttings and 3/8" bentonite chips</i>								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.			BOREHOLE DIA: <i>4 7/8"</i> WELL DIA: <i>No well - test hole</i>	
WATER LEVEL OBSERVATIONS			BORING STARTED <i>08/18/99</i>	
WL	WD	SWL	BORING COMPLETED <i>08/18/99</i>	
WL			RIG <i>B-3300</i>	FOREMAN <i>S. Meyer</i>
WL			APPROVED	JOB #



LOG OF BORING NO.

OWNER: *KDHE* GEOLOGIST: *Randy Brown*  
 SITE: *Nat. Zinc WP-6 N6800 E5200* PROJECT: *Nat. Zinc BTA*

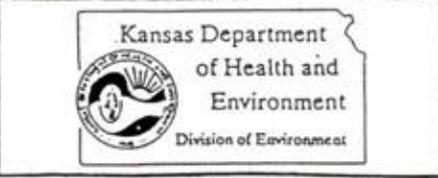
GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	0-2 Dark brown silty loam								
	2-4. Dark gray to brown Silty clay, slightly gritty, Trace of smelter waste								
	4-6 Reddish brown silty clay, mottled, trace of sandstone residuum								
	TD 6'								
	Plugged w/ cuttings and 3/8" bentonite chips								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: *4 7/8"*  
 WELL DIA: *Test hole - no well*

WATER LEVEL OBSERVATIONS

WL	<input checked="" type="checkbox"/>	WD	<input checked="" type="checkbox"/>	SWL
WL				
WL				



BORING STARTED *08/18/09*  
 BORING COMPLETED *08/19/09*  
 RIG *B-3300* FOREMAN *J. Leysen*  
 APPROVED \_\_\_\_\_ JOB # \_\_\_\_\_

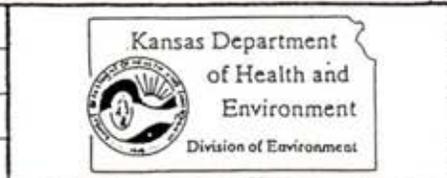
# LOG OF BORING NO.

OWNER: P D HE GEOLOGIST: Randy Brown  
 SITE: Nurt Zinc WP-7 N6600 E5900 PROJECT: Nurt Zinc BTA

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	0-2 Dark brown silt loam, friable, dry		ML						
	2-4 Black clay, slightly gritty, slay waste, plant roots		<del>CL</del> GP						
	4-5 Olive to gray clay, trace sandstone residuum, fat, high plasticity		CH						
	5-6 Olive to reddish-brown silty clay, mottled, fat, very stiff, high plasticity <del>medium</del> JD 6'		CH						

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. BOREHOLE DIA: 4 7/8"  
 WELL DIA: Test hole, no well

WATER LEVEL OBSERVATIONS		
WL <u>▽</u>	WD <u>▽</u>	SWL
WL		
WL		



BORING STARTED 08/18/99  
 BORING COMPLETED 08/18/99  
 RIG B-3300 FOREMAN J. L. rogan  
 APPROVED \_\_\_\_\_ JOB # \_\_\_\_\_

LOG OF BORING NO.

OWNER: *KDHE* GEOLOGIST: *Randy Brown*

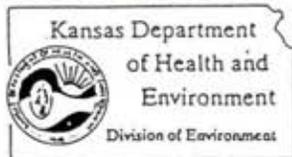
SITE: *Nat Zinc WP-8 N6300 E5600* PROJECT: *Nat Zinc BQA*

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	SAMPLES				TESTS		
			DEPTH (FT.)	USCS SYMBOL	NUMBER	TYPE	RECOVERY	SPT - N BLOWS / FT.	MOISTURE, %
	TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:								
	0-1 Dark brown loam, plant roots		ML						
	1-5 Dark olive clay, with gritty, fine smelter waste		CH						
	5-6 Dark olive to dark gray clay, mottled with brown, tan and reddish brown silty clay, high plasticity, very stiff		CH						
	6-8 Tan to brown to reddish brown silty clay, trace of sandstone residuum and siltstone inclusions, very stiff, high plasticity, moist TD 8' Plugged w/ cuttings and 3/8" bentonite chips		CH						

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

BOREHOLE DIA: *4 9/8"*  
WELL DIA: *Test hole - no well completed*

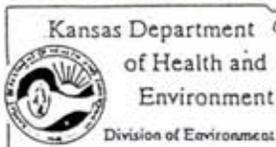
WATER LEVEL OBSERVATIONS		
WL	WD	SWL
<i>✓</i>	<i>✓</i>	



BORING STARTED: *8/19/99*  
BORING COMPLETED: *8/19/99*  
RIG: *B-3300* FOREMAN: *S. Gray*  
APPROVED: \_\_\_\_\_ JOB # \_\_\_\_\_

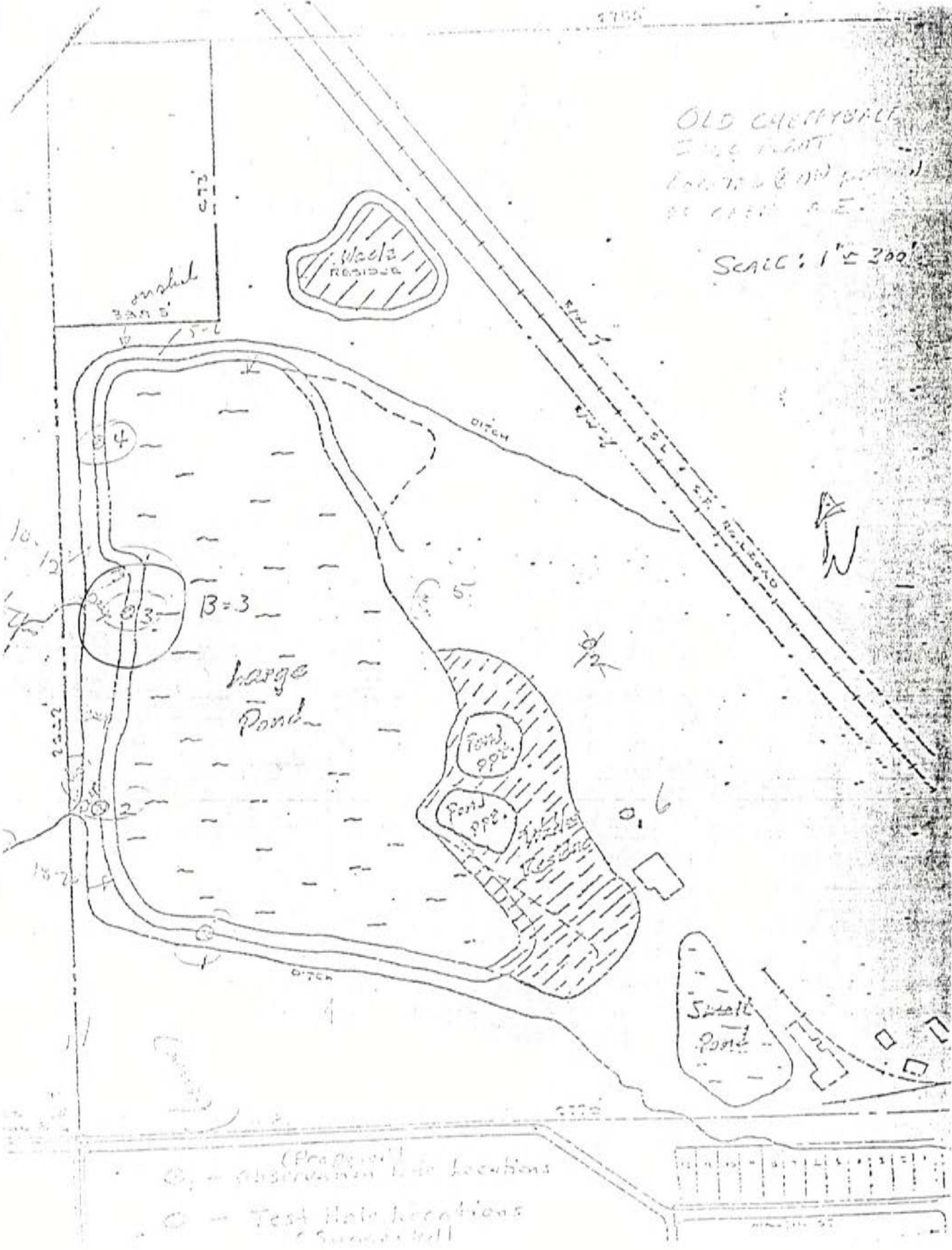
LOG OF BORING NO.

OWNER LOHE	GEOLOGIST Randy Brown
SITE Nat. Zinc WP-9 NS900E5700	PROJECT Nat. Zinc BTA
GRAPHIC LOG DESCRIPTION TOP OF PROTECTOR PIPE: TOP OF CASING: GROUND SURFACE ELEV.:	WELL DETAIL DEPTH (FT.) USCS SYMBOL NUMBER TYPE RECOVERY SPT - N BLOWS / FT. MOISTURE, % FIELD VAPOR TESTS (PPM)
0-1 dark tan + o brown loam, plant roots 1-2 <sup>Smelter</sup> Waste, fine and gritty with mottled reddish-brown Silty clay 2-8 Smelter waste and dark gray clay, gritty, wet, green leachate 8-9 Olive + o dark gray mottled clay TD d Plugged w/cuttings and 3/8" benonite chips	[Empty grid for well details]

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.			BOREHOLE DIA: 4 3/8" WELL DIA: <sup>Winnell, test hole</sup>	
WATER LEVEL OBSERVATIONS			BORING STARTED 08/19/99 BORING COMPLETED 08/19/99	
WL	<input type="checkbox"/>	WD	<input type="checkbox"/>	SWL
WL				
WL				
 Kansas Department of Health and Environment Division of Environment			RIG B-300 APPROVED FOREMAN S. Lopez JOB #	

OLD CHEMICAL  
SITE  
LOCATION & DRAINAGE  
AS OF 1950 A.E.

SCALE: 1" = 300'

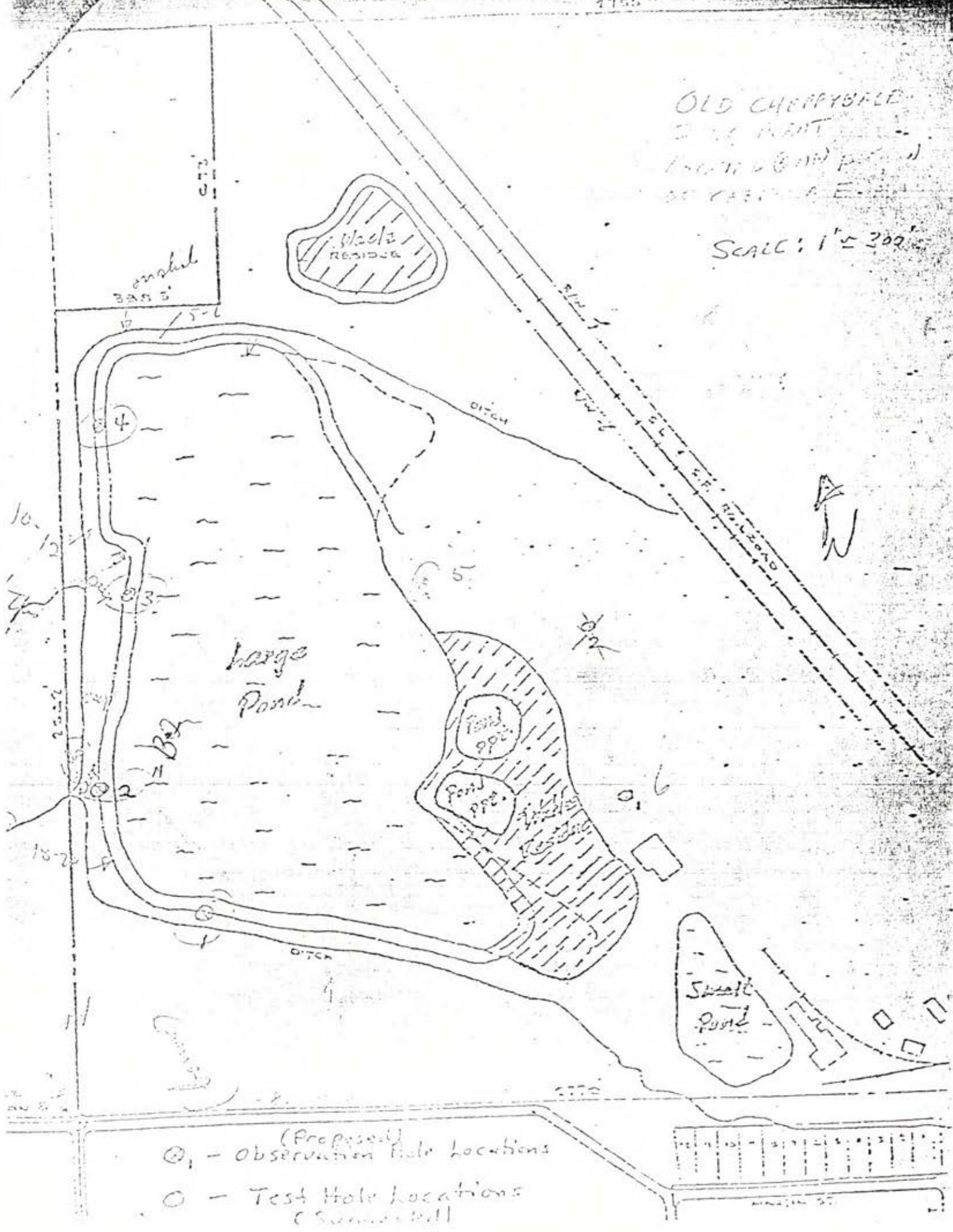


(Proposed)  
 O<sub>1</sub> - observation hole locations  
 O - Test Hole locations  
 (Surveyed Well)



OLD CHERRYVILLE  
2 1/2 AC PLANT  
LOCATION (OWN PROPERTY)  
OF CHERRYVILLE E.A.

SCALE: 1" = 200'

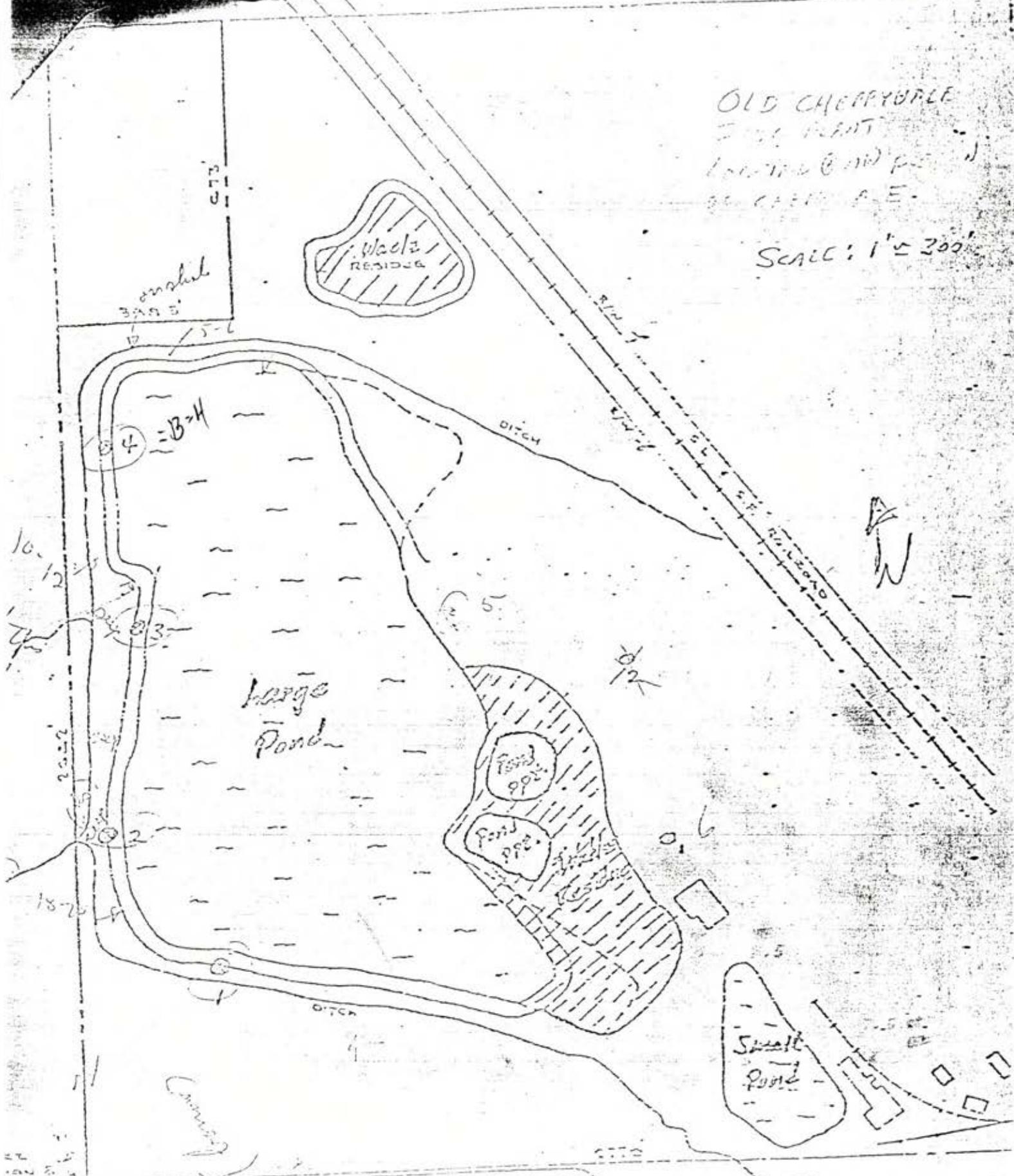


- (Proposed)
- ⊙<sub>1</sub> - Observation Hole Locations
- - Test Hole Locations (Summer Well)

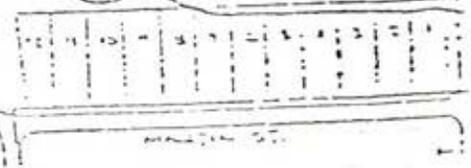


OLD CHERRYVILLE  
POND PLANT  
LOCATION (AND POND)  
ON CAMP A.E.

SCALE: 1" = 300'



- (Proposed)
- ⊙<sub>1</sub> - Observation hole locations
  - - Test Hole locations (Swanwell)



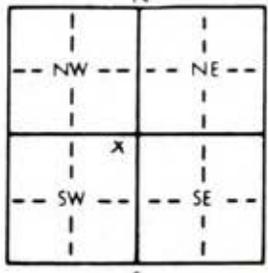


LOCATION OF WATER WELL: County: Montgomery 063 Fraction: NE 1/4 NE 1/4 SW 1/4 Section Number: 8 Township Number: T 32 S Range Number: R 17 E

Distance and direction from nearest town or city street address of well if located within city?  
IN THE N PART OF THE CITY OF CHERRYVALE

WATER WELL OWNER: Arvid & Velma White  
 IR#, St. Address, Box #: RR #2 Board of Agriculture, Division of Water Resources  
 City, State, ZIP Code: Cherryvale, KS 67327 Application Number:

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: DEPTH OF COMPLETED WELL: 98 ft. ELEVATION:



Depth(s) Groundwater Encountered 1. . . . . ft. 2. . . . . ft. 3. . . . . ft.  
 WELL'S STATIC WATER LEVEL . . . . . ft. below land surface measured on mo/day/yr  
 Pump test data: Well water was . . . . . ft. after . . . . . hours pumping . . . . . gpm  
 Est. Yield 10 . . . . . gpm; Well water was . . . . . ft. after . . . . . hours pumping . . . . . gpm  
 Bore Hole Diameter: 1 1/4 in. to . . . . . ft., and . . . . . in. to . . . . . ft.  
 WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well  
 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)  
 2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well  
 Was a chemical/bacteriological sample submitted to Department? Yes . . . . . No ; If yes, mo/day/yr sample was submitted

TYPE OF BLANK CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued  Clamped . . . . .  
 1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (specify below) Welded . . . . .  
 PVC 4 ABS 7 Fiberglass Threaded . . . . .  
 Blank casing diameter: 6 in. to 28 ft., Dia . . . . . in. to . . . . . ft., Dia . . . . . in. to . . . . . ft.  
 Casing height above land surface: 18 in., weight 160 lbs./ft. Wall thickness or gauge No.

TYPE OF SCREEN OR PERFORATION MATERIAL:  PVC 10 Asbestos-cement  
 1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify) . . . . .  
 2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)  
 1 Continuous slot  Mill slot 6 Wire wrapped 9 Drilled holes  
 2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify) . . . . .

SCREEN-PERFORATED INTERVALS: From 78 ft. to 98 ft., From . . . . . ft. to . . . . . ft.  
 From . . . . . ft. to . . . . . ft., From . . . . . ft. to . . . . . ft.  
 GRAVEL PACK INTERVALS: From . . . . . ft. to . . . . . ft., From . . . . . ft. to . . . . . ft.  
 From . . . . . ft. to . . . . . ft., From . . . . . ft. to . . . . . ft.

GROUT MATERIAL:  Neat cement 2 Cement grout 3 Bentonite 4 Other . . . . .  
 Grout intervals: From 0 ft. to 20 ft., From . . . . . ft. to . . . . . ft., From . . . . . ft. to . . . . . ft.

What is the nearest source of possible contamination:  
 1 Septic tank 4 Lateral lines 7 Pit privy 10 Livestock pens 14 Abandoned water well  
 2 Sewer lines 5 Cess pool 8 Sewage lagoon 11 Fuel storage 15 Oil well/Gas well  
 3 Watertight sewer lines 6 Seepage pit 9 Feedyard 12 Fertilizer storage 16 Other (specify below)  
 13 Insecticide storage  
 Direction from well? SW How many feet? 200

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	2	Top soil			
2	17	Clay			
17	82	Shale			
82	98	Lime			

**RECEIVED**

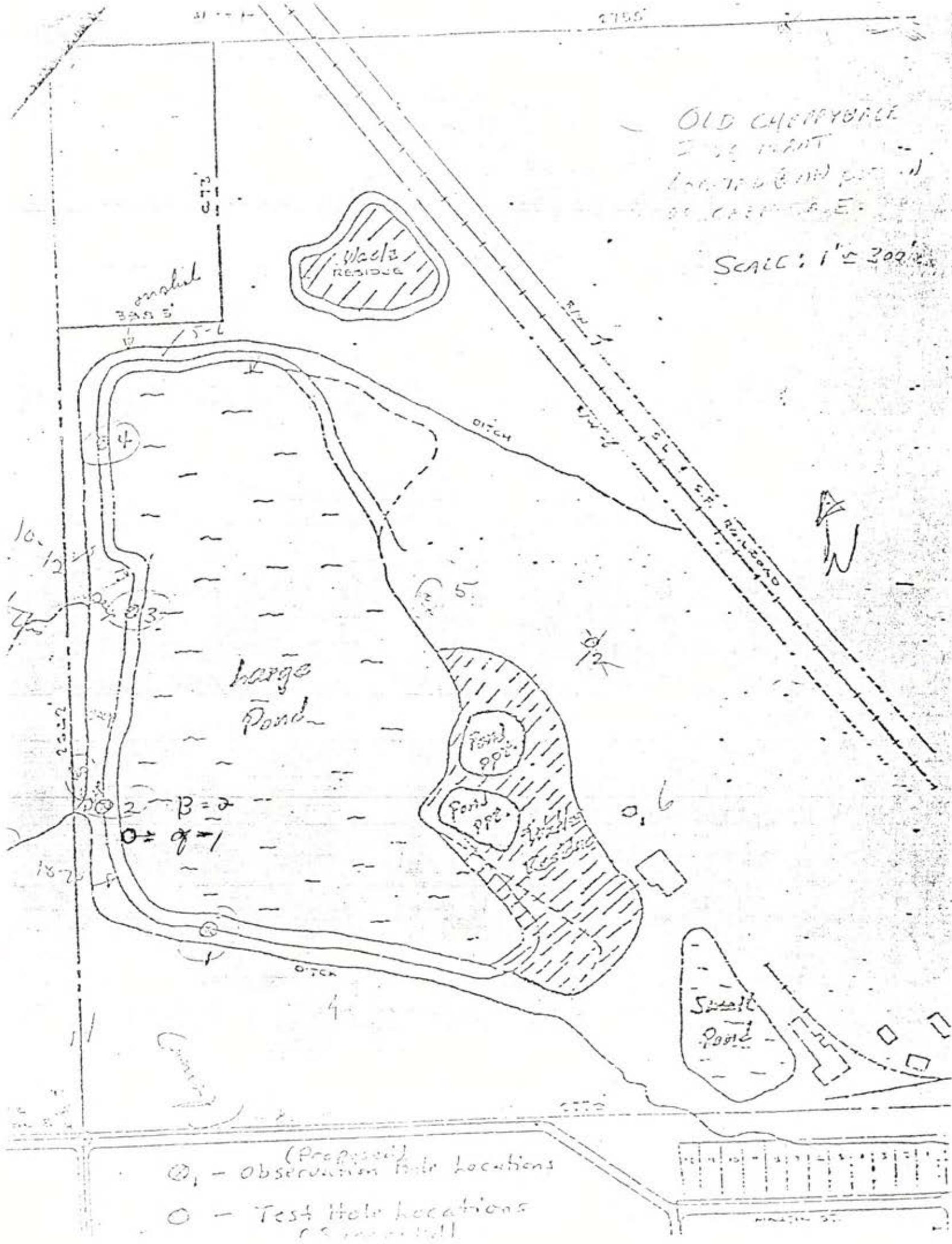
JUN 27 1990

DIVISION OF ENVIRONMENT

CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was  constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 5-1-90 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 464 This Water Well Record was completed on (mo/day/yr) 5-1-90  
 Under the business name of WATER WELL SERVICES INC by (signature) Arvid White

OLD CHERRYVILLE  
 2nd TRACT  
 LOCATED @ NW CORNER  
 OF CHERRYVILLE

SCALE: 1" = 300'

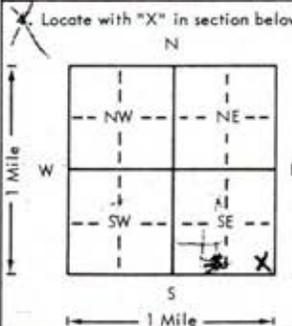


(Proposed)  
 ● - Observation Hole Locations  
 ○ - Test Hole Locations

USE TYPEWRITER OR BALL POINT PEN-PRESS FIRMLY, PRINT CLEARLY.

WATER WELL RECORD  
KSA 82a-1201-1215

Kansas Department of Health and Environment-Division of Environment  
(Water well Contractors)  
Topeka, Kansas 66620

1. Location of well: County <u>Monterey</u> Fraction <u>SW 1/4 SE 1/4</u> Section number <u>9</u> Township number <u>T 32 S</u> Range number <u>R 17 E</u>	
2. Distance and direction from nearest town or city: <u>CORNER OF MARTIN &amp; SCHOOL</u> 3. Owner of well: <u>NATIONAL ZINC CO. Box 280</u> R.R. or street: <u>CHERRY VALE, KS 67335</u> City, state, zip code: <u>CHERRY VALE, KS 67335</u>	
X Locate with "X" in section below:  Sketch map: <u>Well Test # B-2 of # 1</u>	
6. Bore hole dia. <u>12</u> in. Completion date <u>4-27-78</u> Well depth <u>12</u> ft.	
7. <input checked="" type="checkbox"/> Cable tool <input type="checkbox"/> Rotary <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input type="checkbox"/> Hollow rod <input type="checkbox"/> Jetted <input type="checkbox"/> Bored <input type="checkbox"/> Reverse rotary	
8. Use: <input type="checkbox"/> Domestic <input type="checkbox"/> Public supply <input type="checkbox"/> Industry <input type="checkbox"/> Irrigation <input type="checkbox"/> Air conditioning <input type="checkbox"/> Stock <input type="checkbox"/> Lawn <input type="checkbox"/> Oil field water <input checked="" type="checkbox"/> Other	
9. Casing: Material <u>PVC</u> Height: Above or below Threaded <input type="checkbox"/> Welded <input type="checkbox"/> Surface <input checked="" type="checkbox"/> in. RMP <input type="checkbox"/> PVC <u>6.6</u> Weight <input type="checkbox"/> lbs./ft. Dia. <u>3</u> in. to <u>4</u> ft. depth Wall Thickness: inches or Dia. <u>3</u> in. to <u>7</u> ft. depth page No. <u>210</u>	
10. Screen: Manufacturer's name <u>W.M.I.</u> Type <u>P.V.C.</u> Dia. <u>3"</u> Slot gauge <u>1/16</u> Length <u>5'</u> Set between <u>7</u> ft. and <u>12</u> ft. ft. and <u>    </u> ft. Gravel pack? <u>YES</u> Size range of material <u>5/8</u>	
11. Static water level: <u>NR</u> ft. below land surface Date <u>4-27-78</u> <sup>no./day/yr</sup>	
12. Pumping level below land surfaces: <u>    </u> ft. after <u>    </u> hrs. pumping <u>    </u> g.p.m. <u>    </u> ft. after <u>    </u> hrs. pumping <u>    </u> g.p.m. Estimated maximum yield <u>    </u> g.p.m.	
13. Water sample submitted: <u>    </u> mo./day/yr. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Date <u>    </u>	
14. Well head completion: <u>6" PVC CITY</u> <input type="checkbox"/> Pitless adapter <u>    </u> inches above grade	
15. Well grouted? <u>YES</u> With: <input checked="" type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <input type="checkbox"/> Concrete Depth: From <u>0</u> ft. to <u>6-7</u> ft.	
16. Nearest source of possible contamination: ft. <u>10</u> Direction <u>NE</u> Type <u>DOND</u> Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
17. Pump: <u>    </u> Not installed Manufacturer's name <u>    </u> Model number <u>    </u> HP <u>    </u> Volts <u>    </u> Length of drop pipe <u>    </u> ft. capacity <u>    </u> g.p.m. Type: <input type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Reciprocating <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other	
18. Elevation: <u>    </u> 19. Remarks: <u>test well on 6" casing</u> <u>RECEIVED</u> <u>MAY 2 1978</u>	
20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. Business name <u>    </u> License No. <u>    </u> Address <u>    </u> Signed <u>    </u> Date <u>    </u> Authorized representative	

9 in. 3' of water

B-2 of # 1 x 2 are 5' apart.

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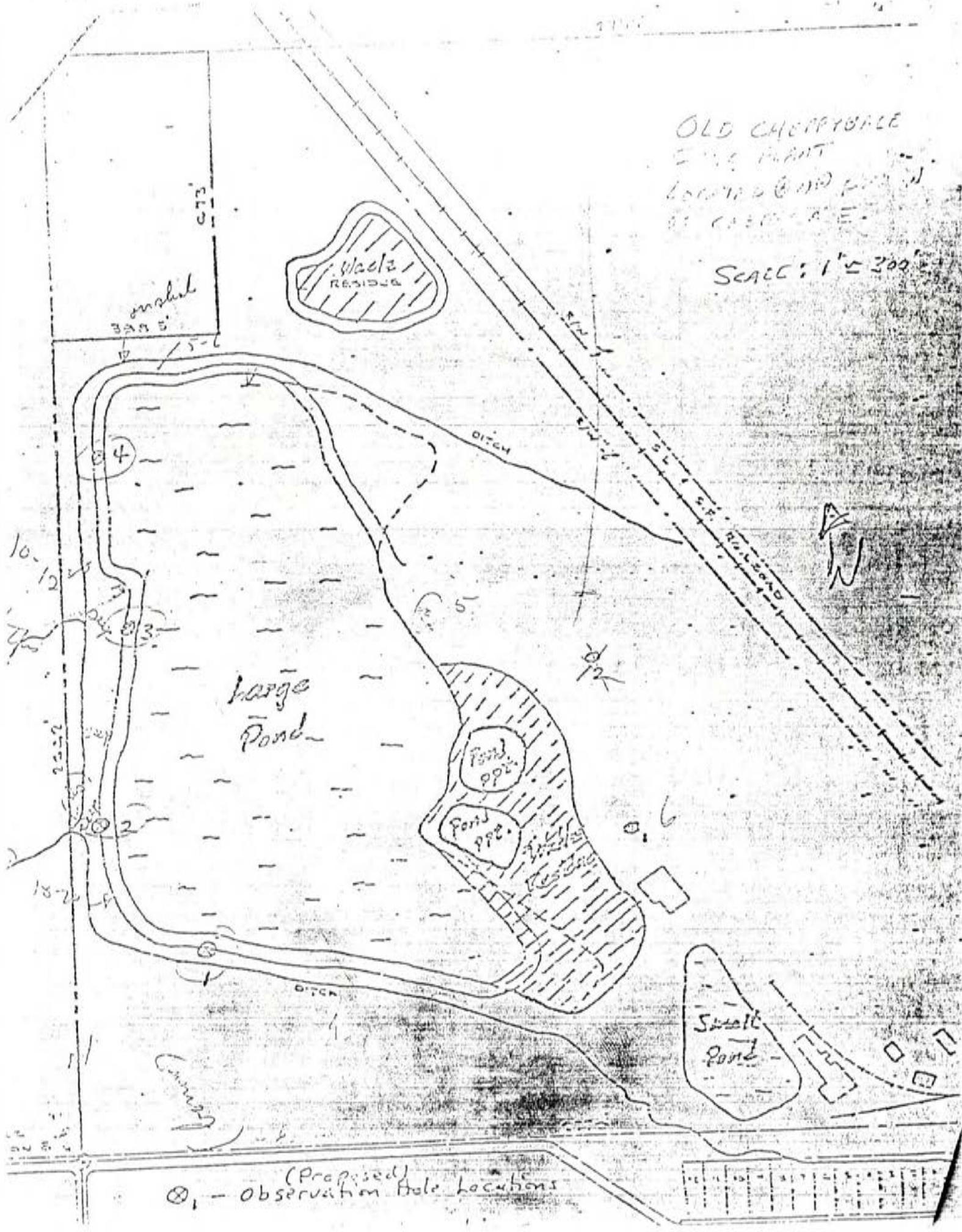
MAY 2 1978

Forward the white, blue and pink copies to the Department of Health and Environment  
DIVISION OF ENVIRONMENT  
OF & EG. SEC.

Form WWC-5

OLD CHEPPYBALLE  
E. M. PLANT  
LOCATED @ END ROAD  
OF CHEPPYBALLE

SCALE: 1" = 200'



(Proposed)  
⊗<sub>1</sub> - Observation Hole Locations

USE TYPEWRITER OR BALL POINT PEN-PRESS FIRMLY, PRINT CLEARLY.

WATER WELL RECORD  
KSA 82a-1201-1215

Kansas Department of Health and Environment-Division of Environment  
(Water well Contractors)  
Topeka, Kansas 66620

1. Location of well: County <u>Montgomery</u>		Fraction <u>SW SW NE</u> 1/4 1/4 1/4		Section number <u>8</u>	Township number <u>T 37 S R 17 E</u>	Range number <u>17 E</u>
2. Distance and direction from nearest town or city: <u>CORNER OF</u>			3. Owner of well: <u>NATIONAL FIRE INSURANCE CO.</u>			
Street address of well location if in city: <u>MARTIN &amp; SCHOOL ST</u>			R.R. or street: <u>CHERRY VALLEY</u> City, state, zip code: <u>BOY 280 667335</u>			
4. Locate with "X" in section below: 		Sketch map: <u>Well test # B-1</u>		6. Bore hole dia. <u>4</u> in. Completion date <u>4-26-78</u> Well depth <u>17</u> ft.		
5. Type and color of material		From To		7. <input checked="" type="checkbox"/> Cable tool <input type="checkbox"/> Rotary <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input type="checkbox"/> Hollow rod <input type="checkbox"/> Jetted <input type="checkbox"/> Bored <input type="checkbox"/> Reverse rotary		
<u>TOP SOIL + LINDER = BLACK 01 01</u> <u>SILTY CLAY = YELLOW TO BROWN 02 1 17</u>				8. Use: <input type="checkbox"/> Domestic <input type="checkbox"/> Public supply <input type="checkbox"/> Industry <input type="checkbox"/> Irrigation <input type="checkbox"/> Air conditioning <input type="checkbox"/> Stock <input type="checkbox"/> Lawn <input type="checkbox"/> Oil field water <input checked="" type="checkbox"/> Other		
				9. Casing: Material <u>PVC</u> Height: <input checked="" type="checkbox"/> Above or below Threaded <input type="checkbox"/> Welded <input checked="" type="checkbox"/> Surface <u>6</u> in. RMP <input type="checkbox"/> PVC <input type="checkbox"/> Weight <input type="checkbox"/> lbs./ft. Dia. <u>3</u> in. to <u>9</u> ft. depth; Wall Thickness: inches or Dia. <u>3</u> in. to <u>9</u> ft. depth; gage No. <u>1216</u>		
				10. Screens: Manufacturer's name <u>M. P. I.</u> Type <u>P.V.P.</u> Dia. <u>3</u> Slot gauge <u>1/16</u> Length <u>8</u> Set between <u>9</u> ft. and <u>17</u> ft. ft. and <u>17</u> ft. Gravel pack? <u>yes</u> Size range of material <u>5/8</u>		
				11. Static water level: <u>8</u> ft. below land surface Date <u>4-26-78</u>		
				12. Pumping level below land surfaces: <u>45 min.</u> <u>made 8' of water</u> _____ ft. after _____ hrs. pumping _____ g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m. Estimated maximum yield _____ g.p.m.		
				13. Water sample submitted: <u>Yes</u> <input checked="" type="checkbox"/> No <input type="checkbox"/> Date <u>4-26-78</u>		
				14. Well head completion: <u>P.I.C. C.F.P.</u> <input type="checkbox"/> Pitless adapter <u>6</u> inches above grade		
				15. Well grouted? <u>yes</u> With: <input checked="" type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <input type="checkbox"/> Concrete Depth: From <u>2</u> ft. to <u>3</u> ft.		
				16. Nearest source of possible contamination: ft. <u>12</u> Direction <u>NO</u> Type <u>POND</u> Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
				17. Pump: <input checked="" type="checkbox"/> Not installed Manufacturer's name _____ Model number _____ HP _____ Volts _____ Length of drop pipe _____ ft. capacity _____ g.p.m. Type: <input type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Reciprocating <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other		
18. Elevation:		19. Remarks: <u>Test well for</u> <u>Pollution - gravel to 6" above</u> <u>J.A. Hawkins</u> <u>Test well in Pond Dyke</u>		20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. Business name <u>PROWIT Const</u> License No. <u>253</u> Address <u>1111 S. 1st St</u> Signed <u>Arthur P. Rowlett</u> Date <u>4/26/78</u> Authorized representative		

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MAY 2 1978

DIVISION OF ENVIRONMENT  
(Use a second sheet if needed)  
OF & EQ SEC.

Forward the white, blue and pink copies to the Department of Health and Environment

Form WWC-5

**NATIONAL ZINC SITE  
CHERRYVALE, KANSAS**

**APPENDIX J**

**Data Validation and Approved Quality Assurance Project Plan**

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT  
MEMORANDUM

DATE: December 23, 1999

TO: National Zinc BTA Site File

THROUGH: Randolph L. Brown, Unit Chief, Site Assessment Unit

FROM: Travis Kogl, Environmental Geologist, Site Assessment Unit <sup>JK</sup>  
Jon Brady, Chemist III, Inorganic Chemistry, DHEL <sup>AB</sup>

SUBJECT: Data Validation/Review of XRF/Laboratory Analytical Data

I. Introduction:

This memorandum summarizes the validation process for the in-field analytical data and laboratory analytical data for the National Zinc Brownsfield Technical Assessment (BTA) site in Cherryvale, Kansas. The data was evaluated by a validation team consisting of Travis Kogl of KDHE/BER and Jon Brady of KDHE/Division of Health and Environmental Laboratories (DHEL) in accordance with KDHE/BER Standard Operating Procedure (SOP)-11, *Evaluation and Validation of Data*. In addition to evaluating and validating the BTA data in accordance with SOP-11, a linear regression was calculated for field-based analytical data. All laboratory samples submitted for this project were analyzed by KDHE's Division of Health and Environment Laboratory (DHEL) for analysis by EPA Method 6010 or 6210 for total metals (Method 245.2 for mercury) by inductively coupled plasma (ICP) and/or EPA Method 1311 for Toxic Characteristic Leachate Procedure (TCLP) analysis.

II. Data Evaluation/Validation:

1. *Holding times* - The 180-day holding time for ICP was not exceeded for any target analytes. The 28 day holding time for mercury analysis was exceeded for all samples analyzed for TCLP. Mercury is not a target analyte for the site, therefore this deficiency will not adversely affect the quality of the data.
2. *Instrument calibration* - All calibrations and tuning are factory-set and internal for the Niton 733 XRF. The calibration is completed during the warm up period. Warm-up times were included on daily field data sheets and notes.

A daily ICP calibration was performed on dates which project samples were analyzed by DHEL. Calibration documentation for these dates are maintained in the DHEL database.

3. One laboratory blank for each batch of 20 samples was analyzed by DHEL in accordance with DHEL's Quality Management Plan (QMP) and EPA Method SW-846. Documentation of blank results are maintained in the DHEL database.
4. *Laboratory control samples* - Daily laboratory control samples were analyzed on the same dates that project samples were analyzed. Documentation for the control samples are maintained in the DHEL database.
5. *ICP interference check samples* were run when necessary and documentation is maintained in the DHEL database.
6. *Duplicate samples* - One laboratory duplicate sample was analyzed for each batch of 20 samples analyzed for total metals by Method 6210. Percent differences were calculated and all data for the BTA were evaluated to be within method acceptance criteria. Laboratory duplicate samples are not included in the method for TCLP analysis.
7. *Matrix spike/duplicates* - Percent recovery was calculated for each matrix spike/matrix spike duplicate for all project samples analyzed for TCLP. Data was evaluated under SW 846 criteria and was within acceptable percentages. Matrix spikes and matrix spike duplicates are not included for the DHEL method for total metal analysis.
8. *Furnace atomic absorption* -Furnace atomic absorption was not utilized by DHEL for this project.
9. *ICP serial dilutions* - ICP serial dilutions were performed when sample concentrations exceeded linear acceptance ranges.
10. *Sample result verifications* - Sample result verifications are performed by the field chemist upon recording the XRF value on the field sheets. DHEL results are checked by the analyst before signing analytical report sheets.
11. *Field duplicates* - Percent differences were calculated for laboratory field duplicate samples and deemed acceptable for project goals. Percent differences are included in Table 1.

Relative Standard Deviations (RSD) were calculated for field-based analytical results in accordance with EPA Method 6200 as follows:

$$\text{RSD} = (\text{SD}/\text{Mean Concentration}) \times 100$$

RSD values were within 20%, excluding three outlier samples. All three outliers were near the detection limits. This can be expected because as the detection limit is approached, the difference in duplicate values results in a high RSD value. Analytical results with an RSD percentage less than 20 can be considered adequately precise by Method 6200 guidelines. RSD values are included in Table 2.

12. General data assessment: Analytical data have been evaluated to be acceptable for the needs of the National Zinc BTA project for both field and laboratory data submitted for this project. All chain-of-custody (COC) forms correlate with submitted samples and were properly signed by both sampling and laboratory personnel.

### III. Validation Summary

The accuracy of reported analytical results was judged adequate for project goals based upon percent recoveries of matrix spikes/matrix spike duplicates, laboratory duplicates, and field duplicates. Precision for reported analytical results was judged to be adequate for project goals based upon, matrix spike/matrix spike duplicates percent recoveries and percent differences calculated for field duplicate samples. Precision for field based data was judged to be adequate based upon calculated relative standard deviations. Representativeness for reported analytical results was judged to be adequate for project goals based upon holding times and blank results. Sensitivity was judged to be adequate for project goals through evaluation of reported detection limits. All detection limits were adequate. Comparability was determined to be adequate. Sampling protocols were documented to be consistent with requirements in the site Quality Assurance Project Plan (QAPP). Completeness is expressed as the percentage of all measurements judged to be valid. Data for the National Zinc BTA has been judged to be 100% complete.

### IV. Other notes:

The linear regression was calculated for in-field XRF and corresponding laboratory analysis for lead. The  $r^2$  value was calculated to be 0.81. EPA Method 6200 XRF guidance allows  $r^2$  values of 0.9 or greater to be used as definitive, laboratory quality-equivalent data. EPA guidance varies between  $r^2$  values of 0.49 (EPA Region VII) to 0.7 (EPA Method 6200) as the lower range for quantitative screening level data, while data below this range are generally accepted as qualitative screening-quality data. The overall screening data for this project is therefore equivalent to quantitative screening-quality data consistent with EPA Method 6200 and is adequate for project goals.

**Table 1**  
**Percent Differences for Laboratory Total Metal Duplicates**  
**National Zinc BTA**  
**Cherryvale, Kansas**

Sample Location	Arsenic mg/kg	Barium mg/kg	Cadmium mg/kg	Chromium mg/kg	Lead mg/kg	Selenium mg/kg	Silver mg/kg
N6600 E5025	28.03	675.97	103.6	18.69	208.66	<5.00	5.87
N6800 E5025Dup	21.42	190.58	11.00	28.7	110.7	<5.00	3.29
% Difference	23.58	71.81	89.38	-53.56	46.95		43.952
N5500 E5500	32.56	169.65	43.79	42.68	358.77	<5.00	3.53
N5500 E5500Dup	22.11	182.54	52.01	35.73	319.32	<5.00	2.89
% Difference	32.09	-7.6	-18.77	16.28	11		18.13
N6800 E5900	6.61	115.96	18.41	28.99	457.83	<5.00	<1.00
N6800 E5900Dup	<5.00	114.03	14.53	25.54	230	<5.00	21.54
% Difference		1.66	21.08	11.9	49.76		
N5500 E6500	19.73	224.66	460.73	34	3,290	<5.00	9.38
N5500 E6500Dup	19.21	217.82	384.61	30.07	2751	<5.00	8.13
% Difference	2.64	3.04	16.52	11.79	16.38		13.33
N5300 E6900	35.41	171.68	86.12	28.91	7,892.89	14.57	14.84
N5300 E6900Dup	22.35	169.32	85.96	27.99	8,315.03	16.86	11.98
% Difference	36.88	1.37	0.19	3.18	-5.35	-15.72	19.27
N6500 E6900	20.91	239.63	52.24	27.43	1,061	<5.00	<1.00
N6500 E6900Dup	19.3	170.79	55.18	32.84	1,303.35	<5.00	<1.00
% Difference	7.7	28.73	-5.63	-19.72	-22.8		
N6600 E6900	20.27	258.24	19.16	36.98	785.23	<5.00	<1.00
N6600 E6900Dup	19.56	280.82	17.49	34.61	480.28	<5.00	<1.00
% Difference	3.5	-8.74	8.72	6.41	38.84		
N7100 E6900	<5.00	341.35	0.7	28.85	13.87	<5.00	<1.00
N7100 E6900Dup	<5.00	292.74	0.88	30.28	15.29	<5.00	<1.00
% Difference		14.24	-25.71	-4.96	-10.24		
N5700 E7400	291	283.56	180.12	43.25	7,797	<5.00	15.09
N5700 E7400Dup	279.24	311.97	151.15	41.2	7,358	<5.00	14.7
% Difference	4.04	-10.02	16.08	4.74	5.64		2.58
N6400 E7400	30.04	206.12	43.04	29.78	1260.46	<5.00	2.28
N6400 E7400Dup	26.64	207.38	39.84	24.89	1148.71	<5.00	2.23
% Difference	11.32	-0.61	7.43	16.42	8.87		2.19
N5500 E7500	33.26	169.82	95.76	29.61	2,172.82	<5.00	1.32
N5500 E7500Dup	34.38	168.76	89.93	33.99	2,143.55	<5.00	1.61
% Difference	-3.37	0.62	6.09	-14.79	1.35		-21.97

Source: Compiled by KDHE/BER Site Assessment Unit/Lab data generated by Dept of Health & Environmental Laboratory EPA 6010

Comments: mg/kg = milligrams per kilogram  
 < = Less than  
 Sample were collected on August 11 & 12, 1999  
 Analysis by EPA Method 6010

Table 2  
Relative Standard Deviations  
for Field XRF Data  
National Zinc BTA  
Cherryvale, Kansas

Date Analyzed	HIGH STD		MED STD		Field Duplicates		
	ppm	% Diff	ppm	% Diff	1st Value	2nd Value	RSD
07/07/99	5625	1.68	1061	-8.69	2462	2576	2.262803
	5363	-3.05	1027	-11.62	442	461	2.104097
	5596	1.16	1065	-8.35	645	637	0.624025
	5612	1.45			381	335	6.424581
	5472	-1.08					
	5555	0.42					
07/13/99	5523	-0.16	1175	1.12	<67	<83	
	5472	-1.08	1155	-0.6			
07/14/99	5318	-3.87	1191	2.5	<81	87.2	
	5500	-0.58	1209	4.04	710	519	15.54109
	5622	1.63	1184	1.89	<70	<78	
	5782	4.52	1091	-6.11	<66	<65	
	5308	-4.05	1048	-9.81			
	5481	-0.92	1125	-3.18			
07/15/99	5756	4.05	1054	-9.29	<71	<65	
	5526	-0.11	1028	-11.53	<87	<75	
	5379	-2.77	1107	-4.73	152	151	0.330033
			1168	0.52	<70	<70	
			1170	0.69			
07/20/99	5548	0.29	1168	0.52	223	144	21.52589
	5808	4.99	1144	-1.55	164	191	7.605634
	5600	1.23	1124	-3.27	789	775	0.895141
	5420	-2.02					
	5568	0.65					
07/21/99	5500	-0.58	1126	-3.1	145	130	5.454545
	5408	-2.24	1106	-4.82	119	<82	
	5523	-0.16	1124	-3.27	436	526	9.355509
	5507	-0.45	1156	-0.52	167	130	12.45791
	5526	-0.11	1087	-6.45	1552	1589	1.177969
	5526	-0.11	1056	-9.12	161	88.3	29.16165
					896	808	5.164319
					854	837	1.005322
07/22/99	5395	-2.48	1088	-6.37	1995	1809	4.88959
	5468	-1.16	1110	-4.48	1018	1106	4.143126
	5408	-2.24			3382	3280	1.531072
					1380	1534	5.284832
07/27/99	5081	-8.15	1113	-4.22	167	115	18.43972
	5500	-0.58	1048	-9.81	97.8	95.7	1.085271
	5462	-1.27			904	719	11.39864
	5315	-3.92					
07/28/99	5644	2.02	1040	-10.5	189	107	27.7027
	5548	0.29	1060	-8.78	213	247	7.391304
			1148	-1.2	191	151	11.69591
			1139	-1.98	101	<78	
			1108	-4.65	250	256	1.185771
			1148	-1.2	948	1024	3.853955
			1092	-6.02	124	136	4.615385
07/29/99	5241	-5.26	1160	-0.17	260	245	2.970297
	5497	-0.63	1123	-3.36	146	132	5.035971
	5372	-2.89			350	380	4.109589
	5372	-2.89					
	5344	-3.4					
08/11/99	5312	-3.98	1136	-2.24	139	<72	
	5696	2.96	1095	-5.77	186	131	17.35016
	5542	0.18	1088	-6.37	574	559	1.323919
	5600	1.23	1100	-5.34	1501	1656	4.909724
	5404	-2.31			208	218	2.347418
					163	247	20.4878
08/12/99					142	109	13.14741
	5516	-0.29	1100	-5.34	309	293	2.657807
	5360	-3.11					

Source: KDRE/BER Site Assessment Unit

Avg RSD 7.66

Comments: Value of High STD = 5532 ppm  
Value of Med STD = 1162 ppm  
ppm = parts per million  
% Diff = Percent difference between actual value of standard and the determined value calculated according to EPA Method 6200 guidance  
RSD = Relative standard deviation between successive field duplicates calculated according to EPA Method 6200 guidance

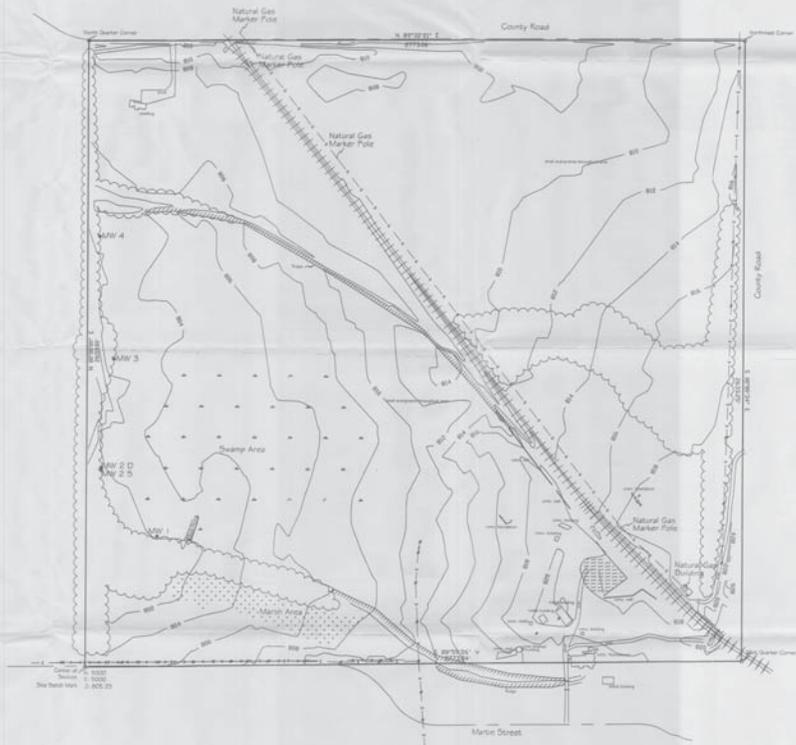
**NATIONAL ZINC SITE  
CHERRYVALE, KANSAS**

**APPENDIX K**

**Topographic Survey**

Topographical Survey  
NE/4 Sec 8 T32S R17E  
National Zinc Site, Cherryvale, Kansas

NO.	NORTH	EAST	AREA
NW 1	3257.50	5249.56	1712.87 AC
NW 2 S	3846.12	5841.96	2252.08 AC
NW 4 S	3846.08	5841.73	2251.98 AC
NW 3	4333.91	6112.76	2652.25 AC
NW 4	4822.26	5547.71	2674.47 AC



LEGEND

- = Iron Stake Found
- = Nail Set
- = Lath Set
- = Power Pole
- = Tree Line
- = Water
- = Overhead Electric
- = Underground Natural Gas

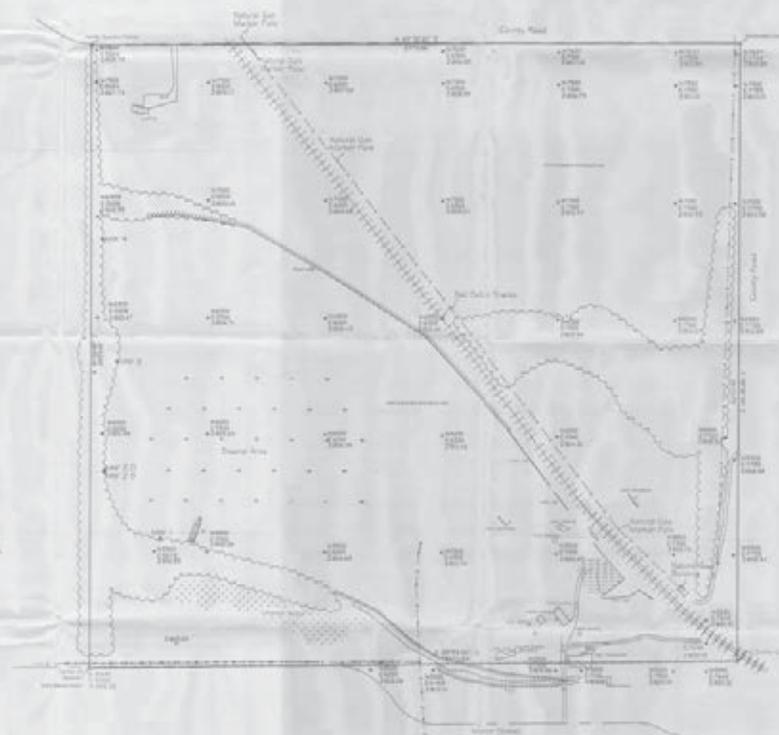
Project No. 16-63 K-2328-01  
 284627 - Center square on West end of South road, 122 feet left of baseline, Station 98+26, Elevation 797.22  
 284628 - A chipped "L" Southwest corner concrete sign at the Southwest corner of 484.320 feet right of baseline, Station 387+41, Elevation 802.25  
 Site Bench Mark - Iron bar located on the Southeast property corner using the Center of Section 8 T32S R17E of the 6th PM, Elevation 805.25



Geotechnical Services Inc. 4503 East 47th St., South Wichita, KS 67220-4551	Scale: 1"=100' Date: 06/28/19 Drawn By: HSC Approved By: JLC Sheet 2 of 2
Carlson Surveying & Mapping Inc. P.O. Box 1701 1426 Kansas St Wichita, KS 67202	Project No. 19305

Topographical Survey  
 NE/4 Sec 8 T32S R17E  
 National Zinc Site, Cherryvale, Kansas  
 Sept. 2010

Station	Angle	Distance	Bearing
1+00	90°00'00"	100.00	N 00°00'00" W
1+01	90°00'00"	100.00	N 00°00'00" W
1+02	90°00'00"	100.00	N 00°00'00" W
1+03	90°00'00"	100.00	N 00°00'00" W
1+04	90°00'00"	100.00	N 00°00'00" W



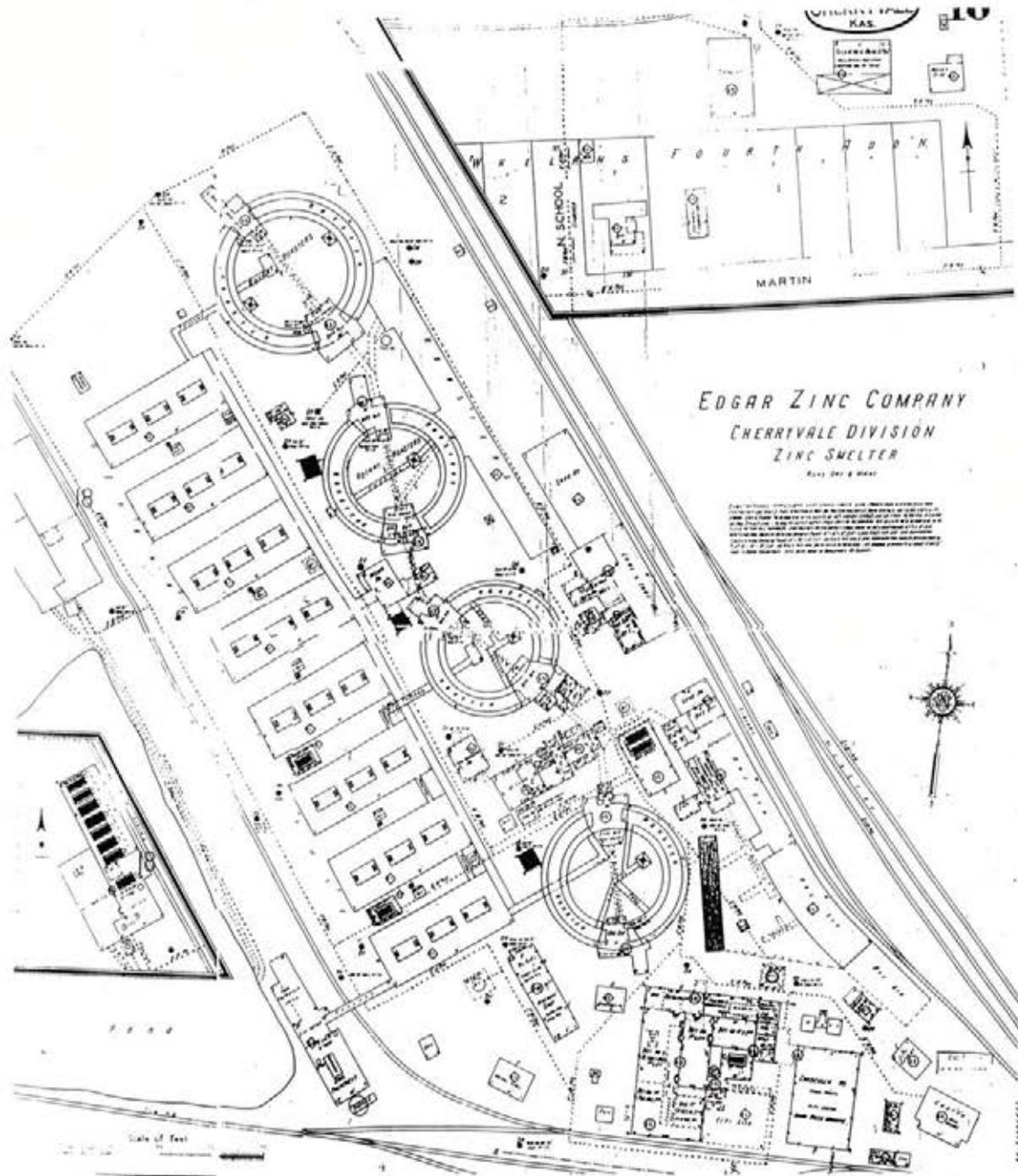
Legend

- Survey Station
- Spot Elevation
- Contour Interval
- Road Right-of-Way
- Utility Right-of-Way
- Easement
- Boundary
- Obstruction
- Underground Natural Gas

Notes:  
 1. All elevations are in feet and are based on the datum of the National Geodetic Survey (NAD 83).  
 2. The boundary shown on this map is based on the survey of the National Zinc Site, Cherryvale, Kansas, dated 1987.  
 3. The boundary shown on this map is based on the survey of the National Zinc Site, Cherryvale, Kansas, dated 1987.



Geotechnical Services Inc. 1000 East 17th St., Suite 100 Lawrence, KS 66044-2000	Drawn: J. Smith Check: J. Smith Date: 09/20/10 Project No. 10000
Carlson Surveying & Mapping Inc. 1000 East 17th St., Suite 100 Lawrence, KS 66044-2000	Project No. 10000



EDGAR ZINC COMPANY  
 CHERRYVALE DIVISION  
 ZINC SMELTER  
 PLAN No. 8-1924

THIS PLAN SHOWS THE LAYOUT OF THE ZINC SMELTER AND THE LOCATION OF THE SEVERAL BURNING FURNACES, REFINING FURNACES, AND THE ZINC CASTING MACHINES. THE LOCATION OF THE SEVERAL BUILDINGS AND THE LOCATION OF THE SEVERAL TANKS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL RAILROADS AND THE LOCATION OF THE SEVERAL ROADS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL WELLS AND THE LOCATION OF THE SEVERAL PUMPS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL OFFICES AND THE LOCATION OF THE SEVERAL STORES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL HOUSES AND THE LOCATION OF THE SEVERAL CHURCHES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL SCHOOLS AND THE LOCATION OF THE SEVERAL HOSPITALS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL PARKS AND THE LOCATION OF THE SEVERAL GOLF COURSES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL CLUBS AND THE LOCATION OF THE SEVERAL RESTAURANTS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL THEATERS AND THE LOCATION OF THE SEVERAL CINEMAS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL GYMNASIUMS AND THE LOCATION OF THE SEVERAL SWIMMING POOLS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL BATHS AND THE LOCATION OF THE SEVERAL SAUNAS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL BARBERSHOPS AND THE LOCATION OF THE SEVERAL BEAUTY SALONS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL TAILORS AND THE LOCATION OF THE SEVERAL SHOE REPAIR SHOPS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL CLOTHING STORES AND THE LOCATION OF THE SEVERAL GROCERY STORES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL FURNITURE STORES AND THE LOCATION OF THE SEVERAL ELECTRICAL STORES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL MUSIC STORES AND THE LOCATION OF THE SEVERAL BOOKSTORES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL NEWSSTANDS AND THE LOCATION OF THE SEVERAL PHARMACIES ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL OPTICIAN'S AND THE LOCATION OF THE SEVERAL DENTISTS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL LAWYERS AND THE LOCATION OF THE SEVERAL DOCTORS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL ENGINEERS AND THE LOCATION OF THE SEVERAL ARCHITECTS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL ACCOUNTANTS AND THE LOCATION OF THE SEVERAL CLERKS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL MANAGERS AND THE LOCATION OF THE SEVERAL SUPERVISORS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL WORKERS AND THE LOCATION OF THE SEVERAL UNIONS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL POLICE AND THE LOCATION OF THE SEVERAL FIRE DEPARTMENT ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL MILITARY AND THE LOCATION OF THE SEVERAL NAVY ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL AIR FORCE AND THE LOCATION OF THE SEVERAL MARINE CORPS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL COAST GUARD AND THE LOCATION OF THE SEVERAL CUSTOMS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL POST OFFICE AND THE LOCATION OF THE SEVERAL TELEGRAPH OFFICE ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL RAILROADS AND THE LOCATION OF THE SEVERAL STEAMSHIPS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL AIRLINES AND THE LOCATION OF THE SEVERAL TRUCKS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL BUSES AND THE LOCATION OF THE SEVERAL TAXIS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL CARS AND THE LOCATION OF THE SEVERAL TRUCKS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL BUSES AND THE LOCATION OF THE SEVERAL TAXIS ARE ALSO SHOWN. THE LOCATION OF THE SEVERAL CARS AND THE LOCATION OF THE SEVERAL TRUCKS ARE ALSO SHOWN.

Scale of Feet

**NATIONAL ZINC SITE  
CHERRYVALE, KANSAS**

**APPENDIX L**

**Preliminary Assessment and Site Inspection (PA/SI) Forms**

**NOTE:** This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

**GENERAL INSTRUCTIONS:** Complete Sections I and III through X as completely as possible before Section II (Preliminary Assessment). File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

## I. SITE IDENTIFICATION

A. SITE NAME National Zinc		B. STREET (or other identifier) NE 1/4, Sec. 8, T 32S, R 17E,	
C. CITY Cherryvale	D. STATE Kansas	E. ZIP CODE 67335	F. COUNTY NAME Montgomery
G. OWNER/OPERATOR (if known) 1. NAME National Zinc Company, Bartlesville, Oklahoma		2. TELEPHONE NUMBER 918-336-7100	
H. TYPE OF OWNERSHIP <input type="checkbox"/> 1. FEDERAL <input type="checkbox"/> 2. STATE <input type="checkbox"/> 3. COUNTY <input type="checkbox"/> 4. MUNICIPAL <input checked="" type="checkbox"/> 5. PRIVATE <input type="checkbox"/> 6. UNKNOWN			
I. SITE DESCRIPTION Abandoned since December 1976			
J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.) Old records from Water Pollution Section, KDHE			K. DATE IDENTIFIED (mo., day, & yr.)
L. PRINCIPAL STATE CONTACT 1. NAME John Paul Goetz		2. TELEPHONE NUMBER 913-862-9360	

## II. PRELIMINARY ASSESSMENT (complete this section last)

A. APPARENT SERIOUSNESS OF PROBLEM <input type="checkbox"/> 1. HIGH <input type="checkbox"/> 2. MEDIUM <input type="checkbox"/> 3. LOW <input type="checkbox"/> 4. NONE <input checked="" type="checkbox"/> 5. UNKNOWN		
B. RECOMMENDATION <input type="checkbox"/> 1. NO ACTION NEEDED (no hazard) <input type="checkbox"/> 2. IMMEDIATE SITE INSPECTION NEEDED a. TENTATIVELY SCHEDULED FOR: b. WILL BE PERFORMED BY: <input type="checkbox"/> 3. SITE INSPECTION NEEDED a. TENTATIVELY SCHEDULED FOR: <u>November 1980</u> b. WILL BE PERFORMED BY: <u>State</u> <input type="checkbox"/> 4. SITE INSPECTION NEEDED (low priority)		
C. PREPARER INFORMATION 1. NAME Vivek Kamath	2. TELEPHONE NUMBER 913-862-9360	3. DATE (mo., day, & yr.) Oct. 1980

## III. SITE INFORMATION

A. SITE STATUS <input type="checkbox"/> 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.) <input checked="" type="checkbox"/> 2. INACTIVE (Those sites which no longer receive wastes.) <u>Since Dec. 1976</u> <input type="checkbox"/> 3. OTHER (specify): (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)		
B. IS GENERATOR ON SITE? <input checked="" type="checkbox"/> 1. NO <input type="checkbox"/> 2. YES (specify generator's four-digit SIC Code):		
C. AREA OF SITE (in acres) Total Plant Area -350Acres	D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES 1. LATITUDE (deg., min., sec.) 2. LONGITUDE (deg., min., sec.)	
E. ARE THERE BUILDINGS ON THE SITE? <input type="checkbox"/> 1. NO <input checked="" type="checkbox"/> 2. YES (specify): <u>Abandoned buildings</u>		

A. TRANSPORTER	B. STORAGE	C. TREATER	D. DISPOSER
1. RAIL	1. PILE	1. FILTRATION	1. LANDFILL
2. TRUCK	2. SURFACE IMPOUNDMENT	2. INCINERATION	2. LANDFARM
3. BARGE	3. DRUMS	3. VOLUME REDUCTION	3. OPEN DUMP
4. TRUCK	4. TANK, ABOVE GROUND	4. RECYCLING/RECOVERY	4. SURFACE IMPOUNDMENT
5. PIPELINE	5. TANK, BELOW GROUND	5. CHEM./PHYS. TREATMENT	5. MIDNIGHT DUMPING
6. OTHER (specify):	6. OTHER (specify):	6. BIOLOGICAL TREATMENT	6. INCINERATION
		7. WASTE OIL REPROCESSING	7. UNDERGROUND INJECTION
		8. SOLVENT RECOVERY	8. OTHER (specify):
		9. OTHER (specify):	
N/A	N/A	N/A	N/A

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

Remedial activity for cleanup of the site has been going on since 1977-78.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

1. UNKNOWN  2. LIQUID  3. SOLID  4. SLUDGE  5. GAS

B. WASTE CHARACTERISTICS

1. UNKNOWN  2. CORROSIVE  3. IGNITABLE  4. RADIOACTIVE  5. HIGHLY VOLATILE  
 6. TOXIC  7. REACTIVE  8. INERT  9. FLAMMABLE

10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
X' (1) PAINT, PIGMENTS	X' (1) OILY WASTES	X' (1) HALOGENATED SOLVENTS	X' (1) ACIDS	X' (1) FLYASH	X' (1) LABORATORY PHARMACEUT.
X (2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGENATED SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	(3) CAUSTICS	(3) MILLING/ MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	(6) OTHER (specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) METALS		
			(11) OTHER (specify):		

# Heavy Metals

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

## VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	X			
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY	X			
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER	X			
8. CONTAMINATION OF SURFACE WATER	X			
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL	X	X	July 1951	Inconclusive
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL	X			
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUIDS	X		Jan. 1951	Overflowing lagoons
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY	X			Abandoned Site
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify):				

## VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

1. NPDES PERMIT     2. SPCC PLAN     3. STATE PERMIT (specify): Not on file  
 4. AIR PERMITS     5. LOCAL PERMIT     6. RCRA TRANSPORTER  
 7. RCRA STORER     8. RCRA TREATER     9. RCRA DISPOSER  
 10. OTHER (specify): \_\_\_\_\_

B. IN COMPLIANCE?

1. YES     2. NO     3. UNKNOWN

4. WITH RESPECT TO (list regulation name &amp; number): \_\_\_\_\_

## VIII. PAST REGULATORY ACTIONS

- A. NONE     B. YES (summarize below)

Waste treatment lagoon was constructed around May 1949. Freeboards increase at many places around 9151.

## IX. INSPECTION ACTIVITY (past or on-going)

- A. NONE     B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION
Water Pollution Control	9/27/77	State	Details in file at BES, KDHE

## X. REMEDIAL ACTIVITY (past or on-going)

- A. NONE     B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION
Overall cleanup of site	10/77	State	Company was asked to cleanup the site. Remedial action for treatment and discharge of water started in 1978.

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment (Section II) information on the first page of this form.

State of Kansas  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
Division of Environment  
Topeka, Kansas 66620

M E M O R A N D U M

TO: Cherryvale Zinc Division File  
FROM: Vivek Kamath *VK*  
DATE: November 17, 1980  
SUBJECT: Site Inspection

On November 6, 1980, John Paul Goetz, Mike Cochran (Southeast District), and the writer conducted an inspection of the above-mentioned site located at Cherryvale, Montgomery County. Mr. E. E. Vogel, Engineering Manager, National Zinc Company, Bartlesville, Oklahoma, was available for showing us around the cleanup operations.

The following observations were made at the time of inspection:

- 1) The leveling of the lake and the small pond with clay and top soil was complete and there are no signs of ponding of water. However, some pretreatment of the top soil will have to be done for growth of grass.
- 2) The addition of lime to the treatment ponds has been stopped and both the ponds are empty. However, there is a thick layer of sludge at the bottom of the ponds.
- 3) The black cinders from the old plant operations have been spread all over the site near the treatment ponds. This was not of much concern, since the material has been found to be inert from earlier analysis.

Representative samples have been taken from the sludge at the bottom of the treatment ponds and from the monitoring wells numbers 1, 2A, 3, and 4. The shallow well number 2B was dry.

jp

County Montgomery

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT  
DIVISION OF ENVIRONMENT

SAMPLE COLLECTION INFORMATION  
INORGANIC ANALYSES

Source of Sample: Cherryvale Zinc,

Address: Cherryvale, Montgomery

Sample Identification: # CZ2, CZ3, CZ4, CZ5.

Date Collected: 11/6/80 Time Collected: AM

Collected By: ~~W. Kamath~~ E. E. Vogel (National Zinc) and V. Kamath

Chain of Custody: V. Kamath →

Date: \_\_\_\_\_ Received From: \_\_\_\_\_ Received By: \_\_\_\_\_

Well No.	Well Depth	Well No.	Well Depth
<u>1631</u> <u>1</u> (CZ2)	_____	_____	_____
<u>1632</u> <u>2A</u> (CZ3)	_____	_____	_____
<u>1633</u> <u>3</u> (CZ4)	_____	_____	_____
<u>1634</u> <u>4</u> (CZ5)	_____	_____	_____

Comments: Monitoring well samples. Locations along south and west side of lake which is covered at the moment.

Examination Requested:

- Heavy Metals (Cd - Cr - Cu - Pb - Zn)
- Heavy Metals Complete
- Partial Chemical Analyses
- Complete Chemical Analyses
- Other pH

Priority:

- Emergency
- Regular

Send Report To: V. Kamath

County Montgomery County

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT  
DIVISION OF ENVIRONMENT

SAMPLE COLLECTION INFORMATION  
INORGANIC ANALYSES

Source of Sample: Cherryvale Zinc,

Address: Cherryvale, Montgomery

Sample Identification: # CZ 1 1635

Date Collected: 11/6/80 Time Collected: 945 A.M

Collected By: V. Kamath

Chain of Custody: V. Kamath →

Date: \_\_\_\_\_ Received From: \_\_\_\_\_ Received By: \_\_\_\_\_

<u>Well No.</u>	<u>Well Depth</u>	<u>Well No.</u>	<u>Well Depth</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Comments: this is the sludge sample in the treatment ponds settled at the bottom. Ponds are dry now.

Examination Requested:

Heavy Metals (Cd - Cr - Cu - Pb - Zn)

Heavy Metals Complete

Partial Chemical Analyses

Complete Chemical Analyses

Other EP Toxicity

Priority:

Emergency

Regular

Send Report To: V. Kamath



**REPORT OF INORGANIC WATER ANALYSIS**  
**STATE OF KANSAS**  
**DEPARTMENT OF HEALTH & ENVIRONMENT**  
**OFFICE OF LABORATORIES AND RESEARCH**  
**FORBES BLDG. 740, TOPEKA, KANSAS 66620**

Address inquiries to:  
 Division of Environment  
 Mail samples to:  
 Environmental Laboratories

Lab. No. 1635  
 H.W. \_\_\_\_\_  
 Acct. Gen. San. \_\_\_\_\_  
 Bottle No. \_\_\_\_\_

LOCALITY Montgomery County COLLECTED BY Kamath  
 DATE COLLECTED 11/6/80 DATE REC'D 11/19/80 DATE REPORTED DEC. 23 1980

Copies To:  
 V. Kamath ✓  
 Chuck Linn

SOURCE:  
 Cherryvale Zinc., Cherryvale, Ks.  
 Sludge Sample, EP Toxicity

RESULTS EXPRESSED IN MILLIGRAMS PER LITER

Calcium (Ca <sup>++</sup> )	Carbonate (CO <sub>3</sub> )	pH	Iron
Magnesium (Mg <sup>++</sup> )	Bicarbonate (HCO <sub>3</sub> )	Turbidity (NTU)	Manganese
Sodium (Na <sup>+</sup> )	Chloride (Cl)	Specific Cond.	Arsenic <u>0.01</u>
Potassium (K <sup>+</sup> )	Sulfate (SO <sub>4</sub> )	T. Dissolved Solids	Barium <u>0.2</u>
	Nitrate (As N)	Total Phosphorus	Cadmium <u>360.</u>
	Fluoride (F)	Ortho Phosphate (P)	Chromium <u>0.01</u>
		Silica (SiO <sub>2</sub> )	Copper
		Boron	Lead <u>0.3</u>
Hardness and Alkalinity in Terms of mg/l of CaCO <sub>3</sub> (calculated)		Dissolved Oxygen	Mercury <u>0.000</u>
Total Hardness	Total Alkalinity	5 day 20°C BOD	Selenium <u>0.028</u>
Carbonate Hardness	NaHCO <sub>3</sub> Alkalinity	COD	Silver <u>0.01</u>
Non-Carbonate Hardness		Ammonia (As N)	Zinc
		T. Sus. Solids	Aluminum

Chemist F-1

Items failing to meet accepted standards are circled.

CD

RECEIVED  
 DIVISION OF ENVIRONMENTAL SERVICES  
 NOV 20 1980





POTENTIAL HAZARDOUS WASTE SITE  
INSPECTION REPORT

REGION VII SITE NUMBER (to be assigned by Hq) KS-000009150

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME National Zinc		B. STREET (or other identifier) NE 1/4, Section 8, Township 32S, Range 17E	
C. CITY Cherryvale	D. STATE Kansas	E. ZIP CODE 67335	F. COUNTY NAME Montgomery

G. SITE OPERATOR INFORMATION			
1. NAME National Zinc Company, Bartlesville, Oklahoma		2. TELEPHONE NUMBER 918-336-7100	
3. STREET SE 1/4 Sec. 8, T 32S, R 17E	4. CITY Cherryvale	5. STATE Ks	6. ZIP CODE 67335

H. REALTY OWNER INFORMATION (if different from operator of site)			
1. NAME National Zinc Company		2. TELEPHONE NUMBER 918-336-7100	
3. CITY Bartlesville	4. STATE Ok.	5. ZIP CODE 74003	

I. SITE DESCRIPTION The site was an old zinc production facility. The cleanup operation of old impoundments had begun in 1978-79.

J. TYPE OF OWNERSHIP  
 1. FEDERAL     2. STATE     3. COUNTY     4. MUNICIPAL     5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.) Feb. 15, 1981	B. APPARENT SERIOUSNESS OF PROBLEM <input type="checkbox"/> 1. HIGH <input checked="" type="checkbox"/> 2. MEDIUM <input type="checkbox"/> 3. LOW <input type="checkbox"/> 4. NONE
--	---

C. PREPARER INFORMATION		
1. NAME Vivek Kamath	2. TELEPHONE NUMBER 913-862-9360	3. DATE (mo., day, & yr.) Nov. 10, 1980

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION			
1. NAME John Paul Goetz		2. TITLE Environmental Engineer	
3. ORGANIZATION KDHE		4. TELEPHONE NO. (area code & no.) 913-862-9360	

B. INSPECTION PARTICIPANTS		
1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
John Paul Goetz	KDHE	913-862-9360
Vivek Kamath	"	"
M. Cochran	Southeast District Office	316-431-2390

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)		
1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
E. E. Vogel	Engineering Manager 918-336-7100	National Zinc Company, P. O. Box 579 Bartlesville, Oklahoma 74003

## INSPECTION INFORMATION (continued)

## D. GENERATOR INFORMATION (source of )

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
National Zinc Co.	(no longer in operation at site, operations terminated on December 1976)		Zinc production waste

## E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
Hazardous waste not hauled			

## F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
Waste is not processed or shipped to off-site facilities		

## G. DATE OF INSPECTION

(mo., day, & yr.)  
Nov. 6, 1980

## H. TIME OF INSPECTION

AM

## I. ACCESS GAINED BY: (credentials must be shown in all cases)



1. PERMISSION



2. WARRANT

## J. WEATHER (describe)

Clear Skies, around 60° F.

## IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER			
b. SURFACE WATER			
c. WASTE treated sludge in ponds	X	KDHE Lab	Jan. 2, 1981
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER (specify) Monitoring wells (4)		KDHE Lab	Jan. 2, 1981

## B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS

a. GROUND     b. AERIAL

2. PHOTOS IN CUSTODY OF:

John Paul Goetz, BES, KDHE

D. SITE MAPPED?

YES. SPECIFY LOCATION OF MAPS:

copy enclosed

E. COORDINATES

1. LATITUDE (deg.-min.-sec.)

2. LONGITUDE (deg.-min.-sec.)

V. SITE INFORMATION

A. SITE STATUS

1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

2. INACTIVE (Those sites which no longer receive wastes.)

3. OTHER (specify):  
(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

1. NO     2. YES (specify generator's four-digit SIC Code): \_\_\_\_\_

C. AREA OF SITE (in acres)

Total 350 Acres - Total area of old ponds 23 Acres

D. ARE THERE BUILDINGS ON THE SITE?

1. NO     2. YES (specify): \_\_\_\_\_

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

<input checked="" type="checkbox"/>	A. TRANSPORTER	<input checked="" type="checkbox"/>	B. STORER	<input checked="" type="checkbox"/>	C. TREATER	<input checked="" type="checkbox"/>	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for.. See note on page 10

1. STORAGE     2. INCINERATION     3. LANDFILL     4. SURFACE IMPOUNDMENT     5. DEEP WELL  
 6. CHEM/BIO/PHYS TREATMENT     7. LANDFARM     8. OPEN DUMP     9. TRANSPORTER     10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE Only sludge is present now

1. LIQUID     2. SOLID     3. SLUDGE     4. GAS

B. WASTE CHARACTERISTICS

1. CORROSIVE     2. IGNITABLE     3. RADIOACTIVE     4. HIGHLY VOLATILE  
 5. TOXIC     6. REACTIVE     7. INERT     8. FLAMMABLE

9. OTHER (specify): Unknown

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

WASTE RELATED INFORMATION (continued)

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE		b. OIL		c. SOLVENTS		d. CHEMICALS		e. SOLIDS		f. OTHER	
AMOUNT		AMOUNT		AMOUNT		AMOUNT		AMOUNT		AMOUNT	
316											
UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE	
tons											
<input checked="" type="checkbox"/>	(1) PAINT, PIGMENTS	<input checked="" type="checkbox"/>	(1) OILY WASTES	<input checked="" type="checkbox"/>	(1) HALOGENATED SOLVENTS	<input checked="" type="checkbox"/>	(1) ACIDS	<input checked="" type="checkbox"/>	(1) FLYASH	<input checked="" type="checkbox"/>	(1) LABORATORY, PHARMACEUT.
	(2) METALS SLUDGES		(2) OTHER(specify):		(2) NON-HALOGNTD. SOLVENTS		(2) PICKLING LIQUORS		(2) ASBESTOS		(2) HOSPITAL
	(3) POTW				(3) OTHER(specify):		(3) CAUSTICS		(3) MILLING/MINE TAILINGS		(3) RADIOACTIVE
	(4) ALUMINUM SLUDGE						(4) PESTICIDES		(4) FERROUS SMELTING WASTES		(4) MUNICIPAL
<input checked="" type="checkbox"/>	(5) OTHER(specify): Lime treatment water sludge; might be contaminated with heavy metals.						(5) DYES/INKS		(5) NON-FERROUS SMLTG. WASTES		(5) OTHER(specify):
							(6) CYANIDE		(6) OTHER(specify):		
							(7) PHENOLS				
							(8) HALOGENS				
							(9) PCB				
							(10) METALS				
							(11) OTHER(specify):				

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X')			3. TOXICITY (mark 'X')				4. CAS NUMBER	5. AMOUNT	6. UNIT
	a. SOLID	b. LIQ.	c. VAPOR	a. HIGH	b. MED.	c. LOW	d. NONE			
Heavy metals	X									

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

A. HUMAN HEALTH HAZARDS

None detected

## .III. HAZARD DESCRIPTION (continued)

 B. NON-WORKER INJURY/EXPOSURE

None

 C. WORKER INJURY/EXPOSURE

None

 D. CONTAMINATION OF WATER SUPPLY

Contamination of adjacent Drum Creek reported by local residents in April 1976.

 E. CONTAMINATION OF FOOD CHAIN

None detected

 F. CONTAMINATION OF GROUND WATER

None to speak of at present

 G. CONTAMINATION OF SURFACE WATER

Drum Creek reported to be contaminated due to excessive precipitation about three to four years ago. No contamination reported since then.

VIII. HAZARD DESCRIPTION (continued)

H. DAMAGE TO FLORA/FAUNA

None

I. FISH KILL

Inconclusive incident of fish kill in 1951

J. CONTAMINATION OF AIR

None

K. NOTICEABLE ODORS

None

L. CONTAMINATION OF SOIL

None

M. PROPERTY DAMAGE

None

## VIII. HAZARD DESCRIPTION (continued)

 N. FIRE OR EXPLOSION

None

 O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

Incidents of overtopped dikes of old lagoon reported when plant was in operation in 1950's.

 P. SEWER, STORM DRAIN PROBLEMS

None

 Q. EROSION PROBLEMS

None

 R. INADEQUATE SECURITY

Gate unattended

 S. INCOMPATIBLE WASTES

Unknown

VIII. HAZARD DESCRIPTION (continued)

T. MIDNIGHT DUMPING

None

U. OTHER (specify):

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	about 3-4 houses downstream			
2. IN COMMERCIAL OR INDUSTRIAL AREAS				
3. IN PUBLICLY TRAVELLED AREAS				
4. PUBLIC USE AREAS (parks, schools, etc.)				

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit) 15 feet	B. DIRECTION OF FLOW West	C. GROUNDWATER USE IN VICINITY Limited-Livestock
D. POTENTIAL YIELD OF AQUIFER very low 1-gpm	E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure) Approx. 8 miles	F. DIRECTION TO DRINKING WATER SUPPLY West
G. TYPE OF DRINKING WATER SUPPLY		
<input type="checkbox"/> 1. NON-COMMUNITY < 15 CONNECTIONS*	<input checked="" type="checkbox"/> 2. COMMUNITY (specify town): <u>Cherryvale</u>	
<input checked="" type="checkbox"/> 3. SURFACE WATER	<input type="checkbox"/> 4. WELL	

**X. WATER AND HYDROLOGICAL DATA (continued)**

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COM- MUNITY (mark 'X')	5. COMMUN- ITY (mark 'X')
	unknown			

I. RECEIVING WATER

1. NAME Drum Creek       2. SEWERS       3. STREAMS/RIVERS  
 4. LAKES/RESERVOIRS       5. OTHER (specify): \_\_\_\_\_

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Unknown

**XI. SOIL AND VEGETATION DATA**

LOCATION OF SITE IS IN:

- A. KNOWN FAULT ZONE       none of these       B. KARST ZONE       C. 100 YEAR FLOOD PLAIN       D. WETLAND  
 E. A REGULATED FLOODWAY       F. CRITICAL HABITAT       G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

**XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED**

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. COVERED	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
	1. SAND				
X	2. CLAY		Limestone - Pennsylvania Drum		
	3. GRAVEL				

**XIII. SOIL PERMEABILITY**

- A. UNKNOWN       B. VERY HIGH (100,000 to 1000 cm/sec.)       C. HIGH (1000 to 10 cm/sec.)  
 D. MODERATE (10 to .1 cm/sec.)       E. LOW (.1 to .001 cm/sec.)       F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

1. YES       2. NO      3. COMMENTS:

H. DISCHARGE AREA

1. YES       2. NO      3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE      2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.

0-3

Southwest

J. OTHER GEOLOGICAL DATA

## XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

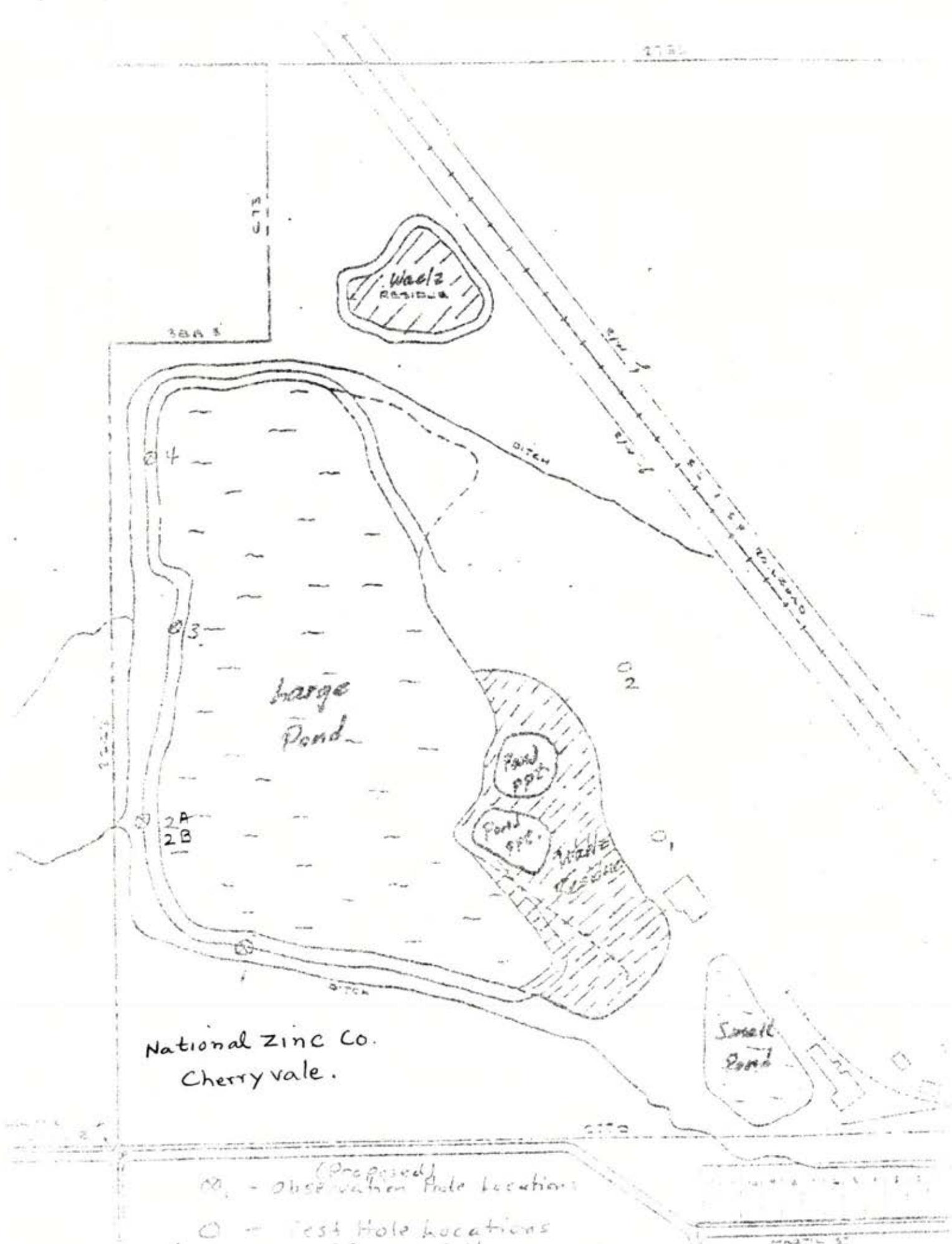
A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X')		
					1. YES	2. NO	3. UNKNOWN
Temporary permit to discharge treated water was given on March 8, 1979							X

## XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

 NONE     YES (summarize in this space)

Remedial action for cleaning up the site was initiated by the KDHE in October 1977. The lake water has been discharged after treatment and the lake covered with dirt and top soil. The lime treatment of the ponds is also completed and the ponds are dry. The only action which needs to be taken is encapsulation of sludges and residues and the final surface contour along with lime treatment plus top soil cover. The entire project was to have been completed by November 1, 1980. However, it has been stopped due to lack of funds. The company has expressed its intention to complete the project as soon as funds become available.

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition (Section II) information on the first page of this form.



National Zinc Co.  
Cherryvale.

- (Proposed)
- ⊙ - Observation Hole Locations
- - Test Hole Locations



POTENTIAL HAZARDOUS WASTE SITE  
TENTATIVE DISPOSITION

REGION VII SITE NUMBER KS-000009150

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME National Zinc	B. STREET NE 1/4 S.8, T32S, R17E, Montgomery Co.	
C. CITY Cherryvale	D. STATE Ks	E. ZIP CODE 67335

II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY			
		EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED -- NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED (If yes, complete Section III.)	X		X		
C. REMEDIAL ACTION NEEDED (If yes, complete Section IV.)	X				X
D. ENFORCEMENT ACTION NEEDED (if yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)					

E. RATIONALE FOR DISPOSITION

Remedial action was initiated by KDHE in October 1977 and is still going on. The tasks which have to be carried out by the operator include final grading and application of soil cover and lime treatment and planting of grass. The whole plan should be completed by July 1981. In the meantime some investigative activity will also be performed by the state to check for groundwater contamination.

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION (mo., day, & yr.)

July 1981

G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL BE DEVELOPED (mo., day, & yr.):

H. PREPARER INFORMATION

1. NAME V. Kamath	2. TELEPHONE NUMBER 913-862-9360	3. DATE (mo., day, & yr.) 4/17/81
----------------------	-------------------------------------	--------------------------------------

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

B. PROPOSED INVESTIGATIVE ACTIVITY (Detailed Information)

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION (mo, day, & yr)	3. TO BE PERFORMED BY (EPA, Contractor, State, etc.)	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF SITE INSPECTION				
(1) _____				
(2) _____				
(3) _____				
b. TYPE OF MONITORING				
(1) Groundwater	4/81	State	4.	on-site and off-site
(2) _____				
c. TYPE OF SAMPLING				
(1) _____				
(2) _____				

**NATIONAL ZINC SITE  
CHERRYVALE, KANSAS**

**APPENDIX M**

**Property Ownership Records and Other Supporting Documentation**

8.005

National Zinc Co.  
P.O. Box 579  
Bartlesville, Okla  
74605

RESTRICTIVE COVENANT

National Zinc Company, a Delaware corporation, the owner of the following-described real property located in Montgomery County, State of Kansas: (See attached map)

TRACT 2

All of the Northeast Quarter of Section Eight (8), Township Thirty-two (32) South, Range Seventeen (17) East, lying south and west of the right-of-way of the St. Louis and San Francisco Railroad, save and except the following:

- a. A tract of land described as beginning at the Northwest corner of the North Half (N/2) of the Northeast Quarter (NE/4) of said Section Eight (8), thence East on the Section line 388.5 feet, thence South 673 feet, thence West 388.5 feet, thence North on the Quarter Section line 673 feet to the place of beginning.
- b. A tract of land described as beginning at a point on the East-West Half Section line of said Section Eight (8) located 75 feet North of the Northeast corner of Lot One (1), Block One (1), WHELAN'S FOURTH ADDITION to the City of Cherryvale, Kansas, according to the Recorded Plat thereof, thence North a distance of 85 feet, thence Easterly and parallel to the center line of the railroad spur a distance of 300 feet, more or less, to the West right-of-way line of the St. Louis and San Francisco Railroad, thence Southeasterly along the aforesaid railroad right-of-way to the East-West Half Section line of said Section 8, thence West along said Half Section line a distance of 325 feet, more or less, to the point of beginning, said tract containing 0.57 acres, more or less.

and

TRACT 5

A tract of land lying in the Northeast Quarter (NE/4) of the Southeast Quarter (SE/4) of said Section Eight (8) described as follows:

Beginning at the Northeast corner of the Northwest Quarter (NW/4) of the Southwest Quarter (SW/4) of Section Eight (8), thence East 1089 feet along the Half Section line of Section Eight (8), thence South 75 feet, thence West 1089 feet along the North line of the alley located on the North side of Blocks One (1) and Two (2), WHELAN'S FOURTH ADDITION to the City of Cherryvale, Kansas, according to the Recorded Plat thereof, thence North 66 feet to the point of beginning, said tract containing 1.76 acres, more or less.

hereby makes the following declarations of restrictions and specifies that such restrictions shall constitute covenants running with all of such land, and shall be binding on all parties and all persons claiming under it, this

declaration of restrictions being designed for the purpose of protecting the public welfare:

The owners of the above-described property, their successors and assigns, may not, without the express prior written consent of the Secretary of the Kansas Department of Health and Environment, use or develop such property in any way which would involve (a) the removal of waste material stored at the site; (b) the construction of permanent structures; (c) the alteration of contours thereof; (d) the digging of drainage ditches; (e) the removal or disturbance of environmental monitoring stations installed thereon; (f) the changing of vegetation grown on areas thereof used for waste storage or disposal; (g) the production, use or sale of food chain crops; (h) the removal of security fencing, signs or other devices installed or used to restrict public access to areas thereof used for waste storage or disposal. The Secretary of the Kansas Department of Health and Environment, its successors and assigns, shall have a perpetual right of ingress and egress over and across the above-described property to sample, repair or reconstruct environmental monitoring stations constructed thereon as part of the site closure activities."

IN WITNESS WHEREOF, National Zinc Company has hereunto set its hand this 26<sup>th</sup> day of October, 1983.

NATIONAL ZINC COMPANY  
A Delaware Corporation

By Thomas L. Vogt  
President Thomas L. Vogt

ATTEST:

James W. Brown  
Notary Secretary  
James W. Brown  
[CORPORATE SEAL]  
STATE OF OKLAHOMA )  
COUNTY OF TULSA ) ss.

Before me, the undersigned, a Notary Public in and for said County and State, on this 26<sup>th</sup> day of October, 1983, personally appeared Thomas L. Vogt, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as a free

and voluntary act and deed and as the free and voluntary act and deed of such corporation for the uses and purposes therein set forth.

Given under my hand and seal of office the day and year last above written.

Diane E. Zonka  
Notary Public

Diane E. Zonka



STATE OF KANSAS }  
MONTGOMERY COUNTY } SS

This instrument was filed for record on  
the 15 day of Nov. A.D., 19 83 at  
1:00 o'clock P. M. and duly recorded  
in book 61 of Misc. page 218

Nora Steinberger  
Register  
By NORA STEINBERGER Deputy

ORIGINAL COMPARED WITH RECORD



RECEIVED

NOV 17 1983

NATIONAL ZINC CO.  
BARTLESVILLE, OKLA.



**TRACT 1**  
 SE 1/4 SEC. 5, T32S - R17E  
 EXCEPT R.R. RIGHT OF WAY &  
 SW OF R.R. RIGHT OF WAY

6 ACRES NOT OWNED BY N.Z.CO.

RAILROAD RIGHT OF WAY

**TRACT 2**

MONITOR WELLS

NE 1/4 SEC. 8, T32S - R17E  
 EXCEPT R.R. RIGHT OF WAY &  
 6 ACRES

HIGHWAY N° 169

HIGHWAY RIGHT OF WAY

CITY OF CHERRYVALE

ENLARGED PLAN DWG. 165-CF

**TRACT 3**  
 NW 1/4 SE 1/4 SEC. 8  
 T32S, R17E  
 EXCEPT WEST END ADD.

WEST END ADD.

**TRACT 4**  
 LOTS 1 TO 7 INC. BLK. 1  
 LOTS 1 TO 12 INC. BLK. 2  
 WHELAN'S 4<sup>TH</sup> ADDITION

**TRACT 5**  
 STRIP 1089' LG. &  
 66' TO 75' W. NORTH  
 OF WHELAN'S 4<sup>TH</sup>  
 ADDITION

NO.	BY	DATE	DESCRIPTION	NO.	DATE	ISSUED TO
REVISION				PRINT ISSUE		

NOTES:  
 METALLURGICAL AREAS  
 REF. DWG. N° : 165 - CF

national zinc company bartlesville oklahoma		DEPT. CHERRYVALE	DATE 5-10-68
DWN. BY J.D. Cotton		CHERRYVALE, KANSAS	SCALE —
CHECKED BY E.E.V.		PLANT SITE PROPERTIES	164-CF

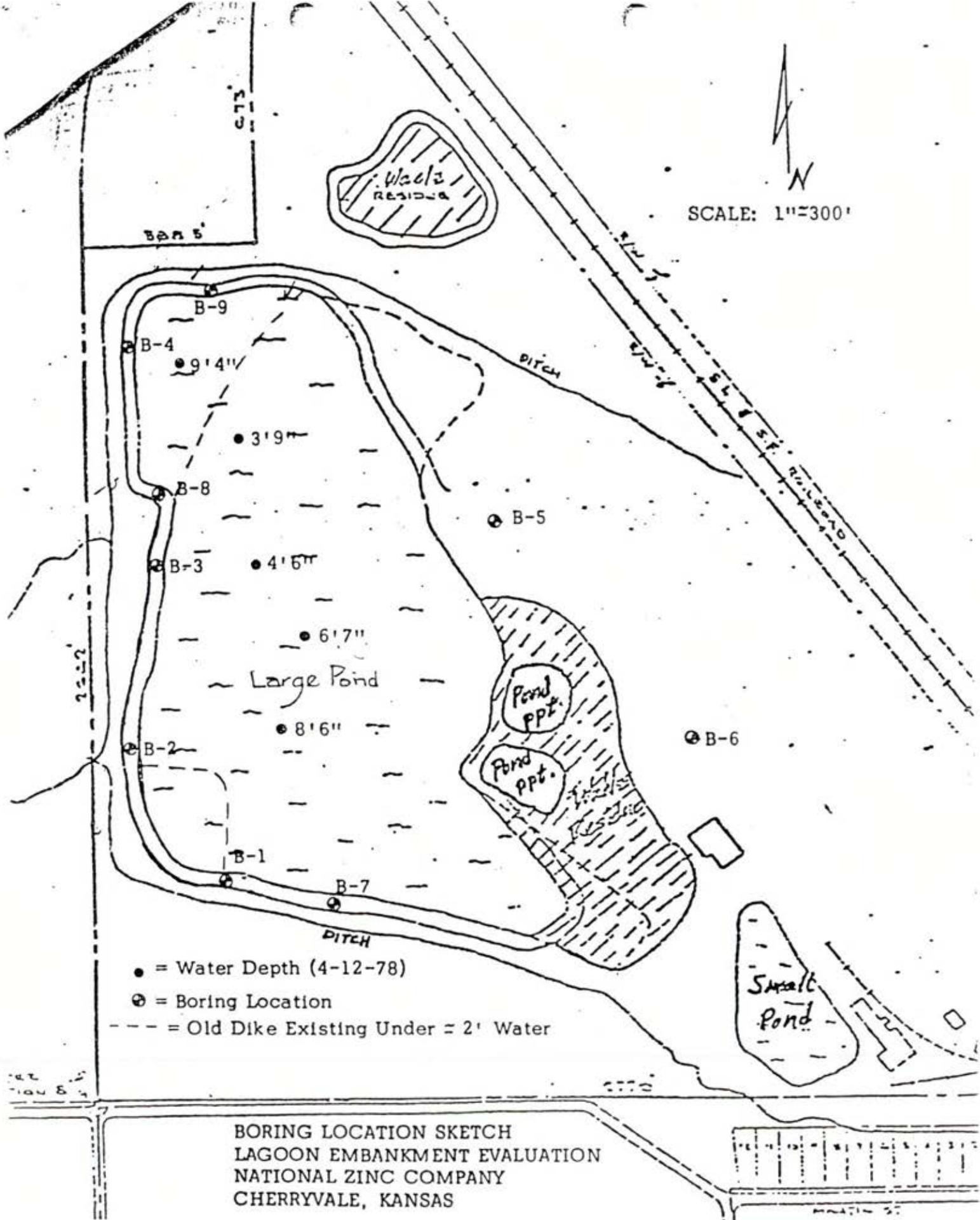


Figure 1

State of Kansas  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
DIVISION OF ENVIRONMENT  
Topeka, Kansas 66620

M E M O R A N D U M

TO: Melville W. Gray  
FROM: Don Carlson and Bill Bryson  
DATE: October 19, 1977  
SUBJECT: Discussion of Water Pollution Problems  
at Cherryvale Zinc Inc.

RECEIVED

OCT 20 1977

BUREAU OF ENVIRONMENTAL  
SANITATION

The Cherryvale Zinc Division of National Zinc, Inc., permanently terminated their operations at the Cherryvale, Kansas, facility on December 24, 1976. An inspection was made of the premises on September 27, 1977, by Kansas Department of Health and Environment staff from Topeka and Chanute relative to the existence of possible surface or groundwater pollution hazards associated with plant runoff and the containment facilities at the site. It is a consensus of the group that a potentially serious pollution hazard to the surface water exists and that steps should be taken to require National Zinc, Inc. to clean up the premises and dispose of all liquid and solid wastes in an environmentally acceptable manner.

In order to appreciate the scope and magnitude of the problem, the following attachments are included with this memorandum:

1. A chronology of past actions or positions taken by the Department of Health and Environment toward on-site containment of runoff and process waste streams.
2. Chemical analyses and heavy metal determination of lagoon and seepage water collected on April 7, 1976, April 6, 1977, and September 27, 1977.
3. A set of maps and two drawings showing:
  - a. The location of the plant with respect to Cherryvale and Montgomery County in general (Figures 1, 2, and 3).
  - b. The position and area coverage of lagoons which have received heavy metal contamination. (Figures 1 and 2).
  - c. The location of major points of seepage outflow from leaks in the dike of Lagoon A. (Figure 4).

- d. The direction and drainage course receiving contaminated stormwater runoff and/or wastewater. (Figures 2 and 3).

The presence of heavy metals in Lagoon A is considered a potential pollution threat to the downstream water quality in Cherry and Drum Creeks. The chloride and sulfate concentration is also high enough to be of some concern with particular reference to their additive affects in solutions containing heavy metals. The pollution potential is realistic and has arisen through the following set of circumstances:

1. The 15 acre Lagoon A was designed to receive plant runoff. This includes runoff from the numerous piles of slag and roasted ore. During the past year, the dike separating Lagoon B (five acres) from Lagoon A has been submerged due to excessive runoff. The estimated depth of Lagoon A is a minimum of five feet. The permeable cinder and slag material comprising the dike of Lagoon A allows seepage loss into the drainage from several places (Figure 4). Chemical analyses show undesirable concentrations of cadmium, zinc, copper, and nickel in both pond water and seepage. Even with the seepage losses, sufficient runoff has occurred at times to cause overtopping of the dike. This has eroded the dike in two places and has resulted in a slight lowering of the lagoon capacity. The freeboard in Lagoon A was about four inches below the top of the dike on September 27. The heavy mineral concentrations far exceed the water quality standards for Nickel, Cadmium, Zinc and Copper and it is doubtful that fish and other biota could survive in the stream. The absence of reported fish kill occurrences during the last 15 years probably reflects the total absence of fish rather than stream quality improvement after lagoon construction.
2. The piles of slag and roasted ore will continue to be a source of heavy mineral contaminants unless disposed of in an environmentally acceptable manner. This is basically a hazardous waste problem and is being studied by John Goetz and Jon Hughes. The degree and extent of contaminants leaching from the stockpiles will be better defined when we receive a detailed chemical analysis from the stockpiled materials.
3. Inspection of the analyses shows that there is very little lead in the lagoon water or resulting seepage. It is our opinion that a heavy mineral concentrate (including lead) is present in the clay and silt layer at the bottom of the lagoons. This would be expected since lead has a low degree of mobility and, therefore, attenuates rather rapidly.

4. There is some indication that the dike around Lagoon A consists primarily of cinder and granulated slag. We have no record that the core of the dike consists of less permeable material. The base of the lagoon is on top of a limestone and this condition has created a convenient vehicle for seepage movement. Seepage coupled with dike erosion caused by overflow could eventually trigger a structural failure of the dike. The result of failure would be the instantaneous discharge of large quantities of lagoon water downstream.

The above addresses and defines the potential pollution problems which could develop if the lagoons and waste piles are relegated to a state of permanent abandonment. The difficult part of the problem is the development of feasible methods for disposal, or treatment of the various liquids and solid wastes involved. The following paragraphs explore alternative disposal measures and the problems that might be encountered during the implementation of each.

The water in the four lagoons presents a removal problem because of the volume of fluid which would have to be transported for disposal elsewhere. The following options are open:

1. Drill a well to the Arbuckle for disposal of the lagoon water. The depth of the top of the Arbuckle in this area ranges between 1100 - 1200 feet. This disposal operation would be viewed as a one-time occurrence and the well would be plugged in accordance with KCC supervision as soon as the liquid contents of each lagoon were emptied.
2. Treatment of the water to remove heavy metals is only part of the problem since the chloride and sulfate concentrations would still be too high to return to the environment through surface discharge. (Table 2). Some heavy metals, i.e. Cadmium and Zinc have high mobility and low attenuation behavior. Iron was not analyzed for which was probably an omission because several heavy metals are tied up by iron and do not leave the source area.

The resulting problems associated with each option are outlined below:

1. Deep Well Disposal of Lagoon Water - Because of the volume of fluid involved, one alternative would be to drill a disposal well into the Arbuckle or underlying Lamotte sandstone (if present) and dispose of the contents of each lagoon. Usage of this well would be limited to the life of the project after which it would be plugged. Use of the Arbuckle for disposal would depend upon:

- a. The existing water quality in the Arbuckle of Labette and Montgomery Counties.
- b. The ability of the Arbuckle to receive fluid at an acceptable rate without wellhead pressure.
2. Physical-Chemical Treatment of Lagoon Contents - Treat the fluid in each lagoon to remove the heavy metals prior to discharge to the surface drainage. Disadvantages or shortcomings of this method:
  - a. The volume of water in the lagoons would make this course of action a real chore.
  - b. There would be a considerable volume of metal sludge or concentrate which would require transport to a hazardous waste site.
3. Bottom Sediment of the Lagoon - Removal of the bottom sediment from the lagoon in order to lessen the amount of heavy metals available for leaching to the surface drainage.
  - a. Some difficulty as described under 2(b).
4. Disposal or Landfilling of Slag and Roasted Ore Piles - A decision would be needed on whether these piles should be disposed of as a hazardous waste or as demolition material. A chemical analysis of the amount of potential leachable heavy metal material would be necessary to determine which category of disposal is desirable.
  - a. If the slag or roasted ore is relatively inert, the lagoons could be backfilled with this material and provided with a dirt cover.
  - b. If the material has appreciable quantities of leachable material, a decision as to acceptable disposal (encapsulation, removal to a hazardous waste site, etc.) would have to be made.
  - c. Areas of heavily contaminated soil should be treated in a similar manner to 4(b).
5. Stormwater Diversion - In order to implement any of the above, structures for the diversion of uncontaminated stormwater runoff will be needed.

Two additional situations which necessitate an early solution to these problems are:

1. The City of Cherryvale would like to develop this acreage as an industrial park. If National Zinc can transfer its culpability in this matter to the city, the matter of negotiating environmental upgrading would become more difficult.
2. The Environmental Protection Agency is embarking on a pit, pond and lagoon inventory which is to be administrated through the states as a part of P.L. 93-523. Each lagoon facility will be subjected to evaluation with respect to its pollution potential. For statistical purposes, it would show us in a better light if some type of clean up program had been initiated.

We have taken photographs and slides of the plant site, lagoon system, and receiving stream. These are available if you would wish to view them.

jaw

Attachment

cc: D. Carlson  
B. Bryson  
J.P. Goetz  
B. Towery  
H. Janzen  
E. Jensen

CHRONOLOGY OF KDHE INVOLVEMENT  
WITH CHERRYVALE ZINC COMPANY

- June 1941 - Montgomery County Health Department investigated alleged pollution of Drum Creek. Samples analyzed by Board of Health indicate the presence of zinc and lead. No documentation as to the outcome of the investigation.
- November 1941 - Board of Health directs the Montgomery County Health Department to contact industry and initiate action by the industry to abate further pollution of Drum Creek.
- July 1947 - Letter informs Board of Health that construction of the holding ponds is nearing completion. The letter discusses the release of the ponds liquid when flows in Drum Creek are high via a siphon.
- September 1948 - An investigation of pollution in Drum Creek indicates that excessive surface runoff had filled the lagoons. The ponds had overflowed and a section of the dikes were noted as leaking.
- February 1949 - Dwight F. Metzler calls a hearing to discuss pollution from the National Zinc Co.
- May 1949 - As a result of the hearing, a large lagoon is designed to assure total containment. Gordon E. Mau reviewed the plans and specifications for what is now the large lagoon, i.e. Lagoon A on Figure No. 1. Review comment states "The earth dam around the storage pond should be constructed of soil and not cinders as pointed out in the specifications and . . .".
- August 1949 - Large lagoon complete.
- August 1949 - Gordon E. Mau makes a final inspection and determines that the construction was adequate.
- July 1951 - Fish kill investigation by Herman Janzen did not tie the fish kill to National Zinc. The investigation was made 7 days after the reported fish kill. An inspection of the ponds indicated that they had been overtopped in 6-12 different places previously.
- September 1951 - Fish kill investigation by Herman Janzen and Gordon Mau. Report indicates that the dike was again overtopped.
- May 1952 - The elevation of the dike tops were increased to provide freeboard. Inspection by Herman Janzen indicates that compaction may not be adequate as there was no evidence that rolling equipment had been used.

April 1959 -

Investigation of stream pollution by Leonard Imhof indicates the presence of occasional seeps along the south embankment of the lagoon system.

April 1976 -

Bill Towery investigates complaints from farmers over appearance of Drum Creek and the possibility of a fish kill or illness among their cattle from drinking the water. Inspection indicates seepage from lagoon dikes. It was also determined that a pump which directed the process wastewater to Lagoon B had broken down and that the sump had overflowed and entered the ditch on the south side of the plant. The bypassing had been eliminated at the time of the inspection. Samples from the unnamed tributary to Drum Creek were analyzed with the following results:

Cu = 0.34 ppm  
Pb = 0.14 ppm  
Zn = 170 ppm  
Cd = 50 ppm  
Ni = 0.38 ppm

A sample was taken from Drum Creek where it leaves Section 18 and analyzed with the following results:

Cu = 0.00 ppm  
Pb = 0.00 ppm  
Zn = 2.3 ppm  
Cd = 0.61 ppm  
Ni = 0.00 ppm

TABLE NO. 1

Process Wastewater Discharge to Lagoon B: (4-7-76)

Na = 2,080 ppm	Cu = 1,800 ppm	Cd = 1,600 ppm
K = 460 ppm	Pb = 1,100 ppm	Ni = 0.96 ppm
Cl = 11,000 ppm	Zn = 3,000 ppm	
SO <sub>4</sub> = 200 ppm	Cr (hex) = 0.96 ppm	

Contents of Lagoon A: (4-6-77)

Na = 2,060 ppm	Cu = 13 ppm
Cl = 2,790 ppm	Pb = 5.2 ppm
SO <sub>4</sub> = 1,780 ppm	Zn = 1,900 ppm
pH = 5.5	Cd = 350 ppm

Contents of Lagoon B: (4-6-77)

Na = 3,800 ppm	Cu = 21 ppm
Cl = 6,120 ppm	Pb = 1.3 ppm
SO <sub>4</sub> = 1,425 ppm	Zn = 600 ppm
pH = 5.9	Cd = 105 ppm

Contents of Lagoon C: (4-6-77)

Na = 1,300 ppm	Cu = 420 ppm
Cl = 2,100 ppm	Pb = 90 ppm
SO <sub>4</sub> = 290 ppm	Zn = 900 ppm
pH = 4.5	Cd = 200 ppm

Contents of Lagoon D: (4-7-76)

Na = 240 ppm	Cu = 230 ppm
Cl = 1,860 ppm	Pb = 29 ppm
SO <sub>4</sub> = 207 ppm	Zn = 600 ppm
Ni = 0.45 ppm	Cd = 180 ppm

Seepage Collected from West Dike of Lagoon A: (9-27-77)

Cd = 30 ppm	Zn = 160 ppm	Alk = 40 ppm
Cr = 0.01 ppm	Ni = 1.1 ppm	
Cu = 5 ppm	pH = 6.7	
Pb = 0.1 ppm	SO <sub>4</sub> = 664 ppm	
Na = 524 ppm	Cl = 2,470 ppm	

Seepage Collected from South Dike of Lagoon A: (9-27-77)

Cd = 58 ppm	Zn = 300 ppm	Alk = 10 ppm
Cr = 0 ppm	Ni = 1.5 ppm	
Cu = 8 ppm	pH = 5.1	
Pb = 0.16 ppm	SO <sub>4</sub> = 1,830 ppm	
Na = 1,450 ppm	Cl = 2,310 ppm	

Surface Water from North Drainage Ditch prior to entering the Plant Property  
(North of Railroad Tracks): (9-27-77)

Cd = 0.01 ppm  
Cr = 0 ppm  
Cu = 0.03 ppm  
Pb = 0 ppm  
Na = 56

Zn = 0.82 ppm  
Ni = 0.01 ppm  
pH = 7.7  
SO<sub>4</sub> = 33 ppm  
Cl = 117 ppm

Alk = 188 ppm

Confluence of Drainage Ditches leaving the Plant Property (Unnamed Tributary  
to Drum Creek): (9-27-77)

Cd = 20 ppm  
Cr = 0 ppm  
Cu = 0.72 ppm  
Pb = 0.3 ppm  
Na = 1,330 ppm

Zn = 110 ppm  
Ni = 0.30 ppm  
pH = 6.7  
SO<sub>4</sub> = 1,450 ppm  
Cl = 950 ppm

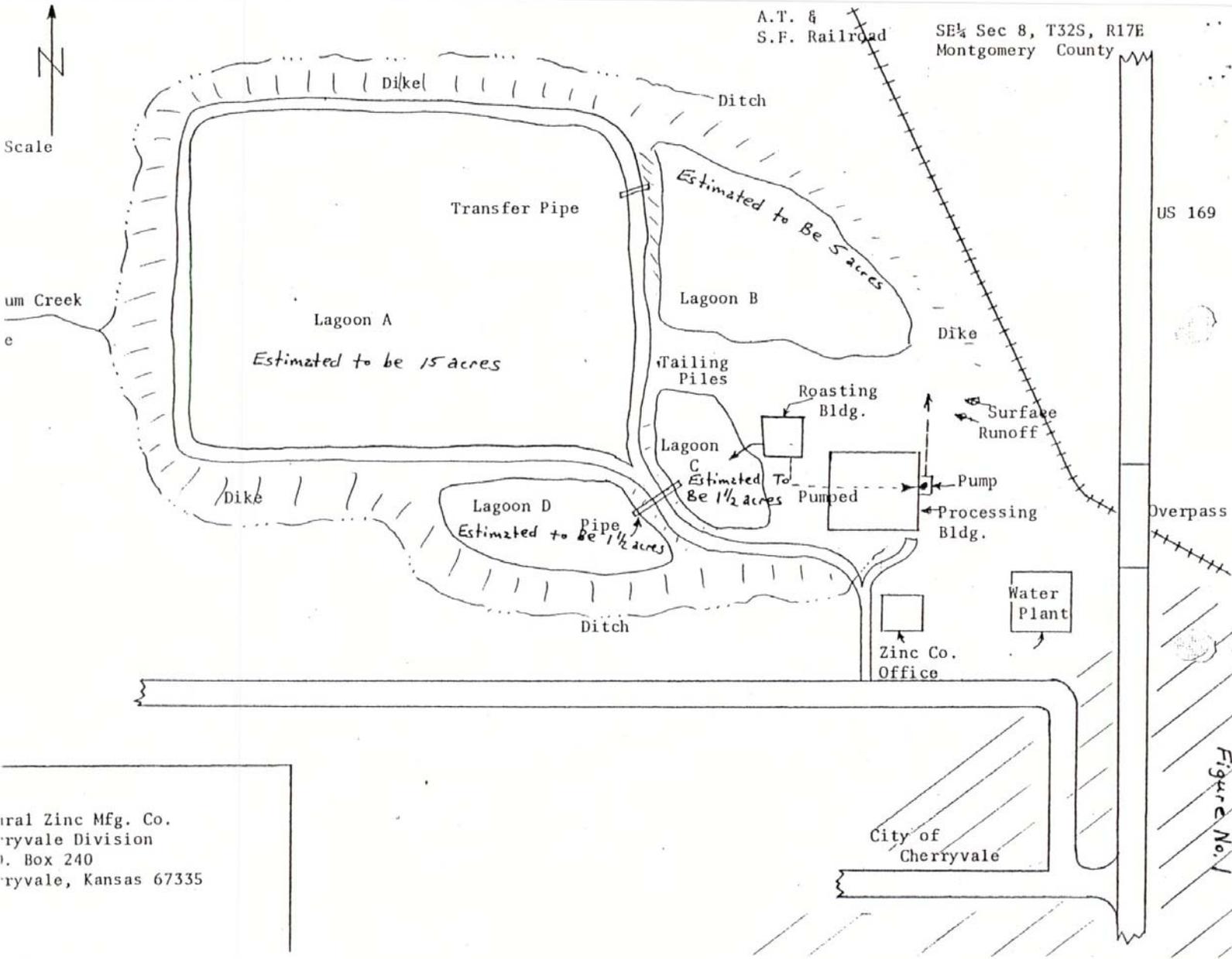
Alk - 80 ppm

TABLE NO. 2

	<u>Drinking Water Standards (mg/l)</u>	<u>Levels of Toxicity to Fish (mg/l)</u>
Cd	.010*	.012
Cu	1.00**	.020
Ni	--	.040
Pb	.050*	50
Zn	5.0**	.100

\*Cause for rejection of supply.

\*\*Limit should not be exceeded. Alternate source should be utilized if available.



Central Zinc Mfg. Co.  
 Cherryvale Division  
 P.O. Box 240  
 Cherryvale, Kansas 67335

Figure No. 1

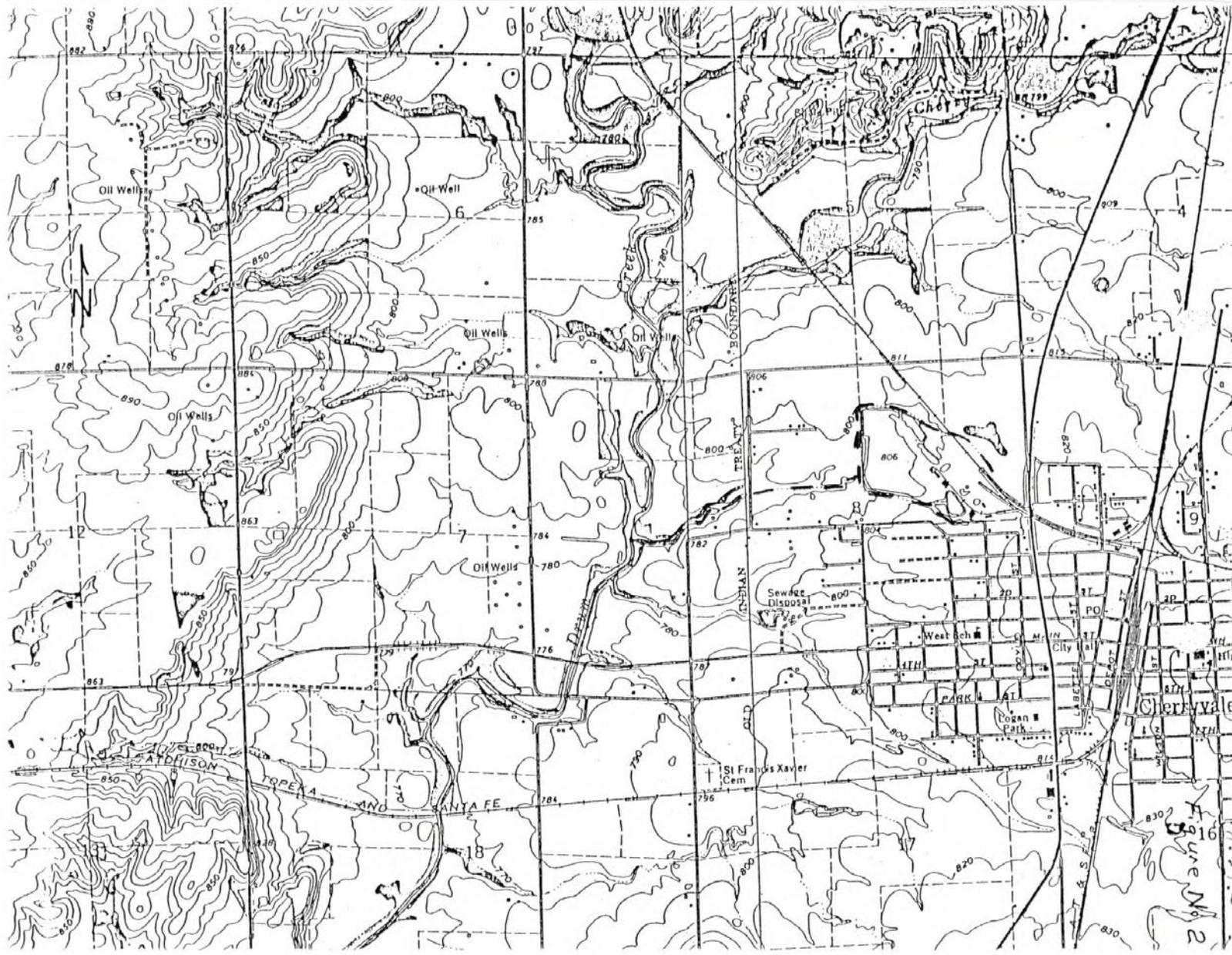
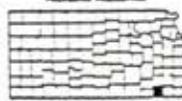
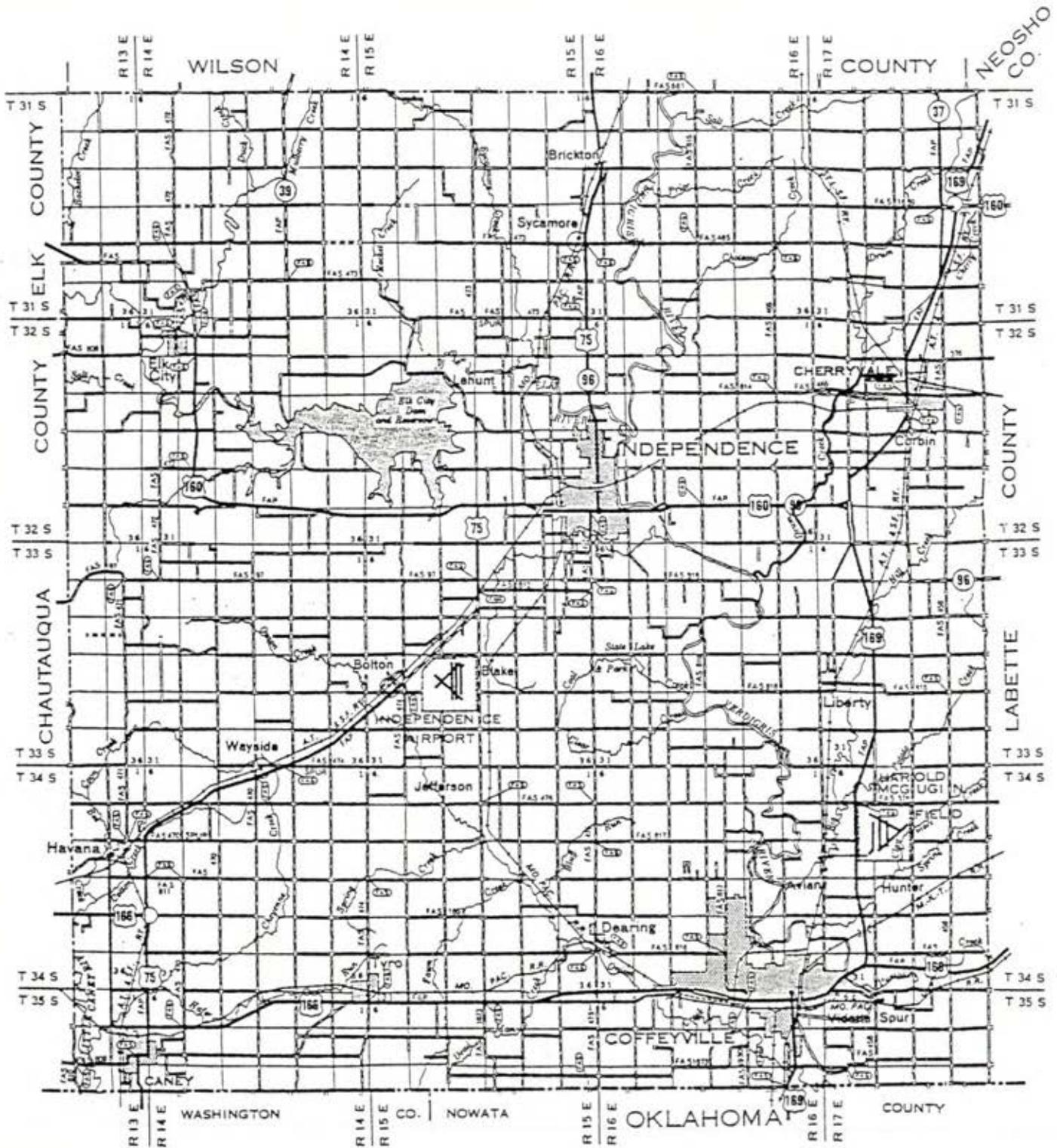


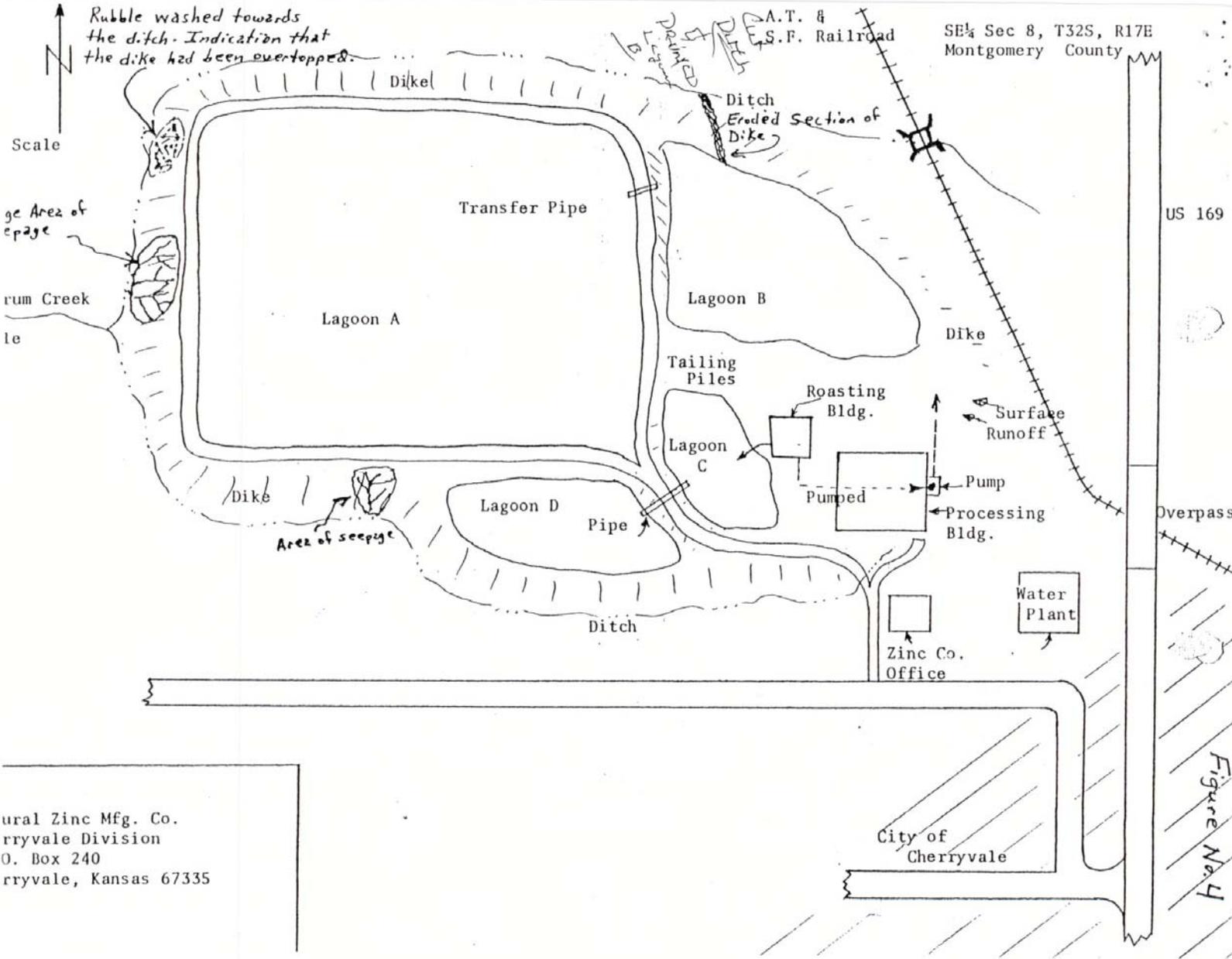
Figure No. 2



1970

GENERAL HIGHWAY MAP  
**MONTGOMERY COUNTY**  
**KANSAS**

ISSUED BY THE  
 STATE HIGHWAY COMMISSION OF KANSAS  
 DEPARTMENT OF PLANNING AND DEVELOPMENT  
 IN COOPERATION WITH THE  
 U. S. DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION



ural Zinc Mfg. Co.  
 rryvale Division  
 O. Box 240  
 rryvale, Kansas 67335

Figure No 4

RECEIVED

JUL 26 1978

DIVISION OF ENVIRONMENT  
OF & EG SEC.

State of Kansas  
Department of Health and Environment  
Division of Environment  
Topeka, Kansas 66620

MEMORANDUM

*msb*  
*Bill Bryson*

TO: Cherryvale 4.1 File (National Zinc)  
FROM: Chuck Linn *Chuck*  
DATE: July 26, 1978  
SUBJECT: Inspection of National Zinc Facility at Cherryvale

On July 25, 1978, Jon Hughes and I inspected the abandoned zinc smelter (National Zinc) at Cherryvale, Kansas. It was my first visit and only Jon's second visit to the site. So, we are not able to make significant comments on changes in the site over the period of time the division has been involved with this problem; but, I will record those observations which appear significant.

1. The contents of lagoon A are about 2½ feet below the top of the dike which should provide ample storage for the fall rains. The decrease in contents probably comes from two sources: (a) the Cherryvale area has experienced a drought this summer with net evaporation, and (b) the dike on the north side of lagoon B has been cut allowing all of the contents of B to be drained out (and quite possibly a part of the contents of A) through the transfer pipe between the two ponds.
2. It appears when the lagoons A and B are full, the water levels are such that off site drainage as well as that drainage originating on site flows around the northeast side of lagoon B, around lagoon A, and off the property. This is probably all that kept A and B from overflowing. With the break in lagoon B, rain-water from the site and from the undefined drainage area east of the Santa Fe Railroad now flows through lagoon B and out the hole in the dike. The side ditch along the west side of the railroad is silted full. (see attached sketch)

The dike in lagoon B should be repaired and the railroad ditch cleaned out so that the normal drainage pattern is restricted. This work should be done as soon as possible while dry weather allows.

I think I would like to dispose of the sludge from the proposed treatment in lagoon B. I need some soil samples and drilling in that vicinity to plan a disposal area.

Page 2

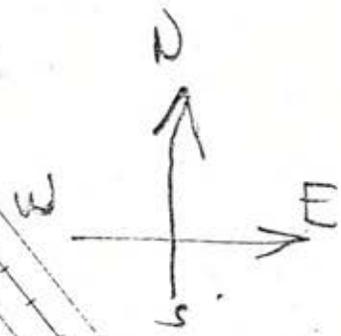
It would also be helpful to know something about the sediments in lagoon B. I will have my people pick up a core sample for analysis out of the bottom of B while it is dry.

We will run a leaching test on it to see what might come out if we decide to leave it there.

jp

cc: Don Carlson  
Bill Bryson  
John Goetz  
Southeast District - Chanute Office

2755'



Dike Cut Here

RR

Ditch Silted Full Here

2835'

Transfer Pipe

Lagoon "A"

Large Pond

"B"

DITCH

When the lagoons are full drainage gas around the end of "B"'s dike

Point 97%

Point 97%

Small Pond

2170'

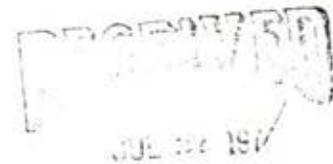
WATER TREAT PLANT



WATER ST

State of Kansas  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
DIVISION OF ENVIRONMENT  
Topeka, Kansas 66620

MEMORANDUM



BUREAU OF ENVIRONMENTAL  
SANITATION

TO: Melville W. Gray and Eugene T. Jensen

FROM: Don Carlson, Bill Bryson, John Goetz, & Chuck Linn

DATE: July 25, 1978

SUBJECT: Proposed Phasing Out and Elimination of Abandoned  
Lagoon System at Cherryvale Zinc Company,  
Cherryvale, Kansas

This memorandum will supplement the discussion of water pollution problems presented in the October 19, 1977, memorandum of Carlson and Bryson. The following presents a brief summary of information and conclusions since October 19, 1977:

1. A meeting with National Zinc Company was held on November 10, 1977. Conclusions of the meeting were as follows:
  - A. A geologic and soils engineering report was to be submitted which would address the primary concern of the structural integrity of the lagoon dikes.
  - B. Identification, location, and leachate analyses was to be submitted for all spent sludges remaining at the site.
  - C. Diversion of all rainwater around the pond was to be initiated as soon as possible.
2. November 17, 1977, letter to Mayor of Cherryvale from Gene Jensen advising the city against entering into any agreements or contracts in which the city would assume the responsibility or liability for the cleanup of the site.
3. January 10, 1978, letter submitted by National Zinc Company containing analyses of waste sludges. The leachate analyses indicated minimal release of heavy metals.

The pond water was also treated to a pH of 10 with slaked lime and the solids settled out. The supernatant was analyzed for heavy metals and showed less than 1 ppm for Zn, Cu, and Cd. This treatment, however, does not reduce the high concentration of chlorides (2800 ppm) and sulfate (1800 ppm).

4. Letter of January 31, 1978, from Don Carlson to National Zinc Company commenting on information submitted January 10, 1978. Requirements concerning installation of monitoring wells and soil tests were specified.
5. June 15, 1978, Geologic and Soils Engineering Report submitted for our review. The conclusions of the report are:
  - A. The wastewater lagoon has adequate slope stability for existing slope configurations and lake level.
  - B. Plant area should be graded so as to divert all uncontaminated storm water runoff from entering the lagoon.
  - C. Seepage does not appear critical at the present time.
6. Monitoring well analyses reported on June 29, 1978. These analyses are summarized below:

Well No.	1	2	2A	3	4	Primary Drinking Water Standard
Cadmium (ppm)	0.12	0.98	0.01	1.5	0.01	0.01
Chromium (ppm)	0.00	0.03	0.02	0.04	0.00	0.05
Copper (ppm)	0.07	0.32	0.21	1.5	0.03	1.0
Lead (ppm)	0.01	0.04	0.01	0.07	0.02	0.05
Zinc (ppm)	7.1	10.00	0.38	26.0	0.27	5.0

As can be seen a slight contamination of groundwater has occurred primarily due to cadmium and zinc.

7. June 30, 1978, telephone conversation between Paul Stubblefield (KOAM News Reporter - Pittsburg, Kansas) and Don Carlson. Mr. Stubblefield indicated he had received several letters and telephone calls from people complaining about cleanup procedures at the Cherryvale Zinc Company. Don was referred to the complainants and later contacted them. The primary complainant was associated with the local pride committee. After an explanation of progress to date, the complainant was satisfied that we were progressing towards cleanup of the area.

Based on this additional information, we have formulated a proposed plan for the elimination of the lagoon system. Three alternatives were considered:

1. Physical-Chemical Treatment with the release of the treated water.

2. Deep well disposal.
3. Transportation of liquids off-site to a hazardous waste facility.

Due to the quantity of wastewater (40-50 million gallons) and present policies for use of deep wells, the only viable alternative is physical-chemical treatment and controlled release of the treated waters into the Verdigris River.

We envision the treatment system to consist of a mixing tank for addition of lime followed by a clarifier. Prior to final release of the water pH adjustment will probably have to be considered. A copy of the calculations for quantities of lime added and sludge produced is attached. It should be noted that lime addition is not the only acceptable method of physical-chemical treatment.

The primary consideration in the release of the treated water is the effect on water quality in the Verdigris River. This river serves as the water supply for Coffeyville. Calculations for heavy metals plus chlorides and sulfates at low flow in the Verdigris indicate all parameters would be well below drinking water standards. Also, the landowners bordering Drum Creek should be notified of the discharge and possible effects on any livestock watering operations.

The disposal of sludges produced by chemical treatment will be on the existing site. However, the exact location will not be designated until a final evaluation of the pond bottom can be conducted as the pond is emptied. Once all the sludges have been placed in the most secure area of the site, the entire area would be graded and covered in order to minimize rainwater infiltration of the sludges. The solid waste section will be responsible for establishing guidelines for future use of the site.

In conclusion, we feel it necessary to drain the pond as quickly as possible. Therefore, we propose to notify the National Zinc Company of our requirements concerning wastewater discharge and to have them submit a detailed proposal for wastewater treatment and sludge disposal for our approval.

jaw  
Attachment

State of Kansas  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
DIVISION OF ENVIRONMENT  
Topeka, Kansas 66620

RECEIVED

JUL 27 1978

BUREAU OF ENVIRONMENTAL  
SANITATION

Montgomery County

MEMORANDUM

TO: Melville W. Gray and Eugene T. Jensen

FROM: Don Carlson, Bill Bryson, John Goetz, & Chuck Linn

DATE: July 25, 1978

SUBJECT: Proposed Phasing Out and Elimination of Abandoned Lagoon System at Cherryvale Zinc Company, Cherryvale, Kansas

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State of Kansas . . . John Carlin, Governor

# DEPARTMENT OF HEALTH AND ENVIRONMENT

Barbara J. Sabol, Secretary

Forbes Field  
Topeka, Kansas 66620  
913-852-9360



November 28, 1983

Mr. E. E. Vogel  
National Zinc Company  
P.O. Box 579  
Bartlesville, Oklahoma 74005

Dear Mr. Vogel:

This letter will acknowledge receipt of the restrictive covenant for your property in ~~Cherryvale, Kansas.~~ With the submittal of this document all closure activities are now considered complete and are approved by the Department.

We wish to express our appreciation for the professional manner in which the closure of this facility was conducted. Proper closure of facilities such as this will help assure protection of the environment for future generations.

You should be aware that we will continue to periodically visit the site to assure that the site continues to be secure. If a condition is observed which requires your attention we will contact you immediately.

We would also hope that you continue your monitoring of the groundwater.

Please forward your results to us as you have in the past.

Sincerely,

DIVISION OF ENVIRONMENT

John Paul Goetz, P.E., Chief  
Hazardous Waste Management Section  
Bureau of Waste Management

JPG/cc/4c

cc: Bill Towery



State of Kansas . . . John Carlin, Governor

# DEPARTMENT OF HEALTH AND ENVIRONMENT

~~xxxxxx~~  
Barbara J. Sabol, Secretary

Forbes Field  
Topeka, Kansas 66620  
913-862-9360



April 5, 1983

Mr. E.E. Vogel  
Engineering Manager  
National Zinc Company  
P.O. Box 579  
Bartlesville, OK 74003

Dear Mr. Vogel:

We appreciate the time taken by you to meet with John Goetz and me at your Cherryvale facility on March 22, 1983. The purpose of this meeting and inspection was to check if the clean-up and closure of the old surface impoundments and other waste disposal areas was satisfactorily completed. Although the project has been completed as outlined in your closure plan, there are a few areas which must be addressed:

1. Erosion of top soil near the low-lying areas must be minimized;
2. Barren patches of land observed during our inspection must be reseeded;
3. Groundwater monitoring must continue on a quarterly basis. We would appreciate receiving copies of test results on a quarterly basis instead of annually.

We will again visit the site in two months to review progress in controlling Problems No. 1 and No. 2.

During our meeting we also discussed the need for filing restrictive covenants with the county register of deeds stating that any future uses of the property after closure shall be conducted in a manner so as to preserve the integrity of waste containment systems designed, installed and used during the post-closure maintenance period of the disposal areas. We are of the opinion that by requiring you or subsequent property owners or tenants to consult with our Department during planning of any improvement to the site or during construction of permanent structures, drainage ditches, alteration of contours, changes in vegetation grown on areas used for waste disposal, future environmental or health hazards could be minimized. We request that you prepare a draft for such restrictions

on future uses of the land and submit it by May 15, 1983 for our review and comment.

If you have any questions, please feel free to call me.

Sincerely yours,

DIVISION OF ENVIRONMENT

*Vivek Kamath*

Vivek Kamath  
Hazardous Waste Management Section  
Bureau of Environmental Sanitation

VK:cavs  
cc: Bill Towery

## Effluent Limitations and Monitoring Requirements

During the effective period of this approval, all such discharges shall be limited and monitored by the permittee as specified below:

### Sample Point - 001(A) - Treated Water Pumped from Pond

<u>Effluent Characteristic</u>	<u>Discharge Limitations Daily Maximum mg/l</u>	<u>Measurement Frequency and Sample Type</u>
pH	-	Daily Grab
Total Suspended Solids	45	Daily Grab
Chlorides	-	Daily Grab
Sulfates	-	Daily Grab
Cadmium	0.2	Daily Grab
Copper	1.0	Daily Grab
Lead	0.3	Daily Grab
Nickel	0.2	Daily Grab
Zinc	10.0	Daily Grab

The maximum allowable discharge from the settling ponds shall not exceed 100 gpm.

### Sample Point - 001(B) - Downstream from the Confluence of the Discharge Stream and the Dilution Water Stream.

<u>Effluent Characteristic</u>	<u>Discharge Limitations Daily Maximum mg/l</u>	<u>Measurement Frequency and Sample Type</u>
pH	6.0 - 9.5	Daily Grab
Total Suspended Solids	-	Daily Grab
Chlorides	1500	Daily Grab
Sulfates	1100	Daily Grab
Cadmium	0.1	Daily Grab
Copper	0.5	Daily Grab
Lead	0.15	Daily Grab
Nickel	0.1	Daily Grab
Zinc	5.0	Daily Grab

### Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The exact place, date, and time of sampling;
- b. The dates the analyses were performed;
- c. The person(s) who performed the analyses;
- d. The analytical techniques or methods used; and
- e. The results of all required analyses.

### Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Division of Environment.

### Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any effluent limitation specified in this permit due to an unusual or extraordinary occurrence, the permittee shall immediately notify the Department by telephone and provide the Director of the Division of Environment with the following information, in writing, within five (5) days of becoming aware of such condition:

- a. A description of the discharge and cause of noncompliance;  
and
- b. The period of noncompliance, including exact dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

Cherryvale Line Co.



State of Kansas . . . ~~XXXXXXXXXXXXXXXXXXXX~~

*MWG*



DEPARTMENT OF HEALTH AND ENVIRONMENT

~~XXXXXXXXXXXXXXXXXXXX~~

Topeka, Kansas 66620

March 8, 1979

Mr. E. E. Vogel  
National Zinc Company  
Post Office Box 579  
Bartlesville, Oklahoma 74003

Re: Permit to Discharge from the  
Cherryvale, Kansas, Facility

Dear Mr. Vogel:

We have completed our review of your request to discharge treated water from your operations at Cherryvale, Kansas, into Drum Creek. An extensive review was conducted of the possible effects of such a discharge on downstream property owners. In addition, our Water Quality Management Section evaluated the effects of treated water on aquatic life through an inhouse bioassay analysis. We concluded that the treated water, when released at the required rates and concentrations, should not result in any deleterious effect on the environment, or downstream water users.

Based on these results, you are hereby granted interim permission to initiate the discharge of waters into Drum Creek in accordance with the attached conditions. This approval will be in effect until April 15, 1979. We anticipate that a "permanent" permit will be issued in advance of this date.

If you should have any questions, please contact me immediately.

*Melville W. Gray*  
Melville W. Gray, P.E.  
Director  
Division of Environment

MWG:JPG:jaw  
Attachment  
cc: Bill Bryson ✓  
Chuck Linn  
Southeast District

State of Kansas  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
Division of Environment  
Topeka, Kansas 66620

M E M O R A N D U M

TO: Cherryvale Zinc Division File  
FROM: Vivek Kamath *VK*  
DATE: November 17, 1980  
SUBJECT: Site Inspection

On November 6, 1980, John Paul Goetz, Mike Cochran (Southeast District), and the writer conducted an inspection of the above-mentioned site located at Cherryvale, Montgomery County. Mr. E. E. Vogel, Engineering Manager, National Zinc Company, Bartlesville, Oklahoma, was available for showing us around the cleanup operations.

The following observations were made at the time of inspection:

- 1) The leveling of the lake and the small pond with clay and top soil was complete and there are no signs of ponding of water. However, some pretreatment of the top soil will have to be done for growth of grass.
- 2) The addition of lime to the treatment ponds has been stopped and both the ponds are empty. However, there is a thick layer of sludge at the bottom of the ponds.
- 3) The black cinders from the old plant operations have been spread all over the site near the treatment ponds. This was not of much concern, since the material has been found to be inert from earlier analysis.

Representative samples have been taken from the sludge at the bottom of the treatment ponds and from the monitoring wells numbers 1, 2A, 3, and 4. The shallow well number 2B was dry.

jp

Cherryvale  
file



State of Kansas . . . John Carlin, Governor

DEPARTMENT OF HEALTH AND ENVIRONMENT



Joseph F. Harkins, Secretary

Forbes Field  
Topeka, Kansas 66620  
913-862-9360

January 15, 1982

Mr. E. E. Vogel  
Engineering Manager  
National Zinc Company  
P.O. Box 579  
Bartlesville, Oklahoma 74003

Dear Mr. Vogel:

We have received your letter outlining the steps taken by you to clean-up your Cherryvale facility since 1978. The clean-up of the site appears to be satisfactory. However, we are deferring our decision to close the project until a final inspection is made by this Department. We will get in touch with you in this connection sometime in May. In the meantime you must continue to monitor the groundwater near the vicinity of the site.

If you have any questions, please feel free to contact me.

Sincerely yours,

DIVISION OF ENVIRONMENT

*Vivek Kamath*

Vivek Kamath  
Hazardous Waste Management Section  
Bureau of Environmental Sanitation

VK:cavs  
cc: Bill Towery

1987

NATIONAL ZINC COMPANY

SITE NAME: National Zinc Company (Cherryvale Zinc Division)

ADDRESS: Cherryvale, Kansas, NE 1/4, Section 8, Township 32S, Range 17E,  
Montgomery County, Kansas

SITE ID: KSD 980406698

LEAD AGENCY: KDHE

✓ WASTE TYPE: Groundwater, surface water and soils contamination with heavy metals, principally zinc and cadmium.

QUANTITY: Not determined.

SITE DESCRIPTION: Inactive zinc processing facility with large settling ponds onsite. Cased operation 1976. Waste area includes piles of ores and sludges estimated at over 2000 tons.

This was a primary zinc smelter which ceased operation in December of 1976. It was in operation in 1941 when the department observed the discharge of water, into a tributary of Drum Creek. The waste area included piles of ores, sludges, and a lagoon of contaminated water which occasionally covered 25 acres.

Area sloping to the southwest with groundwater flow towards the west. Underlain by Pennsylvanian Drum Limestone; 15' to groundwater. Groundwater use limited to livestock.

PRESENT OWNER: Ivy Holdings, Ltd., Bartlesville, Oklahoma, (Name change from National Zinc in 1984).

ENVIRONMENTAL PROBLEMS RELATED TO THE SITE:

Some groundwater contamination from heavy metals and periodic contamination of surface water into streams (Drum Creek and the Verdigris River). The surface water contamination occurred from lagoon water seeping through the dike and periodic overtopping of the dike for many years.

REMEDIAL ACTIONS AT SITE:

The leftover ores and sludges (over 2,000 tons) were removed from the site during 1979. Monitoring wells were drilled and sampled. Approximately 95 million gallons of fluid from the lagoon was treated and discharged into Drum Creek and the lagoon was backfilled. Some of the remaining sludges were encapsulated on-site. A restrictive use covenant was prepared and governs the site.

AREAS OF CONCERN RELATED TO THE SITE:

There is some residual contamination of groundwater in the vicinity of the site, but generally there is little groundwater use. There may be continuing low-level surface water contamination coming from the vicinity of the site.

# Pace Analytical

426803

**CHAIN-OF-CUSTODY RECORD**  
Analytical Request

Client <b>KDHE-BER</b>	Report To: <b>Randy Brown</b>	Turn around Time	Pace Client No.
Address <b>Bldg #740, Forbes Field Topeka, KS 66620</b>	Bill To:	<input type="checkbox"/> 24 Hours	Pace Project Manager <b>RW</b>
Phone	P.O. # / Billing Reference	<input type="checkbox"/> 48 Hours	Pace Project No. <b>6030872</b>
	Project Name / No.	<input type="checkbox"/> 3-5 Days	*Requested Due Date: <b>6-11-99</b>
		<input type="checkbox"/> 1 Week 2 Weeks	
		<input checked="" type="checkbox"/> Normal 14 Days	

Sampled By (PRINT): **John Maurice, Laura Bond**      Date Sampled: **5/20/99**

Sampler Signature: *[Signature]*      Date Sampled: *[Signature]*

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES					ANALYSES REQUEST	REMARKS
						UNPRESERVED	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	VOA (HCL)	NaOH		
1	Na+ Zinc Sed-9	1355	Sed		1	X					X	602625022
2	<del>Sed-10</del>	<del>1525</del>			1	X					X	
3	Sed-11	1530			1	X					X	602625030
4	<del>Sed-11</del>	<del>1530</del>			1	X					X	
5												
6												
7												
8												

SHIPMENT METHOD	AIR BILL NO.	SHIPPING DATE	NUMBER OF COOLERS	ITEM NUMBER	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
					<i>[Signature]</i>	5/20/99	0815	<i>[Signature]</i>	5/20/99	1630
Additional Comments										
SAMPLE CONDITION										
Temp: _____ °C	Received on Ice: Y / N	Sealed Cooler: Y / N	Samples Intact: Y / N							

SEE REVERSE SIDE FOR INSTRUCTIONS

