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BEAZER EAST, INC.
436 SEVENTH AVENUE
PITTSBURGH, PENNSYLVANIA

1992 ANNUAL RCRA GROUNDWATER MONITORING SUMMARY KOPPERS INDUSTRIES, INC. SUPERIOR, WISCONSIN EPA ID# WID006179493

MARCH 1993

CHESTER
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FEDERAL EXPRESS

Ref. No. 178293-01

June 3, 1993

Ms. Cynthia K. English
Wisconsin Department of Natural
Resources
Hazardous Waste Management Section
Bureau of Solid Waste Management
101 S. Webster, GEF II
P. O. Box 7921
Madison, WI 53707

Dear Ms. English:

Re: Koppers Industries, Inc.
Superior, Wisconsin
EPA ID# WID 006 179 493

On behalf of Beazer East, Inc. (Beazer), enclosed is the 1992 RCRA Annual Groundwater Monitoring Summary for the above-referenced facility.

If you have any questions, please call Eric Manges, Beazer, at (412) 227-2683.

Very truly yours,

David L King

David L. King
Project Manager

DLK:erh dk-93

Encl.

cc: E. Manges - Beazer (2 copies)
T. Ries - KII Superior Plant
J. Batchelder - KII
G. LeRoy - WDNR

R. Tipton - EPA, Region V

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Monroeville, Pennsylvania 15146
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1992 ANNUAL RCRA GROUNDWATER MONITORING SUMMARY KOPPERS INDUSTRIES, INC. SUPERIOR, WISCONSIN EPA ID# WID006179493

Prepared By: Chester Environmental
Project No. 178297-02

MARCH 1993

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1.0 INTRODUCTION

This report was prepared by Chester Environmental, formerly Keystone Environmental Resources, Inc., for Beazer East, Inc. (Beazer) and presents a summary of groundwater monitoring data collected during 1992 at the Koppers Industries, Inc. wood treating plant located in Superior, Wisconsin. This data was compiled to satisfy Resource Conservation and Recovery Act (RCRA) requirements.

As of June 16, 1988 BNS, a Delaware Corporation, acquired 90% of the stock of Koppers Company, Inc. BNS is a wholly-owned, indirect subsidiary of Beazer PLC. On December 28, 1988 the Superior facility was sold to Koppers Industries, Inc. (KII). On January 26, 1989 the name Koppers Company, Inc. (Koppers) was changed to Beazer Materials and Services, Inc. (BM&S). On April 16, 1990, the name Beazer Materials and Services, Inc. changed to Beazer East, Inc. (Beazer).

Water levels and groundwater samples were collected as part of a quarterly monitoring program for the RCRA regulated unit which consists of two closed K001 surface impoundments. K001 hazardous waste is classified as bottom sediment sludge from the treatment of waste waters from wood preserving processes that use creosote and/or pentachlorophenol. The two impoundments have been backfilled and capped following the closure plan approved by the WDNR. Closure certification was submitted to WDNR in November 1989.

During August 1988, 11 of the wells that monitored the two impoundments during their active operation were decommissioned to allow for the capping of the impoundments. The 11 decommissioned wells were L-1S, L-2S, L-3S, L-3M, L-4S, L-4M, L-4D, L-5S, L-5M, L-5DR and L-17. In November 1988 and 1989, four wells (MW-1S, MW-4S, MW-4D, and MW-2S) were installed by Wisconsin Test Drilling, Inc. (now WTD Environmental Drilling, Inc.) to replace several of the decommissioned wells in accordance with the interim post closure monitoring plan. These four wells were subsequently renamed wells W-10B, W-12B, W-12C and W-6B, respectively.

In July and August of 1990, 26 new wells were installed at the Superior facility as part of the Phase II RCRA Facility Investigation (RFI). The 15 existing wells were

renamed to provide a consistent nomenclature for all wells on the site. Current well names are used for all monitoring wells in this report.

2.0 SITE HYDROGEOLOGY

The Superior facility is immediately underlain by a sequence of Quaternary deposits. The uppermost stratigraphic unit is a clay deposit thought to represent a till comprised of reworked lake bottom sediments. Previous geologic studies in the Superior area and aquifer testing at the plant, show this clay is characterized by a low permeability. Within this clay unit, at depths varying from 35 to 50 feet, is a semi-continuous deposit of fine to coarse sand, silt and gravel. This material comprises the uppermost aquifer at the site. The clay unit continues beneath the sand and gravel unit to the top of the Precambrian Superior sandstone, which is reported to occur regionally at depths ranging from 170 to 210 feet below ground surface.

Figure 1 shows the locations of the wells currently in place at the Superior facility. The "A"-level wells are shallow water table observation wells (13.0 to 15.5 feet deep). With one exception, these wells are completed in clay. Well W-17A is partially screened in sand and may be located in the area where an underground tank was removed and replaced with sand fill. The "B"-level wells are completed at an intermediate depth within the clay, generally 30.0 to 35.0 feet deep. However, wells W-6B, W-10B and W-12B are completed at 17.5, 22.0 and 21.5 foot depths, respectively. The "C"-level wells are completed within the semi-continuous sand unit, generally 39 to 49 feet in depth.

Wells included in the RCRA monitoring well network for the closed surface impoundments include upgradient well nest W-4, (W-4A, W-4B, W-4C) and sidegradient or downgradient wells W-6B, W-6C, W-7C, W-8C, W-9C, W-10B, W-12B and W-12C. These wells are shown on Figure 2.

Water levels were measured quarterly in selected wells (March 3, June 1, September 17, and December 16, 1992). Groundwater elevations calculated from these quarterly measurements are presented in Table 1. These data were used to produce groundwater elevation contour maps presented as Figures 3 through 14. Certain wells may not have

been utilized for contouring efforts on different dates, due to possible leakage of surface water into the well, or non-measurement of water levels. Only wells for which groundwater elevation data was utilized in contouring are shown on Figure 3 through 14. Site proximity in relation to surface waters, should also come into subjective consideration when interpreting the contour maps, as water levels in the clay are somewhat erratic.

Groundwater contours for the shallow clay zone are depicted on Figures 3 through 6. Data from well W-17A was not used in any contouring efforts for the shallow clay because it is partially completed in sand. Groundwater flow across the site is generally in a northerly direction. The figures suggest a slight groundwater mounding effect at the northeastern corner of the property in the tank farm area. Comparing these figures to the USGS topographic map, a groundwater divide near the site is suggested by regional surface water drainage patterns. A northward component of flow is also suggested, toward Lake Superior, although easterly and/or westerly components are possible, toward Crawford Creek and/or Bluff Creek.

Dense, nonaqueous phase liquid (DNAPL) had been detected in well W-27A in the first and third quarters of 1991. In the third quarter of 1991, the outer casing of Well W-27A was bent and the PVC ruptured. Water level measurements could not be collected from the fourth quarter of 1991 to the third quarter of 1992. The well was repaired during the third quarter 1992 sampling round. In the fourth quarter of 1992, the apparent thickness of DNAPL was 2.78 feet in well W-27A.

Groundwater elevation contours drawn for the intermediate clay zone are depicted on Figures 8 through 10. Wells W-6B, W-10B and W-12B were not used to contour the groundwater elevations in the intermediate clay level. The bottom of the screened interval of these three wells is higher in elevation than other "B"-level wells. Wells that monitor the defined intermediate clay zone are thus scarce in the immediate vicinity of the impoundments. These factors make it difficult to determine the hydraulic gradient of the intermediate clay in the surface impoundment area. Available water level information suggests groundwater flows in a westerly direction across the impoundments in the intermediate clay zone.

Figures 11 through 14 are potentiometric surface maps constructed for the deep (sand) unit. A relatively flat gradient exists across the site in contrast to the overlying clay unit. Groundwater generally flows to the north in the sand unit across the impoundments, toward Lake Superior. However the water level in Well W-18C is normally higher than in Well W-19C, which creates a local anomaly in the potentiometric surface maps.

An average annual estimated groundwater flow velocity was calculated for the shallow and intermediate zones of the clay unit, and the sand aquifer using the equation $v = Ki/n$, where (v) is the average linear groundwater flow velocity, (K) is the hydraulic conductivity, (i) is the average hydraulic gradient and (n) is effective porosity.

The hydraulic conductivity of the shallow and intermediate clay from slug tests averages 2.28×10^{-6} feet per minute. An effective porosity of 0.30 (30%) was determined for the clay from literature references (Freeze and Cherry 1979). For the shallow ("A"-level) clay zone, unitless hydraulic gradients of 0.0083, 0.0024, 0.00178, and 0.00117 (0.0034 average) were measured across the impoundments from Figures 3, 4, 5 and 6, respectively. The calculated horizontal groundwater flow velocity is 3.72×10^{-5} ft/day. For the intermediate ("B"-level) clay zone, hydraulic gradients of 0.0069, 0.0056, 0.0065, and 0.00773 (0.0067 average) were measured in a westerly direction. The calculated horizontal groundwater flow velocity is 7.33×10^{-5} ft/day.

The hydraulic conductivity of the sand ("C"-level) averages 1.57×10^{-2} ft/min from slug tests conducted during the Phase II RFI. An effective porosity of 0.20 (20%) was determined for the sand from literature references (Freeze and Cherry 1979). Hydraulic gradients determined from Figures 11, 12, 13 and 14, were 0.00029, 0.00034, 0.00043 and 0.00032 in a northerly direction, respectively. The average of these values is 0.00035. The calculated groundwater flow velocity is 0.04 ft/day in the sand.

All of these calculated average horizontal groundwater flow velocities represent an estimate of the rate of migration of constituents dissolved in groundwater. Actual flow velocity may be higher or lower then calculated. Processes such as adsorption and biochemical degradation have not been considered in these estimates.

3.0 GROUNDWATER QUALITY

Four sampling rounds were conducted during 1992 at the Superior, Wisconsin site. The wells sampled during each round and the parameters for which each sample was analyzed are shown in Table 2. During the fourth quarter of 1992, analyses included the Appendix IX list of volatile and semivolatile constituents by EPA Methods 8240 and 8270, respectively. Organochlorine pesticides (EPA Method 8080), organophosphorous pesticides (EPA Method 8140), herbicides (EPA Method 8150), dioxins and furans (EPA Method 8280) were also analyzed on these samples. The Appendix contains the laboratory analytical data for 1992.

Table 3 is a summary of groundwater indicator parameters. Both pH and specific conductance in groundwater samples from all four quarters were within ranges typically found at the Superior site. Total dissolved solid concentrations ranged from 110 mg/L in the fourth quarter (W-9C) to 980 mg/L in the second quarter (W-12B).

Table 4 lists all detected volatile organic compounds (VOCs) for the four quarters of 1992, including the fourth quarter Appendix IX detected volatiles. VOCs listed (acetone, 2-butanone, benzene and methylene chloride) are those constituents detected in any groundwater samples collected during calendar year 1992. Acetone, 2-butanone and methlyene chloride are not site related. In the first and second quarters, similar amounts of these contaminants were found in well samples and in their associated QA/QC samples. These VOC constituents were likely introduced in the laboratory or during field sampling. Benzene was detected only in the first quarter well W-10B sample, at an estimated (J) concentration of 2.2 ug/L. VOCs were not detected in any sample in the third and fourth quarters.

Concentrations of any semivolatile compounds detected in calendar year 1992 are presented in Table 5. Pentachlorophenol was detected in the samples from wells W-12B and W-12C in the first three quarters of 1992. Concentrations ranged from 28 J ug/L in well W-12C (first quarter) to 3,100 ug/L in well W-12B (second quarter). Bis(2-ethylhexyl)phthalate was quantified in wells W-4A (15 ug/L), W-4B (3.4 ug/L),

W-4C (17 ug/L) and W-6C (35 ug/L) in the second quarter, wells W-4C (20 ug/L) and W-8C (18 ug/L) in the third quarter, and in well W-4C (14 ug/L) in the fourth quarter.

It should be noted that the use of pentachlorophenol (PCP) as a wood preservative at the Superior facility was discontinued in 1979, three years prior to the construction of the RCRA impoundments in 1982. Thus, the RCRA impoundments did not receive wastewater derived from PCP, and did not contain phenolics constituents, except for possible trace amounts.

During all four quarters of 1992, the commonly detected dissolved metals were calcium, manganese and sodium. The dissolved concentrations of these metals are present at levels expected in the natural environment and are not considered site related. Manganese concentrations were above the Wisconsin Preventive Action Limits (PALS) of 25 ug/L in two quarters of 1992. Six samples exceeded the PALS limit in the second quarter and seven samples were above the limit in the third quarter. Dissolved zinc was detected at a concentration of 22 ug/L in well W-4C in the first quarter. It was also detected in the sample from well W-8C in the second quarter.

During the fourth quarter of 1992, all samples collected were analyzed for the Appendix IX suite of dissolved metals. Only dissolved barium, calcium, chromium, manganese and sodium were detected in groundwater samples. Five of the ten samples analyzed contained dissolved barium, at concentrations ranging from 220 to 250 ug/L. Chromium was detected in well W-4A at a concentration of 13 ug/L. Detections of (total) metals in unfiltered groundwater samples occurred, but are considered to be primarily due to entrained sediment. The results of metals analyses are presented in the Appendix.

The results of the dioxin/furan analyses performed on fourth quarter 1992 samples are shown in Table 6. Total H_XCDFs were quantified in well sample W-12B (0.20 Z ng/L) and the trip blank (0.48 Z ng/L). The "Z" indicated the result was detected, however, it was detected below the lowest standard calibration and above zero. Because the result is at such a low concentration and it was also detected in the trip blank, it is likely the detection of total H_XCDFs is a result of laboratory conditions and not related to constituents detected in groundwater at the site.

There were no detections in any wells of the remaining Appendix IX constituents including: organochlorine pesticides (EPA Method 8080), organophosphorous pesticides (EPA Method 8140), organophosphorous herbicides (EPA Method 8150), Dioxins or furans (EPA Method 8280).

4.0 CURRENT SITE STATUS

The Phase II RFI Report, which was prepared by Chester on behalf of Beazer was submitted to the WDNR and the U.S. EPA, Region V in June 1991. This Report has been reviewed by both agencies, and comments received.

Chester, on behalf of Beazer, has submitted an Existing Conditions Report to WDNR in March 1991, which proposes a revised RCRA quarterly post-closure compliance monitoring program for the two closed RCRA impoundments. The current quarterly groundwater monitoring program for the former RCRA surface impoundments will remain unchanged in 1993, until the proposed post-closure groundwater compliance monitoring program, under review by WDNR, is approved or the program is otherwise amended.

TABLES

TABLE 1

SUMMARY OF 1992 ANNUAL GROUNDWATER ELEVATIONS

KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

WELL NO.	TOP OF CASING ELEVATION (feet/msl)	DEPTH TO GROUNDWATER (feet)	GROUNDWATER ELEVATION (feet/msl)	DEPTH TO GROUNDWATER (feet)	GROUNDWATER ELEVATION (feet/msl)	DEPTH TO GROUNDWATER (feet)	GROUNDWATER ELEVATION (feet/msl)	DEPTH TO GROUNDWATER (feet)	GROUNDWATER ELEVATION (feet/msl)
		MARCH 3, 1992		JUNE 1, 1992		SEPTEMBER 17, 1992		DECEMBER 16, 1992	
W-1C	674.05	5.38	668.67	NM	---	13.57	660.48	13.29	660.76
W-2C	672.65	NM	---	NM	---	NM	---	NM	---
W-3C	674.29	11.92	662.37	11.76	662.53	12.05	662.24	11.72	662.57
W-4A	677.22	6.38	670.84	4.76	672.46	5.27	671.95	5.97	671.25
W-4B	677.69	11.15	666.54	10.78	666.91	10.85	666.84	10.63	667.06
W-4C	677.23	14.45	662.78	14.29	662.94	14.54	662.69	14.24	662.99
W-5C	674.92	NM	---	NM	---	NM	---	NM	---
W-6B	674.65	3.97	670.68	5.29	669.36	7.18	667.47	4.74	669.91
W-6C	675.73	13.37	662.36	13.14	662.59	13.51	662.22	13.19	662.54
W-7C	674.10	11.67	662.43	11.49	662.61	11.80	662.30	11.47	662.63
W-8A	676.49	4.13	672.36	4.32	672.17	4.31	672.18	4.59	671.90
W-8C	676.48	14.02	662.46	13.79	662.69	14.15	662.33	13.82	662.66
W-9C	673.13	10.76	662.37	10.53	662.60	10.88	662.25	10.58	662.55
W-10B	676.84	5.97	670.87	5.23	671.61	6.74	670.10	5.75	671.09
W-11A	676.66	5.15	671.51	4.52	672.14	4.36	672.30	4.90	671.76
W-12B	677.89	14.83	663.06	14.51	663.38	14.94	662.95	14.61	663.28
W-12C	678.18	15.65	662.53	15.42	662.76	15.76	662.42	15.46	662.72
W-13A	680.00	5.47	674.53	5.24	674.76	NM	---	NM	---
W-14A	677.69	3.91	673.78	3.69	674.00	3.52	674.17	4.40	673.29
W-14B	677.37	5.52	671.85	6.12	671.25	5.99	671.38	5.63	671.74
W-15A	672.50	NM	---	NM	---	NM	---	NM	---
W-16A	675.15	4.28	670.87	3.73	671.42	3.59	671.56	5.34	669.81
W-17A	673.46	NM	---	NM	---	NM	---	NM	---
W-18A	674.53	3.29	671.24	4.32	670.21	3.30	671.23	3.92	670.61
W-18C	674.91	12.31	662.60	12.21	662.70	12.47	662.44	12.13	662.78
W-19A	675.56	5.80	669.76	5.10	670.46	5.23	670.33	5.67	669.89
W-19C	675.17	12.93	662.24	12.78	662.39	12.97	662.20	12.73	662.44
W-20A	674.87	4.42	670.45	3.89	670.98	3.71	671.16	NM	---
W-21A	674.04	4.31	669.73	4.78	669.26	4.45	669.59	4.34	669.70
W-21B	674.87	7.91	666.96	8.25	666.62	8.29	666.58	8.18	666.69
W-22A	674.87	5.00	669.87	5.42	669.45	4.42	670.45	5.76	669.11
W-23A	674.38	1.83	672.55	2.77	671.61	2.57	671.81	3.81	670.57
W-24A	675.09	NM	---	NM	---	1.28	673.81	NM	---
W-25A	676.55	2.94	673.61	2.86	673.69	2.65	673.90	3.47	673.08
W-25B	676.53	5.06	671.47	5.41	671.12	5.68	670.85	5.29	671.24
W-26A	674.25	4.04	670.21	4.66	669.59	4.59	669.66	4.42	669.83
W-26B	674.28	7.74	666.54	8.00	666.28	8.14	666.14	7.95	666.33
W-27A	675.82	3.02	672.80	NM	---	NM	---	4.22	671.60
W-28A	676.28	3.58	672.70	3.79	672.49	3.32	672.96	4.08	672.20
W-28C	676.55	13.95	662.60	13.89	662.66	14.07	662.48	13.79	662.76
W-29A	673.38	NM	---	NM	---	NM	---	NM	---

NOTES:

All elevations are in feet above mean sea level (msl).
NM indicates water level not measured.

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TABLE 2

SUMMARY OF GROUNDWATER QUALITY SAMPLING
1992 RCRA MONITORING

KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

SAMPLED WELLS		PARAMETERS
W-4A, W-4B, W-4C, W-6B, W-6C, W-7C, W-8C, W-9C, W-10B, W-12B, W-12C	Quarterly	pH, SC, Temperature, TOC, TOX, TDS, Soluble COD, Chloride, Nitrate as N, Ammonia Nitrogen as N, Turbidity, Hardness, Apparent Color, Dissolved Metals (Al, As, Ca, Cd, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Na, V, Zn) Volatiles, Semivolatiles
	Annually	Chloride, Fluoride, Total Cyanide Total Sulfide, Total and Dissolved Metals, (Ag, Ba, Be, Hg, Sb, sn, Th) Appendix IX (Volatiles, Semivolatiles. Organochlorine, Pesticides, Organophosphorous Pesticides, Herbicides) Dioxins, Furans

NOTES:

(1) Trip blanks, field (equipment) blanks and laboratory blanks are also analyzed on a quarterly basis. These were analyzed for selected parameters.

(2) During the December16, 1992 sampling, the sample from well W-10B was not analyzed for apparent color or turbidity due to insufficient well recovery.

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TABLE 3

GROUNDWATER INDICATOR PARAMETERS
CALENDAR YEAR 1992

KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

WELL	FIELD pH (S.U.)	FIELD SPECIFIC CONDUCTANCE (umhos/cm)	TOTAL DISSOLVED SOLIDS (mg/L)
FIRST QUARTER (March 3-4, 1992)			
W-4A	7.02	730	670
W-4B	7.74	500	440
W-4C	7.53	510	470
W-6B	7.56	600	620
W-6C	8.00	411	400
W-7C	8.05	350	440
W-8C	7.97	145	280
W-9C	8.66	130	150
W-10B	7.54	490	440
W-12B	7.39	950	920
W-12C	7.54	750	710
FB#1 (3-3-92)	7.32	0.0	7.0
FB#2 (3-4-92)	7.32	0.0	2.0
TB#1 (3-3-92)	5.68	2.0	12
TB#2 (3-4-92)	NA	NA	NA
LB (3-9-92)	NA	NA	ND
SECOND QUARTER (June 1-3, 1992)			
W-4A	7.02	590	710
W-4B	7.81	480	440
W-4C	7.63	530	400
W-6B	7.70	590	700
W-6C	7.91	390	410
W-7C	7.91	260	430
W-8C	8.03	240	300
W-9C	8.71	140	160
W-10B	7.51	600	480
W-12B	7.42	700	980
W-12C	7.63	140	720
FB#1 (6-2-92)	7.76	0.0	ND
FB#2 (6-3-92)	7.81	0.0	ND
TB#1 (6-2-92)	7.93	0.0	1.0
TB#2 (6-3-92)	NA	NA	NA
LB (6-8-92)	NA	NA	ND
THIRD QUARTER (September 17, 1992)			
W-4A	7.04	800	680
W-4B	7.82	500	420
W-4C	7.57	500	430
W-6B	7.51	790	620
W-6C	7.77	460	360
W-7C	7.99	500	420
W-8C	8.39	330	280
W-9C	8.66	135	120
W-10B	7.42	540	460
W-12B	7.50	1105	930
W-12C	7.60	850	710
FB (9-17-92)	6.10	0.0	ND
TB (9-17-92)	5.25	0.0	ND
LB (9-22-92)	NA	NA	ND
FOURTH QUARTER (December 16, 1992)			
W-4A	7.31	800	670
W-4B	7.84	510	400
W-4C	7.48	550	440
W-6B	7.59	799	640
W-6C	7.95	421	370
W-7C	8.00	448	400
W-8C	8.45	309	270
W-9C	9.07	140	110
W-10B	7.70	510	680
W-12B	7.52	910	940
W-12C	7.56	800	670
FB (12-16-92)	7.16	10	ND
TB (12-16-92)	7.08	4.0	ND
LB (12-22-92)	NA	NA	ND

NOTES:

NA indicates not analyzed.
ND indicates not detected.

TABLE 4
DETECTED VOLATILE ORGANIC COMPOUNDS (EPA 8240)
CALENDAR YEAR 1992
KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

WELL	ACETONE (ug/L)	METHYLENE CHLORIDE (ug/L)	2-BUTANONE (ug/L)	BENZENE (ug/L)
FIRST QUARTER (March 3-4, 1992)				
W-4A	76	5.0	ND	ND
W-4B	45 J	6.1 J	ND	ND
W-4C	58	4.5 J	ND	ND
W-6B	54	ND	ND	ND
W-6C	38 J	ND	ND	ND
W-7C	48 J	ND	ND	ND
W-8C	49	5.6 J	ND	ND
W-9C	53	5.1 J	ND	ND
W-10B	63	ND	ND	2.2 J
W-12B	84	ND	ND	ND
W-12C	19	ND	ND	ND
FB#1 (3-3-92)	28 J	6.8 J	ND	ND
FB#2 (3-4-92)	35 J	ND	ND	ND
TB#1 (3-3-92)	ND	5.9 J	ND	ND
TB#2 (3-4-92)	ND	ND	5.1 J	ND
LB (3-4-92)	ND	ND	ND	ND
LB (3-6-92)	ND	ND	ND	ND
LB (3-10-92)	ND	ND	ND	ND
LB (3-12-92)	ND	ND	ND	ND
THIRD QUARTER (September 17, 1992)				
W-4A	ND	ND	ND	ND
W-4B	ND	ND	ND	ND
W-4C	ND	ND	ND	ND
W-6B	ND	ND	ND	ND
W-6C	ND	ND	ND	ND
W-7C	ND	ND	ND	ND
W-8C	ND	ND	ND	ND
W-9C	ND	ND	ND	ND
W-10B	ND	ND	ND	ND
W-12B	ND	ND	ND	ND
W-12C	ND	ND	ND	ND
FB (9-17-92)	ND	ND	ND	ND
TB (9-17-92)	ND	ND	ND	ND
LB (9-29-92)	ND	ND	ND	ND

WELL	ACETONE (ug/L)	METHYLENE CHLORIDE (ug/L)	2-BUTANONE (ug/L)	BENZENE (ug/L)
SECOND QUARTER (June 1-3, 1992)				
W-4A	ND	ND	ND	ND
W-4B	ND	ND	ND	ND
W-4C	ND	ND	ND	ND
W-6B	ND	2.9 J B	ND	ND
W-6C	ND	3.2 J B	ND	ND
W-7C	ND	3.1 J B	ND	ND
W-8C	ND	ND	ND	ND
W-9C	ND	ND	ND	ND
W-10B	ND	ND	ND	ND
W-12B	ND	ND	ND	ND
W-12C	ND	ND	ND	ND
FB#1 (6-2-92)	ND	ND	ND	ND
FB#2 (6-3-92)	ND	3.8 J B	ND	ND
TB#1 (6-2-92)	ND	ND	ND	ND
TB#2 (6-3-92)	ND	3.5 J B	ND	ND
LB (6-12-92)	ND	ND	ND	ND
LB (6-17-92)	ND	5.4 J	ND	ND
LB (6-18-92)	ND	ND	ND	ND
FOURTH QUARTER (December 16, 1992)				
W-4A	ND	ND	NA	ND
W-4B	ND	ND	NA	ND
W-4C	ND	ND	NA	ND
W-6B	ND	ND	NA	ND
W-6C	ND	ND	NA	ND
W-7C	ND	ND	NA	ND
W-8C	ND	ND	NA	ND
W-9C	ND	ND	NA	ND
W-10B	ND	ND	NA	ND
W-12B	ND	ND	NA	ND
W-12C	ND	ND	NA	ND
FB (12-16-92)	ND	ND	NA	ND
TB (12-16-92)	ND	ND	NA	ND
LB (12-29-92)	ND	ND	ND	ND
LB (12-30-92)	ND	ND	ND	ND

NOTES:
ND indicates not detected. NA indicates not analyzed.
J indicates compound was detected, but below the quantitation limit. The result is an estimated value.
B indicates compound was detected in method blank associated with this sample.

CHESTER ENVIRONMENTAL

TABLE 5

DETECTED SEMIVOLATILE ORGANIC COMPOUNDS (EPA 8270)

CALENDAR YEAR 1992

KOPPERS INDUSTRIES, INC.

SUPERIOR, WISCONSIN

WELL	ACENAPTHENE (ug/L)	BENZO(GHI) PERYLENE (ug/L)	BIS(2-ETHYLHEXYL) PHTHALATE (ug/L)	DIBENZO(A,H) ANTHRACENE (ug/L)	INDENO(123-CD) PYRENE (ug/L)	NAPHTHALENE (ug/L)	2,3,4,5-TETRACHLORO-PHENOL (ug/L)	PENTACHLOROPHENOL (ug/L)
FIRST QUARTER (March 3-4, 1992)								
W-4A	ND	ND	ND	ND	ND	ND	ND	ND
W-4B	ND	ND	ND	ND	ND	ND	ND	ND
W-4C	ND	ND	ND	ND	ND	ND	ND	ND
W-6B	ND	ND	ND	ND	ND	ND	ND	ND
W-6C	ND	ND	ND	ND	ND	ND	ND	ND
W-7C	ND	ND	ND	ND	ND	ND	ND	ND
W-8C	ND	ND	ND	ND	ND	ND	ND	ND
W-9C	ND	ND	ND	ND	ND	ND	ND	ND
W-10B	5.1 J	ND	ND	ND	ND	10	ND	ND
W-12B	ND	ND	ND	ND	ND	ND	ND	1000
W-12C	ND	ND	ND	ND	ND	ND	ND	28 J
FB#1 (3-3-92)	ND	ND	ND	ND	ND	ND	ND	ND
FB#2 (3-4-92)	ND	ND	ND	ND	ND	ND	ND	ND
TB#1 (3-3-92)	ND	ND	ND	ND	ND	ND	ND	ND
TB#2 (3-4-92)	NA	NA	NA	NA	NA	NA	ND	NA
LB (3-6-92)	ND	ND	ND	ND	ND	ND	ND	ND
LB (3-12-92)	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

TABLE 5

DETECTED SEMIVOLATILE ORGANIC COMPOUNDS (EPA 8270)

CALENDAR YEAR 1992

KOPPERS INDUSTRIES, INC.

SUPERIOR, WISCONSIN

Phenol - Feb. '92

Mar. 1990 → Pentachloro

Oct. 1990 →

Feb. '92

WELL	ACENAPTHENE (ug/L)	BENZO(GHI) PERYLENE (ug/L)	BIS(2-ETHYLHEXYL) PHTHALATE (ug/L)	DIBENZO(A,H) ANTHRACENE (ug/L)	INDENO(123-CD) PYRENE (ug/L)	NAPHTHALENE (ug/L)	2,3,4,5-TETRACHLORO-PHENOL (ug/L)	PENTACHLOROPHENOL (ug/L)

TABLE 5 (Continued)
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS (EPA 8270)
CALENDAR YEAR 1992
KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

WELL	ACENAPTHENE (ug/L)	BENZO(GHI) PERYLENE (ug/L)	BIS(2-ETHYLHEXYL) PHTHALATE (ug/L)	DIBENZO(A,H) ANTHRACENE (ug/L)	INDENO(123-CD) PYRENE (ug/L)	NAPHTHALENE (ug/L)	2,3,4,5-TETRACHLORO-PHENOL (ug/L)	PENTACHLOROPHENOL (ug/L)
SECOND QUARTER (June 1-3, 1992)								
W-4A	ND	ND	15	ND	ND	ND	ND	ND
W-4B	ND	ND	3.4	ND	ND	ND	ND	ND
W-4C	ND	ND	17	ND	ND	ND	ND	ND
W-6B	ND	ND	2.2 J	ND	ND	ND	ND	ND
W-6C	ND	ND	35	ND	ND	ND	ND	ND
W-7C	ND	ND	4.6 J	ND	ND	ND	ND	ND
W-8C	ND	ND	9.0 J	ND	ND	ND	ND	ND
W-9C	ND	ND	3.3 J	ND	ND	ND	ND	ND
W-10B	3.6 J	ND	ND	ND	ND	ND	ND	ND
W-12B	ND	ND	ND	ND	ND	ND	ND	3100
W-12C	ND	ND	7.8 J	ND	ND	ND	ND	85
FB#1 (6-2-92)	ND	ND	ND	ND	ND	ND	ND	ND
FB#2 (6-3-92)	ND	ND	ND	ND	ND	ND	ND	ND
TB#1 (6-2-92)	ND	ND	ND	ND	ND	ND	ND	ND
TB#2 (6-3-92)	NA	NA	NA	NA	NA	NA	NA	NA
LB (6-3-92)	NA	NA	NA	NA	NA	NA	NA	NA
LB (6-6-92)	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

ND indicates not detected.
NA indicates not analyzed.
J indicates compound was detected, but below the quantitation limit.
The result is an estimated value.

CHESTER ENVIRONMENTAL

TABLE 5 (Continued)
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS (EPA 8270)
CALENDAR YEAR 1992
KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

WELL	ACENAPTHENE (ug/L)	BENZO(GHI) PERYLENE (ug/L)	BIS(2-ETHYLHEXYL) PHTHALATE (ug/L)	DIBENZO(A,H) ANTHRACENE (ug/L)	INDENO(123-CD) PYRENE (ug/L)	NAPHTHALENE (ug/L)	2,3,4,5-TETRACHLORO-PHENOL (ug/L)	PENTACHLOROPHENOL (ug/L)
THIRD QUARTER (September 17, 1992)								
W-4A	ND	2.5 J	2	2.1 J	2.4 J	ND	ND	ND
W-4B	ND	ND	ND	ND	ND	ND	ND	ND
W-4C	ND	ND	20	ND	ND	ND	ND	ND
W-6B	ND	ND	ND	ND	ND	ND	ND	ND
W-6C	ND	ND	ND	ND	ND	ND	ND	ND
W-7C	ND	ND	ND	ND	ND	ND	ND	ND
W-8C	ND	ND	18	ND	ND	ND	ND	ND
W-9C	ND	ND	2 J	ND	ND	ND	ND	ND
W-10B	1.1 J	ND	ND	ND	ND	ND	ND	ND
W-12B	ND	ND	ND	ND	ND	ND	ND	880
W-12C	ND	ND	ND	ND	ND	ND	ND	130
FB#1 (9-17-92)	ND	ND	ND	ND	ND	ND	ND	ND
TB#1 (9-17-92)	ND	ND	ND	ND	ND	ND	ND	ND
LB (9-16-92)	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

ND indicates not detected.
NA indicates not analyzed.
J indicates compound was detected, but below the quantitation limit.
The result is an estimated value.

CHESTER ENVIRONMENTAL

TABLE 5 (Continued)
DETECTED SEMIVOLATILE ORGANIC COMPOUNDS (EPA 8270)
CALENDAR YEAR 1992
KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

WELL	ACENAPTHENE (ug/L)	BENZO(GHI) PERYLENE (ug/L)	BIS(2-ETHYLHEXYL) PHTHALATE (ug/L)	DIBENZO(A,H) ANTHRACENE (ug/L)	INDENO(123-CD) PYRENE (ug/L)	NAPHTHALENE (ug/L)	2,3,4,5-TETRACHLORO-PHENOL (ug/L)	PENTACHLOROPHENOL (ug/L)
FOURTH QUARTER (December 16, 1992)								
W-4A	ND	ND	2.0 J	ND	ND	ND	ND	ND
W-4B	ND	ND	2.0 J	ND	ND	ND	ND	ND
W-4C	ND	ND	14	ND	ND	ND	ND	ND
W-6B	ND	ND	ND	ND	ND	ND	ND	ND
W-6C	ND	ND	ND	ND	ND	ND	ND	ND
W-7C	ND	ND	3.0 J	ND	ND	ND	ND	ND
W-8C	ND	ND	ND	ND	ND	ND	ND	ND
W-9C	ND	ND	2.0 J	ND	ND	ND	ND	ND
W-10B	ND	ND	ND	ND	ND	ND	ND	ND
W-12B	ND	ND	ND	ND	ND	ND	88	1200
W-12C	ND	ND	3.0 J	ND	ND	ND	2.0 J	76
FB#1 (12-16-92)	ND	ND	ND	ND	ND	ND	ND	ND
TB#1 (12-16-92)	ND	ND	ND	ND	ND	ND	ND	ND
LB (12-23-92)	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

ND indicates not detected.
NA indicates not analyzed.
J indicates compound was detected, but below the quantitation limit.
The result is an estimated value.

CHESTER ENVIRONMENTAL

TABLE 6

DETECTED DIOXINS/FURANS
FOURTH QUARTER 1992
DECEMBER 16, 1992

KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN

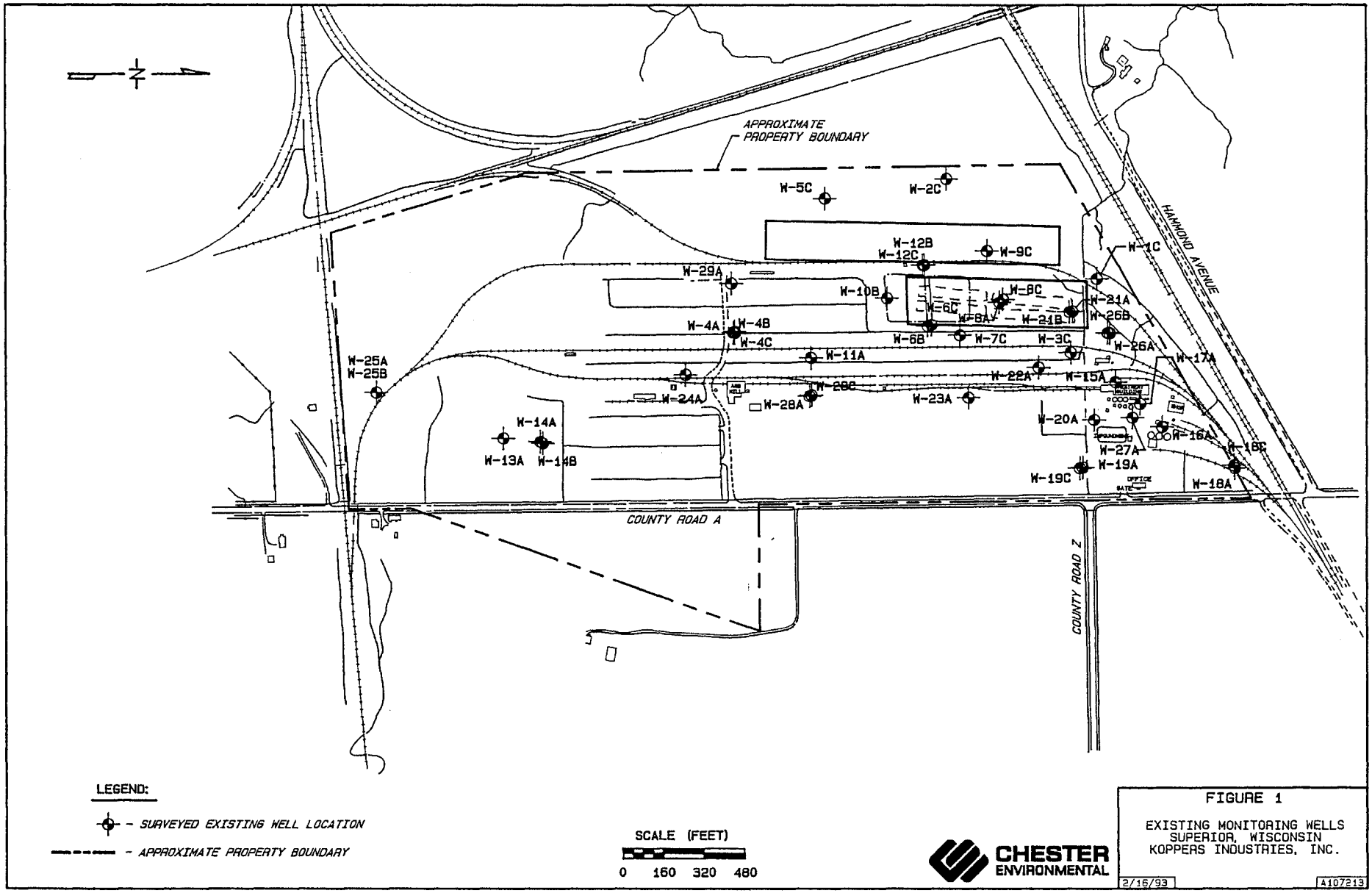
WELL	HxCDFs (total) (ng/L)
W-4A	ND
W-4B	ND
W-4C	ND
W-6B	ND
W-6C	ND
W-7C	ND
W-8C	ND
W-9C	ND
W-10B	ND
W-12B	0.20 Z
W-12C	ND
FB (12-16-92)	ND
TB (12-16-92)	0.48 Z
LB (12-18-92)	ND

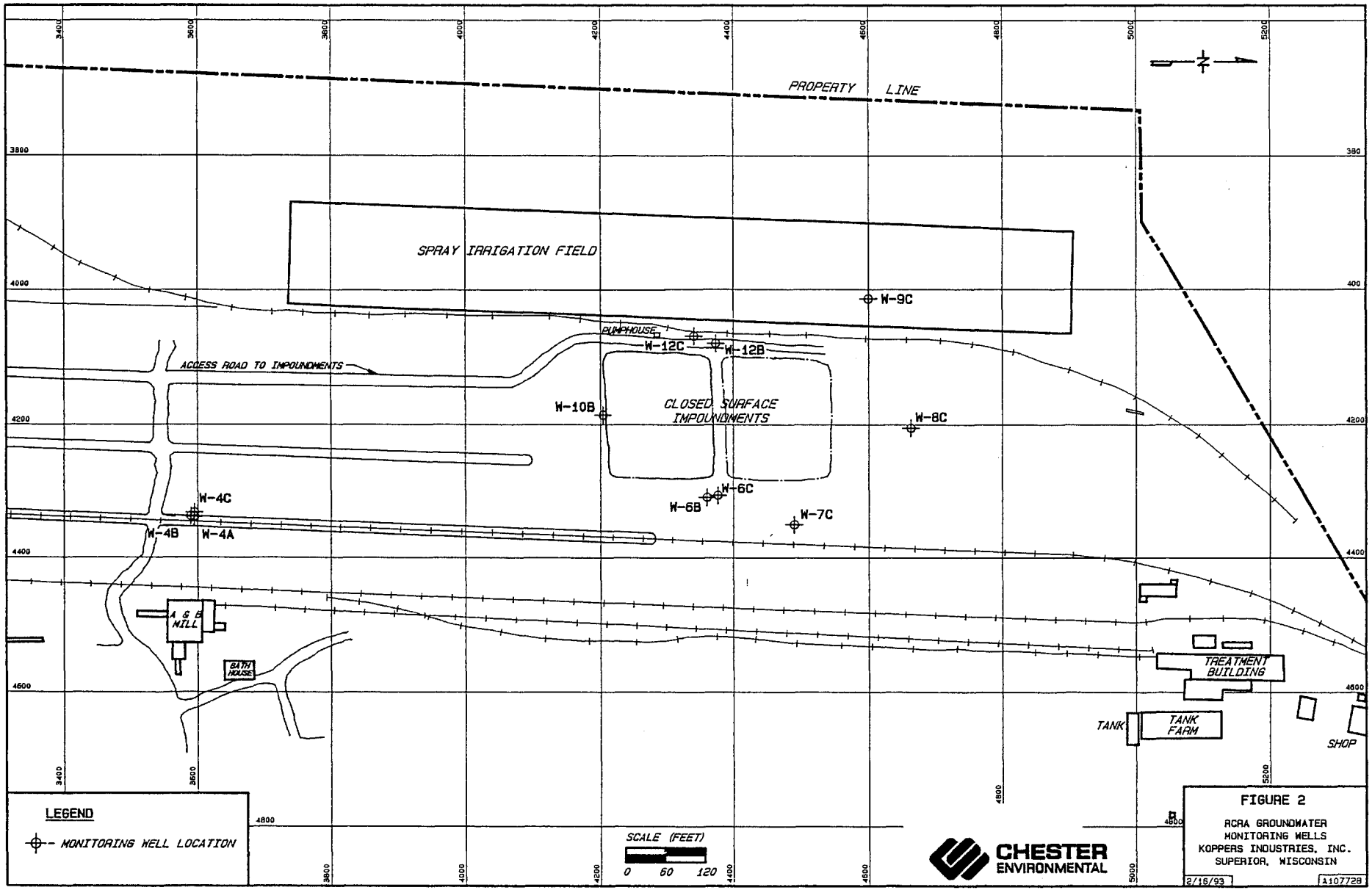
NOTE:

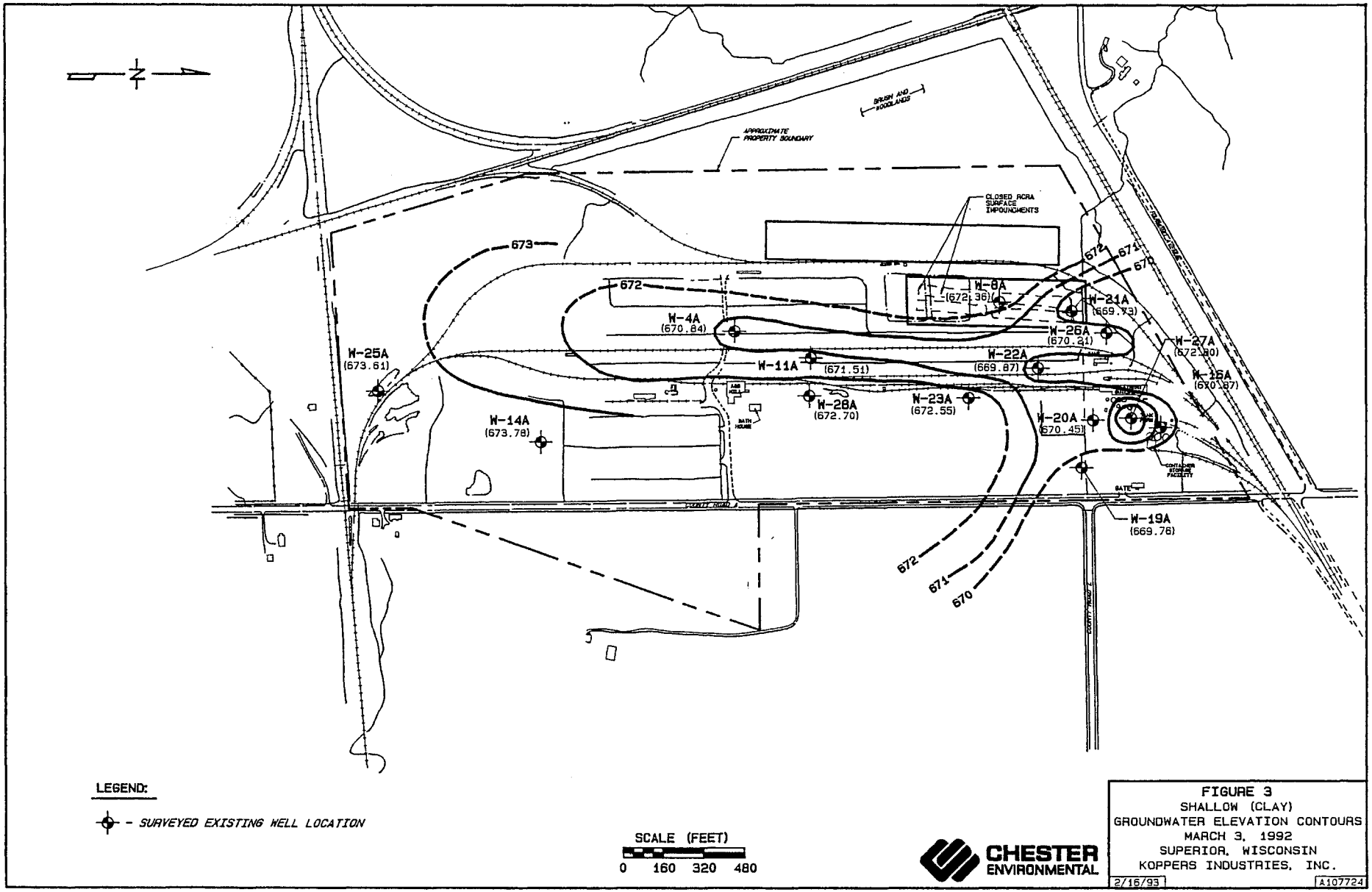
Z indicates result detected is below the lowest standard and above zero.

CHESTER ENVIRONMENTAL

FIGURES


APPROXIMATE
PROPERTY BOUNDARY
HAMMOND AVENUE
COUNTY ROAD A
COUNTY ROAD Z
W-1C
W-2C
W-3C
W-4A
W-4B
W-4C
W-5C
W-6B
W-6C
W-7C
W-8A
W-8C
W-9C
W-10B
W-11A
W-12B
W-12C
W-13A
W-14A
W-14B
W-15A
W-16A
W-16B
W-17A
W-18A
W-18C
W-19A
W-19C
W-20A
W-21A
W-21B
W-22A
W-23A
W-24A
W-25A
W-25B
W-26A
W-26B
W-27A
W-28A
W-28C
W-29A
LEGEND:
- SURVEYED EXISTING WELL LOCATION
- APPROXIMATE PROPERTY BOUNDARY
SCALE (FEET)
0 160 320 480
CHESTER ENVIRONMENTAL
FIGURE 1
EXISTING MONITORING WELLS
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.
2/16/93
A107213


PROPERTY LINE
SPRAY IRRIGATION FIELD
W-9C
PUMPHOUSE
W-12C
W-12B
ACCESS ROAD TO IMPOUNDMENTS
W-10B
CLOSED SURFACE IMPOUNDMENTS
W-8C
W-6C
W-6B
W-7C
W-4C
W-4B
W-4A
A & B MILL
BATH HOUSE
TREATMENT BUILDING
TANK
TANK FARM
SHOP
LEGEND
MONITORING WELL LOCATION
SCALE (FEET)
0 60 120
CHESTER ENVIRONMENTAL
FIGURE 2
RCRA GROUNDWATER MONITORING WELLS
KOPPERS INDUSTRIES, INC.
SUPERIOR, WISCONSIN
2/15/93
A107728



LEGEND:

⊕ - SURVEYED EXISTING WELL LOCATION

SCALE (FEET)

0 160 320 480

CHESTER ENVIRONMENTAL

FIGURE 3
SHALLOW (CLAY)
GROUNDWATER ELEVATION CONTOURS
MARCH 3, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/16/93 A107724

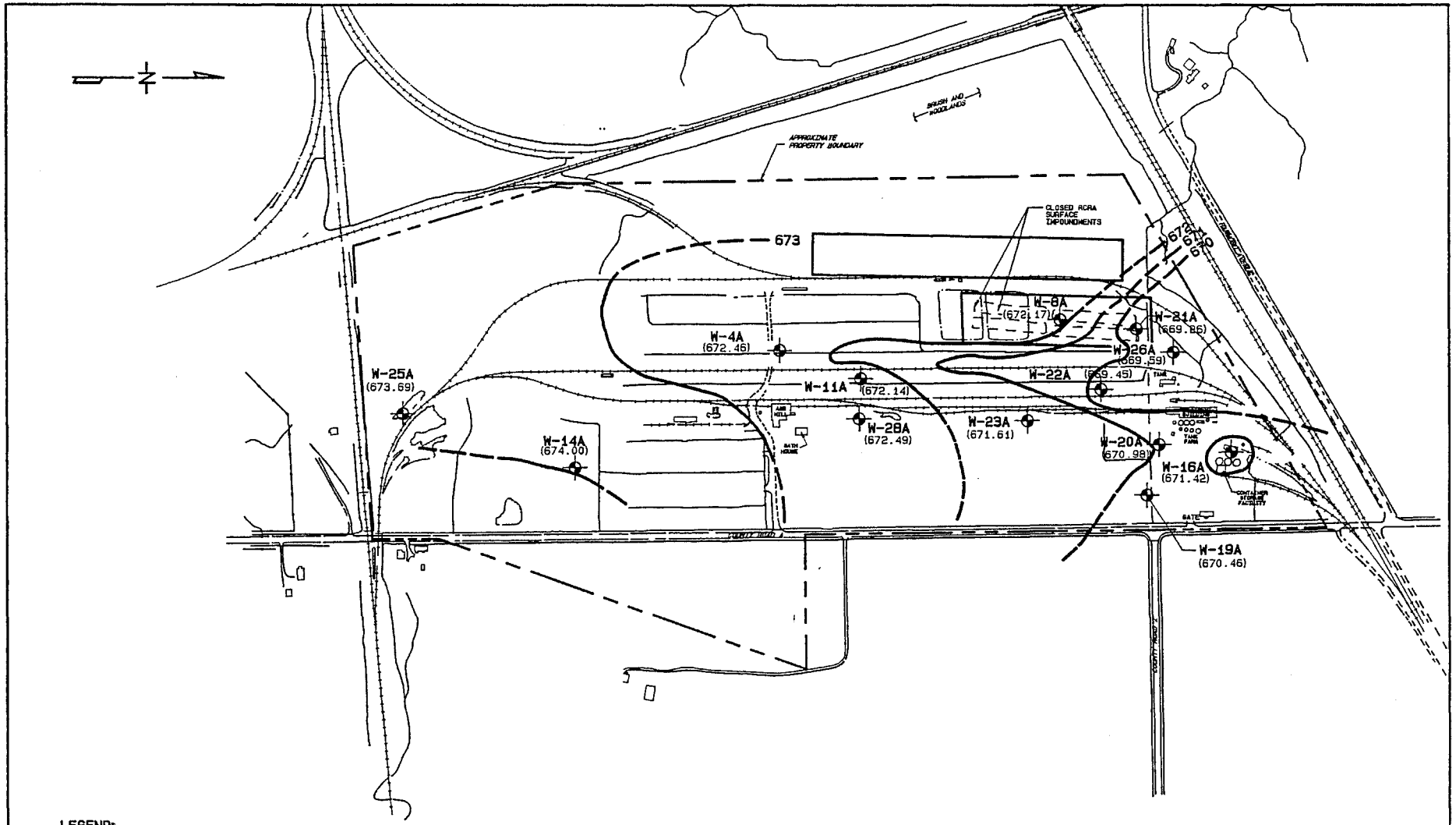
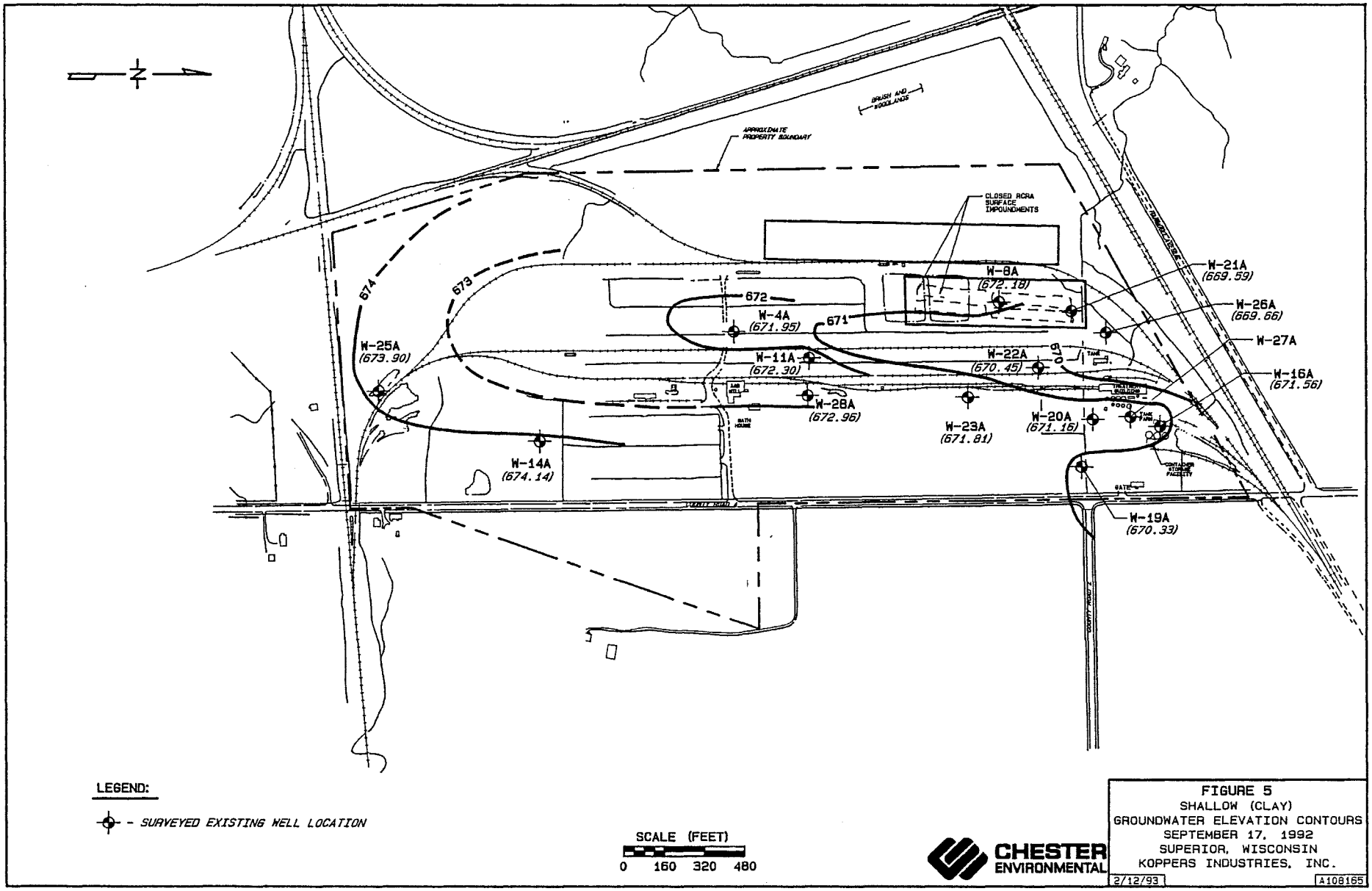


FIGURE 4
SHALLOW (CLAY)
GROUNDWATER ELEVATION CONTOURS
JUNE 1, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93 A107904



LEGEND:

⊕ - SURVEYED EXISTING WELL LOCATION

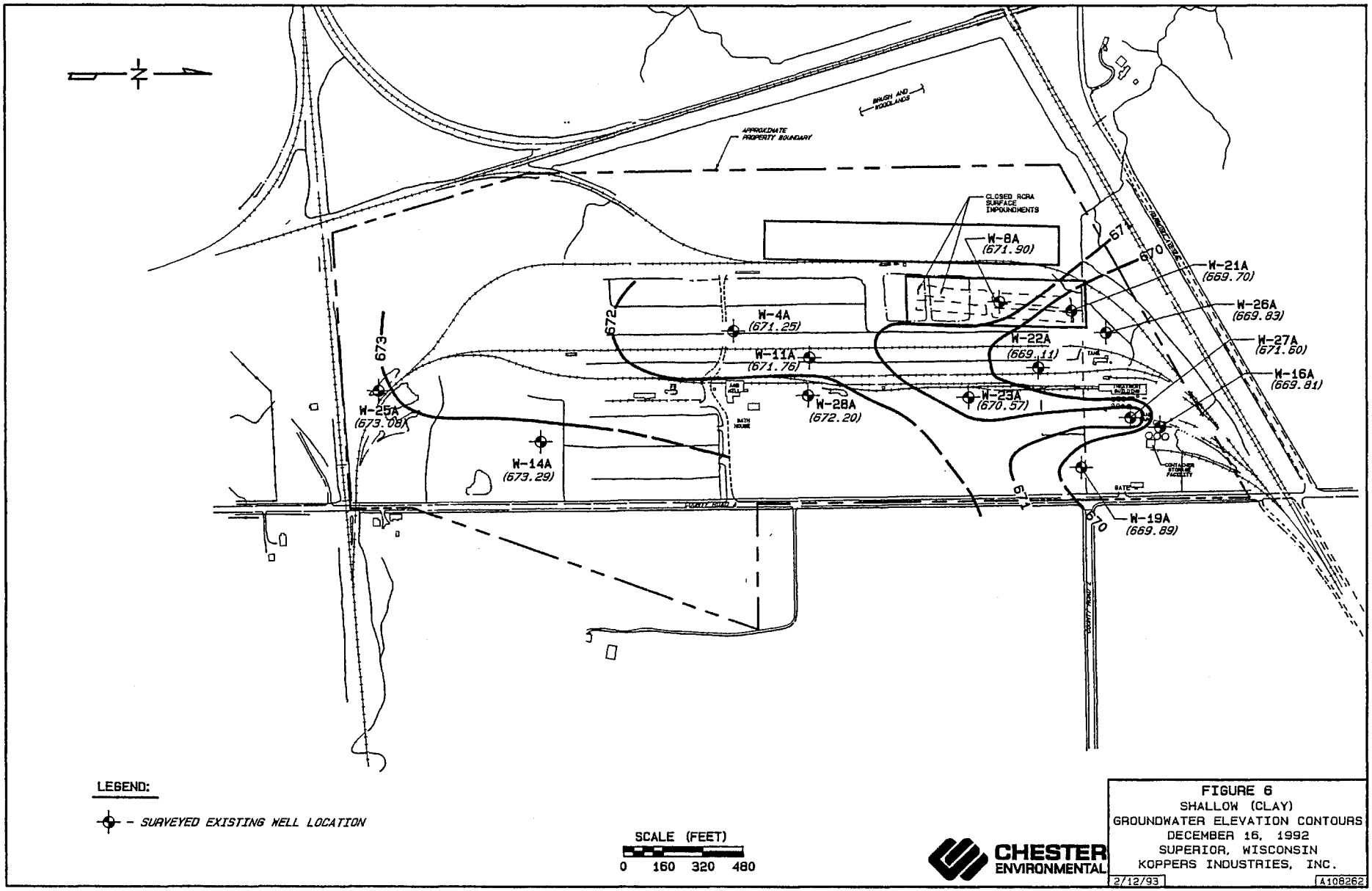
SCALE (FEET)

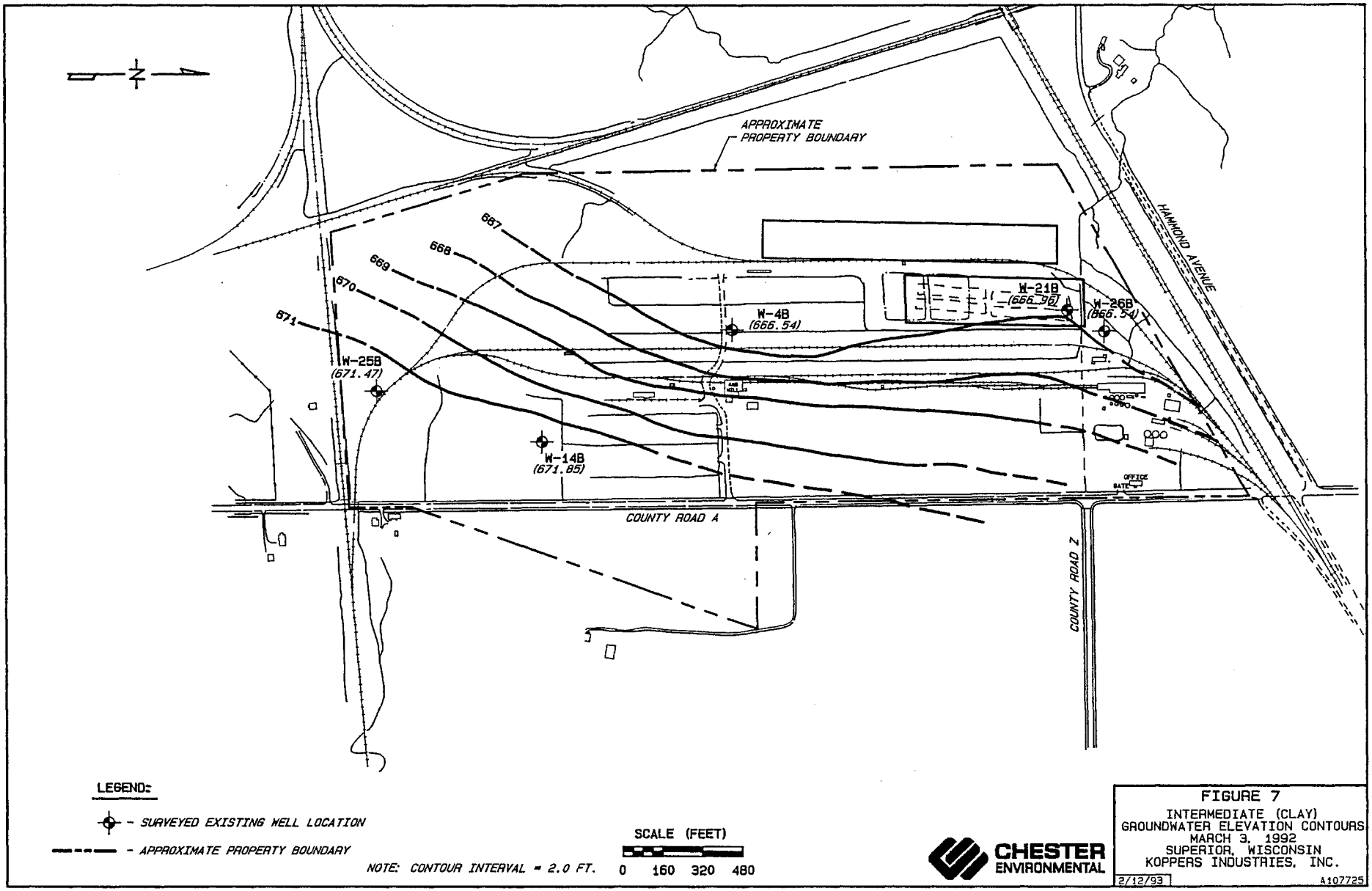
0 160 320 480

CHESTER ENVIRONMENTAL

FIGURE 5
SHALLOW (CLAY)
GROUNDWATER ELEVATION CONTOURS
SEPTEMBER 17, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93 A108165


APPROXIMATE PROPERTY BOUNDARY
BRUSH AND WOODLANDS
CLOSED RCRA SURFACE IMPOUNDMENTS
W-8A (671.90)
W-21A (669.70)
W-26A (669.83)
W-27A (671.60)
W-16A (669.81)
W-4A (671.25)
W-11A (671.76)
W-22A (669.11)
W-23A (670.57)
W-28A (672.20)
W-25A (673.08)
W-14A (673.29)
W-19A (669.89)
673
672
671
670
669
COUNTY ROAD
LEGEND:
- SURVEYED EXISTING WELL LOCATION
SCALE (FEET)
0 160 320 480
CHESTER ENVIRONMENTAL
FIGURE 6
SHALLOW (CLAY)
GROUNDWATER ELEVATION CONTOURS
DECEMBER 16, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.
2/12/93
A108262



LEGEND:

- SURVEYED EXISTING WELL LOCATION
- APPROXIMATE PROPERTY BOUNDARY

NOTE: CONTOUR INTERVAL = 2.0 FT.

CHESTER ENVIRONMENTAL

FIGURE 7
INTERMEDIATE (CLAY)
GROUNDWATER ELEVATION CONTOURS
MARCH 3, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93 A107725

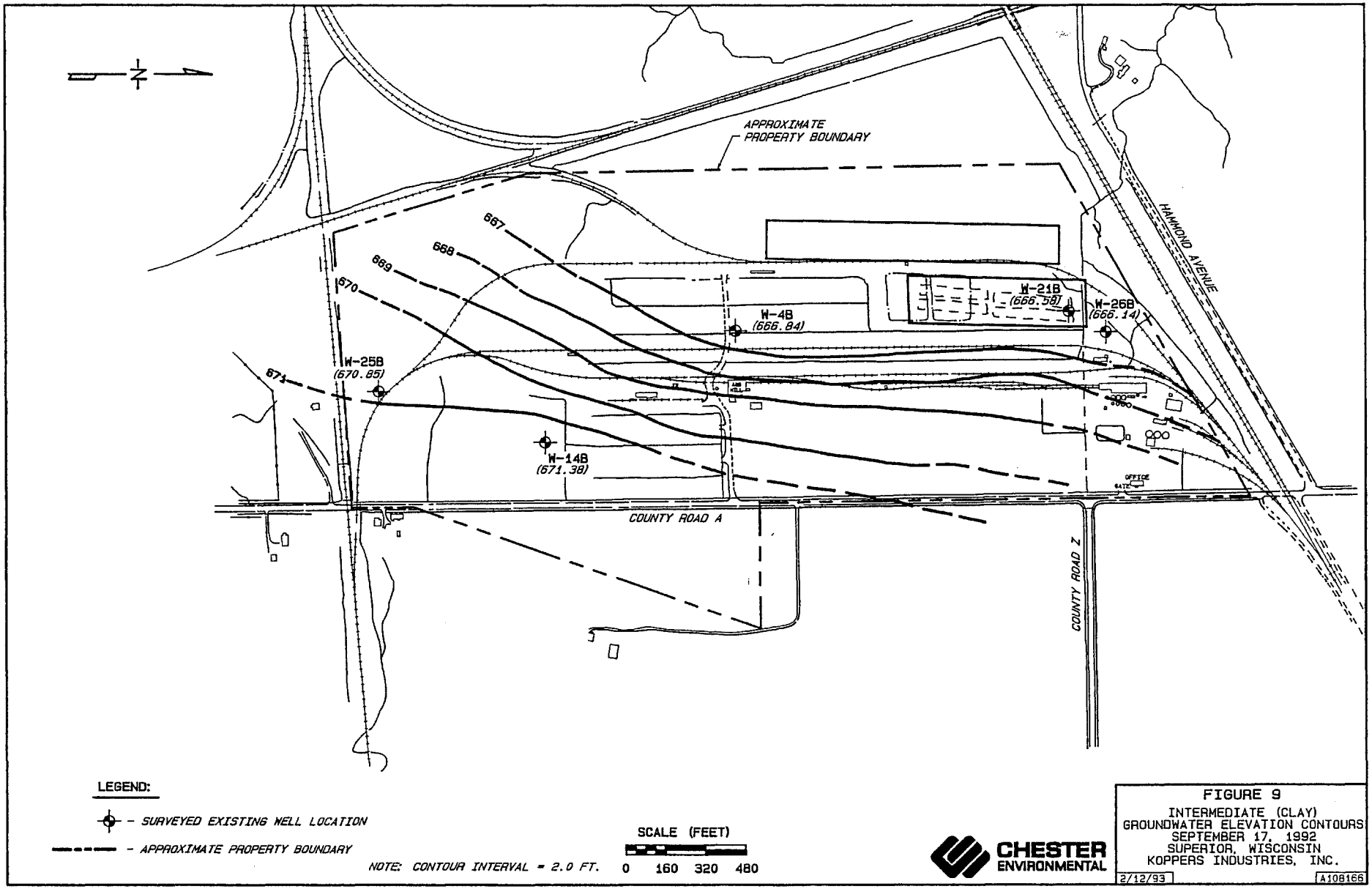


FIGURE 9
INTERMEDIATE (CLAY)
GROUNDWATER ELEVATION CONTOURS
SEPTEMBER 17, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93 A108166

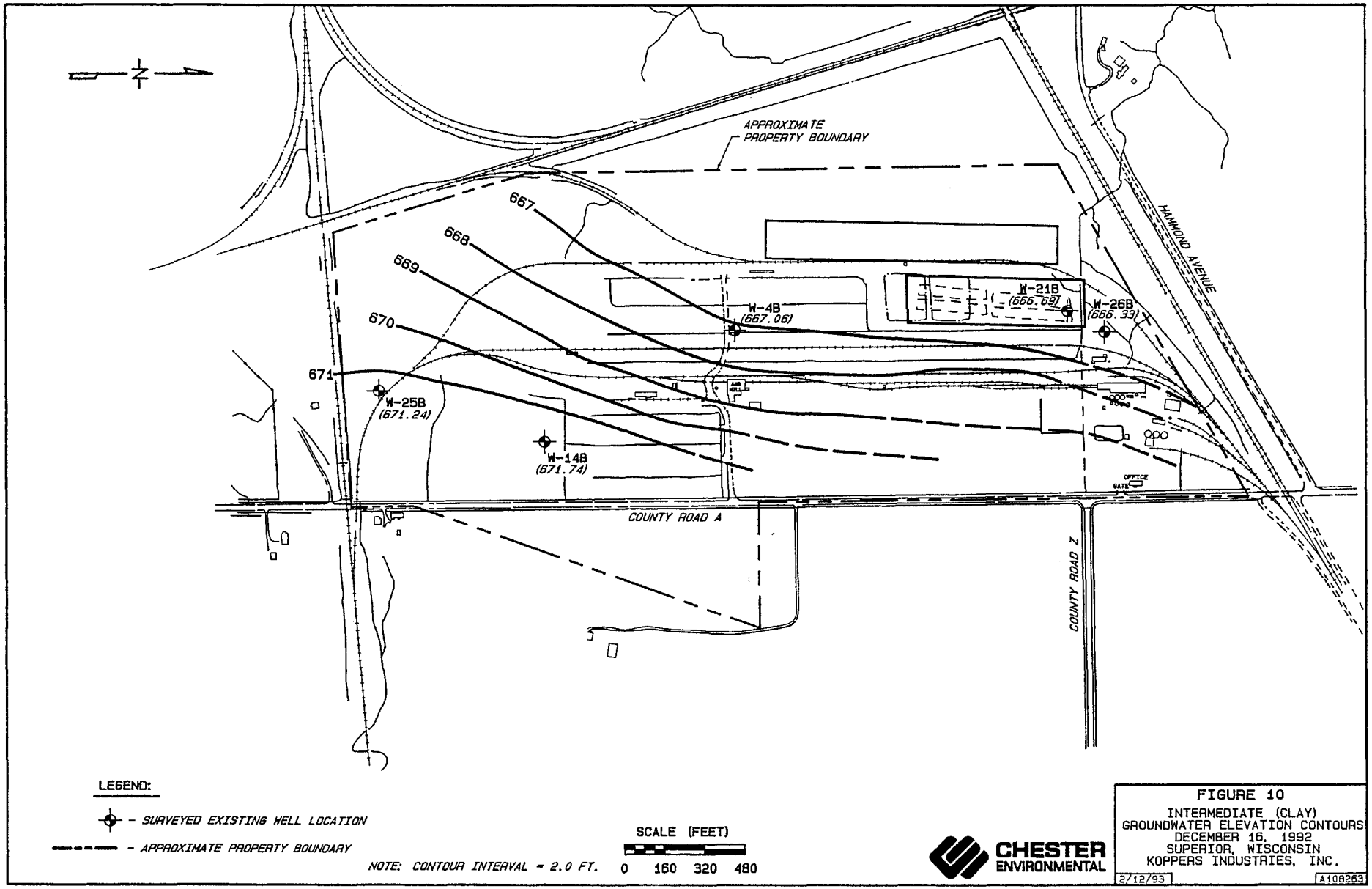


FIGURE 10

INTERMEDIATE (CLAY)
GROUNDWATER ELEVATION CONTOURS
DECEMBER 16, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93

A108263

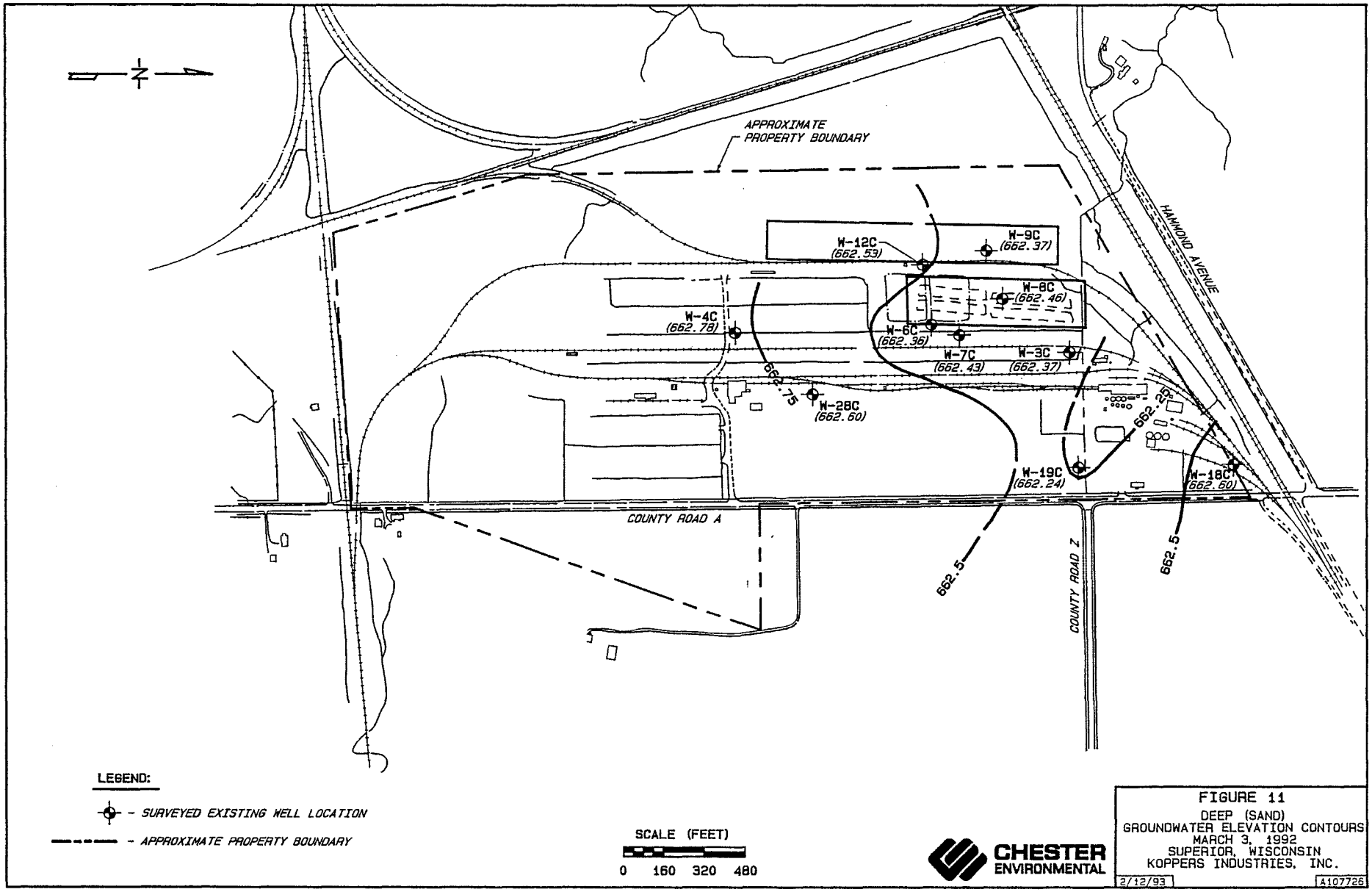
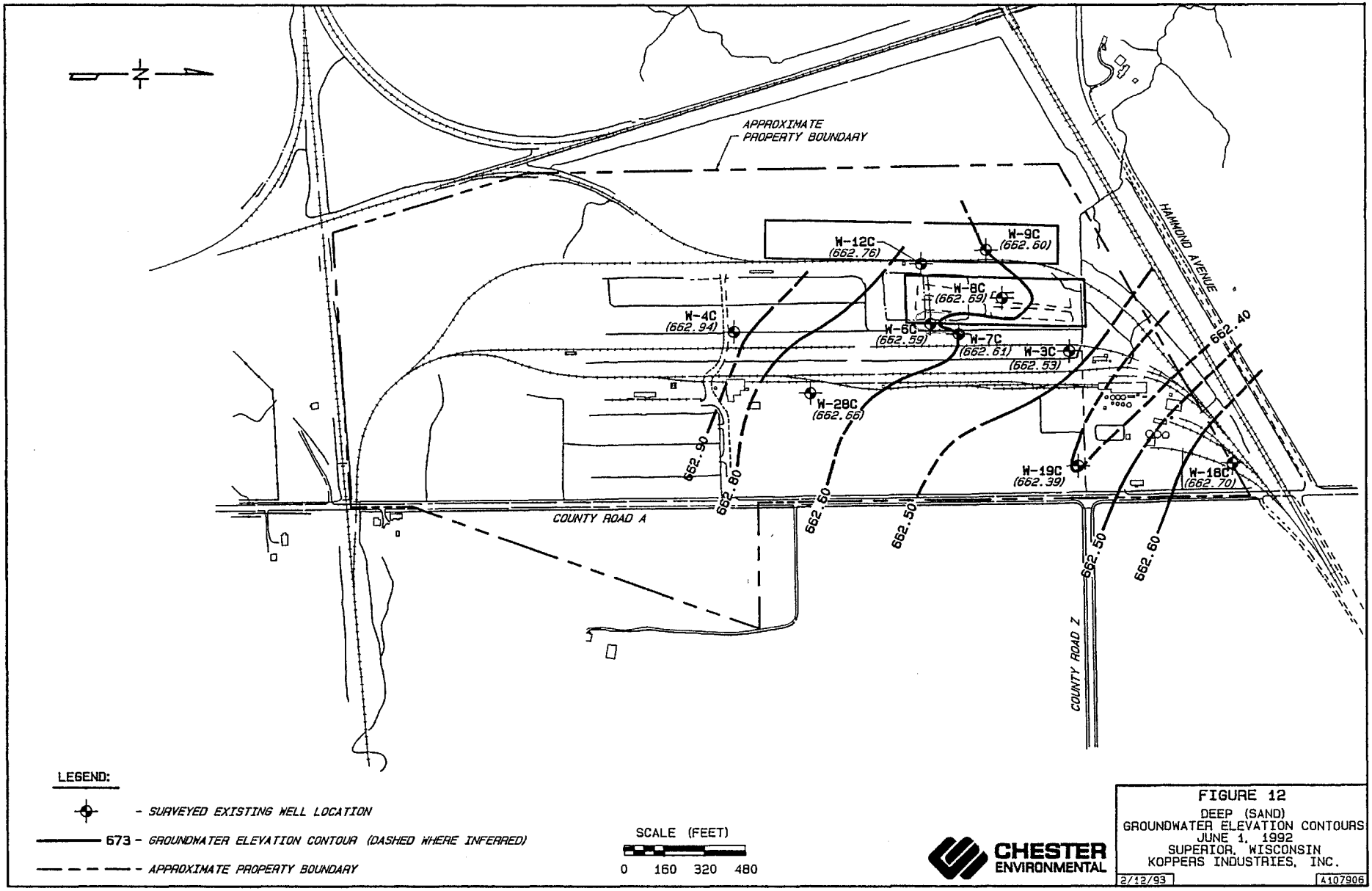


FIGURE 11
DEEP (SAND)
GROUNDWATER ELEVATION CONTOURS
MARCH 3, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93 A107726


APPROXIMATE
PROPERTY BOUNDARY
HAMMOND AVENUE
W-12C
(662.76)
W-9C
(662.60)
W-8C
(662.69)
W-4C
(662.94)
W-6C
(662.59)
W-7C
(662.61)
W-3C
(662.53)
W-28C
(662.66)
W-19C
(662.39)
W-18C
(662.70)
662.90
662.80
662.60
662.50
662.40
662.50
662.60
COUNTY ROAD A
COUNTY ROAD Z
LEGEND:
- SURVEYED EXISTING WELL LOCATION
673 - GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- APPROXIMATE PROPERTY BOUNDARY
SCALE (FEET)
0 160 320 480
CHESTER ENVIRONMENTAL
FIGURE 12
DEEP (SAND)
GROUNDWATER ELEVATION CONTOURS
JUNE 1, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.
2/12/93
A107906

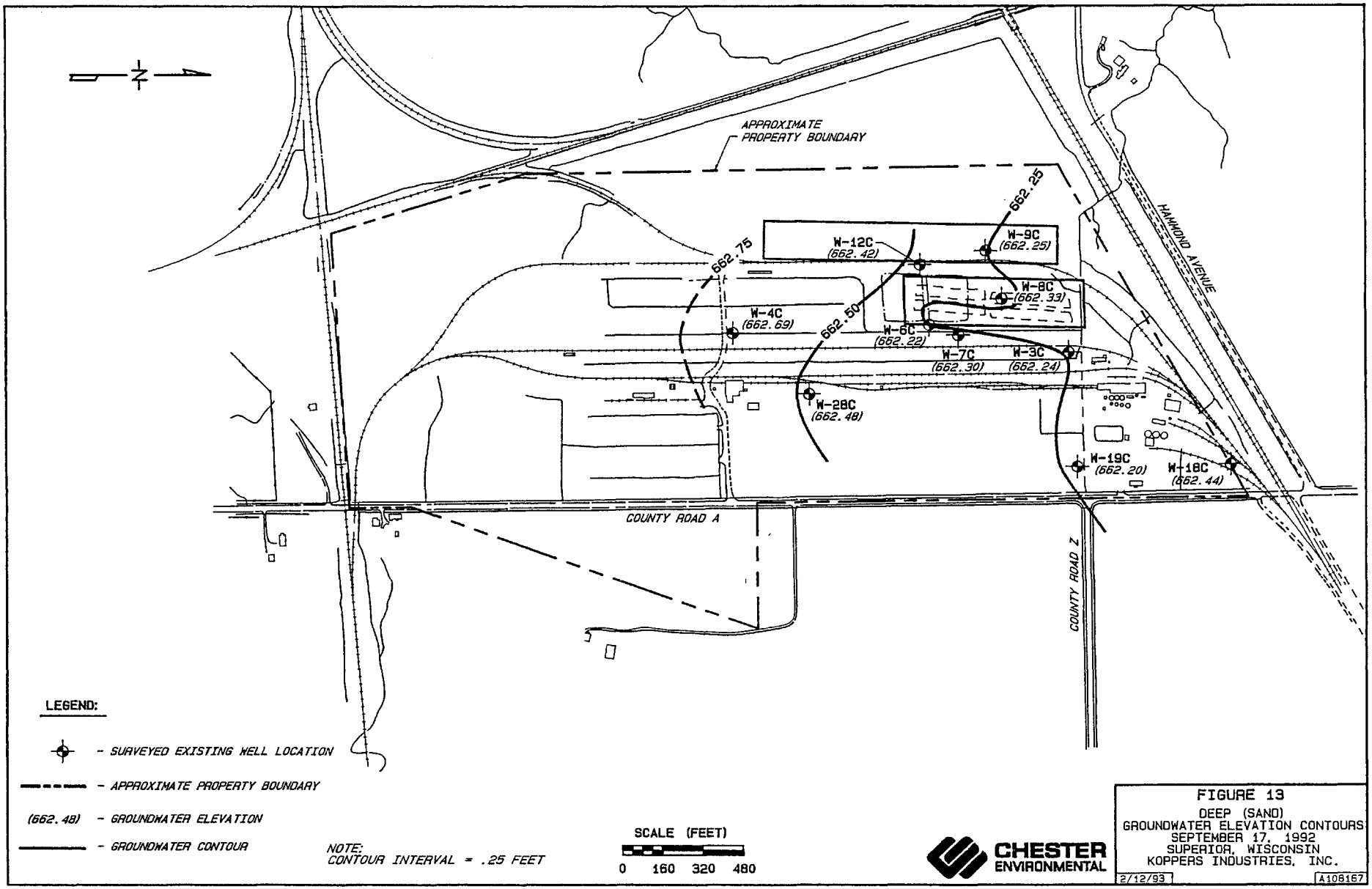


FIGURE 13

DEEP (SAND)
GROUNDWATER ELEVATION CONTOURS
SEPTEMBER 17, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93

A108167

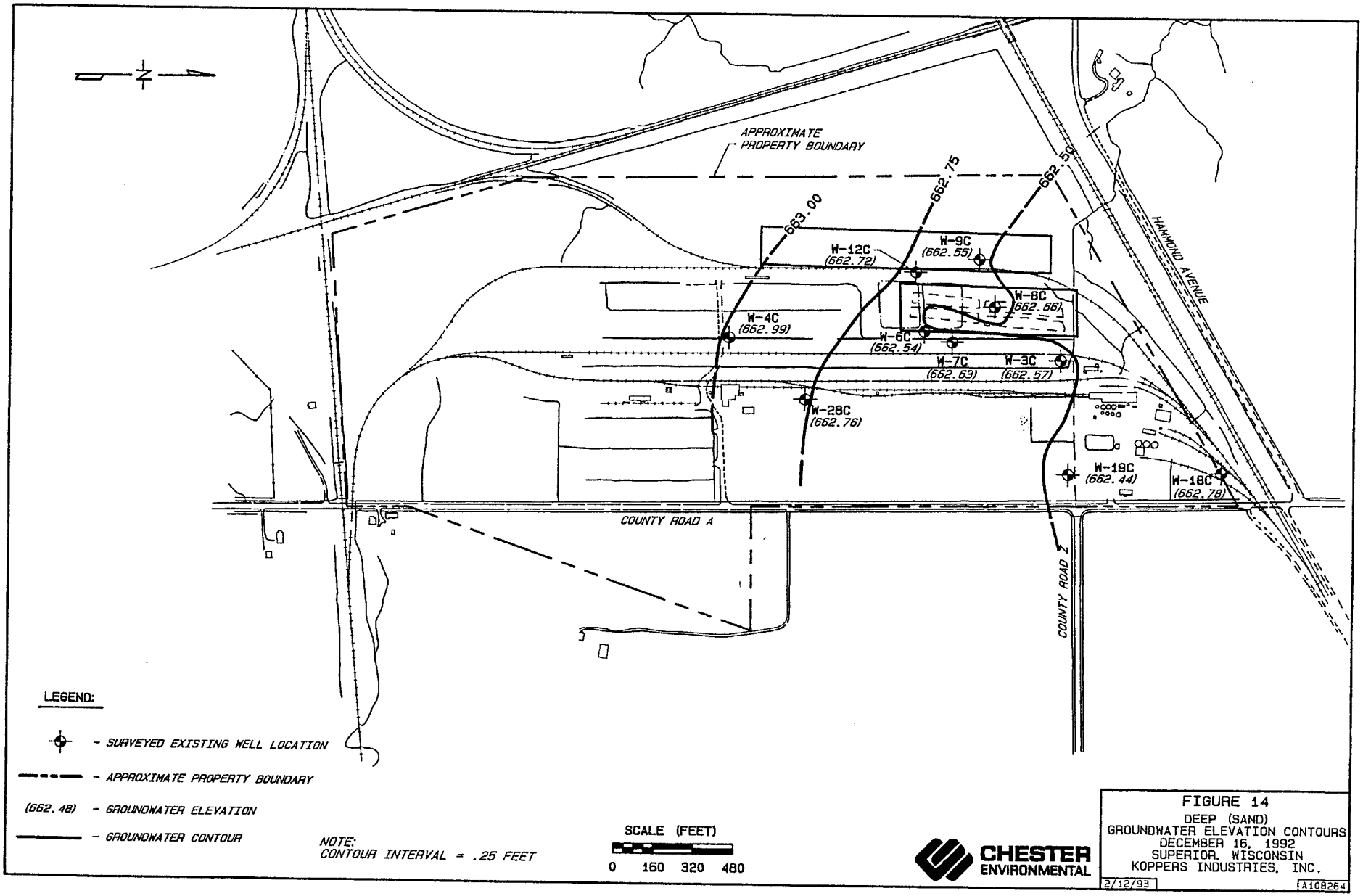


FIGURE 14
DEEP (SAND)
GROUNDWATER ELEVATION CONTOURS
DECEMBER 16, 1992
SUPERIOR, WISCONSIN
KOPPERS INDUSTRIES, INC.

2/12/93 A108264