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TABLE 3-1

DESIGNATED SURFACE WATER USES
OF WATER BODIES NEAR THE SASC SITE

	Class A	Class B (WW)	Class B (LW)	Class C	HQR
Des Moines River					
Mouth in Lee County to confluence with Raccoon River	X	X			
Raccoon River to Center St. Dam		X			
Center St. Dam to Hwy. I-80/I-35	X	X			
Des Moines Water Works intake, Prospect Park (NE $\frac{1}{4}$, S28, T79N, R24W)				X	
Raccoon River					
Mouth in Polk County to Polk-Dallas County line	X	X			
City of Des Moines Water Works intake				X	
Polk-Dallas County line to confluence with N. and S. Raccoon River	X	X			X
Walnut Creek	No Specified Uses				
Des Moines Water Works recharge basins	X		X	X	
Grays Lake	X		X		
Frink Creek	No Specified Uses				

Source: Iowa Environmental Protection Commission, Title IV, Chapter 61, Iowa Water Quality Standards, 1990.

TABLE 3-2

SUMMARY OF CLIMATOLOGICAL INFORMATION FOR DES MOINES, IOWA

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Temperature (°F)													
Average Monthly 1989	32.5	15.4	37.1	52.3	61.0	68.9	77.1	73.3	62.2	54.1	36.0	16.9	48.9
Normal Monthly	18.6	24.5	35.1	50.5	62.1	71.6	76.3	73.9	65.1	54.2	38.6	25.7	49.7
Record High	65.0	73.0	91.0	93.0	98.0	103.0	105.0	108.0	101.0	95.0	76.0	69.0	108.0
Record Low	-24.0	-20.0	-22.0	9.0	30.0	38.0	47.0	40.0	26.0	14.0	-3.0	-22.0	-24.0
Record Mean ^a	20.6	24.8	36.5	50.6	61.7	71.2	76.2	73.8	65.3	53.9	38.4	25.9	49.9
Precipitation (Inches)													
Water Equivalent													
-Total Monthly 1989	1.30	1.05	0.37	1.95	3.62	2.22	3.65	6.53	5.41	2.28	0.19	0.57	29.14
-Normal Monthly	1.01	1.12	2.20	3.21	3.96	4.18	3.22	4.11	3.09	2.16	1.52	1.05	30.83
-Maximum Monthly	4.38	2.99	5.37	7.76	7.53	14.19	10.51	13.68	10.19	7.29	6.52	3.43	14.19
-Minimum Monthly	0.07	0.13	0.37	0.23	1.23	1.13	0.04	0.25	0.41	0.03	0.03	0.12	0.03
-Record Mean ^a	1.11	1.13	1.97	2.92	4.15	4.61	3.41	3.79	3.40	2.45	1.63	1.21	31.77
Snowfall (Inches)													
-Total snow, ice pellets 1989	0.1	16.3	1.2	0.6	T	0.0	0.0	0.0	0.0	T	1.7	6.6	26.5
-Record Mean Snowfall ^a	8.1	7.3	6.6	2.0	T	0.0	0.0	0.0	T	0.3	2.8	6.8	33.8
Windspeed (MPH)													
Mean Speed ^b	11.8	11.6	12.9	12.9	11.2	10.3	9.0	8.7	9.5	10.4	11.5	11.4	10.9
Fastest Mile	66	56	66	76	70	76	73	60	55	56	72	61	76
Peak Gust	54	62	58	66	54	56	67	63	54	60	62	55	67
Prevailing Wind Direction ^c	NW	NW	NW	NW	SE	S	S	S	S	S	NW	NW	NW

Normal levels are based on a data collection period of 1951-1980.

T = Trace Amount

^a Record means are based on the following data collection periods:

Temperature: 1878-1989

Precipitation: 1877-1989

Snowfall: 1940-1989

^b Length of record for mean wind speed is 40 years.

^c Period of record for prevailing wind direction: 1951-1963

TABLE 4-1
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
SB-1	F	SOIL		X					
SB-2	F	SOIL		X					
SB-3	F	SOIL		X					
SB-4	F	SOIL		X					
SB-5	F	SOIL		X					
SB-6	F	SOIL		X					
SB-7	F	SOIL		X					
SB-8	F	SOIL		X					
SB-9	F	SOIL		X					
SB-10	F	SOIL		X					
SB-11	F	SOIL		X					
SB-12	F	SOIL		X					
SB-13	F	SOIL		X					
SB-14	F	SOIL		X					
SB-15	F	SOIL		X					
SB-16	F	SOIL		X					
SB-17	F	SOIL		X					
SB-18	F	SOIL		X					
SB-19	F	SOIL		X					
SB-20	F	SOIL		X					
SB-21	F	SOIL		X					
SB-22	F	SOIL		X					
SB-22FD	F	SOIL		X					
SB-23	F	SOIL		X					
SB-24	F	SOIL		X					
SB-25	F	SOIL		X					
SB-26	F	SOIL		X					
SB-27	F	SOIL		X					
SB-28	F	SOIL		X					
SB-29	F	SOIL		X					
SB-30	F	SOIL		X					
SB-31	F	SOIL		X					
SB-32	F	SOIL		X					
SB-33	F	SOIL		X					
SB-33FD	F	SOIL		X					
SB-34 1.0' - 3.0'	F	SOIL		X					
SB-34 4.0' - 4.5'	T	SOIL		X					
SB-35	F	SOIL		X					
SB-36	F	SOIL		X					
SB-37	F	SOIL		X					
SB-38	F	SOIL		X					
SB-39	F	SOIL		X					
SB-40	F	SOIL		X					
SB-41	F	SOIL		X					
SB-42*	F	SOIL							X
SB-43*	F	SOIL							X
SB-44*	F	SOIL							X
SB-45*	F	SOIL							X
SB-46*	F	SOIL							X

TABLE 4-1 CONT'D
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
DB-1 6.0' - 8.0'	F	SOIL				X			
DB-1 10.0' - 12.0'	I	SOIL				X			
DB-2 12.0' - 14.0'	I	SOIL				X			
DB-2 26.0' - 28.0'	N	SOIL				X			
DB-3 2.0' - 4.0'	F	SOIL				X			
DB-3 8.0' - 10.0'	I	SOIL				X			
DB-3 0.0' - 2.0'(T)	F	SOIL	X						
DB-4 4.0' - 6.0'	F	SOIL				X			
DB-4 12.0' - 14.0'	I	SOIL				X			
DB-5 0.0' - 2.0'	F	SOIL		X					
DB-5 2.0' - 4.0'	I	SOIL		X					
DB-6 2.0' - 4.0'	I	SOIL		X					
DB-6 20.0' - 22.0'	N	SOIL		X					
DB-7 2.0' - 4.0'	I	SOIL		X					
DB-7 22.0' - 24.0'	N	SOIL		X					
DB-8 2.0' - 4.0'	F	SOIL		X					
DB-8 6.0' - 8.0'	I	SOIL		X					
DB-9 2.0' - 4.0'	F	SOIL		X					
DB-9 6.0' - 8.0'	I	SOIL		X					
DB-10 2.0' - 4.0'	F	SOIL		X					
DB-10 4.0' - 6.0'	I	SOIL		X					
DB-11 2.0' - 4.0'	F	SOIL		X					
DB-11 4.0' - 6.0'	I	SOIL		X					
DB-12 0.0' - 0.5'	F	SOIL						X	
DB-12 2.0' - 4.0'	I	SOIL		X					
DB-12 20.0' - 22.0'	N	SOIL		X					
DB-12 0.0' - 2.0'(T)	F	SOIL	X						
DB-12 0.0' - 2.0'(T)FD	F	SOIL	X						
DB-13 2.0' - 4.0'	F	SOIL		X					
DB-13 4.0' - 6.0'	I	SOIL		X					
DB-14 2.0' - 4.0'	F	SOIL		X					
DB-14 4.0' - 6.0'	I	SOIL		X					
DB-15 6.0' - 8.0'	I	SOIL		X					
DB-15 0.0' - 0.5'	F	SOIL						X	
DB-15 4.0' - 6.0'	F	SOIL		X					
DB-15 4.0' - 6.0'(T)	F	SOIL	X						
DB-16 4.0' - 6.0'	F	SOIL		X					
DB-16 8.0' - 10.0'	I	SOIL		X					
DB-16 8.0' - 10.0'FD	I	SOIL		X					
DB-17 8.0' - 10.0'	F	SOIL		X					
DB-17 12.0' - 14.0'	I	SOIL		X					
DB-18 8.0' - 10.0'	I	SOIL		X					
DB-18 10.0' - 12.0'	N	SOIL		X					
DB-19 8.0' - 10.0'	I	SOIL		X					
DB-19 12.0' - 14.0'	N	SOIL		X					
DB-20 8.0' - 10.0'	I	SOIL		X					
DB-20 0.0' - 0.5'	F	SOIL						X	
DB-20 10.0' - 12.0'	N	SOIL		X					
DB-20 10.0' - 12.0'(T)	N	SOIL	X						
DB-20 8.0' - 10.0'FD	I	SOIL		X					

TABLE 4-1 CONT'D
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
DB-21	8.0' - 10.0'	I		X					
DB-21	2.0' - 4.0'	F		X					
DB-21	2.0' - 4.0'(T)	F	X						
DB-22	4.0' - 6.0'	F		X					
DB-22	6.0' - 8.0'	I		X					
DB-22	6.0' - 8.0'FD	I		X					
DB-23	8.0' - 10.0'	F		X					
DB-23	10.0' - 12.0'	I		X					
DB-24	4.0' - 6.0'	F				X			
DB-24	8.0' - 10.0'	I				X			
DB-25	2.0' - 4.0'	F		X					
DB-25	4.0' - 6.0'	I		X					
DB-26	6.0' - 8.0'	F		X					
DB-26	12.0' - 14.0'	I		X					
DB-26	14.0' - 16.0'(T)	N	X						
DB-28	2.0' - 4.0'	I		X					
DB-28	6.0' - 8.0'	N		X					
DB-29	2.0' - 4.0'	F		X					
DB-29	4.0' - 6.0'	I		X					
DB-30	4.0' - 6.0'	I		X					
DB-30	0.0' - 0.5'	F						X	
DB-30	10.0' - 12.0'	N		X					
DB-30	10.0' - 12.0'(T)	N	X						
DB-30	4.0' - 6.0'FD	I		X					
DB-31	2.0' - 4.0'	F		X					
DB-31	6.0' - 8.0'	I		X					
DB-32	4.0' - 6.0'	F			X				
DB-32	8.0' - 10.0'	I			X				
DB-33	6.0' - 8.0'	F			X				
DB-33	8.0' - 10.0'	I			X				
DB-34	8.0' - 10.0'	I			X				
DB-34	10.0' - 12.0'	N			X				
DB-35	10.0' - 12.0'	I			X				
DB-35	16.0' - 18.0'	N			X				
DB-36	4.0' - 6.0'	I			X				
DB-36	8.0' - 10.0'	N			X				
DB-37	8.0' - 10.0'	I			X				
DB-37	12.0' - 14.0'	N			X				
DB-37	8.0' - 10.0'FD	I			X				
DB-38	2.0' - 4.0'	F			X				
DB-38	4.0' - 6.0'	I			X				
DB-38	0.0' - 0.5'	F						X	
DB-38	6.0' - 8.0'(T)	N	X						
DB-39	8.0' - 10.0'	F		X					
DB-39	10.0' - 12.0'	I		X					
DB-40	6.0' - 8.0'	I		X					
DB-40	8.0' - 10.0'	N		X					
DB-41	4.0' - 6.0'	I			X				
DB-41	20.0' - 22.0'	N			X				

TABLE 4-1 CONT'D
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
DB-41 0.0' - 0.5'	F	SOIL						X	
DB-41 2.0' - 4.0'(T)	F	SOIL	X						
DB-42 6.0' - 8.0'	I	SOIL					X		
DB-42 18.0' - 20.0'	N	SOIL					X		
DB-43 8.0' - 10.0'	I	SOIL					X		
DB-43 0.0' - 0.5'	F	SOIL						X	
DB-43 0.0' - 2.0'	F	SOIL					X		
DB-43 0.0' - 2.0'(T)	F	SOIL	X						
DB-44 2.0' - 4.0'	F	SOIL					X		
DB-44 4.0' - 6.0'	I	SOIL					X		
DB-45 10.0' - 12.0'	I	SOIL					X		
DB-45 18.0' - 20.0'	N	SOIL					X		
DB-46 10.0' - 12.0'	F	SOIL			X				
DB-46 14.0' - 16.0'	I	SOIL			X				
DB-47 14.0' - 16.0'	I	SOIL		X					
DB-47 6.0' - 8.0'	F	SOIL		X					
DB-47 6.0' - 8.0'(T)	F	SOIL	X						
DB-47 14.0' - 16.0'FD	I	SOIL		X					
DB-48 6.0' - 8.0'	I	SOIL					X		
DB-48 18.0' - 20.0'	N	SOIL					X		
DB-49 10.0' - 12.0'	F	SOIL			X				
DB-49 12.0' - 14.0'	I	SOIL					X		
DB-50 8.0' - 10.0'	F	SOIL					X		
DB-50 12.0' - 14.0'	I	SOIL					X		
DB-51 6.0' - 8.0'	F	SOIL					X		
DB-51 8.0' - 10.0'	I	SOIL					X		
DB-52 0.0' - 2.0'	F	SOIL					X		
DB-52 8.0' - 10.0'	I	SOIL					X		
DB-53 2.0' - 4.0'	F	SOIL			X				
DB-53 4.0' - 6.0'	I	SOIL					X		
DB-54 4.0' - 6.0'	F	SOIL					X		
DB-54 8.0' - 10.0'	I	SOIL					X		
DB-55 8.0' - 10.0'	I	SOIL					X		
DB-55 8.0' - 10.0'FD	I	SOIL					X		
DB-55 12.0' - 14.0'	N	SOIL					X		
DB-55 0.0' - 0.5'	F	SOIL						X	
DB-56 6.0' - 8.0'(T)	F	SOIL	X						
DB-56 6.0' - 8.0'	F	SOIL					X		
DB-56 8.0' - 10.0'	I	SOIL					X		
DB-57 2.0' - 4.0'	I	SOIL			X				
DB-57 10.0' - 12.0'	N	SOIL			X				
DB-58 0.0' - 0.5'	F	SOIL						X	
DB-58 0.0' - 2.0'	F	SOIL	X						
DB-58 4.0' - 6.0'	I	SOIL	X						
DB-59 4.0' - 6.0'	F	SOIL				X			
DB-59 6.0' - 8.0'	F	SOIL							X
DB-60 2.0' - 4.0'	F	SOIL					X		
DB-60 12.0' - 14.0'	I	SOIL					X		
DB-61 6.0' - 8.0'	F	SOIL			X				
DB-61 10.0' - 12.0'	I	SOIL			X				

TABLE 4-1 CONT'D
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION		SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
DB-62	8.0' - 10.0'	F	SOIL				X			
DB-62	10.0' - 12.0'	J	SOIL				X			
DB-63	4.0' - 6.0'	F	SOIL			X				
DB-63	6.0' - 8.0'	I	SOIL			X				
DB-63	6.0' - 8.0'FD	I	SOIL			X				
DB-64	8.2' - 8.8'	I	SOIL		X					
DB-64	11.0' - 13.0'	N	SOIL		X					
DB-65	8.2' - 9.0'	I	SOIL		X					
DB-65	11.0' - 13.0'	N	SOIL		X					
DB-65	8.2' - 9.0'FD	J	SOIL		X					
DB-66	9.0' - 11.0'	I	SOIL		X					
DB-66	15.0' - 17.0'	N	SOIL		X					
DB-67	7.0' - 9.0'	F	SOIL			X				
DB-67	12.5' - 13.0'	I	SOIL			X				
DB-68	13.0' - 15.0'	I	SOIL			X				
DB-68	17.0' - 19.0'	N	SOIL			X				
DB-69	4.5' - 5.0'	F	SOIL		X					
DB-69	13.0' - 15.0'	I	SOIL		X					
DB-70	11.0' - 13.0'	I	SOIL		X					
DB-70	17.0' - 19.0'	N	SOIL		X					
FB-1		F	SOIL		X					
FB-2		F	SOIL		X					
DWB-1		NA	WATER		X					
DWB-2		NA	WATER		X					
DWB-3		NA	WATER		X					
SS-1		NA	SEDIMENT					X		
SS-2		NA	SEDIMENT					X		
SS-3		NA	SEDIMENT					X		
SS-4		NA	SEDIMENT					X		
SS-5		NA	SEDIMENT					X		
SS-6		NA	SEDIMENT					X		
SS-7		NA	SEDIMENT					X		
SS-8		NA	SEDIMENT					X		
SW-1		NA	SURFACE WATER					X		
SW-2		NA	SURFACE WATER					X		
SW-3		NA	SURFACE WATER					X		
EW-5		NA	GROUNDWATER	X						
EW-6		NA	GROUNDWATER	X						
NW-4		NA	GROUNDWATER	X						
NW-7		NA	GROUNDWATER	X						
NW-12		NA	GROUNDWATER	X						
NW-17		NA	GROUNDWATER	X						
NW-19		NA	GROUNDWATER	X						
NW-22		NA	GROUNDWATER	X						
NW-22FD		NA	GROUNDWATER	X						

TABLE 4-1 CONT'D
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION		SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
NW-23		NA	GROUNDWATER	X						
NW-27		NA	GROUNDWATER	X						
NW-28		NA	GROUNDWATER	X						
P-10		NA	GROUNDWATER	X						
RI-1	4.5' - 5.0'	I	SOIL		X					
RI-2	5.3' - 6.0'	I	SOIL		X					
RI-3	4.5' - 5.0'	I	SOIL		X					
RI-3	45.0' - 45.7'	N	SOIL		X					
RI-1	37.8' - 38.32'	NA	ROCK PORE WATER		X					
RI-2	45.0' - 45.5'	NA	ROCK PORE WATER		X					
RI-3	45.8' - 46.5'	NA	ROCK PORE WATER		X					
RB-1		NA	WATER		X					
RB-2		NA	WATER					X		
RB-3		NA	WATER		X					
RB-4		NA	WATER		X					
RB-5		NA	WATER		X					
RB-6		NA	WATER		X					
RB-7		NA	WATER		X					
RB-8		NA	WATER		X					
RB-9		NA	WATER	X						
RB-10		NA	WATER			X				
RB-20		NA	WATER		X					
RB-21		NA	WATER		X					
RB-22		NA	WATER		X					
TB-1		NA	WATER		X					
TB-2		NA	WATER		X					
TB-3		NA	WATER		X					
TB-4		NA	WATER		X					
TB-5		NA	WATER		X					
TB-6		NA	WATER		X					
TB-7		NA	WATER		X					
TB-8		NA	WATER		X					
TB-9		NA	WATER		X					
TB-10		NA	WATER		X					
TB-11		NA	WATER		X					
TB-12		NA	WATER		X					
TB-13		NA	WATER		X					
TB-14		NA	WATER		X					
TB-15		NA	WATER		X					
TB-16		NA	WATER		X					
TB-17		NA	WATER		X					
TB-18		NA	WATER		X					
TB-19		NA	WATER		X					
TB-20		NA	WATER		X					
TB-21		NA	WATER		X					
TB-22		NA	WATER		X					

TABLE 4-1 CONT'D
SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1989-1990

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	HSL TOTAL	HSL (V)	HSL (V,P)	HSL (V,M)	HSL (V,M,P)	HSL (M,P)	HSL (P)
TB-23	NA	WATER		X					
TB-24	NA	WATER		X					
TB-25	NA	WATER		X					
TB-26	NA	WATER		X					
TB-27	NA	WATER		X					
TB-28	NA	WATER		X					
TB-29	NA	WATER		X					
TB-30	NA	WATER		X					
TB-31	NA	WATER		X					
TB-32	NA	WATER		X					
TB-33	NA	WATER		X					
TB-34	NA	WATER		X					
TB-35	NA	WATER		X					
TB-40	NA	WATER		X					
TB-41	NA	WATER		X					
TB-42	NA	WATER		X					
TB-43	NA	WATER		X					
TB-44	NA	WATER		X					
WTB-1	NA	WATER		X					
WTB-2	NA	WATER		X					

LEGEND:

- HSL = Hazardous Substance List
- V = Volatile Organic Compounds
- M = Metals
- P = Pesticides
- * = Pesticides/PCBs plus 2,4-D
- FD = Field Duplicate Sample

TABLE 4-2

SHALLOW AUGER BORINGS AND
ASSOCIATED POTENTIAL SOURCE AREAS

Shallow Boring	Potential Source Area
<u>Operable Unit No. 2</u>	
SB-1 through SB-27, SB-40, SB-41	Former Dust Control Areas
SB-28 through SB-39	Former Drum Cleaning Area
SB-42 through SB-46	Former Drum Fill/Loading Area
FB-1 and FB-2	Previously Existing Degreasing Vat
<u>Operable Unit No. 4</u>	
S-1 through S-7	Former Mixing Tank

TABLE 4-3

DEEP SOIL BORINGS AND ASSOCIATED POTENTIAL SOURCE AREAS

Boring Group (DB)	Potential Source Area
<u>Operable Unit No. 2</u>	
30, 31	Former truck loading area
17, 18, 19, 20, 39, 40, 64, 65, 66	Former Solvent storage tanks/rail car unloading area
46, 47, 48, 49, 50, 51, 52, 59, 60	Fill area south of DICO production building - eastern portion
45	Fill area south of DICO production building - central portion
43, 44, 57	Fill area south of DICO production building - western portion
7, 11, 12, 13, 14	Former drum cleaning area - eastern portion
8, 9, 10, 15	Former drum cleaning area - western portion
4, 21, 22, 23, 24, 25, 28	Former dust control areas
26, 27, 29, 67, 68	Former drum fill areas
16, 41, 42, 63	non-specified area southwest of DICO production building
1, 2, 3, 5, 6, 61, 62	non-specified area in northern portion of SASC area
69, 70	Location of previously existing degreasing vat
<u>Operable Unit No. 4</u>	
56	Fill area south of DICO production building - western portion
53, 54, 55	Fill area south of DICO production building - central portion
32, 33, 34, 35, 36, 37, 38	Former DiChem building

TABLE 4-3 (Continued)

DEEP SOIL BORINGS AND ASSOCIATED POTENTIAL SOURCE AREAS

Notes: Several borings are representative of more than one potential source area. However, this table groups each boring with the potential source area considered most likely to have affected each boring location.

Soil boring DB-58 is not included in any of these soil boring groups since it is considered to be outside of any direct impacts or any past/present activities conducted at the DICO facility.

Boring DB-27 was omitted from the program due to access difficulties (EPA-approved).

TABLE 4-4

SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1991

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	TCL VOCs	TCL P/PCBs	TCL P	TPH	C
SB-47	F	SOIL		X			
SB-48	F	SOIL		X			
SB-49	F	SOIL		X			
SB-50	F	SOIL		X			
SB-51	F	SOIL		X			
SB-52	F	SOIL		X			
SB-53	F	SOIL		X			
SB-54	F	SOIL		X			
SB-55	F	SOIL		X			
SB-56	F	SOIL	X	X			
SB-57	F	SOIL		X			
SB-57FD	F	SOIL		X			
SB-58	F	SOIL		X			
SB-59	F	SOIL		X			
SB-60	F	SOIL		X			
SB-61	F	SOIL		X			
SB-62	F	SOIL		X			
SB-63	F	SOIL		X			
SB-64	F	SOIL	X	X			
SB-65	F	SOIL	X	X			
SB-66	F	SOIL		X			
SB-67	F	SOIL		X			
SB-68	F	SOIL		X			
SB-69	F	SOIL		X			
SB-70	F	SOIL		X			
RI-1	NA	GROUNDWATER	X				
RI-1FD	NA	GROUNDWATER	X				
RI-2	NA	GROUNDWATER	X				
RI-3	NA	GROUNDWATER	X				
NW-30	NA	GROUNDWATER	X	X		X	
RB-A	NA	WATER		X			
RB-B	NA	WATER	X	X			
TB-04	NA	WATER	X				
TB-30	NA	WATER	X				
DW-A	NA	WATER	X				
DRILL WATER	NA	WATER	X				

TABLE 4-4

SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1991

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	TCL VOCs	TCL P/PCBs	TCL P	TPH	C
SP-A	NA	SEDIMENT		X			
SP-B	NA	SEDIMENT		X			
SP-C	NA	SEDIMENT		X			
SP-D	NA	SEDIMENT		X			
SP-E	NA	SEDIMENT		X			
SP-F	NA	SEDIMENT		X			
SP-G	NA	SEDIMENT		X			
SP-H	NA	SEDIMENT		X			
SP-I	NA	SEDIMENT		X			
SP-J	NA	SEDIMENT		X			
HA-1	F	SOIL					X
HA-2	F	SOIL					X
HA-3	F	SOIL					X
HA-4	F	SOIL					X
HA-5	F	SOIL					X
HA-6	F	SOIL					X
WPA-1	NA	WIPE			X		
WPA-1A	NA	WIPE			X		
WPA-2D	NA	DUST			X		
WPA-3	NA	WIPE			X		
WPA-3 OL	NA	WIPE			X		
WPA-4	NA	WIPE			X		
WPA-5	NA	WIPE			X		
WPA-6	NA	WIPE			X		
WPA-7	NA	WIPE			X		
WPA-8D	NA	DUST			X		
WPA-9D	NA	DUST			X		
WPA-10D	NA	DUST			X		
WPA-11	NA	WATER			X		
WPB-1	NA	WIPE			X		
WPB-1D	NA	DUST			X		
WPB-2	NA	WIPE			X		
WPB-2A	NA	WIPE			X		
WPB-3D	NA	DUST			X		
WPB-4	NA	WIPE			X		
WPB-5D	NA	DUST			X		
WPB-6D	NA	DUST			X		
WPB-7	NA	WIPE			X		
WPB-8	NA	WIPE			X		
WPB-9	NA	WIPE			X		
WPB-10	NA	WIPE			X		
WPC-1D	NA	DUST			X		
WPC-2	NA	WIPE			X		

TABLE 4-4

SUMMARY OF ANALYSES PERFORMED
ON SAMPLES COLLECTED IN 1991

SAMPLE IDENTIFICATION	SOIL ZONE	SAMPLE MATRIX	TCL VOCs	TCL P/PCBs	TCL P	TPH	C
WPC-3D	NA	DUST			X		
WPC-4	NA	WIPE			X		
WPC-5	NA	WIPE			X		
WPC-6D	NA	DUST			X		
WPC-7	NA	WIPE			X		
WPC-8	NA	WIPE			X		
WPC-8 OL	NA	WIPE			X		
WPC-9	NA	WIPE			X		
WPC-10	NA	WIPE			X		
WPC-11	NA	WATER			X		

LEGEND:

- TCL = Target Compound List
- VOCs = Volatile Organic Compounds
- FD = Field Duplicate Sample
- A = Field Duplicate Sample
- OL = Overlay Sample
- P/PCBs = Pesticides/PCBs
- P = Pesticides
- TPH = Total Petroleum Hydrocarbons
- C = Total and Hexavalent Chromium

TABLE 4-5
SAMPLE CONTAINERS

Type of Analysis	40 ml Glass Septum Vials	1 Pint Glass	1 Quart Glass	500 ml Polyethylene
<u>Soil/Sediment Matrix</u>				
Volatile Organics	3			
Semivolatile Organics/ Pesticides/Metals (any combination)		2		
<u>Groundwater/Surface Water Matrix</u>				
Volatile Organics	3			
Semivolatile Organics			1*	
Pesticides			1*	
Metals				1
Cyanide			1	

*Amber glass container used.

TABLE 4-6

SAMPLE PRESERVATION AND HOLDING TIMES

Type of Analysis	Preservation			Holding Times (days from receipt)	
	1:1 HNO ₃	NaOH	4°C	Extraction	Analysis
<u>Soil/Sediment Matrix</u>					
Volatile Organics			x		10
Semivolatile Organics			x	10	40
Pesticides			x	10	40
Metals			x		180
Cyanide			x		12
Mercury			x		26
<u>Groundwater/Surface Water Matrix</u>					
Volatile Organics			x		10
Semivolatile Organics			x	5	40
Pesticides			x	5	40
Metals	x		x		180
Cyanide		x	x		12
Mercury			x		26

Note: The required aliquot of laboratory grade HNO₃ or NaOH was placed in the appropriate sample containers by UHL prior to collection of the samples.

Note: This table is based on a maximum "lag" time (including shipping) of two days from time of sampling to laboratory receipt of the sample(s).

TABLE 4-7

COMPARISON OF HAZARDOUS SUBSTANCE LIST TO
TARGET COMPOUND LIST AND TARGET ANALYTE LIST

VOLATILE ORGANICS

1,1,1-Trichloroethane	Carbon Tetrachloride
1,1,2,2-Tetrachloroethane	Chlorobenzene
1,1,2-Trichloroethane	Chloroethane
1,1-Dichloroethane	Chloroform
1,1-Dichloroethene	Chloromethane
1,2-Dichloroethane	cis-1,3-Dichloropropene
1,2-Dichloroethene (total)	Dibromochloromethane
1,2-Dichloropropane	Ethyl Benzene
2-Butanone	Methylene Chloride
2-Hexanone	Styrene
4-Methyl-2-pentanone	Tetrachloroethene
Acetone	Toluene
Benzene	trans-1,3-Dichloropropene
Bromodichloromethane	Trichloroethene
Bromoform	*Vinyl Acetate
Bromomethane	Vinyl Chloride
Carbon Disulfide	Xylenes (total)

SEMI-VOLATILE ORGANICS

1,2,4-Trichlorobenzene	Benzo(g,h,i)perylene
1,2-Dichlorobenzene	Benzo(k)fluoranthene
1,3-Dichlorobenzene	*Benzoic acid
1,4-Dichlorobenzene	*Benzyl alcohol
2,4,5-Trichlorophenol	bis(2-Chloroethoxy) methane
2,4,6-Trichlorophenol	bis(2-Chloroethyl) ether
2,4-Dichlorophenol	bis(2-Ethylhexyl)phthalate
2,4-Dimethylphenol	***bis-(2-Chloroisopropyl) ether
2,4-Dinitrophenol	Butylbenzylphthalate
2,4-Dinitrotoluene	**Carbazole
2,6-Dinitrotoluene	Chrysene
2-Chloronaphthalene	Di-n-butylphthalate
2-Chlorophenol	Di-n-octylphthalate
2-Methylnaphthalene	Dibenz(a,h)anthracene
2-Methylphenol	Dibenzofuran
2-Nitroaniline	Diethylphthalate
2-Nitrophenol	Dimethylphthalate
3,3'-Dichlorobenzidine	Fluoranthene
3-Nitroaniline	Fluorene
4,6-Dinitro-2-methylphenol	Hexachlorobenzene
4-Bromophenyl-phenylether	Hexachlorobutadiene
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	Hexachlorocyclopentadiene
4-Chloroaniline	Hexachloroethane
4-Chlorophenyl-phenyl ether	Indeno(1,2,3-cd)pyrene
4-Methylphenol	Isophorone
4-Nitroaniline	N-Nitroso-di-n-dipropylamine
4-Nitrophenol	N-nitrosodiphenylamine

TABLE 4-7 (Continued)

COMPARISON OF HAZARDOUS SUBSTANCE LIST TO
TARGET COMPOUND LIST AND TARGET ANALYTE LISTSEMIVOLATILE ORGANICS

(Continued)

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)Fluoranthene

Naphthalene
Nitrobenzene
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

PESTICIDES/PCBs

4,4'-DDD
4,4'-DDE
4,4'-DDT
Aldrin
alpha-BHC
alpha-Chlordane
Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260
beta-BHC

delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
**Endrin aldehyde
Endrin ketone
gamma-BHC (Lindane)
gamma-Chlordane
Heptachlor
Heptachlor epoxide
Methoxychlor
Toxaphene

METALS/INORGANICS

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Cyanide
Iron

Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

NOTES: * Present on HSL, but not on TCL
** Present on TCL, but not on HSL
*** Designated as 2,2¹-Oxybis(1-chloropropane) on TCL

**TABLE 6-1
GENERALIZED STRATIGRAPHIC COLUMN**

UNIT	THICKNESS	GENERALIZED DESCRIPTION
FILL MATERIAL	2.0' - 14.0'	Dark brown Silty CLAY, light brown f SAND and demolition debris; concrete, brick fragments, scrap iron, wood, etc...
OVERBANK DEPOSITS	0.0' - 14.0'	Dark brown to black Silty CLAY with some f Sand.
GLACIAL OUTWASH	8.0' - 27.5'	Light gray to light brown cf SAND and cf GRAVEL.
CHEROKEE GROUP	~500'	Black Siltstone and Shale, moderately hard, some low angle and horizontal fractures in the upper weathered zone.

TABLE 6-2

RESULTS OF ANALYSES CONDUCTED ON
GROUNDWATER SAMPLE FROM NW-30*
(all values in ppb)

VOLATILE ORGANIC COMPOUNDS DETECTED	
1,2-DICHLOROETHENE (total)	4 J
CHLOROFORM	3 J
TRICHLOROETHENE	11
PESTICIDES/PCBs DETECTED	
ALDRIN	0.060
DIELDRIN	0.075 JP
TOTAL PETROLEUM HYDROCARBONS	N.D.

* Sample collected 03-Sep-91

J Detected below method detection limit

P Greater than 25% difference in concentrations between the two columns

N.D. Not detected

TABLE 6-3

CAUSE OF ANOMALIES IDENTIFIED FROM TERRAIN CONDUCTIVITY SURVEY

Anomaly Designation	Identified by:			Suspected Cause(s) of Anomaly
	Horizontal Dipole	Vertical Dipole	Metal Detector	
A	Yes	Yes	No	Air stripping tower/ chain-link fence
B*	Yes	No	No	Overhead power lines
C	Yes	Yes	No	Underground water mains
D	Yes	Yes	No	Parked automobiles/trailers
E	Yes	Yes	No	Chain-link fence
F	No	Yes	No	Chain-link fence
G	No	Yes	No	Metal building
H	Yes	Yes	Yes	Fill material including demolition debris, waste metal pieces and partially full paint cans
I*	No	Yes	No	Unknown
J	Yes	No	Yes	Unknown, possible chain-link fence or nearby guide wire
K	No	Yes	No	Underground water line and/or nearby chain-link fence
L	No	Yes	Yes	Unknown, possibly nearby monitoring wells and/or buried electrical conduit for recovery well system
M*	No	Yes	Yes	Unknown, possibly overhead power lines
N*	No	Yes	Yes	Fill material

* - Denotes area with anomalously low apparent conductivity values.

TABLE 6-4
EVALUATION OF DATA DETECTED IN
LABORATORY METHOD BLANKS AND TRIP BLANKS

METHOD	ACETONE		2-BUTANONE		CARBON DISULFIDE		METHYLENE CHLORIDE	
	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections
FILL	31	34	22	29	21	31	4	80
FILL/NATURAL SOIL INTERFACE	32	34	23	26	7	15	5	55
NATURAL SOIL	11	12	10	11	4	6	3	23
GROUNDWATER (Unconsolidated Deposits)	0	0	0	0	0	0	1	11
GROUNDWATER (Bedrock)	0	0	0	0	0	0	0	0
SURFACE WATER	0	0	0	0	0	0	0	1
SEDIMENT	0	0	0	3	0	3	0	3
TOTAL	74	80	55	69	32	55	13	173

**TABLE 6-4 (CONTINUED)
EVALUATION OF DATA DETECTED IN
LABORATORY METHOD BLANKS AND TRIP BLANKS**

METHOD	XYLENES		ALDRIN		METHOXYCHLOR		BUTYLBENZYLPHTHALATE	
	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections
FILL	22	23	12	14	0	2	1	2
FILL/NATURAL SOIL INTERFACE	10	10	0	0	0	0	0	1
NATURAL SOIL	7	7	0	0	0	0	1	1
GROUNDWATER (Unconsolidated Deposits)	0	0	1	1	0	0	0	0
GROUNDWATER (Bedrock)	0	0	0	0	0	0	0	0
SURFACE WATER	0	0	0	0	0	0	0	0
SEDIMENT	0	0	0	0	0	0	0	0
TOTAL	39	40	13	15	0	2	2	4

**TABLE 6-4 (CONTINUED)
EVALUATION OF DATA DETECTED IN
LABORATORY METHOD BLANKS AND TRIP BLANKS**

METHOD	TOLUENE		TRICHLOROETHENE	
	Number of Positive Values	Number of Detections	Number of Positive Values	Number of Detections
FILL	19	20	50	51
FILL/NATURAL SOIL INTERFACE	5	5	23	23
NATURAL SOIL	3	3	11	11
GROUNDWATER (Unconsolidated Deposits)	1	1	12	12
GROUNDWATER (Bedrock)	0	0	3	3
SURFACE WATER	0	0	0	0
SEDIMENT	0	0	0	0
TOTAL	28	29	99	100

TABLE 6-5

NATURAL RANGE OF INORGANIC PARAMETERS IN SOILS (PPM)
(Connor and Shacklette, 1975)

Element	Eastern U.S. B Horizon ¹	Missouri B Horizon		Missouri Surface Horizon ²
		Glaciated Prairie	Unglaciated Prairie	
Aluminum	7,000-100,000	57,000-90,000	21,000-90,000	11,000-79,000
Antimony	<150-500	NA	NA	NA
Arsenic	<.2-73	7.2-20	3.4-38	2.5-72
Barium	15-1,000	200-1,000	200-1,000	100-1,500
Beryllium	<1-7	<1-2	<1-2	<1-2
Cadmium	<1-1	NA	NA	<1-11
Calcium	<100-160,000	2,100-8,600	<700-5,700	700-56,000
Chromium	1-100	50-100	30-100	10-150
Cobalt	<3-70	3-30	3-50	<3-30
Copper	<1-150	10-70	7-50	5-150
Iron	100->100,000	18,000-51,000	14,000-123,000	4,900-54,000
Lead	<7-300	15-50	15-70	10-70
Magnesium	50-50,000	2,300-10,000	1,400-7,800	500-28,000
Manganese	<2-7,000	70-2,000	150-7,000	15-3,000
Mercury	.01-3.4	.03-.26	.01-.31	<.01-.8
Nickel	<3-700	15-70	<5-70	<5-70
Potassium	50-37,000	7,500-25,000	5,800-31,000	3,300-37,000
Selenium	<.1-1.4	<.1-3.4	.2-3.1	<.1-2.7
Silver	NA	NA	NA	<.5-3
Sodium	<200-15,000	1,300-8,100	1,000-8,100	700-12,000
Thallium	NA	NA	NA	NA
Vanadium	<5-300	70-150	50-150	15-150
Zinc	<5-400	31-194	22-116	18-640
Cyanide	NA	NA	NA	NA

NA = Not Available

¹ Collected from a depth of approximately 8 inches.

² Collected from a depth of 0 to 6 inches.

TABLE 6-6
SUMMARY OF
VOLATILE ORGANIC COMPOUNDS DETECTED IN FILL
(all values in ppb)

COMPOUND	NO. OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATIONS
Trichloroethene	90	50	55.56%	ND - 55000	79.23
1,2-Dichloroethene	90	41	45.56%	ND - 130000	68.43
Tetrachloroethene	90	36	40.00%	ND - 17000	21.76
Acetone	90	31	34.44%	ND - 470	59.32
Xylenes	90	22	24.44%	ND - 690000	88.79
2-Butanone	90	22	24.44%	ND - 3200	26.95
Carbon Disulfide	90	21	23.33%	ND - 41	4.16
Toluene	90	19	21.11%	ND - 62000	42.73
Ethylbenzene	90	13	14.44%	ND - 83000	49.74
Vinyl Chloride	90	6	6.67%	ND - 760	20.94
Methylene Chloride *	90	4	4.44%	ND - 10000	1427.98
1,1-Dichloroethane	90	1	1.11%	ND - 1	1.00
1,1,1-Trichloroethane	90	1	1.11%	ND - 3	3.00
4-Methyl-2-Pentanone	90	1	1.11%	ND - 3	3.00
2-Hexanone	90	1	1.11%	ND - 5	5.00
Chloroform	90	1	1.11%	ND - 5	5.00

* CONSIDERED TO BE A LABORATORY CONTAMINANT
ND = NOT DETECTED

TABLE 6-7
SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED AT FILL/NATURAL SOIL INTERFACE
(all values in ppb)

COMPOUND	NO. OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATIONS
Acetone	61	32	52.46%	ND - 2900	105.72
Trichloroethene	61	23	37.70%	ND - 13000	53.51
2-Butanone	61	23	37.70%	ND - 100	25.85
1,2-Dichloroethene	61	20	32.79%	ND - 26000	82.50
Tetrachloroethane	61	13	21.31%	ND - 83	11.25
Xylenes	61	10	16.39%	ND - 2900	31.54
Vinyl Chloride	61	8	13.11%	ND - 1100	12.09
Carbon Disulfide	61	7	11.48%	ND - 4	2.63
Methylene Chloride *	61	5	8.20%	ND - 1200	213.39
Toluene	61	5	8.20%	ND - 17000	33.92
Ethylbenzene	61	4	6.56%	ND - 990	214.59
Chlorobenzene	61	1	1.64%	ND - 24	24.00
Benzene	61	1	1.64%	ND - 2	2.00
1,1,2-Trichloroethene	61	1	1.64%	ND - 10	10.00
1,1-Dichloroethane	61	1	1.64%	ND - 220	220.00
1,1,1-Trichloroethane	61	1	1.64%	ND - 3	3.00

* CONSIDERED TO BE A LABORATORY CONTAMINANT
ND = NOT DETECTED

TABLE 6-8
SUMMARY OF
VOLATILE ORGANIC COMPOUNDS DETECTED IN NATURAL SOIL
(all values in ppb)

COMPOUND	NO. OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATIONS
1,2-Dichloroethane	25	11	44.00%	ND - 11000	76.85
Acetone	25	11	44.00%	ND - 370	82.97
Trichloroethene	25	11	44.00%	ND - 33000	63.29
2-Butanone	25	10	40.00%	ND - 78	19.19
Tetrachloroethene	25	7	28.00%	ND - 850	27.97
Xylenes	25	7	28.00%	ND - 1900	20.07
Ethylbenzene	25	4	16.00%	ND - 510	22.62
Carbon Disulfide	25	4	16.00%	ND - 5	2.24
Toluene	25	3	12.00%	ND - 3900	404.74
Methylene Chloride *	25	3	12.00%	ND - 970	865.07
Vinyl Chloride	25	3	12.00%	ND - 1400	104.71
1,1-Dichloroethene	25	3	12.00%	ND - 210	22.19
1,1-Dichloroethane	25	2	8.00%	ND - 37	8.60

* CONSIDERED TO BE A LABORATORY CONTAMINANT
ND = NOT DETECTED

TABLE 6-9

RESULTS FROM SURFICIAL SOIL SAMPLES
 ANALYZED FOR HEXAVALENT CHROMIUM
 AND TOTAL CHROMIUM
 (all values in ppm)

LOCATION	HEXAVALENT CHROMIUM	TOTAL CHROMIUM	PERCENTAGE OF HEXAVALENT TO TOTAL CHROMIUM
HA-1	1.9	570	0.33%
HA-2	<1.0	630	<0.16%
HA-3	<1.0	820	<0.12%
HA-4	1.5	970	0.15%
HA-5	1.8	460	0.39%
HA-6	1.0	540	0.18%

TABLE 6-10
SUMMARY OF PESTICIDE AND PCB COMPOUNDS
DETECTED IN FILL
(all values in ppb)

COMPOUND	NUMBER OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATIONS
Dieldrin	46	28	60.87%	ND - 7900	55.75
4,4'-DDD	46	16	34.78%	ND - 810	66.18
4,4'-DDT	46	15	32.61%	ND - 530	17.72
Aldrin	46	12	26.09%	ND - 36	12.41
4,4'-DDE	46	12	26.09%	ND - 540	18.50
Gamma Chlordane	46	12	26.09%	ND - 110	5.70
Alpha Chlordane	46	10	21.74%	ND - 80	4.81
Delta BHC	46	7	15.22%	ND - 29	2.78
Heptachlor Epoxide	46	6	13.04%	ND - 1.6	1.25
Aroclor 1260	46	4	8.70%	ND - 2200	721.42
Beta BHC	46	4	8.70%	ND - 23	5.49
Endosulfan Sulfate	46	3	6.52%	ND - 88	86.99
Endrin Aldehyde	15	2	13.33%	ND - 85	34.50
Aroclor 1254	46	2	4.35%	ND - 1600	1442.22
Alpha BHC	46	1	2.17%	ND - 15	15.00

ND = NOT DETECTED

Table 6-11
**SUMMARY OF PESTICIDE AND PCB COMPOUNDS
 DETECTED AT FILL/NATURAL SOIL INTERFACE
 AND IN NATURAL SOIL**
 (all values in ppb)

Fill/Natural Soil Interface:

COMPOUND	NUMBER OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATION
Dieldrin	17	1	5.88%	ND - 96	96
4,4'-DDD	17	1	5.88%	ND - 92	92

Natural Soil:

COMPOUND	NUMBER OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATION
Endosulfan Sulfate	9	1	11.11%	ND - 130	130

ND = NOT DETECTED

TABLE 6-12
SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED IN GROUNDWATER IN UNCONSOLIDATED DEPOSITS
(all values in ppb)

COMPOUND	NUMBER OF SAMPLES ANALYZED	NUMBER OF DETECTIONS	PERCENT OF SAMPLES DETECTED IN	CONCENTRATION RANGE	GEOMETRIC MEAN OF DETECTED CONCENTRATIONS
1,2-Dichloroethane (Total)	13	13	100.00%	ND - 450.00	24.03
Trichloroethene	13	12	92.31%	ND - *****	20.75
Vinyl Chloride	13	8	61.54%	ND - 6.00	2.54
Tetrachloroethene	13	3	23.08%	ND - 2.00	1.09
Benzene	13	1	7.69%	ND - 5.00	5.00
Toluene	13	1	7.69%	ND - 0.20	0.20
1,1,1-Trichloroethane	13	1	7.69%	ND - 0.70	0.70
1,2-Dichloroethane	13	1	7.69%	ND - 2.00	2.00
Methylene Chloride *	13	1	7.69%	ND - 56.00	56.00

* CONSIDERED TO BE A LABORATORY CONTAMINANT
ND = NOT DETECTED

TABLE 6-13
 DRINKING WATER STANDARDS
 (MARCH 1992)

FEDERAL PRIMARY DRINKING WATER STANDARDS

<u>Contaminant</u>	<u>Maximum Contaminant Level (ppb)</u>	<u>Iowa Drinking Water Regulations (ppb)</u>
Arsenic	50	50
Barium	2,000*	1,000
Cadmium	5*	10
Chromium	100*	50
Copper	1,300**	
Lead	15**	50
Mercury	2*	2
Selenium	50	10

FEDERAL SECONDARY DRINKING WATER STANDARDS

Iron	300	
Manganese	50	
Zinc	5,000	
Silver	100	50

PROPOSED FEDERAL PRIMARY DRINKING WATER STANDARD***

Antimony	10/5****
Beryllium	1
Cyanide	200
Nickel	100
Thallium	2/1****

*Effective Date: July 30, 1992

**Action Level (effective date December 7, 1992)

***Proposed 7/25/90. Final ruling is expected late April or early May 1992

****EPA is considering two alternative MCLs based upon a Practical Quantification Level (PQL) of five or ten times the Method Detection Limit (MDL)

TABLE 6-14
 SUMMARY OF VOLATILE ORGANIC COMPOUNDS
 DETECTED IN BEDROCK PORE WATER
 (all values in ppb)

COMPOUND	DETECTION LIMITS	RI-1	RI-2	RI-3
Methylene Chloride	2.0	59.0	42.0	89.0
Acetone	2.0	259	1,800	3,400
Carbon Disulfide	2.0	BMDL	30.0	243
1,2-Dichloroethene	2.0	BMDL	BMDL	29.0
Trichloroethene	2.0	BMDL	90.0	34.0
Benzene	2.0	248	612	2,000
Toluene	2.0	30.0	293	2,300
Ethyl Benzene	2.0	BMDL	47.0	373
Xylene (total)	2.0	BMDL	217	1,300

BMDL = BELOW METHOD DETECTION LIMIT

TABLE 6-15

VOLATILE ORGANIC COMPOUNDS
DETECTED IN GROUNDWATER SAMPLES
FROM RI-1, RI-2, RI-3
(all values in ppb)

LOCATION	RI-1	RI-2	RI-3
1,2-DICHLOROETHENE (total)	200	230 J	86
TRICHLOROETHENE	33	14000	560

J Detected below method detection limit

TABLE 6-16
RELATIVE PERCENT DIFFERENCE (RPD) BETWEEN CONCENTRATIONS
OF VOLATILE ORGANIC COMPOUNDS IN ORIGINAL SAMPLES
AND FIELD DUPLICATE SAMPLES

BORING	SAMPLE MATRIX	DEPTH	COMPOUND DETECTED	ORIGINAL SAMPLE (ppb)	DUPLICATE SAMPLE (ppb)	RELATIVE % DIFFERENCE
NW-22	GROUNDWATER	NA	Vinyl Chloride	4.00	3.00	28.57
NW-22	GROUNDWATER	NA	1,2-Dichloroethene	11.00	11.00	0.00
NW-22	GROUNDWATER	NA	Trichloroethene	16.00	16.00	0.00
NW-22	GROUNDWATER	NA	Methylene Chloride	ND	0.50 BJ	NA
DB-55	SOIL	8.0' - 10.0'	Methylene Chloride	3.00 BJ	4.00 BJ	28.57
DB-55	SOIL	8.0' - 10.0'	2-Butanone	7.00 BJ	7.00 BJ	0.00
DB-55	SOIL	8.0' - 10.0'	4-Methyl-2-Pentanone	13.00 J	15.00	14.29
DB-55	SOIL	8.0' - 10.0'	(TIC)Unknown Hydrocarbon	40.00 J	ND	NA
DB-55	SOIL	8.0' - 10.0'	(TIC)C10H16 Hydrocarbon	40.00 J	ND	NA
DB-55	SOIL	8.0' - 10.0'	Acetone	73.00	85.00	15.19
DB-55	SOIL	8.0' - 10.0'	(TIC)3-Pentanone,2,2,4,4-Tetra	ND	50.00 J	NA
SB-22	SOIL	NA	Methylene Chloride	15.00 B	10.00 B	40.00
SB-22	SOIL	NA	Carbon Disulfide	ND	3.00 J	NA
SB-33	SOIL	1.5'-2'	Methylene Chloride	51.00 B	20.00 BJ	8.45
SB-33	SOIL	1.5'-2'	Carbon Disulfide	23.00 J	ND	NA
SB-33	SOIL	1.5'-2'	1,2-Dichloroethene	870.00	980.00	11.89
SB-33	SOIL	1.5'-2'	2-Butanone	ND	88.00	NA
SB-33	SOIL	1.5'-2'	Trichloroethene	450.00	510.00	12.50
SB-33	SOIL	1.5'-2'	Tetrachloroethene	35.00	40.00	13.33
SB-33	SOIL	1.5'-2'	Xylene (Total)	7.00 J	10.00 J	35.29
DB-47	SOIL	14.0' - 16.0'	Methylene Chloride	5.00 B	3.00 BJ	50.00
DB-47	SOIL	14.0' - 16.0'	Acetone	5.00 J	3.00 J	50.00
DB-47	SOIL	14.0' - 16.0'	Carbon Disulfide	ND	3.00 J	NA
DB-16	SOIL	8.0' - 10.0'	Methylene Chloride	ND	2.00 BJ	NA
DB-37	SOIL	8.0' - 10.0'	Methylene Chloride	22.00 B	23.00 B	4.44
DB-37	SOIL	8.0' - 10.0'	Acetone	96.00	27.00	112.65
DB-37	SOIL	8.0' - 10.0'	Carbon Disulfide	8.00	7.00 J	13.33
DB-37	SOIL	8.0' - 10.0'	1,2-Dichloroethene (Total)	4.00 J	9.00	76.92
DB-37	SOIL	8.0' - 10.0'	2-Butanone	5.00 J	ND	NA

TABLE 6-16
RELATIVE PERCENT DIFFERENCE (RPD) BETWEEN CONCENTRATIONS
OF VOLATILE ORGANIC COMPOUNDS IN ORIGINAL SAMPLES
AND FIELD DUPLICATE SAMPLES

BORING	SAMPLE MATRIX	DEPTH	COMPOUND DETECTED	ORIGINAL SAMPLE (ppb)	DUPLICATE SAMPLE (ppb)	RELATIVE % DIFFERENCE
DB-37	SOIL	8.0' - 10.0'	Trichloroethene	7.00	ND	NA
DB-37	SOIL	8.0' - 10.0'	Toluene	4.00 J	2.00 J	66.66
DB-30	SOIL	4.0' - 6.0'	Vinyl Chloride	7.00 J	8.00 J	13.33
DB-30	SOIL	4.0' - 6.0'	Methylene Chloride	6.00 BJ	ND	NA
DB-30	SOIL	4.0' - 6.0'	Acetone	88.00	58.00	41.10
DB-30	SOIL	4.0' - 6.0'	1,2-Dichloroethene (Total)	15.00	14.00	6.90
DB-30	SOIL	4.0' - 6.0'	2-Butanone	16.00	10.00 J	46.15
DB-30	SOIL	4.0' - 6.0'	Xylenes (Total)	10.00	9.00	10.53
DB-22	SOIL	6.0' - 8.0'	Methylene Chloride	2.00 BJ	3.00 BJ	40.00
DB-22	SOIL	6.0' - 8.0'	Trichloroethene	5.00 J	3.00 J	50.00
DB-63	SOIL	6.0' - 8.0'	Methylene Chloride	8.00 BJ	10.00 B	22.22
DB-63	SOIL	6.0' - 8.0'	Acetone	460.00 E	330.00	32.91
DB-63	SOIL	6.0' - 8.0'	2-Butanone	100.00	85.00	16.22
DB-63	SOIL	6.0' - 8.0'	Ethylbenzene	7.00 J	7.00 J	0.00
DB-63	SOIL	6.0' - 8.0'	Xylene	69.00	63.00	9.09
DB-63	SOIL	6.0' - 8.0'	(TIC)C9H12 Aromatic	10.00 J	10.00 J	0.00
DB-65	SOIL	8.2' - 9.0'	Vinyl Chloride	18.00 J	18.00	0.00
DB-65	SOIL	8.2' - 9.0'	Methylene Chloride	15.00 B	2.00 BJ	152.90
DB-65	SOIL	8.2' - 9.0'	Acetone	58.00	87.00	40.00
DB-65	SOIL	8.2' - 9.0'	1,2-Dichloroethene	310.00	260.00	17.54
DB-65	SOIL	8.2' - 9.0'	2-Butanone	44.00	41.00	7.06
DB-65	SOIL	8.2' - 9.0'	Trichloroethene	3.00 J	2.00 J	40.00
DB-20	SOIL	8.0' - 10.0'	Vinyl Chloride	680.00 J	1100.00 J	47.19
DB-20	SOIL	8.0' - 10.0'	Methylene Chloride	770.00 BJ	820.00 BJ	6.29
DB-20	SOIL	8.0' - 10.0'	Acetone	2900.00	ND	NA
DB-20	SOIL	8.0' - 10.0'	1,2-Dichloroethene	21000.00	26000.00	21.28
DB-20	SOIL	8.0' - 10.0'	Trichloroethene	510.00 J	1000.00	64.90
DB-20	SOIL	8.0' - 10.0'	Toluene	12000.00	17000.00	34.48
DB-20	SOIL	8.0' - 10.0'	Ethylbenzene	700.00 J	900.00	25.00
DB-20	SOIL	8.0' - 10.0'	Xylene	2400.00	2900.00	18.87

TABLE 6-16
RELATIVE PERCENT DIFFERENCE (RPD) BETWEEN CONCENTRATIONS
OF VOLATILE ORGANIC COMPOUNDS IN ORIGINAL SAMPLES
AND FIELD DUPLICATE SAMPLES

BORING	SAMPLE MATRIX	DEPTH	COMPOUND DETECTED	ORIGINAL SAMPLE (ppb)	DUPLICATE SAMPLE (ppb)	RELATIVE % DIFFERENCE
DB-12	SOIL	0.0' - 2.0'	Methylene Chloride	10000.00 BJ	6200.00 BJ	46.91
DB-12	SOIL	0.0' - 2.0'	1,2-Dichloroethene	13000.00 J	8500.00	41.86
DB-12	SOIL	0.0' - 2.0'	Toluene	60000.00	20000.00	100.00
DB-12	SOIL	0.0' - 2.0'	Ethylbenzene	83000.00	18000.00	128.71
DB-12	SOIL	0.0' - 2.0'	Xylenes (Total)	690000.00	260000.00	90.53
DB-12	SOIL	0.0' - 2.0'	(TIC)Decane	100000.00 J	50000.00 J	66.67
RI-1	GROUNDWATER	NA	1,2-Dichloroethene (Total)	200.00	180.00	10.53
RI-1	GROUNDWATER	NA	Trichloroethene	33.00	29.00	12.90

J= Concentration below contract required quantitation limit but greater than instrument detection limit. B= Compound detected in laboratory blank.
 ND= Compound not detected. NA= Not applicable.

TABLE 6-17
RELATIVE PERCENT DIFFERENCE (RPD) BETWEEN CONCENTRATIONS
OF SEMIVOLATILE ORGANIC COMPOUNDS IN ORIGINAL SAMPLES
AND FIELD DUPLICATE SAMPLES

BORING	SAMPLE MATRIX	DEPTH	COMPOUND DETECTED	ORIGINAL SAMPLE (ppb)	DUPLICATE SAMPLE (ppb)	RELATIVE % DIFFERENCE
NW-22	GROUNDWATER	NA	All	ND	ND	NA
NW-22	GROUNDWATER	NA	(TIC)Unknown	20.00 J	20.00 J	00.00
DB-12	SOIL	0.0' - 2.0'	Phenathrene	2600.00 J	1500.00 J	53.66
DB-12	SOIL	0.0' - 2.0'	Di-n-Butyphthalate	26000.00	12000.00	73.68
DB-12	SOIL	0.0' - 2.0'	Fluorathene	1700.00 J	950.00 J	56.6
DB-12	SOIL	0.0' - 2.0'	Pyrene	2300.00 J	1200.00 J	62.86
DB-12	SOIL	0.0' - 2.0'	Bis(2-Ethylhexyl)Phthalate	2500.00 J	ND	NA
DB-12	SOIL	0.0' - 2.0'	(TIC)C9H12 Aromatic	200000.00 J	100000.00 J	66.66
DB-12	SOIL	0.0' - 2.0'	(TIC)C9H12 Aromatic	200000.00 J	100000.00 J	66.66
DB-12	SOIL	0.0' - 2.0'	(TIC)Decane	200000.00 J	100000.00 J	66.66
DB-12	SOIL	0.0' - 2.0'	(TIC)Unknown Hydrocarbon	200000.00 J	100000.00 J	66.66
DB-12	SOIL	0.0' - 2.0'	Naphthalene	11000.00	6900.00	45.81
DB-12	SOIL	0.0' - 2.0'	2-Methylnaphthalene	3400.00 J	2000.00 J	51.85

J = Concentration below contract required quantitation limit
but greater than instrument detection limit.

(TIC) = Tentatively identified compound.

TABLE 6-18
RELATIVE PERCENT DIFFERENCE (RPD) BETWEEN CONCENTRATIONS
OF INORGANIC COMPOUNDS IN ORIGINAL SAMPLES
AND FIELD DUPLICATE SAMPLES

BORING	MATRIX	SOIL DEPTH	ANALYTE	ORIGINAL SAMPLE (ppm)	DUPLICATE SAMPLE (ppm)	RELATIVE % DIFFERENCE
NW-22	GROUNDWATER	NA	Aluminum	220.00	208.00	5.61
NW-22	GROUNDWATER	NA	Barium	148.00 B	144.00 B	2.74
NW-22	GROUNDWATER	NA	Cadmium	1.20 B	ND	NA
NW-22	GROUNDWATER	NA	Calcium	175000.00	185000.00	5.56
NW-22	GROUNDWATER	NA	Copper	113.00	ND	NA
NW-22	GROUNDWATER	NA	Iron	3950.00	3490.00	11.66
NW-22	GROUNDWATER	NA	Lead	9.30	7.50	21.43
NW-22	GROUNDWATER	NA	Magnesium	38900.00	41300.00	5.98
NW-22	GROUNDWATER	NA	Manganese	1600.00	1680.00	4.88
NW-22	GROUNDWATER	NA	Potassium	3460.00 B	3540.00 B	2.29
NW-22	GROUNDWATER	NA	Sodium	30300.00	30200.00	0.33
NW-22	GROUNDWATER	NA	Zinc	79.90	13.40 B	142.55
NW-22	GROUNDWATER	NA	Arsenic	ND	2.40 B	NA
DB-55	SOIL	8.0' - 10.0'	Aluminum	9970.00	10500.00	5.18
DB-55	SOIL	8.0' - 10.0'	Arsenic	4.00	4.00	0.00
DB-55	SOIL	8.0' - 10.0'	Barium	86.00	106.00	20.83
DB-55	SOIL	8.0' - 10.0'	Beryllium	0.62 B	0.63 B	1.60
DB-55	SOIL	8.0' - 10.0'	Calcium	1950.00	1940.00	0.51
DB-55	SOIL	8.0' - 10.0'	Chromium	12.80	14.40	11.76
DB-55	SOIL	8.0' - 10.0'	Cobalt	8.10 B	8.50	4.82
DB-55	SOIL	8.0' - 10.0'	Copper	15.90	17.20	7.86
DB-55	SOIL	8.0' - 10.0'	Iron	17800.00	19100.00	7.05
DB-55	SOIL	8.0' - 10.0'	Lead	18.60	16.80	10.17
DB-55	SOIL	8.0' - 10.0'	Magnesium	2430.00	2600.00	6.76
DB-55	SOIL	8.0' - 10.0'	Manganese	641.00	689.00	7.22
DB-55	SOIL	8.0' - 10.0'	Nickel	16.80	19.60	15.38
DB-55	SOIL	8.0' - 10.0'	Potassium	1930.00	1970.00	2.05
DB-55	SOIL	8.0' - 10.0'	Sodium	17.40 B	22.70 B	26.43
DB-55	SOIL	8.0' - 10.0'	Thallium	0.37 B	0.38 B	2.66
DB-55	SOIL	8.0' - 10.0'	Vanadium	21.50	22.30	3.65
DB-55	SOIL	8.0' - 10.0'	Zinc	43.00	49.40	13.85
DB-55	SOIL	8.0' - 10.0'	Cyanide	0.16 B	0.20 B	22.22

B = COMPOUND DETECTED IN LABORATORY BLANK

ND = NOT DETECTED

NA = NOT APPLICABLE

TABLE 6-19
RELATIVE PERCENT DIFFERENCE (RPD) BETWEEN CONCENTRATIONS
OF PESTICIDES AND PCBS IN ORIGINAL SAMPLES
AND FIELD DUPLICATE SAMPLES

BORING	DEPTH	COMPOUND DETECTED	ORIGINAL SAMPLE (ppb)	DUPLICATE SAMPLE (ppb)	RELATIVE % DIFFERENCE
DB-55	8.0' - 10.0'	Heptachlor	18.00 J	ND	NA
DB-37	8.0' - 10.0'	4,4-DDD	46.00	160.00	110.68
DB-12	0.0' - 2.0'	4,4-DDE	540.00	260.00	70.00
DB-12	0.0' - 2.0'	4,4-DDD	330.00	180.00	58.82
DB-12	0.0' - 2.0'	Aroclor-1254	1600.00	ND	NA
DB-12	0.0' - 2.0'	Aroclor-1260	1200.00 J	ND	NA
DB-63	6.0' - 8.0'	Dieldrin	ND	96.00	NA
SB-57	0.0' - 2.0'	Beta-BHC	ND	0.60	NA
SB-57	0.0' - 2.0'	Delta-BHC	ND	2.20	NA
SB-57	0.0' - 2.0'	Aldrin	ND	8.40	NA
SB-57	0.0' - 2.0'	4,4'-DDE	33	ND	NA
SB-57	0.0' - 2.0'	4,4'-DDD	11.00	10.00	9.52
SB-57	0.0' - 2.0'	4,4'-DDT	2.90	20.00	149.34

J= Concentration below contract required quantitation limit but greater than instrument detection limit.

ND= Compound not detected. NA= Not applicable.

TABLE 6-20

USEPA PERFORMANCE EVALUATION SAMPLES

EPA Sample Identification	Laboratory Sample Identification	Analysis Performed	Corresponding Sample Data Summary Package ¹
ISX25-903	8911293	SV	1
ISX25-904	8911294	SV	1
ISX25-905	1295	P	16
ISX25-906	1296	P	16
ISX25-907	8911297	V	1
ISX25-908	8911298	V	1
OQ125-001	8911511 (PE-001)	V	2
OQ125-002	8911664 (PE-002)	V	3
OQ125-003	8912576 (PE-003)	V	7
OQ125-004	8912334 (PE-004)	V	6
OQ125-005	8911848 (PE-005)	V	4
OQ425-003	9003822 (PE-403)	V	26
OQ425-004	9003344 (PE-504)	V	22
OQ425-005	9002970 (PE-405)	V	25
OQ425-001	9015121	V	42
QQ025-001	9015662	V	43

LEGEND: SV = Semivolatile Organic Compounds per CLP
V = Volatile Organic Compounds per CLP
P = Pesticides/PCBs per CLP

¹ SASC Sample Data Summary Packages have been previously submitted to the USEPA, included with monthly reports of analytical data received by ECKENFELDER INC.

TABLE 7-1

CONTAMINANTS WITHIN THE AREAS OF CONCERN

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Volatile Organic Compounds	1,2-Dichloroethene 2-Butanone @ Acetone * Carbon Disulfide @ Ethylbenzene Methylene Chloride Tetrachloroethene Toluene Trichloroethene Vinyl Chloride * Xylenes	1,1-Dichloroethane @ 1,2-Dichloroethene 2-Butanone @ Acetone * Ethylbenzene * Methylene Chloride Tetrachloroethene * Toluene @ Trichloroethene Xylenes *	1,1-Dichloroethane @ 1,2-Dichloroethene 2-Butanone @ Acetone Carbon Disulfide @ Ethylbenzene * Tetrachloroethene @ Toluene Trichloroethene Vinyl Chloride Xylenes	Ethylbenzene Methylene Chloride Toluene Xylenes	Acetone @ Tetrachloroethene * Trichloroethene * 2-Butanone @ 1,2-Dichloroethene @	1,2-Dichloroethene @ 2-Butanone Acetone * Carbon Disulfide @ Ethylbenzene @ Tetrachloroethene @ Xylenes @	Xylenes @ Trichloroethene @ 1,2-Dichloroethene @ Acetone * 2-Butanone @ Carbon Disulfide @ Vinyl Chloride @ Ethylbenzene @
Pesticides	4,4'-DDD * 4,4'-DDE * Dieldrin *	4,4'-DDE @ Endosulfan Sulfate *	ND	Dieldrin *	NA	Aldrin @ Dieldrin	4,4'-DDD * 4,4'-DDE * 4,4'-DDT * alpha-Chlordane @ Dieldrin * gamma-Chlordane @ Endrin Aldehyde @ Beta-BHC @ Alpha-BHC @ Heptachlor Epoxide @ Endosulfan Sulfate @

* Indicates that the contaminant was not detected in concentrations greater than or equal to 1000 ppb.

@ Indicates that contaminant was not detected in concentrations greater than or equal to 100 ppb.

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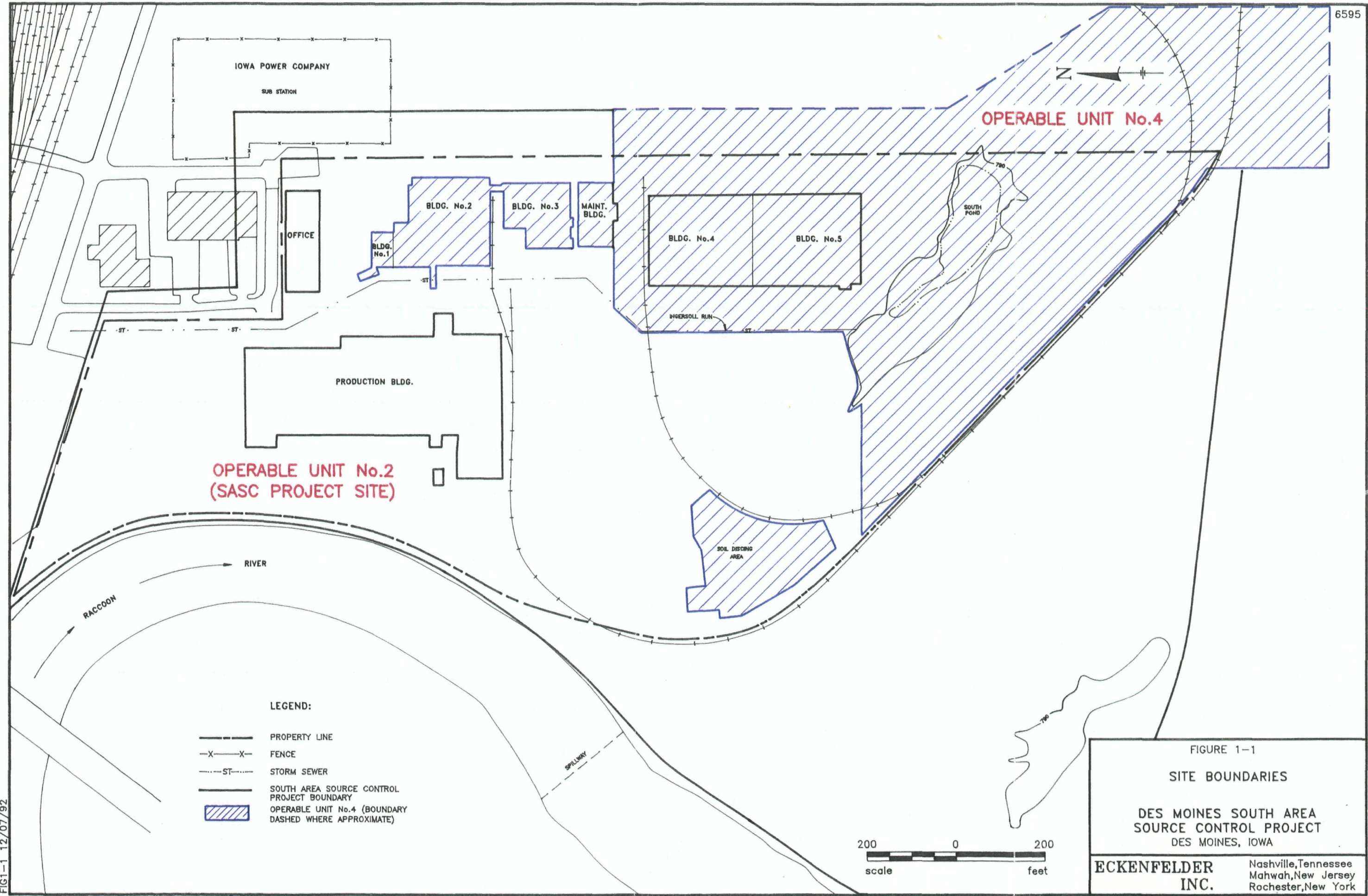


FIG1-1 12/07/92

**OPERABLE UNIT No.2
(SASC PROJECT SITE)**

OPERABLE UNIT No.4

LEGEND:


- — — — — PROPERTY LINE
- X-X- FENCE
- - - - -ST- - - - - STORM SEWER
- — — — — SOUTH AREA SOURCE CONTROL PROJECT BOUNDARY
-  OPERABLE UNIT No.4 (BOUNDARY DASHED WHERE APPROXIMATE)



FIGURE 1-1
SITE BOUNDARIES

DES MOINES SOUTH AREA
SOURCE CONTROL PROJECT
DES MOINES, IOWA

**ECKENFELDER
INC.** Nashville, Tennessee
Mahwah, New Jersey
Rochester, New York