UNI STATES STEEL CORPORATIO GARY WORKS
ANALYSIS AND LOADINGS OF INDUSTRIAL WASTE WATER TO GARY SANITARY DISTRICT

OCT 1976

DATE	FLOW GPD	PHENOLICS PPB	PHENOLICS LB/DAY	CYANIDES PPM	CYANIDES LB/DAY	SUS. SOLIDS PPM	SUS. SOLIDS LB/DAY	AMMONIA - N PPM	AMMONIA - N LB/DAY	PH
1	63900	85700	47	18.30	9.7	30	16	61[illegible].5	325.5	0.0
2	14500	0	0	0.00	0.0	0	0	220.0	26.6	0.0
3	14500	116920	14	26.20	3.2	58	7	97[illegible].0	117.8	0.0
4	116300	0	0	0.00	0.0	0	0	41[illegible].5	399.6	0.0
5	89200	52370	38	6.60	4.8	50	37	350.0	257.1	0.0
6	0	0	0	0.00	0.0	0	0	1250.0	0.0	0.0
7	95400	15940	13	46.60	37.0	69	55	950.0	754.9	0.0
8	133800	0	0	0.00	0.0	0	0	630.0	711.1	0.0
9	229300	0	0	0.00	0.0	0	0	68[illegible].0	1312.2	0.0
10	229300	108500	207	23.70	45.3	51	97	67[illegible].8	1287.0	9.5
11	184200	0	0	0.00	0.0	0	0	52[illegible].0	797.9	9.1
12	105300	76790	67	17.30	15.2	34	30	47[illegible].0	416.6	9.4
13	55400	0	0	0.00	0.0	0	0	48[illegible].5	225.0	9.4
14	0	88040	0	18.30	0.0	76	0	67[illegible].0	0.0	9.4
15	0	0	0	0.00	0.0	0	0	450.0	0.0	9.3
16	0	0	0	0.00	0.0	0	0	191.0	0.0	9.0
17	0	66150	0	44.90	0.0	91	0	23[illegible].0	0.0	9.0
18	0	0	0	0.00	0.0	0	0	200.0	0.0	9.1
19	1100	93940	1	42.00	.4	71	1	450.0	4.1	9.2
20	0	0	0	0.00	0.0	0	0	37[illegible].0	0.0	8.9
21	96000	193200	154	141.40	113.1	64	51	57[illegible].0	459.8	9.0
22	181700	0	0	0.00	0.0	0	0	76[illegible].5	1154.1	9.1
23	226100	0	0	0.00	0.0	0	0	1031.0	1941.8	9.1
24	227600	220800	419	18.30	34.7	10	19	450.0	853.2	9.5
25	122800	0	0	0.00	0.0	0	0	71[illegible].5	728.8	9.0
26	224500	314000	587	149.76	280.1	73	137	1094.0	2045.9	9.1
27	208400	0	0	0.00	0.0	0	0	1000.0	1736.0	9.2
28	74300	218000	135	59.90	37.1	37	23	687.5	425.5	9.3
29	139900	0	0	0.00	0.0	0	0	1150.0	1340.2	9.3
30	164200	0	0	0.00	0.0	0	0	1169.0	1598.9	9.4
31	164200	120600	165	30.00	41.0	7	10	512.5	701.0	9.3
AVG	101961	126711	132	45.95	44.4	51	34	644.2	632.9	9.2

NOTE: 0 MEANS NOT DETERMINED
ANALYZED BY: COKE AND CHEMICALS DIVISION LABORATORY

US EPA RECORDS CENTER REGION 5
460914

RECEIVED
AUG 4 1976
STATE OF INDIANA
STREAM POLLUTION CONTROL
BOARD

WASTE ACID INJECTION
GARY WORKS ACID DISPOSAL WELL
JUNE 1976

Date	Remarks	Annulus Pressure (psig)	Specific Gravity	Free Acid	Injected
June 1	-	50	1.158	1.5% HCL	141,989
2	Down			12.0% H_2SO_4	0
3	Down				0
4	-	65	1.125		57,766
5	-	55	1.130		124,126
6	Down				0
7	Down				0
8	Down				0
9	Down				0
10	Down				0
11	-	60	1.150		168,383
12	Down				0
13	Down				0
14	Down				0
15	Down				0
16	-	110	1.125		174,041
17	-	100	1.125		31,733
18	Down				0
19	Down				0
20	Down				0
21	Down				0
22	Down				0
23	Down				0
24	Down				0
25	Down				0
26	Down				0
27	Down				0
28	Down				0
29	Down				0
30	-	90	1.156		193,130
			TOTAL GALLONS INJECTED	=	891,168

Attachment I

Location of Discharge (Outfall key to attached map)

Designation	Outfall
A	002 (GW-1)
B	005 (GW-1A)
C	007 (GW-2)
D	010 (GW-3)
E	015 (GW-4)
F	017 (GW-5)
G	018 (GW-6)
H	019 (GW-7)
I	020 (GW-7A)
J	021 (GW-9)
K	028 (GW-10A)
L	030 (GW-11A)
M	032 (GW-13)
N	033 (ST-14)
O	034 (ST-17)
P	035 (GW-L1)
Q	036 (GW-L1A)
R	037 (ST-L5)
S	039 (ST-L6)
T	No. 4 Pump House — 002,007,010,015
U	No. 2 Pump House — 035, 036
V	No. 1 Pump House — 017,018,019,020,021,028,030+032
W	Central Pump Station
X	Lakeside Pump House — 033,034,038,039

all other outfalls are to the Grand Calumet River

038 ⇒ Outfalls to Lake Michigan

Associated outfalls

intake water points

ATTACHMENT 8

GARY WORKS

GROUNDWATER FLOW STUDY WATER LEVEL SUMMARIES

GARY WORKS GROUNDWATER FLOW PROJECT

SUMMARY OF WATER LEVEL DATA APRIL 29, 1984 (SET #1)

Monitoring Point	Reference Elev.	Depth (ft.) to Water	Water Elev.	Time of Measurement	Remarks
HWD-2-01	605.37	17.5	587.87	10:53	
HWD-2-02	618.6	30.07	588.53	11:14	
HWD-2-03	619.4	31.09	588.31	11:09	
HWD-2-04	621.01	32.85	588.16	11:06	
P-1	603.10	14.84	588.26	10:57	
P-2	616.36	28.46	587.9	11:24	
P-3	616.98	27.24	589.74	11:20	
USGS 238	607.08	-	-	-	
USGS 239	615.95	-	-	-	
River	589.32	2.08	587.24	10:43	
Lake Michigan	591.99	12.4	579.59	11:44	
HWT-13-01	602.57	16.85	585.72	13:25	
HWT-13-02	603.77	20.88	582.89	12:37	
HWT-13-03	604.13	21.43	582.70	12:32	
HWT-13-04	603.62	21.15	582.47	12:27	
N. Bed HWT-13	606.65	2.6	604.05	12:15	All wet
S. Bed HWT-13	606.65	2.07	604.58	12:17	East half wet
P-4	603.85	20.63	583.22	12:47	
P-5	604.07	19.03	585.04	12:42	
HWT-2-01	595.83	9.28	586.55	14:15	
HWT-2-02	603.81	19.43	584.38	13:50	
HWT-2-03	606.53	21.72	584.81	13:43	
HWT-2-04	606.80	19.32	587.48	13:38	
HWT-2-05	604.21	18.87	585.34	13:03	
HWT-2-06	604.32	21.36	582.96	12:59	

(SET #1)
- Continued -

Monitoring Point	Reference Elev.	Depth (ft.) to Water	Water Elev.	Time of Measurement	Remarks
HWT-2-07	603.55	17.33	586.22	12:54	
E. Lagoon HWT-2	605.13	5.03	600.10	12:52	
W. Lagoon HWT-2	606.80*	13.48	593.32		Measured from top casing HWT-2-04*
P-6	606.92	20.96	585.96	13:31	
P-7	601.86	16.57	585.29	14:09	
P-8	606.72	20.08	586.64	14:01	
P-9	605.79	20.63	585.16	14:05	
P-10	592.27	5.29	586.98	15:41	
P-11	596.94	10.03	586.91	15:31	
HWT-14-01	592.74	8.78	583.96	15:58	
HWT-14-02	592.48	6.34	586.14	15:45	
HWT-14-03	592.07	5.86	586.21	15:53	
HWT-14-04	591.18	4.6	586.58	15:49	
Separator Lagoons	590.30	6.92	583.38	16:02	
P-12	594.80	7.8	587.0	15:36	
P-13	592.80	7.7	585.1	15:22	
HWD-5-01	589.42	4.0	585.42	15:01	
HWD-5-02	594.73	10.74	583.99	14:53	
HWD-5-03	596.34	12.68	583.66	14:45	
HWD-5-04	594.09	11.28	582.81	14:25	
P-14	592.23	4.62	587.61	15:05	
P-15	595.91	9.85	586.06	14:56	
P-16	597.09	13.68	583.41	14:41	
Lake on E.	587.46	3.83	583.63	14:37	

Weather Conditions Prior to Measurement Event:

Weather Conditions on Day of Measurements:

GARY WORKS GROUNDWATER FLOW PROJECT

SUMMARY OF WATER LEVEL DATA JUNE 2, 1984 (SET #2)

Monitoring Point	Reference Elev.	Depth (ft.) to Water	Water Elev.	Time of Measurement	Remarks
HWD-2-01	605.37	17.39	587.98	16:30	
HWD-2-02	618.6	29.85	588.75	16:10	
HWD-2-03	619.4	30.89	588.51	16:15	
HWD-2-04	621.01	32.65	588.36	16:20	
P-1	603.10	14.66	588.44	10:52	
P-2	616.36	28.30	588.06	11:10	
P-3	616.98	27.16	589.82	11:06	
USGS 238	607.08	20.78	586.30	10:00	Levels measured 6-4-84
USGS 239	615.95	20.84	595.11	9:40	" "
River	589.32	2.07	587.25	10:40	
Lake Michigan	591.99	11.84	580.15	11:32	
HWT-13-01	602.57	17.14	585.43	14:10	
HWT-13-02	603.77	20.85	582.92	14:36	
HWT-13-03	604.13	21.31	582.82	14:35	
HWT-13-04	603.62	20.92	582.70	14:29	
N. Bed HWT-13	606.65	3.1	603.55	14:26	Entire bed wet
S. Bed HWT-13	606.65	2.89	603.76	14:23	Top of wet sludge
P-4	603.85	20.36	583.49	14:41	
P-5	604.07	19.21	584.86	14:39	
HWT-2-01	595.83	9.28	586.55	13:23	
HWT-2-02	603.81	19.84	583.97	13:55	
HWT-2-03	606.53	22.20	584.33	14:00	
HWT-2-04	606.80	20.14	586.66	14:02	
HWT-2-05	604.21	20.95	583.26	15:00	
HWT-2-06	604.32	21.73	582.59	14:48	
HWT-2-07	603.55	16.22	587.33	14:46	

(SET #2)
- Continued -

Monitoring Point	Reference Elev.	Depth (ft.) to Water	Water Elev.	Time of Measurement	Remarks
E. Lagoon HWT-2	605.13	5.06	600.07	14:43	
W. Lagoon HWT-2	606.80*	13.13	593.67	9:00	Measured from top of Well HWT-2-04 (6-4)
P-6	606.92	21.24	585.68	13:30	
P-7	601.86	16.78	585.08	13:40	
P-8	606.72	21.09	585.63	13:50	
P-9	605.79	20.84	584.95	13:45	
P-10	592.27	5.04	587.23	12:59	
P-11	596.94	9.95	586.99	13:19	
HWT-14-01	592.74	8.55	584.19	12:50	
HWT-14-02	592.48	6.23	586.25	13:02	
HWT-14-03	592.07	5.74	586.33	13:06	
HWT-14-04	591.18	4.49	586.69	13:09	
Separator Lagoons	590.30	6.80	583.50	12:55	
P-12	594.80	7.52	587.28	13:15	
P-13	592.80	7.28	585.52	12:33	
HWD-5-01	589.42	3.57	585.85	15:15	
HWD-5-02	594.73	10.48	584.25	15:21	
HWD-5-03	596.34	12.49	583.85	15:23	
HWD-5-04	594.09	11.06	583.03	15:36	
P-14	592.23	4.27	587.96	15:10	
P-15	595.91	9.37	586.54	15:18	
P-16	597.09	13.52	583.57	15:25	
Lake on E.	587.46	3.58	583.88	15:28	

Weather Conditions Prior to Measurement Event: Sunny and dry the preceding 4 days. Heavy rains (2") the whole week preceding the dry weather.

Weather Conditions on Day of Measurements: Sunny, warm (80's), dry.

GARY WORKS GROUNDWATER FLOW PROJECT

SUMMARY OF WATER LEVEL DATA JUNE 24, 1984 (SET #3)

Monitoring Point	Reference Elev.	Depth (ft.) to Water	Water Elev.	Time of Measurement	Remarks
HWD-2-01	605.37	17.51	587.86	11:25	
HWD-2-02	618.6	29.98	588.62	11:40	
HWD-2-03	619.4	30.99	588.41	11:35	
HWD-2-04	621.01	32.74	588.27	11:30	
P-1	603.10	14.89	588.21	11:15	
P-2	616.36	28.40	587.96	11:05	
P-3	616.98	27.19	589.79	11:10	
USGS 238	607.08	21.22	585.86	13:30	Levels measured 6-26-84
USGS 239	615.95	21.08	594.87	13:50	" "
River	589.32	2.3	587.02	11:45	
Lake Michigan	591.99	11.73	580.26	10:30	First of three*
HWT-13-01	602.57	17.71	584.86	15:30	
HWT-13-02	603.77	21.24	582.53	12:55	
HWT-13-03	604.13	21.75	582.38	12:57	
HWT-13-04	603.62	21.32	582.3	13:00	
N. Bed HWT-13	606.65	Not obtainable			Only standing water was out in middle of bed
S. Bed HWT-13	606.65	3.48	603.17	13:05	No standing water - top of sludge
P-4	603.85	21.14	582.71	12:50	
P-5	604.07	19.87	584.2	12:45	
HWT-2-01	595.83	10.11	585.72	14:13	
HWT-2-02	603.81	19.68	584.13	15:50	
HWT-2-03	606.53	22.00	584.53	15:45	
HWT-2-04	606.80	20.29	586.51	15:40	

(SET #3)
- Continued -

Monitoring Point	Reference Elev.	Depth (ft.) to Water	Water Elev.	Time of Measurement	Remarks
HWT-2-05	604.21	21.32	582.89	12:30	
HWT-2-06	604.32	22.17	582.15	12:25	
HWT-2-07	603.55	17.78	585.77	12:35	
E. Lagoon HWT-2	605.13	5.30	599.83	12:40	
W. Lagoon HWT-2	606.80	16.43	590.37	-	Level surveyed 6-26
P-6	606.92	21.87	585.05	15:35	
P-7	601.86	17.33	584.53	15:20	
P-8	606.72	21.13	585.59	15:15	
P-9	605.79	21.42	584.37	15:17	
P-10	592.27	6.12	586.15	14:00	
P-11	596.94	10.93	586.01	14:10	
HWT-14-01	592.74	8.45	584.29	13:42	
HWT-14-02	592.48	7.00	585.48	13:55	
HWT-14-03	592.07	6.54	585.53	13:52	
HWT-14-04	591.18	5.40	585.78	13:50	
Separator Lagoons	590.30	6.26	584.04	13:45	
P-12	594.80	8.58	586.22	14:05	
P-13	592.80	7.94	584.86	13:20	
HWD-5-01	589.42	4.03	585.39	14:30	
HWD-5-02	594.73	10.74	583.99	14:35	
HWD-5-03	596.34	12.74	583.6	14:40	
HWD-5-04	594.09	11.19	582.9	14:55	
P-14	592.23	4.87	587.36	14:25	
P-15	595.91	10.11	585.8	14:35	
P-16	597.09	13.58	583.51	14:45	
Lake on E.	587.46	3.45	584.01	14:50	

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 126057 RECORD-# 50159

SAMPLE LOCATION: USGS DUNES WELL 237 45 FT
STATION ID: 413550087163800 LAT.LONG.SEQ.: 413550 0871638 00
DATE OF COLLECTION: BEGIN--810430 END-- TIME--0940
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
USGS DUNES WELL 237 45 FT J-30-81 TI-DJ FLD ALK 261 MG/L TRACE METALS TAKEN

ALK TOT LAB. CACO3	MG/L	260	METALS DISS CHE-EXT		0
ALUMINUM, DIS.	UG/L	1200	OXIDA. REDUC POT. MV		291
ANALYZING AGENCY		80010	OXYGEN, DISSOLV.	MG/L	0.0
ARSENIC, DISSOLVED	UG/L	1	PH (LABORATORY)	UNITS	7.2
BORON, DISSOLVED	UG/L	220	PH FIELD	UNITS	7.0
CADMIUM, DIS.	UG/L	1	POTASSIUM-40, DISS.	PCI/L	5.0
CALCIUM, DISSOLV.	MG/L	240	POTASSIUM, DISSOLVED	MG/L	6.7
CARBON, ORGANIC, DIS	MG/L	7.7	RESIDUE DIS CALC SUM	MG/L	2030
CHLORIDE, DISSOLVED	MG/L	990	ROE, DISS. AT 180 C	MG/L	2420
CHROMIUM, DIS.	UG/L	10	SILICA, DIS.	MG/L	19
COPPER, DIS.	UG/L	1	SODIUM, ABSORP RATIO		5.6
DEPTH LOC VERT IN FT		45.0	SODIUM, DIS.	MG/L	390
FLUORIDE, DISSOLVED	MG/L	0.1	SODIUM, PERCENT	%	49
HARDNESS	MG/L	930	SP. CONDUCTANCE FLD	UMHOS	4030
HARDNESS N.CARB L-EP	MG/L	670	SP. CONDUCTANCE LAB	UMHOS	3720
IRON, DIS.	UG/L	5000	STRONTIUM, DIS.	UG/L	580
LEAD, DIS.	UG/L	15	SULFATE, DISSOLVED	MG/L	140
MAGNESIUM, DISSOLV.	MG/L	80	WATER TEMPERATURE		13.6
MANGANESE, DISSOLV.	UG/L	940	ZINC, DIS.	UG/L	70

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM, DISSO	240	11.976	CHLORIDE, DISS	990	27.92
MAGNESIUM, DIS	80	6.581	FLUORIDE, DISS	0.1	0.00
POTASSIUM, DIS	6.7	0.171	SULFATE, DISSO	140	2.91
SODIUM, DIS.	390	16.965	ALK TOT LAB.	260	5.19
TOTAL		35.693	TOTAL		36.02

PERCENT DIFFERENCE = -0.49

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 126058 RECORD-# 50162

SAMPLE LOCATION: USGS DUNES WELL 238 65 FT
STATION ID: 413705087165500 LAT.LONG.SEQ.: 413705 0871655 00
DATE OF COLLECTION: BEGIN--810429 END-- TIME--1210
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
USGS DUNES WELL 238 65 FT J-29-81 TI DJ FLD ALK 472 MG/L FROTHS ON SPLASHING PUMPED H2O HAS YELLOW TINT ORGANICS TRACE METALS TAKEN

ALERT LIMIT

ALK TOT LAB. CACO3	MG/L	320	METALS DISS CHE-EXT		0
ALUMINUM. DIS.	UG/L	200	OXIDA. REDUC POT. MV		238
ANALYZING AGENCY		80010	OXYGEN. DISSOLV.	MG/L	0.0
ARSENIC. DISSOLVED	UG/L	67 50	PH (LABORATORY)	UNITS	7.5
BORON. DISSOLVED	UG/L	520	PH FIELD	UNITS	7.3
CADMIUM. DIS.	UG/L	1	POTASSIUM-40. DISS.	PCI/L	5.8
CALCIUM. DISSOLV.	MG/L	430	POTASSIUM. DISSOLVED	MG/L	7.0
CARBON. ORGANIC. DIS	MG/L	19	RESIDUE DIS CALC SUM	MG/L	3430
CHLORIDE. DISSOLVED	MG/L	820	ROE. DISS. AT 180 C	MG/L	4030
CHROMIUM. DIS.	UG/L	10	SILICA. DIS.	MG/L	20
COPPER. DIS.	UG/L	1	SODIUM. ABSORP RATIO		6.-
DEPTH LOC VERT IN FT		65.0	SODIUM. DIS.	MG/L	620
FLUORIDE. DISSOLVED	MG/L	< 0.1	SODIUM. PERCENT	%	46
HARDNESS	MG/L	1600	SP. CONDUCTANCE FLD	UMHOS	5400
HARDNESS N.CARB L-EP	MG/L	1300	SP. CONDUCTANCE LAB	UMHOS	5020
IRON. DIS.	UG/L	13000	STRONTIUM. DIS.	UG/L	2000
LEAD. DIS.	UG/L	2	SULFATE. DISSOLVED	MG/L	1200
MAGNESIUM. DISSOLV.	MG/L	120	WATER TEMPERATURE	DEG C	13.7
MANGANESE. DISSOLV.	UG/L	240	ZINC. DIS.	UG/L	100

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM. DISSO	430	21.457	CHLORIDE. DISS	820	23.132
MAGNESIUM. DIS	120	9.871	FLUORIDE. DISS	0.1	0.005
POTASSIUM. DIS	7.8	0.199	SULFATE. DISSO	1200	24.9[illegible]
SODIUM. DIS.	620	26.970	ALK TOT LAB.	320	6.4[illegible]
TOTAL		58.498	TOTAL		54.515

PERCENT DIFFERENCE = 3.52

WATER QUALITY ALERT
CIRCLED ELEMENTS
EXCEEDS LIMITS

WATER QUALITY ALERT
CIRCLED ELEMENTS
EXCEEDS LIMITS

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 126059 RECORD-# 50165

SAMPLE LOCATION: USGS DUNES WELL 239 65 FT
STATION ID: 413634087165300 LAT.LONG.SEQ.: 413634 0871653 00
DATE OF COLLECTION: BEGIN--810429 END-- TIME--1500
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
USGS DUNES WELL 239 65 FT 4-29-81 65 FT TI-DJ FLD ALK 279 MG/L TRACE AND ORGANICS TAKEN

ALK TOT LAB. CACO3	MG/L		240	METALS DISS CHE-EXT		0
ALUMINUM, DIS.	UG/L		30	OXIDA. REDUC POT. MV		398
ANALYZING AGENCY			80010	OXYGEN, DISSOLV.	MG/L	0.0
ARSENIC, DISSOLVED	UG/L		10	PH (LABORATORY)	UNITS	7.6
BORON, DISSOLVED	UG/L		100	PH FIELD	UNITS	7.0
CADMIUM, DIS.	UG/L	<	1	POTASSIUM-40, DISS.	PCI/L	1.3
CALCIUM, DISSOLV.	MG/L		85	POTASSIUM, DISSOLVED	MG/L	1.6
CARBON, ORGANIC, DIS	MG/L		8.9	RESIDUE DIS CALC SUM	MG/L	302
CHLORIDE, DISSOLVED	MG/L		13	ROE. DISS. AT 180 C	MG/L	351
CHROMIUM, DIS.	UG/L	<	10	SILICA, DIS.	MG/L	22
COPPER, DIS.	UG/L		2	SODIUM, ABSORP RATIO		0.3
DEPTH LOC VERT IN FT			65.0	SODIUM, DIS.	MG/L	7.7
FLUORIDE, DISSOLVED	MG/L		0.1	SODIUM, PERCENT	%	5
HARDNESS	MG/L		290	SP. CONDUCTANCE FLD	UMHOS	641
HARDNESS N.CARB L-EP	MG/L		51	SP. CONDUCTANCE LAB	UMHOS	635
IRON, DIS.	UG/L		250	STRONTIUM, DIS.	UG/L	110
LEAD, DIS.	UG/L		1	SULFATE, DISSOLVED	MG/L	8.3
MAGNESIUM, DISSOLV.	MG/L		19	WATER TEMPERATURE		12.6
MANGANESE, DISSOLV.	UG/L		20	ZINC, DIS.	UG/L	90

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM, DISSO	85	4.242	CHLORIDE, DISS	13	0.367
MAGNESIUM, DIS	19	1.563	FLUORIDE, DISS	0.1	0.005
POTASSIUM, DIS	1.6	0.041	SULFATE, DISSO	8.3	0.173
SODIUM, DIS.	7.7	0.335	ALK TOT LAB.	240	4.[illegible]
TOTAL		6.180	TOTAL		5.[illegible]

PERCENT DIFFERENCE = 7.29

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 306022 RECORD-# 16392

SAMPLE LOCATION: USGS DUNES WELL 237 45 FT
STATION ID: 413550087163800 LAT.LONG.SEQ.: 413550 087163B 00
DATE OF COLLECTION: BEGIN--801029 END-- TIME--1700
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
H2S ODOR PRESENT FLD ALK 300 MG/L TI CAP

ALK TOT FLD. CACO3		309			
ALK TOT LAB. CACO3	DETR.	DELETED	NITR DISS NH4 AS N	MG/L	32
ALUMINUM DISSOLVED	UG/L	0	NITR DISS NH4+ORG-N	MG/L	3.2
ANALYZING AGENCY		B0010	NITR DISS ORG AS N	MG/L	0.00
ARSENIC DISSOLVED	UG/L	2	NITR DISSOLVED AS N	MG/L	3.2
BARIUM DISSOLVED	UG/L	100	NITR. DIS NH4 AS NH4	MG/L	4.8
BERYLLIUM DISSOLVED	UG/L	0	NITR. DIS NO2 AS NO2	MG/L	0.00
BORON DISSOLVED	UG/L	230	NITR. DIS NO3 AS NO3	MG/L	0.02
BROMIDE	DETR.	DELETED	OXYGEN DISSOLVED	MG/L	0.0
CADMIUM DISSOLVED	UG/L	3	PH FIELD		7.0
CALCIUM DISS	MG/L	200	PH LAB		7.4
CARBON DIS ORGANIC	MG/L	2.[illegible]	PHOS DIS ORTHO AS P	MG/L	0.01
CHLORIDE DISS	MG/L	870	PHOS.DIS ORTHO -PO4	MG/L	0.03
CHROMIUM DISSOLVED	UG/L	20	POTASSIUM DISS	MG/L	5.0
COBALT DISSOLVED	UG/L	10	POTASSIUM 40.D.PCI/L		3.7
COPPER DISSOLVED	UG/L	2	REDOX POTENTIAL (MV)		166
DEPTH OF WELL IN FT.		45.0	RESIDUE DIS CALC SUM	MG/L	1570
FLUORIDE DISS	MG/L	0.0	RESIDUE DIS TON/AFT		2.71
HARDNESS TOTAL	MG/L	780	RESIDUE DIS 180C	MG/L	1990
IRON DISSOLVED	UG/L	3800	SAR		[illegible]
LEAD DISSOLVED	UG/L	10	SELENIUM DISSOLVED	UG/L	0
MAGNESIUM DISS	MG/L	49	SILICA DISSOLVED	MG/L	16
MANGANESE DISSOLVED	UG/L	730	SODIUM DISS	MG/L	350
MERCURY DISSOLVED	UG/L <	0.1	SODIUM PERCENT		48
METALS DISS CHE-EXT		0	SP. CONDUCTANCE FLD		3630
MOLYBDENUM DISSOLVED	UG/L	0	SP. CONDUCTANCE LAB		3[illegible]
NICKEL DISSOLVED	UG/L	3	STRONTIUM DISSOLVED	UG/L	4[illegible]
NITR DIS NO2 AS N	MG/L	0.00	SULFATE DISS	MG/L	1[illegible]
NITR DIS NO3 AS N	MG/L	0.01	WATER TEMP (DEG C)		1[illegible].5
NITR DIS NO2+NO3 -N	MG/L	0.01	ZINC DISSOLVED	UG/L	1[illegible]
HARDNESS NONCARB	MG/L	470			

CONTINUED ON NEXT PAGE

WATER QUALITY ANALYSIS CONTINUED
LAB ID # 306022 RECORD # 1-342

SAMPLE LOCATION: USGS DUNES WELL 237 45 FT
STATION ID: 413550087163800 LAT.LONG.SEQ.: 413550 0871638 00
DATE OF COLLECTION: BEGIN--801029 END-- TIME--1700

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	200	9.980	CHLORIDE DISS	870	24.543
MAGNESIUM DISS	69	5.676	SULFATE DISS	140	2.915
POTASSIUM DISS	5.0	0.128	NITR DIS NO2+N	0.01	0.001
SODIUM DISS	350	15.225	ALK	310	6.194
TOTAL		31.009	TOTAL		~~27.653~~ 33.653

% Dif = 4.10

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 306034 RECORD-# 15422

SAMPLE LOCATION: DUNES WELL 238 65 FT
STATION ID: 413705087165500 LAT.LONG.SEQ.: 413705 0871655 00
DATE OF COLLECTION: BEGIN--801620 END-- TIME--1250
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
NO H2S ODOR METALLIC ODOR FLD ALK 410 TI GRP

ALK TOT FLD. CACO3	MG/L	410			
ALK TOT LAB. CACO3	MG/L	370	NITR DIS NO2+NO3 -N	MG/L	0.14
ALUMINUM DISSOLVED	UG/L	0	NITR DISS -N AS N	MG/L	0.05
ANALYZING AGENCY		8001	NITR DISS NH3+ORG-N	MG/L	0.35
ARSENIC DISSOLVED	UG/L	24	NITR DISS ORG AS N	MG/L	0.30
BARIUM DISSOLVED	UG/L	100	NITR DISSOLVED AS N	MG/L	0.53
BERYLLIUM DISSOLVED	UG/L	0	NITR. DIS NH4 AS NH4	MG/L	0.06
BORON DISSOLVED	UG/L	30	NITR. DIS NO2 AS NO2	MG/L	0.03
BROMIDE	DET-.	DELETE	NITR. DIS NO3 AS NO3	MG/L (	0.74
CADMIUM DISSOLVED	UG/L	4	OXYGEN DISSOLVED	MG/L	0.04
CALCIUM DISS	MG/L	41	PH FIELD		7.4
CARBON DIS ORGANIC	MG/L	13	PH LAB		7.6
CHLORIDE DISS	MG/L	400	PHOS DIS ORTHO AS P	MG/L	0.04
CHROMIUM DISSOLVED	UG/L	30	PHOS.DIS ORTHO -PO4	MG/L	0.15
COBALT DISSOLVED	UG/L	-	POTASSIUM DISS	MG/L	4.5
COPPER DISSOLVED	UG/L	3	RAT SED 410.0.EQ1/L		3.7
DEPTH OF WELL IN FT.		55.0	REDOX POTENTIAL (MV)		41.0
FLUORIDE DISS	MG/L	0.	RESID DIS CALC SUM	MG/L	2920
HARDNESS NONCARB	MG/L	1100	RESID DIS TOM/MFT		4.3
HARDNESS TOTAL	MG/L	1400	RESID DIS 180C	MG/L	3150
IRON DISSOLVED	UG/L	2600	SAR		5.3
LEAD DISSOLVED	UG/L	11	SELENIUM DISSOLVED	UG/L	0
MAGNESIUM DISS	MG/L	100	SILICA DISSOLVED	MG/L	15
MANGANESE DISSOLVED	UG/L	240	SODIUM DISS	MG/L	480
MERCURY DISSOLVED	UG/L <	0.1	SODIUM PERCENT		41
METALS DISS CHELATE		0	SP. CONDUCTANCE FLD		7450
MOLYBDENUM DISSOLVED	UG/L		SP. CONDUCTANCE LAB		4130
NICKEL DISSOLVED	UG/L	7	STRONTIUM DISSOLVED	UG/L	1500
NITR DIS NO2 AS	MG/L	0.01	SULFATE DISS	MG/L	1100
NITR DIS NO3 AS	MG/L	0.17	TEMP TEMP (DEG C)		13.1
			ZINC DISSOLVED	UG/L	140

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WATER QUALITY ANALYSIS CONTINUED
LAB ID = 306634 RECORD = 16424

SAMPLE LOCATION: DUNES WELL 234 65 FT
STATION ID: 413705087165500 LAT.LONG.SEQ.: 413705 0871655 00
DATE OF COLLECTION: BEGIN--801024 END-- TIME--1250

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	410	20.458	CHLORIDE DISS	600	16.924
MAGNESIUM DISS	100	8.224	SULFATE DISS	1100	22.902
POTASSIUM DISS	4.5	0.125	ALK TOT LAB.	370	7.383
SODIUM DISS	460	20.010	NITR DIS NO2+N	0.14	0.013
TOTAL		48.820	TOTAL		47.233

PERCENT DIFFERENCE = 1.65

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 306032 RECORD-# 16422

SAMPLE LOCATION: DUNES WELL 239 65 FT
STATION ID: 413634087165300 LAT.LONG.SEQ.: 413634 0871653 00
DATE OF COLLECTION: BEGIN--801029 END-- TIME--1450
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
H2S ODOR PRESENT FLD ALK 362 MG/L TI CAP

ALK TOT FLD. CACO3	MG/L	362	
ALK TOT LAB. CACO3	MG/L	290	
ALUMINUM DISSOLVED	UG/L	0	
ANALYZING AGENCY		80010	
ARSENIC DISSOLVED	UG/L	89	50
BARIUM DISSOLVED	UG/L	100	
BERYLLIUM DISSOLVED	UG/L	0	
BORON DISSOLVED	UG/L	120	
BROMIDE	MG/L	0.3	
CADMIUM DISSOLVED	UG/L	3	
CALCIUM DISS	MG/L	81	
CARBON DIS ORGANIC	MG/L	7.7	
CHLORIDE DISS	MG/L	10	
CHROMIUM DISSOLVED	UG/L	10	
COBALT DISSOLVED	UG/L	10	
COPPER DISSOLVED	UG/L	2	
DEPTH OF WELL IN FT.		65.0	
FLUORIDE DISS	MG/L	0.0	
HARDNESS NONCARB	MG/L	0	
HARDNESS TOTAL	MG/L	280	
IRON DISSOLVED	UG/L	5100	
LEAD DISSOLVED	UG/L	10	
MAGNESIUM DISS	MG/L	18	
MANGANESE DISSOLVED	UG/L	50	
MERCURY DISSOLVED	UG/L	< 0.1	
METALS DISS CHE-EXT		0	
MOLYBDENUM DISSOLVED	UG/L	0	
NICKEL DISSOLVED	UG/L	1	
NITR DIS NO2 AS N	MG/L	0.01	
NITR DIS NO3 AS N	MG/L	0.00	

NITR DIS NO2+NO3 -N	MG/L	0.01	
NITR DISS NH4 AS N	MG/L	~~1.~~ 1.4	
NITR DISS NH4+ORG-N	MG/L	1.4	
NITR DISS ORG AS N	MG/L	0.00	
NITR DISSOLVED AS N	MG/L	1.4	
NITR. DIS NH4 AS NH4	MG/L	1.9	
NITR. DIS NO2 AS NO2	MG/L	0.03	
NITR. DIS NO3 AS NO3	MG/L	0.00	
OXYGEN DISSOLVED	MG/L	~~0.~~ 0.2	
PH FIELD		7.0	
PH LAB		7.3	
PHOS DIS ORTHO AS P	MG/L	0.08	
PHOS.DIS ORTHO -PO4	MG/L	0.25	
POTASSIUM DISS	MG/L	1.4	
POTASSIUM 40.D.PCI/L		1.0	
REDOX POTENTIAL (MV)		126	
RESIDUE DIS CALC SUM	MG/L	328	
RESIDUE DIS TON/AFT		0.54	
RESIDUE DIS 180C	MG/L	398	
SAR		0.2	
SELENIUM DISSOLVED	UG/L	0	
SILICA DISSOLVED	MG/L	28	
SODIUM DISS	MG/L	6.3	
SODIUM PERCENT		5	
SP. CONDUCTANCE FLD		636	
SP. CONDUCTANCE LAB		607	
STRONTIUM DISSOLVED	UG/L	160	
SULFATE DISS	MG/L	3.1	
WATER TEMP (DEG C)		11.8	
ZINC DISSOLVED	UG/L	20	

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WATER QUALITY ALERT
CIRCLED ELEMENTS
EXCEEDS LIMITS

WATER QUALITY ANALYSIS CONTINUED
LAB ID # 306032 RECORD # 16422

SAMPLE LOCATION: DUNES WELL 239 65 FT
STATION ID: 413634087165300 LAT.LONG.SEQ.: 413634 0871653 00
DATE OF COLLECTION: BEGIN--801029 END-- TIME--1450

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	81	4.042	CHLORIDE DISS	10	0.282
MAGNESIUM DISS	18	1.481	SULFATE DISS	3.1	0.065
POTASSIUM DISS	1.4	0.036	ALK TOT LAB.	290	5.794
SODIUM DISS	6.3	0.274	NITR DIS NO2+N	0.01	0.001
TOTAL		5.832	TOTAL		6.142

PERCENT DIFFERENCE = -2.58

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 129059 RECORD-# 90619

SAMPLE LOCATION: DUNES WELL 239 65 FT
STATION ID: 413634087165300 LAT.LONG.SEQ.: 413634 0871653 00
DATE OF COLLECTION: BEGIN--800429 END-- TIME--1330
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
DUNES WELL 239 65 FT 4-29-80 TI WL FLD ALK 318 MG/L H2S ODOR NOTED
YELLOW TINT TO PUMPED H2O FINE SAND RETAINED ON .45M FILTERS

AIR TEMP (DEG C)			9.5	NITR DIS NO3 AS N	MG/L	0.02
ALK.TOT(CACO3)	MG/L		310	NITR DIS NO2+NO3 -N	MG/L	0.03
ALUMINUM DISSOLVED	UG/L		10	NITR DISS NH4 AS N	MG/L	0.91
ANALYZING AGENCY			80010	NITR DISS NH4+ORG-N	MG/L	1.3
ARSENIC DISSOLVED	UG/L		28	NITR DISS ORG AS N	MG/L	0.39
BARIUM DISSOLVED	UG/L		100	NITR DISSOLVED AS N	MG/L	1.3
BERYLLIUM DISSOLVED	UG/L		0	NITR. DIS NH4 AS NH4	MG/L	1.2
BORON DISSOLVED	UG/L		150	NITR. DIS NO2 AS NO2	MG/L	0.03
BROMIDE	MG/L		0.2	NITR. DIS NO3 AS NO3	MG/L	< 0.09
CADMIUM DISSOLVED	UG/L		0	OXYGEN DISSOLVED	MG/L	0.1
CALCIUM DISS	MG/L		95	PH FIELD		6.7
CARBON DIS ORGANIC	MG/L		7.6	PH LAB		8.2
CHLORIDE DISS	MG/L		11	PHOS DIS ORTHO AS P	MG/L	0.00
CHROMIUM DISSOLVED	UG/L	<	10	PHOS.DIS ORTHO -PO4	MG/L	0.00
COBALT DISSOLVED	UG/L		0	POTASSIUM DISS	MG/L	1.7
COPPER DISSOLVED	UG/L		2	POTASSIUM 40.D.PCI/L		1.3
DEPTH OF WELL IN FT.			65.0	REDOX POTENTIAL (MV)		145
DEPTH(FT.FR.SURFACE)			30.0	RESIDUE DIS CALC SUM	MG/L	346
DPTH BOT. OF SAM.FT.			30.0	RESIDUE DIS TON/AFT		0.45
FLUORIDE DISS	MG/L		0.1	RESIDUE DIS 180C	MG/L	329
HARDNESS NONCARB	MG/L		14	SAR		0.1
HARDNESS TOTAL	MG/L		320	SELENIUM DISSOLVED	UG/L	0
IRON DISSOLVED	UG/L		2300	SILICA DISSOLVED	MG/L	21
LEAD DISSOLVED	UG/L		1	SODIUM DISS	MG/L	5.6
MAGNESIUM DISS	MG/L		21	SODIUM PERCENT		4
MANGANESE DISSOLVED	UG/L		370	SP. CONDUCTANCE FLD		724
MERCURY DISSOLVED	UG/L	<	0.1	SP. CONDUCTANCE LAB		504
MOLYBDENUM DISSOLVED	UG/L		0	STRONTIUM DISSOLVED	UG/L	130
NICKEL DISSOLVED	UG/L		3	SULFATE DISS	MG/L	1.2
NITR DIS NO2 AS N	MG/L		0.01	WATER TEMP (DEG C)		11.6
				ZINC DISSOLVED	UG/L	50

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WATER QUALITY ANALYSIS CONTINUED
LAB ID # 129059 RECORD # 90619

SAMPLE LOCATION: DUNES WELL 239 65 FT
STATION ID: 413634087165300 LAT.LONG.SEQ.: 413634 0871653 00
DATE OF COLLECTION: BEGIN--800429 END-- TIME--1330

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	95	4.741	CHLORIDE DISS	11	0.310
MAGNESIUM DISS	21	1.727	FLUORIDE DISS	0.1	0.005
POTASSIUM DISS	1.7	0.043	SULFATE DISS	1.2	0.025
SODIUM DISS	5.6	0.244	ALK,TOT(CACO3)	310	6.194
			NITR DIS NO2+N	0.03	0.002
TOTAL		6.755	TOTAL		6.536

PERCENT DIFFERENCE = 1.64

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 123115 RECORD-# 88954

SAMPLE LOCATION: USGS DUNES WELL 237 45 FT
STATION ID: 413550087163800 LAT.LONG.SEQ.: 413550 0871638 00
DATE OF COLLECTION: BEGIN--800424 END-- TIME--1340
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
DUNES WELL 237 45 FT 04-24-80 CAS PD FLD ALK 267 MG/L FIANT H2S ODOR
MANY BUBBLES IN SAMPLING LINE

AIR TEMP (DEG C)		3.0	NITROGEN NH4 ASN DIS	MG/L	2.3
ALK.TOT(CACO3)	MG/L	280	NITROGEN NO2 ASN DIS	MG/L	0.03
ANALYZING AGENCY		80010	NITROGEN NO3 ASN DIS	MG/L	0.06
BORON DISSOLVED	UG/L	290	NO2+NO3 AS N DISS	MG/L	0.09
CALCIUM DISS	MG/L	240	OXYGEN DISSOLVED	MG/L	0.2-
CARBON DIS ORGANIC	MG/L	2.5	PH FIELD		6.5
CHLORIDE DISS	MG/L	710	PH LAB		7.2
DEPTH OF WELL IN FT.		45.0	PHOS ORTHO DIS AS P	MG/L	0.00
DEPTH(FT.FR.SURFACE)		45.0	PHOSPHATE DIS ORTHO	MG/L	0.00
DPTH BOT. OF SAM.FT.		41.0	POTASSIUM DISS	MG/L	5.3
FLUORIDE DISS	MG/L	0.1	POTASSIUM 40.D.PCI/L		4.0
HARDNESS NONCARB	MG/L	650	REDOX POTENTIAL (MV)		155
HARDNESS TOTAL	MG/L	930	RESIDUE DIS CALC SUM	MG/L	1650
IRON DISSOLVED	UG/L	4700	RESIDUE DIS TON/AFT		5.99
MAGNESIUM DISS	MG/L	80	RESIDUE DIS 180C	MG/L	4330
MANGANESE DISSOLVED	UG/L	470	SAR		3.6
NITR. NH4 AS NH4 DIS	MG/L	3.0	SILICA DISSOLVED	MG/L	18
NITR. NO2 AS NO2 DIS	MG/L	0.10	SODIUM DISS	MG/L	250
NITR. NO3 AS NO3 DIS	MG/L	0.27	SODIUM PERCENT		37
NITROGEN DIS ORG ASN	MG/L	1.2	SP. CONDUCTANCE FLD		3300
NITROGEN DISS AS N	MG/L	3.5	SP. CONDUCTANCE LAB		3030
NITROGEN DISS KJD	MG/L	3.5	SULFATE DISS	MG/L	170
			WATER TEMP (DEG C)		13.2

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	240	11.976	CHLORIDE DISS	710	20.029
MAGNESIUM DISS	80	6.581	FLUORIDE DISS	0.1	0.005
POTASSIUM DISS	5.3	0.136	SULFATE DISS	170	3.539
SODIUM DISS	250	10.875	ALK.TOT(CACO3)	280	5.594
			NO2+NO3 AS N D	0.09	0.006
TOTAL		29.567	TOTAL		29.173

PERCENT DIFFERENCE = 0.67

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY ATLANTA, GEORGIA

WATER QUALITY ANALYSIS
LAB-ID # 129060 RECORD-# 90622

SAMPLE LOCATION: DUNES WELL 238 65 FT
STATION ID: 413705087165500 LAT.LONG.SEQ.: 413705 0871655 00
DATE OF COLLECTION: BEGIN--800429 END-- TIME--1115
STATE CODE: 18 COUNTY CODE: 089 PROJECT IDENTIFICATION: 441806000
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
DUNES WELL 238 65 FT 4-29-80 TI WL FLD ALK 383 MG/L H2S ODOR PRESENT
YELLOW TINT TO PUMPED WATER METALLIC ODOR DK GREY MATL RETAINED ON

AIR TEMP (DEG C)		6.9	NITR DIS NO3 AS N	MG/L	0.02
ALK.TOT(CACO3)	MG/L	290	NITR DIS NO2+NO3 -N	MG/L	0.04
ALUMINUM DISSOLVED	UG/L	10	NITR DISS NH4 AS N	MG/L	2.3
ANALYZING AGENCY		80010	NITR DISS NH4+ORG-N	MG/L	2.7
ARSENIC DISSOLVED	UG/L	12	NITR DISS ORG AS N	MG/L	0.40
BARIUM DISSOLVED	UG/L	10	NITR DISSOLVED AS N	MG/L	2.7
BERYLLIUM DISSOLVED	UG/L	10	NITR. DIS NH4 AS NH4	MG/L	3.0
BORON DISSOLVED	UG/L	270	NITR. DIS NO2 AS NO2	MG/L	0.07
BROMIDE	MG/L	0.2	NITR. DIS NO3 AS NO3	MG/L <	0.09
CADMIUM DISSOLVED	UG/L	0	OXYGEN DISSOLVED	MG/L	0.3
CALCIUM DISS	MG/L	370	PH FIELD		7.2
CARBON DIS ORGANIC	MG/L	13	PH LAB		7.8
CHLORIDE DISS	MG/L	610	PHOS DIS ORTHO AS P	MG/L	0.00
CHROMIUM DISSOLVED	UG/L	20	PHOS.DIS ORTHO -PO4	MG/L	0.00
COBALT DISSOLVED	UG/L	0	POTASSIUM DISS	MG/L	4.8
COPPER DISSOLVED	UG/L	1	POTASSIUM 40,D.PCI/L		3.6
DEPTH OF WELL IN FT.		65.0	REDOX POTENTIAL (MV)		76.0
DEPTH(FT.FR.SURFACE)		30.0	RESIDUE DIS CALC SUM	MG/L	2600
DPTH BOT. OF SAM.FT.		30.0	RESIDUE DIS TON/AFT		3.77
FLUORIDE DISS	MG/L	0.1	RESIDUE DIS 180C	MG/L	2770
HARDNESS NONCARB	MG/L	1000	SAR		4.9
HARDNESS TOTAL	MG/L	1300	SELENIUM DISSOLVED	UG/L	0
IRON DISSOLVED	UG/L	560	SILICA DISSOLVED	MG/L	17
LEAD DISSOLVED	UG/L	0	SODIUM DISS	MG/L	410
MAGNESIUM DISS	MG/L	100	SODIUM PERCENT		40
MANGANESE DISSOLVED	UG/L	360	SP. CONDUCTANCE FLD		5290
MERCURY DISSOLVED	UG/L	0.1	SP. CONDUCTANCE LAB		3860
MOLYBDENUM DISSOLVED	UG/L	0	STRONTIUM DISSOLVED	UG/L	1300
NICKEL DISSOLVED	UG/L	8	SULFATE DISS	MG/L	910
NITR DIS NO2 AS N	MG/L	0.02	WATER TEMP (DEG C)		11.6
			ZINC DISSOLVED	UG/L	220

CONTINUED ON NEXT PAGE

WATER QUALITY ANALYSIS CONTINUED
LAB ID # 129060 RECORD # 90622

SAMPLE LOCATION: DUNES WELL 238 65 FT
STATION ID: 413705087165500 LAT.LONG.SEQ.: 413705 0871655 00
DATE OF COLLECTION: BEGIN--800429 END-- TIME--1115

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	370	18.463	CHLORIDE DISS	610	17.208
MAGNESIUM DISS	100	8.226	FLUORIDE DISS	0.1	0.005
POTASSIUM DISS	4.8	0.123	SULFATE DISS	910	18.946
SODIUM DISS	410	17.835	ALK.TOT(CACO3)	290	5.794
			NITR DIS NO2+N	0.04	0.003
TOTAL		44.647	TOTAL		41.957

PERCENT DIFFERENCE = 3.11

MAR 21 1984

Mr. A. A. Spinola
Senior Environmental Engineer
Environmental Affairs
U.S. Steel Corporation
125 Jamison Lane
Monroeville, PA 15146

Dear Mr. Spinola:

Re: U.S. Steel Corporation, Gary Works
Groundwater Monitoring
EPA ID No. IND 005444062

As per our conference call on March 6, 1984, the Division of Land Pollution Control understands that your consultant, Michael Baker, Jr., Inc., will undertake a study designed to determine the groundwater flow gradient at the facility. The study will involve installation of additional monitoring points to obtain water levels to determine if a valid upgradient - downgradient relationship exists. The study could result in a revision of the RCRA monitoring program for the facility. If an alternate groundwater monitoring system is proposed, the guidelines under Subpart F, 265.90(d)(1-5) (320 IAC 4-6) will be applicable for your situation.

If you have any questions regarding this correspondence, please contact Mr. Robert Downey of this office at AC 317/633-8476.

Very truly yours,

Karyl K. Schmidt

Karyl K. Schmidt, Chief
Geology/Chemistry Support Section
Technical Support Branch
Division of Land Pollution Control

RAD/jb

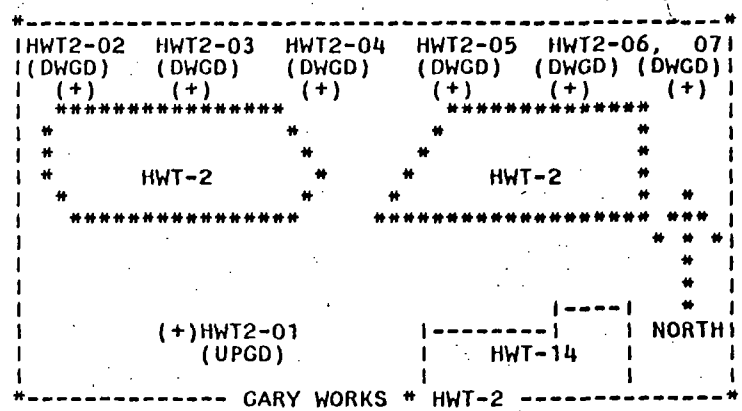
TUEZAM L/Spinola

APPENDIX B

RESULTS OF STUDENT'S T-TEST FOR APRIL, 1983 SAMPLING

SUMMARY REPORT - SAMPLING ROUND (SR-2) REPORT DATE: 29 NOV 83

TABULATION OF RESULTS BY FACILITY, SITE,
AND SAMPLING POINT FOR SAMPLING ROUND



CLIENT: U.S. STEEL CORPORATION
FACILITY: GARY WORKS LOCATION: GARY, INDIANA
SITE: HWT-2
SAMPLING ROUND: 03 YEAR: 83 PURPOSE: ANNUAL

SAMPLING POINT, SAMPLE NO.

PARAMETER	UNIT	REGULATORY LEVEL	HWT2-06 DOWNGRADIENT 10/25/83 831307	HWT2-07 DOWNGRADIENT 10/26/83 831313
CHLORIDE	MG/L		2400.	1600.
IRON	MG/L		8.55	LT0.01
MANGANESE	MG/L		0.73	0.4
PHENOLS	MG/L		LT0.01	0.033
SODIUM	MG/L		61.9	45.3
SULFATE	MG/L		1100.	960.
PH	SU		6.9	9.1
PH	SU		7.	9.1
PH	SU		6.9	9.1
PH	SU		6.9	9.1
SPECIFIC CONDUCTANCE	UMHOS/CM		7200.	5920.
SPECIFIC CONDUCTANCE	UMHOS/CM		7200.	5950.
SPECIFIC CONDUCTANCE	UMHOS/CM		7200.	5960.
SPECIFIC CONDUCTANCE	UMHOS/CM		7200.	5950.
TOTAL ORGANIC CARBON	MG/L		9.8	6.5
TOTAL ORGANIC CARBON	MG/L		9.7	7.
TOTAL ORGANIC CARBON	MG/L		10.1	6.9
TOTAL ORGANIC CARBON	MG/L		9.3	6.9
TOTAL ORGANIC HALOGEN	UG/L		208.	50.
TOTAL ORGANIC HALOGEN	UG/L		300.	61.
TOTAL ORGANIC HALOGEN	UG/L		243.	56.
TOTAL ORGANIC HALOGEN	UG/L		200.	62.
GROUND WATER ELEVATION	FT WD		3.99	7.18

LOG OF PLANT NO. 400 BORING AT WEST END OF 84" HOT STRIP MILL

FOREMAN W. Rogers LOGGED BY K. Dixon DATE STARTED 11/6/63 DATE COMPLETED 11/7/63

LOCATION Per sketch BORING METHOD Rotary CASING -

NOTES	L	L.L.	TYPE	NO.	QU.	BLOWS/FT.	ELEV.	DESCRIPTION	DEPTH
							+1.0	SURFACE	0.0
W.L. 2.5' in auger hole at start of boring. Had to re-locate hole because slag poured over original hole.			SS	1	-	1/1		Slag FILL	
							-18.0		19.0
			SS	2	-	15/15			
			SS	3	-	13/17		Dense grey fine SAND	
			SS	4	-	10/11			
			SS	5	-	15/15			
			SS	6	0.5P	3/2	-39.5		40.5
	103.3	22.6	ST	7	0.58	-			
	99.5	27.6	ST	8	1.05	-			
	105.2	22.5	ST	9	1.17	-		Medium to stiff grey SILTY CLAY, trace of sand, occasional pebble	
Lost ST @ 70'.									
	102.0	23.5	ST	10	1.16	-			
Lost ST @ 85'.									

GROUND WATER DEPTH

SCALE 1" = 10' AT COMPLETION 2.5' @ AFTER HRS. @ AFTER HRS.

LAYNE-WESTERN CO.

LOG OF PLANT NO. 400 BORING AT WEST END OF 84" HOT STRIP MILL
(Continued)

FOREMAN [illegible] LOGGED BY [illegible] DATE STARTED 11/6/63 DATE COMPLETED 11/7/63
LOCATION [illegible] BORING METHOD Rotary CASING -

NOTES	γ	W.C.	TYPE	NO.	QU.	BLOWS/FT.	ELEV.	DESCRIPTION	DEPTH
								SURFACE	
	106.5	19.9	ST	11	1.85	-		Medium to stiff grey SILTY CLAY, trace of sand, occasional pebble	
							-94.0		95.0
			SS	12	4.5+P	17/26			
								Hard to very stiff grey SILTY CLAY, little sand & pebbles, (till)	
			SS	13	4.5+P	23/32			
			SS	14	3.2P	14/24			
							-123.0		124.0
			W	15	-	-	-126.0	BEDROCK - limestone	127.0
								Bottom of hole @ 127.0'	

GROUND WATER DEPTH
DRY AT COMPLETION 2.5' @ AFTER HRS @ AFTER HRS

LAYNE-WESTERN CO.

ECOLOGY & ENVIRONMENT, INC.

LABORATORY SERVICES REQUEST

Project Name: US STEEL

Location (city/county/state): GARY, INDIANA

Team Leader: Lee Ende

OSC:

Project TDD/PAN:

Analytical TDD/PAN: T05-9308-809

Date Form Submitted:

Date Report Due:

Matrix	Parameter/Method	Sampling Date	Sample Shipment Date	Data Deadline Verbal	Data Deadline Hard Copy	Detection Limit	QA Level	# Samples Collect	MS	MSD	Fld Dup	Blk	Tot. # Smpl
Water	VOA	8-13	8-13	14 calendar days	21 calendar days	Method	II	4	—	—	—	—	4
↓	SVOA	↓	↓	↓	↓	↓	↓	↓					↓
	TOTAL CN^-												
	Reactive CN^-												
	pH												
	TCLP VOA												
	TCLP SVOA												
	TCLP metals												

ecology and environment, inc.
6777 ENGLE ROAD, CLEVELAND, OHIO 44130, TEL. (216) 243-3330
International Specialists in the Environment

LAB ADDRESS

TO: John Vordine - Mary J. Lipp

FROM: Ennis

SITE: U.S. Steel - Gary Plant

DATE: 16 August 93

ANALYTICAL TDD: 7059305809 PROJECT TDD: PLEASE SUPPLY!

ANALYTICAL PAN: PROJECT PAN:

* Send your samples to the following laboratory, which has been selected for your project:

EMS Homitage
1019 Marquette Drive
Romeoville, Illinois 60441

Attention: Sample Receiving

Tel./FAX: 708-378-1600

NOTE: Label blank and duplicate samples as sequentially coded sample numbers so that they will be blind QC samples (i.e., do not label as "blank" or "duplicate" on C-O-C.)

* I've no idea of labs location relative to the storehouse, but you could give a ring to Dawn Sickerman (378-4022169) to inquire about sample pick-up. Some labs do this for free.

P.L. They could do a pick-up tomorrow, but not this afternoon.

recycled paper