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SMIDT, B.

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COMMERCE CITY, CO

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APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

IN ORDER TO EVALUATE THE POTENTIAL FOR CONTAMINATED GROUND WATER TO FLOW BEYOND THE NORTHWEST BOUNDARY OF RMA, A SERIES OF BORINGS WERE DRILLED AND WATER SAMPLES WERE COLLECTED FOR ANALYSES. THE PURPOSE OF THIS DRILLING PROGRAM WAS TWOFOLD: (1) ONE WAS TO DETERMINE THE SUBSURFACE GEOLOGIC CONDITIONS THAT EXIST AT THE BOUNDARY, AND (2) THE OTHER WAS TO PROVIDE A PRELIMINARY INSIGHT AS TO THE EXTENT OF THE GROUND WATER CONTAMINATION PROBLEM AT THAT BOUNDARY. ONLY THE FINDINGS RELATED TO WATER QUALITY ARE PRESENTED IN THIS REPORT. THE FINDINGS RELATED TO THE SUBSURFACE HYDROGEOLOGICAL CONDITIONS WILL BE PRESENTED AS PART OF A LATER REPORT DEALING WITH THE ENTIRE NORTHWEST GRADIENT.

14. SUBJECT TERMS
CONTAMINATION, CHEMICALS, DRILLING

15. NUMBER OF PAGES

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UNCLASSIFIED			

DEPARTMENT OF THE ARMY
ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO 80022

original
81342R02

SARRM-CC

FILE COPY

1 May 78

SUBJECT: Interim Report on Groundwater Quality at the Northwest Boundary of RMA

Project Manager for Chemical Demil
and Installation Restoration
ATTN: DRCPM-DRR
Building E4585
Aberdeen Proving Ground, Maryland 21010

1. Reference is made to message, DRCPM-DRR, 131818Z Mar 78, Subject: RMA IR Program Priorities.

2. Subject Report is forwarded for your review and information.

3. The Report deals only with the Arsenal's northwest boundary and represents an evaluation at an instant point in time. For this reason, the conclusions to be drawn are limited. No determination can be made as to whether values will increase, decrease, or remain constant. Upon completion of programmed drilling operations in the northwest quadrant area and analysis of water samples, a more comprehensive report will be prepared covering the area from Basin F to the northwest boundary and addressing present and possible future contamination at the boundary.

1 Incl
as

ALONZO WILLIAMS, JR.
COL, CmlC
Commanding

INTERIM REPORT ON GROUNDWATER QUALITY AT THE NORTHWEST BOUNDARY OF ROCKY MOUNTAIN ARSENAL

APRIL 1978

Prepared By

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INTRODUCTION

In order to evaluate the potential for contaminated groundwater to flow beyond the northwest boundary of RMA, a series of borings were drilled and water samples were collected for analyses. The purpose of this drilling program was twofold; (1) one was to determine the subsurface geologic conditions that exist at the boundary, and (2) the other was to provide a preliminary insight as to the extent of the groundwater contamination problem at that boundary. Only the findings related to water quality are presented in this report. The findings related to the subsurface hydrogeological conditions will be presented as part of a later report dealing with the entire northwest quadrant.

Method of Study

Drilling for this study was conducted on 250-foot centers from the north boundary in section 22 parallel to the boundary southward into section 33 (Figure 1). All holes were drilled to a depth of at least five feet into interpreted bedrock. No casings were installed in the borings in section 22, which were drilled in September of 1976. Included in this report are four wells, three of which are in section 22 and the other is in section 27, that are located along the northwest boundary and are part of the 360° Monitoring Program.

FINDINGS

The analyses on water samples collected from the northwest boundary ranged from DIMP and DCPD determinations in the uncased boreholes to an extensive list of parameters shown in Table 1. The parameters shown here were run on the 40 samples collected from the cased wells along line G-H (Figure 1).

The principal compounds of interest are the organic ones because they provide the surest means of evaluating groundwater contamination as a result of Arsenal activity. In addition, the presence of mercury and arsenic generally indicate industrial contamination because they are rarely found in natural groundwaters.

The only potential contaminant found above detectable levels along the northwest boundary is DIMP. The highest DIMP values are in section 22, sample from an uncased boring indicated a DIMP concentration of 20 ugl. Table 2 is a summary of the analyses for the 360° monitoring well, along the northwest boundary. Of these five wells, the highest average DIMP

concentration was 12 ugl in well 22-5 which is about 400 feet downgradient of uncased boring that indicated the 20 ugl DIMP concentration. DIMP levels in the 40 cased wells along line G-H indicated concentrations between 1.78 and 0.9 ugl (Table 3).

DBCP has only been identified in one well above detectable levels and that occurs in well 22-5, which is one of the 360° monitoring wells.

The inorganics detected in the groundwater are much more difficult to evaluate in terms of industrial contamination. Table 3 also lists the health standards for drinking water for the detected constituents in the groundwater. Nearly all the well samples exceed the health standards for at least one constituent. It should be pointed out, however, that naturally occurring water, surface or groundwater, rarely meets the determined standards for drinking water. Although fluoride is well above standards in well 22-4 (well above recommended maximums), it is felt that given the hydrogeologic setting this high concentration is a naturally occurring phenomenon.

In addition to the analyses performed above, water samples from seven selected wells along line G-H were collected for GC Mass Spectrometer analyses. Wells 27-10, 28-9 and 28-17 indicated the presence of cyclohexane and cyclohexanol in low concentrations. These organic compounds are related to insecticide manufacture (Appendix 1), and their presence in the water is not understood. These three wells do not indicate any other compounds in the water that might explain the presence of these two organic substances. Certainly any future studies in the northwest quadrant will need to be addressed to these compounds.

CONCLUSIONS AND RECOMMENDATIONS

1. The principal purpose of this investigation was to ascertain whether or not a groundwater contamination problem exists along the northwest boundary.

2. Presence of organic substances indicate groundwater contamination as a result of industrial activity.

3. DIMP is present in low concentrations in all wells analyzed.

4. DBCP was detected in only one well.

5. Although some inorganic constituents exceed drinking water standards, it is believed that none of these constituents are in any part due to

industrial activity.

6. The detection of cyclohexanone and cyclohexanol indicates a need for further evaluation at sites upgradient from the wells in which they were detected.

7. The fact that DIMP occurs in the groundwater, even though at very low levels, indicates that some level of groundwater contamination has occurred.

8. The low levels of contamination present in the groundwater indicate that; (1) contaminated groundwater is just reaching the boundary, (2) a plume of contaminated groundwater has already moved past the boundary, or (3) the low levels indicate significant attenuation of contamination levels as a result of natural aquifer characteristics.

9. Additional investigations, such as line E-E' will help to clarify the significance of the contamination levels detected at the northwest boundary.

10. Additional investigations parallel to interpreted groundwater flow will be required to evaluate the quantity of contamination and the rates at which it is moving toward the boundary.

11. Although the contamination is not yet significant at the northwest boundary, it may become of significance at some future date.

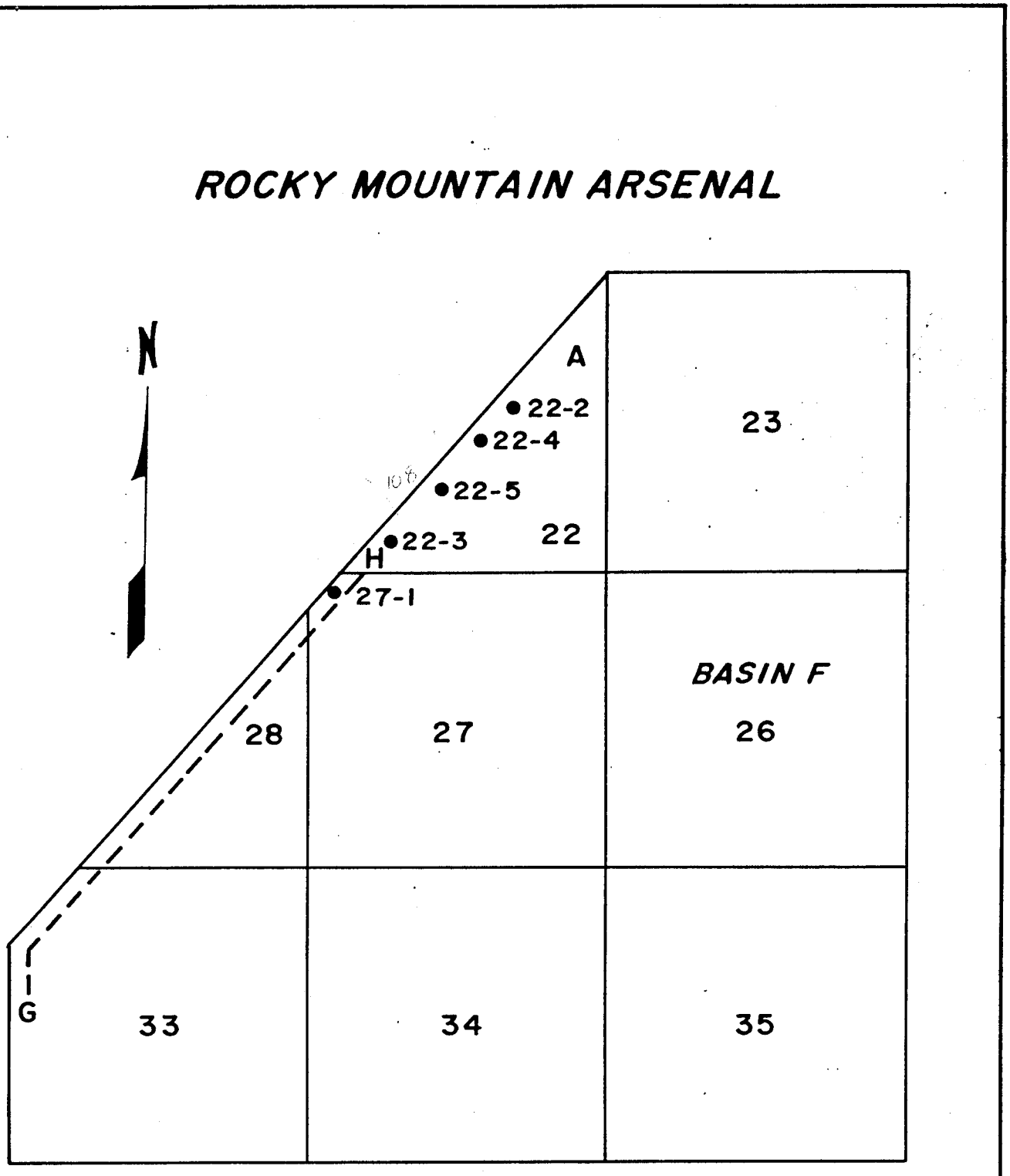

Fig. 1 Location of boreholes and wells used for evaluating groundwater quality at the Northwest boundary

Table 1. Parameters analyzed for in 40 wells along the northwest boundary or RMA.

Inorganics	Organics
Cl*	DIMP*
SO_4*	DCPD*
F*	DBCP*
NO_3*	Sulfone
Na*	Sulfoxide
Mn	Oxathiane
Hardness*	Dithiane
pH*	
Arsenic	
Mercury	

*Parameters included in the 360^0 Monitoring Program.

Table 2. Summary of water quality from existing 360° monitoring wells along the northwest boundary.

	WELLS				
Parameter	22-2	22-3	22-4	22-5	27-1
DIMP[1]	3.06	9.7	3.4	12.02	0.99
DCPD[1]	10	10	10	10	10
DBCP[1]	0.2	0.2	0.2	0.9	0.2
Na [2]	472	375	242	342	94
Cl [2]	272	413	129	473	131
SO_4 [2]	1388	207	121	233	91
NO_3 [2]	5.3	3.03	0.23	1.76	1.46
F [2]	0.46	2.34	7.73	249	0.82
Hardness[2]	560	402	68	448	278
pH					

[1] Units in ugl

[2] Units in mgl

Table 3. Mean, highest and lowest values, and water quality standards of water parameters of 40 northwest boundary wells.

Parameter[1,2]	Mean	Highest	Lowest	Standard
DIMP[1]	0.97	1.78	0.73	500
F	0.97	1.49	0.72	2.4
Mn	0.78	1.82	0.12	0.05
NO_3	0.23	3.2	<0.04	10
Cl	60	116	38	250
pH	7.72	8.14	7.35	---
Hardness	257	402	120	---
SO_4	104	238	30	250
Na	65	99	24	250

[1]DCPD, DBCP, sulfoxide, sulfone, oxathiane, dithiane, As, and Hg were analyzed for but not detected.

[2]Units are in ugl for DIMP and mgl for all others except pH.

APPENDIX 1

Results of GC/MS Scan of Water from Northwest Boundary Wells.

REQUEST FOR AND RESULTS OF TESTS

PAGE NO. 1 | NO. OF PAGES 1

SECTION A - REQUEST FOR TEST

1. TO:
C, Proc Eval & Dev Bldg 831
C, Geohydrology Div Bldg 741
C, Ecosystems Div Bldg 741

2. FROM:
Matl Anal Lab Div
Building 743

3. PRIME CONTRACTOR AND ADDRESS

CONTRACT NUMBER

4. MANUFACTURING PLANT NAME AND ADDRESS

P. O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED
				9 Mar 78

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND. AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE
Water			

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY
		9 Mar 78

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS

GC/MS scan on random selected north boundary samples.

Cyclohexanone is estimated to be in low ppm range in the samples listed below with the X designation.

17. SEND REPORT OF TEST TO

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER

4. TEST PERFORMED	RESULTS OF TEST		SAMPLE RESULT	REQUIREMENTS
	DIMP	DCPD	CYCLOHEXANONE	CYCLOHEXANOL
W#27-6 G-8-0164	-	-	-	-
W#27-10 G-8-0162	-	-	X	X
W#28-3 G-8-0163	-	-	-	-
W#28-9 G-8-0167	-	-	X	X
W#28-17 G-8-0166	-	-	X	X
W#33-6 G-8-0165	-	-	-	-
W#33-13 G-8-0161	-	-	-	-
W#118 sample through carbon column.	-	X	-	-

E	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE
17 Mar 78	RICHARD A. KARN Chemist	Richard A. Karn

DD FORM 1 FEB 62 1222 REPLACES DD FORM 1222. 1 JUL 58. WHICH IS OBSOLETE.

A. Cyclohexanone: Solvent for cellulose acetate and DDT, may act in weak narcotic-like fashion, is mildly irritating to skin and/or mucous membranes and is lethal to mice in air concentration of 8,000 ppm. (Source is Merck Index)

B. Cyclohexanol: Used in insecticide manufacturing, acts in narcotic-like fashion, may cause liver and/or kidney damage, suggested maximum allowable industrial exposure of 100 ppm (time interval not stated). (Source is Merck Index)

APPENDIX 2

Results of analyses by MALD of the 40 northwest boundary wells.

WELL NO		33-5	33-6	33-7	33-8	33-9
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	100.00	57.00	62.00	64.00	63.00
PH		7.68	7.84	8.14	8.06	7.82
SO4	MGL	1250.00	106.00	110.00	120.00	123.00
NA	MGL	66.00	66.00	71.00	69.00	63.00
F	MGL	.92	.95	.80	.79	.75
NIT	MGL	LT .04	.05	.14	LT .04	LT .04
HARD	MGL	200.00	280.00	290.00	305.00	265.00
DIMP	UGL	1.05	.95	1.22	1.55	1.20
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	1.30	.65	.32	.76	1.04

WELL NO		33-10	33-11	33-12	33-13	33-3
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	66.00	51.00	45.00	40.00	53.00
PH		7.68	7.76	7.67	7.43	7.65
SO4	MGL	112.00	145.00	119.00	105.00	102.00
NA	MGL	51.00	58.00	44.00	36.00	69.00
F	MGL	.68	.75	.81	.95	.87
NIT	MGL	3.20	LT .04	LT .04	LT .04	LT .04
HARD	MGL	335.00	245.00	240.00	205.00	270.00
DIMP	UGL	.82	.85	.92	1.75	1.00
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	.45	.70	.66	1.58	.59

WELL NO		33-4	28-21	28-9	28-10	28-11
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	57.00	51.00	52.00	48.00	42.00
PH		7.74	7.52	7.63	7.70	7.71
SO4	MGL	103.00	106.00	70.00	238.00	173.00
NA	MGL	65.00	69.00	95.00	84.00	72.00
F	MGL	1.06	.72	1.03	.97	.82
NIT	MGL	LT .04	LT .04	LT .04	.07	LT .04
HARD	MGL	260.00	260.00	402.00	335.00	280.00
DIMP	UGL	.90	1.00	.83	.73	.80
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	.99	.59	1.24	.94	.84

WELL NO		28-12	28-13	28-14	28-15	28-16
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	43.00	45.00	43.00	46.00	47.00
PH		7.71	7.79	7.70	7.75	7.76
SO4	MGL	123.00	111.00	107.00	105.00	106.00
NA	MGL	69.00	63.00	74.00	66.00	69.00
F	MGL	.78	.81	.89	.81	.82
NIT	MGL	LT .04	.05	.10	.04	LT .04
HARD	MGL	305.00	300.00	265.00	295.00	305.00
DIMP	UGL	.84	.81	.90	.75	.90
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	.66	.66	.73	.91	.87

WELL NO		28-17	28-18	28-19	28-20	28-1
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	45.00	47.00	45.00	48.00	93.00
PH		7.99	7.82	7.64	7.82	7.76
SO4	MGL	112.00	92.00	51.00	62.00	50.00
NA	MGL	77.00	72.00	38.00	82.00	86.00
F	MGL	.74	.80	.80	1.14	1.26
NIT	MGL	LT .04	.22	.05	.05	LT .04
HARD	MGL	205.00	304.00	188.00	210.00	245.00
DIMP	UGL	.81	.82	.89	1.06	1.07
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	.24	.30	.18	.37	1.02

WELL NO		28-2	28-3	28-4	28-5	28-6
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	85.00	97.00	43.00	64.00	55.00
PH		7.68	7.82	7.82	7.74	7.79
SO4	MGL	67.00	73.00	73.00	104.00	148.00
NA	MGL	33.00	84.00	31.00	74.00	74.00
F	MGL	1.14	1.23	1.17	1.03	1.17
NIT	MGL	.05	.05	.22	LT .04	LT .04
HARD	MGL	238.00	280.00	170.00	250.00	270.00
DIMP	UGL	1.75	1.02	.92	.83	.78
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	1.07	1.08	.33	1.82	.71

WELL NO		28-7	28-8	27-4	27-5	27-6
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	60.00	57.00	85.00	116.00	114.00
PH		7.86	7.63	7.62	7.68	7.67
SO4	MGL	239.00	240.00	80.00	79.00	71.00
NA	MGL	77.00	69.00	82.00	99.00	93.00
F	MGL	1.03	1.49	1.12	1.27	1.17
NIT	MGL	LT .04	LT .04	.05	LT .04	.07
HARD	MGL	385.00	304.00	256.00	270.00	272.00
DIMP	UGL	.77	1.13	1.21	1.02	1.78
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	1.31	1.06	1.10	1.03	1.07

WELL NO		27-7	27-8	27-9	27-10	27-11
SAMPLE DATE		28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78	28 FEB 78
CONTAMINANT	UNITS					
CL	MGL	43.00	85.00	60.00	38.00	48.00
PH		7.64	7.57	7.68	7.35	7.55
SO4	MGL	53.00	65.00	65.00	30.00	36.00
NA	MGL	27.00	71.00	51.00	24.00	34.00
F	MGL	.86	1.08	1.06	.85	.94
NIT	MGL	.07	.04	.10	.04	.11
HARD	MGL	150.00	230.00	190.00	120.00	120.00
DIMP	UGL	1.41	1.13	.94	.77	.88
DCPD	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DBCP	UGL	LT .20	LT .20	LT .20	LT .20	LT .20
CPMSO	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
CPMO2	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
OXAT	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
DITH	UGL	LT 10.00	LT 10.00	LT 10.00	LT 10.00	LT 10.00
ASTOT	UGL	LT 50.00	LT 50.00	LT 50.00	LT 50.00	LT 50.00
HGTOT	UGL	LT 2.00	LT 2.00	LT 2.00	LT 2.00	LT 2.00
MN	MGL	.27	.42	1.18	.12	.12

EOF:208

RECORDS LISTED = 209