AD-A286 222

NTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	00/00/75	

4. TITLE AND SUBTITLE
GROUNDWATER STUDY OF THE ROCKY MOUNTAIN ARSENAL AND SOME SURROUNDING AREA, 1974 - 1975

5. FUNDING NUMBERS

6. AUTHOR(S)
SHUKLE, R.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
COLORADO: DEPT. OF HEALTH. WATER QUALITY CONTROL DIVISION
DENVER, CO

8. PERFORMING ORGANIZATION REPORT NUMBER
81337R10

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*
THE PURPOSE OF THIS REPORT IS TO PRESENT QUANTITATIVE GROUND WATER DATA FROM THE PROPERTY OF THE ROCKY MOUNTAIN ARSENAL AND SOME SURROUNDING AREAS. IN ADDITION, AN ATTEMPT IS MADE TO DETERMINE THE ORIGIN OF CERTAIN MATERIALS LEAVING THE PROPERTY OF THE ARSENAL AND PRESENT GROUND WATER CONDITIONS FOR THE IMMEDIATE AND SOME SURROUNDING AREAS.

14. SUBJECT TERMS	15. NUMBER OF PAGES
ALDRIN, DIMP, ENDRIN, DCPD, PESTICIDES, SAMPLING	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED			

81337R10

[redacted]

2nd Copy

1974 - 1975

GROUNDWATER STUDY OF THE ROCKY MOUNTAIN ARSENAL AND SOME SURROUNDING AREAS

Prepared by:

Colorado Department of Health
Water Quality Control Division
Robert J. Shukle,
Industrial Waste Consultant

The purpose of this report is to present quantitative groundwater data from the property of the Rocky Mountain Arsenal and some of the surrounding area. In addition, an attempt will be made to determine the origin of certain materials leaving the property of the Arsenal and present groundwater conditions for the immediate and some surrounding areas.

Data Review

Dicyclopentadiene (DCPD), a precursor for certain pesticides, was initially detected in a drainage ditch designated as "a" in Figure 2. The ditch drained a low area located on the Arsenal property and carried the water to First Creek. Several samples have been collected from the ditch and each sample has contained DCPD. Since that time in May, 1974, the drainage has been blocked off by the Army but groundwater has now started to surface in the south ditch of 96th Avenue. This water again flows to First Creek and still possesses the odor of DCPD.

The material was detected next in two private wells at the corner of 96th Avenue and Peoria Street. One of the wells is a pasture well located sixty feet south of First Creek and is about fifteen feet deep. The second well, previously utilized for drinking purposes, was indicated to be about 250 feet deep. This depth would penetrate the initial bedrock layer and enter a lower aquifer. At this time, it is unknown whether DCPD is present in the lower aquifer or if a leak exists in the upper well casing.

Sampling of wells on the Arsenal in August of 1974 indicated that the DCPD was originating from the area of Lake F, see Figure 2 and Table 1. As the concentration of DCPD in Lake F was unknown, resampling of several of the

wells around Lake F, as well as Lake F, was performed in January, 1975. The pattern of DCPD in the wells was almost identical to that found during the previous sampling, see Figure 6 and Table 3. From the sampling, Lake F was found to contain a lower concentration of DCPD than that found in the groundwaters. In addition, very high copper and chloride concentrations were found in Lake F but not in the downgradient wells. Interpretation of the data indicates that the material, DCPD, is not originating from the main body of Lake F but is originating from the area of the southeast corner of Lake F. The influent line to Lake F is located in this corner as well as an isolated portion of Lake F. The isolated part is lined but was diked off several years ago for the purpose of creating a stilling area to aid in the settlement of influent solids.

DCPD is a fairly volatile material at room temperature. This being the case, the concentration of DCPD in the influent waste should be higher than that found in Lake F. A loss of the influent waste to the groundwaters could, therefore, result in a higher concentration of the material in the groundwater than that found in Lake F.

The above inference of a leak associated with the influent waste is made as this is felt to be the most likely source at this time. A detailed investigation should be able to prove or disprove this point.

Copper and chloride are conservative materials and the high levels found in Lake F should be the result of concentration during the last eighteen years. As a result, the influent waste should contain copper and chlorides but in much lower concentrations. If a leak existed near the influent point, the impact on groundwaters would be much less noticeable with respect to these materials.

Wells 129 and 145, shown on Figures 7 and 8, are located in the narrow bedrock channel which directs the flow of groundwater from Lake A to the area of

Lake F and downgradient areas. These wells should, therefore, indicate the present influence of Lake A on downgradient groundwaters. The January sampling of these wells showed the presence of copper and dieldrin plus the lack of aldrin and endrin. The copper was found in excess of 6 ppm in Well 145 and decreased in concentration in the downgradient wells. The concentration of copper was below detectable levels by the time the groundwater reached the northernmost tip of Lake F. As Lake F contains copper in excess of 400 ppm, the lack of copper in the downgradient wells would indicate that the main body of Lake F does not contain a major leak. Additional confirmation of this is the lack of highly elevated chloride levels in wells downgradient of Lake F. Lake F contains 43,000 ppm chlorides and a major leak would substantially increase chloride levels in downgradient wells. Chlorides in excess of 600 ppm were found in Well 145 showing that Lake A is still contributing chlorides to the downgradient area. The lack of aldrin and endrin in Wells 145 and 129 indicates that Lake A is a very doubtful source for the aldrin and endrin found in the wells in the southeast corner of Lake F. This would again indicate that a new source of pollution exists in the southeast corner of Lake F.

Diisopropylmethylphosphonate (DIMP), a byproduct of the chemical destruction and manufacture of GB nerve gas, was initially disposed of to Lake A prior to 1957 and to Lake F after that time. The August, 1974 and January, 1975 sampling of wells on Arsenal property have shown a wide distribution of DIMP on the property downgradient of Lake A. DIMP, in concentrations as high as 48 ppm has been found in on-site wells, with the concentration in Lake F found to be in excess of 400 ppm. It was indicated by Army personnel that DIMP has not been added to Lake F since the early 1960's. This would indicate that DIMP is a very stable material.

Sampling of off-site surveillance wells was conducted by the Tri-County Health Department in December, 1974. The sampling showed DIMP at detectable levels

in an area of approximately twenty-five square miles, see Figure 9 and Table 4. The twenty-five square miles do not include the contaminated area on Arsenal property. The most northernly point of detection was at 144th Avenue, Station XXV, approximately one mile south of Brighton. The origin of the material appears to be Lake A which was unlined during the period of use.

Conclusions

The following are conclusions drawn from the investigation:

(1) It appears that the source of groundwater contamination exists in the southeast corner of Lake F. However, it does not appear to be the main body of Lake F. DCPD in low ppm concentrations and aldrin, endrin and dieldrin in low ppb concentrations are some of the materials which appear to be migrating from this source.

(2) DIMP has been detected at less than a ppb level in groundwaters approximately one mile south of Brighton. The present distribution of the material is approximately 30 square miles of which 25 are off the Arsenal property.

(3) DCPD, a precursor for the production of pesticides, has been detected in the groundwaters on and off Arsenal property plus in a tributary to First Creek.

(4) Toxicological data on DIMP is very limited and therefore will not be commented on. DCPD possess a very strong offensive odor with toxicological data on this materia' being somewhat limited.

(5) Comparison of past and present chloride levels on the Arsenal generally shows a marked reduction in concentrations downgradient of Lake A. Two main pockets of elevated chloride exist; one is Lake A itself and the other is north of 96th Avenue and east of Brighton Boulevard.

(6) The pesticides aldrin, endrin and dieldrin do not appear to be extremely mobile in the groundwaters. It is very likely that the affinity these materials have for certain soil has retarded the movement in the groundwater. As a result, a widespread problem is not anticipated with respect to these materials.

Recommendations

(1) Immediate studies to determine the toxicity of DIMP and DCPD are needed. The studies should be conducted at facilities other than Army related facilities.

(2) An immediate investigation to determine the exact location of materials entering the groundwaters is needed. The first point looked at should be the influent area to Lake F.

(3) Reclamation of the groundwater for DIMP is recommended.

(4) Reclamation of DCPD from the groundwater appears feasible and is recommended. Continual pumping of certain existing wells could prove to be an effective method. As the main body of Lake F appears to be sound, disposal of the pumped water into the lake should be acceptable.

(5) Weekly sampling of wells 8, 11 and 14 which provide water to the City of Brighton should be initiated with analysis performed for DIMP.

(6) Quarterly sampling and analysis of groundwaters from specific wells on the Arsenal should be performed. In addition, yearly sampling of all wells should be performed.

(7) Copies of all analytical data obtained by the Army or Shell Chemical Company should be supplied to the Department of Health as well as the U. S. Environmental Protection Agency.

(8) Improved maintenance of existing wells on the Arsenal property should be required. The present means of maintenance has resulted in a considerable number of lost or unusable wells.

(9) The August, 1974 sampling showed the presence of aldrin, endrin, dieldrin and DCPD in well 81-A. These materials are probably attributed to spills or sewer leaks in the industrial complex. Therefore, testing the industrial sewer lines for leaks is recommended.

(10) Additional sampling of groundwaters around Brighton should be performed to determine the areal extent of DIMP. This is mentioned as the material could be present in groundwaters due west of Brighton and east of the South Platte River.

TABLE I

(See Figures 1, 2, 3 & 4)

WELL	CHLORATE *	CHLORIDE *	SODIUM *	TOTAL HARDNESS *	SODIUM ADSORPTION RATIO	SPECIFIC CONDUCTANCE	SULFATE *	NITRATE NITROGEN *	TOTAL PHOSPHORUS *	BORON *	pH	TOTAL ALKALINITY *	ALDRIN ppb	ENDRIN ppb	DIELDRIN ppb	DDE ppb	MALATHION ppb	METHYL PARATHION ppb	DICYCLOPENTADIENE *	DIISOPROPYLMETHYLPHOSPHONATE *
1003-A	0.1	120	124	216	3.5	990	100	0	0.6	0.21	7.40	200	0	0	0.66	0	0	0	0.0012	0.40
1006	0	91	230	560	4.5	2035	740	5.0	0.2	0.26	7.70	200	0	0	0	0	0	0	0	0
1011	0.2	4250	1140	5600	6.5	13200	1771	1.0	1.0	0.26	6.85	336	0	0	0.54	0	0	0	0	48.0
1012	0.1	470	355	1112	4.5	3300	1074	24	0.4	0.46	7.80	188	0	0	0	0	0	0	**	3
1017	2.5	245	230	196	7.5	1403	123	10.5	0.6	0.15	7.60	212	30	40	10	0	20	0	0	3
1040	0	1250	1200	2160	10.0	8030	3074	0	0.2	0.68	7.30	152	0	0	0	0	0	0	0	0
1041	0	180	184	212	5.6	1100	118	0	0.8	0.12	8.65	220	0	0	0.75	0	0	0	0	0.27
1045	0	572	200	182	6.5	1738	500	1.0	1.4	0.85	7.25	264	10	3.69	0.90	0	0	0	0	0.14
1060	0	350	300	420	7.0	2090	245	1.0	2.5	0.56	7.45	364	0	9.3	0	0	0	0	4.00	1.42
1061	0	356	140	81	7.0	1210	256	12.5	0.3	0.33	7.50	256	0	0	0	0	0	0	0	0
1062	0	107	185	144	6.4	1045	100	4.5	1.2	0.16	7.55	264	0.71	6.80	1.38	0.36	0	0	< .0006	0.39
1065-A	0	2400	1700	3800	12.5	11660	4328	45.0	1.0	1.5	7.30	360	0	0	0	0	7.38	0	0	0.27
1067	0	70	10	136	0.4	1020	16	4.0	50	0.31	7.70	468	7.50	10	3.33	0	2.6	0	0	0
1	0	141	270	6**	15.0	1155	128	1.0	2.2	0.27	8.40	264	0.20	0	0.72	0	0	0	0	0.37
1073	0	240	140	440	3.0	1520	193	7.0	0.5	0.31	7.40	236	0.96	20	40	0	0	3.30	0.0056	0.43
1075	0	340	400	296	9.0	2365	395	2.0	0.7	0.52	7.65	336	0.21	0	0.48	0	0	0	0.0019	3.2
1078	0	436	165	113	6.5	1430	361	23	0.3	0.35	7.55	272	0	0	0	0	0	0	0	0
1079	0	178	400	1480	4.5	3520	1740	2.0	0.4	0.36	7.20	344	0	0	0	0	0	0	0	0
1081-A	0	53	225	304	6.5	1355	219	0	1.0	0.90	7.55	488	8.25	20	1.62	0	0	0	2.90	0
1089	3.1	330	170	484	3.4	1650	187	12.0	2.1	0.12	8.15	232	0	0	0	0	0	0	0	0
1095	0	139	295	80	13.5	1375	155	2.0	0.8	0.29	8.60	352	0	0	0.78	0	0	0	0.0011	0
1115	0	290	250	296	6.0	1395	152	2.0	0.7	0.39	7.45	304	0	0	0	0	0	0	4.10	0.95
1117	0.6	116	71	200	2.0	780	78	1.0	0.5	0.09	7.75	120	2.43	5.58	1.56	0	0	0	0	0
118	0	202	156	296	4.0	1320	137	0	3.0	0.20	7.35	220	0	0	0	0	0	0	5.80	0.51
119	0	556	210	155	7.5	1705	483	1.0	1.3	0.37	7.40	252	7.50	10	1.62	0	5.30	0	0	0
121	0	660	580	1120	7.5	3850	1055	4.0	0.1	0.70	8.25	348	0	0	0	0	0	0	0	3.5
122	0.3	310	154	640	2.8	1870	343	13	0.4	0.63	7.50	232	0	0.24	0.66	0	0	0	< .001	0.50
123	0	137	260	668	4.5	2120	776	16	0.4	0.90	7.45	236	0.09	0	0	0	0	0	0	0.50

* Parts per million (ppm)

** Parts per billion (ppb)

Negative for DCPD by CS_2 extraction; QNS for Headspace method

TABLE 2

(See Figures 1 & 2)

WELL DEPTH	LOCATION OF SAMPLE	DATE OF SAMPLE	CHLORATE *	CHLORIDE *	SODIUM *	TOTAL HARDNESS *	CALCIUM as $CaCO_3$*	MAGNESIUM *	SODIUM ABSORPTION RATIO	CONDUCTANCE	CHLORINATED PESTICIDES	ORGANOPHOSPHORUS PESTICIDES	CHLOROPHENOXY HERBICIDES	DCPD *	DIMP *	ODOR	SULFATE *	POTASSIUM *	SELENIUM *	NITRATE *	PHOSPHATE *	BORON *
1' 11"	Station 1	5/13/74													4.96							
1' 8"	Station 2	5/13/74													6.00							
3' 3"	Station 3	5/13/74													0.31							
Ditch	Station 4	5/13/74	0	240	205	540	300	58	3.9	2080	3)	0	0	-	0.24	32 DCPD	480	4	0	1	0.8	0.44
		5/14/74	0	240	250	690	350	83	4.2	2170	-	0	-	0.03	-	8 DCPD	500	4	0	1	0.8	0....
		5/20/74	0	250	270	600	310	71	3.7	2110	-	0	-	-	-	4 DCPD	-	3	0	2.4	0.3	-
		5/22/74	0	240	245	510	260	61	5.0	1720	-	0	-	-	-	32 DCPD	430	5	0	1.2	1.0	0.46
Composite	Station 6	5/22/74	-	-	-	-	-	-	-	-	3)	0	-	0.028	0.51	2	-	-	-	-	-	-
Creek Composite	First Creek Leaving PAA	5/15/74	0	130	130	400	210	46	2.7	1370	-	0	0	-	-	0	360	5	0.004	0.5	0.8	0.35
		5/22/74	0	120	145	345	144	49	3.0	1160	-	0	-	-	-	0	320	6	0	0.5	0.6	0.32
250'	George Hall (Domestic)	5/20/74	0	48	100	56	44	3	5.5	565	0	0	-	0.006	0.04	1 DCPD	62	1	0	1.3	0	0.03
15'	George Hall (Pasture)	5/20/74	0	540	435	600	330	66	9.5	2880	3)	0	-	1.50	0.56	128 DCPD	435	6	0	9	48	0.70
6' to 35'	9760 Peoria	5/20/74	0	810	425	250	190	17	10	2550	0	0	-	0	2.22	0	5	9	0	1.8	0.5	0.10
6' to 35'	Well 58	5/20/74	0	520	400	820	520	78	6	3100	0	0	-	0	0.95	0	555	8	0	2.5	0.12	0.83
375'	Silver Saddle Lounge	5/20/74	0	25	90	28	8	3	8	415	0	0	-	0	0	0	26	0	0	0.8	0	0.02
550'	11921 E. 96th Ave.	5/20/74	0	10	95	16	4	3	10	455	0	0	-	0	0	0	38	1	0	2.8	0	4
550'	11841 E. 96th Ave.	5/20/74	0	12	95	12	4	2	12	430	0	0	-	0	0	0	42	0	0	1.0	0.2	3
Composite	First Creek Influent	5/22/74	0	70	145	210	164	12	4.4	970	Trace	0	-	0	0	0	122	24	0	0.5	3.0	0.16
Composite	Sanitary Discharge of PAA	5/22/74	0.5 1)	135	90	240	148	22	3.6	1080	3)	0	0	0	0	3 Not Ident	113	5	0	0.8	6.8	0.43
Grab	Cooling Water	5/22/74	0	95	70	150	84	17	2.7	645	-	-	-	0	0	0	63	4	0	0.5	0.4	0.14

* Parts Per Million (ppm)

1) Interference - result high

3) Interference in test estimated <2 ppb

ROCKY MOUNTAIN ARSENAL 1/75

TABLE 3

(See Figures 5, 6, 7 & 8)

Well	pH	Chlorides **	Copper **	Sodium **	Organophosphorous **	Aldrin*	Endrin*	Dieldrin*	Dimp **	DCPA*	Sulfate **	Arsenic **	COD **	[illegible] **
Lake F	5.1	43000	480	27000	0	1410	90	459.9	408	1.58	15420	0.45	16000	
31	7.2	148	0	110	0	0.18	0	1.05	0.03	0.28	-	-	-	
41	7.3	276	0	165	0	0	0	0.75	0.63	0	-	-	-	
60	-	320	0.20	230	0	0.05	0	10.0	1.29	310	-	-	-	
62	6.9	126	0.30	140	0	0.38	0	0.95	0.04	xxx	-	-	-	
72	7.2	155	0	130	0	0	0	0.75	0.70	0	-	-	-	
73	7.2	275	0.20	110	-	0.90	4.05	21.6	0.66	120	-	-	-	
105	7.2	153	0	140	0	0	0	0.96	0.01	0	-	-	-	
115	-	270	0	210	3	0.08	0	0	0.11	670	-		-	
117	7.2	650	0.22	230	0	0.27	0	0	0.18	0	-	-	-	
118	6.9	206	0	150	0	0.48	28.5	0	0.27	4350	-	-	-	
124	7.0	184	0	130	0	0.09	0	0.95	0.54	xxx	-	-	-	
125	7.3	130	0	140	0	0	0	0.87	0.04	0	-	-	-	
127	7.0	465	0.84	230	0	3.94	0.83	8.75	1.20	0	-	-	-	
129	7.2	495	3.52	700	0	0		0.50	0.90	0	-	-	-	
132	7.2	393	0	220	27.8+	0.09	0	0	0.38	2930	-	-	-	
133	7.0	310	0	120	8.95+	0.27	16.65	20.70	0.43	10.78	-	-	-	
134	-	230	0	160	0	1.50	3.00	0.75	0.20	0	-	-	-	
141	7.2	990	1.10	550	0	0	0	0	3.18	0	-	-	-	
142	7.4	128	0.38	160	0	0	0	0.95	0.06	0	-	-	-	
145	7.0	630	6.24	310	0	0	0	0.18	0.75	0	-	-	-	

* an unidentified material present
* parts per billion
** parts per million

xxx zero by analysis but odor present
+ as malathion
- not analyzed

RHA SURVEILLANCE WELLS
December, 1974

TABLE 4
(See Figure 9)

Well No.	Fluoride	DCPD	DIMP	Chlorinated Hydrocarbons	Organo Pesticides	Total Hardness	Specific Conductance	Sodium	Chloride	NO_3 as N	Sulfate	Gross Alpha	Gross Beta
I	1.3	0	0	0	0	475	1440	150	115	19	270	34.0 ± 19.1	11.8 ± 11.5
II	1.2	0	0	0	0	470	1440	150	117	17	270	50.1 ± 20.6	19.2 ± 12.3
VIII	1.3	0	6.60	0	0	380	1140	110	80	11	167	37.4 ± 18.2	IFB
IX	1.7	0	0	0	0	51	388	79	16	0.69	42	12.2 ± 8.2	IFB
X	2.2	0	0	0	0	210	804	125	45	4.0	138	26.1 ± 13.6	12.5 ± 11.0
XI	0.9	0	0	0	0	394	1194	140	91	0.8	302	41.3 ± 17.9	18.5 ± 12.0
XII	1.5	0	8.05	0	0	390	995	92	64	6.9	140	45.5 ± 17.1	IFB
XV	0.65	0	0.60	0	0	297	804	71	67	5.5	130	42.0 ± 15.5	17.3 ± 11.6
XVI	1.0	0	0	0	0	503	1450	170	86	12	420	38.3 ± 19.5	13.8 ± 11.7
XVIII	1.4	0	0	0	0	12	1440	380	91	5.1	290	81.7 ± 22.5	IFB
XIX	0.9	0	38.4	0	0	467	1200	125	107	19	207	34.0 ± 13.2	15.7 ± 11.9
XX	1.2	0	40.2	0	0	388	1169	120	110	6.9	220	50.5 ± 19.5	15.6 ± 11.7
XXI	1.5	0	75.0	0	0	450	1215	100	95	14	120	44.2 ± 18.5	11.6 ± 11.3
XXII	0.55	0	2.13	0	0	380	1090	113	67	6.9	160	40.0 ± 17.6	IFB
XXIV	1.6	0	0.87	0	0	590	1880	240	168	38	260	60.5 ± 24.9	IFB
XXV	1.3	0	0.57	0	0	495	1368	150	125	16	282	33. ± 19.3	17.6 ± 12.2
XXVII	1.1	0	0	0	0	380	994	77	68	9.9	189	47.2 ± 17.2	12.1 ± 11.2
XXVIII	1.4	0	2.9	0	0	340	1215	135	160	3.2	150	27.0 ± 17.3	13.5 ± 11.4
XXX	0.6	0	0	0	0	408	871	62	55	10	141	9.[illegible] ± 17.0	24.5 ± 12.3
XXXI	0.55	0	0	0	0	380	91[illegible]	66	67	7.4	171	9.[illegible] ± 18.1	20.6 ± .1
XXXII	0.65	0	1.11	0	0	285	81[illegible]	72	68	4.4	125	1.[illegible] ± 14.0	IFB

DIMP = parts per billion
Other Units are parts per million
Conductance = micromohs
Gross alpha & beta are pc/l

DEFINITION OF LETTERED SAMPLING POINTS FOR FIGURE I

(a) Station 4 - ditch leaving property to First Creek

(b) First creek leaving R.M.A. property

(c) George Hall's domestic well - 250'

(d) George Hall's pasture well - 15'

(e) 9760 Peoria well - 305'

(f) 11921 E. 96th Avenue well - 560'

(g) 11841 E. 96th Avenue well - 550'

(h) Silver Saddle Lounge well - 375'

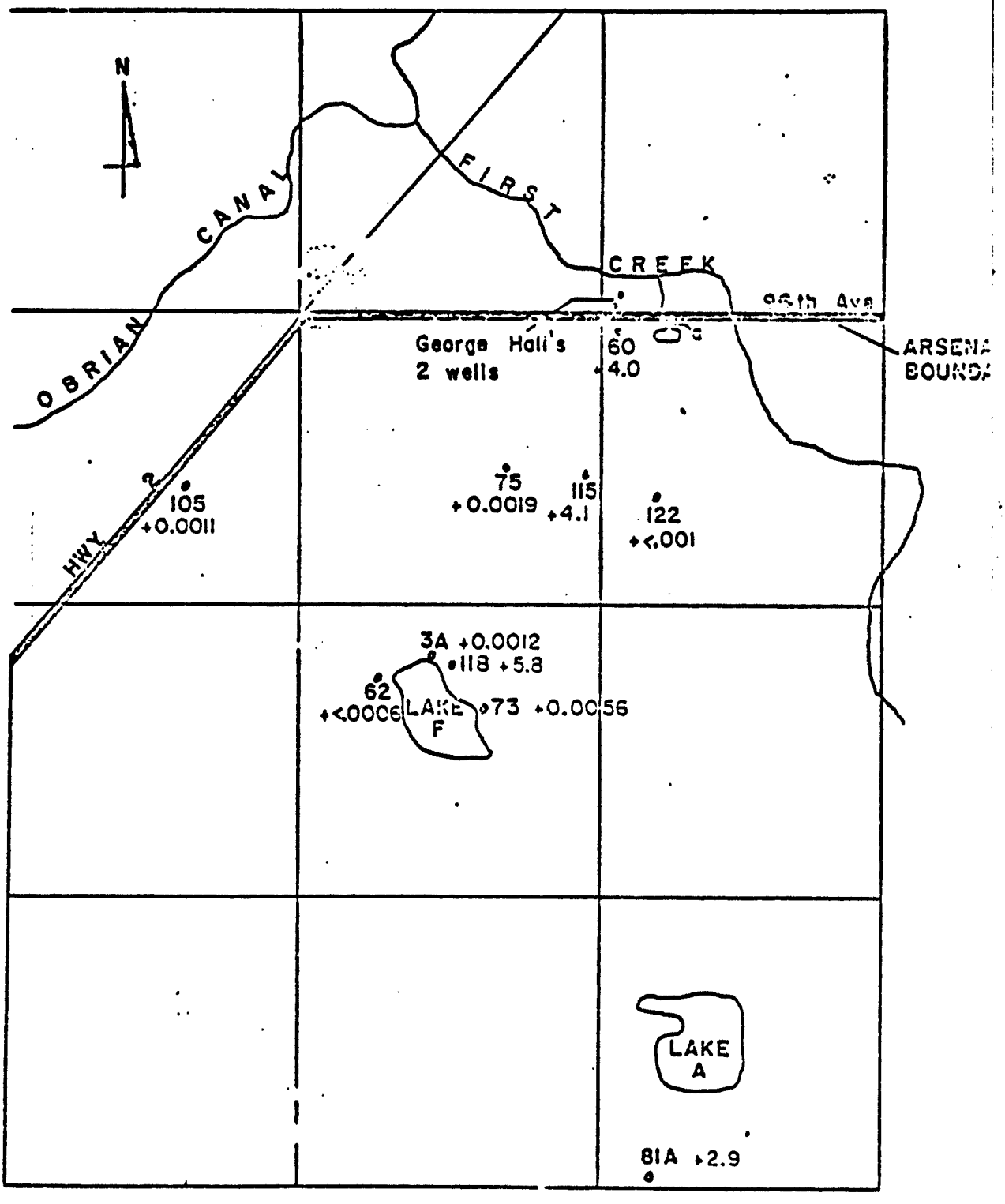
(i) Sanitary discharge of R.M.A. prior to settling

(j) Cooling water discharge to First Creek

(k) First Creek influent to R.M.A. property

(m) 3 wells on Mr. Land's property

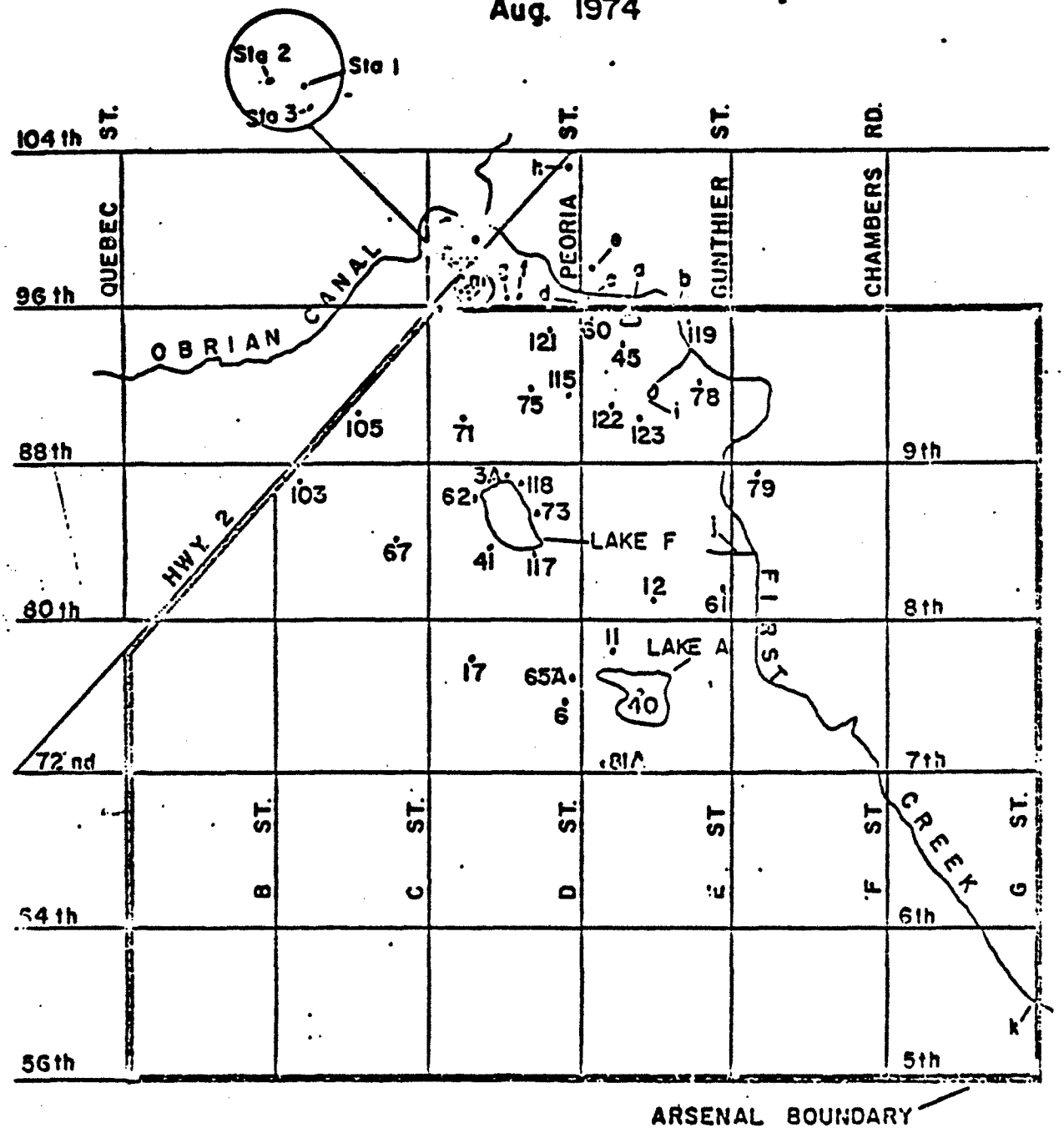
WELLS WHERE DCPD WAS DETECTED Aug. 1974



+ Concentration in PPM

MAP OF SAMPLING LOCATIONS

Aug. 1974



WELLS WHERE DIMP WAS DETECTED Aug. 1974

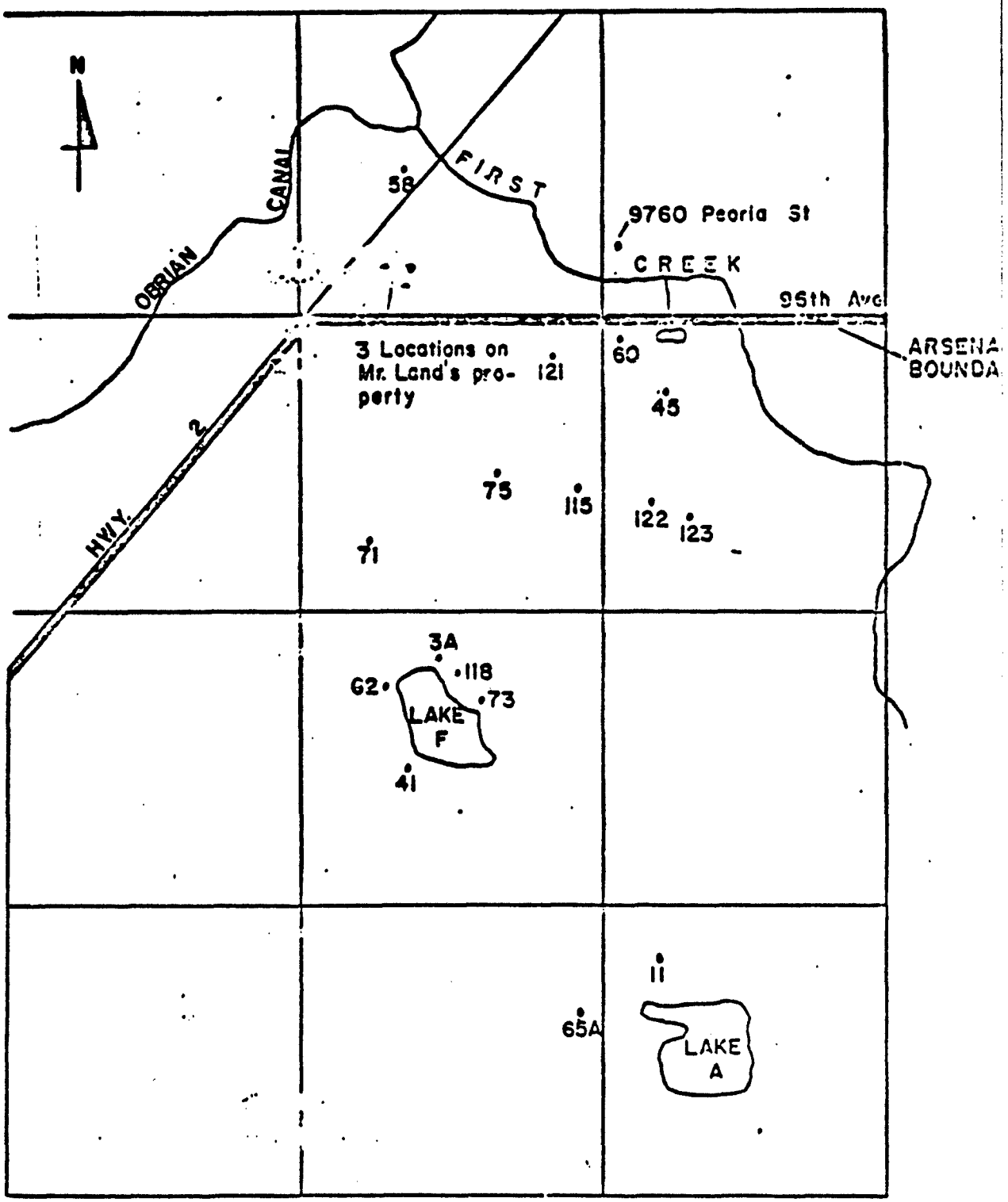


Figure 5

MAP OF SAMPLING LOCATIONS
1/75

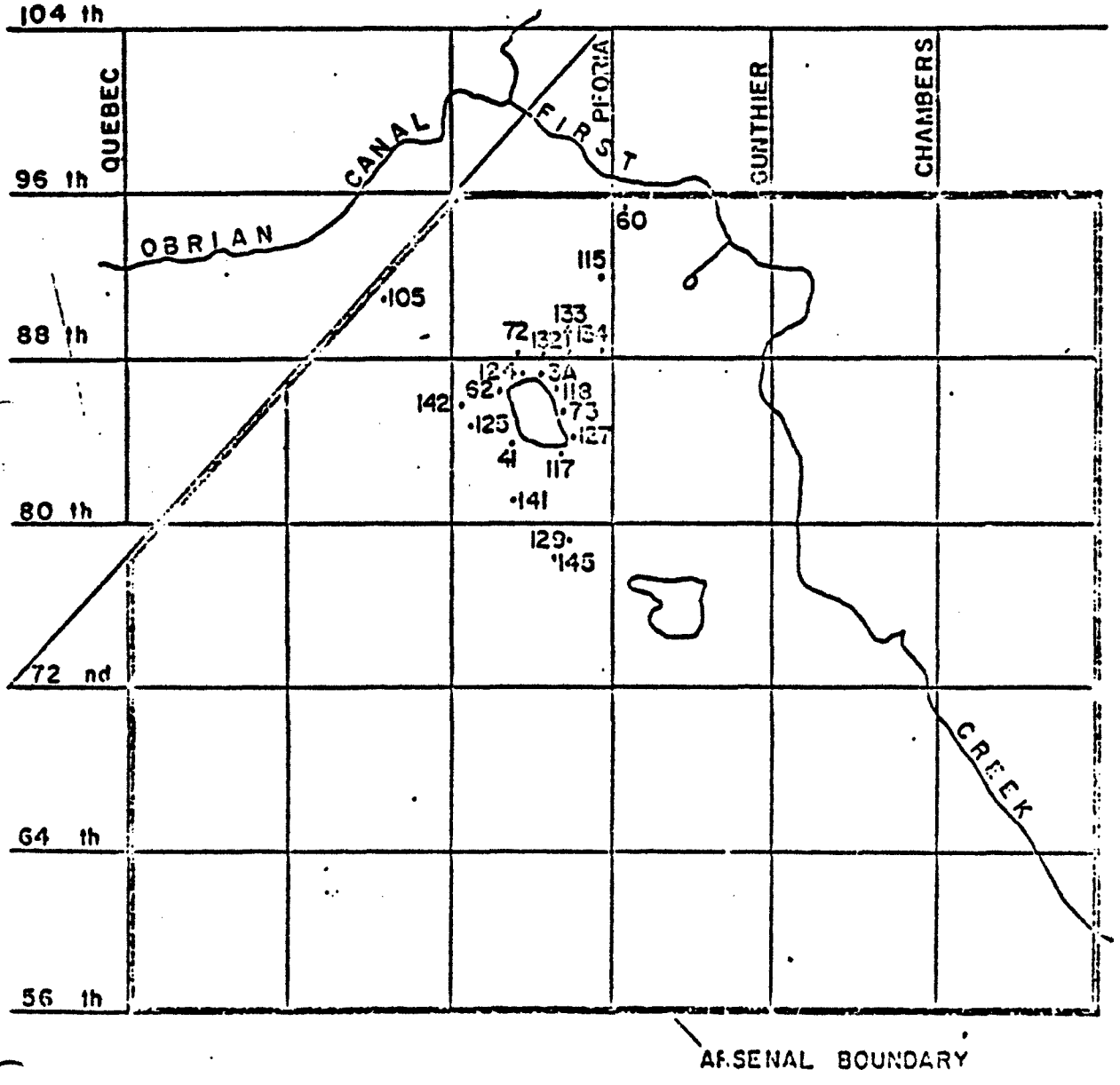
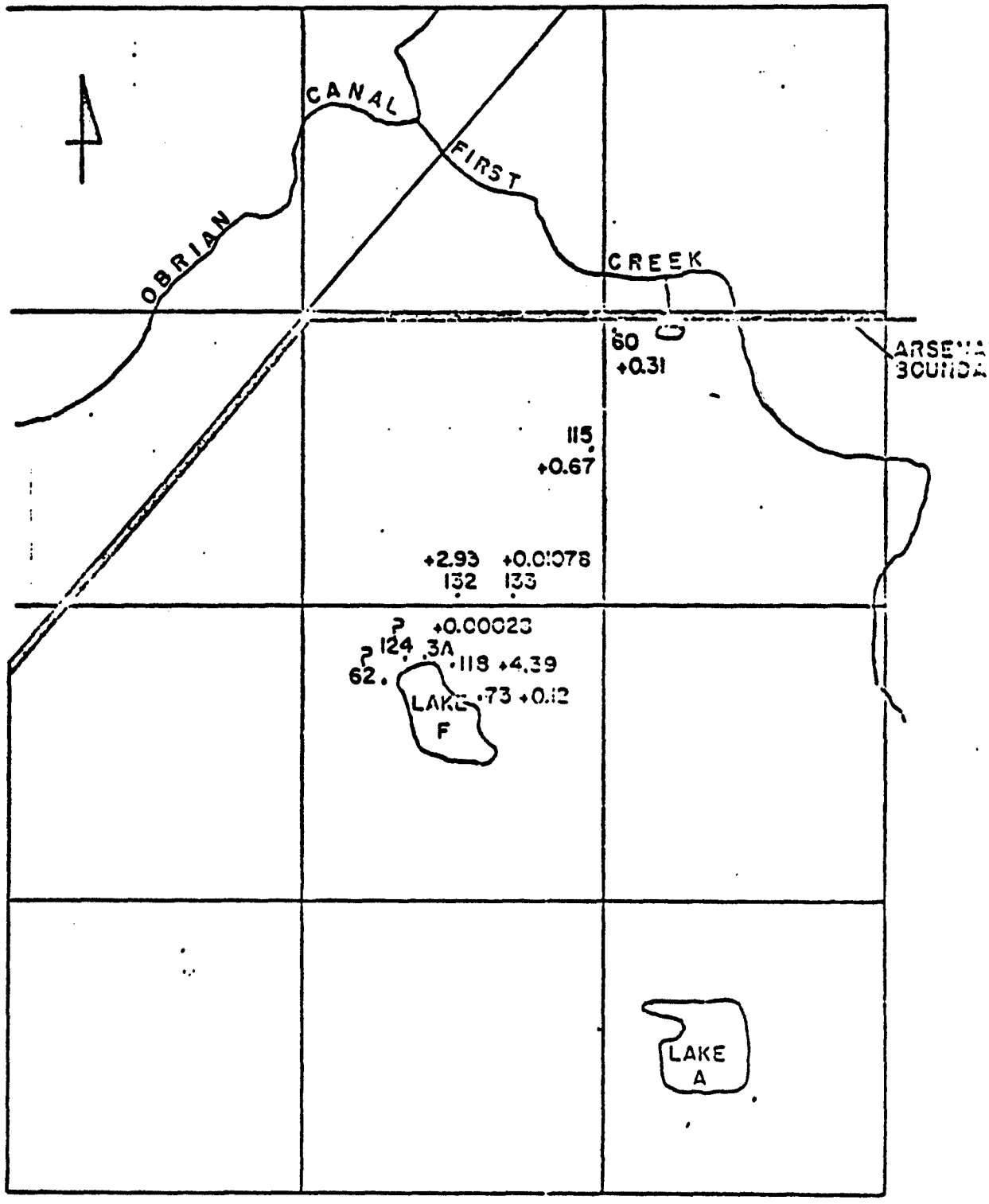


Figure 6

.ELLS WHERE DCPD WAS DETECTED 1/75

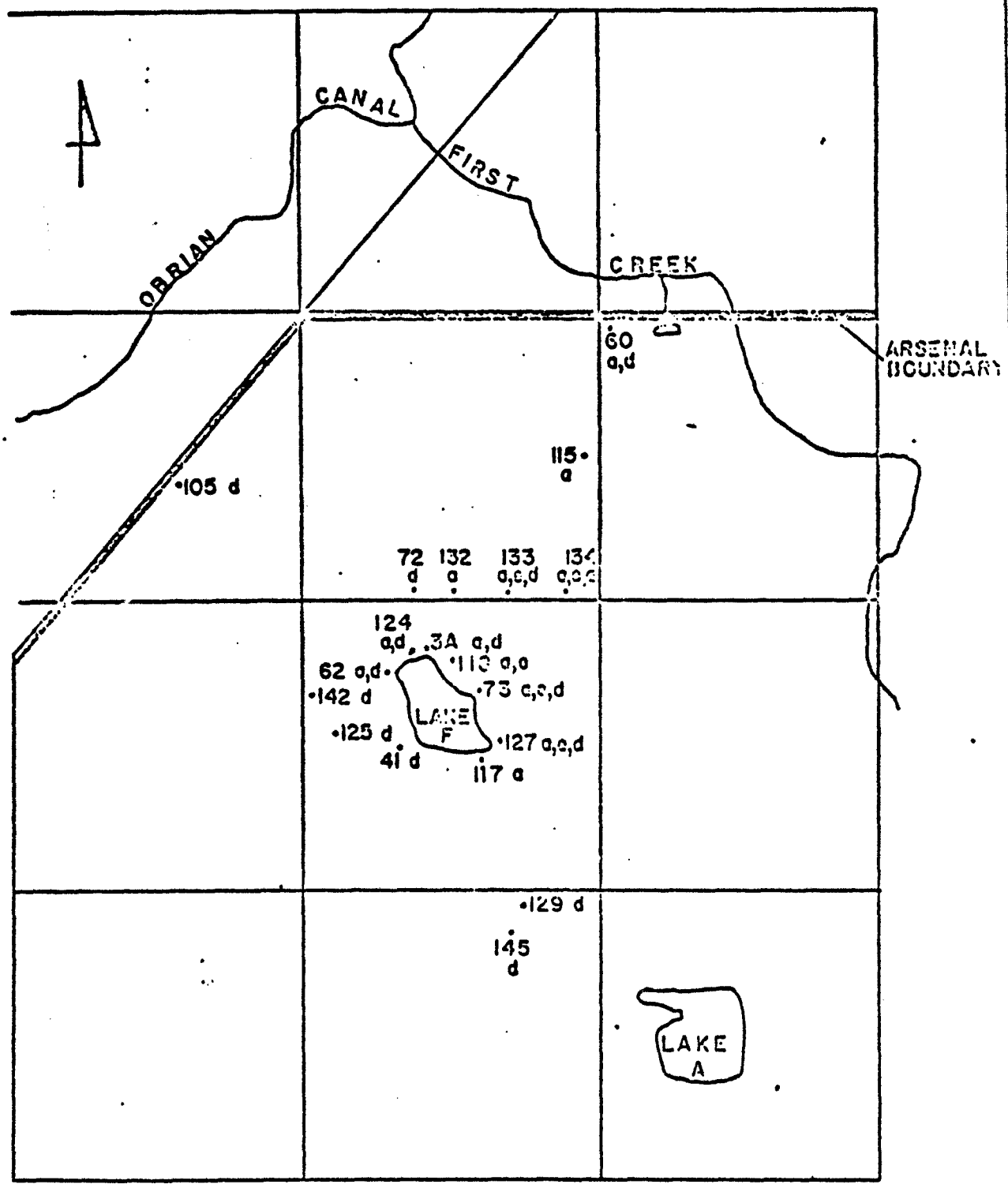


+ - Concentration in PPM

P - Detected by odor but not by analysis

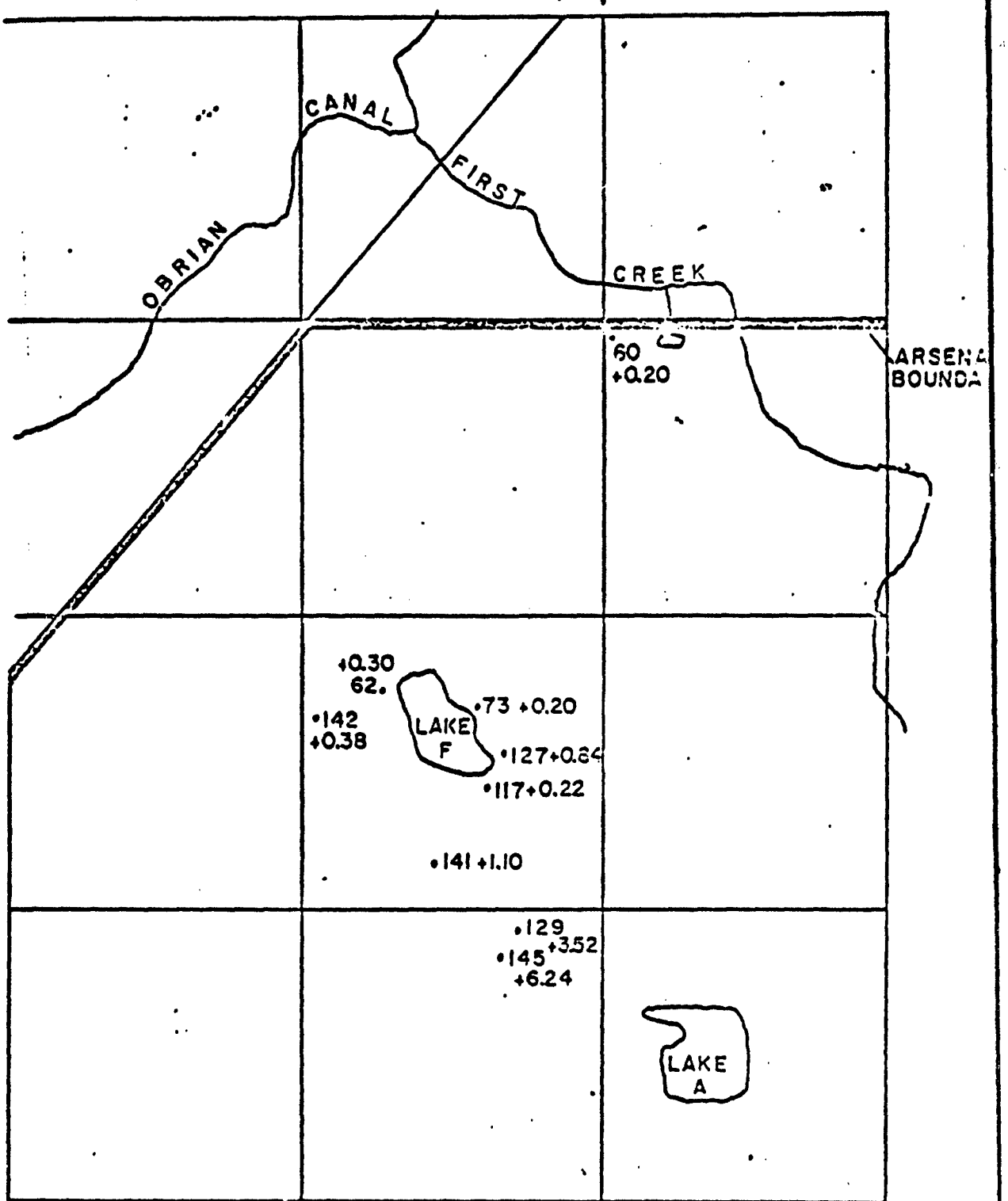
Figure 7

WELLS WHERE ALDRIN, EDRIN & DIELDRIN WERE DETECTED 1/75



ALDRIN - a

WELLS WHERE COPPER WAS DETECTE
1/75



• - Concentration in PPM.