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RADIOLOGICAL STATUS OF THE GROUND WATER
BENEATH THE HANFORD PROJECT
JANUARY-JUNE, 1968

By

T. H. Essig

Environmental Evaluations
Radiation Protection
TECHNICAL SERVICES DIVISION

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RADIOLOGICAL STATUS OF THE GROUND WATER
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I. INTRODUCTION

More than 500 wells have been drilled to ground water on the Hanford project. These wells are used for the surveillance of radionuclide movement through the sediments both above and below the regional water table. Approximately half of the surveillance wells are located at disposal sites situated on the interior plateau 12 to 15 miles up-gradient from the nearest domestic water supply. Data obtained from these wells are used to determine when a disposal facility is to be retired. All other surveillance wells are sampled to determine the status of contaminants within the general ground water flow network

This report is prepared semi-annually to provide an evaluation of the status of ground water contamination resulting from disposal of plant effluents. All ground water samples were analyzed by the Radiological Analysis Unit, Battelle-Northwest. The data presented in this report were collected during the first six months of 1968; the previous report in this series is BNWL-835, "Radiological Status of the Ground Water Beneath the Hanford Project, July-December, 1967."⁽¹⁾

Total beta concentrations in the unconfined and confined ground water aquifers are presented in Tables B and C respectively. Results are tabulated for well-water samples in which total beta concentrations exceeded the analytical limit. The average concentrations for the previous report period are listed for comparison. The locations of wells referred to in this report may be found by referring to the latest Hanford Wells document.⁽²⁾

II. EVALUATION OF GROUND WATER SURVEILLANCE DATA

Radionuclide concentrations in the ground water beneath Hanford are evaluated in terms of their respective Maximum Permissible Concentrations (MPC).^{*} It is recognized that the MPC is only intended for evaluating radioactivity in drinking water. While recognizing the limitations of the MPC values, they are still considered a rapid, meaningful method of evaluating the potential radiological significance of water-borne radioactivity. At present no water from the contaminated zone (Figures 1 and 2) is being consumed by humans or is used for irrigation or consumption by cattle. The latter two pathways would need to be examined in more detail in the event of such use.

The MPC values used in this report are those which apply to individuals of the general public.⁽³⁾ An evaluation of the radioactivity in groundwater outside of Hanford's limited areas by this method indicated that the concentrations of all radionuclides were less than the MPC values for sustained water consumption by the general public.

The ground water contamination pattern beneath Hanford can be logically broken into three areas, based on the kinds and quantities of waste disposed to ground at each area: a) 200 Area (chemical processing areas) and associated 600 Area wells, b) 100 Area (production reactor areas) and associated 600 Area wells, and c) 300 Area (fuel fabrication and laboratory area) wells. The routine ground water surveillance effort in the past has been concentrated primarily on 200 Area effluents, since these provide the radioactivity which is most widely distributed in the ground water at Hanford. Ground water concentration data are available, however, for the 100 and 300 Areas, and are presented in this report.

³H and ¹⁰⁶Ru-Rh are used to trace the ground water flow paths away from major chemical processing disposal sites because these nuclides move at essentially the same rate as ground water and can be detected in the ground water at concentrations which are small relative to their MPC values.

A. 200 Area and Associated 600 Area Wells

Ground water samples collected from wells within and near the zone in which 200 Area effluents are present are analyzed for total beta, tritium, and nitrate. The total beta activity is calculated as ¹⁰⁶Ru-Rh, since radiochemical analyses have shown that these radionuclides account for most of the radioactivity (other than ³H) in this ground water zone. Other routine ground water analyses (beyond total β , ³H, and NO₃⁻) include total α , ⁶⁰Co, ⁹⁰Sr, and ¹³⁷Cs which are determined at specific disposal sites (Table A).

* AECM Chapter 0524, Annex 1, Table II, Column 2 (3)

1. Ruthenium-106 Concentrations (unconfined aquifer)

Ruthenium-106 concentrations are shown in Figure 1 for 2-10%, 10-100%, and >100% MPC (10 pCi/ml)⁽³⁾. The outer boundary of each zone is the down-gradient edge and represents 2%, 10% and 100% MPC, respectively. The lowest level shown (2% MPC) corresponds to a total beta concentration of 0.2 pCi/ml. This level was chosen because it is immediately above fluctuations in the detection limit of 0.08 pCi/ml, the actual statistical method used yields a detection limit of about twice this value.

An evaluation of total beta concentrations in terms of the ¹⁰⁶Ru MPC shows that the zones of detectable contamination extend in a southeasterly direction from 200-E Area, as has been observed in the past.⁽¹⁾ A comparison of contamination contours for the six-month periods ending December 1967 and June 1968 indicates that the following changes have occurred: a) the outer contour (2% MPC) extending from 200-E and 200-W Areas has slightly decreased in size, b) the inner contour (10% MPC) has extended somewhat at the eastern edge to include well 699-26-15, and c) the 100% MPC contour has shown no change. The few locations which exceeded the MPC were all either within the 200-E or 200-W Areas.

The delineation of concentration zone boundaries as shown in Figure 1 (and Figure 2) should not be interpreted as indicating that no activity is present in the ground water beyond the boundaries. It is probable that some activity does in fact reach the river, but due to dilution and decay, the concentrations are too low to be measured in the ground water or in the river.

2. Tritium Concentrations (unconfined aquifer)

Tritium concentrations are shown in Figure 2 for zones from the analytical limit (~ 0.1%) to 10%, 10-50%, 50-100% and >100% MPC (3000 pCi/ml)⁽³⁾. The outer boundary of each zone is the down-gradient edge and represents ~0.1%, 10%, 50%, and 100% MPC, respectively. The lowest-level contours shown (~ 0.1% MPC) represent "lines of detectability", i.e., tritium concentrations in well samples outside of and further down-gradient of these contours were reported as "less than" values (which varied from 1.5 to about 4 pCi/ml).

An evaluation of tritium concentrations in terms of their MPC values shows that the zones of detectable contamination extend in a southeasterly direction, as has been observed in the past.⁽¹⁾ A comparison of contamination contours for the six-month periods ending December 1967 and June 1968 indicates that the following changes have occurred: a) the eastern end of the outermost contour (~ 0.1% MPC) located immediately south of Gable Mountain has receded slightly while the western end of the same contour located north of 200-E Area has extended, and b) the innermost contour (50% MPC) has extended further east to include well 699-26-15. As was the case with ¹⁰⁶Ru, the few locations which exceeded the MPC were all within either the 200-E or 200-W Areas.

FIGURE 1
Ruthenium-106 Concentrations Beneath the Hanford Project

FIGURE 2
Tritium Concentrations Beneath the Hanford Project

3. Contamination in Confined Ground Water

Samples taken from wells which penetrate specific aquifers in past years have indicated that some radioactive wastes may be entering the confined aquifers beneath the project. The extent to which such wastes appear in confined or semi-confined aquifers is difficult to evaluate because of the limited number of points at which these aquifers can be sampled with the present well system.

Water samples from specific aquifers are obtained from either vertically-separated tubes (piezometers) contained within a single well or from piezometer tubes which have been drilled as separate wells. Admittedly, there is no certainty that the vertical separation of piezometer tubes is infallible, and the possibility of inter-aquifer transfer within a well may exist. Nevertheless, no radioactivity was detected consistently during this report period in any confined aquifer more than 5 miles down-gradient from the major disposal sites.

Total beta concentrations in samples taken at various depths (in some instances from confined aquifers) below the water table are listed in Table C. The maximum six-month average beta activity in well water from a confined zone was 0.14 pCi/ml (<2% MPC for ^{106}Ru) in well 699-31-31-R in a zone 334 feet below the water table. The maximum six-month average tritium activity in well water from a confined zone was 920 pCi/ml (31% MPC for ^3H) in well 699-42-42-P in a zone 98 feet below the water table.

4. Ground Water Quality

The disposal of liquid wastes to the ground has caused measurable changes in ground water quality near disposal sites. The changes in water quality are attributable directly to the concentrations of salts in the wastes and indirectly to the degradation of minerals in the soil by the wastes. Table D shows concentrations of radioactive and non-radioactive materials in the ground water near disposal sites and down-gradient from the sites. Concentrations of the non-radioactive materials in the ground water are below the Public Health Service recommended drinking water limits⁽⁴⁾ except for nitrate which is above the recommended 45 ppm (NO_3^-) limit in several wells.

B. 100 Area and Associated 600 Area Wells

The presence of radioactivity in the ground water beneath the 100 Areas is due to disposal of wastes to trenches and to leaks in reactor effluent systems. Well water samples were collected from within and near the 100 Areas and were analyzed for total beta. The results of these analyses appear in Table E. Preliminary data have shown that ^{51}Cr was the only gamma-emitting radionuclide present in quantities detectable by routine methods. Since the efficiency for measuring ^{51}Cr

by total beta counting is relatively small, the concentrations shown in Table E should be multiplied by a factor of about ten to obtain the equivalent ^{51}Cr concentrations. If this multiplication is done, the highest average measured concentrations (well 199-B4-4) would be slightly over 10% of the MPC for ^{51}Cr (2000 pCi/ml)⁽³⁾.

The estimated extent of detectable radioactivity in the ground water beneath the 100 Areas is shown as a short-dashed line in Figure 1. Three contaminated zones can be distinguished: 100-B, 100-K - 100-N, and 100-D, with the radioactivity level decreasing in that order (i.e. 100-D is the lowest of the three areas).

C. 300 Area Wells

The presence of radioactive and non-radioactive contaminants in the ground water beneath the 300 Area arises from the disposal of wastes to two process ponds located north and east of the 300 Area. Results of samples collected from 300 Area wells are shown in Table F. The radioactivity in the 300 Area ground water is primarily due to uranium, although ^{51}Cr has also been identified. If the Public Health Service drinking water limits⁽⁴⁾ are used as a base for comparison with the concentrations of non-radioactive contaminants, much of the ground water beneath the 300 Area is above the recommended limits.* Sampling of the river adjacent to the disposal sites has shown no concentrations approaching these limits.

* The recommended limits are: NO_3^- , 45 ppm; Cr^{+6} , 50 ppb; and F^- , 1.4-2.4 ppm (depending on the ambient air temperature).

TABLE A

Activity in the Ground Water at Major Disposal Sites
From Wells Having the Highest Activity Level at Each Site

Crib	Waste	Well # (299-)	Average Conc. (pCi/ml), Jan.-June, 1968				
			Total β	Total α	^{60}Co	^{90}Sr	^{137}Cs
Analytical Limit*			0.08	0.02		0.02	
<u>Purex</u>							
216-A-8	Tank Farm Cond.	E25-7	0.51	-	NA	NA	<0.16
216-A-10	Process Cond.	E24-2	18.	-	NA	-	NA
216-A-27	Lab. & Stacks	E17-3	11.	-	0.20	-	NA
216-A-30	Steam Cond.	E16-2	0.22	-	<0.16	-	<0.34
216-A-31	Organic Waste	E24-9	24.	-	0.09	-	<0.19
216-A-36B	Scrubber Waste	E17-5	26.	-	0.09	-	<0.13
<u>P Plant</u>							
216-B-12	Process Cond.	E28-9	-	-	NA	-	NA
216-B-50	Cond. from ITS#1	E33-23	1.8	-	NA	NA	<0.40
216-B-55	Steam Cond.	E28-13	0.26	-	NA	NA	<0.15
<u>Redox</u>							
216-S-9	Process Cond.	W22-26	23,000	-	<1.1	-	<0.33
216-S-20	Lab. Wastes	W22-20	0.82	-	<0.03	-	<0.20
216-S-21	Tank Farm Cond.	W23-4	0.16	0.08	NA	NA	<0.29
<u>T Plant</u>							
216-T-19	Evaporator Cond.	W15-4	1.2	NA	NA	NA	<0.30
216-T-34	300 Area Waste (ret.)	W11-15	17.	-	NA	NA	NA
216-T-35	300 Area Waste	W11-18	14.	-	<0.07	-	<0.24
216-T-36	Decon. Facility	W10-2	0.51	0.10	<0.04	-	<0.25
<u>U Plant</u>							
216-U-12	Process Cond.	W22-22	3.2	-	NA	NA	NA
<u>Z Plant</u>							
216-Z-1Ac	Recovery Process Waste	W18-7	NA	-	NA	NA	NA
216-Z-7	300 Area Waste (ret.)	W15-7	710.	-	29.	1.4	<0.24
216-Z-12	Pro. & Lab. Waste	W18-5	NA	-	NA	NA	NA

NA - Not analyzed.

* A (-) indicates that the concentration was less than the analytical limit. No analytical limits are listed for ^{60}Co and ^{137}Cs because, although such limits can be established, they fluctuate over a wide range with the background count rates.

TABLE B

Total Beta Activity in Unconfined Ground Water
(200 Area and Associated 600 Area Wells)
(in units of pCiβ/ml)

<u>Well No.</u>	<u>January-June, 1968</u>			<u>July-Dec., 1967</u>
	<u>Avg. Conc.</u>	<u>Max. Conc.</u>	<u>Conc. in Latest Sample</u>	<u>Avg. Conc.</u>
<u>200-E Area</u>				
<u>216-A Disposal Facilities</u>				
299-E16-2	0.22	0.50	0.50	1.0
299-E17-1	7.4	8.1	8.1	14.
299-E17-2	6.4	7.6	4.7	12.
299-E17-3	11	16	8.5	15.
299-E17-5	26.	40.	24.	31.
299-E17-6	<0.08	0.11	0.11	0.13
299-E17-7	20.	35.	23.	28.
299-E24-2	18.	32.	8.5	29.
299-E24-9	24.	33.	16.	23.
299-E25-2	1.2	3.4	0.22	<0.08
299-E25-3	1.8	8.5	0.58	0.27
299-E25-5	0.30	0.43	0.35	0.32
299-E25-6	0.38	0.50	0.34	-
299-E25-7	0.51	0.69	0.59	0.52
<u>216-B Disposal Facilities</u>				
299-E28-13	0.26	0.91	0.09	-
299-E33-3	5.8	7.7	7.7	12.
299-E33-23	1.8	2.2	2.0	-
<u>216-BC Disposal Facilities</u>				
299-E13-20	0.25	0.32	0.18	0.10
<u>Outside Specific Disposal Sites</u>				
299-E19-1	<0.08	0.14	<0.08	<0.08
299-E24-7	<0.08	0.10	<0.08	<0.08
299-E26-1	<0.08	0.10	<0.08	<0.08
299-E27-3	0.81	1.1	1.1	0.47
299-E28-4	<0.08	0.18	<0.08	<0.08
299-E32-1	0.19	0.70	0.70	<0.08
299-E34-1	<0.08	<0.08	<0.08	0.16

TABLE B (Continued)

Total Beta Activity in Unconfined Ground Water
(200 Area and Associated 600 Area Wells)
(in units of pCiB/ml)

<u>Well No.</u>	<u>January-June, 1968</u>			<u>July-Dec., 1967</u>
	<u>Avg. Conc.</u>	<u>Max. Conc.</u>	<u>Conc. in Latest Sample</u>	<u>Avg. Conc.</u>
<u>200-W Area</u>				
<u>216-S Disposal Facilities</u>				
299-W22-20	0.82	2.7	0.23	0.40
299-W22-25	3,800.	16,500.	16,500.	6,100.
299-W22-26	23,100.	27,700.	22,000.	14,000.
299-W23-2	0.34	1.7	0.04	0.56
299-W23-3	0.51	1.4	0.10	0.40
299-W23-4	0.16	0.86	0.28	0.38
<u>216-U Disposal Facilities</u>				
299-W21-1	0.27	0.56	0.56	0.13
299-W22-22	3.2	6.1	4.9	24.
<u>216-T Disposal Facilities</u>				
299-W6-1	0.11	0.24	0.14	<0.08
299-W10-2	0.51	0.81	0.46	1.6
299-W10-3	0.29	0.47	0.23	-
299-W10-4	0.40	0.65	0.65	0.52
299-W11-15	17.	20.	20.	9.3
299-W11-18	14.	19.	17.	64.
299-W12-1	0.08	0.35	0.10	0.08
299-W14-2	1,400.	1,500.	1,300.	1,800.
299-W15-4	1.2	2.0	1.7	4.1
299-W11-17	9.9	20.	20.	6.3
<u>216-Z Disposal Facilities</u>				
299-W15-2	<0.08	<0.08	<0.08	<0.08
299-W15-7	710.	930.	830.	3,200.
299-W19-4	<0.08	0.10	<0.08	0.08
299-W22-4	0.15	0.44	0.44	0.12
<u>600 Area Wells</u>				
699-S12-29	<0.08	0.09	<0.08	<0.08
699-S8-19	<0.08	<0.08	<0.08	0.13
699-S6-E14	<0.08	<0.08	<0.08	<0.08
699-S3-E12	<0.08	0.08	0.08	0.65

TABLE B (Continued)

Total Beta Activity in Unconfined Ground Water
(200 Area and Associated 600 Area Wells)
(in units of pCiB/ml)

<u>Well No.</u>	<u>January-June, 1968</u>			<u>July-Dec., 1967</u>
	<u>Avg. Conc.</u>	<u>Max. Conc.</u>	<u>Conc. in Latest Sample</u>	<u>Avg. Conc.</u>
<u>600 Area Wells (cont.)</u>				
699-8-17	<0.08	<0.08	<0.08	<0.08
699-10-E12	<0.08	0.09	<0.08	0.13
699-14-E6T	<0.08	0.12	<0.08	0.74
699-16-26	1.2	1.8	1.8	1.3
699-19-58	0.10	0.16	0.09	0.10
699-20-E5T	<0.08	<0.08	<0.08	0.10
699-20-20	0.48	0.76	0.62	0.27
699-22-70	0.10	0.24	<0.08	0.24
699-24-1T	<0.08	<0.08	<0.08	0.44
699-24-33	0.19	0.48	0.08	0.49
699-26-15	1.5	2.1	2.1	0.87
699-27-8	<0.08	0.12	<0.08	<0.08
699-28-40	0.10	0.14	<0.08	0.23
699-29-78	<0.08	<0.08	<0.08	0.14
699-31-31	2.2	3.3	2.1	3.5
699-31-53B	<0.08	0.10	<0.08	<0.08
699-31-65	<0.08	<0.08	<0.08	<0.08
699-32-62	<0.08	<0.08	<0.08	0.11
699-33-56	<0.08	0.17	<0.08	0.08
699-34-39A	1.2	2.1	1.2	3.0
699-34-88	<0.08	0.10	<0.08	0.13
699-35-70	0.30	0.40	0.35	0.27
699-36-46R	0.40	0.63	0.29	0.32
699-37-82A	0.10	0.33	0.08	0.15
699-38-65	<0.08	0.10	<0.08	<0.08
699-38-70	<0.08	<0.08	<0.08	<0.08
699-40-1	<0.08	<0.08	<0.08	<0.08
699-41-23	0.67	0.77	0.67	0.92
699-42-42	0.12	0.17	0.09	0.25
699-43-42	0.40	1.4	<0.08	0.41
699-44-64	<0.08	<0.08	<0.08	<0.08
699-45-69	<0.08	<0.08	<0.08	<0.08
699-47-35	<0.08	0.11	<0.08	0.12
699-47-46	<0.08	0.10	<0.08	<0.08
699-50-53	1.6	3.6	3.6	2.3
699-50-85	<0.08	0.18	<0.08	<0.08
699-52-47	0.16	0.42	<0.08	0.23
699-53-55	<0.08	<0.08	<0.08	0.20
699-54-57	<0.08	<0.08	<0.08	<0.08

TABLE B (Continued)

Total Beta Activity in Unconfined Ground Water
(200 Area and Associated 600 Area Wells)
 (in units of pCi β /ml)

<u>Well No.</u>	<u>January-June, 1968</u>			<u>July-Dec., 1967</u>
	<u>Avg. Conc.</u>	<u>Max. Conc.</u>	<u>Conc. in Latest Sample</u>	<u>Avg. Conc.</u>
<u>600 Area Wells (cont.)</u>				
699-55-50A	0.15	0.20	0.13	0.31
699-55-50C	0.20	0.31	0.09	0.20
699-55-76	<0.08	<0.08	<0.08	0.09
699-55-89	<0.08	<0.08	<0.08	<0.08
699-55-95	0.10	0.18	0.18	<0.08
699-55-50 D	0.12	0.31	0.09	0.20

TABLE C

Total Beta Activity in Confined Ground Water
(in units of pCiβ/ml)

<u>Piezometer Tube Designation</u>	<u>Depth Below Water Table (feet)</u>	<u>January-June, 1968</u>			<u>July-Dec., 1967</u>
		<u>Avg. Conc.</u>	<u>Max. Conc.</u>	<u>Conc. in Latest Sample</u>	<u>Avg. Conc.</u>
699-S31-1P	146	<0.08	0.11	<0.08	0.24
699-S18-E2P	190	<0.08	<0.08	<0.08	0.20
699-S14-20P	58	<0.08	<0.08	<0.08	<0.08
699-S12-29P	86	<0.08	0.09	<0.08	0.11
699-S6-E4CP	417	<0.08	0.19	<0.08	<0.08
699-10-E12P	316	<0.08	<0.08	<0.08	<0.08
699-20-E12P	296	<0.08	<0.08	<0.08	<0.08
699-28-40P	315	<0.08	<0.08	<0.08	0.09
699-31-31P	503	<0.08	<0.08	<0.08	0.12
699-31-31R	334	0.14	0.16	0.12	0.36
699-42-42P	98	<0.08	0.12	<0.08	0.13

TABLE D

Ground Water Quality - January-June, 1968

<u>Well No.</u>	<u>Distance From Processing Facility (miles)</u>	<u>Total β (pCi/ml)</u>	<u>Total α (pCi/ml)</u>	<u>pH</u>	<u>SO₄²⁻ (ppm)</u>	<u>NO₃⁻ (ppm)</u>	<u>Na⁺ (ppm)</u>	<u>Ca⁺⁺ (ppm)</u>	<u>Organic (ppm)</u>
<u>200-E Area</u>									
299-E17-1	<1	7.4	<0.02	7.5	65	100.	38	43	<0.2
299-E17-2	<1	6.4	<0.02	7.4	60	830.	36	41	<0.2
299-E17-5	<1	26.	<0.02	7.5	84	440.	39	100	<0.2
299-E24-2	<1	18.	<0.02	7.3	76	260.	36	81	<0.2
299-E24-9	<1	24.	<0.02	7.3	55	520.	36	52	0.5
<u>600 Area</u>									
699-36-46R	<1	0.40	<0.02	7.8	69	0.91	21	25	0.5
699-34-39A	2.0	1.2	<0.02	7.5	76	12.	34	26	<0.2
699-28-40	2.6	0.10	<0.02	7.5	59	5.2	21	32	<0.2
699-40-33	3.0	<0.08	<0.02	8.0	4.0	0.36	52	15	<0.2
699-31-31	3.8	2.2	<0.02	7.8	64	32.	44	24	<0.2
699-24-33	4.0	0.19	<0.02	7.6	66	2.4	24	34	<0.2
699-41-23	4.9	0.58	<0.02	7.5	76	44.	29	45	<0.2
699-16-26	6.1	1.2	<0.02	7.5	72	25.	24	51	<0.2
699-20-20	6.4	0.48	<0.02	7.5	64	39.	16	52	<0.2
699-26-15	6.9	1.5	<0.02	7.3	64	6.3	30	29	<0.2
<u>Columbia River</u>									
Hanford				8.2	14	0.25		26	
Average Conc. in Ground Water Prior to Significant Plant Disposal (5).				7.9	22	2.2	19	29	

A blank in the table indicates that the analysis was not made.

TABLE E

Total Beta Activity in Unconfined Ground Water
(100 Area and Associated 600 Area Wells)
(in units of pCiβ/ml)

<u>Well No.</u>	<u>Avg. Conc.</u>	<u>Max. Conc.</u>	<u>Conc. in Latest Sample</u>	<u>July-Dec., 1967 Avg. Conc.</u>
199B-4-4	22.	35.	35.	7.6
199B-5-1	17.	20.	14.	17.
199D-2-5	<0.08	<0.08	<0.08	<0.08
199D-5-12	0.36*	0.36	0.36	0.49
199F-5-1	<0.08	<0.08	<0.08	<0.08
199F-7-1	<0.08	<0.08	<0.08	<0.08
199H-3-1	<0.08	<0.08	<0.08	<0.08
199K-11	<0.08	<0.08	<0.08	<0.08
199N-3 O	3.4	6.1	0.65	0.76
199N-8 U	6.8*	6.8	6.8	-
699-67-86	0.14	0.25	<0.08	0.19
699-69-45	0.10	0.10	0.10	0.29
699-70-68	0.68	1.3	1.3	<0.08
699-71-77	13.	30.	3.0	6.2
699-71-84	3.8	6.5	1.8	3.6
699-72-73	5.0	8.9	0.70	0.54
699-72-92	0.17	0.23	0.10	<0.08
699-81-58	0.24	0.43	<0.08	0.48
699-84-35	0.19	0.36	0.36	<0.08
699-86-60	0.41	0.51	0.42	0.55
699-97-43	0.11	0.15	0.15	0.15
699-96-49	0.22	0.29	0.15	4.8

* Results of single sample analyses during the six-month period.

TABLE F

Analytical Data - 300 Area Wells
Jan.-June, 1968 Averages

<u>Well No.</u>	<u>Alpha</u> <u>(pCi/ml)</u>	<u>Beta</u> <u>(pCi/ml)</u>	<u>NO₃</u> <u>(ppm)</u>	<u>*U</u> <u>(pCi/ml)</u>	<u>*Cr⁺⁶</u> <u>(ppb)</u>	<u>*F-</u> <u>(ppm)</u>
399-1-1	0.26	0.23	56	0.30	56.	1.9
399-1-2	0.24	0.21	55	0.79	175.	0.98
399-1-3	0.45	0.20	53	0.24	69.	1.7
399-1-4	0.12	0.16	34	0.19	9.4	0.92
399-2-1	0.43	0.38	50	-	-	-
399-3-1	0.09	0.24	49	0.44	40.	0.62
399-4-1	0.16	0.19	64	0.46	210.	1.05
399-4-7	0.26	0.21	44	-	-	-
399-5-1	0.03	<0.08	18	0.07	9.0	0.20
399-5-2	<0.02	<0.08	0.5	-	-	-
399-6-1	0.04	<0.08	28	0.025	12.	0.22
399-8-1	0.05	0.08	16	0.094	40.	0.22
399-8-2	<0.02	<0.08	7	0.019	9.4	0.26
399-8-3	0.04	<0.08	22	0.023	27.	0.29

* Results of single analyses during the six-month period.

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