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HW-89074

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REGIONAL SURVEY MONTHLIES 1948

W. C. Berlin, Jr.

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HW-89074

010-121

Oct 30, 1948BY: W. SinglevichFROM: W.C. Berlin Jr.

Report from SITE SURVEY for the Month of

October 1948

The attached report was compiled from the following number of

SURVEYS:

Water - Drinking	500cc 11.7 liters	<u>294</u>
Test Wells		<u>12</u>
Elver		<u>98</u>
Waste		<u>111</u>
Rain		<u>65</u>
Air - Air Filters		<u>66</u>
Detachable Chambers		<u>870</u>
Hand Pump		<u>0</u>
Film Packets		<u>112</u>
Land - Vegetation (on Area)		<u>354</u>
Vegetation (off Area)		<u>448</u>
Solids (rud, lint, soil)		<u>18</u>
Mobile Instruments		<u>10</u>
Portable Instruments		<u>24</u>
<u>Soil (on Area)</u>		<u>29</u>
Total Surveys		

VIOLATION --

There were 354 routine samples taken during the month of

There has been very little change in the level of contamination throughout the area. The predominate spread of airborne contamination is more evident in the Pasco to Connell area.

Location	Max. uc/kg	Avg. uc/kg	Previous Month's Avg. uc/kg
North of the 200 Areas	0.11	0.04	0.04
Near the 200 Areas	1.88	0.12	0.10
South of the 200 Areas	0.13	0.04	0.04
Richland	0.09	< 0.04	< 0.04
Pasco	0.16	0.04	< 0.04
Kennelwick	0.07	< 0.04	0.05
Emtton City	0.05	< 0.04	0.04
Richland "Y"	0.06	0.05	0.04
Kenford	0.08	< 0.04	0.08

Inside Separation Areas

Location	Max. uc/kg	Avg. uc/kg	Previous Avg. uc/kg
200 West	0.43	0.08	0.09
200 East	1.05 * 10.50	0.24	0.32

* This activity was due to a contaminated ~~sample~~ which was isolated and radioautographed. This sample was collected on

VEGETATION (CONTINUED) --

Off Area -- 70 samples of vegetation were collected on a survey of Benton Gap during this period. The maximum found was 0.11 uc/kg at the 600 foot elevation. Other samples 0.09 uc/kg and 0.10 uc/kg were taken at 2000 feet and 1950 feet respectively. The average of all samples was 0.04 uc/kg.

22 samples of vegetation were taken between Kennewick and Plymouth. The maximum of 0.11 uc/kg was found 8 miles SW of Kennewick. The average of all samples was 0.04 uc/kg.

Ground Contamination Measured with Portable G. M. Meter --

2 200-West - A maximum reading of 1000 c/m was obtained 3000 feet SE of the 291-T Stack.

2 200-East - A maximum reading of 500 c/m was obtained 500 feet East of the 291-B Stack.

Soil = 29 samples of soil were collected during this period. The maximum sample collected was 0.016 uc/gr while the average of all samples was 0.012 uc/gr.

VEGETATION (CONTINUED) --

Off Area -- There were four trips off area this period.

77 - Hermiston - Pullman. The maximum sample found was 0.10 $\mu\text{c}/\text{kg}$ at Wallula.
One sample was collected at Washburn which was 0.08 $\mu\text{c}/\text{kg}$ the average
of all samples was $<0.04 \mu\text{c}/\text{kg}$.

42 - Ritzville - Spokane - Rosalia. The maximum sample of 0.06 $\mu\text{c}/\text{kg}$ was found at
Ritzville. The average of all samples was $<0.04 \mu\text{c}/\text{kg}$

56 - Ritzville - Moorshak - Ellensburg - The maximum found was 0.07 $\mu\text{c}/\text{kg}$ taken 15 miles
north of Lind. The average of all samples was $<0.04 \mu\text{c}/\text{kg}$.

60 - Toppenish - Goldendale - The Dalles - The maximum sample was collected at a point
10 miles east of Boardman. Was 0.08 $\mu\text{c}/\text{kg}$. The average of all samples was $<0.04 \mu\text{c}/\text{kg}$.

Ground Contamination Measured with Portable G. M. Meter --

200-West - A maximum reading of _____ c/m was obtained _____
 feet _____ of the 291-T Stack.

200-East - A maximum reading of _____ c/m was obtained _____
 feet _____ of the 291-B Stack.

9 - Samples were collected in the Beverly - Corfu area. The maximum of 0.09 $\mu\text{c}/\text{kg}$
was found 2 miles north of Eltopia and 0.11 $\mu\text{c}/\text{kg}$ at Corfu. The average of all
samples was 0.05 $\mu\text{c}/\text{kg}$.

— four

294 samples of drinking water were surveyed this period, with the following maximum individual results:

Location	Total Number Samples	Date	ALPHA - c/m/L		BETA - GAMMA		FLUOROPHOTOMETER	
			Ether Extraction		c/L		Ug L/L	Ug G/L
			Maximum	Average	Maximum	Average	Maximum	Average
3000 Area "B"	2	9-29	7.02	<6.0	<5x10 ³	<5x10 ³		
" " "C"	2	9-29	26.24	15.64		1		
Richland #13	11	10-5	14.78	10.64			7.44	4.37
" #2	5	9-28	16.14	12.92			9.42	5.86
" #4	2	10-7	15.28	11.43				*
" #12	2	9-30	11.49	9.69				
" #15	8	9-27	18.17	13.73			12.90	8.84
" #18	2	9-27	7.33	6.62				
Benton City	2	10-5	17.25	16.90				
Keenewick Stand. Sta.	4	10-13	10.32	<6.0			1.49	1.04
Wells Ranch	3	10-6	11.36	<6.0				
Pistol Range	3	10-18	14.97	8.47				
300 Area #1	17	10-12	131.15	53.79			46.1	31.8
" " #2	16	10-1	98.99	65.78			72.9	49.4
" " #3	16	10-11	88.70	34.00			33.2	21.3
" " #4	12	9-27	119.63	89.56			91.3	65.1
" " Sanitary	17	9-29	69.12	47.41			51.1	34.3
White Bluffs City Well	17	10-19	18.42	12.67			14.9	8.7
100 H. Sanitary	16	10-7	15.71	<6.0			7.79	1.62
B-Y Well	2	9-27	6.35	<6.0	✓	✓		

— Five

Colombia Camp	11.7 L	9-27	3.52	3.25	0.06
Headgate well	11.7 L	9-27	3.74		0.08
	10-11		3.98		
	10-11		0.70	2.22	
Hanford	11.7 L	9-27	3.02		0.15
	10-11		4.51	3.76	
3000 Area "A"	11.7 L	9-22	2.05	2.05	0.035
"	11.7 L	9-22	4.28		0.027
"	10-6		3.96	4.12	0.43
"	11.7 L	9-22	4.30		-0.01
"	10-6		5.42	4.86	0.61
"	11.7 L	9-29	5.27		0.24
"	10-6		3.63	4.45	0.20
"	11.7 L	10-6	4.40	4.40	0.12
"	11.7 L	10-4	4.04	4.04	0.23
"	11.7 L	9-22	10.58		0.09
Richland Well #2	"	10-5	10.43		0.40
	10-19		14.02	11.68	
5	11.7 L	9-29	6.33	6.33	0.29
12	11.7 L	9-29	4.25	4.25	0.36
13	11.7 L	9-22	6.58		0.06
	10-4		6.03	6.30	0.30
14	11.7 L	9-29	5.85	5.85	0.30
15	11.7 L	9-20	9.72		0.61
-	10-4		14.20	11.96	0.51

Five - A

				PUMP PRODUCTION			PRODUCTION PER HOUR	
				ACTUAL	THEORETICAL		PER HOUR	PER HOUR
Richland Well #16	11.7 L	9-20	3.91			0.22		
		10-4	3.86	3.88		0.40		
#18	11.7 L	9-20	2.48			0.20		
		10-4	3.21	5.34		0.28		
Tract House K 748	11.7 L	9-20	4.07			0.36		
		10-4	3.88	3.97		0.32		
" " J 685	11.7 L	9-20	2.21					
		10-4	0.27	1.24		0.20		
B-Y Well	11.7 L	9-27	5.72					
		10-11	8.77	7.24		0.27		
Benton City	11.7 L	9-28	25.00	25.00		0.28		
Cobbs Corner	11.7 L	9-28	6.26	6.26		0.19		
Kennewick 614	11.7 L	9-28	1.56			0.25		
		10-14	1.31	1.43		0.33		
Kennewick Standard Ste	11.7 L	9-29	323.54			4.14		
		10-12	16.48			0.61	5.95	
		10-14	17.42	119.15		0.16		
Riverland	11.7 L	9-22	1.59	1.59		0.09		
Midway	11.7 L	10-6	0.64	0.64		0.05		
Lower Knob	11.7 L	9-22	0.05	0.05		0.11		
Wills Ranch	11.7 L	9-22	1.81	1.81		0.02		
Paseo H + R. Depot	11.7 L	9-29	5.83			7.35		
		10-12	1.16			8.12	0	
		10-14	0.85	2.61		0.51		
Segersons Ranch	11.7 L	10-6	1.01	1.01		0.16		

1948

11.7 L	9-27	6.34	0.51	
11.7 L	10-11	6.67	6.50	
11.7 L	9-23	13.42	0.07	
10-11	14.30	13.86		
Pistol Range				
White Bluffs City				
Test Wells				
11.7 L	9-28	1.23	0.92	
11.7 L	10-6	2.97	0.34	
11.7 L	10-6	-0.16	0.40	
11.7 L	10-6	0.03	0.22	
11.7 L	10-6	-0.11	0.47	
Rivers				
Yakima River	3000 Area Pond Inlet	11.7 L	10-6	3.64
Columbia River	Itom. PGE Pump	11.7 L	10-14	6.05
Columbia River	Rickland Dock	11.7 L	10-14	1.57
Columbia River	Pasco-Kennewick Bridge	11.7 L	10-14	1.33
Royal Water				
00-H	11.7 L	9-21	0.84	0.29

Date	Sample Type	Values in ug per L.	Date	Sample Type	Values in ug Per L.
9-27	Waste Line #47	858.0			
9-28	" #48	700.0			
9-29	" #49	315.0			
9-30	" 50	507.0			
10-1	" 51	570.0			
10-2	" 52	744.0			
10-4	" 53	677.0			
10-5	" 54	443.0			
10-6	" 55	753.0			
10-7	" 56	540.0			
10-8	" 57	376.0			
10-9	" 58	679.0			
10-11	" 59	376.0			

WATER (CONTINUED) --Test Wells --12 samples of water were taken this period.

There was no evidence of Beta, Gamma or Alpha
contamination found.

Rivers --Columbia River --

98 samples of Columbia River water were collected this
 period and surveyed, with the following results:

Location	No. of Samples	ALPHA - d/m/L		BETA AND GAMMA uc/L	
		Maximum	Average	Maximum	Average
Above 100-B	2			$<5 \times 10^{-5}$	$<5 \times 10^{-5}$
181-B	5	<6	<6	$<5 \times 10^{-5}$	$<5 \times 10^{-5}$
181-D	5	<6	<6	46.9×10^{-5}	35×10^{-5}
181-F	5	<6	<6	87.2×10^{-5}	55×10^{-5}
Hanford	13	<6	<6	160.9×10^{-5}	85×10^{-5}
100 H Raw Water 5 Mi. No. 300 Area	18	8.1	<6	$<5 \times 10^{-5}$	$<5 \times 10^{-5}$
300 Area	4	<6	<6	36.9×10^{-5}	25×10^{-5}
Richland	8	8.25	<6	39.5×10^{-5}	30×10^{-5}
Pasco	4	<6	<6	18.4×10^{-5}	15×10^{-5}
Raw Water (Export Line)	34	36.95	<6	$<5 \times 10^{-5}$	$<5 \times 10^{-5}$

RIVERS (CONTINUED) --

Columbia River Flow (Thousands of gallons per second)

10/1/48	518
10/6/48	503
10/13/48	540
10/20/48	488
10/26/48	488

Taking River --

12 samples of Taking River water were collected and sur-

veyed during this period.

No evidence of contamination

found.

107 Effluent --

58 samples of the effluent water from the 107 basins

were taken, with results as follows:

Location	No. of Samples	Alpha B/L	Beta and Gamma uc/L	Average
1904-B	3	12.0	6.0	.35
107-D	16	14.8	6.0	.92
107-E	13	17.5	6.0	.63
107-B	16	27.2	6.0	.46
1904-D	5	8.8	6.0	.38
1904-F	5	11.7	6.0	.39

500 ml - 3702

25 ml - 1844

10/1/48
10/6/48
10/13/48
10/20/48
10/26/48
10/27/48
10/28/48
10/29/48
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12/31/48

WASTE CONTAMINATION --200 West - Waste Solutions --

Location	Maximum	Maximum
	Alpha - d/e/L	Beta and Gamma uc/L
WTM Swamp Inlet	24.33	10×10^{-5}
West Side	36.04	10×10^{-5}
South Side	73.30	10×10^{-5}
WTM Swamp - West Side	57.60	$< 5 \times 10^{-5}$
Inlet	24.02	0×10^{-5}
Laundry Ditch - Inlet	89.94	15×10^{-5}
600'	147.53	20×10^{-5}
231 Ditch - Inlet	34.50	$< 5 \times 10^{-5}$
1st. Underpass	40.66	15×10^{-5}

200 West - Waste Solids --

Location	Date	Alpha - d/m/L		Beta and Gamma uc/L $\times 10^{-5}$
		Direct Count	Ether Extraction	
WTM Swamp - S. Side	9-30		124.00	89.6
" "	10-7		592.56	14.6
" "	10-14		73.92	45.9
" "	10-21		28.38	3.4
" "				
WTM Swamp - W. Side	9-30		127.48	58.4
" "	10-7		498.65	47.3
" "	10-14		184.74	28.2
" "	10-21		292.29	47.3
" "				

200 W. Retention Basin (T)

200 E Retention Basin (B)

Alpha (d/m/L)
Maximum
No Samples

61.23

Beta (uc/L)
Maximum
No Samples
 47×10^{-5}

WASTE CONTAMINATION (CONTINUED) --200 West - Waste Solids (Continued) --

Location	Date	Alpha - d/m/g		Beta and Gamma us/L x 10 ³
		Direct Count	Ether Extraction	
Laundry Lint	9-30		1766	539
" "	10-7		32	43
" "	10-14		552	97
" "	10-21		170	26
" "				

200-West -- Portable G. M. Survey --

The maximum reading obtained in this area was 200 c/m on mud
at T-Swamp west side

200 East -- Portable G. M. Survey --

The maximum reading obtained in this area was 250 c/m on mud
at 1000' from inlet of "B" ditch

WASTE CONTAMINATION (CONTINUED) --300 Area - Waste Solutions --

No. of Samples	Alpha - d/m/L		Beta and Gamma - uc/L x 10 ⁵	
	Maximum	Average	Maximum	Average
3 (Inlet)	12659.3	7486.9	335	130
3 (NW Corner)	1389.0	1385.4	28	21

300 Area - Waste Solids --

Location	Date	Alpha - d/m/g		uc/kg x 10 ³ Beta and Gamma
		Direct Count	Ether Extraction	
300 Area Pond Inlet	9-29		69	13
" " " "	10-6		10	9
" " " "	10-20		150	17
" " " "				
" " " "				
" " " NW Cor.	9-29		33	4
" " " "	10-6		6	14
" " " "	10-20		19	17
" " " "				
" " " "				

300 Area - Portable G. M. Survey --

The maximum reading obtained in this area was 225 c/m/ on Mud.
at inlet to 300 Area Pond.

200 North Area Waste Surveys --

Location	Maximum Reading			
"N" Ditch	<u><0.05</u> Mrep/Hr	<u><0.05</u> MR/HR	<u>900</u> CPM	
" " "	<u>5.0</u> "	<u>2.5</u> "	<u>44,000</u> "	
" " "	<u>4.5</u> "	<u>2.0</u> "	<u>32,000</u> "	

AIR MONITORING --

Integrans -- Results obtained at the atmospheric monitoring stations,
as compared to the previous month, are as follows: (MREP/24 hours)

<u>Location</u>	<u>October 1948</u>	<u>September 1948</u>
100-B	0.2	0.7
100-D	0.2	1.2
100-F	0.8	1.0
200-W	0.4	0.2
200-E	0.5	0.8
* Riverland	0.6	1.5
Hanford	1.3	1.7
300 Area	1.5	0.6
700 Area	< 0.1	1.2
Kennewick	< 0.1	0.3
Pasco	0.2	0.5
Benton City	0.5	0.5

* New Instrument installed.

AIR MONITORING (CONTINUED) --

"C" Chambers -- A survey of the "C" Chambers results for the month of October 1948, as compared to the previous month, are as follows:

Locations	Dosage in Mrep/ 24 hrs.	
	<u>October 1948</u>	<u>September 1948</u>
100-B	0.3	0.3
100-D	0.4	0.3
100-F	0.4	0.4
200-W	0.3	0.3
200-E	0.5	0.6
300 Area	0.5	0.4

Film Packets -- Results obtained from film packet data monitoring show the radiation levels to be <5.0 ^{mrep} Mrep/ 24 hrs. at all locations. Twenty three packets were in service.

No significant reading.

AIR MONITORING (CONTINUED) --

Detachable Chambers -- Average dosage readings obtained with detachable chambers, as compared to the previous month's observation, are as follows:

(all readings are average ^{mrcp} ~~map~~ / 24 hrs.)

LocationsOctober 1948September 1948100 Areas and Environs --

<u>Route 1 Mile 8</u>	<u>0.47</u>	<u>0.58</u>
" 28 " 10	<u>0.50</u>	<u>0.52</u>
105 DR	<u>0.79</u>	<u>0.58</u>
" 28 " 5	<u>0.44</u>	<u>Bad Chambers</u>
White Bluffs	<u>0.54</u>	<u>0.53</u>
" 11-A " 1	<u>0.60</u>	<u>0.56</u>
Hanford 614 Bldg	<u>0.48</u>	<u>0.48</u>
" 1 and Route 4 North	<u>0.45</u>	<u>0.37</u>
Hanford 101 Bldg	<u>0.60</u>	<u>0.53</u>
<u>Within 5 miles 200-E --</u>		
<u>Route 4S Mile 6</u>	<u>0.65</u>	<u>0.54</u>
" 11A " 6	<u>0.54</u>	<u>0.71</u>
" 3 " 1	<u>Bad chambers</u>	<u>0.65</u>
234-235 Area-200W west.	<u>0.87</u>	<u>Not installed</u>
Meteorology - 200'	<u>0.92</u>	<u>0.60</u>
241 TX-200W	<u>Removed</u>	<u>0.54</u>
<u>Within 10 miles 200-E --</u>		
<u>Route 4S Mile 10</u>	<u>0.79</u>	<u>0.70</u>
" 10 " 1	<u>0.79</u>	<u>0.60</u>
" 10 " 3	<u>Bad chambers</u>	<u>Bad chambers</u>
" 2S " 4	<u>0.86</u>	<u>0.82</u>
<u>Near 300 Area --</u>		
<u>Route 4S Mile 16</u>	<u>0.48</u>	<u>0.88</u>
" 4S " 22	<u>0.48</u>	<u>0.54</u>
<u>700 Area</u>	<u>0.48</u>	<u>0.48</u>
<u>Benton City</u>	<u>0.48</u>	<u>0.79</u>
<u>Riverland</u>	<u>0.48</u>	<u>0.48</u>

AIR MONITORING (CONTINUED) --

Constant Iodine Monitoring -- I^{131} concentrations as measured by C. I. Units in the month of October 1948 were as follows:

<u>Location</u>	<u>Maximum 8 hour concentrations uc/L</u>	<u>Mean average concentrations for October 1948 uc/L</u>
200 ESE	4.0×10^{-7}	5.5×10^{-9}
200 W - Tower #4	4.4×10^{-7}	3.5×10^{-10}
Gable Mountain	4.0×10^{-7}	8.7×10^{-10}
Richland	$< 1.0 \times 10^{-7}$	1.1×10^{-10}
<u>200 West Gate</u>	1.5×10^{-7}	1.9×10^{-9}

Air Filters -- The average I^{131} concentrations at various locations during the month of October 1948 were as follows:

<u>Location</u>	<u>October 1948</u>	<u>September 1948</u>
Pasco	1.6×10^{-10}	1.6×10^{-10}
300 Area	3.9×10^{-10}	6.0×10^{-10}
200-E, Tower #18	3.5×10^{-9}	8.9×10^{-9}
100-D	1.6×10^{-10}	1.1×10^{-10}
200-W Gate	C.I. Unit Installed	8.2×10^{-10}
Benton City	1.7×10^{-10}	7.1×10^{-11}
Hanford 614	2.6×10^{-9}	1.2×10^{-9}
<u>Hanford 101 Bldg</u>	4.3×10^{-10}	2.5×10^{-10}
<u>White Bluffs</u>	1.7×10^{-10}	9.3×10^{-11}
<u>105-DR</u>	2.9×10^{-10}	1.3×10^{-10}

AIR MONITORING (CONTINUED) —

Rain Sampling -- 65 rain samples were collected in this period. Results obtained are summarized as follows:

<u>Location</u>	<u>Maximum uc/L</u>	<u>Average uc/L</u>
Within 200-E Area	8.5×10^{-2}	1.5×10^{-2}
Within 200-W "	1.9×10^{-2}	2.6×10^{-3}
100 Areas and Environs	2.7×10^{-4}	1.2×10^{-4}
Intermediate on Area	3.6×10^{-3}	8.1×10^{-4}
Outlying - off Area	8.8×10^{-3}	1.0×10^{-3}

The maximum off area sample was
collected at Riverland on 9/29/48

BEST COPY AVAILABLE

November 30, 1948

TO: W. SingletaryFROM: W. C. Berlin Jr.

Report from SITE SURVEY for the Month of

November 1948

The attached report was compiled from the following number of

SURVEYS:

	500cc	271
Water - Drinking	11.7.4	75 ?
Test Wells		16
River		74
Waste		69
Rain		85
Air - Air Filters		68
Detachable Chambers		15 44
Hand Pump		0
Film Packets		140
Land - Vegetation (on Area)		378
Vegetation (off Area)		326
Solids (mud, lint, soil)		15
Mobile Instruments		12
Portable Instruments		23
<u>Special Columbia River</u>		<u>232</u>
<u>Snow Samples</u>		<u>30</u>
<u>Special Waste Samples</u>		<u>47</u>
Total Surveys		<u>2925</u>

VEGETATION --

There were 378 routine samples taken during the month of

 . The levels of contamination as indicated
by vegetation sampling shows a decrease in all locations except
in the Hanford area. There were no highly significant readings
on vegetation during this period.

Location	Max. uc/kg	Avg. uc/kg	Previous Month's Avg. uc/kg
North of the 200 Areas	0.11	<0.04	0.04
Near the 200 Areas	1.23	0.11	0.12
South of the 200 Areas	0.12	<0.04	0.04
Richland	0.07	<0.04	<0.04
Pasco	<0.04	<0.04	0.04
Yornewick	0.04	<0.04	<0.04
Benton City	0.10	<0.04	<0.04
Richland "Y"	0.04	<0.04	0.05
Hanford	0.12	0.04	<0.04

Inside Separation Areas

Location	N. Sampled	Max. uc/kg	Avg. uc/kg	Previous Avg. uc/kg
200 West	20	0.42	0.10	0.09
200 East	16	1.20	0.30	0.32
Outside 200 East	24	0.24	0.12	None

VEGETATION (CONTINUED) --

Off Area - 16 samples were collected between 300 Area and Hanford. The average of all samples was 0.04 $\mu\text{c/kg}$ and a maximum of 0.16 $\mu\text{c/kg}$ found 5 miles SE of Hanford.

19 samples were collected in the Goose Egg Hill area. The average of all samples was 0.09 $\mu\text{c/kg}$ and the maximum was 0.26 $\mu\text{c/kg}$ found directly South of 200 East gate.

69 sample were collected on a survey of Benton Gap. The average of all samples was 0.04 $\mu\text{c/kg}$ and the maximum was 0.1 $\mu\text{c/kg}$ found at the 2650 feet level.

(continued)

Ground Contamination Measured with Portable G. M. Meter --

200-East - A maximum reading of 7500 c/m was obtained 1500 feet SE of the 291-T Stack.

200-East - A maximum reading of 440 c/m was obtained 1000 feet East of the 291-B Stack.

Vegetation (cont)

Off Area

✓ 16 samples were collected between Paseo and Ringold. The average of all samples < 0.04 and the maximum of $0.09 \mu\text{g/kg}$ was found east of 300 Area 2 miles.

✓ 22 samples were collected in the Plymouth-Kennebec-Hoover area. The average of all samples was $< 0.04 \mu\text{g/kg}$ and the maximum was $0.10 \mu\text{g/kg}$.

34 samples were collected between Seattle and Richland. The average of all samples was $< 0.04 \mu\text{g/kg}$. The maximum sample $0.06 \mu\text{g/kg}$ was found 10 miles South of Ellensburg.

64 samples were collected in the general area around Warburg. The maximum found was $0.05 \mu\text{g/kg}$ taken 10 miles SE of Washburn. The area between Paseo and Washburn has produced positive results on each survey made of the area. The Average was $< 0.04 \mu\text{g/kg}$.

✓ 86 samples were collected on Wabun 3 Slaps during this period. The maximum found was $0.06 \mu\text{g/kg}$ while the average of all samples was found to be $< 0.04 \mu\text{g/kg}$. Statistical analysis of the results of this survey shows the level of contamination to be significantly lower than the survey taken in September 1948. This survey should be continued to determine if the lower level is due to the use of the sand traps on the 200 Area Slaps or whether it be a routine fluctuation.

Nov. 30, 1948

Columbia River Mud - 68 Samples of mud from the Columbia River were collected and analysed with results as follows:

Location	No. Sample	Shore				5' from Shore			
		Alpha d/m/L		Beta $\mu\text{c/kg} \times 10^3$		Alpha d/m/L		Beta $\mu\text{c/kg} \times 10^3$	
		Max	Aver.	Max	Aver.	Max	Aver.	Max	Aver.
Wills Ranch	4		2.96	.0188	.0129	—	0.98	.025.3	.012.9
Allard Pump	3	0.97	0.85	.019.9	.017.4	—	2.01	.038.9	.020.0
100-H Area	5	1.94	1.16	.020.8	.014.8	2.62	1.18	.025.9	.014.3
Below 100-F	4	1.63	1.39	.019.9	.017.4	—	3.45	.025.8	.018.7
Below 300 Area	5	(20.9)	(6.64)	.048.9	.025.9	(15.4)	(5.47)	.033.0	.023.1
Ric. and Dook	5	3.8	2.55	.025.8	.017.2	—	2.18	.019.3	.010.0
Pasco-Kenn. Bridge	5		0.82	—	.015.9	4.0	1.98	.043.0	.018.2
Hanford Ferry	3	2.03	1.18	.027.8	.015.9	1.69	1.05	.013.0	.011.8

* Note: Samples as indicated show complete survey, i.e. Sample of water and sample 5' from shore

[illegible]

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Location	No. of Wells	Average		Range		Average	
		1967-68	1968-69	1967-68	1968-69	1967-68	1968-69
Hanford	3	10.25	6.37	$< 5 \times 10^{-5}$	$< 5 \times 10^{-5}$		
3000 Well A	4	10.14	< 6				
" " B	4	8.87	< 6				
" X " C	4	18.66	7.18				
" X " D	3	10.48	6.10				
" X " #5	6	9.36	6.79				
Rehland #13	13	10.50	< 6			5.26	3.45
X #2	4	27.60	16.40				
#4	5	8.30	< 6				
X 12	3	16.80	9.81				
X 14	5	17.30	9.17				
X 15	7	22.14	17.22				
X 16	6	15.22	9.15				
18	4	19.71	12.29				
Tract House J-685	4	12.94	< 6				
Benton City	4	30.60	26.30				
Cobbs Corner	4	6.78	< 6				
Kennewick 614	4	< 6	< 6	7.87	$< 5 \times 10^{-5}$	0.94	0.58
Riverland	4	8.24	< 6	$< 5 \times 10^{-5}$	$< 5 \times 10^{-5}$		
X Hills Ranch	4	11.62	< 6				
Pasco	4	6.78	< 6	9.92	$< 5 \times 10^{-5}$	0.65	0.47
Sagersons Ranch	3	25.04	9.11	$< 5 \times 10^{-5}$	$< 5 \times 10^{-5}$		
Pistol Range	4	9.98	< 6				

Gallon = 3.79 Liters
 Pound = 453.6 grams

NOVEMBER 1948

300 wells - 2 cent

Activity	Flow	
#1 54 d/liter	$\times 250 \times 60 \times 242$	= 3,630,000 gallons $\times 3.79$ = 13,794,000 liters
#2 51 d/liter	$\times 250 \times 60 \times 620$	= 9,300,000 gallons $\times 3.79$ = 35,340,000 liters
#3 32 d/liter	$\times 460 \times 60 \times 680$	= 18,768,000 gallons $\times 3.79$ = 71,318,400 liters
Total		31,698,000

#1 $13,800,000 \times 36 \text{ ug/l} = 13.8 \times 10^6 \times 36 = 497 \times 10^6 = 497,000,000$

#2 $35,300,000 \times 34 \text{ ug/l} = 35.3 \times 10^6 \times 34 = 1200 \times 10^6 = 1,200,000,000$

#3 $71,300,000 \times 21 \text{ ug/l} = 71.3 \times 10^6 \times 21 = 1497 \times 10^6 = 1,497,000,000$

#1	$\frac{497}{454}$	1.1 lbs
#2	$\frac{1200}{454}$	2.7 lbs
#3	$\frac{1497}{454}$	3.3 lbs

7.1 lbs

W. S. English
 12-5-48

Special Water Samples

North Bend Washington

A sample of water was taken from the skiff station at North Bend, Wash. The Beta was $< 5 \times 10^{-5}$ but the Alpha was 65.91 d/m/l. This is the result of three counts.

Puget Sound

Duplicate samples of water were collected at Washington. The average Beta count was $< 5 \times 10^{-5}$. The average Alpha was 69.0 d/m/l.

Rivers

A survey of the Snake, Palouse, Touchet, Yellowhead and Umatilla Rivers was made on 11-22-46. There were no Beta results over 5×10^{-5} . Alpha results > 6.0 d/m/l were found at the Snake River (8.3 d/m/l) Touchet River (5.22 d/m/l).

Fluorophotometer Analysis

November 30 1948

Date	300 Area #1	300 Area #2	300 Area Sanitary	Richland #13	Benton City
8-12			29.9		
			49.6		
8-13	20.5	50.0	37.0	4.0	17.2
	40.4	30.6	40.0	3.8	11.4
8-14	42.3	43.6	39.0	3.1	
	41.2	71.9	73.6	3.5	
8-15	26.9	73.6	32.3		
	24.3	61.3	48.1	2.1	
8-18	18.6	36.4	75.8	3.7	
	18.0	20.3	45.0	8.1	2.1
8-19	41.4	39.5	32.3	5.3	
	27.1	72.9	32.3	1.9	
8-20	26.2	48.7	65.3	6.3	7.0
	24.3	59.5	64.6	3.4	6.1
8-21	29.2	61.9	40.4	4.2	
	26.3	36.1	51.1	4.8	
8-22	20.6	72.1	28.4	4.8	
	41.0	68.4	44.4	5.2	

November 30, 1948

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55 Samples

No	Sample	Location	Time	Temp	Humidity	Wind	Pressure	Altitude	Notes
1	11.7 L	10/35	3.25		0.16				Columbia Camp
2	11.7 L	11/7 L	3.72		0.11				Headgate
1	11.7 L	11/8	3.72		0.03				Headgate
2	11.7 L	10-25	3.02						Hanford
1	11.7 L	11-8	2.71		0.22				
1	11.7 L	11-3	2.22		0.17				3000 well A
1	11.7 L	11-3	3.28		0.26				8
2	11.7 L	11-3	3.64		6.08				Q
1	11.7 L	10-20	4.35		0.13				D
2	11.7 L	10-18	2.85		0.50				Richland #13
1	11.7 L	11-15	2.82		0.13				
2	11.7 L	10-25	5.52		0.27				2
1	11.7 L	11-2	9.12		0.08				
1	11.7 L	11-11	7.18		—				4
1	11.7 L	11-11	—		0.29				12
1	11.7 L	11-11	10.42		0.22				14
1	11.7 L	10-18	3.83		0.35				15
1	11.7 L	10-18	2.81		0.23				16
1	11.7 L	11-11	4.20		0.36				Trout Hatchery
2	11.7 L	10-25	5.71		0.19				BY
2	11.7 L	11-8	3.18		0.17				
2	11.7 L	10-12	11.86		0.29				San Gity
2	11.7 L	11-9	12.28		0.31				Cobb's Forest
1	11.7 L	10-12	5.80		0.22				
1	11.7 L	11-0	3.79		0.19				
1	11.7 L	11-0	4.70		0.21				

Location	No. Sample	Date	Time	Temp	Wind	Wind		Wind	
						Direction	Speed	Max	Avg
Kennewick 614	4	11.7 L	11-1	1.42			0.16		
			11-3	1.22			0.24		
			11-5	1.15			0.22		
			11-10	1.80	1.40		0.17	0.20	
Kennewick Sta Sta	4	11.7 L	11-1	1.30			0.11		
			11-3	2.24			0.17		
			11-5	2.10			0.25		
			11-10	1.18	1.71		0.28	0.20	
Riverland	2	11.7 L	10-3	1.33			0.15		
			11-10	0.48	0.91		0.13	0.14	
Midway	1	11.7 L	11-10	2.20	2.20		0.12	0.12	
Lower Knob	2	11.7 L	10-13	3.18			0.21		
			11-10	0.23	0.71		0.28	0.25	
Wills Ranch	2	11.7 L	10-13	1.40			0.14		
			11-10	1.36	1.38		0.03	0.09	
Paseo	3	11.7 L	11-1	2.10			0.19		
			11-3	0.95			0.28		
			11-5	0.67	1.24		0.20	0.22	
Sagehen Ranch	1	11.7 L	11-10	1.15	0.15		0.15	0.15	
Pistol Range	1	11.7 L	11-8	3.83	3.83		0.29	0.29	
White Bluffs C.	1	11.7 L	11-8	12.71	12.71		0.26	0.26	
prairie 13	2	11.7 L	10-12	0.56			0.46		
			11-9	1.57	1.07		—	—	
Ranch 13	1	11.7 L	11-9	0.23	0.23		0.42	0.42	
Smiley Ranch	1	11.7 L	11-9	0.36	0.36		0.17	0.17	
11-11	1	11.7 L	11-9	—	—		0.18	0.18	

RIVERS (CONTINUED) --Columbia River Flow (Thousands of gallons per second)

Yakima River --

11 samples of Yakima River water were collected and surveyed during this period. The maximum Alpha sample was 6.9 d/m/l taken at the mouth of the Yakima River. The average of all samples was 5.6 d/m/l.

107 Effluent --

28 samples of the effluent water from the 107 basins were taken, with results as follows:

Location	No. of Samples	Alpha d/m/L		Beta and Gamma uc/L	
		Maximum	Average	Maximum	Average
1904-B	3	204.1	36.9	0.43	0.36
1904-B D	3	38.8	13.0	0.30	0.26
1904-B F	3	69.6	15.1	0.33	0.22
107-B	6	50.6	19.1	0.26	0.24
107-D	6	47.0	13.4	0.33	0.26
107-F	7	48.9	8.8	0.28	0.13

200 W. Retention Basin	8	51.7	9.1		7.6×10^{-5}
200 E. " "	—				

അടവുപത്രം - 357

Location	Wardroom	Bedroom
Wm Swamp Inlet	68.7	10 X 10 -5
West Side	144.8	10 X 10 -5
South Side	40.0	10 X 10 -5
Wm Swamp - West Side	109.9	< 5 X 10 -5
Inlet	320.3	< 5 X 10 -5
Laundry Ditch - Inlet	428.1	12.4 X 10 -3
600'	834.7	7.4 X 10 -3
231 Ditch - Inlet	35.1	25 X 10 -5
1st. Underpass	34.2	< 5 X 10 -5

200 West - 1st St - Sold 1/15

Location	Date	Alpha - g/m/g	no/L	Direct Count	Behavior Extraction	Rate and Gamma
MTM Swamp - S. Side	11-4		1.5			7.5 X 10 ⁻²
	11-11		17.6			7.3 X 10 ⁻²
	11-18		276.3			.14.8 X 10 ⁻²
MTM Swamp - W. Side	11-4		481.6			4.9 X 10 ⁻²
	11-11		46.9			4.5 X 10 ⁻²
	11-18		346.2			2.0 X 10 ⁻²

WASTE CONTAMINATION (CONTINUED) --

200 West - Waste Solids (Continued) --

Location	Date	Alpha - d/m/g		us/L
		Direct Count	Ether Extraction	Beta and Gamma
Laundry Lint	11-4		287.1	8.0×10^{-2}
" "	11-11		38.5	3.8×10^{-2}
" "	11-18		1334.6	193.6×10^{-2}
" "				
" "				

200 West -- Portable G. M. Survey --

The maximum reading obtained in this area was 875 c/m on mud
 at Inlet of the Laundry Ditch

200 East -- Portable G. M. Survey --

The maximum reading obtained in this area was 1700 c/m on Mud
 at 2nd sewerage of the "B" ditch

WASTE CONTAMINATION (CONTINUED)

300 Area - Waste Solutions --

No. of Samples		Alpha - d/m/L		Beta and Gamma - uc/L	
		Maximum	Average	Maximum	Average
Inlet	3	2039.0	1165.0	32.9×10^{-5}	15×10^{-5}
NW. Cor.	3	4368.0	2960.0	20.2×10^{-5}	15×10^{-5}

300 Area - Waste Solids --

Location	Date	Alpha - d/m/g		uc/kg
		Direct Count	Ether Extraction	Beta and Gamma
300 Area Pond Inlet	11-4		5.27	1.0×10^{-2}
" " " "	11-10		590.1	0.46
" " " "	11-17		178.9	3.2×10^{-2}
" " " "				
" " " "				
" " " NW Cor.	11-4		210.4	12.7×10^{-2}
" " " "	11-10		80.1	4.1×10^{-2}
" " " "	11-17		7.33	1.5×10^{-2}
" " " "				
" " " "				

300 Area - Portable G. M. Survey --

The maximum reading obtained in this area was 6400 c/m/ on mud
at the Inlet of the "old" 300 Area Pond.

200 North Area Waste Surveys --

Location	Maximum Reading			
"N" Ditch	<u>0.5</u>	Mrep/Hr	<u>0.5</u>	MR/HR <u>1400</u> CPM
"P" " "	<u>5.5</u>	"	<u>4.5</u>	" <u>18500</u> "
"R" " "	<u>4.5</u>	"	<u>4.5</u>	" <u>34250</u> "

Location of Max Reading

N. Ditch At inlet on water

P. Ditch On mud at 40 feet

O. D. I. D. mud at 11 ft

Rain Sampling -- 85 rain samples were collected in this

period. Results obtained are summarized as follows:

Location	Maximum uc/L	Average uc/L
Within 200-E Area	1.0 x 10 ⁻²	1.9 x 10 ⁻³
Within 200-W "	8.5 x 10 ⁻³	1.7 x 10 ⁻³
100 Areas and Environs	4.5 x 10 ⁻⁴	1.3 x 10 ⁻⁴
Intermediate on Area	3.4 x 10 ⁻³	5.6 x 10 ⁻⁴
Outlying - off Area	3.2 x 10 ⁻⁴	6.6 x 10 ⁻⁵

The maximum off area sample was collected at

the 200 Area, Ireland.

Snow

30 snow samples were collected on November

19, 1948. The average of all samples was

1.8 x 10⁻⁴ uc/L. The maximum sample of 4.4 x 10⁻³ uc/L

was collected at Route 45 mile 10.

END

DATE

FILMED

4/13/94