AEC RESEARCH AND DEVELOPMENT REPORT HW-11333

Technology, Hanford

RADIOACTIVE CONTAMINATION IN THE ENVIRONS OF THE HANFORD WORKS FOR THE PERIOD APRIL - MAY - JUNE, 1948

By W. Singlevich

October 15, 1948

DISCLAIMER

RADIOACTIVE CONTAMINATION IN THE ENVIRONS
OF THE HANFORD WORKS
FOR THE QUARTER APRIL - MAY - JUNE - 1948

INTRODUCTION:

This report summarizes the radioactive contamination measured at the Hanford Works and immediate plant areas for the quarter April, May, and June, 1948.

ABSTRACT:

Section I - Meteorological Data:

The wind direction prevailed from the northwest during the quarter. The prevailing wind directions of the 100 Areas differed from those observed at the Meteorology Station in 200-West area.

Section II - Airborne Contamination and Air Radiation Levels:

There was no outstanding difference in comparing the data of this quarter with that observed last quarter. In addition to the I^{131} measurements, the residual [illegible] discharge active particles are mentioned.

Section III - Alpha and Beta Contamination in the Columbia and Yakima Rivers:

A decrease in the average radioactive contamination in the Columbia River was noted as greater dilutions were in effect as a result of the flooding waters during the quarter.

The raw water from the Columbia River was significantly higher in average beta activity at 100-F than at the other 100 Areas although the magnitude of the contamination was below the reporting level.

A direct correlation was obtained between the contamination measured in Columbia River samples taken near Hanford and the known Columbia River flow.

The average alpha activity at all locations was less than the detectable quantity.

[redacted]

Section IV - Beta Contamination in the Rain:

There was no outstanding change in the average beta contamination measured in rain samples collected inside the perimeter of the Hanford Works; a decrease was observed in the average levels measured outside the perimeter fence.

Section V - Alpha and Beta Contamination in Drinking Water:

The uranium contamination increased in the 300 Area Sanitary Water system as a result of the increased river flow. A cross section map indicating the probable source of the contamination in the 300 Area Wells is presented.

Natural uranium in trace amounts continued to be found in most drinking water samples.

All other drinking water samples contained less than 5×10^{-5} μc/Liter of total beta-gamma emitters.

Section VI - Beta Contamination on Vegetation:

A decrease in the average beta contamination on vegetation was noted throughout the area during the quarter.

The average beta contamination on vegetation in the Wahluke Plateau Region was found to be about the same as that measured in the Richland Area.

The residual long half-life elements present in vegetation from the stack effluent waste is mentioned.

Section VII - Alpha and Beta Contamination in Hanford Wastes:

No outstanding changes were noted in the wastes of Hanford this quarter with the exception of the 300 Area Waste Pond where considerably higher levels of uranium contamination were measured this quarter.

General:

The sampling and instrument locations from which all the data included in this report were gathered are essentially the same as reported in HW-9496(6) except as revised and corrected on Maps 1 and 2 attached to this report.

SECTION I

METEOROLOGICAL DATA

The meteorological conditions, during the hours of metal dissolution only, are summarized graphically on Figures 1 through 6. The meteorological measurements were taken by the Meteorology Group of the Health Instrument Divisions.

Since the atmospheric and ground contamination patterns are closely related to the wind direction,(1) four of the graphs are centered about this variable. Figure 1 is an eight point compass wind rose summarizing the prevailing wind direction observed over the three month period. The major change in wind direction this quarter when compared to the previous quarter is a decided increase in the prevalence of the westerly component, which increased from 18 percent to 27 percent of the time. A decrease was noted in all other directions except the north-west direction which continued to be the prevailing direction in the 200- West Area.

Figure 2 is a breakdown of the above data into monthly periods. The northwest direction increased steadily throughout the entire quarter whereas the southwest and west components decreased. A more detailed study of the wind direction trend during this quarter is presented on Figure 3 which summarizes the average wind direction for each month and for the quarter as measured by a sixteen point compass. Small month-to-month fluctuations are noticeable; however, the northwest quadrant prevailed over 50 percent of the time in any given period. In general, the distribution of contamination on vegetation seems to follow in the direction of the prevailing winds. (See Map 4 - Iso-Activity Map of Beta Contamination on Vegetation.)

An analysis of the average wind directions measured at the 100 Areas as compared to the wind directions measured at the 200-West Area Meteorology Station is shown in Figure 4. A comparison of the wind roses again clearly indicates that the wind directions are not uniform within the perimeter of the project proper.

Referring to Figure 4, the most noticeable difference in wind direction was observed in the month of May; the northwest direction prevailed 42 percent of the time in the 200-West Area, while at 100-F Area, in the same period, five directions prevailed more than 10 percent of the time, with no one direction exceeding 16 percent of the time. It appears that the wind direction at 100-F Area was much more variable than at the other three locations under discussion; the southerly components tended to prevail a larger percentage of the time than it did at any of the other stations.

An analysis of the dilution factors measured during metal dissolving periods indicated a decided decrease in the percent of time that the aloft condition existed with an increase in the number of hours that dilution factors were less than 500:1. In the quarter ending March 31, dilutions less than 1000:1 existed only 3.7% of the total dissolving hours, whereas in the present quarter this condition prevailed 18% of the time. Similarly, the aloft condition which prevailed 75 percent of the time during the last quarter decreased to an average of 50 percent of the time in this quarter. Figure 5 is a graphic presentation of the percent of time that the various average dilution conditions existed as calculated for the actual dissolving hours only. Figure 6 is a summary of the wind direction and velocity during the period of less than 500:1 dilutions. A comparison of the current data to similar data in previous quarters indicated no specific correlation between the wind direction and the dilutions.

This meteorological summary covers those atmospheric conditions which existed at the time of actual uranium dissolution; the meteorological summations for the overall average daily 24 hour periods are available from the monthly reports issued by the Meteorological Section of the H. W. Divisions.(2)(3)(4)

Section I

(See Figures 1, 2, 3, 4, 5, and 6)

[redacted]

SUMMARY WIND DIRECTIONS — 200-W
DISSOLVING HOURS ONLY
APRIL — MAY — JUNE
1948

FIGURE 1

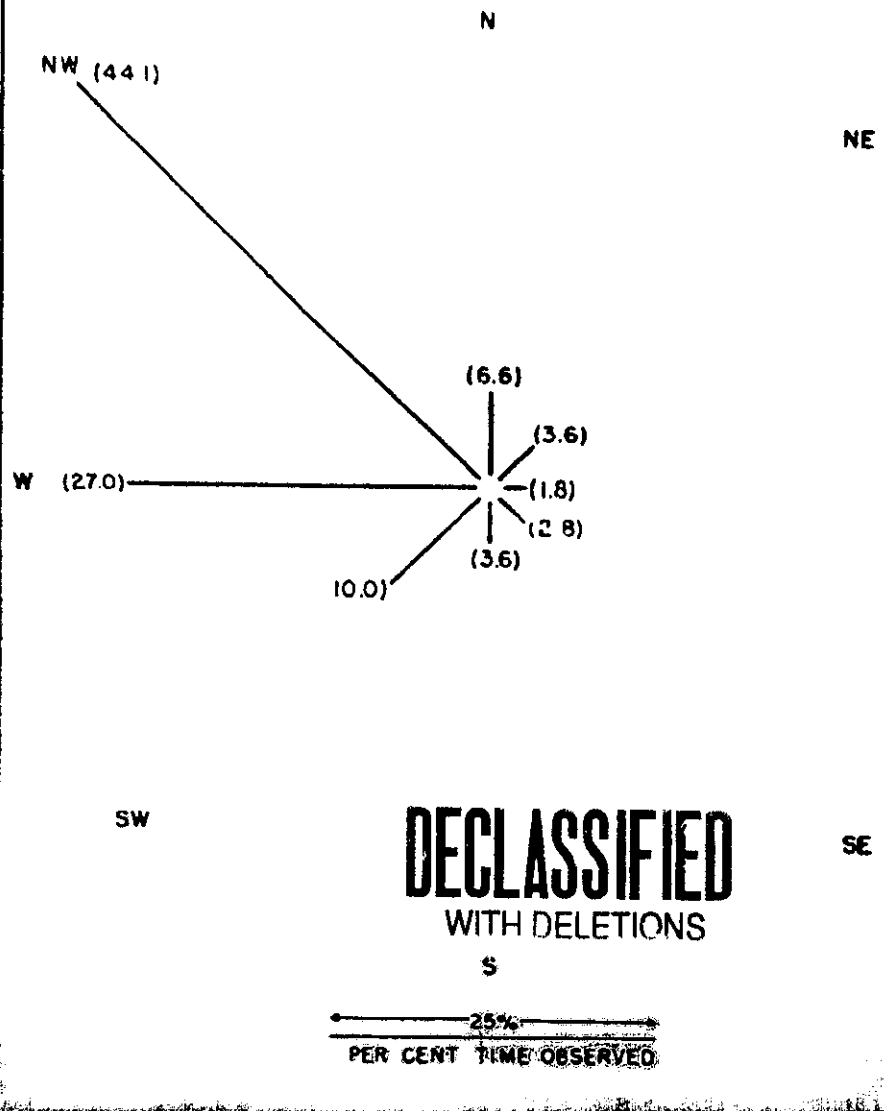

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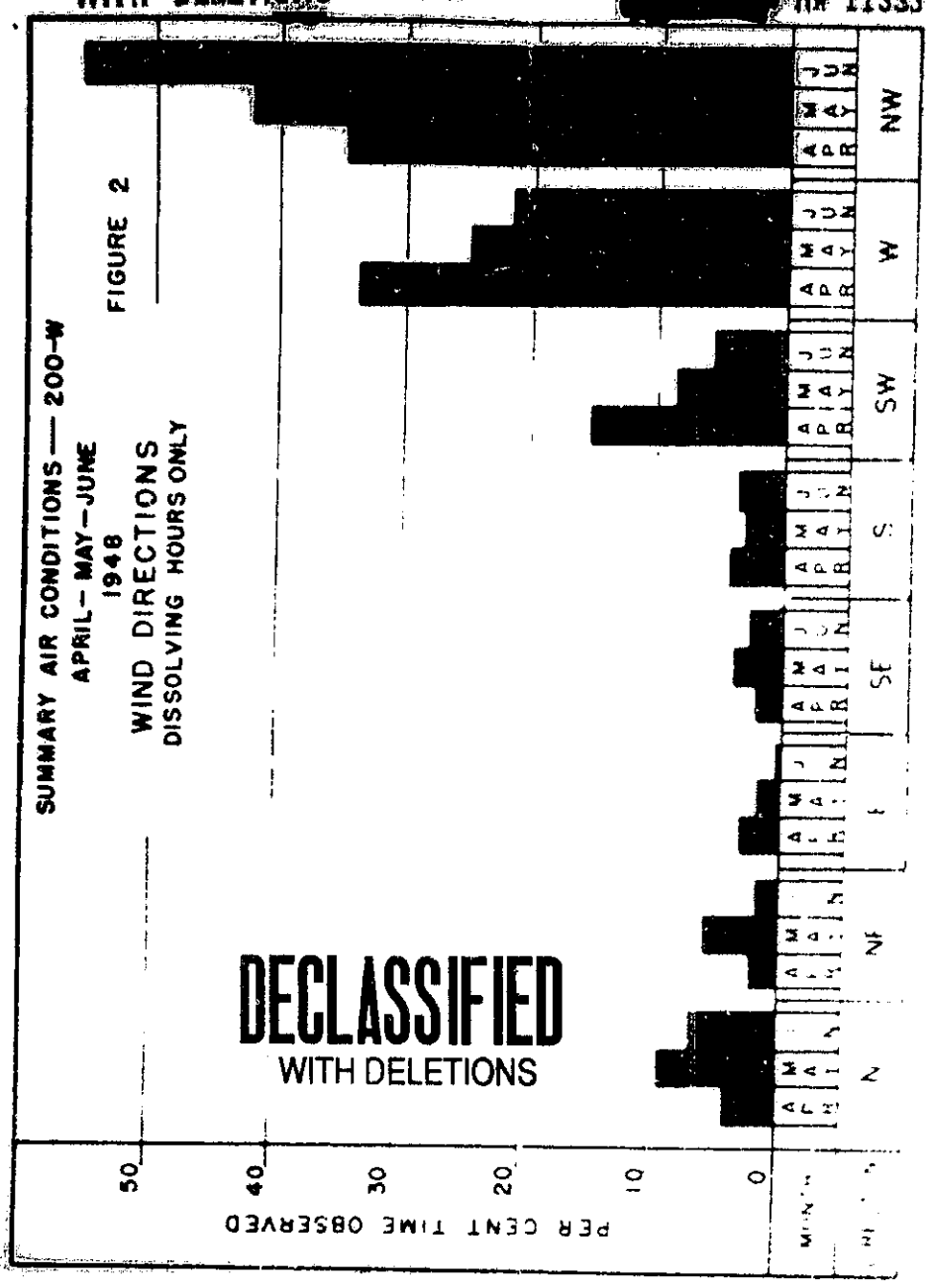
FIGURE 2

SUMMARY AIR CONDITIONS — 200-W
APRIL - MAY - JUNE
1948
WIND DIRECTIONS
DISSOLVING HOURS ONLY



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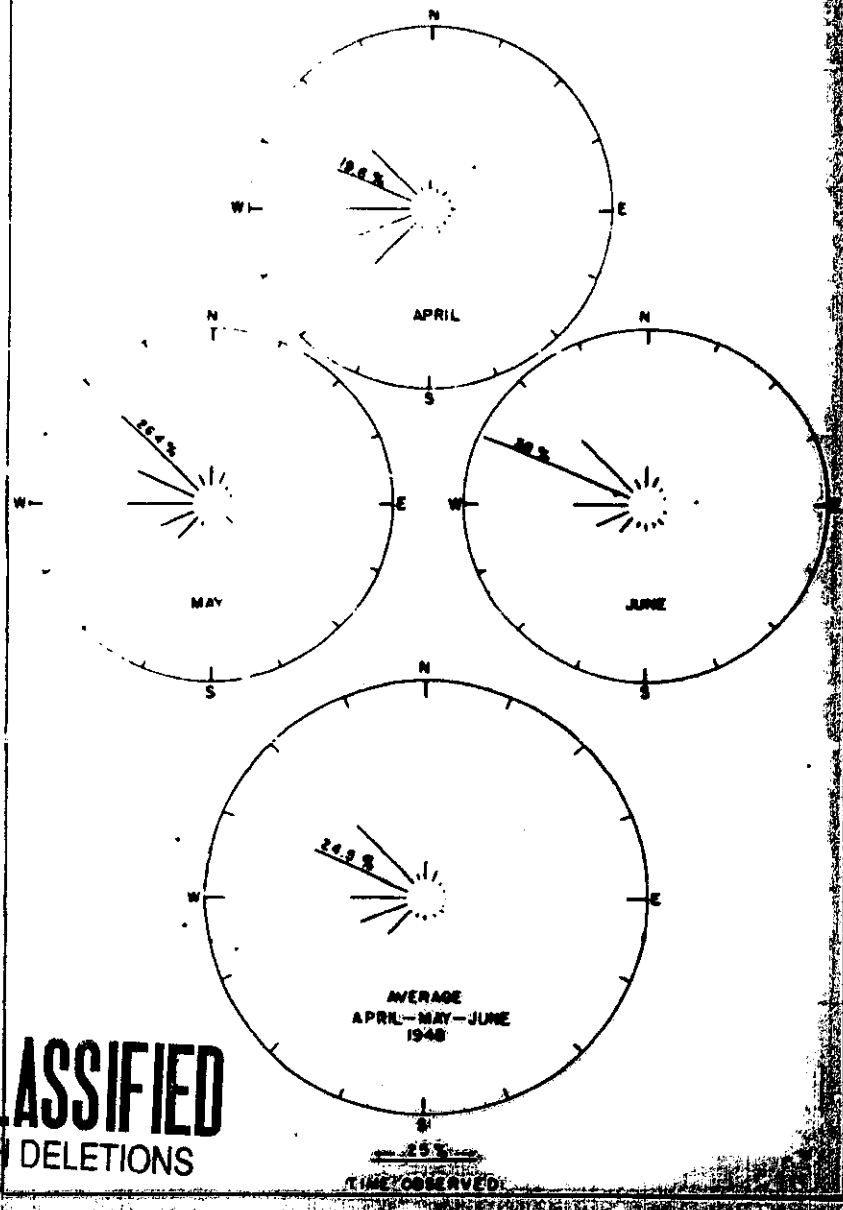
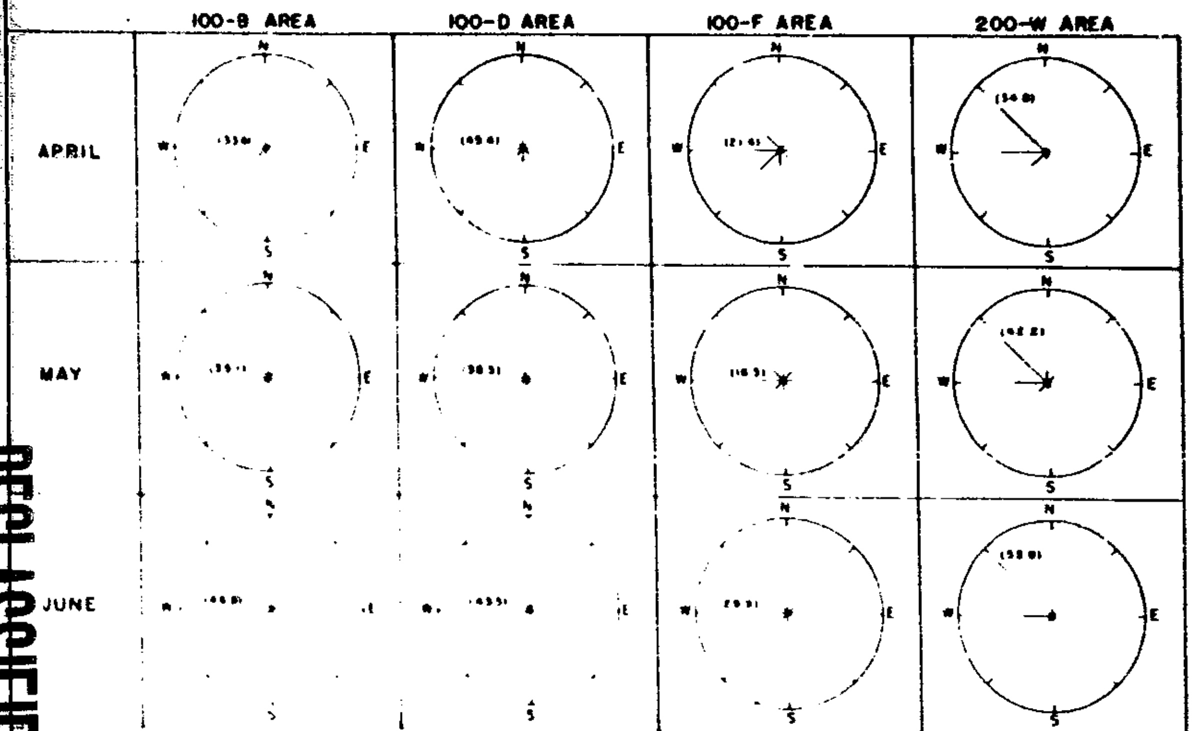
RECORDED WIND DIRECTIONS — 200 W
DISSOLVING HOURS ONLY
APRIL - MAY - JUNE
1948

FIGURE 3



COMPARISON OF WIND DIRECTIONS
AS OBSERVED DURING ACTUAL DISSOLVING HOURS

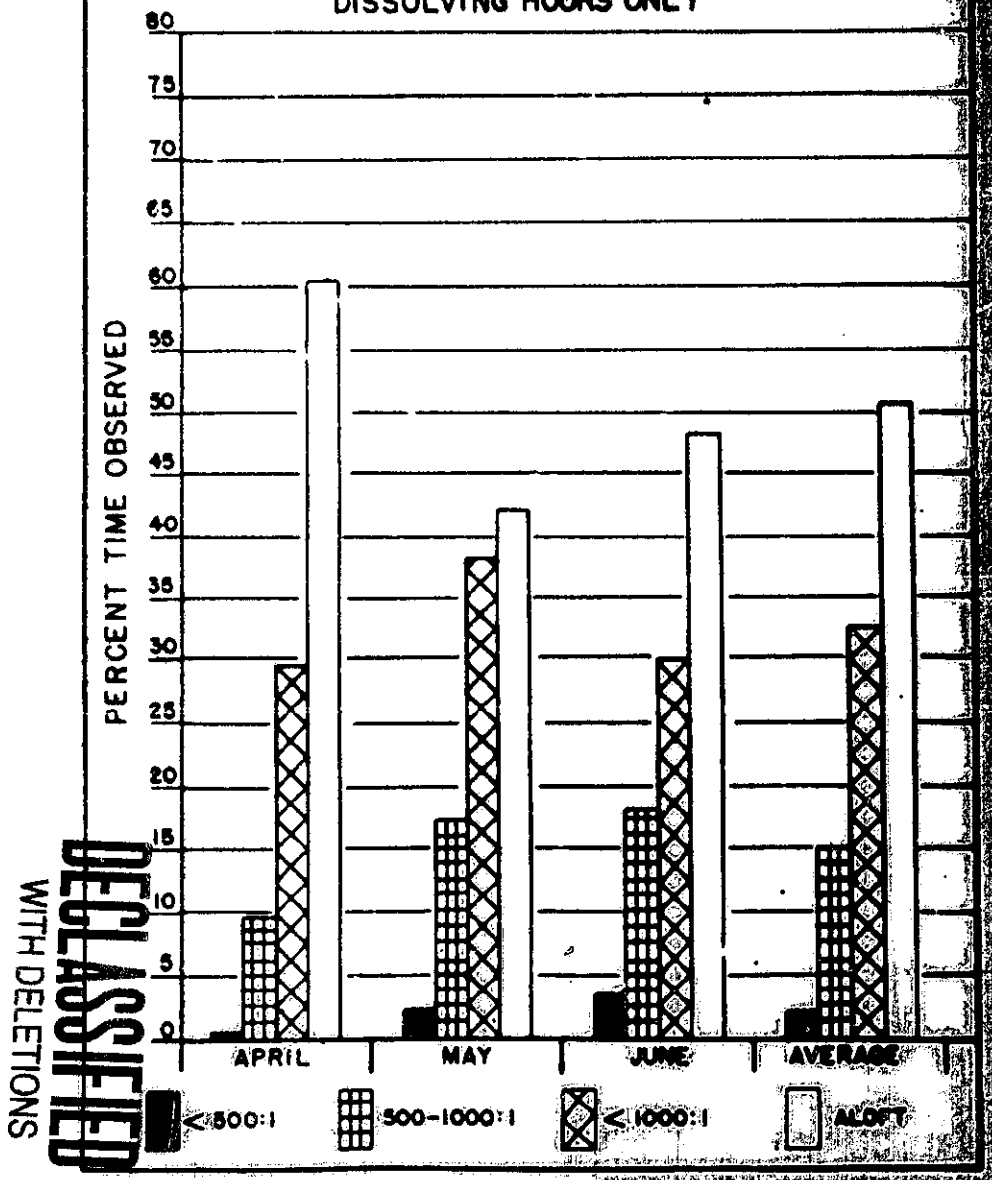
FIGURE 4



SCALE: 40% = TIME OBSERVED

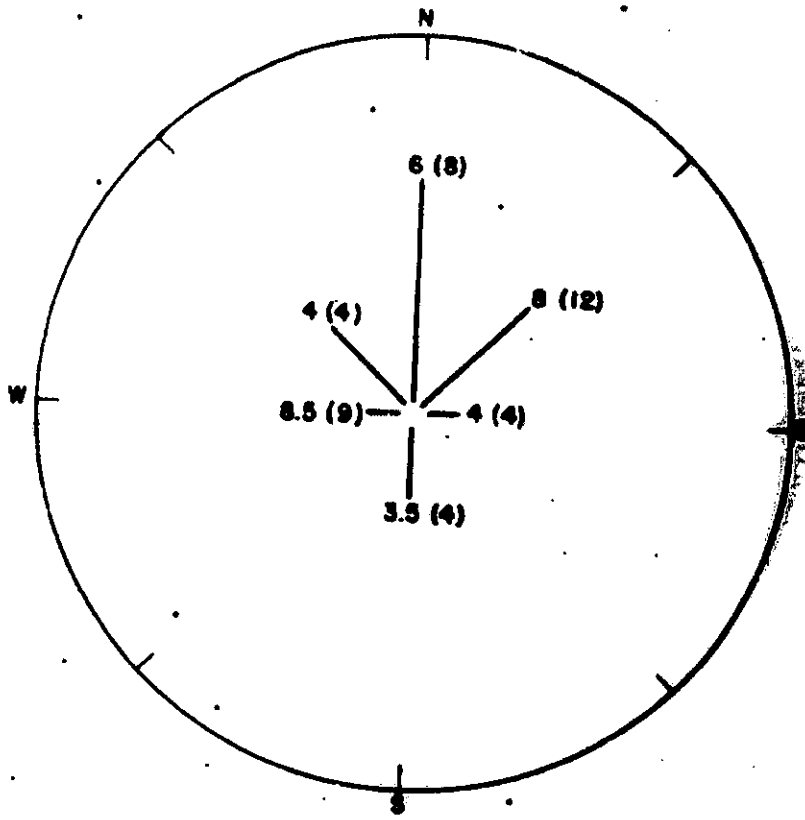
WIND DILUTION ANALYSIS
622 BLDG.—200-W AREA
DISSOLVING HOURS ONLY

FIGURE 5



WIND CONDITIONS DURING LOW DILUTION PERIODS
DISSOLVING HOURS ONLY
200-W AREA
APRIL—MAY—JUNE
1948

FIGURE 6



NUMERALS=AVERAGE VELOCITY
( )=MAXIMUM VELOCITY
VELOCITY IN MILES PER HOUR

DILUTIONS < 500:1

50%

SCALE — PER CENT TIME OBSERVED

BETA CONTAMINATION IN COLUMBIA RIVER APRIL—MAY—JUNE 1948

FIGURE 9

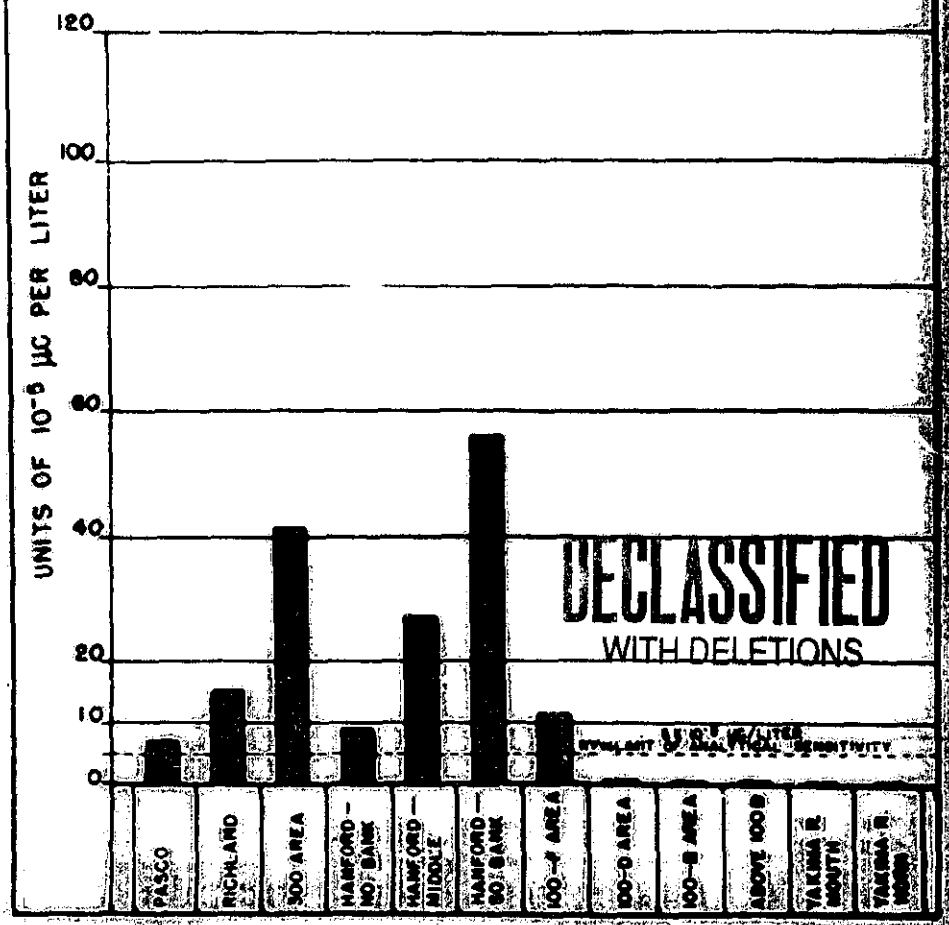


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TABLE VIII

RESULTS OF STATISTICAL ANALYSIS OF RADIOACTIVE CONTAMINATION MEASURED IN THE DRINKING WATER

April - May - June - 1948

Alpha Activity

LOCATIONS COMPARED	NUMBER SAMPLES	AVERAGE ACTIVITY dis/min/liter	"t" TEST VALUE	CONCLUSIONS
300 #4	13	96.6	3.11	Well #4 significantly higher than Well #1
300 #1	63	49.8		
Richland #15	12	0.84	0.9	No significant difference
Richland #13	89	0.27		
Benton City	13	1.51	3.01	Benton City significantly higher than Richland #13
Richland #13	89	0.27		
300 Sanitary	61	11.39	8.97	Highly significant difference
Richland #13	89	0.27		
White Bluffs	64	1.37	4.97	Highly significant difference
Richland #13	89	0.27		
Pistol Range	13	0.90	1.56	No significant difference
Richland #13	89	0.27		

[redacted]

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TABLE VII

RESULTS OF STATISTICAL ANALYSIS OF RADIOACTIVE CONTAMINATION MEASURED IN THE DRINKING WATER

April - May - June, 1948

Beta Activity

LOCATIONS COMPARED	NUMBER SAMPLES	AVERAGE ACTIVITY μc per liter	"T" TEST VALUES	CONCLUSION
Benton City Prosser	13 12	4.1×10^{-6} 7.0×10^{-6}	1.04	No significant difference
Prosser Richland #3	12 102	7.0×10^{-6} 4.4×10^{-6}	1.48	No significant difference
Kennewick Cl4 Kennewick Std. Stc.	12 13	6.0×10^{-6} 9.0×10^{-6}	1.08	No significant difference
Benton City Hobbs Corner	13 13	4.1×10^{-6} 4.8×10^{-6}	0.44	No significant difference
Richland #13 Hanford	102 4	4.4×10^{-6} 4.9×10^{-6}	0.17	No significant difference
Richland #2 Richland #14	14 16	8.0×10^{-6} 1.5×10^{-6}	3.07	Richland #2 significantly higher than Richland #14
Kennewick Cl4 Columbia Camp	12 13	6.0×10^{-6} 2.8×10^{-6}	3.40	Kennewick Cl4 significantly higher than Columbia Camp.
Kennewick Std. Stc. Richland #13	13 102	9.0×10^{-6} 4.4×10^{-6}	2.63	Kennewick Std. Stc. significantly higher than Richland #13
(Direct Count) 300 Area Sanitary 300 Area #1	63 17	4.2×10^{-6} 7.1×10^{-6}	2.67	Well #1 significantly higher than Sanitary
300 Area #4 Richland #13	17 102	7.1×10^{-6} 4.4×10^{-6}	1.87	No significant difference
3000 #1 3000 #6	12 96	5.8×10^{-6} 3.6×10^{-6}	1.70	No significant difference
100-D Sanitary 100-D Sanitary	13 13	5.1×10^{-6} 2.0×10^{-6}	2.49	Significance of difference questionable
100-D Sanitary Richland #13	13 102	5.4×10^{-6} 4.4×10^{-6}	0.63	No significant difference

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TABLE VII

RESULTS OF STATISTICAL ANALYSIS OF RADIOACTIVE CONTAMINATION MEASURED IN THE DRINKING WATER

April - May - June, 1948

Beta Activity

LOCATIONS COMPARED	NUMBER SAMPLES	AVERAGE ACTIVITY μc per liter	"T" TEST VALUES	CONCLUSION
Benton City Pasco	13 12	4.1×10^{-6} 7.0×10^{-6}	1.04	No significant difference
Pasco Richland #3	12 102	7.0×10^{-6} 4.4×10^{-6}	1.46	No significant difference
Kennewick Old Kennewick Std. Sta.	12 13	6.0×10^{-6} 9.0×10^{-6}	1.09	No significant difference
Benton City Cobbs Corner	13 13	4.1×10^{-6} 4.8×10^{-6}	0.44	No significant difference
Richland #13 Hanford	102 4	4.4×10^{-6} 4.9×10^{-6}	0.17	No significant difference
Richland #2 Richland #14	14 16	8.0×10^{-6} 1.5×10^{-6}	3.07	Richland #2 significantly higher than Richland #14
Kennewick Old Columbia Camp	12 13	6.0×10^{-6} 2.8×10^{-6}	3.40	Kennewick Old significantly higher than Columbia Camp.
Kennewick Std. Sta. Richland #13	13 102	9.0×10^{-6} 4.4×10^{-6}	2.63	Kennewick Std. Sta. significantly higher than Richland #13
(Direct Count) 300 Area Sanitary 300 Area #1	63 17	4.2×10^{-6} 7.1×10^{-6}	2.67	Well #1 significantly higher than Sanitary
300 Area #1 Richland #13	17 102	7.1×10^{-6} 4.4×10^{-6}	1.87	No significant difference
3000 #1 3000 #6	12 96	5.8×10^{-6} 3.6×10^{-6}	1.70	No significant difference
100-D Sanitary 100-K Sanitary	13 13	5.1×10^{-6} 2.0×10^{-6}	2.49	Significance of difference questionable
100-D Sanitary Richland #13	13 102	5.4×10^{-6} 4.4×10^{-6}	0.63	No significant difference

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TABLE VIII

RESULTS OF STATISTICAL ANALYSIS OF RADIOACTIVE CONTAMINATION MEASURED IN THE DRINKING WATER

April - May - June - 1948

Alpha Activity

LOCATIONS COMPARED	NUMBER SAMPLES	AVERAGE ACTIVITY dis/min/liter	"t" TEST VALUE	CONCLUSIONS
300 #4	13	98.6	3.11	Well #4 significantly higher than Well #1
300 #1	63	49.8		
Richland #15	12	0.64	0.9	No significant difference
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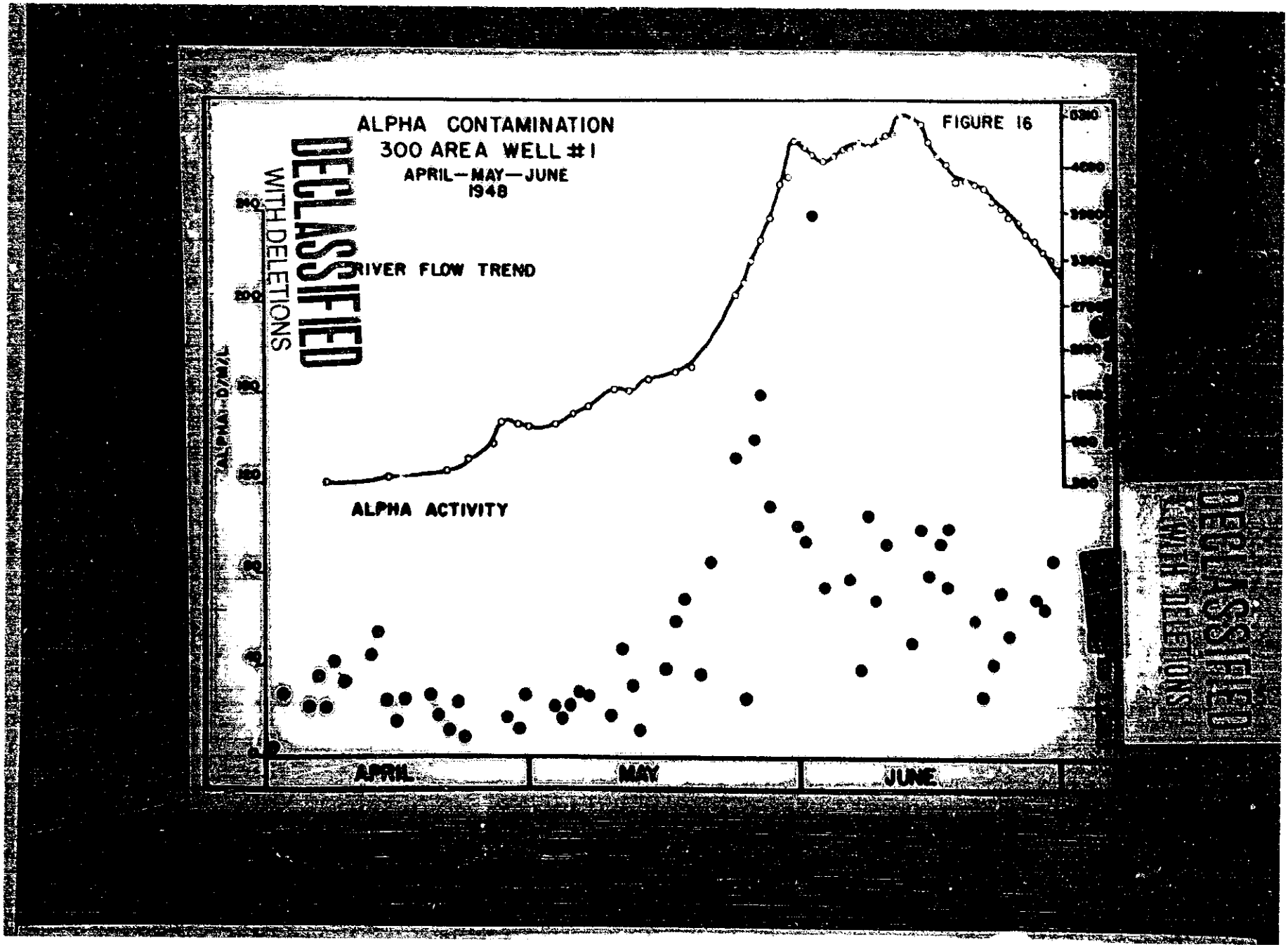
Richland #13	89	0.27		
Pistol Range	13	0.90	1.56	No significant difference
Richland #13	89	0.27		


ALPHA CONTAMINATION
300 AREA WELL #1
APRIL—MAY—JUNE
1948
FIGURE 16
RIVER FLOW TREND
ALPHA ACTIVITY
APRIL
MAY
JUNE
DECLASSIFIED
WITH DELETIONS

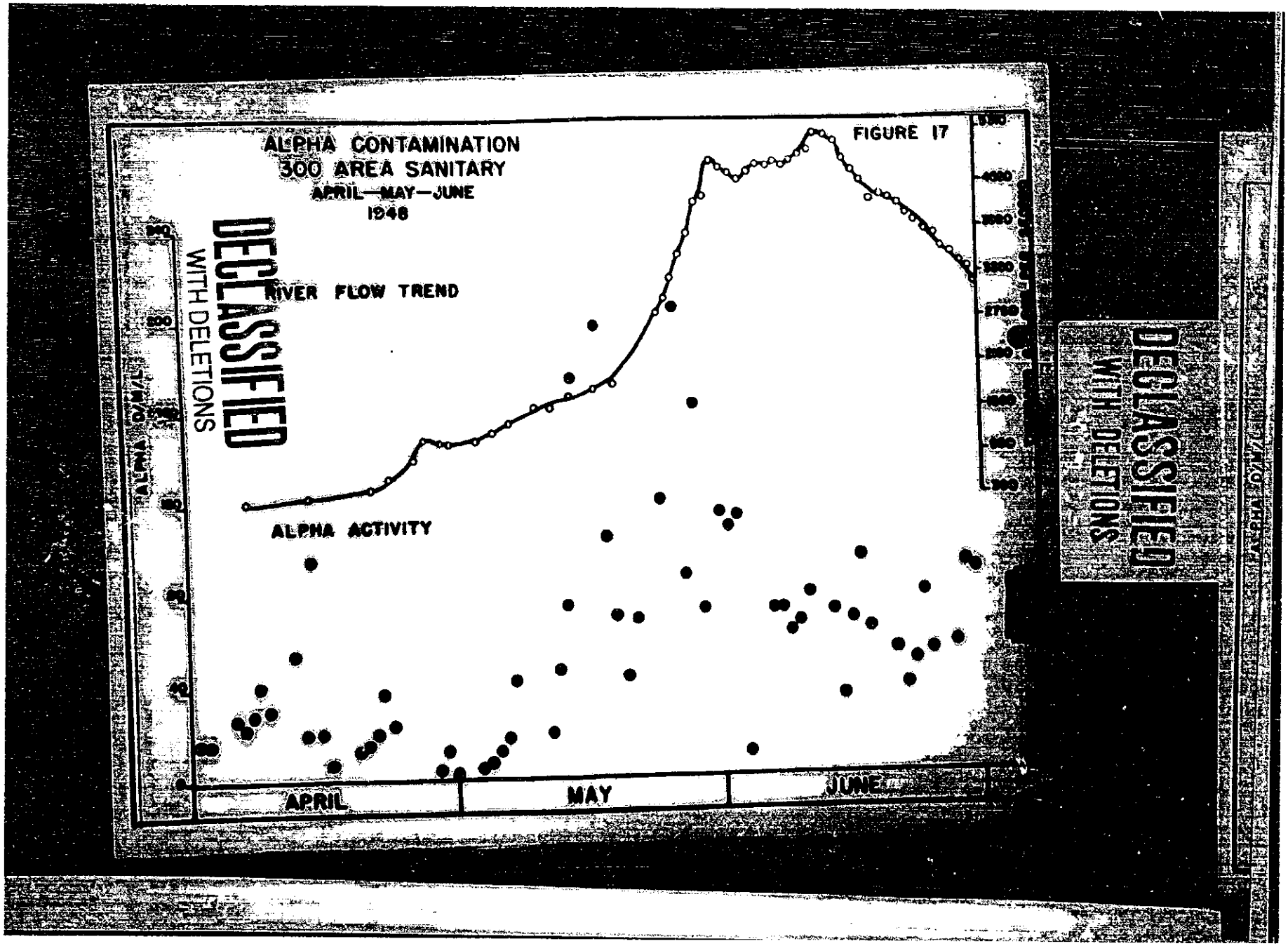


FIGURE 17
ALPHA CONTAMINATION
300 AREA SANITARY
APRIL—MAY—JUNE
1948
RIVER FLOW TREND
ALPHA ACTIVITY
APRIL
MAY
JUNE
DECLASSIFIED
WITH DELETIONS
DECLASSIFIED
WITH DELETIONS

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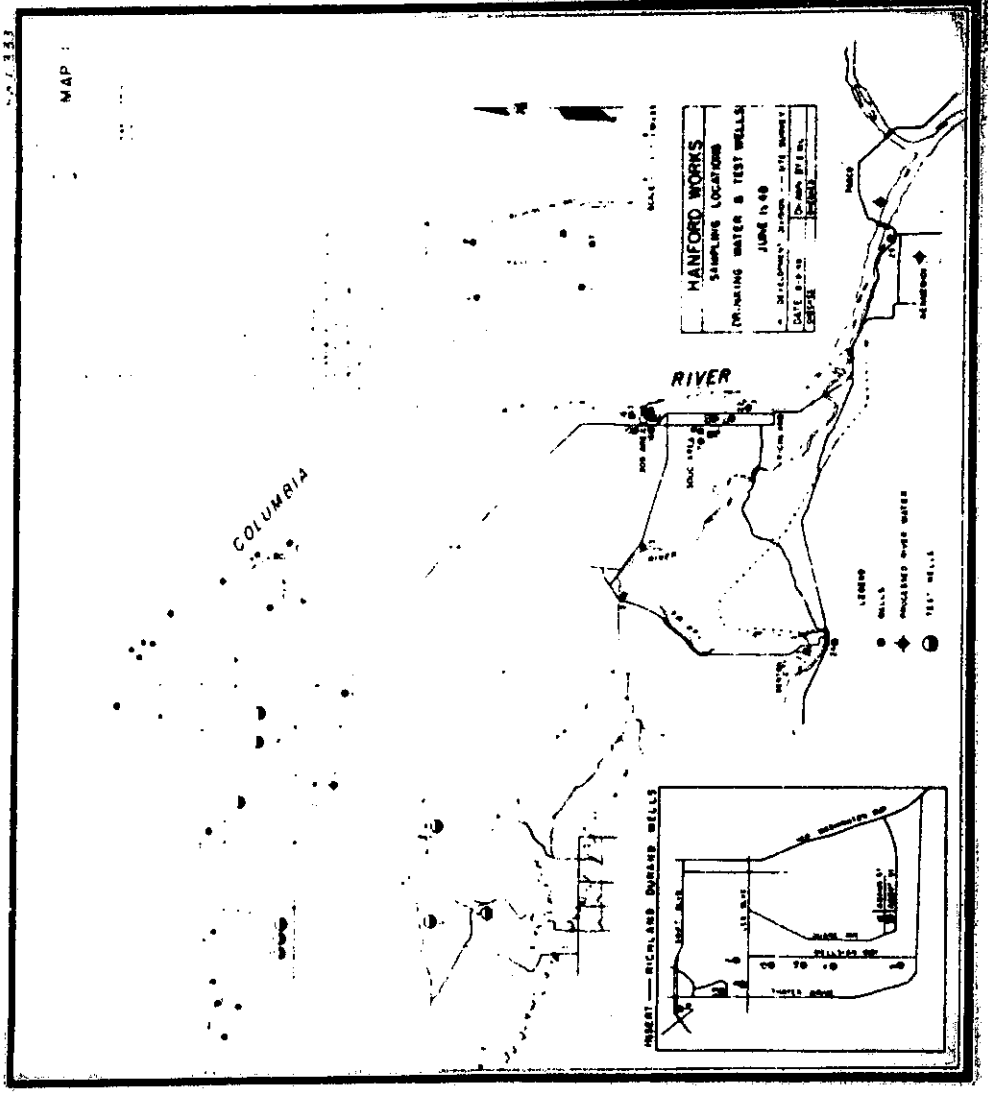

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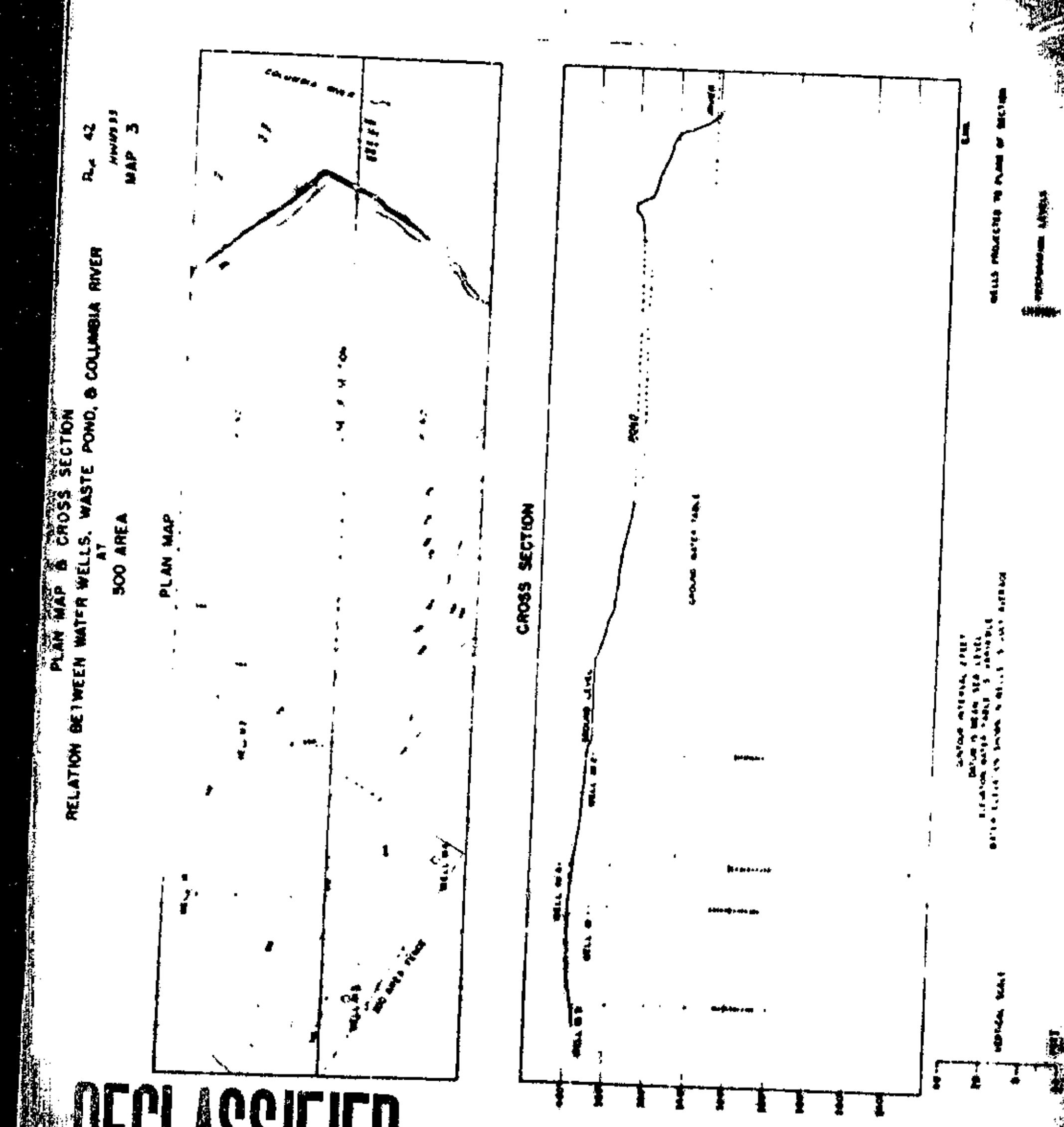

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SECTION VI

[illegible] CONTAMINATION OF VEGETATION

The quantity of [illegible] and 8.4 day Xenon in the uranium dissolved [illegible] Argus was based on the basis of weight of uranium dissolved, decreased [illegible] for at least three during the quarter of April - May - June, 1948. Figure [illegible] with the estimated quantities of I^{131} involved in the separations area. The total quantity of I^{131} present during the dissolving process has been steadily [illegible] the increased "cooling" time. The cooling period during this [illegible] The total quantity of I^{131} expelled from the stacks [illegible] is approximately one-half the amount calculated [illegible] Figure 13. Scrubbers installed on the dissolver off-gas line [illegible] this figure by a factor of 10. Accurate scrubber [illegible] must be determined by experiment are not available at this time. Table IX [illegible] illustrates the decrease of the estimated quantities of I^{131} [illegible] to be present when the uranium is dissolved for the past year.

Figure 14 shows the average beta activity found on vegetation samples by direct [illegible] from the six selected locations. For the purposes of calculation, it was assumed that all of the beta activity was from 8 day iodine. Maps [illegible] beta activity and estimating the average distribution of the beta contamination [illegible] about the project and vicinity. The general distribution of the [illegible] activity appears to be as expected from the meteorological data presented in Section I of this report.

An analysis of one hundred and seventy-two vegetation samples collected from [illegible] locations in the residential areas of Pasco, Kennewick, Richland "Y", Pasco, and North Richland indicated that the levels of contamination measured [illegible] the entire residential district was 0.03 μc/kg during the quarter; this average [illegible] was significantly lower than the average measured last quarter, (0.04 μc/kg) [illegible]

is interesting to note that in this quarter the maximum average beta activity detected in any individual vegetation sample was identical in magnitude to the overall average activity detected in the last quarter. The current average beta activity in vegetation in the populated areas is the lowest observed since January, 1948.

A comparison between the average beta contamination on vegetation in the village of Richland and that found in the outlying populated areas of Benton City, Columbia City, Hanford, Riverland, and Midway, indicated that there was no significant difference between them. For the second consecutive quarter, the average contamination detected in Richland (0.031 μc/kg) was lower than the average activity of the surrounding sampling locations. The analytical results of weekly samples taken at eight locations on the Van Giesen Road to Benton City indicated that the activity on these samples to be about the same as that found in Richland.

As a result of a continued decrease in the beta activity detected on vegetation samples during this quarter, the average activity inside the separation areas was less than 0.10 μc/kg for the first time since 1948. A summary of the recent trend is presented in the following tables

BETA CONTAMINATION ON VEGETATION

Average μc I^{131}/kg

	200 West Area	200 East Area
January	0.49	0.32
February	0.31	0.46
March	0.67	0.18
April	0.13	0.48
May	0.06	0.08
June	0.05	0.05

An analysis of the data for the separations area indicated a highly significant decrease in the contamination level inside the 200-West Area during the quarter; however, the decrease in the average activity within the 200-East Area was not significant when compared to the average of last quarter. Contrary to the previous quarter, no significant difference was found in comparing the average beta contamination level

[redacted]

found in the 200 East and 200 West Areas this quarter. Vegetation samples taken outside the 200-West Area Gatehouse indicated a decrease in the level of contamination by a factor of about three from the last quarterly average of 1.41 uc/kg. This average activity immediately outside the 200-West Area gate is still significantly higher than the average found within the 200-West Area.

The highest average beta contamination level on vegetation was still found on samples taken from Route 3, Mile Post 2, where an average of 0.16 μc/kg was found during the quarter. The highest individual vegetation sample in the quarter was found inside the 200-East Area on a sample containing 3.4 uc/kg.

Two special vegetation surveys of the Burton Gap region in the Rattlesnake Mountain area were completed in this period. In general, the activity in that region continues to decrease although the quantities involved are still detectable. The average beta activity was 0.05 μc/kg. Figure 15 portrays the extent of the average beta contamination detected on the samples at the various elevations of the Burton Gap Region. The deposition is more uniformly distributed over the entire terrain in this quarter; previous results showed heavier concentrations in the plateau region between the 1500 and 2000 foot levels.(8)

Washed-out roads caused by the flooding waters of the Columbia River during the quarter limited the "off-area" surveys. Only one survey of the Wahluke Plateau was completed in this quarter. On May 8, the average of 108 vegetation samples taken from selected stations over the entire plateau was 0.08 μc/kg. A comparison of this data to the data of the survey taken April 7, (Avg. 0.05 μc/kg) indicated a definite decrease in the average beta contamination level found on the vegetation in that area. Individual sample results were within the normally expected range, and the maximum (0.30 uc/kg) was not significantly different from the average on the plateau. The average activity on the Wahluke Plateau does not differ significantly from the average found at any location in the Richland-Pasco area as found during the period of this survey.

The calculated values for beta contamination on vegetation included in this section of the report were corrected for self-absorption losses, decay, and geometry assuming that all the activity was from 8 day iodine; the longer half-lived materials were not considered for in this data analysis. Referring to a recent report[8] on long-lived fission activities in vegetation at the Hanford Works, it was reported that about four percent of the long-lived fission products have a half-life of about [illegible] percent at 275 days and about 1 - 3 percent very long half-lives.

A survey of the contamination at Hanford and vicinity during August indicated <0.02 uc/kg fission product contaminants in the Richland-Kennewick-Pasco areas [illegible] areas. However, as one approaches the vicinity of [illegible] positive indications are noted with levels as high as 0.40 uc/kg [illegible] samples inside the 200 areas.

A program for analysis of the vegetation specifically for I^{131} and for the longer half-life materials is now being tested in the laboratory.

Section VI

(See Table IX and Figures 13, 14, 15, and Map 4)

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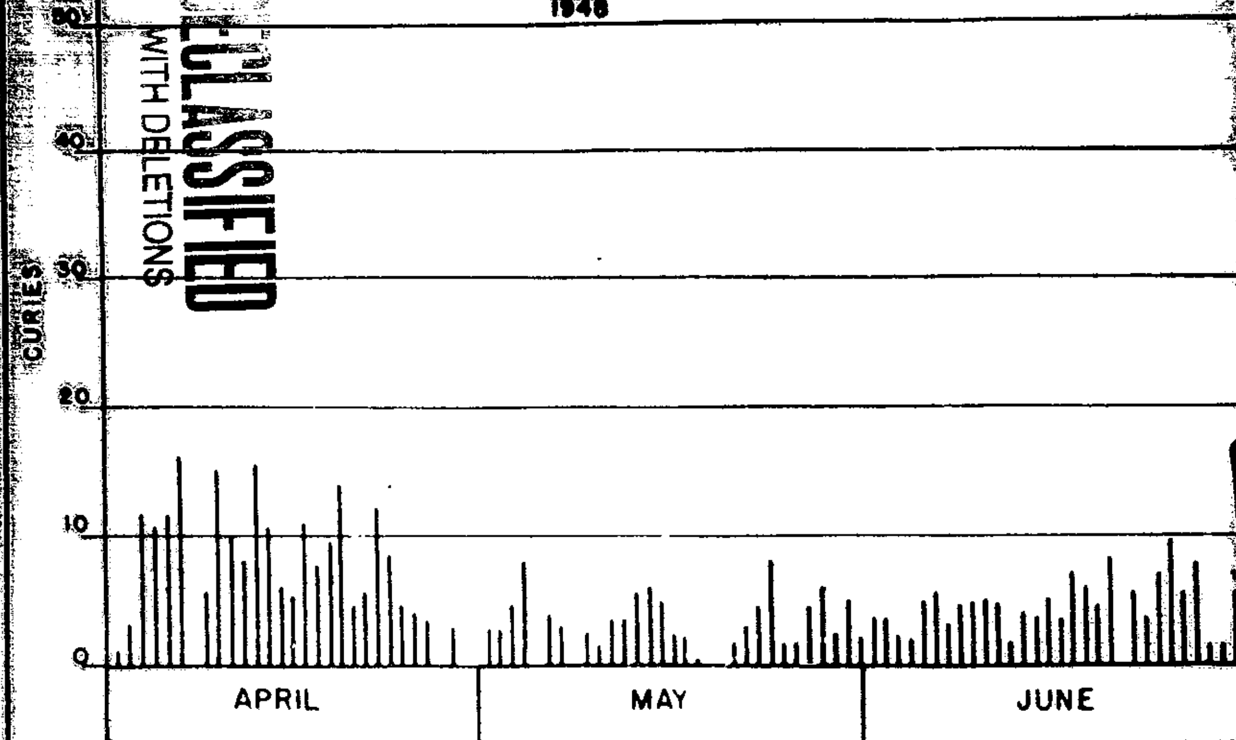
TABLE IX

CURIES OF RADIOIODINE [redacted] IN METAL DISSOLVED

AS CALCULATED ON BASIS OF WEIGHT OF URANIUM

MONTH	200 EAST AREA	200 WEST AREA	TOTAL
	Curies Iodine	Curies Iodine	Iodine
July, 1947	1176	891	2067
August	851	717	1568
September	566	509	1075
October	176	282	458
November	229	204	433
December	130	193	273
January, 1948	210	89	299
February	164	114	278
March	479	91	570
April	79	147	226
May	15	84	99
June	72	63	135

[redacted]



DISSOLVING DATA FOR I^{131}
200-W AND 200-E STACKS
APRIL-MAY-JUNE
1948

FIGURE 13

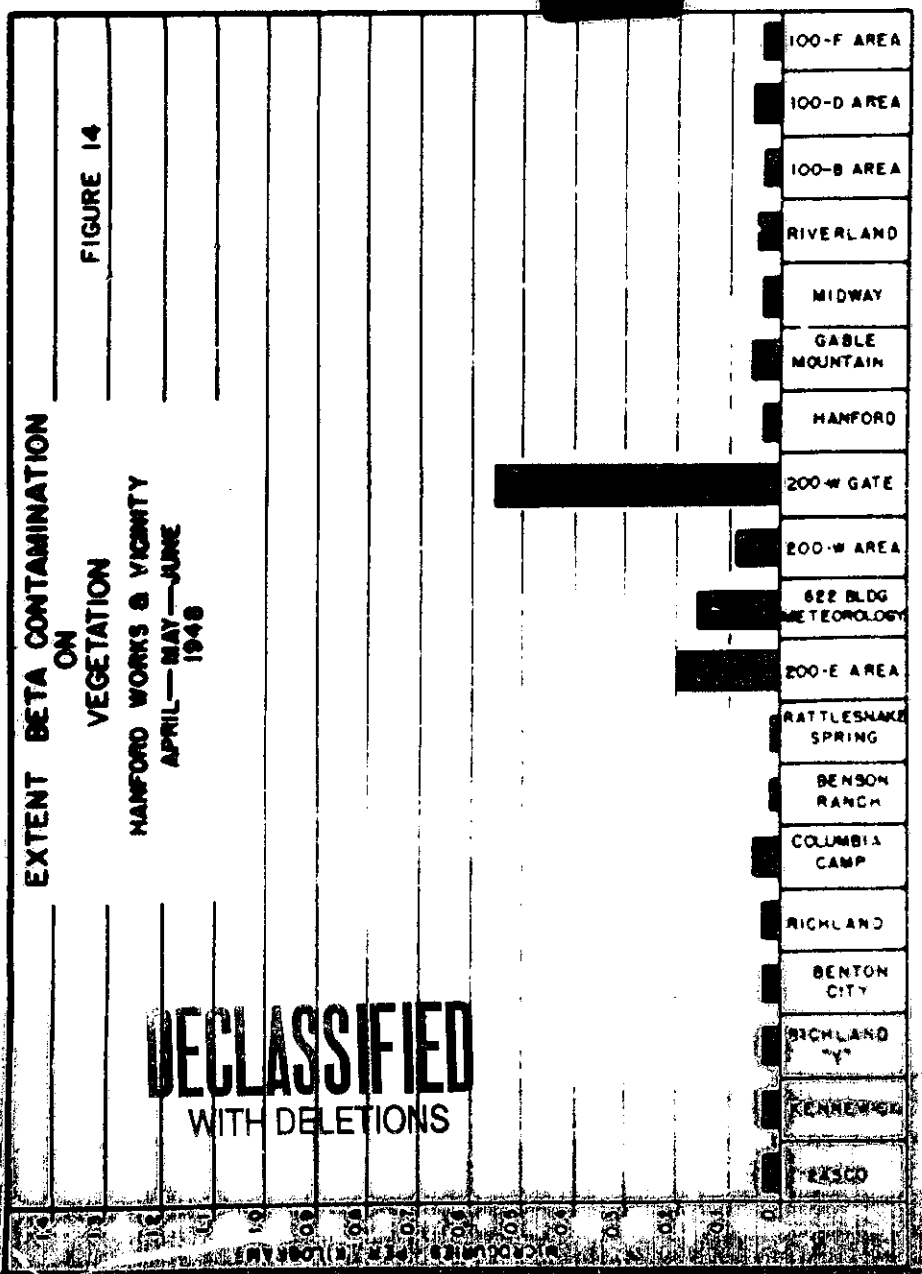
Form 10 [redacted] HW 11333 DEL

FIGURE 14

EXTENT BETA CONTAMINATION ON VEGETATION

HANFORD WORKS & VICINITY

APRIL — MAY — JUNE 1948



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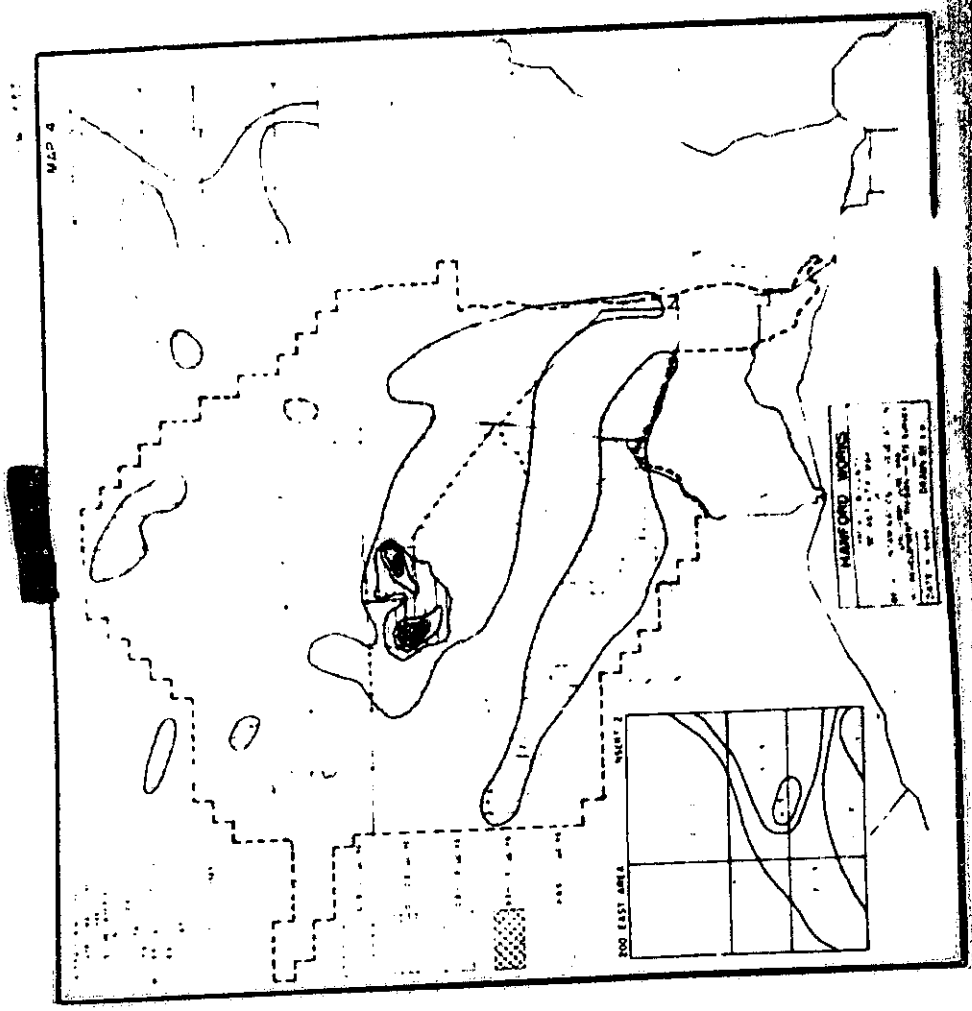

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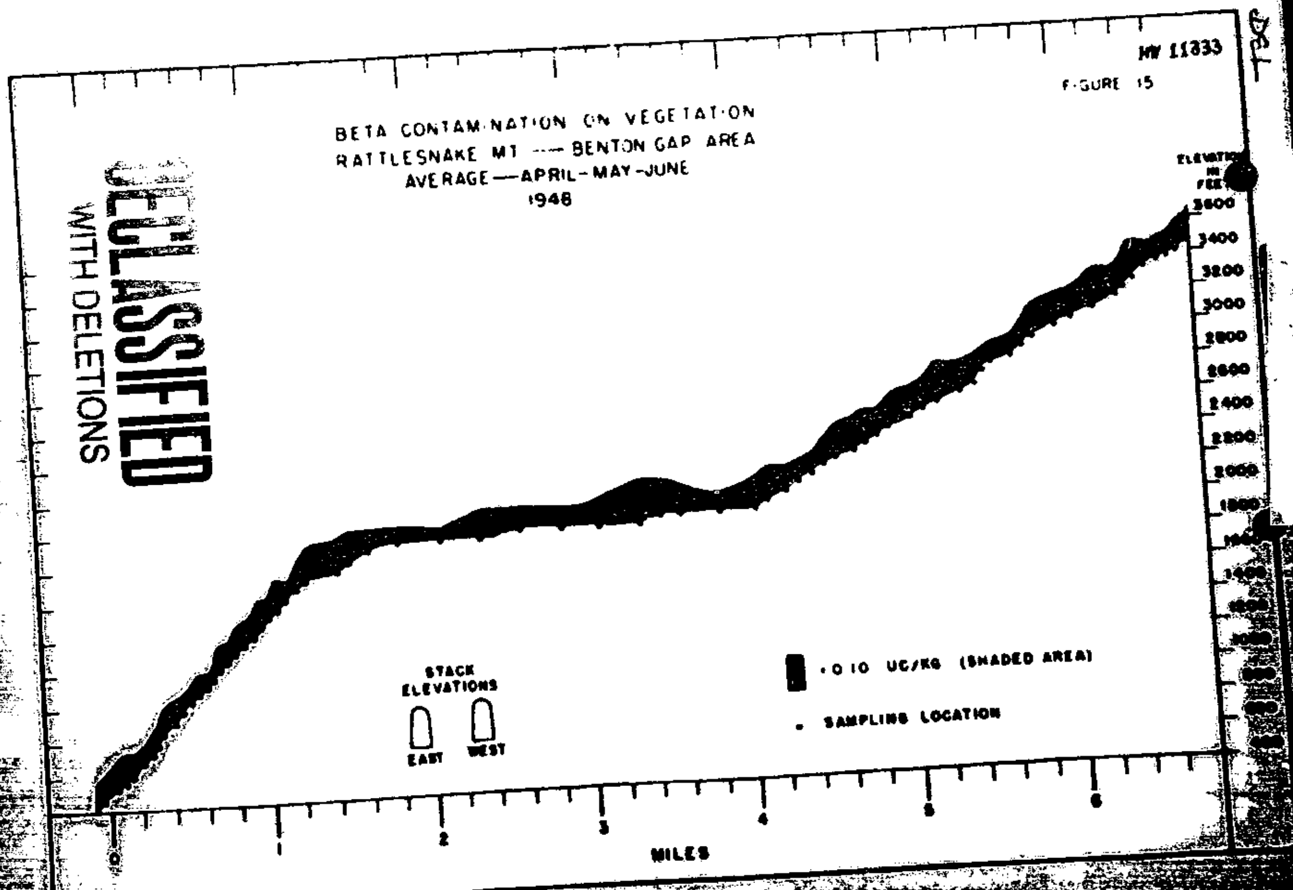
FIGURE 15



BETA CONTAMINATION ON VEGETATION
RATTLESNAKE MT —— BENTON GAP AREA
AVERAGE —— APRIL–MAY–JUNE
1948

DECLASSIFIED
WITH DELETIONS

200 NORTH AREA WASTES:

The maximum levels of contamination noted at the 200 North Area ditches as measured by portable Geiger counters is tabulated below:

April - May - June - 1948

LOCATION	NO. OF SURVEYS	INSTRUMENT READINGS*
"A" Ditch	8	750 counts/minute
"B" Ditch	7	22,000 counts/minute
"R" Ditch	7	38,000 counts/minute

*Background measurement of instrument about 50 counts/minute.

The activity level at the B and R ditch remained about the same as noted in the previous quarter. Since last quarter, the "A" building has been used for other purposes than for the usual storage and cleaning of cask cars; this change resulted in a tremendous decrease in the amount of radioactive contamination measured at the "A" ditch during this quarter.

200 AREA WASTE LINES:

Four surveys of the 200 West and 200 East Area waste lines between the [redacted] ing and the tank farms were made during the quarter. No readings above the background of the survey instruments were obtained indicating the probability of no underground line breaks.

Four surveys were made of the test holes in the 200 West Area and one survey in the 200 East area. The levels of activity measured inside the test holes at the level of the waste line proper were essentially at the background of the instruments used except inside the "B" and "B" hole which indicated the usual level of about 5 times the normal background.

200 WEST AREA WASTE SAMPLES:

A summary of alpha and beta contamination measured in samples taken every week in the 200 West Area is tabulated in the following table:

[redacted]

SECTION VII

ALPHA AND BETA CONTAMINATION IN HANFORD WASTES

The radioactive contamination in the exit cooling water of the 100 Area piles is [illegible] in the 107 retention basins and the 1904 spillways before being discharged [illegible] Columbia River. The average beta-gamma activity detected in the samples from the 107 area is summarized in the table below:

SAMPLE LOCATION	BETA—GAMMA ACTIVITY
[illegible]	$< 5 \times 10^{-5}$ uc/liter
107-D	0.26 uc/liter
107-F	0.20 uc/liter

No significant change was noted in the total beta-gamma activity of the 100 Area [illegible] samples in comparing the data of this quarter with that noted in the last quarter. The [illegible] area, containing in a non-operating condition, did not discharge any significant amounts of radioactive contamination into the river.

The total alpha activity in the 100 Area wastes remained about the same this quarter with an indication of trace amounts detected in some samples from the 100-D area retention basins. To date, none of this alpha activity has been detected in any of the [illegible] spillway samples or river samples. A recent thorough analysis of a sample from the 107-D basin indicated negative results for both uranium and plutonium. The [illegible] procedure is also currently being checked to determine the possibility of trace amounts of contamination being introduced into the analysis.

It is of interest to note that a sample of muck accumulated around the tubes at the [illegible] of the 100-D Area pile indicated alpha activity from polonium as high as [illegible] uc/gm/gram muck. A program is now set up to analyze all the 100 Area wastes initially for total alpha activity as well as conducting specific analyses for uranium, plutonium, and polonium, to insure that these contaminants are not discharged as effluent wastes which might find their way to the river.

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Water Sample Location	Total Beta Activity μc/liter		Total Alpha Activity dis/min/liter	
	Maximum	Average	Maximum	Average
Swamp, Inlet	5.9×10^{-5}	1.1×10^{-5}	400	60
Swamp, N. Side	2.3×10^{-4}	3.1×10^{-5}	180	70
Swamp, S. Side	4.8×10^{-5}	1.5×10^{-5}	480	80

Mud Samples Location	Total Beta Activity μc/gm		Total Alpha Activity dis/min/gram	
	Maximum	Average	Maximum	Average
Swamp, N. Side	0.12	0.06	540	210
Swamp, S. Side	[illegible]	0.14	470	160

There is no apparent significant change in the overall levels of the radio-active contamination measured in the T Swamp area when the data of this quarter is compared with that of the last quarter except for the noted increase in the total alpha activity measured in the mud samples.

A summary of the total alpha and beta contamination detected on weekly samples taken from the "U" Swamp in the 200 West Area is tabulated below:

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Location	Total Beta Activity μc per liter		Total Alpha Activity dis/min/liter	
	Maximum	Average	Maximum	Average
Laundry Ditch Inlet	3.6×10^{-4}	7.0×10^{-5}	234	96
Laundry Ditch 600'	6.7×10^{-4}	9.5×10^{-5}	256	90
231 Ditch Inlet	5.2×10^{-5}	7.5×10^{-6}	80	20
231 Ditch Underpass	3.0×10^{-5}	8.1×10^{-6}	245	60
T Swamp Inlet	4.8×10^{-5}	1.7×10^{-5}	195	76
T Swamp West Side	1.3×10^{-4}	1.0×10^{-5}	140	60

Contamination from the Laundry Building and the 231 Building is discharged into the "U" Swamp proper by means of closed disposal lines and open ditches. A review of the above data indicates that the wastes from the Laundry contribute somewhat more

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contamination to the swamp than does the 231 Building. Analysis of laundry lint taken from around and inside the building indicate contamination levels as high as 0.44 [illegible]/kg of lint and about 400 dis/min/gram of alpha activity all of which eventually is leached out into the "B" Swamp via the Laundry ditch. This type of material is the chief constituent of the radioactive contaminants in the Laundry ditch.

[illegible] RESULTS:

A brief summary of the results of analyses of water and mud samples taken from the 300 Area Retention Basin is tabulated below:

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Location Area Type Sample	Total Beta Activity		Total Alpha Activity	
	µc/liter	µc/liter	dis/min/liter	dis/min/liter
	Maximum	Average	Maximum	Average
Pond Inlet - Water	0.12	0.01	1.5×10^3	2.8×10^4
N.W. Corner - Water	3×10^{-4}	9×10^{-5}	7×10^3	1×10^3
	µc/kg		dis/min/kg	
Pond Inlet - Mud	6.0	1.4	4.5×10^4	6.8×10^3
N.W. Corner - Mud	0.3	9×10^{-2}	80	20

The alpha and beta activity detected in the 300 Area Retention Pond during this quarter is considerably higher than that usually found. There was a noted increase both in the total alpha and beta activity in samples taken from the inlet side of the pond. This increase would indicate that a contaminant had been discharged into the pond at some recent date. The high activities noted in this quarter were found to be chiefly from uranium as confirmed by fluorophotometer analyses.

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