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DATE 8/12/47

SUBJECT The Trend of Contamination in the Air
the Columbia River, Vegetation, and Waste
at the HEW for the period 3/25/47 - 6/30/47

To File

FROM J. W. Healy

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23 copies,

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~~+ 4 Isodose maps #7094, 3-5495,
#3-5553 and #7321~~

THE TREND OF CONTAMINATION IN THE AIR, THE COLUMBIA
RIVER, VEGETATION, AND WASTE AT THE HANFORD ENGINEER
WORKS FOR THE PERIOD MARCH 25, 1947 to JUNE 30, 1947

By: J. W. Healy
Date: 8/12/47

CLASSIFICATION CANCELLED
DATE <u>5-7-58</u>
For The Atomic Energy Commission
<i>H. F. Canale</i>
Chief, Declassification Branch <i>Can</i>

Medical Department (H.I. Section)
General Electric Company
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THE TREND OF CONTAMINATION IN THE AIR, THE COLUMBIA
RIVER, VEGETATION, AND WASTE AT THE HANFORD ENGINEER
WORKS FOR THE PERIOD MARCH 25, 1947 TO JUNE 30, 1947

The attached graphs and maps illustrate the contamination observed in and around the Hanford Engineer Works for the period of March 25, 1947 to June 30, 1947.

The air conditions at the Meteorology Station (Building 622) are summarized in graph I to indicate the fraction of the time that various wind directions prevailed during normal periods of metal dissolution. Approximately 54% of the time, the wind was from a northerly direction and approximately 18% the wind was from a southerly direction. These conditions are very close to those obtained during the last quarter. The estimated dilution factors occurring during this period are also summarized on the same graph. These factors indicate a continuation of the increase in the fraction of time that the dilution factors is less than 500 to 1 and between 500 and 1000.

The average vegetation contamination, as summarized in graph II for this period, dropped by a factor of four to five in all outlying regions. The averages for the 100 Areas, 300 Area, Richland, etc., were all less than half of tolerance. The level in the 200 Areas is about the same as for the last quarter. The trend charts (graphs V to XI) for individual locations are included to provide data for specific times during the three months period. The isocactivity chart (Map 4) indicates a spread of vegetation contamination to the West and Northwest of the stacks. Several isolated areas of contamination greater than the tolerance level were found on the Wahluke Plateau.

The summary of the average air borne contamination as determined by the use of filters (graph III) indicates a decrease in the air concentrations by a factor of two to five in locations on the reservation. A very slight decrease is noted in Pasco and Benton City. The trend charts, graphs XII to XV, indicate that the greatest decrease occurred during the last three weeks of the period.

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In general, the average radiation levels on the reservation as observed with the detachable ionization chambers remain the same as during the previous period. There was an average decrease of 0.5 mrep/24 hrs. in the locality of five miles within the 200 Areas. These readings are summarized in Table I. The summary of the average Columbia River contamination (graph IV) indicates a decrease in levels as would be expected from the increased flow of the river. The average estimated flow of the Columbia River during this period was approximately 1,900,000 gallons per second while the average flow during the first three months of 1947 was approximately 350,000 gallons per second. The cross section samples at Hanford again indicate a higher concentration at the South bank. The average concentration is approximately equal to the concentration at the 300 and the 700 Areas.

Several graphs (XVI to XIX) have been prepared to indicate the trend of the alpha and beta contamination detected in samples of water and mud taken from the 300 Area retention basin. The trends of uranium concentration in the 300 Area wells and sanitary water are given in graphs XX to XXII. The water levels in the wells during this period were obtained from the Power Department and are also plotted on graphs XX and XXI. The contamination levels were obtained by evaporating 500 cc of the water and counting the residue directly for alpha with no correction for self-absorption. It may be noted that the 300 Area sanitary water appears to be slightly more active than the wells. It is believed that this is due to the reduction of solids in the water in the processing plant.

Graph XXIII indicates the trend of the maximum radiation reading around the 200 North Area waste ditches.

Two complete surveys of the fourteen holes around the waste lines in the 200 West Area were made with a G.M. Probe. Two holes, one at the juncture of the line to the "T" Farm and the "U" Farm, and one approximately half way between the "T" Farm and "U" Farm gave positive values ranging from twice to six times the background reading of 40 to 50 counts per minute. Holes approximately 30 feet from these sites gave background readings.

Methods of Evaluation

The methods used were the same as reported in previous quarterly and yearly reports. A study of the technique used for water analysis indicated approximately 100% yield for substances emitting a 1.3 Mev beta particle and approximately 50% yield for plutonium in 200 West sanitary water.

The waste hole surveys are carried out by lowering a G.M. Probe to within six inches of the bottom of the hole (usually eleven feet) and measuring the counting rate for five minutes.

L. J. Cherubin

W. C. Berlin

H. J. Pass

J. W. Healy

J. W. Healy
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8/12/47

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TABLE I

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Radiation Levels Observed With
Detachable Ionization Chambers In
mrep/24 hrs

<u>Location</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>Averages</u>
100 Area and Environs				0.7
Rt. 1 Mile 8 (100-B)	0.5	0.5	0.5	
Rt. 2-N Mile 10 (100-D)	0.7	0.7	0.5	
Rt. 2-N Mile 5 (100-F)	0.7	0.7	0.7	
Rt. 11-A Mile 1 (Hanford)	1.0	0.7	0.7	
Rt. 1 and Rt. 4-N	0.7	0.7	0.7	
Within 5 miles of 200 Areas				1.2
Rt. 4-S Mile 6	1.2	1.7	1.0	
Rt. 11-A Mile 6	1.0	1.0	0.7	
Rt. 3 Mile 1 (meteorology)	0.7	1.7	0.7	
Meteorology 200' Level	1.7	1.0	1.0	
Gable Mountain Summit	1.7	1.7	0.7	
Within 10 miles of 200 Areas				1.0
Rt. 4-S Mile 10	1.0	1.2	1.0	
Rt. 10 Mile 1	0.5	1.2	0.7	
Rt. 10 Mile 3	0.7	1.2	1.0	
Rt. 2-S Mile 4	0.7	0.7	0.7	
Near 300 Area				0.7
Rt. 4-S Mile 16	0.7	0.7	0.7	
Rt. 4-S Mile 22	0.5	0.7	0.7	

All the above values include the background measurements at the monitored locality.

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- I. Summary of Air Conditions at the 622 Bldg. for the dissolving hours of 4 P.M. to 8 A.M. during period April 1 - June 30, 1947.
- II. Summary of the Average Vegetation Contamination (B&G) in $\mu\text{c}/\text{kg}$ for period of March 25 - June 25, 1947.
- III. Summary of the Average Air Contamination (B&G) in $\mu\text{c}/\text{liter}$ for period Mar.31-June 1947
- IV. Summary of the Average Columbia River Contamination for period Mar.31 -June 30,1947
- V. Trend of Vegetation Contamination (B&G) in $\mu\text{c}/\text{kg}$ at Richland and Pasco.
- VI. Trend of Vegetation contamination (B&G) " " " Kennewick and Benton City
- VII. Trend of Vegetation Contamination (B&G) " " " Hanford and 300 Area
- VIII. Trend of Vegetation Contamination (B&G) " " " 100-B, 100-D, 100-F
- IX. Trend of Vegetation Contamination (B&G) " " " Rt.4S,M1.4 & Meteorology 622 Bldg.
- X. Trend of Vegetation Contamination (B&G) " " " Riverland & Midway Power
- XI. Trend of Vegetation Contamination (B&G) " " " Gable Mt. & Columbia Camp
- XII. Trend of Air Contamination (B&G) in $\mu\text{c}/\text{liter}$ at 200-East Area.
- XIII. Trend of Air Contamination (B&G) " " " Gable Mt. & 100-D Area
- XIV. Trend of Air Contamination (B&G) " " " Benton City and Pasco
- XV. Trend of Air Contamination (B&G) " " " 300 and 700 Areas
- XVI. Trend of Water Contamination (B&G) " " " 300 Area Pond
- XVII. Trend of Water Contamination (alpha) in $\text{dis}/\text{min}/\text{liter}$ at 300 Area Pond
- XVIII. Trend of Mud Contamination (alpha) in $\text{dis}/\text{min}/\text{kg}$ around the 300 Area Pond
- XLX. Trend of Mud Contamination (B&G) in $\mu\text{c}/\text{kg}$ around the 300 Area Pond
- XX. Trend of Uranium Contamination in $\text{d}/\text{m}/\text{liter}$ at 300 Area Well #1
- XXI. Trend of Uranium Contamination in $\text{d}/\text{m}/\text{liter}$ at 300 Area Well #2
- XXII. Trend of Uranium Contamination in $\text{d}/\text{m}/\text{liter}$ at 300 Area Sanitary Water
- XXIII. Trend of the Maximum Weekly Contamination (April,May,June) (B&G) observed around the Waste Ditches in the 200-North Area.

MAPS

- I. Extent of Off-area Vegetation Contam. for period May 12-June 21,1947 HEW-7094
- II. Extent of Off-area Vegetation Contam. " " Mar.5-Apr. 23, 1947 #3-5495
- III. Extent of Vegetation Contam. on Wahuks Plateau for period Apr.29-May 6,1947 #3-5553
- IV. Average Vegetation Contam. Isodose Map for period Mar.25-June 23,1947 HEW-7321

at the 622 Bldg.
for the dissolving hours of
4 P.M. to 8 A.M.

during the period
April 1 through June 30, 1947

11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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WILD DIRECTIONS

DILUTION FACTORS

Percent of Time

Q

4

15

5

34

34

↓ ↓ ↓

100

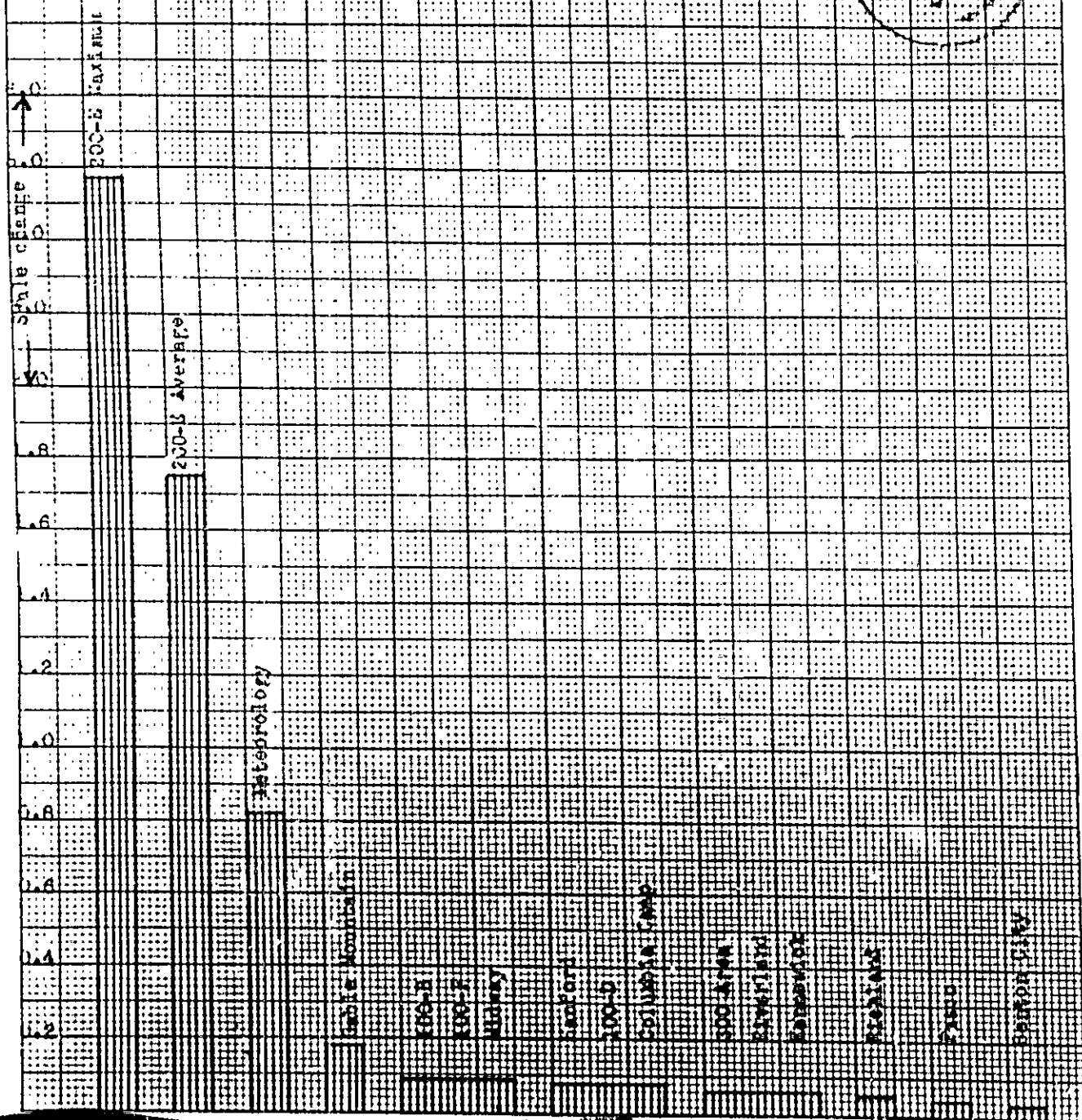
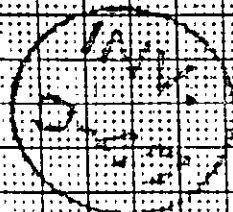
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GRAPH II
SUMMARY OF THE AVERAGE
NEUTRON CONTAMINATION (E.A.G.) IN
ON THE PERIOD OF MARCH 25 TO JUNE 25, 1964

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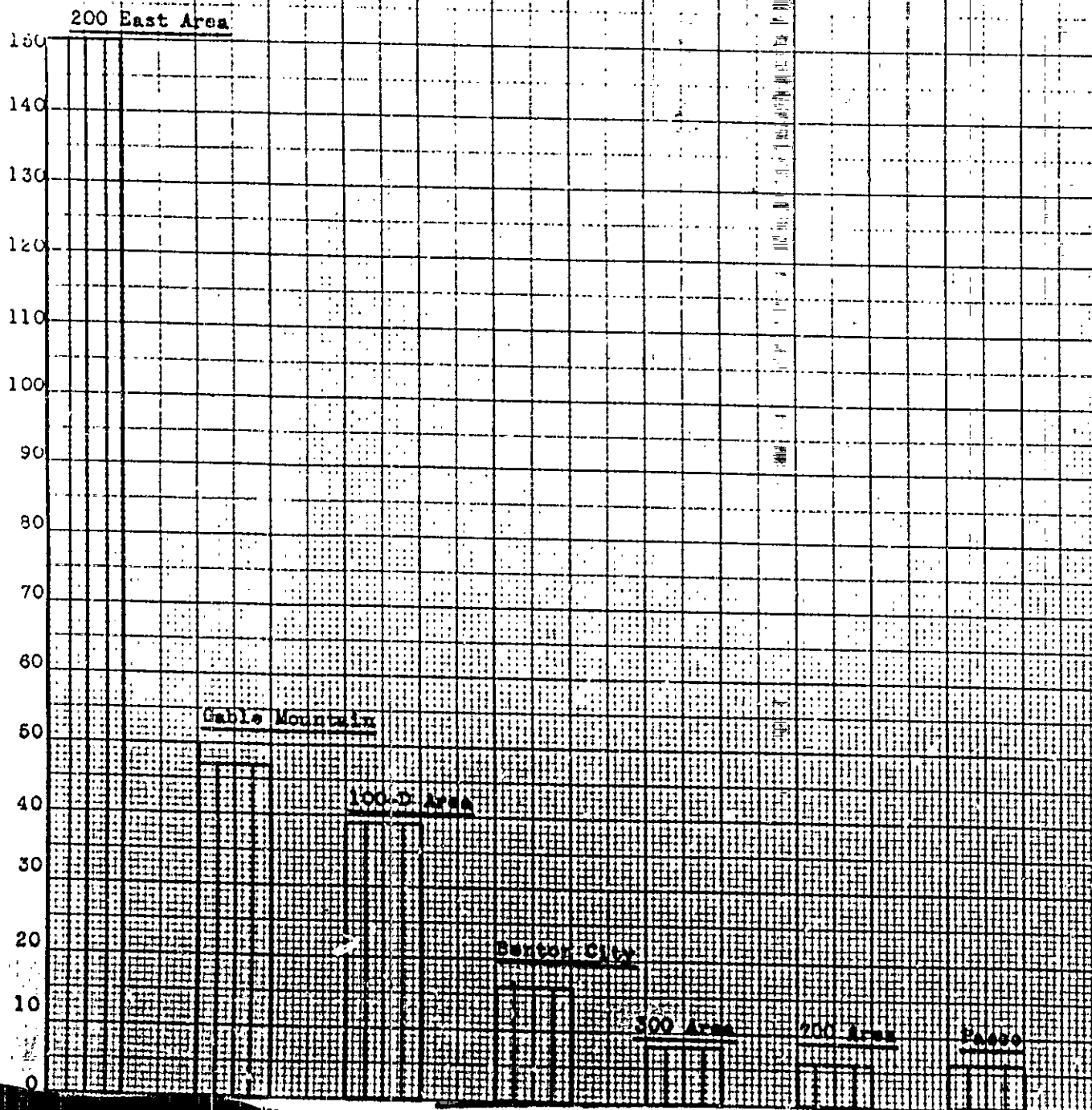


μc/Liter
x10-10

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MAP I
SUMMARY OF THE AVERAGE
AIR CONTAMINATION (B & G)
in μc/Liter
for the period
March 25, 1947 to June 24, 1947

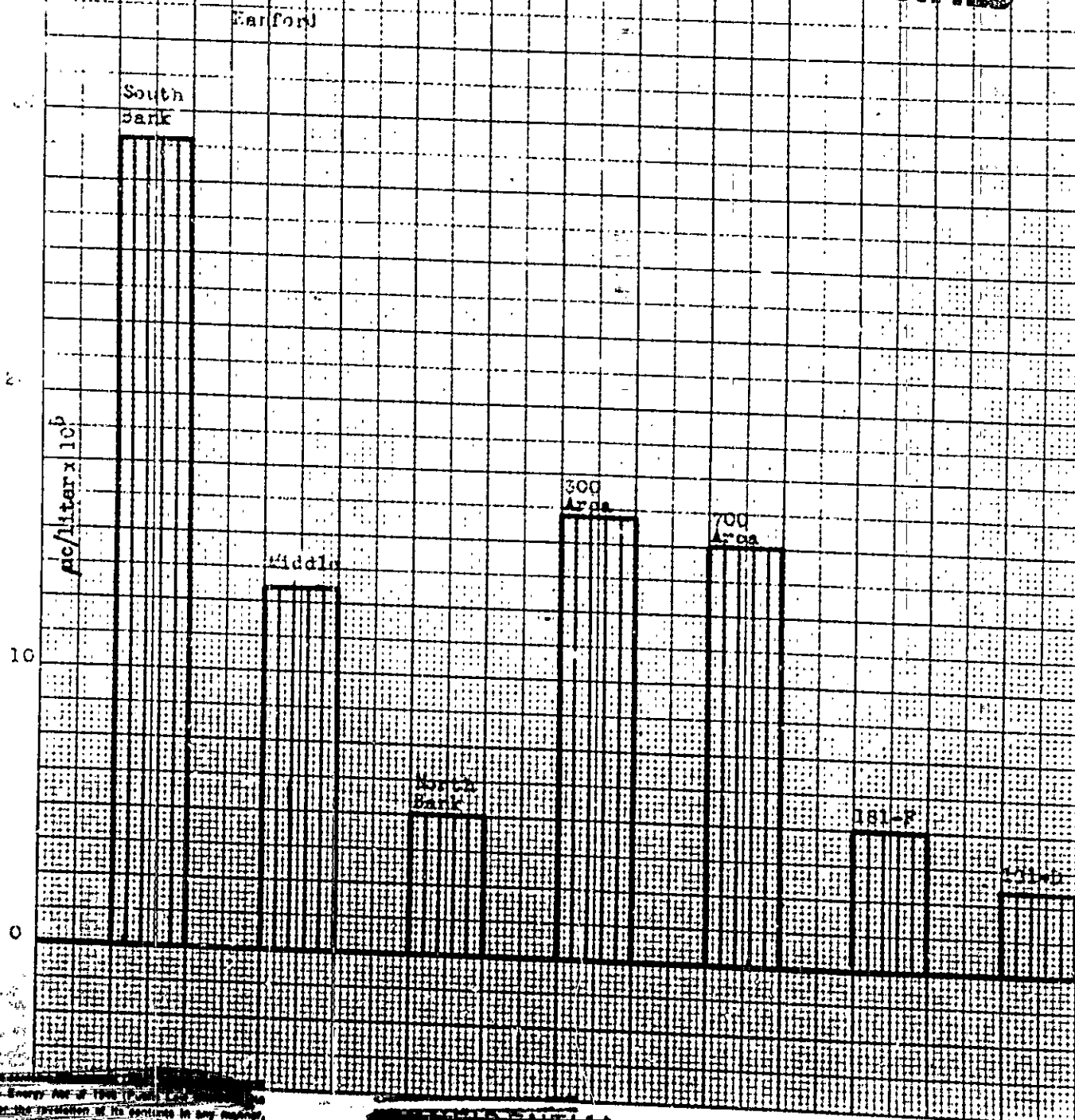
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SUMMARY OF THE AVERAGE COLUMBIA
RIVER CONTRIBUTION
 for the period of March 31 to June 30, 1947

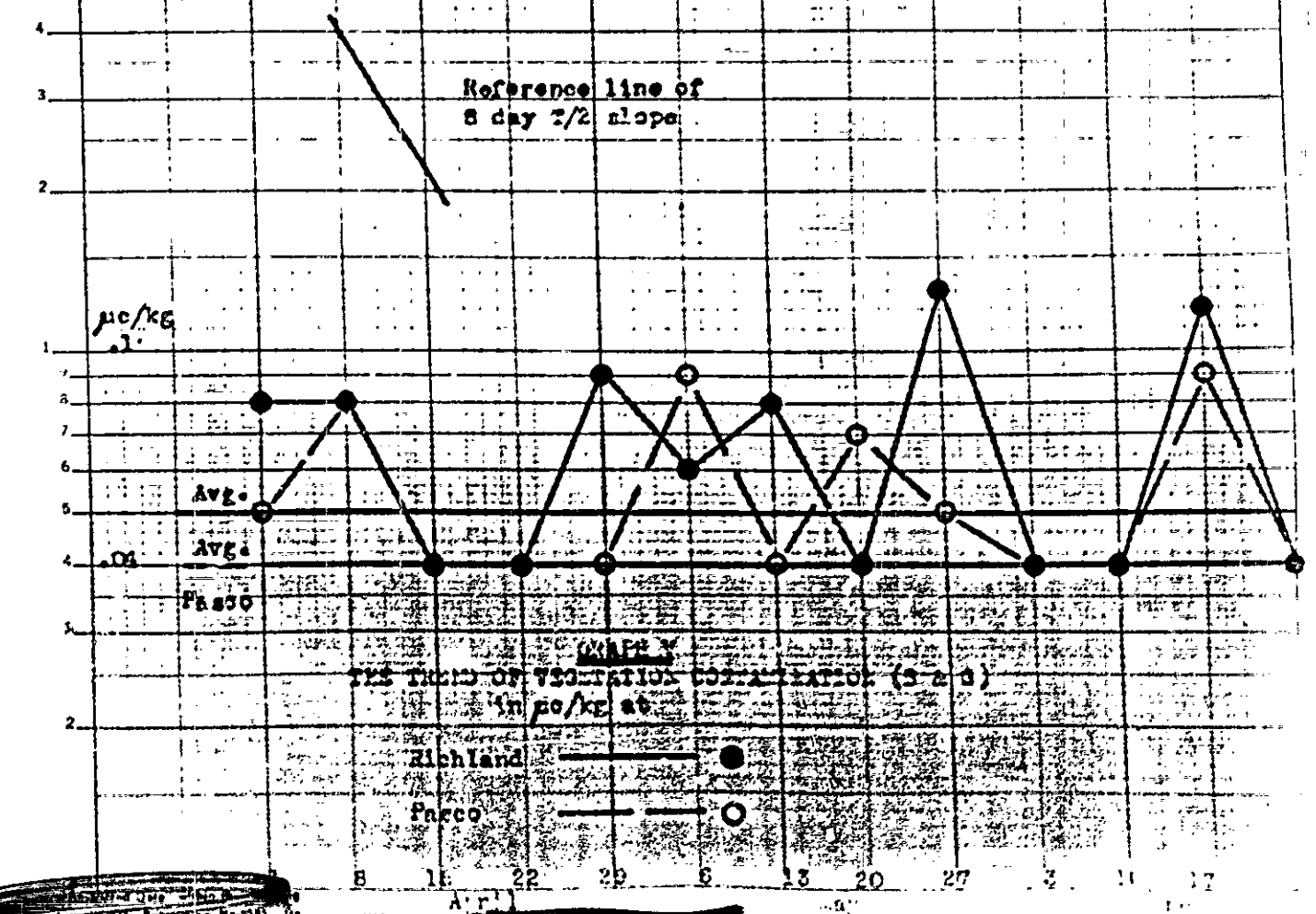
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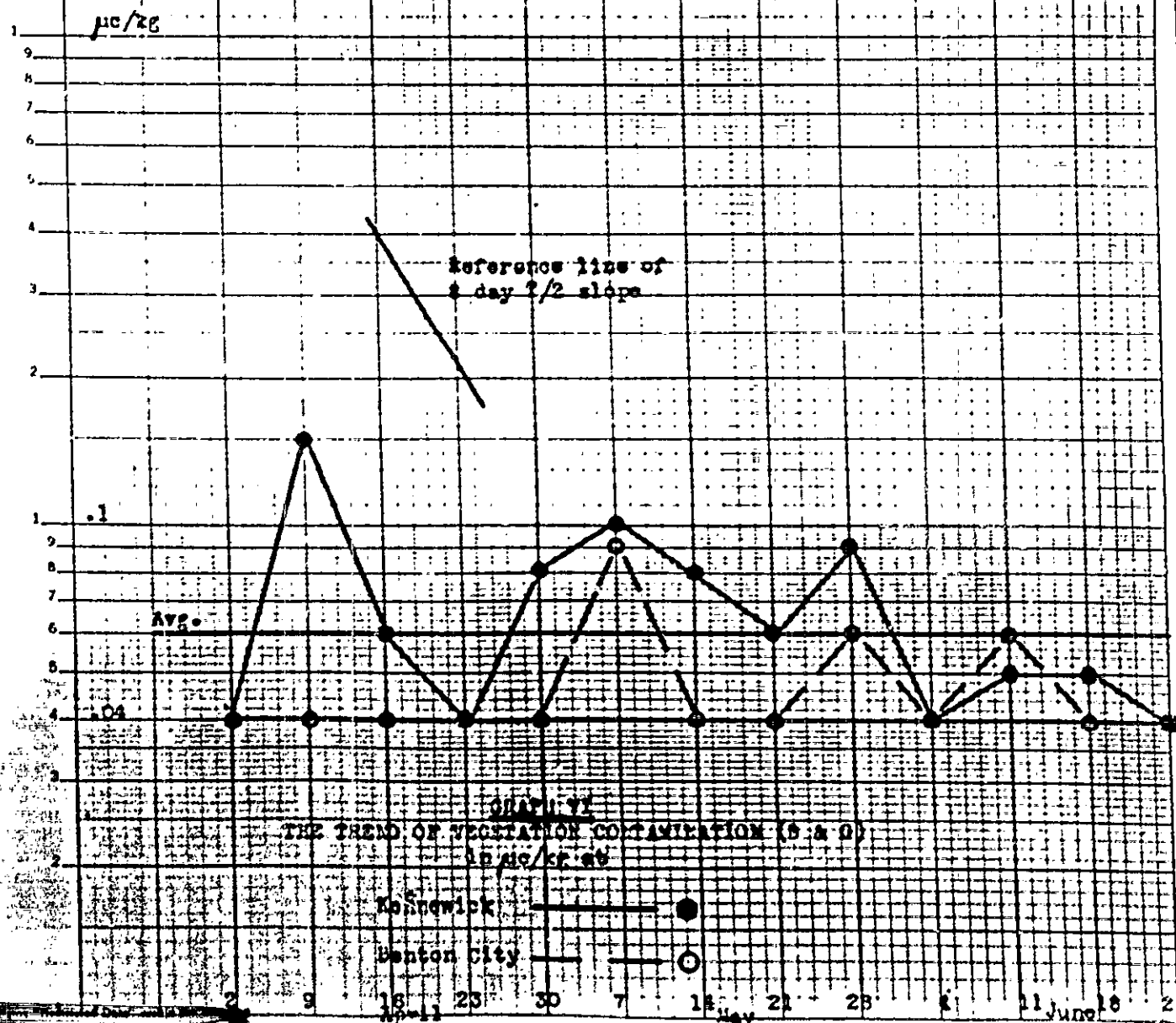
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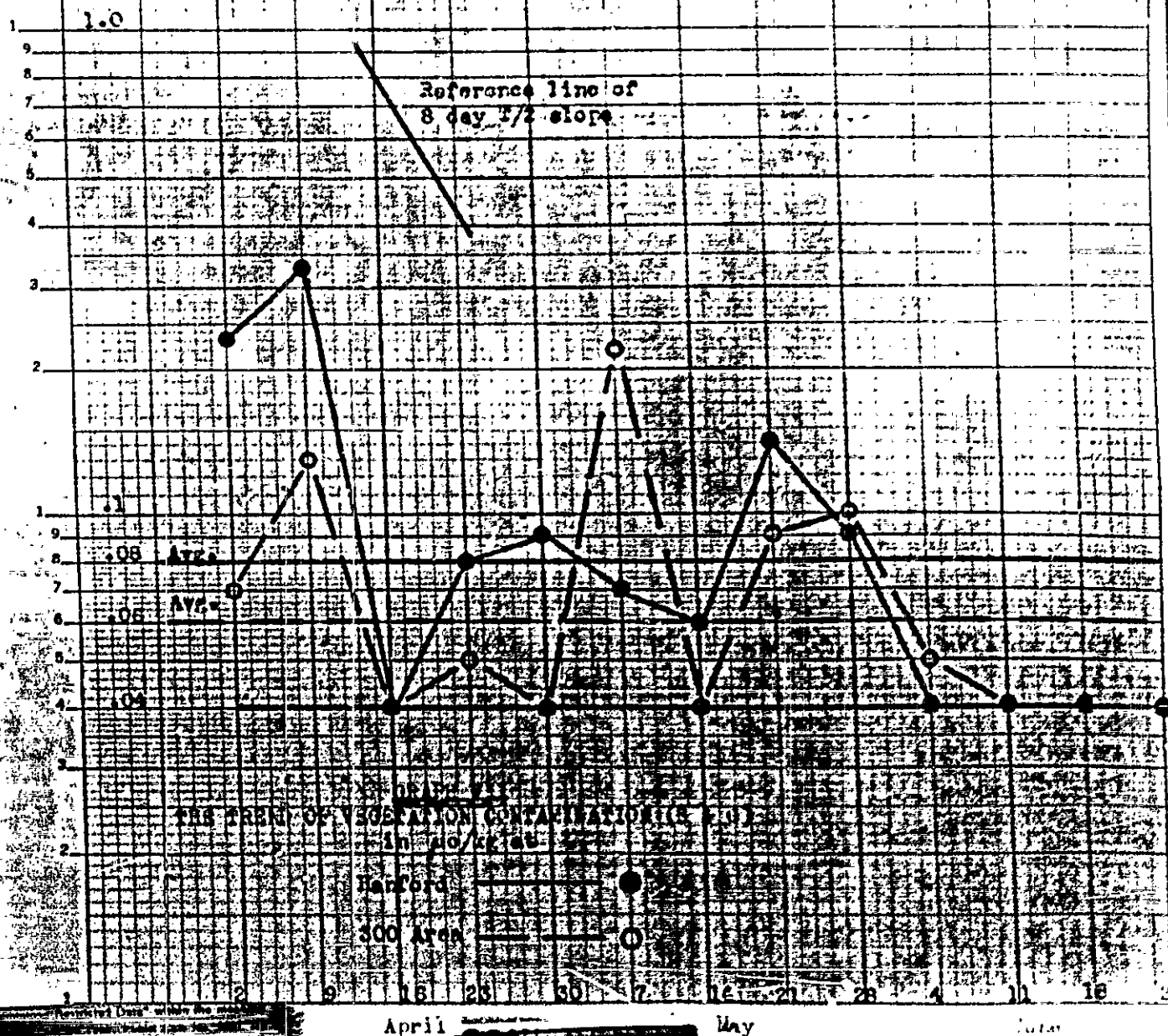
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Reference line of
 8 day T/2 slope

$\mu\phi/kZ$
 1.0

100H and 100F

1.09

1.08

Avg.

Avg.

1.07

1.06

1.05

1.04

1.03

1.02

1.01

1.00

0.99

0.98

0.97

0.96

0.95

0.94

0.93

0.92

0.91

0.90

0.89

0.88

0.87

0.86

0.85

THE TREND OF VEGETATION CONTAMINATION (R + G)

1.00/kZ

1.00/kZ

1.00/kZ

1.00/kZ

1.00/kZ

1.00/kZ

1.00/kZ

1.00/kZ

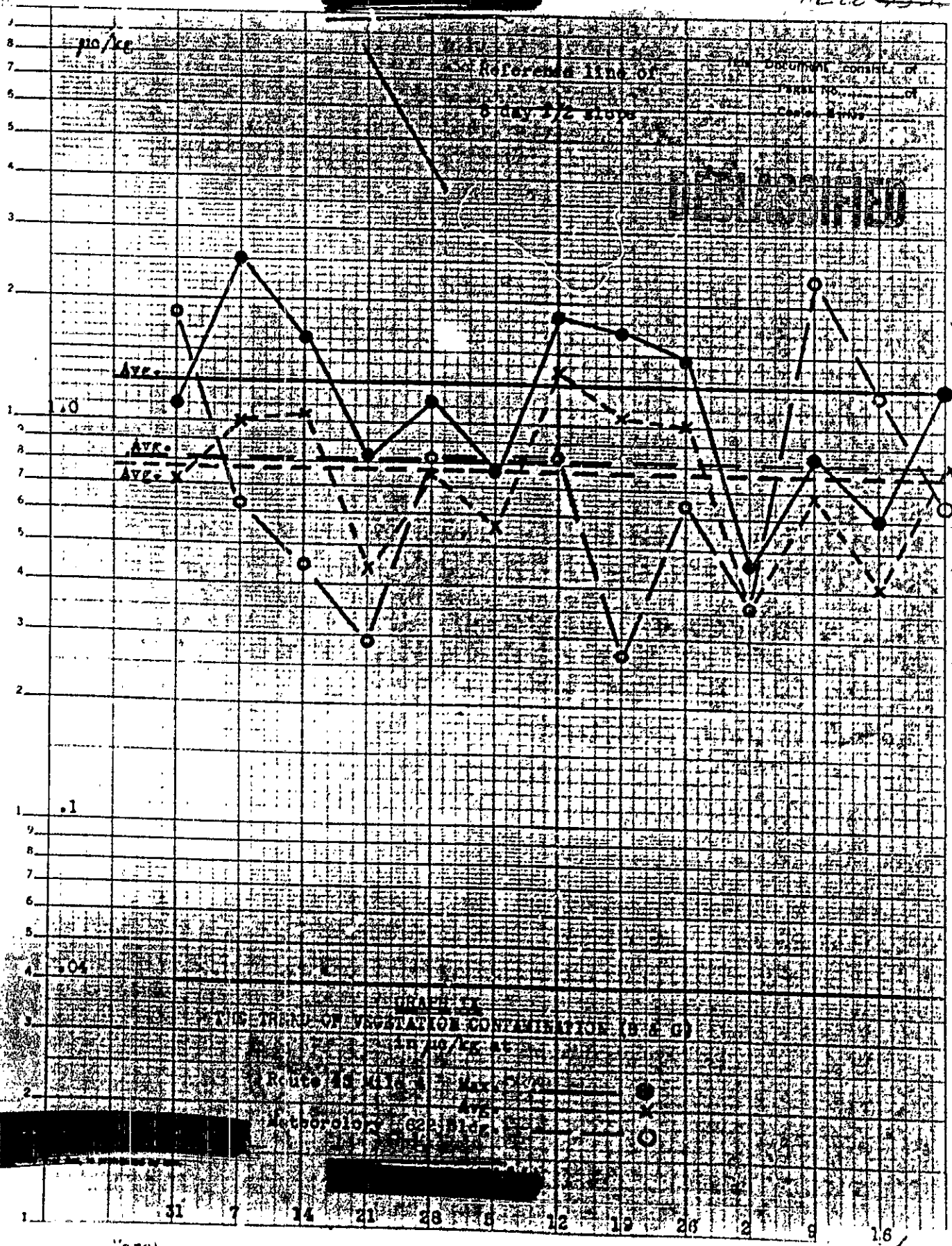
1.00/kZ

1.00/kZ

1.00/kZ

April 11 4 21 28 5 13 20 May 27 2 9 June 16 23

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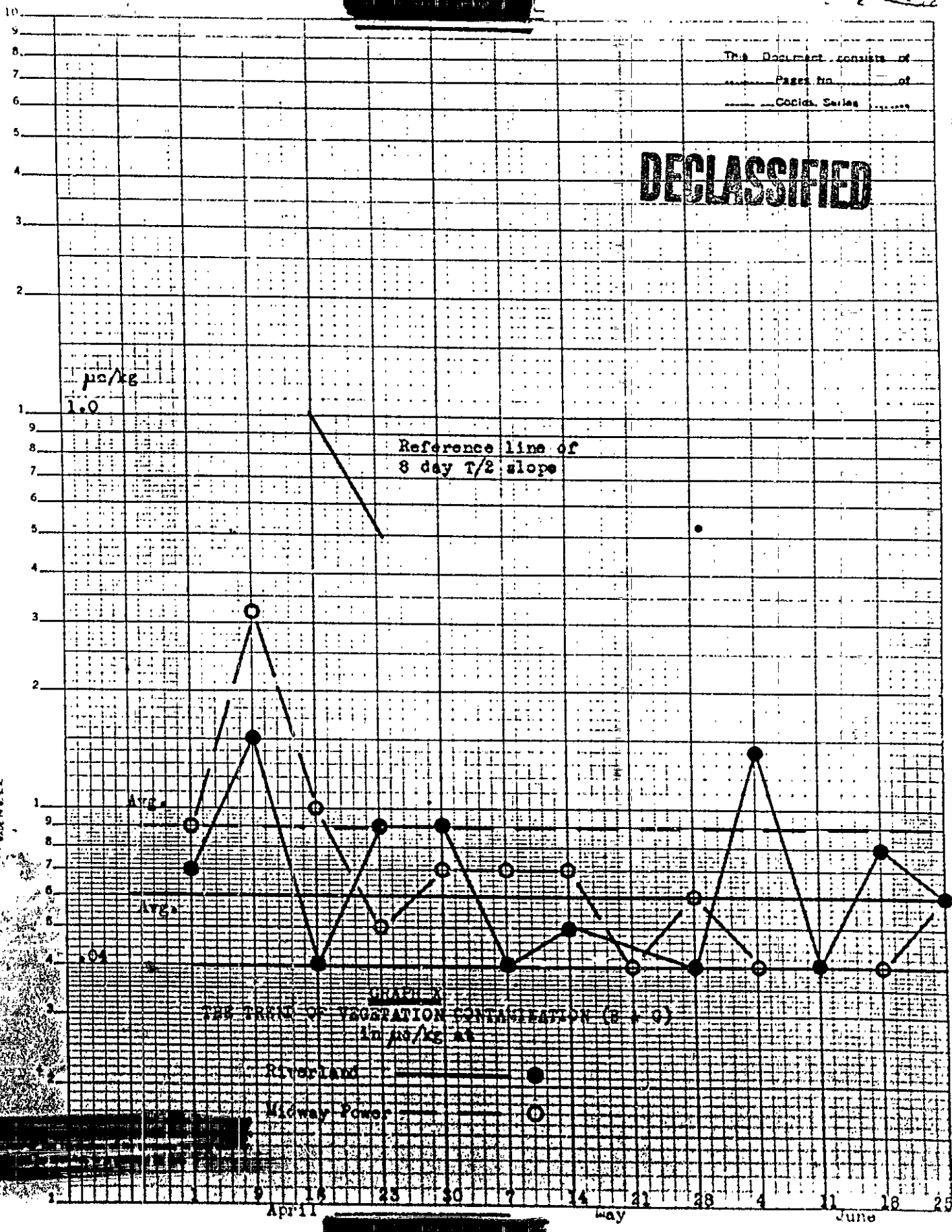
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GRAPH X
THE TREND OF VEGETATION CONTAMINATION (2 - 4)
In $\mu\text{Ci/kg}$ at

Riverland

Midway Power

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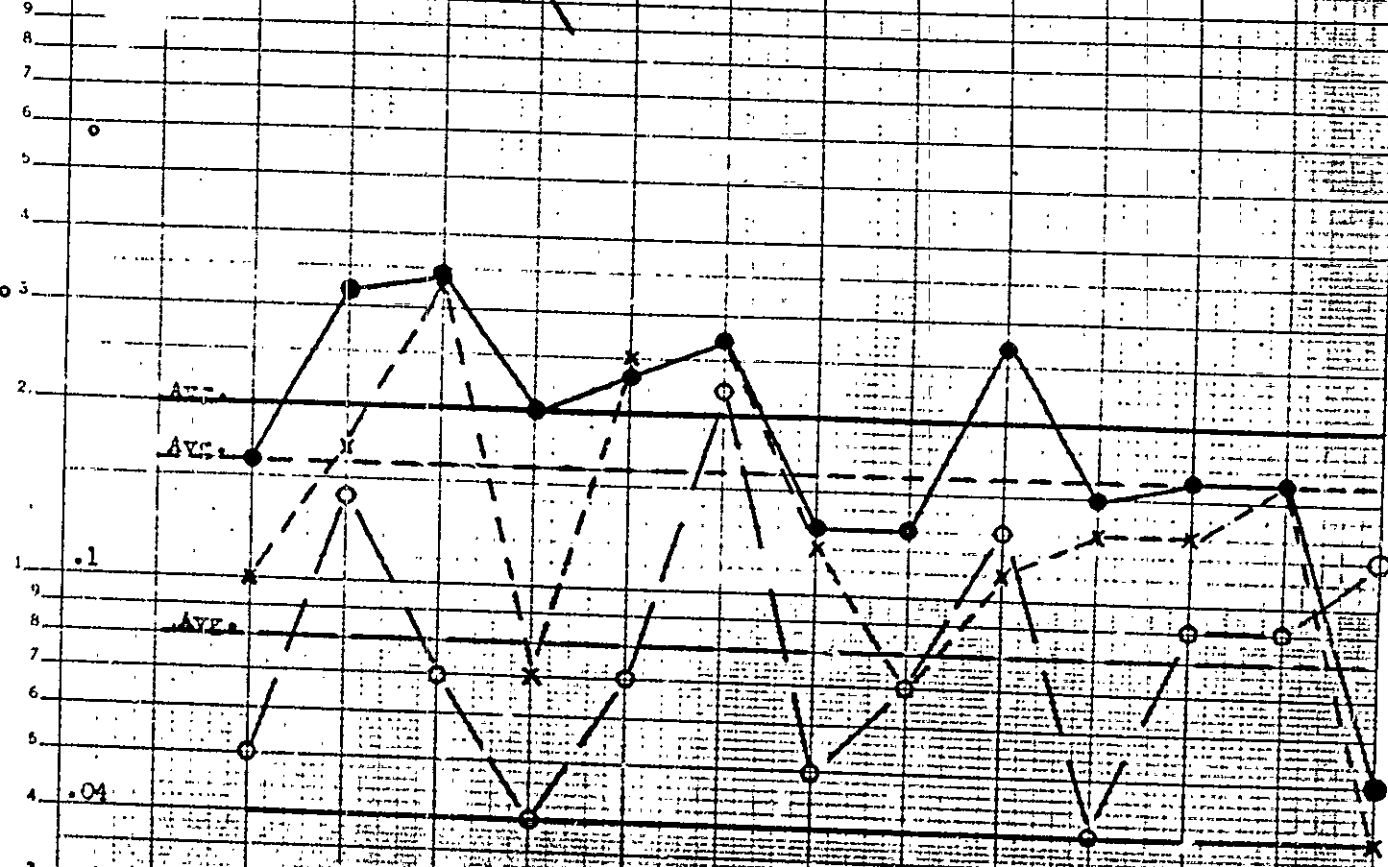
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8 day 1/2 slope

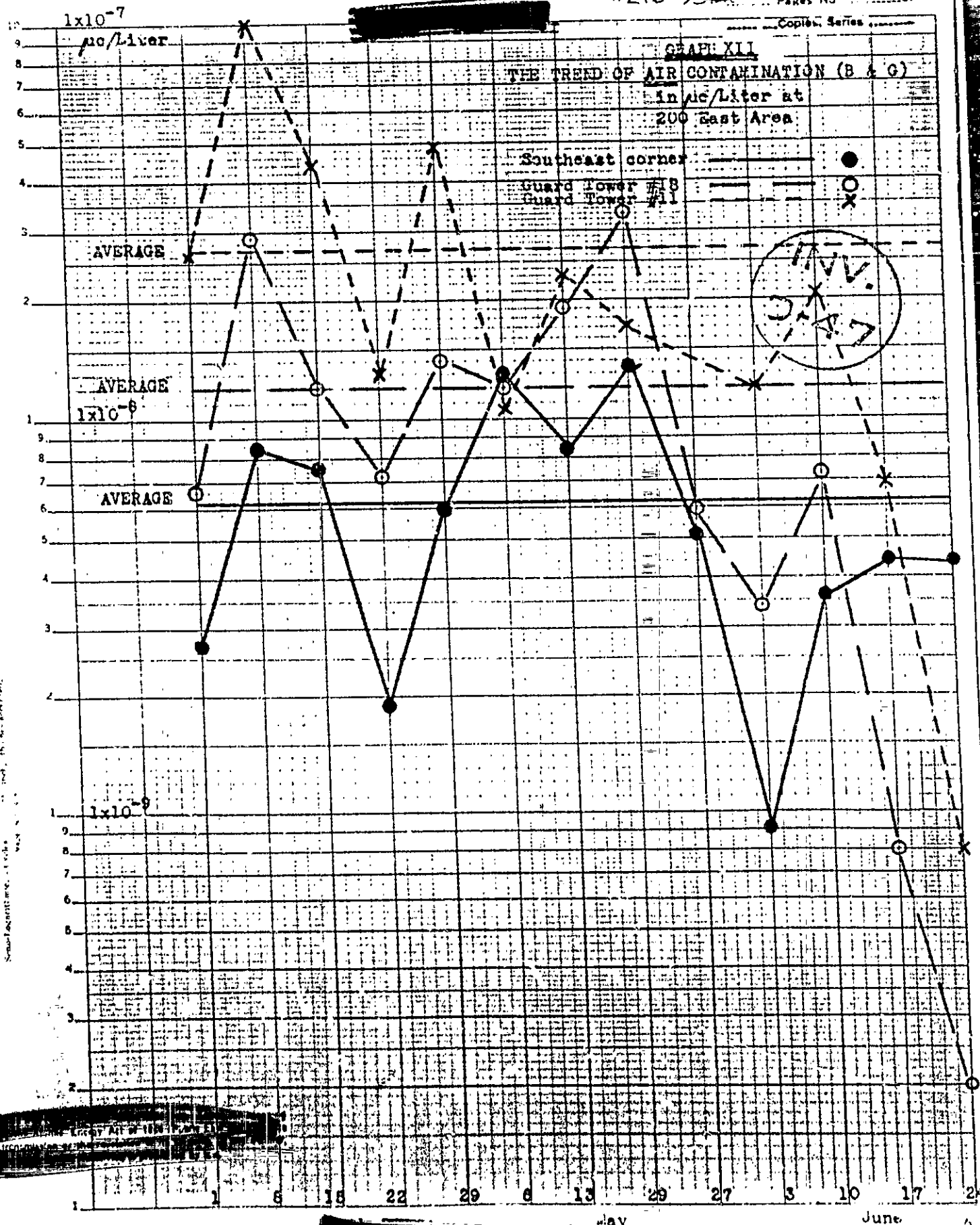
1.0 $\mu\text{g}/\text{kg}$



GRAPH XI
THE TREND OF VEGETATION CONTINUATION (2. A 8)
in $\mu\text{g}/\text{kg}$ at

Cable Mountain East end —●—
Columbia Camp East end —x—
Columbia Camp —○—

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
APRIL MAY JUNE



7311

μg/Liter

GRAPH XIV

Palco

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AVERAGE

See-Longtime, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 26

Sum
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April

$\mu\text{c/Liter}$

GRAPH XV
THE TREND OF AIR CONTAMINATION (B & G)
in $\mu\text{c/Liter}$ at

300 Area

700 Area

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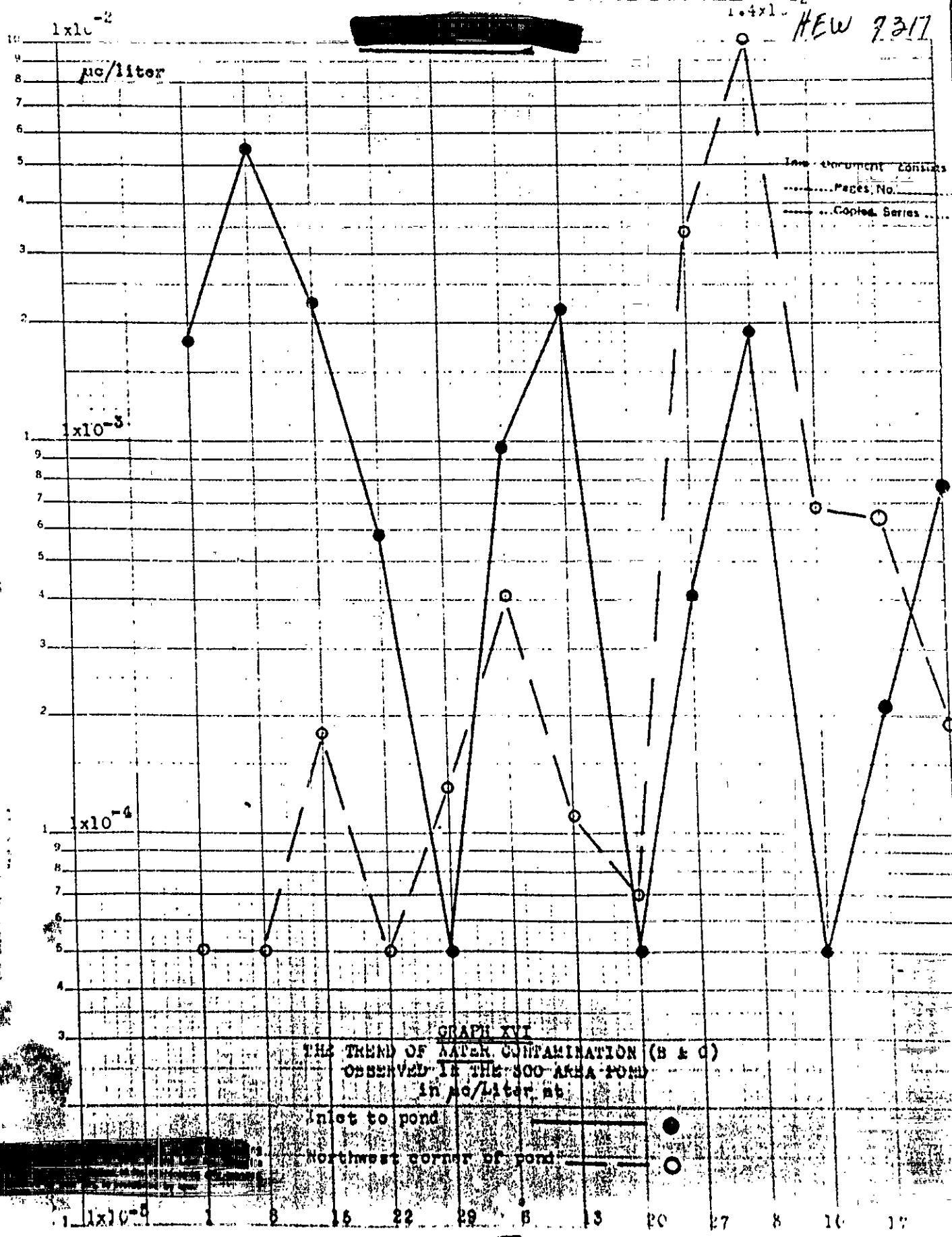
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April May June

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NEW 7317

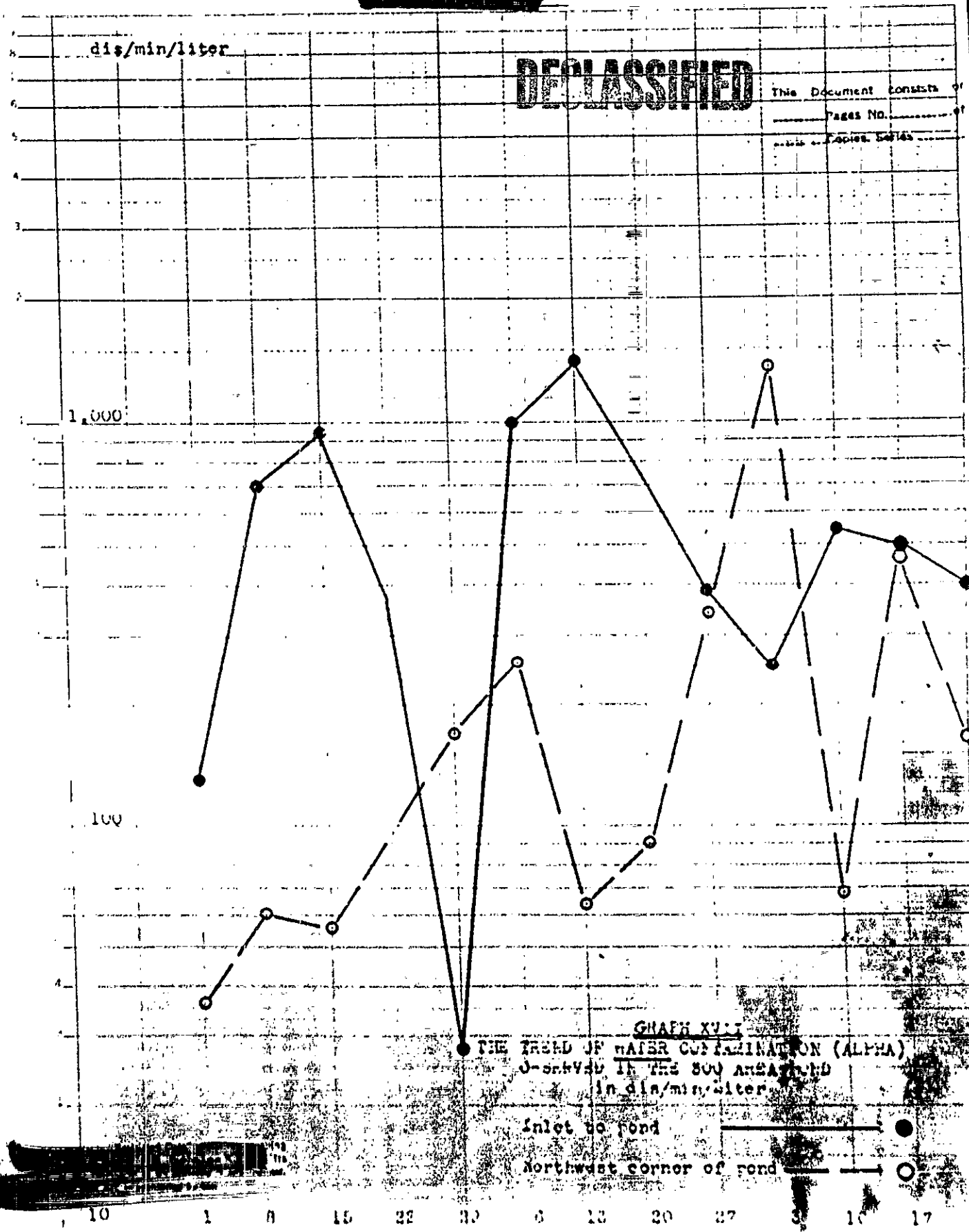


GRAPH XVI
THE TREND OF WATER CONTAMINATION (B & C)
OBSERVED IN THE 300 AREA POND
in mc/liter at

April

CONFIDENTIAL

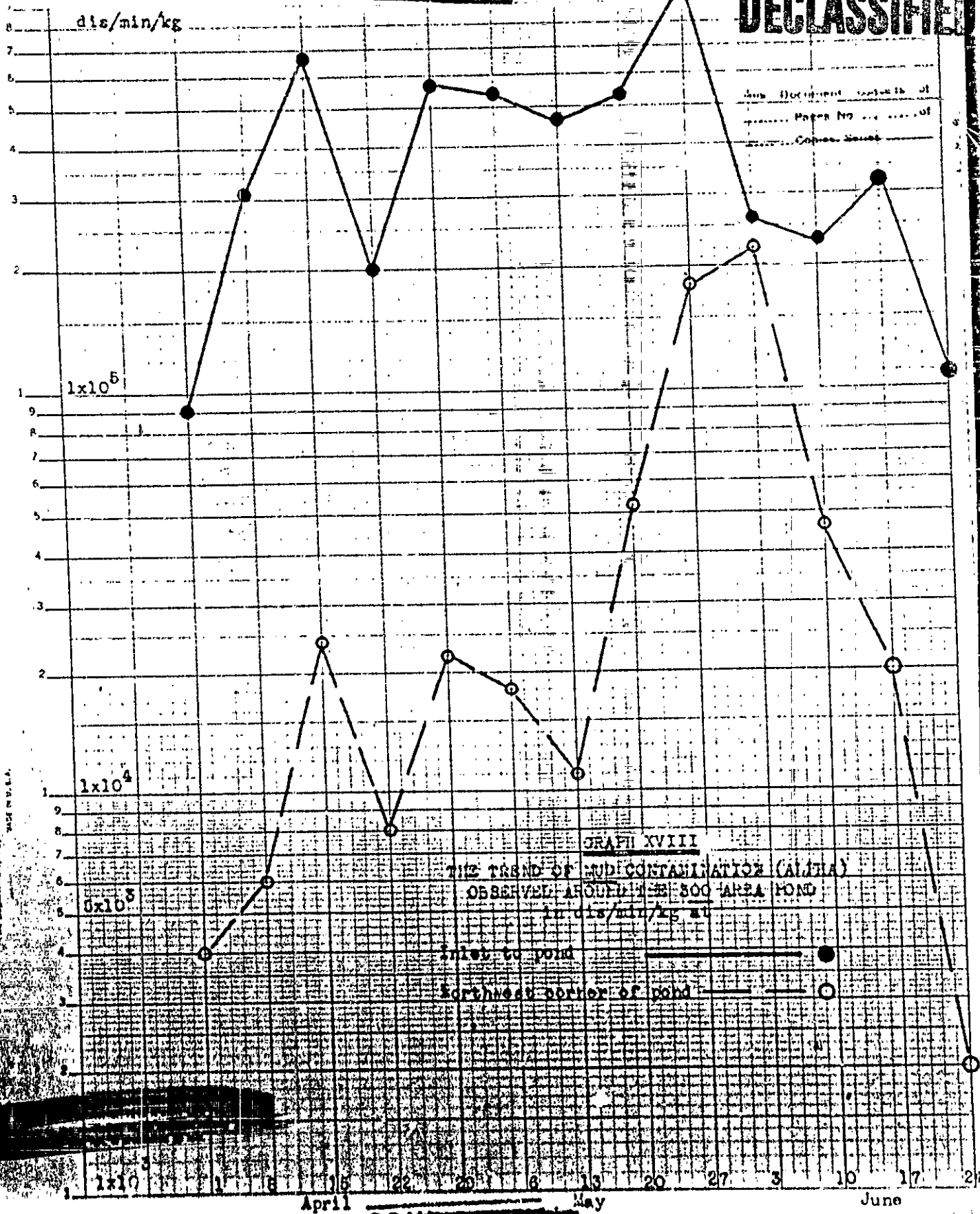
111 11 7922



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1×10^5

dis/min/kg



STUFFEL & SUTTER CO., N. Y. R.D. 14-21
East Laguardia, 3 Cycles X N to the inch, 7 1/2 inch aperture,
100% N.B.A.

7301
DECLASSIFIED

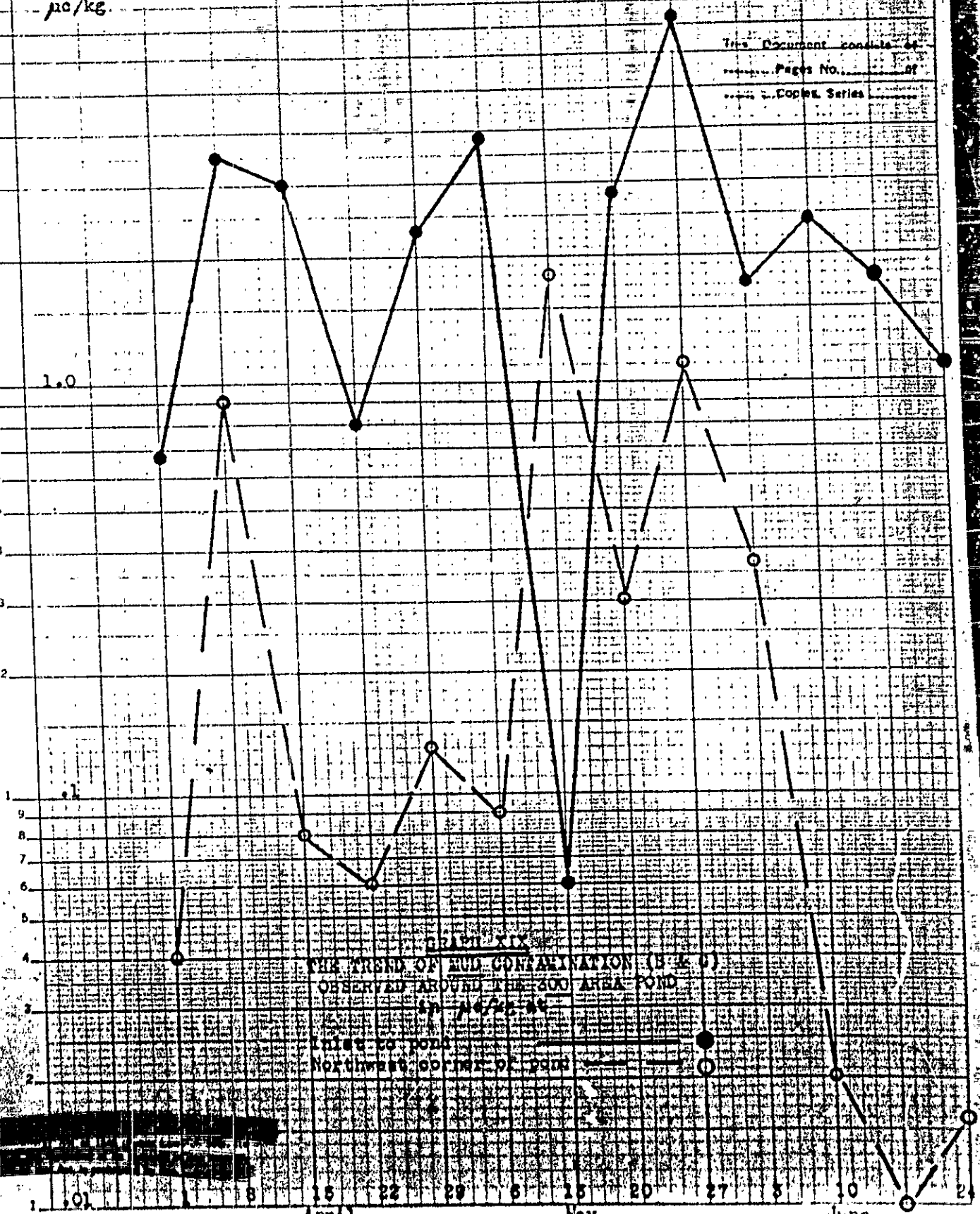
µg/kg

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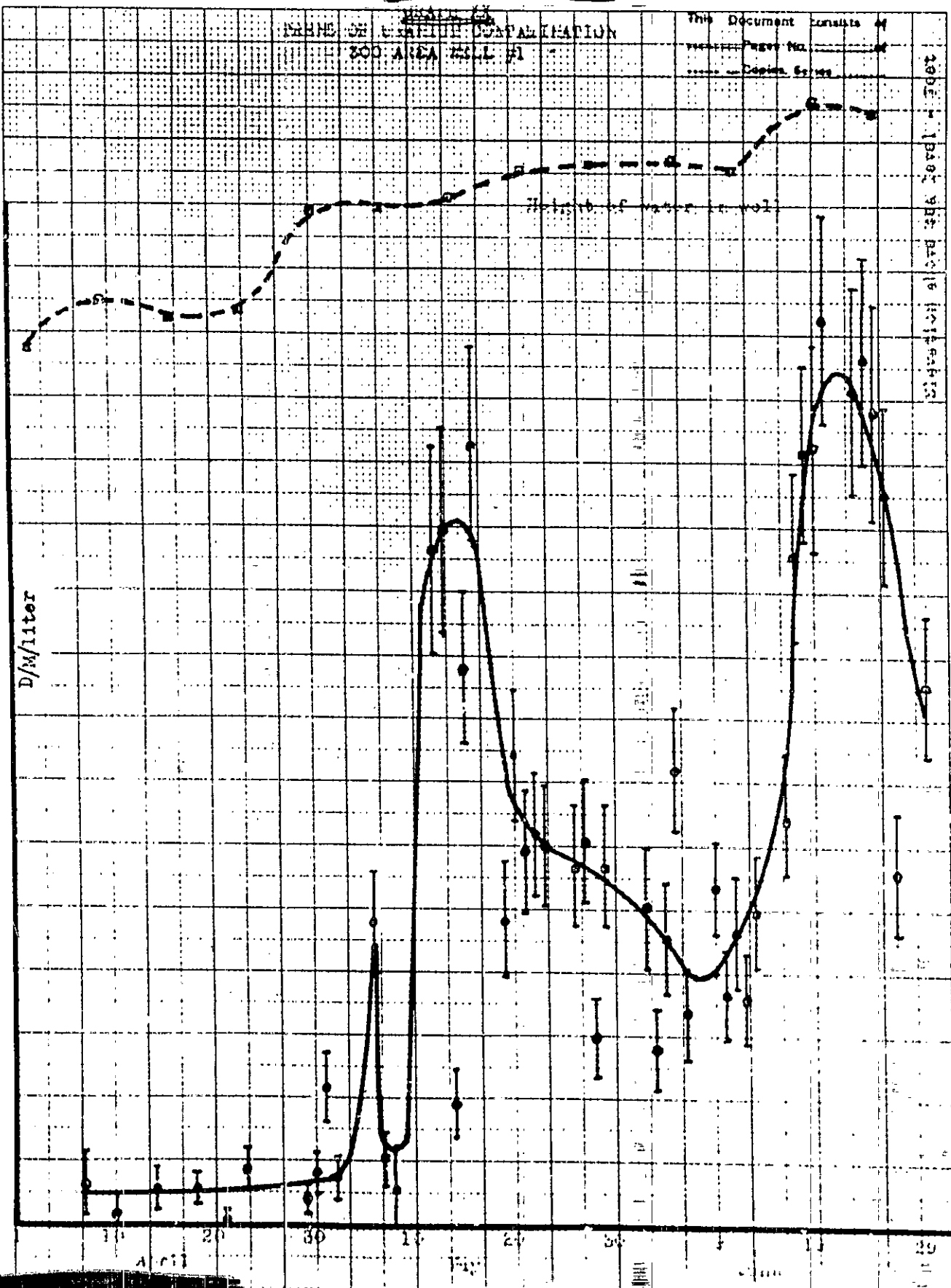
1.0

GRAPH XIX
THE TREND OF MUD CONTAMINATION (B-2-C)
OBSERVED AROUND THE 200 AREA POND
in April at
Northwest corner of pond

1 01 8 15 22 29 6 13 20 27 3 10 2
April May June



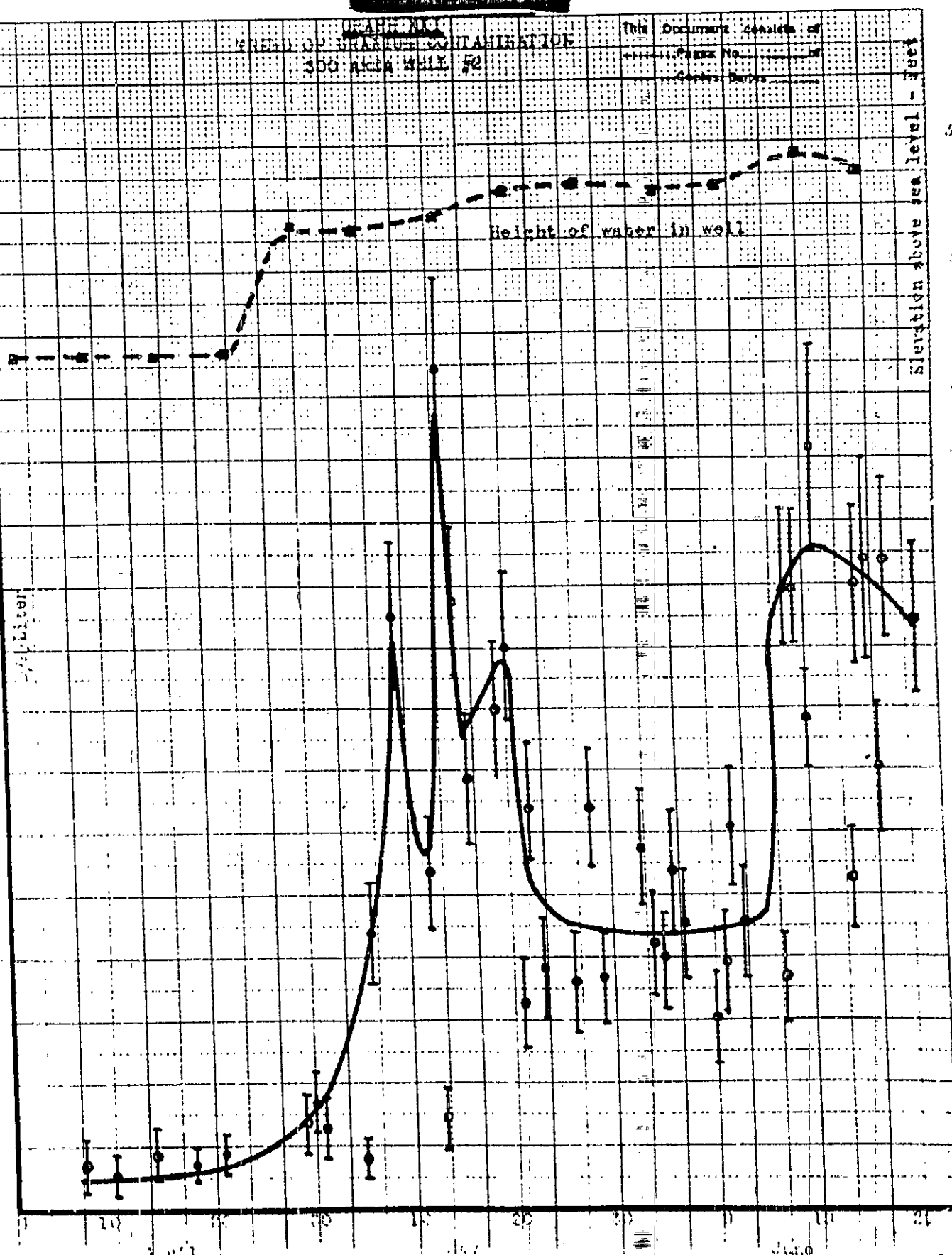
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SECRET

FIELD OF GRAVITY CONTAMINATION
300 ACIA WELLS 72

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SECRET

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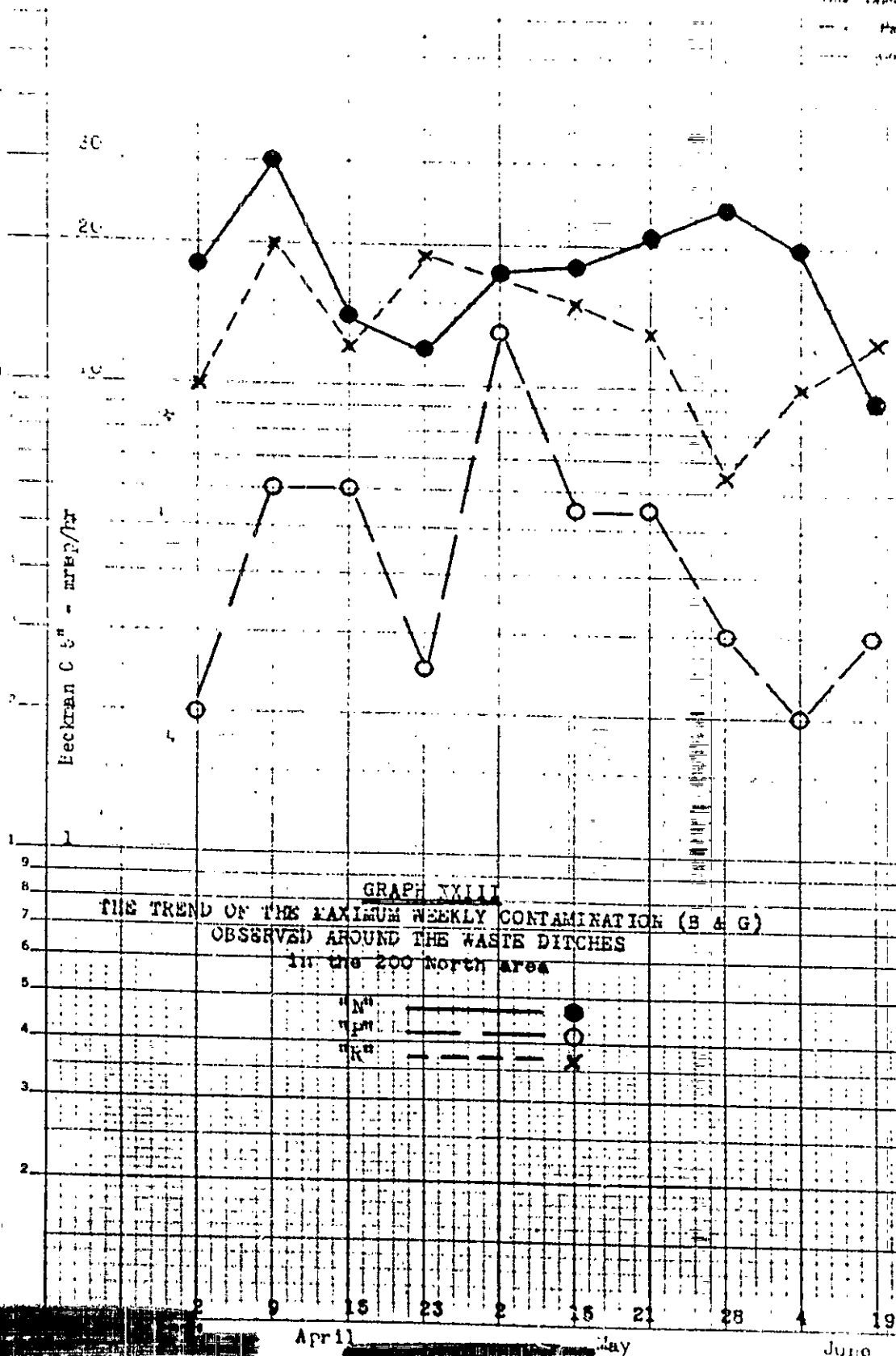
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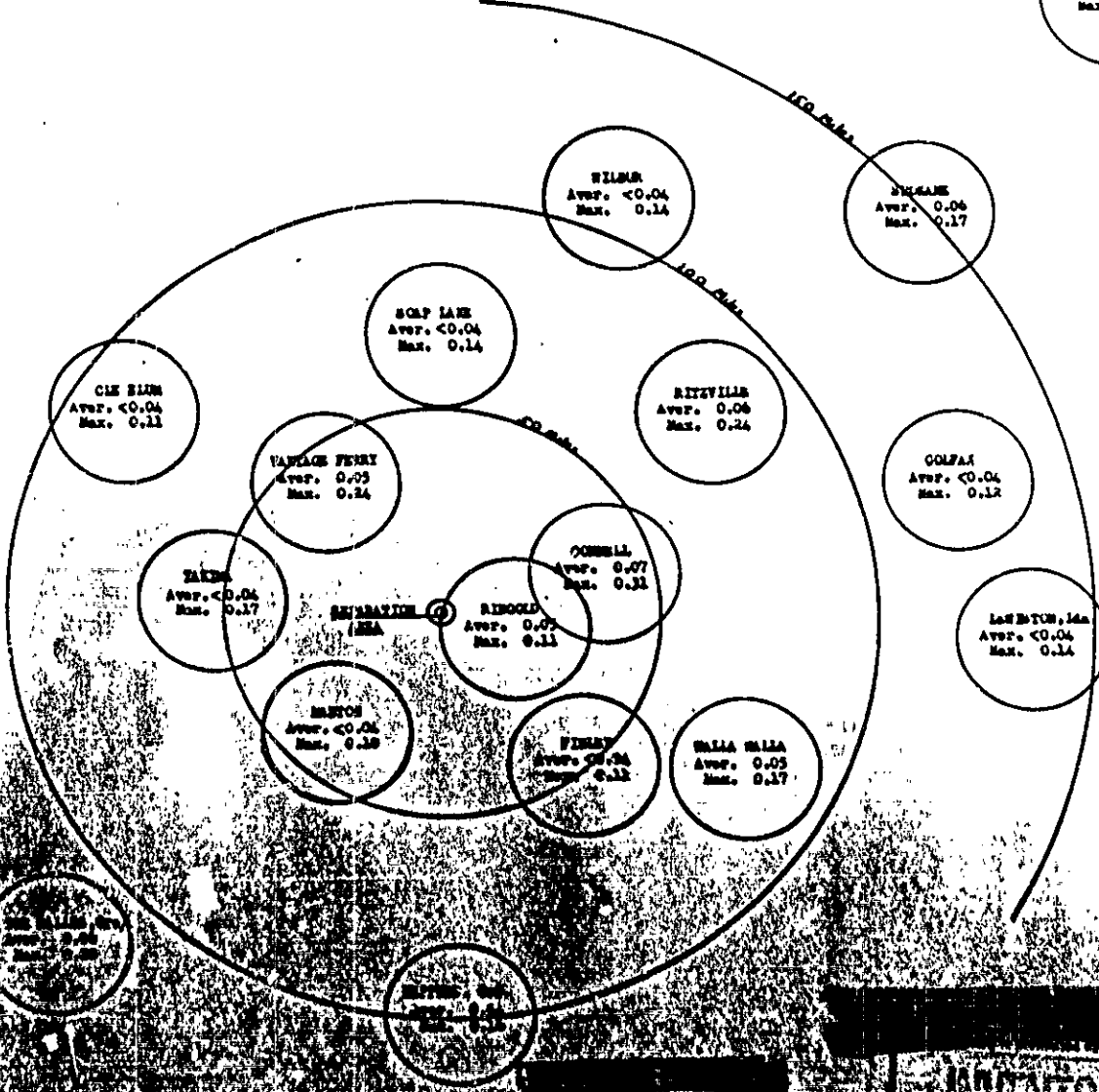


1944
D-22

23

COLVILLE
Aver. 0.04
Max. 0.09

DAMPPOINT
AVER. <0.04
MAX. 0.12



**IMMEDIATELY
DELETED**

FOI 195

**RIGHT AND
FREEDOM**

35

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11200-72

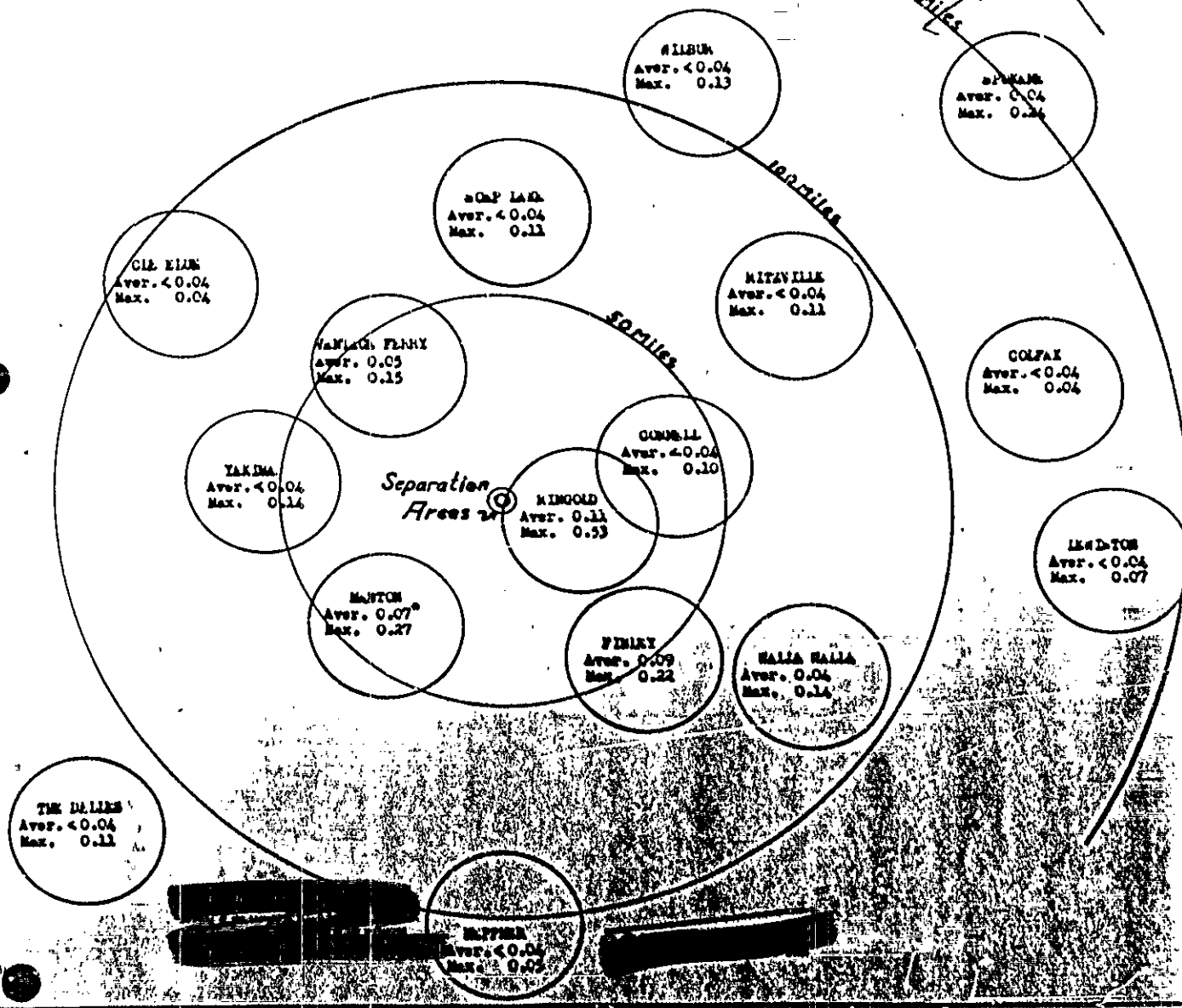
INV.
D-47

HANFORD ENGINEER STATION
EXTENT OF VEGETATION CONTAMINATION -
OFF AREA
Date: April 30, 1947 Drawn By: S.C.B.
Date of Survey: Mar. 2 to April 23, '47

• Sample Average 0.04 uo/kg
Maximum 0.07 uo/kg

Note - All figures are expressed in
terms of uo/kg.

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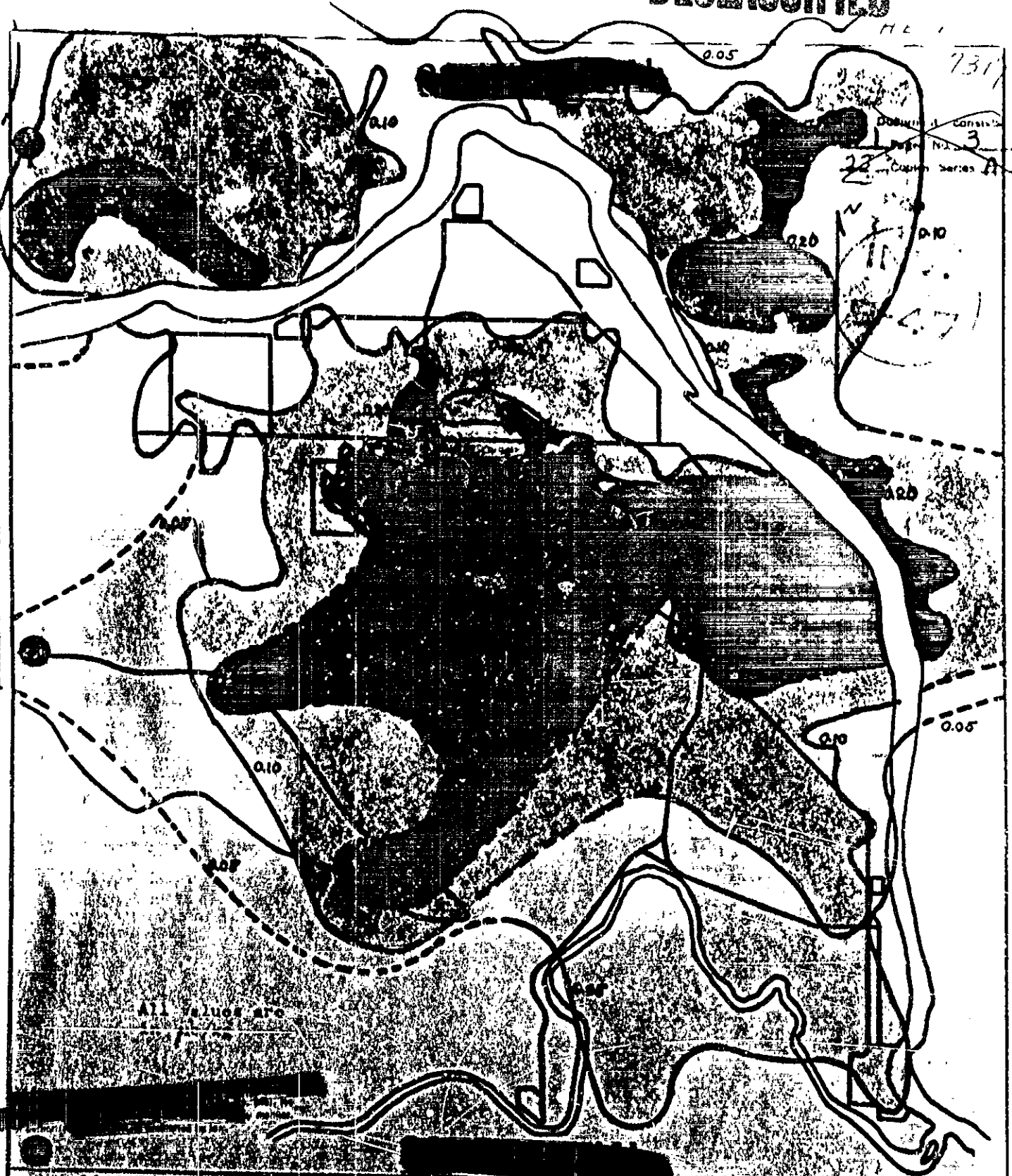
8-555
HFW-7317
INV.
D-47



Extent of Vegetation Contamination
on the Waihi Plateau
for the period April 29 to May 6, 1947

CODE
○ - 0.01 to 0.05
○ - 0.06 to 0.10
○ - 0.11 to 0.15
○ - 0.16 to 0.20
○ - 0.21 to 0.25
○ - 0.26 to 0.30
○ - 0.31 to 0.35
○ - 0.36 to 0.40
○ - 0.41 to 0.45
○ - 0.46 to 0.50
○ - 0.51 to 0.55
○ - 0.56 to 0.60
○ - 0.61 to 0.65
○ - 0.66 to 0.70
○ - 0.71 to 0.75
○ - 0.76 to 0.80
○ - 0.81 to 0.85
○ - 0.86 to 0.90
○ - 0.91 to 0.95
○ - 0.96 to 1.00
○ - Other Values indicated on map

DECLASSIFIED



HANFORD ENGINEER WORKS

APPROVED

DATE 3-1-47

DRAWN BY J.W.H.

CHECKED

R.D.G. NO. 222-4

DWG.
NO.

33

Average Vegetation Contamination Levels
for Period March 25 to June 28, 1947