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HEALTH PHYSICS ACTIVITIES FOR JUNE, 1948 ^(w)
12412
7-28-48 S. Visner, C.L. Gritzner

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This document consists of 42 pages,
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CARBIDE AND CARBON CHEMICALS CORPORATION
K-25 PLANT
Safety and Inspection Division
Oak Ridge, Tennessee

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HEALTH PHYSICS ACTIVITIES FOR JUNE, 1948

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Report number: K-178 Part VI
File number: _____
Date of issue: July 28, 1948

Title: Report of Health Physics
Activities at K-25 Plant
for June, 1948

Authors: S. Visner
C. L. Gritzner

CARBIDE AND CARBON CHEMICALS CORPORATION

K-25 PLANT

Oak Ridge, Tennessee

A B S T R A C T

Herein are reported the Health Physics Activities for June, 1948, in the K-25 Plant. The results of radiation surveys, area and personnel monitoring, air sampling, and the water survey program are reported. In addition, a Health Physics Summary of reported routine and spot surveys is presented in tabular form. The appendix includes a table of air analyses for chemical contaminants.

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I. SUMMARY

The following summary of reported Health Physics routine surveys made by operating personnel and of spot surveys made by the Radiation Hazards Department, is presented in tabular form. A comparison of the tables of reported area surveys for the months of May and June indicates a slight overall increase in the area of work locations showing contamination, and a slight overall decrease in the alpha radiation intensity encountered. A decrease in the number of routine surveys reported by operating groups is also evident in this comparison. However, an improvement in this situation is anticipated with the reorganization of the plant routine survey groups.

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Symbols used in the following tables are:

- G - Gloves
- C - Coveralls
- M - Assault Mask
- R - Respirator
- S - Shoe Covers
- B - Head Cover
- L - Lab Coat
- A - Rubber Apron
- W - Lead Wall Shielding
- Om - Neoprene or Rubber Gloves
- B - Boots or Rubbers

- T - Tonge Mechanical Equipment
- E - Other Mechanical Equipment
- Co - Concrete wall shielding
- I - Indicates surveys made only when supervisor feels they are warranted
- Y - Indicates one "set" of air samples; judgment size of set depends on supervisor's judgment
- .. - This column represents the number of persons who will be in this work area during a twenty-four (24) hour period
- - No information

HEALTH PHYSICS SUMMARY

TABLE I

Locations Where Protective Devices are Mandatory

Location	Approximate Number of Personnel	Protective Measures in Force		Type of Personnel Monitoring	Average Rate of Contamination (cpm)	SPOT SURVEYS BY RADIATION HAZARDS DEPARTMENT			REPORTED ROUTINE SURVEYS BY OPERATING GROUP					Remarks	General Location of Contamination	Radiative Material Hazards						
		Cont.	Rad.			Alpha Rad. (c/s)	Alpha Rad. (c/s)	Alpha Rad. (c/s)	Beta Gamma	Survey Schedule	Number of Reported Surveys	Number of Above Tolerance Readings	Maximum Readings				Alpha Air Samples					
																		Alpha Rad. (c/s)	Alpha Rad. (c/s)	Alpha Rad. (c/s)	Alpha Rad. (c/s)	Alpha Rad. (c/s)
1301 Oxide Converter Room	6	C, G, S, M	None	Head Film Count Badge	750	5,400	0.0	7.4	0.0	4.0	5 per week	2	2	None	16	None	5,690	517	0-0	Decontaminated frequently	Floor and equipment	None
1303 Oxide Oxidation Room	4	C, G, S, M, Film	None	Head Film Count Badge	80	84,100	298.7	76.0	1.2	70.0	3 per week	3 per week	3 per week	None	None	None	None	None	None	Decontaminated frequently	Floor and equipment	None
1301 Oxide Shift Room	4	C, G, S, M, Film	None	Head Film Count Badge	80	4,000	500.0	50.0	6.0	57.0	3 per week	3 per week	3 per week	None	None	None	None	None	None	Decontaminated frequently	Floor and equipment	None
1401 Neutron Capture Room	30	S, G, C	None	Head Film Count Badge	2500	2,950	-	0.25	-	0.008	Weekly	I	I	1	None	None	2	1,400	600	Decontaminated after each survey	Floor, work benches and equipment	None
1410 Carbon Capture Room	6	C, G, S	None	None	750	16,500	-	80.0	-	50.0	I	I	I	None	None	None	None	None	None	None	Floor and equipment	None
1400 Distillation Room	60	C, G, S, M, Film	None	Head Film Count Badge	4,35	1,800	0.0	1.0	0.0	0.0	Daily	I	Daily	15	None	None	57	31,700	None	None	Floor and equipment	None

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C. R. E. I.

TABLE II

Locations Where Protective Devices are Prescribed for Specific Jobs

Location	Type of Protective Measures in Force	Type of Personnel Monitoring	SPOT SURVEYS BY RADIATION HAZARD DEPARTMENT			REPORTED ROUTINE SURVEYS BY OPERATING GROUP			Remarks	General Location of Contamination	Radioactive Material Releases		
			Av. per cent of Work Location Above Tolerance	Alpha Cont. (p/h)	Beta Cont. (p/h)	Alpha Cont. (p/h)	Beta Cont. (p/h)	Gamma Cont. (p/h)				Max. Alpha Cont. (p/h)	Max. Beta Cont. (p/h)
101 C-318 Striping Milling	0 G, M	None	0.0	2.1	0.0	1.90	1	1	None	None	None		
131 Feed Purification Ag. Crub Feed Room	0 G, O, M	Head Film Count Badge	185.0	0.48	0.54	0.54	3	30	None	16.8	None		
131 Personnel Room	0 G, O, M	Head Count	7.2	0.7	0.08	0.08	1	None	4	3.270	None		
451 Shipping Room	10 G, O, M	Head Film Count Badge	40.0	2.0	1.80	1.80	3	None	6	4.920	1 None		
451 Carbon Trap	0 G, O, M	Head Film Count Badge	11,900	0.0	2.0	2.0	None	None	None	246	None		
451 "A" and "B" Air Pump Room	0 G, O, M	Head Count	2,840	0.0	2.2	0.8	2	None	None	None	None		
400 Coded Chemical Waste	0 G, C	None	33,500	1.90	0.10	0.10	None	None	None	None	None		
400	0 G, C	None	4,900	0.24	0.20	0.20	None	None	None	None	None		
16A	0 G, C	None	5,400	0.11	0.00	0.00	None	None	None	None	None		
16A	0 G, C	None	>85,400	10.90	0.11	0.11	None	None	None	None	None		
17A	0 G, C	None	3,860	0.40	0.060	0.060	None	None	None	None	None		
402-1 thru 402-9 Jim Becherer Stations	0 G	None	<185	0.0	0.0	0.0	3	None	None	<360	None		
402-4 Feed Filler	0 G	None	2,000	0.0	0.0	0.0	2	None	None	1,900	None		
402-1 thru 402-10 Jim Becherer Stations	0 G	None	<200	0.0	0.0	0.0	None	None	None	None	None		
402-1 thru 402-10 Jim Becherer Stations	110 G	None	<200	0.0	0.0	0.0	None	None	None	None	None		
402-1 thru 402-11 Jim Becherer Stations	120 G	None	2,760	0.0	0.06	0.0	None	None	None	None	None		
402-12 thru 402-13 Jim Becherer Stations	90 G	None	2,750	0.0	0.1	0.0	9	None	None	22,200 5,582	None		
402-12 Product Cylinder Head Repair Shop	2 10, C	Head Count	12,700	0.0	0.0	2.0	11	None	None	29,960 4,788	None		
402-8 Product Cylinder Assembly Shop	3 10, C	Head Count	14,860	0.0	3.0	1.2	12	None	None	23,300 11,104	None		
402-12 Basement	3 None	Head Count	16,700	0.0	0.18	0.06	4	None	None	50,920 19,032	None		
402-3 Cold Trap Room	0 None	None	<200	0.0	0.0	0.0	None	None	None	11,100 1,970	None		
402-7 Product Withdrawal Area	0 0	Head Film Count Badge	4,650	0.0	1.5	0.0	11	Daily	None	29	1 None		
402-7 Tri-alar Room	10 G, O, M	Head Count	6,600	0.0	2.3	2.0	None	None	None	None	None		
402-8 East Room	10 G, O, M	Head Count	5,900	0.0	5.0	3.0	None	None	None	None	None		

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HEALTH PHYSICS SUMMARY TABLE II (CONT'D)
Locations Where Protective Devices are Prescribed for Specific Jobs

Location	Approx. # of Persons	Promotive Measures in Force	Type of Monitoring	Approximate Area (sq. ft.)	Avg. of all Max. Rads. in Working Location of all Surveys	SPOT SURVEYS BY RADIATION BARRIERS DEPARTMENT		REPORTED ROUTINE SURVEYS BY OPERATING GROUP		Remarks	General Location of Contamination	Radioactive Material Involved
						Avg. per cent of Fork Location Above Tolerance	Avg. per cent of Fork Location With Wipe Activity (Alpha)	Survey Schedule	Number of Reported Surveys			
		Cont. Rad. Alpha Beta Gamma	Alpha Beta Gamma		Alpha Cont. (r/m) Beta Cont. (c/m) Gamma Cont. (c/m)	Alpha Cont. (%) Beta Cont. (%) Gamma Cont. (%)	Alpha Cont. (r/m) Beta Cont. (c/m) Gamma Cont. (c/m)	Alpha Cont. (r/m) Beta Cont. (c/m) Gamma Cont. (c/m)	Alpha Cont. (r/m) Beta Cont. (c/m) Gamma Cont. (c/m)			
0 and 5-4" Geiger Instruments E-311-4	3	0	None	600	0.20	0.0	0.0	Weekly	1	1	1	None
E-305-7	3	0	None	1600	0.08	0.06	0.0	Weekly	1	1	1	None
E-305-9	3	0	None	400	0.70	0.0	0.0	Weekly	1	1	1	None
E-402-9	2	0	None	700	0.11	0.07	0.0	Weekly	1	1	1	None
0 and E-400 Geiger Instruments E-311-4	4	0, C	None	600	0.08	0.0	0.0	None	None	None	None	None
E-310-1	4	0, C	None	1360	0.30	0.0	0.0	None	None	None	None	None
E-305-2	4	0, C	None	800	0.33	0.0	0.0	None	None	None	None	None
E-301-6	6	0, C	None	760	0.07	0.30	0.0	None	None	None	None	None
E-301-8	3	0, C	None	1600	0.11	0.42	0.0	Weekly	1	1	1	None
E-305-12	25	0, C	None	2600	0.11	0.030	0.0	Weekly	1	1	1	None
024 Electronic	10	0	None	3800	0.86	0.082	0.082	None	None	None	None	None
024 Parametric	2	None	None	1200	-	0.031	0.0	None	None	None	None	None
401 Pilot Plant	6	0, C	None	1600	0.28	0.061	0.061	Weekly	1	1	1	None
401 Valve Shop	6	0, C	None	6850	0.46	0.00	0.00	Daily	1	1	1	None
401 AC Pump and 1 Shop	40	0	None	62400	-	0.00	0.00	Daily	1	1	1	None
401 Cleaning	1	0	None	800	0.46	2.10	1.24	None	None	None	None	None
401 Seal	15	0, A	None	1400	0.06	0.14	0.28	Weekly	1	1	1	None
401 Pumping Station	20	0, A	None	220	-	0.32	0.00	Weekly	1	1	1	None
401 Storage	4	L, T	None	800	0.11	0.77	0.18	None	None	None	None	None
401 Station	20	0, P	None	1790	0.10	0.32	0.01	None	None	None	None	None
401 Station	25	0, P	None	4190	0.04	0.28	0.01	None	None	None	None	None
401 Station	6	0, P	None	260	-	-	0.00	None	None	None	None	None
401 Station	6	L, A	None	1060	-	0.41	0.02	None	None	None	None	None

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II. INTRODUCTION

The following are the highlights of the Health Physics activities in the K-25 Plant for June, 1948.

The program was continued of monitoring for and removing radioactive contamination throughout the plant. Marked improvement is evidenced in some quarters where emphasis on proper techniques for preventing spread of contamination is resulting in lower radioactivity levels. As an example, the new equipment designed to contain material more effectively is being installed in the K-1405 vibrator room.

The education program on Health Physics was continued in the plant. A series of seminars on Health Physics topics was initiated. A strip film for Health Physics orientation was nearing completion.

The power supply cables on field radiation detection instruments are being modified to meet electrical specifications.

Initial surveys have been made in the Radio-Chemical Laboratory. No above tolerance radiation was detected.

A modification in film badge distribution procedure has been initiated which provides for weekly distribution of badges to centrally located badge holders to enable users to pick up and store their individual badges daily. Also, weekly film badge controls are being exposed.

There were two significant incidents which come under the term "Material Release".

- 1) Film badges for two laboratory employees indicated several times the permissible exposure to beta and gamma radiation. It has not been possible to correlate these readings with the available description of the employee's activities during the time interval under consideration. The possibility cannot be overlooked of exposure of the two film badges mentioned above to a radium source.
- 2) Through error, a used converter was dismantled in the shops without previous decontamination. The shop personnel were checked at the Dispensary for possible exposure to radioactive contamination.

The water survey program continued to indicate extremely low level contamination. Sludge from the K-25 sewage treatment plant yielded approximately one hundred parts per million of uranium.

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III. ORGANIZATION

The plant organization with respect to administering the policies pertaining to the protection of personnel from potential radiation hazards remains essentially unaltered. Five men have been added to the Health Physics Inspection Section and assigned duties as Radiation Monitors and one new Health Engineer has been added to the organization of the Radiation Hazards Department. The responsibilities and duties of the respective groups concerned with Health Physics problems are listed in the report for October, 1947.

IV. RADIATION SURVEYS

In accordance with its responsibilities, the Health Physics Section conducted spot surveys on an irregular schedule.

The results of these audits are summarized for each location involved:

K-101 C-816 Stripping Building

Surveys were made in this location on June 3 and June 15. In the first survey, four (4) above tolerance alpha activities were found. A maximum alpha count of 4260 c/m was found in a 6 ft² area on the floor of the second story during the first survey. A reading of 1925 alpha c/m was found on a one-inch, four-hole flange on an open line. It was possible to transfer 700 c/m of the floor contamination, and 175 c/m of the material on the one-inch flange as shown by the wipe test. The second survey in this area revealed six (6) above tolerance locations. A maximum alpha activity of 17,820 c/m was located in a 1 ft² area on the floor under the stripping tower. A wipe test indicated it was possible to transfer 1780 c/m of this material. Spots on the floor totaling approximately 7 ft² in area measured 2430 alpha c/m, 324 alpha c/m of this material being transferable as shown by the wipe test. Gloves are used by personnel in this area.

K-131 Feed Purification Building

Fresh Feed Room

Spot surveys in this room on June 14 and June 22 revealed above tolerance alpha and beta-gamma activity. Surface contamination was found to be approximately the same for each

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survey. A maximum reading of 2110 alpha c/m was found in a 2 ft² area on the floor in the vicinity of the "D" bath. It was possible to transfer 302 alpha c/m of this material. Floor contamination existed, for the most part, in the vicinity of cylinder feed baths and carbon traps. Three times tolerance alpha activity was found on the bases of the vacuum pumps. It was possible to transfer 750 alpha c/m of this material. Contamination as high as 1200 alpha c/m was found on operators' shoes. One pair of gloves in use by an operator was contaminated with 2110 alpha c/m of material. New gloves were issued and the contaminated gloves properly disposed of. Beta gamma radiation as high as 492.8 mrep/8 hrs. existed two (2) inches from a group of valves recently removed from feed cylinders. These valves were sent out for decontamination immediately after the reading was reported to the supervisor. A reading of 179 mrep/8 hrs. was obtained one (1) inch from a metal plate on the cylinder freeze-out buggy. A rubber mat in driveway showed a reading of 116.5 mrep/8 hrs. at a distance of one (1) inch. The rubber mat was immediately moved out. The contamination on the cylinder freeze-out buggy and rubber mat can be attributed to replacement of feed cylinder valves. These readings were taken with a Landsverk Electrometer. A reading in the cylinder rack between empty cylinders, taken with a Victoreen 263-A meter showed 100 mrep/8 hrs. This does not constitute a hazard as this location is not a working locale and is practically inaccessible. A reading outside the rack showed 40 mrep/8 hrs. An air sample in the room during normal feed operations gave a reading of 0.037 alpha c/m/ft³. Personnel wear coveralls, gloves and mask when changing cylinders.

Furnace Room

A survey made on June 14 revealed two (2) above tolerance readings. The highest reading showed 5120 alpha c/m on the floor in a 6 ft² area near "C" furnace. It was possible to transfer 750 alpha c/m of this material. The highest beta gamma reading obtained was 7.2 mrep/8 hrs. at a full cylinder.

K-631 Waste Disposal Building

Shipping Room

Three (3) spot surveys were made in this location during the month. The first, made on June 4, revealed three (3) above tolerance alpha readings. The maximum reading on this survey

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showed 2320 alpha c/m in a 2 ft² area on the floor under No. 2 sampling point. The two later surveys revealed four (4) above tolerance readings. A maximum reading of 1060 alpha c/m was found on these surveys. This reading was obtained on a scale platform approximately 4 ft² in area. One hundred and fifty (150) c/m of this material was found by the wipe test to be transferable. A 900 alpha c/m reading was obtained in a 4 ft² area on the floor in the vicinity of No. 2 cylinder and No. 2 sample point. The wipe test showed 150 c/m of this material to be transferable. An alpha reading of 300 c/m was obtained on the shoes of one of the operators. Decontamination work is frequently done in this location. Personnel wear coveralls, gloves, and mask during sampling and cylinder changing operations. An air sample taken during sampling operations gave 0.022 alpha c/m/ft³.

Carbon Trap Room

This room was the subject of three (3) spot surveys during the month. The first survey was made on June 4 and revealed five (5) above tolerance alpha readings. A maximum reading of 13,650 alpha c/m was found on the outer surface of carbon trap #T-212. Six hundred and twenty (620) alpha c/m of this material was transferable by wipe test. Two (2) surveys taken later in the month showed that a high level of surface alpha activity still existed in the vicinity of the carbon traps. The maximum surface alpha reading found on carbon trap #T-212 in the first survey remained unchanged, except that wipe test showed only 300 alpha c/m to be transferable on these later surveys. A reading of 5120 alpha c/m was obtained on a 3 ft² area on a concrete slab outside the truck door on the second survey, but the third survey, made a week later, showed this area to be below tolerance as a result of decontamination work. Most of the contamination in this room results from spills which occur during the recharging of carbon traps.

A and B Waste Pump Rooms

Spot surveys in these rooms on June 4, June 14, and June 22 showed the "A" Pump Room to have no above tolerance readings. A maximum alpha reading of 2790 c/m was found on an accumulator tank manhole cover and housing in the "B" Pump Room on the first survey. One hundred and fifty (150) c/m of this alpha material was transferable by wipe test. A subsequent survey showed this surface to have been decontaminated to 1500 alpha c/m surface reading.

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K-300 Coded Chemical Vaults

Vault 1-X (Cylinder Storage)

A survey conducted June 15 revealed eleven (11) above tolerance readings on floor and equipment. A reading of more than 33,520 alpha c/m was obtained on an old product cylinder stored next to concrete column A-35. It was possible to transfer 1240 c/m of this material as shown by a wipe test. A reading on a foot square area, on the floor just inside the door, showed an alpha count of 2830 c/m.

This vault is used for storage and is locked except during loading and unloading operations. Operators wear coveralls and gloves while at work in this location.

Vault 8-A (Oxide Material and Cylinder Storage)

A spot survey made on June 15 revealed five (5) above tolerance alpha readings. A reading inside the safe showed 4880 alpha c/m. One taken on top of the scaler also showed 4880 c/m. It was possible to transfer 265 c/m of this material by wipe test. Six (6) inches from nine (9) drums of residue from chemical #723 gave a gamma reading of 0.016 R, per 8 hours. Six (6) inches from C-721 material gave a beta gamma reading of 96 mrep/8 hrs. The highest air activity reading was 0.36 alpha c/m/ft³. One man who wears coveralls and gloves, works in this vault.

Vault 15-A (Contaminated Solutions and Solids Storage)

Two (2) spot surveys were made in this location. The first survey, on June 4, revealed alpha readings ranging from 960 alpha c/m to 1920 alpha c/m on the tops of several storage drums. The second survey showed the same contamination existing as in the previous survey. This location is used for storage of contaminated carbon and solution, and is locked except when loading and unloading material.

Vault 16-A (Contaminated Solution and Solids Storage)

Two (2) surveys were conducted during the month. The first survey was made on June 4, and revealed alpha counts ranging from 1920 c/m to over 35,420 c/m. The maximum reading was obtained on a 434 ft² area of floor in the northeast corner of the vault. The same amount of this material (over 35,420 alpha c/m) could be

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transferred by the wipe test. The second survey, June 17, revealed approximately 1400 ft² of floor space in the same location as above to have a maximum wipe test reading of 35,400 c/m. This spot on the floor with high wipe test reading results from a spill of contaminated solution. One (1) airborne sample taken on a sampling table while no work was in progress read 0.00 c/m/ft³.

No hand counting program has been started in this location and no decontamination work was accomplished in this vault during the month. Protective equipment worn in this area includes coveralls, gloves and shoe covers.

Vault 17-A (Contaminated Carbon Storage)

A spot survey, made on June 4, revealed seven (7) above tolerance readings. An alpha reading of 1920 c/m was obtained on about a 12 ft² area of floor space near column 11-L. The wipe test showed 380 c/m of this material to be transferable. A maximum reading of 3840 c/m was found on the top of a storage drum. One (1) airborne alpha sample was taken near the south wall. It showed 0.00 c/m/ft³.

This location is used for storing contaminated carbon and is kept locked except when loading or unloading material. The operator handling the material wears coveralls and gloves.

K-402-1 through K-402-9 Line Recorder Stations

A spot survey on June 7, revealed no above tolerance counts in the Line Recorder Stations.

K-402-4 Portable Feed Unit

No above tolerance counts were found on a survey made June 7. The unit is shut down and is only used in emergencies.

K-402-4 Feed Filter

On a survey made on June 7 only one (1) above tolerance reading of 1995 alpha c/m was found on the insulation around a manhole cover. None of this material was transferable by the wipe test.

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K-311-1 through K-301-5 Cascade Buildings

A spot survey here during the month showed all line recorder stations, floors, and equipment to be below tolerance level.

Two (2) above tolerance readings were found in Laboratory K-311-1, the maximum surface alpha reading being 1500 c/m. This reading was obtained on a 1 ft² floor area.

K-302-1 through K-303-10 Cascade Buildings

One (1) spot survey was conducted here during the month. No above tolerance conditions were found in the line recorder stations.

One (1) above tolerance reading of 1540 alpha c/m was found in K-302-5 Purge and Product Room at the base of a Beach-Russ pump. A wipe test showed that none of this activity was transferable.

K-304-1 through K-305-11 Cascade Buildings

One (1) spot survey was conducted in this area during the month. Four (4) above tolerance locations were found. The highest reading found was 2760 alpha c/m. This material is not readily accessible to personnel, the majority of the contamination centering on the floor under a rough pump and covering a very limited area. Various wipe tests revealed no transferable material.

This survey compares favorably with the survey of the previous month, having a lesser number of above tolerance locations and no transferable material.

K-305-12 through K-312-3 Cascade Buildings - Area V

One (1) spot survey was made during the month. Three (3) above tolerance locations were noted. The highest count found was 2760 alpha c/m, located on the base of a manifold pump, K-306-4. A reading of 1250 alpha c/m was found in a similar location in K-306-6. A reading of 1250 alpha c/m was found on a bench in K-306-7 Line Recorder Station. No transferable material was found by wipe test.

Although this survey shows the same number of above tolerance locations as last month's survey, a decided decrease in the degree of contamination per location was noted.

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K-305-12 Cylinder Head Repair Shop

Four (4) spot surveys were made during the month. Twenty-three (23) above tolerance locations were found. Surface contamination ranged from 375 to 25,250 alpha c/m. Three (3) of these active locations were found to have transferable material up to 19,650 alpha c/m.

These surveys revealed a relatively small amount of activity on the floor, while the major part of the contamination continues to be found on steel top work tables. Operating personnel are required to wear gloves and coveralls as protective clothing. A hand counting program is in effect here.

K-306-6 Cylinder Assembly Shop

Four (4) spot surveys were made during the month. Twenty-two (22) readings above tolerance levels were revealed. Activity from 875 to 28,000 alpha c/m was found.

Contamination was found largely on steel top work table, vacuum test table, and tightening block. Five (5) locations where contamination could be transferred by wipe test were noted. A high count of 28,000 alpha c/m surface reading was found on the vacuum test table.

Supervision surveys this shop daily and decontaminates as needed.

K-306-7 Product Withdrawal Area

Four (4) surveys were made during the month. Fourteen (14) above tolerance locations were found. This contamination covers a total area of approximately seven (7) square feet.

A high count of 8820 c/m was found in the dry box on the "A" withdrawal stand. Forty-two (4200) c/m was observed on an operator's glove. These gloves were immediately disposed of. A count of 4200 c/m was found on a defroster unit.

The major part of this contamination was found inside of dry boxes near the take-off connections. Although the number of above tolerance locations corresponds closely with surveys of the

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previous month, a marked improvement is seen in a decrease of alpha c/m per location and the complete absence of transferable contamination. Continuous daily air samples revealed all, with the exception of one sample, to be below tolerance. The one high air contamination sample was at the tolerance level of 2.1 alpha c/m/ft³.

K-312 Basement

Four (4) surveys were conducted during the month of June. Thirty-three (33) above tolerance readings were found, ranging from 875 to 19,640 alpha c/m. Contamination was found to be transferable on seven (7) of these locations. The highest transferable reading noted was 3930 alpha c/m.

The major part of this contamination was found to be on Cells 7 and 9 in K-312-1, and to be located on and around pump and motor bases. A limited amount was found on the floor in the immediate vicinity of these cells. Work has been started on carbon seal housings on these cells and should be finished during the first week of July.

K-312-3 Cold Trap

Two (2) surveys were made during the month. Neither of these surveys revealed any above tolerance alpha activity. Further checks on this location will be unnecessary since this room is no longer in use and is not subject to further contamination.

K-305-9 Equipment Portal

One (1) survey was made during the month. No surface contamination was found. This room is kept in very good condition considering the amount of contaminated solution and equipment handled.

K-300 and K-400 Process Instrument Shops

One June 10 a spot survey was conducted in all instrument shops. No above tolerance contamination was found in the K-301-4 and K-305-9 Shops. In the K-303-7 Shop, two (2) above tolerance locales were found. Activity of 1530 alpha c/m was found on a $\frac{1}{2}$ ft² area on a conditioning manifold and 3060 alpha c/m on a

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window sill. Wipe tests showed that none of this material was transferable. One (1) above tolerance reading of 6490 alpha c/m was found inside a hood in the K-402-9 Shop. This location was immediately decontaminated. Short duration air samples taken in each shop were at normal background activity. These samples can be considered representative of conditions normally existing in the shops.

K-300 and K-400 Process Maintenance Shops

A total of seven (7) shops were surveyed during the month. These shops revealed no above tolerance counts, with the exception of Shops K-302-5 and K-305-12. Twelve (12) seal pans in K-302-5 had wipe test count as high as 8100 alpha c/m. Seal pullers in this shop read 6660 c/m. It was possible to transfer 920 alpha c/m of this material as shown by a wipe test. A work bench top read 1530 alpha c/m. The wipe test showed 300 alpha c/m of this material to be transferable. On a floor area of approximately 3 ft² in the K-305-12 Shop, an alpha count reaching a maximum of 1875 c/m was found. A 2010 alpha c/m reading was found on an A. C. Pump bearing. Several seal pans were found to be above tolerance. No transferable material was found by wipe test; however, a slight increase of surface contamination was noted over the survey of the preceding month. One (1) airborne alpha sample taken in each shop was at normal background activity.

Maintenance Jobs

During the month of June an audit was made of converter changes in Plant III, covering a total of ten (10) cells. Of the twenty-six (26) airborne samples taken, three (3) were found to be above tolerance specifications.

A sample taken at #5 converter outlet, Cell 1, K-305-12, revealed an alpha airborne reading of 2.11 c/m/ft³. This sample was taken immediately after welders finished cutting. An airborne alpha reading of 2.3 c/m/ft³ was taken at #2 converter outlet, Cell 8, K-305-12, while the converter was being pulled. Twenty-four and five tenths (24.5) c/m/ft³ was established for airborne alpha activity on Cell 8, K-305-12, at #1 converter outlet during the removal of this converter. Rules have been established covering the use of respiratory protection in the form of assault masks and dust respirators during the above

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normal operations which are known to give above tolerance air activities. Only two (2) surface alpha readings above tolerance were noted. A reading of 1250 alpha c/m was found on the floor at #4 converter inlet in the K-305-12 Building, Cell 8. A reading of 2375 alpha c/m was noted on the floor at #2 converter inlet, K-305-12, Cell 8. None of this material was transferable by wipe test. All locations having above tolerance surface activity were decontaminated immediately by trained personnel present during the converter change operation.

K-1004 Laboratories A, B, C and D

Sampling Section (Rooms 19-A, 20-A, 215-C, Outdoor Storage Cages.)

After a rise over last month's activity levels during the first part of this month, a general area decontamination brought the rooms and installations of this section to a better condition than has been reported so far. One (1) spot survey reported only one (1) point above tolerance alpha activity in Rooms 20-A and 215-C and approximately four (4) square feet of contaminated area in Room 19-A distributed among three floor areas. Several contaminated tools and gloves were located and immediate removal and decontamination was arranged. Other hazard possibilities were investigated and found satisfactory. Airborne alpha and surface and other beta gamma activity were not present.

Radiation Section

Spot checks in this section showed very little active material. The hood in Room 23 showed above tolerance surface activity on the work surface. The floor in front of the hood was also active, showing counts up to 2941 c/m on the surface and 259 c/m transferable activity. The rest of the room was clear of contamination and Room 18 was completely free of wipe activity. Only two (2) small spots where active materials had penetrated porous desk tops were found. The existence of these spots is known by supervision and plans to paint them have been made. Decontamination in this room has successfully removed all other surface activity.

Uranium Analysis Section

Five (5) spot checks made in the rooms of this section showed that contamination is well controlled. Two (2) rooms remained below tolerance throughout the month, while relatively few points

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remained in the other rooms. Room 111 had an area of imbedded non-transferable activity up to 1148 c/m on a table top, but no other activity was found. The grinding equipment in Room 170 has been decontaminated to remove all transferable material, and surface-bonded contamination was located in only three (3) places on the equipment. Signs stating that the equipment is contaminated and should not be handled, have been posted. Room 105, which is decontaminated regularly, showed less recontamination this month than in any previous month. Floors proved to be the principal offenders; one (1) spot at 8100 c/m surface and 328 c/m wipe was found. This was due to a fresh spill and was immediately decontaminated. No other wipe activity was evident on either floors or other surfaces and activity hazards of other types were not present.

Counting Section

Considerable improvement in surface activity levels appeared in this section, as evidenced by the fact that all rooms except one yielded at least one (1) completely below tolerance survey report during the month. Transferable activity was found only in Rooms 104 and 122 and in only one (1) location in each room. Both points were successfully decontaminated after spot checks had located the activity. Regular decontamination of points located in routine surveys was carried out as well. The adoption of a policy of daily decontamination by the operating personnel, who know the areas which may have been subject to contamination, has proved the best means attempted so far, to permanently control contamination. Although a certain amount of recontamination always occurs, decontamination seems best accomplished by the operator who saw it occur. The results in this section during June seem to bear up this conclusion.

Spectrometer Section

Spot checks reported Rooms 59, 206, 213, 217 and 274, of this section, free of all contamination throughout the month. Rooms 63, 211 and 215 were found to be free of beta gamma, airborne alpha and transferable alpha activity, but several surface alpha readings were reported. Points with activity up to 3670 c/m were found on floors, table tops and hoods. After several pairs of leather gloves were found which read up to 4525 c/m a program of more frequent glove exchange was adopted. A regular glove monitoring procedure will be followed and the presence of above tolerance

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surface activity will be considered sufficient cause for replacement. Contamination levels were found to be particularly high in Room 207, where readings up to 28,320 c/m were found on freeze-out stands and up to 5310 c/m on floor areas under analytical units in the neighborhood of freeze-out stands and sample manifolds. Wipe test readings up to 2625 were obtained. In order to control this hazard, the use of aluminum foil as a non-absorptive, disposable cover for points subject to spillage has been started and it is hoped that satisfactory control will thus be obtained. All other areas in Room 207 were free of above tolerance activity.

Spectrometer Standards Section

Several points, in two (2) rooms of this section, which remain from previous operations were shown to be still emitting surface activity during this month's spot checks. All had been decontaminated in the past, and while surface readings up to 4425 c/m were found, no transferable activity was present. One (1) spot check located a small area where wipe test results of 175 c/m were obtained. This point was successfully decontaminated. No other activity was found.

Analytical Research Section

Good decontamination procedures have kept the rooms of this section very clean throughout the month. Several points which could not be decontaminated were still surface active, but a program of sealing these areas with suitable protective coatings is under way. One (1) spot check reported a contaminated asbestos square which was removed immediately. The only above tolerance wipe test reported was on a plate under the arc holders in a spectrometer. This point is relatively inaccessible to personnel, and known to be contaminated by all who work with the instrument. A suitable means of control is being investigated, however, and it is hoped that the problem will be removed during July. No other activity hazards were found in this section.

Molecular Spectroscopy Section

Two (2) spot surveys in this section showed that it remained free of all above tolerance activity throughout the month. Decontamination after potentially contaminating operations has kept this section free of all activity.

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Physical Chemistry Section

While several points were found on floors, benches and equipment which showed above tolerance surface activity from former operations, no transferable activity was found. The few points located were known areas of contamination which had resisted decontamination. A program of covering such areas with paint, and in some instances stainless steel, was in progress during June and complete contamination freedom is hoped for next month. All other activity was below tolerance.

Conditioning Section

A complete spot check in the rooms of this section located active deposits only on the tops of two (2) hot plates. These had been repeatedly decontaminated and showed no transferable material. To assure complete freedom from all above tolerance activity it is proposed to coat these surfaces with aluminum paint or, if that does not reduce the present count, to replace this equipment. All other conditions in these labs were satisfactory; no activity hazards exist.

Barrier Research Section

One (1) spot check made in this section this month located two (2) points which had been previously reported, but on which efforts to decontaminate had been made. These points had been reduced to 1078 c/m and 1540 c/m respectively and wipe tests were zero at both points. Further efforts to decontaminate or cover these points are being made. The rest of the surfaces in this section were free of contamination, however, and no other activity hazards are present.

Critical Mass Section

While present conditions in the Critical Mass Section's laboratories do not meet the required standards for contamination freedom, the existence of many above tolerance areas are known. Suitable protective clothing is worn by the limited personnel working there, strict visitor controls are in force, and an extensive decontamination and anti-contamination program is under way. This month's spot checks reported many above tolerance readings. Readings up to 5110 c/m on underfoot areas, 19,071 c/m

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on work surfaces, 14,670 c/m on equipment, 14,670 on hand tools, 2934 c/m on instruments and 4401 c/m on used gloves were reported. The reporting of only five (5) positive wipe test results out of more than 200 readings demonstrates the success of preliminary decontaminations. It is intended, however, to continue the regular practice of wearing rubber gloves while working in these rooms until all tolerance regulations are met and at all times when any possibility of contamination spread is present. No other radiation hazards exist.

Special Analysis Section

Decontamination early in June removed all surface and wipe activity from the surfaces in this room, but later operations partly through recontamination but more probably due to a wearing off of protective coatings, caused above tolerance readings to reappear late in the month. A spot survey made on the twenty-fourth located only one (1) above tolerance reading of 1232 c/m surface and 308 c/m wipe test on the exterior surface of a waste container while readings taken on the twenty-ninth showed counts of 5100 on a motor mount, 2000 on a hood work surface, and 900 on a balance table. All wipe tests were reported negative, and no other radiation hazards were found.

K-1024 Instrument Building

Electronic Instrument Shop

A number of control measures in effect in this shop serve to isolate contamination and operations responsible for contamination. Room 13 in this building is used for disassembling tube racks after they have been taken out of the Process Building. The south end of Room 13 is roped off, and personnel are not allowed to enter before seeing the operator for instructions. A hand counter is set up at the exit of Room 13 to check hands of personnel before they leave the area. Room 15 in this shop is used for checking equipment as it comes into the shop for repair, and for decontaminating and storing contaminated equipment.

Two (2) spot surveys were conducted during the month; one on June 15 and one on June 22. The first survey revealed the following above tolerance counts: a work bench in the southwest corner of Room (31) approximately 13 ft² in area showed alpha counts

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ranging from 885 c/m to 3000 c/m; a flat bottomed truck in Room 15 showed 1420 alpha c/m, 170 c/m of the material being transferable by wipe test. The second survey revealed more alpha contamination than the first survey. Above tolerance counts were found at the following locations: in Room 13 the work bench in the southwest corner of the room read 920 alpha c/m; the work table near the south wall read 2140 c/m; and the bottom of the sink showed 4870 alpha c/m. A work bench in the southeast corner of the room showed 2140 alpha c/m, and a metal bottomed chair read 1380 c/m.

Four (4) bellows out of Hy-Kar Valve read 7730 alpha c/m. A wipe test showed 300 alpha c/m of this material to be transferable. The highest airborne alpha activity found by air sampling read 0.11 c/m/ft³. This air sample was taken next to a tube rack while two (2) men were working on the rack.

Pneumatic Instrument Shop

Two (2) spot surveys were conducted in this shop during the month. The first survey was made June 15 and revealed two (2) above tolerance readings. A spot on the east end of work bench #28 showed 1770 alpha c/m. The top of a test table read 885 alpha c/m. None of the above tolerance counts were transferable by wipe test. The second survey was made June 22 and showed the shop to be free of alpha contamination. The highest airborne alpha activity as shown by air sample was 0.56 c/m/ft³.

Instrument Development Shop

One (1) spot survey was made here on June 15. Out of approximately forty (40) alpha readings, none was found to be above tolerance. This shop is used for instrument development and is not expected to be contaminated to any great extent.

K-1031 Carbon Storage

One (1) spot survey was made during the month. It revealed two (2) above tolerance readings. The top of an old product cylinder showed an alpha reading of 3240 c/m. A reading on scales in this location showed 1250 alpha c/m, of which 150 c/m was transferable by wipe test. Since this building is used for storage only, no personnel are exposed to contaminated material here for any considerable length of time.

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K-1035 Stores Department

Spot surveys by the Health Physics Inspection group were commenced in the warehouse and storage buildings during the month in order to determine the amount of contamination in these locations and devise means for preventing the storage of contaminated equipment. Surveys were made as follows:

K-1042 Warehouse Building

A majority of the readings on vacuum pumps and stored equipment showed above tolerance alpha counts. A maximum alpha reading of 9900 c/m was obtained on an open line on a mist filter. 1760 alpha c/m of this material was transferable by wipe test. Beach-Russ pumps, Kinney pumps, A. C. pumps and similar process equipment is stored here.

K-1044 Warehouse Building

A spot survey revealed above tolerance readings on pieces of process piping with a maximum count of 1080 alpha c/m. It was possible to transfer 231 alpha c/m of this material by wipe test.

K-1036 Warehouse Building

Above tolerance counts were found on equipment that had been returned to stores for redistribution. A maximum reading of 1760 alpha c/m was found on a signal can with a transfer of 176 alpha c/m possible by wipe test.

K-1052 Warehouse Building

A spot survey revealed above tolerance contamination on the majority of crane valve bellows and valve parts. A maximum of 6280 alpha c/m was found on a 4 inch bellows. It was possible to transfer 348 alpha c/m as shown by a wipe test.

K-1035 Warehouse Building

Counts as high as 5400 alpha c/m were found on material transferred from salvage to stores. This material was supposedly free of contamination. Three hundred and fifty (350) alpha c/m of the contamination was transferable by the wipe test.

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Vault 3A - C-616 Cylinder Storage

The majority of cylinders showed above tolerance readings. A maximum reading of 39,720 alpha c/m was found on a cylinder flange. 1540 alpha c/m of this material was transferable by wipe test.

K-1043 and Vault 4A

No contamination was found on spot surveys in this location.

K-1301 Building

Oxide Conversion Room

Surveys on June 7 and June 16 showed a great deal of floor contamination. Readings as high as 6820 alpha c/m were found on the floor. It was possible to transfer 1700 alpha c/m as shown by a wipe test. Shelves in the tool cabinet revealed a maximum reading of 5120 alpha c/m. 1510 alpha c/m of this contamination was transferable by wipe test. A pair of gloves in the room showed a reading of 3512 alpha c/m. Operating personnel are equipped with coveralls, gloves, work shoes and mask. Visitor control is in effect.

Grinding Room

Surface and air contamination are known to be high in this location. Coveralls, gloves, masks, shoes and head covers are worn by operating personnel. A maximum alpha reading of 34,120 c/m was found on the floor. A beta gamma reading of 0.296 r/8 hrs. was taken 3 inches above an open container of C-624 oxide material. This was mostly beta radiation. Work by an individual in this area is limited to two (2) hours per work day. Use of shoe covers while in the room was suggested in order to prevent the spread of contamination by personnel tracking it out. Using a vacuum cleaner to get loose material off clothing and equipment before coming out of the room was also suggested. This room is decontaminated frequently. Visitor control signs are posted.

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Weigh Room

High surface and air contamination are known to exist. A maximum alpha reading of 6000 c/m was found on the floor. Protective clothing in form of coveralls, mask, shoes, gloves and head covers are worn. Above tolerance beta gamma readings (chiefly beta) were taken. A reading of 0.300 r/3 hrs. was obtained 12 inches above an open container of class "B" ash. Three inches away from open container of C-723-A oxide material revealed 0.194 4/8 hr. The room is decontaminated frequently. Visitor control signs are posted.

Hallway, Office and Maintenance Room

Spot surveys on June 7 and 16 revealed the same conditions of contamination on each survey. Approximately 75% of the Hallway floor showed contamination as high as 10,240 alpha c/m with a possible transfer of 5120 alpha c/m as shown by wipe test. Counts as high as 1510 alpha c/m were found on furniture. A maximum of 1510 alpha c/m was found on the floor of the Crew Leader's Office, with a possible transfer of 530 alpha c/m as shown by wipe test. Work shoes of the operator in the Weigh Room revealed an alpha reading of 17,000 c/m. A pair of gloves showed a reading of 3410 alpha c/m. The maximum air sample reading, taken in the Hallway, was 0.41 alpha c/m/ft³. A 6 ft² area on the floor under the sink in the Maintenance Room had a reading of 10,240 alpha c/m with a possible transfer of 5120 alpha c/m as shown by wipe test. Inside the sink a reading of 1190 alpha c/m was obtained. It was possible to transfer 665 alpha c/m of the contamination by wipe test. Operating personnel were observed washing visibly contaminated gloves and head covers in the sink. It was suggested that this should be discontinued. The floor and cover of the waste water drain in the floor near the sink read 1060 alpha c/m. Floor contamination in the offices, Hallway and Maintenance Room is caused by the tracking of contamination out of Weigh and Transfer Rooms. No protective equipment is required in the Hallway, Maintenance Room and office. The supervisor stated that a request has been submitted to relocate and redesign the oxide recovery unit.

K-1303 Building

Decontamination and Recovery

Decontamination Room - converter decontamination equipment is complete except for electrical wiring and insulation. The

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contaminated solution recovery system is approximately 50% completed.

C-2144, MFL and Contaminated Solution Recovery

Above tolerance surface contamination on the floor is prevalent in this locale. A maximum count of 8530 alpha c/m was revealed with a possible transfer of 1700 alpha c/m shown by the wipe test. Operators wear coveralls, gloves, work shoes and respirators. Visitor control signs are posted.

K-1401 Building

Vacuum Pump Shop

Four (4) spot surveys were conducted in this shop during the month. On these surveys, 21 above tolerance readings were revealed. A survey on June 3 revealed a maximum alpha reading of 2300 c/m on the inside of a Welch pump storage bin. The survey conducted on June 8 revealed 10 above tolerance counts on the floor and equipment, the highest count being 2300 alpha c/m on a degreasing tray. A survey made June 16 revealed a count as high as 7080 alpha c/m on Beach-Russ pump parts lying on a work bench. The last survey, conducted on June 23, showed a considerable decrease in contamination levels in this shop. Only three (3) above tolerance counts were found on this survey. A maximum alpha count of 1420 c/m was found on a work table. Only one of the total of 21 above tolerance counts showed any wipe activity. The locations of above tolerance readings in this shop are decontaminated after each survey is made. One airborne alpha sample taken on the Welch pump test table gave 0.32 c/m/ft³. Hand and shoe counts are taken daily in this shop. This location is in very good condition considering the amount of contaminated equipment handled. Contamination in this shop is not widespread, but is localized as shown above.

Seal Cleaning Enclosure

Three (3) spot surveys were conducted during June. The first surveys, made on June 16 and 18, revealed approximately 24 ft² of floor space in the south end of the room to have alpha counts ranging from 1060 c/m to 11,950 c/m. A survey on June 23 showed that the floor had been decontaminated to below tolerance levels, but revealed an alpha reading as high as 5300 c/m on a 10 ft² work table top. It was possible to transfer 177 c/m of this material. This room has now been decontaminated and will be used for other purposes. Recontamination is not anticipated. Air activity in this location was found to be at normal background level.

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Pneumatic Instrument Shop

An initial spot survey was made here on June 18, and out of approximately thirty (30) readings taken, one above tolerance surface alpha count of 8850 c/m was found on a work bench top near the east wall. None of this above tolerance contamination was transferable.

A. C. Pump and Seal Shop

Three (3) spot surveys were conducted in this location during the month. The first survey, made on June 8, revealed a maximum alpha count greater than 27,820 c/m on old seals stored in the shop. The second survey was made on June 16. The old seals mentioned above had been put in containers and stored in the north end of the shop where they do not constitute a hazard. The third survey, made June 23, showed the shop to be free of alpha contamination except for three flat bottomed trucks used for storing A.C. Pumps. One of these trucks showed a surface alpha reading of 7080 c/m. One thousand four hundred and twenty (1420) c/m of material could be transferred as shown by wipe test. No above tolerance readings were found in the Seal Shop. No contaminated seals are handled here. One airborne alpha sample was taken near an inductance heating table. It showed 0.45 alpha c/m/ft³. The supervisor in charge stated that he would have contaminated trucks decontaminated or marked as contaminated. This should eliminate much of the radiation hazard in this area. Hand counts are taken here at least twice daily. No above tolerance counts have been reported.

Valve Shop

Four (4) spot surveys were conducted in this location during the month. The first survey, made June 3, revealed an alpha reading of 1530 c/m on approximately $\frac{1}{2}$ ft² of area of a work bench. This spot was decontaminated to below tolerance level. Three other surveys were made June 8, June 18 and June 23. Out of approximately 100 readings taken on these surveys, none were above tolerance. Two airborne alpha samples were taken on a work bench while the operator was working on Kerotest valves. The highest air activity was 0.28 alpha c/m/ft³. Hand counts are taken at least twice daily. No above tolerance hand counts were reported.

Cleaning Area

Approximately 80 readings were taken on the floor and equipment during a spot survey conducted June 8. These revealed no above tolerance counts.

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K-26 Pilot Plant

Two spot surveys conducted on June 8 and June 18 showed the same degree of contamination existing on both surveys. A spot on a work bench, approximately 1 ft² in area, has a maximum surface reading of 5310 alpha c/m. It was possible to transfer 177 c/m of this material by wipe test. This work bench has been in the same condition for the past two months. Approximately fifty other readings taken on the floor and equipment revealed no other above tolerance readings.

K-1405 Chemical Engineering Building

Vibrator Room

A spot survey made on June 2 revealed 3400 c/m on a floor area approximately 20 ft². It was possible to transfer 1060 alpha c/m of this material by means of a wipe test. This contamination is a result of the operation of the oxide vibrator unit. An alpha reading of 3400 c/m was found on the work shoes of the operator here.

Operations ceased for the remainder of the month in this location after the above survey. Equipment is being redesigned and new equipment installed. The vibrator tray will henceforth be enclosed. This should greatly reduce alpha contamination in this location and aid in shielding beta radiation which has been found to be as high as 20 mrep/hr. at 10 inches. The room was decontaminated before maintenance work was started. Gloves, coveralls, shoe covers, head covers and respirators are required for the protection of operators in this area. Signs restricting entry to the room during operations and "No Eating" signs have been posted.

Tri-Chlor Room

Surveys on June 11 and 21 revealed twelve (12) above tolerance readings. A maximum reading of 13,650 alpha c/m was found on top of a trash can with a possible transfer of 155 alpha c/m. A reading of 1550 alpha c/m was found on the outside of a furanco, 310 alpha c/m of this material being transferable by wipe test. The base of the centrifuge unit showed 3410 alpha c/m with a possible transfer of 465 alpha c/m by wipe test. In a 2 ft² area on the floor near the double doors, a reading of 1290 alpha c/m was found. It was possible to transfer 325 alpha c/m by wipe test. Personnel working here are furnished coveralls, gloves, shoes and respirators.

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East Room (Carbitol Recovery Process)

Spot surveys on June 11 and June 21 revealed about the same conditions of contamination. Much of this contamination was found on the floor in the vicinity of the contaminated solution recovery unit. It is probably due to spills of contaminated solution. Readings as high as 5120 alpha c/m were found, with a possible transfer of 620 alpha c/m by means of a wipe test. A count of 2430 alpha c/m was found on a concrete slab outside the southeast door. A wipe test showed that 486 alpha c/m of the contamination was transferable. Personnel are furnished coveralls, shoes, masks, respirators and gloves.

A survey on June 2 revealed a high level of contamination on the floor. An area approximately 50 ft² showed above tolerance readings as high as 6920 alpha c/m. It was possible to transfer 906 alpha c/m of the material by wipe test. This contamination can be attributed to spills from the C-616 recovery unit located here. A large quantity of depleted material was spilled at the time of this survey.

K-1407 Change House

Operating personnel in the K-1405 Building started using the Change House for clothing changes and for showers on June 2. Hand counting will be started here.

K-1409 Change House

A spot survey in this location on June 7 revealed high surface alpha contamination. In a 2 ft² area on the floor near the sink, a reading of 17,000 alpha c/m was found. It was possible to transfer 1700 alpha c/m of this material as shown by a wipe test. A count of 1330 alpha c/m was found on wood slats on the floor in the shower room.

K-1410 Carbon-Alumina Separation

A survey conducted on June 9 showed the building to be highly contaminated. A maximum reading on approximately a 400 ft² area of floor space around and under the separator read 16,220 alpha c/m. It was possible to transfer 2490 c/m of this alpha material by wipe test. Equipment showed alpha readings as high as 4860 c/m. An operator's shoes showed an alpha reading of 3240 c/m. Most of the above tolerance contamination is caused by carbon dust being blown over room during sampling and separation of carbon-alumina. This building is also temporarily used for storing contaminated equipment until the K-1303 Building is back in operation. One airborne alpha sample was taken on June 21 in the center of the room while no work was in progress in the building. It showed 0.31 alpha c/m/ft³. Personnel working in this locale use protective equipment in the form of coveralls, gloves, head covers, work shoes and assault masks when operating the separator.

V. PERSONNEL MONITORING

Hand and Foot Counts

Personnel monitoring in the form of hand checks were taken throughout ~~CONFIDENTIAL~~

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the month in locations where persons are subjected to possible contamination by virtue of the work they perform.

In the laboratory division the policy as outlined in the previous month, of regular hand counting and spot counting only where individual incidents make it necessary is still in effect.

No formally recorded foot counts were reported this month. The hand counting schedule and results are listed in the following table:

<u>Location</u>	<u>Number of Employees Counted</u>	<u>Type of Count</u>	<u>Minimum Frequency</u>	<u>Number Above Tolerance</u>
K-306-7 Product Withdrawal Area	7	Alpha	Twice/shift	0
K-305-9 Change House (Entry & Exit to Plant III RR Area)				
K-1004 Laboratory				
Sampling	12	Alpha	Twice/shift	0
Uranium Analysis	17	Alpha	Twice/shift	0
Counting	19	Alpha	Twice/shift	0
Electronics	6	Alpha	Twice/shift	0
Spectrometer	57	Alpha	Twice/shift	0
Critical Mass	6	Alpha	Twice/shift	0
Radio-Chemical Laboratory	33	Alpha	Daily	0
		Beta-Gamma		
Tracer Laboratory	8	Alpha	Twice/shift	0
		Beta-Gamma		
Counting	3	Beta-Gamma	Twice/shift	0
		Gamma		
K-1024 Electronic Shop	12	Alpha	Twice/shift	0
K-1401 Maintenance Building				
A.C. Pump Shop	6	Alpha	Twice/shift	0
Vacuum Pump Shop	27	Alpha	Twice/shift	0
Valve Shop	8	Alpha	Twice/shift	0
K-1407 Change House (Engineering Development)	No hand count checks were reported taken.			
K-1409 Change House (Chemical Operations)	14	Alpha	Twice/shift	0

In addition to the above reported numbers, checks are frequently made whenever it is decided by individuals or by supervision that a hand count is required.

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Film Badges

An average of two hundred and forty-four (244) Film Badges per week were issued throughout the K-25 Plant during the month of June, a weekly increase of thirteen (13) badges over the month of May. Their use was divided between personnel monitoring and stationary monitoring as follows:

	<u>Stationary</u>	<u>Personnel</u>
Critical Mass Laboratory	6	9
Emergency Monitoring	14	0
Engineering Development	3	0
Health Physics Inspection Section	0	13
Instrument Development Section	0	4
Laboratory Division	4	73
Process Division	43	40
Plant Protection Division	0	30
Maintenance Division	0	2
Electronic Instrument Division	0	3
	<u>70</u>	<u>174</u>

In addition two (2) neutron badges were used each week in stationary positions in the Critical Mass Laboratory.

Finger Pads

A total of fifty-two (52) finger pads were distributed each week during the month. They were divided between the Laboratory Division and the Process Division.

Twenty-five (25) visitor's badges were issued weekly during the month to the K-1004-J Lab and Critical Mass Laboratory to be used by visitors to these Laboratories.

Readings on these film badges showed that two film badges, worn during the week of June 11 to June 18, indicated an over tolerance beta gamma exposure. Additional information is presented under "Material Release".

Pocket Chambers

X-ray and Electron Diffraction Section

Pocket chambers are used by six (6) employees who regularly work

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in locations where possibility of exposure to high intensity of X-ray and electron beams exist. No above tolerance readings were reported this month.

K-1004-J Radio-Chemical Laboratory

Twenty-seven (27) cases of exposure were reported as greater than 5 mrep/day. In no case however, was any exposure greater than 45 mrep/day. While the plant tolerance is 100 mrep/day, the laboratories have arbitrarily set 5 mrep/day as the maximum permissible exposure.

VI. PROCESS MATERIAL RELEASES

K-1405 Chemical Engineering Building - June 1, 1948

A material release of short duration occurred when C-616 gas leaked past the gasket of a P.G. Container. The container was being heated with a torch in an attempt to unplug one end. No air sample results or surface readings were reported. The gas was exhausted from the Building by fans before a deposit occurred. No one was sent to the dispensary.

K-1401 Building - June 22, 1948

A converter was being cut open for retubing and other maintenance work. Upon removal of the converter head, a small amount of solid process material was noticed in the converter. Four (4) men who were working on this converter were sent to the dispensary for examination. The maximum surface alpha reading obtained on the converter head showed 1746 c/m.

K-631 - Waste Disposal Building - June 24, 1948

A material release of between five and ten minutes duration occurred when C-616 gas escaped to the atmosphere during preparation for replacing a valve on a chlorine type tail cylinder. The cylinder had been freezing down in dry ice, and a valve had been opened to equalize pressure when the release occurred. No surface or air sample readings were reported. Since all personnel involved were wearing the proper protective equipment (gas mask, coveralls, gloves) no one was sent to the dispensary.

K-1004-B, Room 105 - June 10, 1948

During regular operations at 10:50 a.m. approximately 0.5 gm of process material was spilled in the prepared hood in Room 105. A

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sticking tube collar, due to frosting from L-28 freeze out was assigned as the cause. Simple decontamination of the stainless steel tray with carbonate solution was carried out, and the design of the plexiglass hood cover assured no exposure of personnel.

K-1004-B, Room 121 - June 11 through 18, 1948

Film badges of two (2) employees of the Counting Sections Radiation Survey group showed readings above four (4) times tolerance for the period of June 11 through June 18. An investigation conducted by their immediate supervisor, their section head, and three (3) representatives of the Radiation Hazards Department, plus a radiation consultant could assign no possible cause for the reading. It was felt that accidental exposure of the badge, while not being worn, was probably the explanation. The appearance of the developed film ruled out the possibility of errors in processing. Medical Department findings were completely negative, showing no detectable damage. Employees were assigned to limited work for six weeks, where radiation exposure possibilities do not exist.

VII. WATER SAMPLE PROGRAM

The water survey program was carried on during June according to the schedule revised in March 1948. The Mud and Sludge Sample schedule was also unchanged. Results of all water sampling were exceptionally good. All analytical reports indicated that no contaminant concentration rises occurred. Uranium concentrations remained at less than 5 parts per billion at all points save two, where low readings indicated no serious problems. The Poplar Creek inlet carrying drainage from K-1300, K-1401, K-1405 and the holding pond showed two parts per billion on one sample. The S-50 sewer effluent averaged ten parts per billion during the month, which, in view of the heavy rains, is not a high figure. Fluoride samples remained at or below two-tenths part per million for all samples, and alpha and beta counts remained at background level.

Results of mud samples were still somewhat inconclusive but steps were taken to improve mud sampling and analyses for future control programs.

A sewage sludge analysis of 45,000 / 22,500 parts per billion of uranium is in good agreement with previous results, and shows some expected decrease indicated by the decrease in uranium content of the

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influent water. The laboratory development program will include work to improve sewage sludge analyses as well as mud.

VIII. SPECIAL PROBLEMS

Radio-Chemical Laboratory

Initial Health Physics surveys in the Radio-Chemical Laboratory indicated no above tolerance conditions existing.

Film Strip

The film strip which is to be used in training plant personnel in radiation hazards and the precautions to be observed has been prepared and revised, and will be ready for use in July.

Film Badges

Sets of nine (9) film badges per week were exposed as controls for varying lengths of time to a known radium source in order to compare calculated and measured results. These "Special Control" badges have shown good agreement between calculated and measured values. A set of these controls will be run weekly hereafter.

Radiation Instrument Development

The new Raytheon CK 571 AX tubes were installed in four (4) Zutos replacing the VX 32 tubes. No appreciable change was noted in the stability and drift of the units. However, an increase in sensitivity was noted in all four of the instruments.

The results are:

<u>Serial No.</u>	<u>Divisions/1000 counts per minute source VX 32</u>	<u>Divisions/1000 counts per minute source CK 571 AX</u>
211	3	5 $\frac{1}{2}$
219	3 $\frac{1}{2}$	6 $\frac{1}{2}$
215	2 $\frac{1}{2}$	5
181	5 $\frac{1}{3}$	7 $\frac{1}{2}$

The improved circuit designed for use in the Zuto case and with a long narrow probe was tested. Sensitivity with the standard ion

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chamber is 50 c/m per division and with the long probe 100-200 c/m per division. The mechanical stability of the instrument is to be improved since certain position changes result in a temporary zero shift.

The second alpha counter for hands was completed and placed in operation. This unit is an improvement over the first three chamber units. Four chambers are employed, two connected to each Poppy amplifier. Appearance, ruggedness, and ease of operation have been improved; sensitivity remains unchanged.

IX. EDUCATION PROGRAM

A series of Health Physics seminars was initiated during the month of June, with attendance from the plant divisions averaging approximately fifty (50) per meeting. Topics covered during the month were:

- June 11 - "The Physical Properties of Radiation" - S. Visner
- June 18 - "The Effects of Radiation on Living Organisms" - N. Gerber
- June 25 - "Radiation Tolerances" - W. H. Ray

Five additional seminars on Health Physics have been scheduled in this series.

During the month of June two Radiation lectures were given to a total of twenty-four (24) Electrical Maintenance personnel of supervisory level. The material covered was the same as that outlined in previous Health Physics reports.

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APPENDIX

Table A summarizes the results of air analyses for chemical contaminants made during June. Except for flammable gas analyses by the Safety and Inspection Division, all analyses were made by the Industrial Hygiene Section of the Laboratory Division. Routine sampling is scheduled following a review of work areas within the Plant by the responsible supervisor, the Medical and Safety Departments. In addition to routine sampling, special surveys are made on request to cover special conditions, check operations, etc.

Table B summarizes the results of bacteria counts made on sanitary water. These counts are all made by the Process Utilities Department.

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TABLE A
AIR ANALYSES FOR CHEMICAL CONTAMINANTS

June, 1948

LOCATION	CONTAMINANT	MAX. ALLOWABLE CONCENTRATION MAC	SAMPLING SCHEDULE	NUMBER OF SAMPLES	AVERAGE ANALYSIS	NUMBER ABOVE MAC	REMARKS
Lab A, Rms. 18, 23, 59, 63	Mercury	0.1 mg/cu. m.	Bi-monthly	5	0	None	
Lab C, Rms. 214, 215, 219, 220	Mercury	0.1 mg/cu. m.	Bi-monthly	6	0	None	
Lab C, Rm. 207	Mercury	0.1 mg/cu. m.	Special	2	0.09mg/cu.m.	1	Mercury had been spilled
Lab D, Rms. 3 & 4	Mercury	0.1 mg/cu. m.	Monthly	5	0	None	
Lab D, Rms. 04, 05, 08, 09, 11, 12, 17, 19, 20, 21, 22	Mercury	0.1 mg/cu. m.	Bi-monthly	22	0	None	
K-1401, Conditioning Lab, Rm. 22	Mercury	0.1 mg/cu. m.	Special	1	0.02mg/cu.m.	None	Mercury had been spilled
K-1401, Barrier Research, Rms. 204, 210, 215-N, 252	Mercury	0.1 mg/cu. m.	Bi-weekly	14	0	None	
K-1024, West Wing	Mercury	0.1 mg/cu. m.	Monthly	5	0	None	
K-1024, East Wing	Mercury	0.1 mg/cu. m.	Monthly	2	0.04mg/cu.m.	None	
K-1037, Barrier Test Lab	Mercury	0.1 mg/cu. m.	Weekly	12	0.01mg/cu.m.	None	

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LOCATION	CONTAMINANT	MAX. ALLOWABLE CONCENTRATION MAC	SAMPLING SCHEDULE	NUMBER OF SAMPLES	AVERAGE ANALYSIS	NUMBER ABOVE MAC	REMARKS
K-1302, Cell 2, Inside Tank	HF	3 ppm	Special	3	9 ppm	1	Tank being purged for entry
K-1301, Rm. 6	Uranium	150 Micrograms per cu. m. as chemical toxicant only	Special	4	11.6 mg/cu.m.	4	Grinding operation being revised, to eliminate dust, respiratory protection worn by operators
Asphalt Plant, Tank interiors	Fleammable vapor	-	Special	9	-	None	

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TABLE B
BACTERIA COUNTS OF SANITARY WATER

LOCATION	SAMPLING SCHEDULE	NUMBER OF SAMPLES	BACTERIA		REMARKS
			COUNTS ABOVE ZERO		
K-1515, settled water	twice a week	10	none		
K-1515, filtered water	twice a week	10	none		
Distribution system, various outlets in rotation	six per week	26	none		Two samples a month are checked by the State Department of Health.
K-1101	-	4	2	(20 & 1000 per ml.)	Outlet connected to stagnant header; closed off and flushed.
K-1401	-	1	1	(3 per ml.)	Contamination in new water cooler; tagged and disinfected.

NOTE:

1. The "bacteria count" is the number of colonies counted after incubation of an agar plate with 1 ml. of water.
2. The maximum allowable count on this plant is 100 per ml.



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