(5)

SRDB 17606

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Autopsy Data 1959, 1960 + Bioassay summary

Document Type:

☒ **Facilities/Process** (i.e. source terms, contamination surveys, general area/breathing zone air sampling, area radiation surveys, radon/thoron monitoring, fixed location dosimeters, missed dose information, radiological control limits, Radiation Work Permits, incidents/accidents)

☐ **Medical Dose** (i.e. X-rays, occupational medical dose, exam frequencies, equipment performance characteristics)

☒ **Environmental Dose** (i.e. ambient radiation, on-site releases, on-site radionuclide concentrations)

☒ **Internal Dose** (i.e. urinalysis, fecal, In-Vivo, breath sampling, radon/thoron, nasal smears, analytical methods, exchange frequency, detection limits, record keeping practices, codes, performance characteristics)

☐ **External Dose** (i.e. Thermoluminescent Dosimeters (TLDs), film badges, Pocket Ion Chambers, analytical methods, exchange frequency, detection limits, record keeping practices, codes, performance characteristics)

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☐ **Facilities/Process**

Overall Topic Usefulness: ☐ high ☐ med. ☐ low ☐ none

TBD Sub Topics

- ☐ Facility/Building Descriptions
- ☐ Process Descriptions
- ☐ Radionuclides/Sources
- ☐ Waste Treatment/Disposal Operations
- ☐ Chronological Info

Keywords

- ☐ containment
- ☐ contractor
- ☐ dust samples
- ☐ feed material
- ☐ fission products
- ☐ HLW
- ☐ Inventory/shipment info
- ☐ LLW
- ☐ reactors
- ☐ recycled uranium
- ☐ remediation
- ☐ solubility
- ☐ TRU
- ☐ workplace/air monitoring

☐ **Medical Dose**

Overall Topic Usefulness: ☐ high ☐ med. ☐ low ☐ none

TBD Sub Topics

- ☐ Examination Frequencies
- ☐ Equipment/Techniques
- ☐ Organ Dose Info/Calculations
- ☐ Chronological Info

Keywords

- ☐ collimate
- ☐ frequency by age
- ☐ group
- ☐ personnel information
- ☐ photofluorography
- ☐ X-ray

☐ **Environmental Dose**

Overall Topic Usefulness: ☐ high ☐ med. ☐ low ☐ none

TBD Sub Topics

- ☐ Environmental Monitoring
- ☐ Internal Dose Info
- ☐ Onsite Releases to air
- ☐ External Dose Info
- ☐ Ambient Radiation
- ☐ Noble Gases
- ☐ Radionuclide Concentrations

Keywords

- ☐ area
- ☐ deposition
- ☐ dispersion
- ☐ dust samples
- ☐ energy range
- ☐ group
- ☐ intake/uptake
- ☐ media sampling
- ☐ meteorology
- ☐ particle size
- ☐ radiation type
- ☐ release
- ☐ solubility
- ☐ survey
- ☐ workplace/air monitoring

☒ **Internal Dose**

Overall Topic Usefulness: ☐ high ☐ med. ☐ low ☐ none

TBD Sub Topics

- ☐ Personal Air Sampling
- ☐ In Vitro
  - ☐ MDA
  - ☐ Counting Methods
  - ☐ Reporting Practices
  - ☐ Urine Analysis
  - ☐ Fecal Analysis
  - ☐ Interferences
- ☐ In Vivo
  - ☐ MDA
  - ☐ Counting Methods
  - ☐ Reporting Practices
  - ☐ Whole Body Counting
  - ☐ Chest Counters
  - ☐ Other Counters
  - ☐ Interferences

Keywords

- ☐ acute
- ☐ alpha
- ☐ bioassay
- ☐ chronic
- ☐ contamination
- ☐ detection limit
- ☒ dust sample
- ☐ fecal
- ☐ group
- ☐ incident
- ☐ ingestion
- ☒ inhalation
- ☐ intake/uptake
- ☐ mass
- ☐ measurement units
- ☐ organ dose
- ☐ particle size
- ☐ personnel information
- ☐ radionuclide
- ☐ sample activity
- ☐ sample volume
- ☐ solubility
- ☐ source term
- ☐ survey
- ☐ uncertainty
- ☐ urinalysis
- ☐ workplace/air monitoring
- ☐ wound

☐ **External Dose**

Overall Topic Usefulness: ☐ high ☐ med. ☐ low ☐ none

TBD Sub Topics

- ☐ Historical Administrative Practices
- ☐ Dosimetry Technology
- ☐ Dosimetry Calibration
- ☐ Workplace Radiation Fields

Keywords

- ☐ acute
- ☐ beta dose
- ☐ chronic
- ☐ correction factors
- ☐ criticality
- ☐ detection limit
- ☐ exchange frequency
- ☐ exposure
- ☐ film badge
- ☐ gamma dose
- ☐ geometry
- ☐ immersion
- ☐ incident
- ☐ monitoring equipment
- ☐ neutrons
- ☐ organ dose
- ☐ personnel information
- ☐ photons
- ☐ pocket ionization chamber
- ☐ radiation energy
- ☐ skin
- ☐ source term
- ☐ survey
- ☐ TLD
- ☐ uncertainty

☐ **Energy Employee Data**

☐ Individual Information ☐ Group Information

Overall Topic Usefulness: ☐ high ☐ med. ☐ low ☐ none

Complete Technical Review Performed by: _____ (Health Physicist) Date:

MALLINCKRODT CHEMICAL WORKS

FINE CHEMICALS FOR MEDICINAL, PHOTOGRAPHIC
ANALYTICAL AND INDUSTRIAL PURPOSES

ST. LOUIS 7, M

December 16, 1960

Mr. H. L. Price,
Director, Div. of Licensing & Regulation,
U. S. Atomic Energy Commission,
Washington 25, D. C.

Dear Mr. Price:

On February 17, 1960 we requested a clarification of the word "incident" in paragraph 20.403 of 10 CRF 20. We had particular reference to the exposure of individuals in routine operations to airborne radioactive dust concentrations in excess of the maximum allowable concentration of 5×10^{-11} microcuries per milliliter for uranium.

On July 28, 1960 the requested clarification was received stating that it is the Commission's intent that notice of all overexposures, from routine operations or otherwise, should be submitted.

Table I presents data indicating exposures of various personnel to dust concentrations in excess of the maximum allowable concentration. The data represent integrated airborne dust concentrations in microcuries per ml of air based on statistical studies in the area and calculated from the hours worked on various jobs in the indicated week. For purposes of clarity, exposures have been calculated on the basis of a standard 40 hour week, even though in one period (May and June, 1960) the personnel were working a six day, 48 hour week. This of course, results in an apparent concentration 20% greater than that actually observed. The data presented is for 1959 and the first three quarters of 1960. In those weeks where no figures are shown, there were no calculated overexposures to any personnel in the plant. The figures shown represent the integrated dust concentration for each individual who was overexposed. For comparison, the total number of men in the working force for 1960 has been shown.

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TABLE I

INTEGRATED AIRBORNE URANIUM DUST EXPOSURES GREATER THAN 5×10^{-11} MICROCURIES PER MILLILITER FOR 1959

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Over Exposure										6.0	5.3 5.3 6.0 6.4 6.4 6.8 6.4	5.7 6.8 6.0 5.7 5.3 5.7	6.0 6.8 6.8 5.7 5.7	5.7 5.7 6.9 9.1 6.3 5.7 6.9 5.7

Week	15	16	17	18	19	20	21	22	23	24	25	26	27
Over Exposure	[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]	5.7 [illegible] 5.7	6.0 6.9 5.7 5.3 7.2 6.9 7.9	5.7 6.6 6.0 5.7	6.9		6.9		5.7 6.6			5.4 5.1	

Week	28 through 52
Over Exposure	0

TABLE 1 (continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURES GREATER THAN 5×10^{-11} MICROCURIES PER MILLILITER FOR FIRST THREE QUARTERS 1960

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Total Working Force	51	51	53	52	51	52	52	48	48	51	51	50	53	53
Over Exposure	7.5 4.7	7.1 5.4 7.5	7.8 12.6 6.4	14.8	11.6 11.1 6.7	9.6 11.6					5.8			

TABLE I (continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURES GREATER THAN 5×10^{-11} MICROCURIES PER MILLILITER FOR FIRST THREE QUARTERS 1960

Week	15	16	17	18	19	20	21	22	23	24	25	26	27
Total Working Force	56	56	57	56	57	56	56	56	54	48	48	45	45
Over Exposure						28.2	28.2	23.5	28.2	24.6	6.5	5.7	5.
						14.4	20.5	20.5	24.6	24.6	6.5	6.5	5
						24.6	20.5	20.5	24.6	12.8	5.1	6.5	5
						13.8	21.5	11.5	24.5	10.8	6.8	5.2	5.
						10.8	23.5	23.5	10.1	10.8	6.5	6.5	5
						17.2	9.0	19.1	24.6	24.6	6.5		
						30.8	20.5	9.0	21.5	24.6	5.4		
						24.6	20.5	23.5	24.6	24.6	5.4		
						26.1	20.5	17.2	22.3	14.8	5.4		
						17.8	21.5	20.5	20.5	19.5	5.4		
						17.8	10.5	20.5	28.2	16.9			
						5.6	28.2	20.5	10.8	24.6			
						28.2	10.8	21.5	19.5	19.5			
						10.8	10.9	23.5	19.5	18.1			
						28.7	20.5	9.0					
						10.8		9.0					
								20.5					
								20.7					

GREATER THAN 5×10^{-4} MICROCURIES PER

MILLILITER FOR FIRST THREE QUARTERS 1960

Week	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Total Working Force	43	44	43	42	43	43	43	43	44	44	42	42	42	42
Over Exposure	6.5 6.7 6.7 6.7			34.7 6.5 6.5	6.5 6.5 6.5	6.5 6.5	6.5 6.5					6.5 6.5 6.5		

Mr. H. L. Price--

As would be expected, overexposures are sporadic and can be closely correlated with new or revised plant operations.

In the period from week 10 to 26, 1959, a new operation was being developed, the startup of the pellet facility. This was a completely new installation involving a process somewhat different from previous practice. Initial training operations showed minor overexposures which were corrected as training progressed. It was believed that the major problems had been solved, at least for a relatively low production rate.

At this time we also undertook our first sizeable quantity of fully enriched metal. Here, again, only minor overexposures were observed and these were eliminated by improved training and practices on the part of the operating personnel.

Six overexposures over a six week period resulted in the blending (compositing) facility during this time. These were caused by defective doors on the dust enclosures and were eliminated by the repair of the equipment. No recurrence has been observed to date.

In the period from weeks 1 to 11, 1960, overexposures were again observed in the pellet facility, this time in a period of very high production rates. It is believed that the practices which had been adequate at low levels of production were not entirely suitable for seven day operation at a high production rate. To correct this situation the entire press feed process was modified to eliminate a portion in which dust generation was high and containment was difficult. At this time a new centerless grinder had recently been installed and it was discovered that entrained grinder coolant fluid was discharging airborne radioactive material into the open air space. Installation of a new dust enclosure on the grinder, as well as a new dust enclosure on the number two press eliminated further overexposures in this area.

In the period from weeks 20 to 24, 1960, we encountered the most difficult airborne dust problem in the history of the plant. This problem was primarily concerned with the operation of the high enrichment metal facility at a very high production rate. The practices which had been developed at low production levels on a five day week were found to be inadequate and a great amount of effort was required to reduce airborne dust levels. In a first attempt to eliminate the problem, additional makeup air was supplied to the room by increasing the speed of the air supply blower. This did not result in satisfactory improvement and a larger motor was installed which allowed the blower to be operated at its maximum rate. When this did not result in satisfactory air velocities into the dust enclosures, an opening was made in the roof of the building and an additional makeup air supply was installed. The air velocities at the face of the dust enclosures were raised from a minimum of 100 feet/min. to 150 feet/min. In addition to the increase in face velocities, a new hood was installed for closing and purging metal reduction bombs and for pickling metal biscuits. Improved handling practices were developed such as the elimination of certain weighing

Mr. H. L. Price--

operations which had been performed in the working area; all bottles were washed on the outside before they were brought from the dry boxes into the working area and housekeeping was improved. The entire area was wet mopped at frequent intervals, including the floor, overhead, pipes and duct work. The air supply ducts were opened and wet mopped inside to remove dust which apparently had entrapped airborne radioactive material from the recycle air. The development of these changes and modifications did not occur simultaneously and a considerable period was required to modify, test and re-modify. Improvements in process are still being made to further reduce airborne dust concentrations in this area.

The problem was further aggravated by the simultaneous startup of a facility to manufacture high enriched UO_2 shot. Thus, it became necessary to determine which of the two processes was contributing the major portion of airborne dust and eliminate insofar as possible the contribution from that source. Then the second process was investigated to determine necessary changes in that process. Process changes here included the installation of a hand operated press in a hood, installation of sieves in a dry box and prevention of removal of contaminated bottles into the working area. A continuing program of reduction of airborne dust is in effect in this area as well as in the metal area.

One overexposure in the week of August 1, 1960, resulted from the sampling of slag from metal reduction by a summer employee in a manner not consistent with approved practices. This incident was not repeated.

It must be pointed out that the overexposures noted pertain to only a small portion of the working force at the Hematite Plant. At the peak of operations some 105 persons were employed in the plant in various positions and these overexposures occurred to a maximum of 18 in the week of May 31, 1960.

The dust concentrations reported are, of course, calculated numbers based on tests performed in the area and on the number of hours worked in the area. No credit allowance has been made for the use of protective equipment which is supplied to the working force. It is common practice for operators to wear a dust mask even when the operation is confined to a hood. In this way the air actually inspired has a somewhat lower airborne dust concentration than the calculated value. Table II shows the results of urine analysis for 16 of the 21 persons overexposed in the period of May and June 1960. The remaining 5 were not sampled during this period. Of the 16 that were sampled, only 5 showed a significant increase in urine content. More complete urine data in the appendix shows that subsequent urine analyses returned to a normal level within a very short time.

TABLE II--Urine Analyses for Personnel Overexposed
During the Period of May-June 1960

Operator	Sample Date	D/M/L
F	6/27/60	222
H	5/16/60	92
K	5/16/60	24
P	5/16/60	111
Q	5/16/60	164
V	6/27/60	54
W	5/16/60	406
Z	6/20/60	31
BB	6/20/60	0
FF	5/16/60	13
HH	5/31/60	0.4
II	5/16/60	0.7
JJ	6/27/60	164
LL	6/27/60	263
NN	6/15/60	61
PP	6/27/60	28

Additional data are presented in the appendix. Table III is the complete exposure history, by operator for those overexposed in 1959. Table IV is like information for 1960. Table V is the biological analysis for uranium in urine for 1959-1960. It is believed that at least a few of the high urine analyses resulted from physical contamination of the sample during collection since a recheck revealed no significant uranium in urine.

We hope this report meets with your approval. If you have any comments or questions, please do not hesitate to get in touch with us.

Very truly yours,

MALLINCKRODT CHEMICAL WORKS
Nuclear Division

FZ/wt

Frank Zeitlin

Frank Zeitlin

cc: Manager, Oak Ridge Operations Office

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

DECEMBER 29, 1958 TO MARCH 29, 1959

NAME	1	2	3	4	5	6	7	8	9	10	11	12	1
A	0	0	0	0	0	0	0	0	0	0.8	1.5	1.9	1.[illegible]
B	1.1	0.8	3.8	1.9	2.3	1.5	0	0	0	0	0.7	0	1.9
C	0	0	0	0	0	0	0	0	0	0	0	0	5.0
D	0.4	0.4	0.4	0.4	3.0	0.4	0.4	0.4	0.4	0.4	3.0	1.9	1.9
E	0	0	0	0	0	0	0	0	0	1.1	5.3	2.6	3.0
F	1.1	1.5	1.9	1.5	1.5	1.9	1.5	0.8	1.9	1.1	1.5	2.3	1.5
G	0	0	0	0	0	0	0	0	0	2.3	1.5	0	4.[illegible]
H	0	0	0	0	0	0	2.6	1.1	1.5	1.1	1.9	1.5	1.9
I	0.4	1.1	0.8	0.4	0.8	0.4	0.8	0.8	4.5	3.8	3.4	5.7	4.5
J	0	0	0	0	0	0	0	0	0	1.1	1.9	1.5	4.[illegible]
K	0	0	0	0	0	0	1.5	1.1	1.5	0.8	2.7	0.8	0.[illegible]
L	2.7	2.3	0.8	3.4	2.3	1.9	0.4	0.4	1.9	0.4	5.3	6.8	5.0
M	0	0	0	0	0	0	1.9	1.9	1.5	1.5	1.9	1.9	1.9
N	0	0	0	0	0	0	0	1.5	1.5	1.9	1.9	1.9	1.9
O	0	0	0	0	0	0	0	0	0	0.4	6.0	6.0	6.0
P	0.4	0.4	0.8	0.4	3.0	0.4	0.4	0.4	0.4	0.4	2.6	1.9	1.9
Q	0.4	1.1	0.8	0.4	3.0	0.8	0.4	0.4	0.4	0.4	2.3	1.9	2.[illegible]
R	1.1	1.9	1.1	1.5	1.5	1.1	1.9	3.0	4.5	6.0	3.0	5.7	5.0
S	0	0	0	0	0	0	0	0	3.4	0.8	6.4	5.3	6.[illegible]
T	1.1	1.9	1.9	1.9	1.9	1.5	2.3	0.8	1.1	2.3	2.7	3.8	2.[illegible]
U	0.4	1.1	1.1	1.5	1.1	0.4	1.5	1.5	0.4	1.5	6.4	3.4	6.[illegible]
V	0	1.1	2.3	2.7	1.5	1.1	1.5	0.8	1.1	0.8	6.8	4.5	5.[illegible]
W	1.9	1.1	1.5	1.9	1.5	1.5	1.1	0.4	3.0	3.8	3.0	5.7	3.[illegible]
X	0	0	0	0	0	0	0	0	4.2	2.3	6.4	5.0	5.[illegible]
Y	0.4	0.8	0.4	1.9	0.8	1.1	0.8	0.8	0.8	0.8	1.1	1.5	1.[illegible]
Z	1.1	1.5	1.1	1.9	0.8	1.5	1.9	1.5	0.8	0.4	0	1.5	1.[illegible]

TABLE III (Continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

MARCH 30 THROUGH JUNE 28, 1959

NAME	14	15	16	17	18	19	20	21	22	23	24	25	26
A	1.6	1.6	1.6	1.3	1.6	1.3	0.9	1.9	0.8	1.3	0	0	0
B	0.6	5.3	1.9	1.6	2.5	0	0	0	0	0	0	0	0
C	5.7	3.1	4.7	6.0	5.7	2.2	0.6	0.9	0.9	0.6	0.3	1.5	1.[illegible]
D	2.2	1.9	2.5	2.8	1.6	1.6	1.3	0.3	0.9	0	0	0	1.[illegible]
E	5.7	0.6	0	0	0	0	0	0	0	0	0	0	0
F	1.6	1.6	1.3	2.2	2.2	1.3	1.3	1.6	0.9	3.5	0.9	2.3	1.[illegible]
G	2.2	0	2.2	1.9	1.9	0	0	2.2	0	0	1.3	1.1	1.[illegible]
H	1.6	1.9	1.9	1.6	1.3	1.6	1.3	1.3	0.6	1.3	1.6	1.5	2.[illegible]
I	1.9	4.7	1.9	1.6	1.9	1.9	0.6	1.3	0.6	0.6	0.3	1.3	1.[illegible]
AA	0	0	0	0	0	1.3	0.9	1.9	1.6	0.6	1.3	2.5	1.[illegible]
J	6.9	0	0	6.9	4.4	0	0	0	0	0	0	0	0
K	1.9	0	2.2	0	2.2	1.3	0.3	0	1.3	0	0	0.5	1.[illegible]
L	1.9	6.3	4.7	5.0	0	0	4.1	4.4	4.7	1.6	1.6	1.8	1.[illegible]
M	1.6	1.6	0	1.6	1.6	1.3	1.3	1.3	0.6	1.6	0.9	2.4	0
N	1.9	1.6	1.6	5.7	6.6	1.3	1.6	1.9	0.9	0.3	0.9	1.5	1.[illegible]
BB	0	0	0	0	0	0	0	0	0.3	0.9	0.3	1.2	1.[illegible]
O	9.1	6.6	0.9	2.2	0	0	0	0	0	0	0	0	0
CC	0	0	0	0	2.8	6.9	0.9	1.3	1.6	0.9	0	0	0
P	2.2	2.2	2.5	2.2	3.5	1.6	0.9	1.3	1.6	0.3	0	0	0
Q	2.2	2.2	3.1	3.9	2.2	2.5	0.9	0.6	1.3	0.6	0.6	1.8	1.[illegible]
R	1.9	4.4	1.9	1.9	1.3	1.9	0.9	1.3	0.6	0.6	0.6	1.2	1.[illegible]
DD	0	3.5	5.7	5.3	6.0	1.6	0.9	0.9	0.6	0.9	0.3	0.6	1.[illegible]
S	1.9	1.9	2.2	1.9	1.3	1.9	1.3	1.3	1.3	0.9	0.6	1.2	0.[illegible]
T	0	9.1	5.0	7.2	3.1	0.6	2.5	1.6	1.6	1.6	1.6	1.8	1.[illegible]
U	6.3	6.9	4.1	6.9	5.7	1.3	5.0	0	0	5.7	4.7	2.2	3.[illegible]
V	5.7	6.9	2.5	1.3	2.5	1.6	1.9	3.1	0	3.9	4.1	3.8	5.[illegible]
W	1.9	4.1	1.9	3.5	3.5	1.9	1.3	3.1	1.9	1.9	0	0	5.[illegible]

(OVER)

TABLE III (continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

MARCH 30 THROUGH JUNE 28, 1959

NAME	14	15	16	17	18	19	20	21	22	23	24	25	26
X	6.9	3.5	6.0	0	4.7	3.1	0.6	1.3	0.6	0.9	0.3	1.2	2.9
Y	5.7	2.8	5.7	7.9	1.3	0	0	6.9	3.5	6.6	1.3	2.0	2.1
EE	1.9	2.2	1.3	2.5	3.1	1.9	0.6	1.6	0.6	0	0	1.7	2.4
Z	1.6	1.9	1.9	2.2	2.2	2.2	2.2	1.6	1.3	1.6	1.9	2.3	2.4

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

JUNE 29 THROUGH SEPTEMBER 27, 1959

NAME	27	28	29	30	31	32	33	34	35	36	37	38	3
A	1.7	1.8	2.1	2.0	1.7	1.2	1.3	1.8	0.6	1.5	1.3	1.5	1.
C	1.2	0.9	1.6	1.5	0	0	0	1.8	1.3	0.6	1.3	1.2	0.
D	1.5	1.8	1.8	1.8	1.8	1.4	1.5	1.8	1.8	1.5	1.0	1.5	1.
F	2.0	1.4	2.4	0	0	0.6	1.2	1.0	1.2	2.0	1.5	1.0	2.
G	1.6	1.8	2.0	1.3	1.3	1.0	0.7	1.8	1.8	1.5	0.9	1.4	2.
H	1.0	2.4	1.6	1.4	1.2	0.8	0	0	2.4	1.1	1.0	1.6	1.
I	1.0	0	0	1.2	1.4	0.8	0.8	1.2	1.2	1.2	0	1.0	1.
AA	2.4	2.1	1.7	0	0	0	1.7	1.5	1.4	1.1	1.1	1.5	2.
K	0.5	1.1	0.6	0.7	1.0	1.0	1.3	1.2	0	0	1.0	1.2	1.
L	1.5	1.2	1.8	2.0	1.9	1.4	1.3	1.5	1.8	1.7	1.2	0.7	1.
M	0	1.5	2.2	1.2	2.0	0.8	1.1	1.2	1.2	2.0	2.2	1.4	0
N	1.8	1.6	1.3	1.0	1.2	0.8	1.0	1.2	1.2	0.8	0.4	0	0
BB	1.0	1.1	1.2	1.3	1.3	0.9	0.7	0	0	1.0	0	1.0	1.
FF	0	0	0	0	0	0	0	0	0	0	0	1.0	1.
CC	1.1	1.2	1.2	1.2	1.4	0.8	1.0	1.3	1.2	0.4	1.0	1.2	1.
P	1.5	1.7	1.8	1.8	1.0	1.5	1.8	1.8	1.5	1.8	1.1	1.5	1.
Q	1.5	1.8	1.8	1.8	1.8	1.1	1.5	0	0	1.5	1.0	1.5	1.
R	0.9	1.2	1.2	1.3	1.4	0.8	0.9	1.2	1.2	1.0	0	0	0
DD	1.1	1.2	1.0	1.0	1.2	0.6	0.6	1.1	1.0	1.1	0.7	0.8	1.
S	0.5	1.4	0	0	0.8	0.4	1.0	1.1	1.0	0.5	0.4	0.5	0.
T	1.2	1.8	1.8	1.8	1.6	0.5	0.9	1.0	1.0	0.5	0.5	0.7	0.
U	2.1	2.0	1.8	1.8	1.8	0.8	0.9	1.7	2.2	1.4	1.4	1.5	2.
V	0	1.7	2.0	1.9	1.7	1.0	0.7	1.5	1.5	0	1.3	0.3	0.
W	3.1	2.4	2.1	1.8	1.5	0.7	1.0	1.1	0.4	1.1	1.8	0	1.
X	1.2	1.2	1.2	1.2	0	0	1.0	1.3	0.9	1.2	0.8	0.4	1.
Y	2.0	1.7	1.9	1.2	1.3	0.4	0.6	1.0	1.4	0.5	0.6	1.3	0.
EE	2.0	0	0	2.4	2.4	1.9	1.2	2.3	2.5	1.0	2.0	2.0	1.
Z	2.0	2.3	0	0	2.0	1.5	1.4	2.4	2.4	1.7	2.0	2.0	2.

TABLE 33 (CONTINUED)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

SEPTEMBER 28, 1959 THROUGH JANUARY 3, 1960

NAME	40	41	42	43	44	45	46	47	48	49	50	51	52	53
A	2.2	2.8	1.1	2.8	3.0	0	1.2	1.8	0.8	1.8	1.8	1.8	1.2	0.9
AA	1.7	2.1	2.0	1.6	2.0	2.0	1.8	1.0	0.9	1.8	1.8	1.5	1.2	0.9
BB	1.0	1.1	1.0	1.2	1.3	1.3	1.3	1.5	0.9	1.2	1.2	1.2	0	2.6
C	1.7	1.2	1.2	1.2	1.8	1.5	1.5	1.5	0.6	1.8	1.8	1.5	0.9	1.2
D	1.8	1.8	1.8	1.8	1.8	2.6	1.8	1.8	0.9	1.8	1.8	1.8	1.2	0.9
DD	1.0	1.0	0.8	1.1	1.2	1.2	1.0	1.3	0.9	1.0	1.1	1.4	0.6	1.0
EE	2.1	1.6	1.8	2.4	2.4	1.2	1.2	2.4	0.9	1.2	1.2	2.4	1.4	0.6
F	1.2	1.7	2.4	2.7	1.2	1.2	2.0	1.4	0.6	1.2	2.4	2.4	0	0.6
FF	1.4	1.0	0	0	1.2	1.2	1.2	1.2	0.6	1.2	1.2	1.2	0.6	1.0
G	1.0	1.2	0.6	1.4	1.3	1.4	1.4	1.5	1.0	1.4	1.4	1.5	1.0	3.2
H	1.0	1.6	2.4	1.4	1.2	2.4	2.4	0	1.0	2.4	2.4	1.2	1.2	1.3
HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9
GG	0	0	0	0	0	2.4	2.4	2.4	1.2	2.4	1.2	2.5	0.9	0.8
I	1.2	0.8	1.2	1.4	1.4	1.4	1.4	1.3	0.6	1.4	1.2	1.2	0.6	3.8
II	0	0	0	0	2.5	2.7	2.2	2.2	2.2	2.2	2.2	2.5	1.4	0
JJ	1.2	2.4	2.4	2.8	2.0	2.4	2.3	2.1	0.9	1.8	1.8	1.8	0.9	0.9
K	1.0	1.2	1.0	0.8	1.4	1.6	1.4	1.4	0.6	1.4	1.4	1.6	1.8	1.8
KK	0	0	0	0	1.1	1.5	1.2	1.7	1.0	1.5	1.2	1.7	0.6	3.8
L	1.8	1.8	1.8	2.1	1.8	1.8	1.8	1.8	0.9	1.8	1.6	0.9	1.1	0.9
LL	0	0	0	0	0	0	0	0	0	0	0	1.2	1.2	1.6
M	2.0	2.4	2.4	2.8	2.0	1.4	1.2	2.4	1.2	2.4	2.4	1.6	1.3	1.2
N	3.0	3.7	0.7	4.2	4.0	3.0	2.4	1.8	0.9	1.8	1.8	1.8	0.9	1.4
P	1.8	1.8	1.8	2.3	1.8	1.8	0.9	1.8	1.9	1.8	1.8	1.8	0.9	1.2
Q	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.9	1.8	1.8	1.8	0	0.9
R	1.0	1.2	1.1	1.4	1.4	1.4	1.4	1.4	0.6	1.4	1.4	1.4	0.8	3.8
S	0.8	1.0	0.6	0.7	0.5	0.8	1.2	0.4	0.3	0.6	0.6	1.4	0.3	0.5
T	0.7	0.8	0.6	0.5	0.8	0.6	0.7	0.6	0.9	1.7	1.8	2.1	1.2	1.2
U	2.0	2.1	1.9	1.8	0	0	0	1.9	1.9	1.8	1.9	1.8	0.9	0.6
V	0.7	2.3	2.8	1.6	1.7	1.7	2.0	1.9	0.9	3.0	1.8	2.0	0.3	1.2

(OVER)

TABLE II A (Continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

SEPTEMBER 28, 1959 THROUGH JANUARY 3, 1960

NAME	40	41	42	43	44	45	46	47	48	49	50	51	52	53
W	2.7	2.1	2.5	2.5	3.3	4.0	2.4	0	0.9	1.8	1.8	2.9	0.9	0.9
X	1.0	1.2	1.2	1.4	1.4	1.2	1.4	1.7	1.0	1.4	1.9	1.5	1.0	2.1
Y	1.6	1.8	0.9	0.7	1.9	1.3	2.6	2.6	1.2	2.4	2.4	2.2	0.8	0.4
Z	2.4	2.4	2.4	2.8	2.3	2.4	2.4	2.2	1.3	2.4	2.4	2.4	1.2	2.0

TABLE IV

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

JANUARY 4 THROUGH APRIL 3, 1960

NAME	1	2	3	4	5	6	7	8	9	10	11	12	13
A	1.5	1.8	2.9	4.0	4.0	3.8	3.3	3.9	1.8	0.3	4.0	4.3	1.8
C	1.5	0.3	1.0	0.3	1.5	1.3	1.9	1.2	1.3	0.9	1.2	2.1	1.8
D	1.8	0.3	1.8	1.8	1.8	3.3	3.2	1.8	1.8	1.8	1.9	2.1	1.8
F	1.9	1.4	1.3	1.5	1.8	1.8	1.5	1.8	1.8	2.1	1.6	4.2	1.8
G	3.3	7.1	7.8	0	11.6	9.6	3.2	3.1	4.3	4.2	4.2	4.0	4.1
H	7.[illegible]	2.9	3.6	3.6	3.6	11.6	2.9	3.1	3.3	3.9	2.0	3.5	3.3
I	3.1	3.1	3.1	3.1	3.1	3.1	2.6	2.6	3.1	3.1	3.1	2.6	3.1
K	[illegible].7	2.0	2.2	2.2	1.9	2.3	1.6	1.9	1.9	2.4	1.9	2.3	1.9
L	1.8	1.4	1.2	1.0	0.9	1.2	1.2	1.2	1.1	1.0	0.6	1.4	0
M	2.0	1.4	2.2	1.0	0.6	1.2	1.2	1.2	1.2	1.2	0.2	0	0
N	1.2	1.8	3.3	4.0	4.0	4.0	3.7	1.7	2.0	1.8	4.0	4.6	2.2
P	1.8	1.8	1.8	1.8	1.8	2.0	3.6	1.8	1.8	2.1	1.8	1.8	1.8
Q	1.7	1.8	1.8	1.8	2.3	1.8	1.8	2.7	1.8	1.6	1.8	2.1	1.8
R	3.3	3.1	3.1	3.1	3.1	2.8	2.6	0	0	0	3.1	3.1	3.1
S	0.7	1.6	1.5	1.3	1.5	1.2	1.3	1.6	1.8	1.7	0.7	0.7	0.6
T	1.8	1.8	1.6	1.6	1.5	1.2	0.8	1.8	1.8	1.7	0.6	1.7	2.1
U	0	0.9	1.5	1.5	1.8	2.1	2.4	2.1	2.0	1.9	2.2	2.5	2.1
V	4.6	1.8	1.5	1.5	1.8	2.1	1.6	2.7	1.5	0	1.5	2.1	2.2
W	1.1	1.8	3.3	4.0	4.6	4.0	2.0	2.5	1.8	1.9	4.0	4.3	4.0
X	2.4	2.1	1.9	1.9	1.9	2.4	2.6	0	3.2	2.4	2.5	2.3	2.2
Y	1.1	2.5	0.9	0.9	1.3	1.3	1.1	0.6	1.2	1.2	1.4	1.4	1.2
Z	2.1	1.1	2.2	1.0	1.2	0.6	1.2	1.2	1.2	2.7	1.2	1.7	1.4
AA	2.5	1.8	1.5	1.5	1.8	2.3	1.8	1.8	2.1	1.8	1.9	2.2	2.0
BB	2.8	[illegible].4	12.6	14.8	2.6	3.3	2.6	0.1	0	0	3.4	3.1	3.2
DD	3.9	4.1	4.0	5.0	3.9	3.8	3.0	3.0	4.2	2.5	2.5	2.0	3.2
EE	1.0	[illegible]	[illegible]	4.1	6.7	3.6	3.3	2.2	3.7	2.9	3.4	3.4	3.5

(OVER)

TABLE IV (continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

JANUARY 4 THROUGH APRIL 3, 1960

NAME	1	2	3	4	5	6	7	8	9	10	11	12	13
FF	1.3	1.2	1.2	1.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.4	1.4
GG	0.6	1.7	1.2	1.6	1.8	1.8	1.5	1.8	1.5	1.8	4.0	2.1	1.8
HH	1.8	1.8	1.5	1.2	1.9	1.8	1.8	1.8	1.8	1.6	1.8	2.1	2.3
JJ	1.4	1.8	2.2	3.3	4.6	1.8	1.5	1.8	1.8	2.2	2.0	3.9	1.8
MM	2.2	4.5	3.6	4.7	11.1	3.0	3.1	1.9	2.2	2.3	3.2	3.1	3.5
NN	1.1	1.8	1.2	1.1	0.7	0.3	1.3	1.4	1.2	0.7	1.9	0	1.5
OO	0	3.7	0.5	0.6	0.4	0.4	1.3	0.7	2.3	0.9	5.8	4.8	0

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOURS PER WEEK

APRIL 4 THROUGH JULY 4, 1960

NAME	14	15	16	17	18	19	20	21	22	23	24	25	26
A	1.6	4.0	4.0	4.0	3.3	4.0	14.4	20.5	20.5	24.6	24.6	6.5	5.7
C	0.8	0.5	0.6	1.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
D	1.8	1.8	1.8	1.8	1.8	1.8	13.8	21.5	11.5	1.8	12.8	1.5	1.5
F	2.1	2.0	2.1	2.1	2.1	2.1	2.8	23.5	23.5	0	0	5.1	4.1
G	4.1	3.5	3.9	4.1	2.0	2.2	2.9	2.7	0	0	0	1.2	2.1
H	3.5	2.9	3.4	3.2	3.0	3.7	3.4	2.7	2.4	2.6	2.3	2.9	3.4
I	3.1	2.6	3.5	1.8	3.1	2.1	3.1	3.4	1.8	2.0	0	0	0
K	2.2	1.9	2.4	2.3	2.2	2.1	2.3	1.6	1.6	1.4	2.1	1.7	2.1
L	0	0	1.2	0.7	1.2	1.1	1.2	1.5	1.8	1.4	1.3	1.6	1.5
M	0	0	0	0	0	1.2	1.2	1.2	23.5	24.6	24.6	6.5	6.5
N	1.7	4.0	3.9	4.0	4.0	4.0	30.8	20.5	20.5	24.6	24.6	6.5	6.5
P	1.8	1.8	1.8	1.8	1.8	1.8	17.8	21.5	21.5	0	14.8	1.5	1.5
Q	1.8	2.5	1.8	1.8	1.8	1.8	17.8	10.5	1.5	2.8	1.8	1.5	1.5
R	3.1	2.6	2.8	3.1	3.0	3.1	3.0	2.2	0	0	0	1.8	2.2
S	1.6	0.7	0.5	0.7	1.1	0.5	0.6	0.5	1.5	1.0	0.9	1.5	1.3
T	0.5	0	0.5	1.1	1.6	0.1	0	0	0	0.7	1.5	1.2	-
U	1.7	2.2	2.1	2.1	0	0	0	10.8	9.0	10.8	19.5	5.4	4.0
V	1.8	1.6	2.1	1.4	2.1	2.1	10.8	10.8	9.0	19.5	16.9	5.4	5.2
W	1.3	4.0	3.0	4.0	4.0	4.0	28.7	20.5	20.5	1.8	24.6	2.6	6.5
X	2.2	1.9	2.2	2.2	2.2	2.5	1.9	1.6	1.9	1.8	2.2	0	0
Y	1.2	1.4	1.1	1.0	2.1	4.0	10.8	0.8	2.0	2.0	19.5	2.4	0.9
Z	1.2	1.2	1.2	1.2	1.2	0	0	0	20.7	19.5	18.[illegible]	5.4	2.3
AA	1.6	2.8	2.1	2.1	2.1	2.1	10.8	9.0	9.0	10.1	10.[illegible]	3.6	2.4
BB	3.1	2.6	4.0	4.0	4.0	1.8	24.6	20.5	20.5	22.3	24.6	5.4	2.6
DD	2.1	3.2	1.8	2.2	3.5	2.2	1.6	2.1	1.3	1.9	1.1	2.2	2.2
EE	3.5	2.8	3.5	3.3	2.9	3.1	2.3	2.6	1.3	1.6	2.0	0	0
FF	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0	0	1.4	2.5	1.0	1.0
GG	2.1	3.3	3.9	4.0	4.0	4.0	24.6	20.5	20.5	24.6	24.6	6.5	-
HH	1.8	1.5	1.7	1.5	0	0	0	1.5	19.1	24.5	10.[illegible]	6.8	3.4

(OVER)

Table IV (continued)

INTEGRATED AIRBORNE URANIUM DUST EXPOSURE

MICROCURIES PER MILLILITER x 10^{-11}

BASED ON 40 HOUR PER WEEK

APRIL 4 THROUGH JULY 4, 1960

NAME	14	15	16	17	18	19	20	21	22	23	24	25	26
JJ	1.5	3.6	3.0	4.0	4.0	4.0	26.6	20.5	20.5	20.5	-	-	-
AM	3.2	2.8	2.4	1.2	1.9	1.1	2.0	0	0	1.8	1.8	1.7	1.2
NN	0.9	1.7	0	1.2	0	0	5.6	0.5	0.6	3.0	1.2	0.8	2.0
LL	1.2	1.3	2.1	2.1	2.1	2.1	28.2	28.2	23.5	28.2	-	-	-
GG	1.4	2.1	1.7	2.1	2.5	0.7	0	0.7	0	0	1.2	1.3	2.0
PP	1.9	2.1	2.1	2.1	2.1	2.1	28.2	28.2	23.5	28.2	-	-	-
II	3.6	3.0	0	0.8	0.5	2.0	17.2	0	17.2	21.5	-	-	-

BASED ON 40 HOURS PER WEEK

JULY 5 THROUGH OCTOBER 2, 1960

NAME	27	28	29	30	31	32	33	34	35	36	37	38	39
A	.	.	3.5	2.9	0	0	0	6.5	1.5	1.2	0	0	0
C	0.4	0	0	0	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5
D	1.2	1.5	0	0	0	1.5	1.5	1.5	1.5	1.2	1.5	1.5	1.5
F	1.7	2.0	1.5	1.5	1.5	2.0	0.6	0.5	1.5	1.5	1.1	0.5	0.7
G	1.7	2.2	0.5	1.5	2.3	2.0	2.0	0	0	0	0.1	0	0
H	2.0	2.6	1.2	1.0	2.0	0	2.0	2.0	1.2	1.6	2.0	2.5	2.4
J	0.7	1.0	0.6	0.5	1.5	1.1	1.0	1.5	1.2	1.1	1.2	2.5	2.5
K	0	0	0	0.5	1.5	2.0	1.5	1.5	0.7	1.3	1.8	1.6	2.4
L	0.9	1.0	1.5	1.5	1.4	1.5	1.5	1.0	1.1	1.1	1.4	1.2	1.2
M	0	.	1.5	3.5	2.5	6.5	6.5	4.2	1.4	1.2	1.5	1.5	6.5
N	.	.	1.5	2.5	6.5	6.5	4.8	0	0	1.2	1.5	-	-
P	1.0	1.5	1.5	0	0	1.5	1.5	1.2	1.5	1.2	1.5	1.5	1.5
[illegible]	1.2	0	0	0	1.5	1.5	1.5	1.5	1.5	1.2	1.5	1.5	1.5
R	2.2	2.2	1.5	1.5	1.6	2.4	1.2	1.5	1.7	1.3	2.3	2.2	3.6
[illegible]	1.0	0.8	1.1	0	0	1.1	0.5	0.5	1.1	1.1	1.4	1.9	0.7
[illegible]	.	1.5	1.7	1.5	1.5	3.0	1.5	1.5	1.2	1.2	1.5	1.5	1.5
[illegible]	0	0	1.2	1.5	6.5	6.5	4.8	1.8	1.5	1.6	1.3	0	6.5
[illegible]	.	2.0	0.9	1.1	0	0	1.2	0.6	0.8	1.1	1.4	1.6	1.2
[illegible]	0	2.1	1.6	1.0	1.8	2.0	1.1	1.3	2.0	1.6	1.8	-	-
[illegible]	0.8	1.5	1.5	1.5	1.5	1.5	6.5	5.5	0.8	1.1	0	0	1.0
[illegible]	4.8	0	1.4	1.0	2.0	2.0	1.8	1.5	1.0	1.6	2.0	2.0	2.0
[illegible]	.	[illegible]	0	0	1.5	2.5	2.2	6.5	1.5	1.2	1.5	1.8	4.8
BB	1.6	1.5	1.5	0	0	1.5	1.5	0	0	0.2	1.8	1.5	1.5
DD	1.8	2.4	1.2	0.9	0.7	1.5	1.5	1.5	1.5	1.3	1.9	1.5	2.5
EE	2.4	2.1	0	1.5	2.0	1.0	1.0	0.9	1.0	0.8	1.0	1.0	1.0
FF	0.8	1.0	1.0	1.5	1.0	2.0	1.0	1.0	0.7	0	0	1.5	6.5
HH	1.2	1.7	1.6	1.5	1.5	1.6	1.5	1.5	1.3	1.2	1.4	1.4	1.5
MM	0.4	1.0	1.2	0.8	2.3	1.5	0.5	0.9	2.0	1.2	1.1	1.8	3.2
NN	1.5	1.6	0.6	0.5	0.6	1.5	0.5	0.9	0.7	0.7	0.5	0.5	1.3
OO	2.8	2.7	1.4	0.6	1.0	-	1.1	0.9	0.7	0.4	0.5	0.5	0.5
QQ	-	-	2.4	1.2	34.7	2.4	2.3	2.1	2.2	1.8	-	-	-

TABLE V

URINARY URANIUM BIOLOGICAL DATA

DISINTEGRATIONS PER MINUTE PER LITER

JANUARY 1959 THROUGH SEPTEMBER 1960

NAME	DATE OF SAMPLE	D/M/L
A	3/16/59	62.0
	5/04/59	58.0
	7/13/59	14.0
	11/16/59	19.0
	4/18/60	88.0
	7/11/60	20.0
B	2/16/59	0.0
	4/20/59	0.0
	7/13/59	5.3
C	3/16/59	0.0
	4/20/59	0.0
	9/13/59	0.0
	3/14/60	26.0
	8/15/60	7.0
D	2/16/59	0.0
	7/13/59	47.0
	11/16/59	44.0
	1/18/60	54.0
	3/21/60	60.0
	4/25/60	71.0
	7/11/60	62.0
	8/15/60	685.0
E	3/16/59	35.0
	4/28/59	1.0
F	2/16/59	0.0
	6/15/59	0.0
	10/26/59	35.0
	2/23/60	29.0
	6/27/60	222.0
	7/25/60	107.0
G	4/20/59	14.0
	8/17/59	5.6
	12/14/59	4.0
	4/18/60	8.9
	8/15/60	14.0
H	5/25/59	21.0
	9/13/59	1.8
	1/18/60	23.0
	5/16/60	92.0
	7/11/60	4.0

NAME	DATE OF SAMPLE	D/M/L
I	2/16/59	73.0
	3/23/59	9.1
	4/06/59	14.0
	6/15/59	15.0
	10/26/59	2.0
	2/23/60	7.1
	7/25/60	11.0
J	3/16/59	3.6
	3/23/59	5.2
	5/04/59	0.0
K	1/20/59	13.0
	5/25/59	5.5
	9/20/59	1.8
	1/18/60	15.0
	5/16/60	24.0
L	4/20/59	32.0
	8/17/59	16.0
	12/21/59	20.0
	5/16/60	24.0
M	1/13/59	5.0
	2/16/59	12.0
	6/15/59	2.2
	10/26/59	73.0
	12/28/59	21.0
	3/14/60	27.0
	2/23/60	19.0
	7/25/60	93.0
N	2/09/59	7.5
	3/16/59	10.0
	7/13/59	26.0
	11/16/59	46.0
	1/25/60	44.0
	3/07/60	21.0
	7/25/60	40.0
O	3/16/59	13.0
	3/23/59	3.6
	4/06/59	5.6
	5/25/59	3.6

(OVER)

TABLE 1 (Continued)

URINARY URANIUM BIOLOGICAL DATA

DISINTEGRATIONS PER MINUTE PER LITER

JANUARY 1959 THROUGH SEPTEMBER 1960

NAME	DATE OF SAMPLE	D/M/L
P	2/16/59	27.0
	7/13/59	50.0
	8/17/59	44.0
	10/26/59	40.0
	2/23/60	422.0
	5/16/60	111.0
	7/11/60	46.0
Q	4/20/59	9.0
	5/04/59	27.0
	9/20/59	23.0
	1/18/60	6.0
	5/16/60	164.0
	8/15/60	18.0
R	3/23/59	6.8
	4/06/59	16.0
	4/20/59	8.4
	5/04/59	22.0
	8/17/59	18.0
	12/14/59	4.4
	4/18/60	19.0
	8/15/60	3.1
S	1/26/59	2.0
	3/16/59	87.0
	4/27/59	5.2
	8/17/59	12.0
	12/14/59	5.6
	4/18/60	12.0
	8/15/60	15.0
T	2/16/59	13.0
	3/16/59	22.0
	4/27/59	9.2
	5/25/59	6.8
	8/17/59	3.5
	12/14/59	0.0
	7/25/60	2.9
U	2/16/59	16.0
	5/04/59	0.0
	6/15/59	12.0
	10/26/59	113.0
	12/28/59	27.0
	3/14/60	107.0
	2/23/60	50.0
	4/25/60	140.0
V	6/15/59	16.0
	10/26/59	31.0
	2/23/60	24.0
	6/27/60	54.0
	7/25/60	14.0
W	2/16/59	31.0
	3/23/59	11.0
	4/06/59	11.0
	5/25/59	21.0
	9/13/59	9.7
	1/18/60	4.4
	5/16/60	106.0
	7/11/60	45.0
X	3/16/59	1.2
	3/29/59	1.6
	4/06/59	5.2
	8/17/59	0.0
	12/14/59	0.0
	4/18/60	2.9
	8/15/60	0.0
Y	3/16/59	330.0
	4/27/59	33.0
	6/15/59	27.0
	10/26/59	22.0
	3/14/60	24.0
	7/25/60	10.0
Z	2/16/59	3.6
	6/15/59	7.2
	10/26/59	16.0
	2/23/60	10.0
	6/20/60	31.0
AA	5/04/59	2.0
	5/25/59	107.0
	7/13/59	34.0
	11/16/59	35.0
	1/25/60	44.0
	3/07/60	9.6
	8/15/60	25.0
BB	6/15/59	0.9
	10/26/59	0.0
	2/23/60	1.4
	6/20/60	0.0

(OVER)

TABLE 7 (Continued)

URINARY URANIUM BIOLOGICAL DATA

DISINTEGRATIONS PER MINUTE PER LITER

JANUARY 1959 THROUGH SEPTEMBER 1960

NAME	DATE OF SAMPLE	D/M/L
CC	4/20/59	3.0
	5/25/59	1.8
	9/20/59	2.6
DD	4/20/59	0.9
	8/17/59	0.0
	12/14/59	0.0
	4/18/60	6.7
	8/15/60	22.0
EE	1/19/59	7.0
	5/25/59	12.0
	9/20/59	44.0
	11/16/59	25.0
	1/18/60	16.0
	3/14/60	18.0
FF	8/05/59	0.0
	9/13/59	0.4
	1/18/60	5.6
	5/16/60	13.0
GG	11/03/59	4.0
	11/16/59	18.0
	3/14/60	57.0
	4/25/60	233.0
	7/11/60	58.0
HH	12/14/59	0.0
	1/18/60	11.0
	5/31/60	0.4
II	9/08/59	3.0
	9/20/59	1.3
	12/14/59	0.0
	5/16/60	0.7
	6/06/60	17.0
JJ	9/28/59	9.0
	10/26/59	18.0
	2/23/60	95.0
	5/16/60	84.0
	6/27/60	164.0
	7/25/60	36.0
KK	10/26/59	4.0
	11/16/59	0.0
	2/23/60	7.3
LL	12/07/59	0.0
	1/18/60	5.2
	5/16/60	726.0
	6/27/60	263.0
	7/25/60	154.0
MM	4/20/59	1.2
	8/17/59	0.9
	12/21/59	3.6
	4/18/60	4.9
	8/15/60	0.0
NN	1/13/59	9.0
	2/16/59	25.0
	6/15/59	61.0
	8/17/59	92.0
	12/21/59	20.0
	5/23/60	26.0
OO	3/23/59	13.0
	4/06/59	22.0
	4/20/59	0.0
	8/24/59	18.0
	2/23/60	6.7
	6/20/60	11.0
PP	4/18/60	34.0
	6/27/60	28.0