Field Notes 6/4/63
W. P. Ellis

Union Carbide Corporation
Union Carbide Chemicals Co
" " Olefins Co
South Charleston, West Virginia

Licenses Nos. 47-260-2, -3, -4, and -6.

Personnel monitoring - records in med Dep.
Have routine Clerical Analysis of urine
Blood tests semi annually for Standard groups -
periodically -
Pre-employment & Termination physical

47-260-4 also 47-260-6
Film badges from Tracerlab on weekly basis - Four people covered
No detectable readings -
Ebrahim Gothard Huffman Steele

47-206-2 Personnel Exposures - 7 employees
Special Instrumentation
Film badges from Nuclear Chicago on monthly basis - maximum reading was 20 mrem/month -
44 mrem/ quarter - third quarter 62 -

Session employees have assigned dosimeter and results are tabulated daily and monthly - Sent to medical quarterly
41 mrem in month typical maximum -

under Supervision of N. H. Ketchan
[redacted] - Calibration of Dust and wipe tests - asst in teaching program -
maximum exposure 5 mrem for a single exposure - maximum for month - Dosimeter reading

(b)(6)

[redacted]

maximum
reading 5 mrem Surveying the
1 c Sr-90 density gage - the
max monthly exposure 5 mrem
Survey all equipment.
Rep for Session goes thru William.
When Source comes to Store for
Session group - William goes to
Stores, makes Survey and determin
Source is in good cond. Assign
it a Number. Accompany Store worker
& source from Box - letter to Store
Fire Dep and Session - record
Survey reading Contact + 1 foot -

when Session makes Installation He
fills out Rad Source Inf Sheet #2
Willian Survey recorded on Survey
Data Sheet -

Chief of Fire dept had CD course
and is CD director - Had verbal
instruction from and is instructed
to rope off area and call operator -
Has instrument on truck - CD Kit
CD 700 710 and 720

Have 10 Survey Instr in Experimental

(b)(6)

Instruments

Area all Inst Are Calibrated each 6 ~~months~~ Date Noted on Inst -

✓ curtis wright 305F 0-50 Gm tube

✓ 4 Jordan ~~Cutie~~ cutie Pie AGB-10K/R

✓ 3 Tracerlab Gm tube SU-14 to 25 m/hr

✓ universal atomics GM tube model 700 50 mr/hr -

✓ Victoreen CD 960 (920) Ion Chamber - range 50 r/hr -

✓ Pocket Dosimeters — 24 - 200 m direct reading & CD dosimeter

✓ 4 dosimeter Chargers.

511 [illegible] [illegible]

[illegible] of [illegible] in to in μc

Leak Tests

1100 c/m = .005 μc

32V

all sources are leak tested on receipt.

Surveys

Maximum reading @ 1' was 5mr/hr

Disposal License-2

511-27 - 150 mc Cs-137 returned to Ohmart 12-19-62 <1 mr/hr at box

Source ASR-3-C316-55D under GL License Look at License

511-28 500 mc Cs-137

To Niagara August 1962 Returned 12-20-62

H_3 in - committee Issue

Chromatograph

~~August 62~~ August 62 ~~Feb 62~~ model 26-751 Argon Diode Ionization Detector With 100 mc H^3 Source
Jarrell-Ash unit - U.S. Radium Makes Foils

May 62 250 mc H^3 Aerograph Gas Chromatograph

U.S Radium three H^3 foils
292 mc
132 mc
76 mc

To be used in Chromatographic cell Dev.
Still use some of these

USRC Foil

Sr-90 .03 mc in Jordan RGB-10 KB-5T
Sr-90 20 mc in C-5 Holder used for ~~Chromatograph~~
~~50~~ mc Flow meter in S.C. Plant

Sr-90 500 mc Slurry System at S.C
assigned 514 (on committee Volume -6)

T.E.N. Stull

No forms 4 or 5 completed
No employees less than 18—

Receipts 47-260-6 Licensee
no other material.

$BaC^{14}O_3$

1962 100 mc
1961 5 mc
1963 2 mc — from New England nuclear in polyphenol

Have 3 mc ready to incinerate.
usually convert carbon back to $BaC^{14}O_3$
Have not incinerated any since last inspection—

None to Sewer—
X Transfers to Mellon Inst Pittsburg Pa License 37-909-7

Receipts
Rec 1000c Co-60 10-20-61
from AECL

Water tests
5.5 $\times 10^{-8}$ 9-9-59
6.4 $\times 10^{-8}$ 11-9-62
6.1 $\times 10^{-8}$ 5-21-62
1.4 $\times 10^{-6}$ 12-11-61
9.2 $\times 10^{-6}$ 5-10-62
10-8-62

Dr. Strahan Facility

701 Research & Dev.
Form 3 Posted

Keleket model K-281 Counter with lead shield well + G M tube detector

Carbon 14 for
Sign on Door "Caution Rad Mat"

Sign on storage Bin under Sink
Caut Rad Mat

Carbon Stored under Work table
C-14 Isotope Containers labeled with Sign and Date etc.
One glove box
C-14 Hot or distillation inside Hood
Lab locked when not in use present.

Tracerlab lab monitor with End window G M tube

Waste Can properly labeled.

11
Kenny

* Three shipments

2-18-63	1.1 mc	C^{14}	Ethylene adduct in Compound of Kenny's Blend
4-1-63	0.4 mc	"	
4-18-63	2.1 mc	Terpitol ® anonic 08 C-14	

Returned 4 Pencils of Co-60 to AEC
100 curies 10-20-61
These were decayed & were returned to make room for others -

End window Geiger tube monitor for C-14 - Have not recorded any survey made with these instruments -
No records of surface levels does make sense -

Bldg 722 Irridation Laboratory

Form 3 Posted

All personel logged in & issued a dosimeter

Closed circuit T.V.
39 Pencils 10" long 1/2" in diameter
5½ center core pencils around core

Constant recording monitor of radiation
Charts filed by Fred Williams
Jordan monitoring unit with
Irrigation Chambers in selected
positions
When elevator is moving doors cannot
be opened -

Interlocked with monitor
Source cannot be raised with door open
door cannot be opened when source is up -

Red light on with source operating
Water level detector & interlock
with door - Sample
Emergency trip and Hand crank -
48" Concrete walls -
Horn sounds when source in motion
Crash bar on door to Room -

telephone removed — have intercom

Press button to clear monitor
interlock with door

Sign at door "High Rad area"

Fusible link to hold source up.
Two men must be present.
Light Box in Room when source
actuated.

Two Jordan detectors
Solid 9r-90 15 μc } Cal Sources
2 μc
2 MC

Pocket meter readings < 1 mrem.
Bldg locked when not occupied
Separate fence.

Alhambra Calif.
Serial # 50-51
I 138-1
II 138-2
III 138-3

Co-60
up about 2/3 of time

Have formal training for
Sessions men -

Machine
Research + Dev 770
when ketone is

used C14 to calibrate Chromatograph
Total of 4.56×10^{-7} curies (.4Mc)
over a 3 day period
Sessions
Done in 745 Bldg 4-/16 -18/1963
Air flow on Hood 800 CFM -

2 mc Carbon-14 in Special Assistant Dept
on committee license

5. Dust Bldg
Record of source location + date
Ds on Board

Dosimeter readings recorded for
Dust men -

Instructions
2 Ds Per day per 2 wks.

10 d/m/cc for H^3 out Hood -

Procedures – Same as others
Personnel Training

Chromatographic in Chromatography Lab
Cont Rad Lab. Symbol
SV-90 10mc 1-27-63

511 Ecl Center — Sprada
512 Institute
514 - S.C

Special Instrumentation Dept
L. J. Rogers - Rewine

H^3 Purchased 20 curies - H_2
attached to solids. Incinerated with trash
Partial
measure pressure on Bulb of H^3

~~[redacted]~~ Incinerated 1 curie
Lost 6 curies — Stored in Hood — 1250 CFM
as slow leak — 1-25-61 to 2-21-61

Polyethylene film tagging in incinerator about one curie

Materials used were on order of μc
~~Spot 61~~ over period of year
Dec 59 — to april 61 &
Incineration about one each week —
in open air —

Date of Receipt Stamped on Source

Olefins

Special Instr Tube + Check out gage

Sign on Door "Caution Rad. Mat

Nuclear Chicago Single Channel
Analyzer model 1320B scaler
& model 1620B power supply

Storage Bin made of Concrete Blog
Sign on door Caut. Rad Mat Symbol
Sources in Storage 745

100 Mc of I-131 } Oct 1962
Au-198 200 mc }

All sources labeled

Bkgd reading at door 1 mr/hr (No more than 15 min per week)
Fenced area and sign C.R. & Symbol

Under GL Instr
Olmat 300 and SV-90
C.R. Mat
No GL No.

Sign on door & Hood
H^3 & C^{14} in Hood - Hood runs all time.
Sign CRM + Symbol
Form 3 poster

Research and Dev. 770 Bldg

~~Isotope Storage~~ (Kitchen

~~Special Test Bldg~~ 745

Research + Dev (Shroud) 701

$2.54 \frac{cm}{in} \times 2.54 \frac{cm}{in}$

$12. \times 2.54 \frac{cm}{ft}$

$\frac{12}{508}$

$\frac{\times 54}{30.48}$

$(30.48)^3 \frac{cc}{ft^3}$

30.48

24384

12192

91440

$929.030\ 4$

$28.32 \frac{l}{cu.ft}$

5.04×10^{7} cuft

1416.00

$142.73\ 28 \times 10^{7} \times 10^{3} \frac{cc}{}$

$1.427 \overline{)1.000000}\ .70$

9989

$\cdot 8110$

142.73×10^{10} cc

1.427×10^{12} cc

$\frac{1 \times 10^{6}\ \mu c}{1.427 \times 10^{12}\ cc} = .7 \times 10^{-6} \frac{\mu c}{cc}$

$= 7 \times 10^{-7}\ \mu c/cc$

$\{2 \times 10^{-7}$

$5 \times 10^{-6}\}$

specify lead cut of LS-101 + 102
use the 200 mc Source in lab

47-260-2 user Mr. H. T. Sessions

Leak test SHRN + SHRH each 3 years
506 SHRD and HM-8 every 6 mos
Leak test before placing in operation

Leak tests by N. H. Ketcham or L. J. Rogers

Non compliance: Possession 200 mc Co-60 -
will return to OR

Sign of Radiation Sign Posted

Who calibrates dust?
How much H^3
Do you have Form 4 + 5

		Cs-137	
Permit		one 500 mc	4.60
A+B		+ 200 mc Source	
		Rad Comp - SHRM SHRH SHRD HM-8	
		And misc. LS-101 102	
C		3 Source SHRH	3.00
D		two 500 mc	3.00
		two 1000 mc n-c 506	
E		SHRH	.75
F		ASR-50-3	.50
			9.85

47-260-6 W. J. Skroba, chairman
NH Ketchum R50

Leak Test Neil fabricated Source

use in W. Va + other States of AEC notified

Copy of manual to each user -

Interlocks
Red light
Audible alarm inside
Door open from inside
Telephone TV
Film badges Pocket dosimeters
Use meter when entering cell
Continuous monitoring in cell in control
Fusible links
~~Key~~ Surveys & records
Filter contamination ?
How much use
Power failure

Training
Fire Dept. - Emergency Pers.

How are receipts Handled -
notify safety, Fire Dept, medical

what type dust on emergency truck ?

Review — P. W. Gregory
Head of Ind Relations
Tech center

Bldg 791 — Dr. E. M. Best Jr. MD
medical Director
Tech Center

770 — Mr. R. M. Berg.
Asst Director Dr
Research & Dev. Dept.

740 — L. J. Rogers ~~Dept~~
Dir of S.I.D.

Technical Center ~ 3300 employees

Industrial Hygiene Lab

Form 3 Posted.

Counting leak tests

Instrument calibration

Co-60 1 mc source 47-260-3

Tracerlab R-31

Source container labeled "Caut. Rad mat Symbol"

Source label caut Rad mat Symbol

Date 3-19-59

Co-60 1.1 mc

✓ RCL Scaler model 1 with Well Counter and G-M tube detector (RCL-mod 10400 Halogen quench End window tube -)

For counting

✓ Tracerlab - Lab monitor with the G-M tube SU3-D 20,000 c/m

Instrument cal by sliding platform

1 Dosimeter charger Victoreen mod 2000

✓ 1 CDV-7~~8~~0 500 ~~r~~/hr

1 Jordan 10,000 r/hr

47-260-3

F.C. young - NE Bolton - Mr. Ketchum

C-14 25 mc

Co-60 Sealed Source 1MC

Incineration of C14 one MC per month

Stack 40' high 135,800 ft^3/hr

Less than 2×10^{-9} Mc/ml

Incorporated into the committee license

Dr. young is with main cochrane Canada Ltd.

S.I.D. RADIOACTIVE MATERIALS INVENTORY

AS OF APRIL 15, 1963

Sessions

Cesium 137 Sources

Identification Number	Material	Activity	Bldg & Location	Plant
SHRM 511-1	Cesium 137	200 mc	745 Storage	T. C
SHRM 511-2		200 mc	745 Storage	T. C
SHRM 511-3		200 mc	745 Storage	T. C
" 511-4		200 mc	Bldg. 421 — S. Charleston	
" 511-5		150 mc	* Bldg. 414 #2 Unit — SC	
" 511-6		150 mc	~~745 Storage~~ Bldg SHRM 421 Jar	SC
A — 511-10		500 mc	745 Storage	
SHRM 511-11		20 mc	Bldg. 421	SC
SHRM 511-12		20 mc	Bldg. 414 #1 Unit	SC
" 511-13		20 mc	745 Storage	
" 511-14		20 mc	414 #1 Unit	SC
" 511-15		20 mc	414 #1 Unit	SC
SHRM 511-17		50 mc	745 Storage	
" 511-18		50 mc	414 #1 Unit	SC
" 511-19		50 mc	414 #1 Unit	SC
" 511-20		100 mc	745 Storage	
SHRM 511-21		150 mc	414 #2 Unit	SC
" 511-22		150 mc	745 Storage	
SHRM 511-23		150 mc	745 Storage	
SHRM 511-24		1000 mc	414 #7 Unit	SC
ASR-3 511-25		450 mc	745 Storage	
NLO 50k 511-26		1750 mc	745 Storage — ~~Two sources in one pig~~ ~~750 + 1000~~	
ASR-50-3 511-28		500 mc	Cellosize Unit, Institute	
" 511-29		500 mc	Cellosize Unit, Institute	
SHRM 511-30		1000 mc	Bldg. 771 #5 Cell — Pilot Plant — TC	
SHRM ~~T-31~~		~~1000 mc~~	~~Bldg. 153 #2 Dilution Tank~~	
SHRM 511-32		150 mc	Bldg. 414 #2 Cell	SC
SHRM 511-33		150 mc	Bldg. 414 #2 Cell	SC
Total CS-137		8900 mc		

2 Lucite

1-17-63 16,380 H^3 mc Bldg 746 — Not in use at Present Tagging organics —

Strontium 90

Identification Number	Activity	Location
3631	20 mc	Bldg. 194 2nd Floor
2 — T-34	1000 mc	Bldg. 745 Lab Area — [redacted]
600-2	10 mc	Bldg. 740-3311
Total Str 90	1030 mc	

Carbon 14

Identification Number	Activity	Location
C-14	2 mc	Bldg. 745 Fume Hood
Total Carbon 14	2 mc	

Tritium

Identification Number	Activity	Location
Tritium	16,380 mc	745 Fume Hood
Tritium	500 mc	745 Storage Area
Total Tritium	16,880 mc	

Radium 226 Pellets

Identification Number	Number Pieces	Activity	Location
P-1	5	5 mc	745 Storage
P-2	5	5 mc	745 Storage
P-3	2	2 mc	745 Storage
P-4	1	1 mc	745 Storage
P-5	4	4 mc	745 Storage
P-6	5	5 mc	Texas City, Texas
P-7	2	2 mc	745 Storage
P-8	2	2 mc	745 Storage
P-9	6	6 mc	745 Storage
P-10	5	5 mc	745 Storage
P-11	2	2 mc	745 Storage
P-26	Unknown	Unknown	745 Storage Ra 226 Salts
P-29	1	.1 mc	745 Storage Alphatron Cell
P-30	1	.1 mc	745 Storage Alphatron Cell
P-32	4	4 mc	745 Storage Formerly LAB

Total 43 pieces 1 mc Pellets

Other Sources

Identification Number	Type	Activity	Location
B-1	Au 198	Background Unknown	745 Storage
B-2	Au 198	Unknown .02 mr/hr	745 Storage
B-3	I131	Unknown .015 mr/hr	745 Storage
B-4	Str 90	1μc	745 Storage — Jordan
B-5	Au 198	Unknown .015 mr/hr	745 Storage
B-6	H_3 Foil	500 mc	745 Storage

Radium 226 Compensating Sources

Identification Number	Number Pieces	Activity	Location
R-12	1	.1 mc	Bldg. 153
R-13	1	.150 mc	745 Storage
R-14	1	.500 mc	745 Storage
R-15	1	1 mc	745 Storage
R-17	1	1 mc	745 Storage
R-18	1	.3 mc	745 Storage
R-19	1	.1 mc	745 Storage
R-20	1	.150 mc	745 Storage
R-21	2	2.64 mc	745 Storage
R-22	Several	4.166 mc	745 Storage
R-23	1	1.665 mc	745 Storage
R-24	1	.500 mc	745 Storage
R-25	1	.1 mc	Bldg. 153
R-27	1	.1 mc	745 Storage
R-28	1	.1 mc	Bldg. 113 Institute
R-31	1	.300 mc	745 Storage
R-32	1	.1 mc	745 Storage
R-16	1	1 mc	745 Storage
R-5	1	1 mc	745 Storage

Total Radium Comp. Sources & Other Radium 15.171 mc

njm

TABLE I

LICENSED ENCAPSULATED RADIATION SOURCES
Inventory as of December 31, 1962 (not including radium)

Manufacturer's Name and Type of Housing	Kind of Isotope	No. of Sources	Amount in Each Source* (millicuries)	Total Amount* (millicuries)	Required Frequency for leak Test	Responsible Agency
BROWNSVILLE PLANT						
Ohmart HM-8	Cs 137	1	750	750	6 mos.	Texas
INSTITUTE PLANT						
Ind. Nucleonics BB-0041	Cs 137	1	150	150	3 yrs.	AEC
Ind. Nucleonics BBS-10051	Cs 137	1	50	50	3 yrs.	AEC
Ind. Nucleonics BBS-10073	Sr 90	1	1000	1000	6 mos.	AEC
Ind. Nucleonics BB-0041	Cs 137	1	200	200	3 yrs.	AEC
SEADRIFT PLANT						
Ohmart SHRM	Cs 137	1	125	125	3 yrs.	Texas
Ohmart SHRM	Cs 137	6	150	900	3 yrs.	Texas
Ohmart SHRD	Cs 137	2	300	600	3 yrs.	Texas
E. K. Cole SKS 101/233	Co 60	1	30 microcuries	0.03	6 mos.	Texas
Ohmart HM-8	Cs 137	2	750	1500	3 yrs.	Texas
U. S. Nuclear Source G 223	Co 60	1	1	1	3 yrs.	Texas
SOUTH CHARLESTON PLANT						
Ohmart SHRM	Cs 137	11	100	1100	3 yrs.	AEC
Ohmart SHRM	Cs 137	2	50	100	3 yrs.	AEC
Ind. Nucleonics LS-101	Cs 137	1	25	25	6 mos.	AEC
Jordan Meter	Sr 90	1	0.003	0.003	6 mos.	AEC

C - 6 license

(Continued)

TABLE I (Continued)

Manufacturer's Name and Type of Housing	Kind of Isotope	No. of Sources	Amount in Each Source* (millicuries)	Total Amount* (millicuries)	Required Frequency for Leak Test	Responsible Agency
			TECHNICAL CENTER			
Ohmart SHRH H	Cs 137	2	200	400	3 yrs.	AEC
Ohmart SHRM	Cs 137	1	20	20	3 yrs.	AEC
Ohmart SHRM	Cs 137	5	150	750	3 yrs.	AEC
Ohmart SHRM	Cs 137	2	200	400	3 yrs.	AEC
Ohmart SHRH-A H	Cs 137	3	1000	3000	3 yrs.	AEC
Ohmart SHRM-P	Cs 137	4	20	80	3 yrs.	AEC
Ohmart SHRM-P	Cs 137	3	50	150	3 yrs.	AEC
Ohmart SHRM-P	Cs 137	1	100	100	3 yrs.	AEC
Ohmart HM-8	Cs 137	1	500	500	6 mos.	AEC
Ohmart ASR-3	Cs 137	1	500	500	6 mos.	AEC
Nuclear Chicago Model 506	Cs 137	1	1750	1750	6 mos.	AEC
Ohmart SHRD (z gauge)	Cs 137	1	500	500	6 mos.	AEC
Ohmart ASR-3	Cs 137	1	450	450	6 mos.	AEC
AECL KCP-1 and C-129	Co 60	1	39 pencils up to 250 curies ea.	Approx. 1600 curies	6 mos. (water)	AEC
Tracerlab R-31	Co 60	1	1.1	1.1	6 mos.	AEC
Jordan Meter	Sr 90	1	.03	.03	6 mos.	AEC
Ind. Nucleonics C-5	Sr 90	1	20	20	6 mos.	AEC
Ind. Nucleonics DH-3	Sr 90	1	500	500	6 mos.	AEC S.C
Chromatograph Det.	Sr 90	1	10	10	6 mos.	AEC TC
Chromatograph Det.	Sr 90	2	20	40	6 mos.	AEC

NOTE: Tritium foil sources held by the Technical Center are not included in this table.

(Continued)

TABLE I (Continued)

Manufacturer's Name and Type of Housing	Kind of Isotope	No. of Sources	Amount in Each Source* (millicuries)	Total Amount* (millicuries)	Required Frequency for Leak Test	Responsible Agency
			TORRANCE PLANT			
Ohmart SHRM	Cs 137	12	50	600	6 mos.	California
			WHITING PLANT			
Ohmart SHRM	Cs 137	1	80	80	3 yrs.	AEC
Ohmart SHRM	Cs 137	1	100	100	3 yrs.	AEC
Ohmart SHRM	Cs 137	2	50	100	3 yrs.	AEC
Ohmart SHRM	Cs 137	4	100	400	3 yrs.	AEC
Ohmart SHRM	Cs 137	8	50	400	3 yrs.	AEC
Ohmart SHRM	Cs 137	10	50	500	3 yrs.	AEC
Grand Total Number of Sources 1055						

*Amount of activity at time of purchase. No decay correction made.

NOTE: All of the above encapsulated sources were purchased originally under license agreements with the AEC. Radium sources have not been subject to licensing by the AEC but are included in the new State regulations. Information on approximately 80 radium sources in the Company's possession will be given in a future Summary Report.