INSPECTION NOTES

Aluminum Corp of America (ALCOA)
Alcoa Research Laboratories
Freeport Road
New Kensington, Pennsylvania
37-7653-2

Inspector E. Epstein

Approved by RSG 5/17/62

LICENSEE: _____ Lic. No. 37-7653-2

Type Inspection: (I) (RI) (Announced) (Unannounced) Date May 10, 1962.

I. GENERAL INFORMATION

A. Inspection on: 10 CFR (20) (30) (31) (40) (70)

B. Persons Accompanying:

| Name | Position/Organization |
|---|---|
| 1. A.A. Mammarelli | Ind. Hygienist, Penn. Dept. of Health. |
| 2. | |

C. Persons Contacted: (inc. name, title, rad duties, reports to)

1. John E Lewis - Research Engineer - and R.S.O.
Experience: B.S in Chem. U of Pittsburgh. 8 yrs experience in radioactive material

2. _____
Experience: _____

3. _____
Experience: _____

For person(s) acting as RSO summarize authority: Reports to Dr. P T Stroup PHD director of Research makes monthly reports, has auth to halt any project which he deems a hazard

D. Radiation Safety Comm. (Yes) (No). Meetings yes Minutes yes.

Members, Position & Who report to.
1. Dr. P T Stroup PHD Research Director
2. Dr. E M Foster PHD Chief Physical Chem Div.
MR. John E Lewis R.S.O.
3. _____

Scope & Authority of Committee: Meets as applications and proposals for use come up, authorizes use, users, and facilities. as well as approval for receipt of materials

E. Organization and Administration:

1. Summary of O&A and Program (as pertains to lic. materials)

Research Center for Alcoa uses research conducted in various projects to improve aluminum products. All work is performed in the Physical Chemistry Section ~~by Dr~~ headed by Dr. L M Foster PHD. Foster the R.S.O. is a member of the Physical Chem Section

2. Affiliations: None

F. Facilities & Uses of Byproduct/Source /Special Nuclear Material

1. Isotopes:

| Material/Form | Lic. Limit | Qty on Hand | Qty/Assay | Supplier | Use/rate/quantity |
|---|---|---|---|---|---|
| $Al^{26}$ metal | | 580 uc | 3/7/57 | | in storage |
| $Al^{26}$ powder | | 10 uc | 58 | | " |
| $Ag^{110}$ | | 0.7 mc | 1-28-60 | | " |
| $C^{14}$ Stearic acid | | 10 mc | 1-15-57 | | " |
| $C^{14}$ $BaCO_3$ | | 10 mc | 3-30-56 | | " |
| $C^{14}$ Oxalic Acid | | 1.25 mc | 7-18-61 | | " |
| $C^{14}$ CO gas | | 1 mc | 8-25-61 | | " |
| $C^{14}$ CO gas | | .5 mc | 3-15-62 | | " |
| $C^{14}$ $CO_2$ gas | | 0.5 mc | 3-15-62 | | " |

2. Persons using Material(s): (over) (inc.: name, title, duties, training, experience)

(a) Lewis as above.

(b) R A Kramer PHD in Analytic Chem. at Rensselaer. approved by Isotopes committee.

(c) R.C. Geiger, Thomas L Jack, W W Hill, John Mrozinski — all technician working directly under ~~Kramers~~ Kramers personal supervision.

F. 3. Facilities:
Licensee uses: ( ) Lab ( ) Counting room ( ) Fume hood ( ) Dry box
( ) Table/bench ( ) remote hand. equip. ( ) protective clothing
( ) other _____

Describe checked items: see attached sheets. room 604 storage facilit
changed since last inspection. lead cover ~~of~~ over pit.
pit lined with 2" steel
608 Tritium Room.
600 Autoradiography room.
see attached sketch sheets.

13.5 mc $Sr^{90}$ beta thickness gage in Al-Foil mill
see back of this page.

4. Restricted Area Established _____ Describe _____
All areas of use and storage.

5. Summary of Handling Procedures/Operations:
remote control handling.

6. Instrumentation & Calibration Procedures:
~~Jordan~~ Juno SR-7 alpha Beta Gamma - 0-500 R.
Model 2017 Nucleon of Chicago GM 0-20 mr/hr.
~~Eberline~~ Atomic Accessories TSM-1 Tritium Monitor.
various Scalers and Counters.
Calibrated at 6 month intervals against ~~Calibration sources~~.
~~of~~ 5 mg Ra sources.

7. Other Notes: for radiographer occupancy factors, exposure times, time spent in high radiation area

G. Radiation Safety Precautions & Procedures (Summary of Scope)

1. Instructions, oral & written: Radiation Protection Procedures Alcoa Research Lab. issued to all users. Posted on bulletin board of Foil Mill. Oral lectures by Travis to employees of the foil mill 1hr. explaining hazards and Federal Regulations.

Licensee not complying with written procedures as follows:

full compliance use in accordance with applications dtd 3/14/60 and 3/19/62 and letter dtd 4/21/58.

2. Surveys (working areas, storage facilities, etc.) (records & dates)

(a) Direct reading - restricted areas Yes. April 1, 1962. all areas of use and storage monthly surveys entered in bound book.

unrestricted areas Yes as above.

(b) Smear samples: (rest. & unrest. areas) yes

of tritium room and storage area

recorded show $1 \times 10^{-6}$ uc/100 cm$^2$. $Co^{60}$

(c) Air samples: (rest. & unrest. areas) ~~[illegible]~~ Yes

uses TSM- Tritium air monitor monitor was in

operation in Tritium hood registered 6 uc/m$^3$ ≈ $6 \times 10^{-6}$ uc/ml

inside restricted hood outside registered background.

3. Locking/securing of areas: All rooms locked

H. Procurement Procedures & Control

1. Person ordering/responsible & method: Lewis after approval by the Isotopes Committee

2. Person insuring limits not exceeded: Lewis

3. Supplier: OR or BNL.

4. Summary of procurement & receipt method: (records) Records maintained of all receipt of materials showing dates and amounts.

5. ( ) Preassayed: no

( ) Sterilized: no

( ) Leak Tested: Yes $Sr^{90}$ sealed source at 6 month intervals dry Lewis, according to stated procedures. wipe surface with filter paper of window Counts wipes in beta scintillation counter, using $Sr^{90}$ std calibration source as generally licensed.

I. Storage & Security of Material

(Un)restricted Area (Un)locked space Summary:

Room 604 is totally for storage.

(a) storage bay in the rear of this room is 4'x12' and 4 feet deep. The bay has had added shield since the last inspection to reduce the radiation level at the floor below where female secretaries are located

J. Waste Disposal (method & quantities involved, records & dates)

1. ~~Sanitary sewer~~ to environs ~~tritium~~

tritium is released to the environs

None 5 uc daily 5 days a week = 25 uc/week ~~52 weeks/yr~~

1300 uc yearly.

750 cfm × 60 m/hr × 24 hr/day × 365 day/yr × 28320 ml/ft³

2. ~~Burial~~ None = $1.16 \times 10^{-10}$ uc/ml air.

3. Transfer to O.R. date and amounts recorded -

4-|9|61 4-15 gallon metal drums $Co^{60}$ - 60 mc

$Zr^{95}$ - 5 mc.

note - no further evaporations are performed all liquids are precipitated on solids contained and liquid soaked up in plaster of paris.

4. Incineration

K. (✓) Posting of Areas (CRA) (CHRA) (CRM) (CARA)

(✓) Labeling Containers ( ) Tagging Sources N/A.

(✓) AEC-3 posted & where: at all locations of storage & use visible to all

Summary: All areas posted with signs CRA and CRM.

Tritium Room CARA as well as above signs

all containers labeled CRM. Those in storage have tags containing kind quantity and date of assay.

L. Personnel Monitoring Program (Yes) (No) - ( ) AEC-4 (✓) AEC-5

1. Film Badge: supplier St John x Ray.

Frequency Bi weekly.

review of records: (persons & readings)

Max of 700 mrem for [redacted] during 3 quarter 1961 and 464 1st quarter 1962. [redacted] a technician under Lewis supervision was working with $Co^{60}$ and $Sr^{46}$.

~~Att~~ AEC-5 with all entries completed.

Film badge program for 6 person who operate the Al Foil mill with the 3.5 mc $SR^{90}$ beta gage was started on April 23, 1962 results not yet available dummy badges placed in operators position shows soft γ radiation of 0.8 mr/hr.

2. Wrist badge: supplier no Frequency _____

Records: _____

3. Dosimeters: Supplier: _____ Read by: _____

Records (persons & readings) _____

4. Surveys: ( ) Bioassay ( ) Breath Anal. ( ) other

Describe: no

5. Further information on AEC-4, -5, other related to personnel program: _____

no

AEC CONTRACTS ( ): no

M. For Radiographers:

1. Leak tests: (31.105)

(a) performed by: N/A

(b) persons lic. to perform: _____

(c) description of method: _____

N/A

2. Instrument & Calibration Procedures (31.104)

3. Quarterly Inventory (31.106)

4. Utilization Logs: description - identity - site (31.107)

5. Securing of sources & container records (31.303)

6. Dosimeter & film badge records (31.203)

7. License Conditions:

8. Per 31.102, 103 - Devices/containers properly locked & stored.

9. Status & compliance with operating & emergency procedures (31.202)

10. Per 31.201 Limitations on radiographers & assistant rad. followed.

11. Security and surveillance during rad. operations (31.301)

N/A

12. Radiation levels on devices & containers (31.101) - (inspectors survey readings)

N/A

Note: Describe noncompliance items on back & reference applicable section of Part I.

II. Compliance with 10 CFR

A. 10 CFR 20:

| N/C | OK | NA | Paragraph | Topic |
|---|---|---|---|---|
| | ✓ | | 101(a) | Exposure limits in Rest. Area |
| | | ✓ | 101(b) | Exposure exceptions - AEC-4 |
| | | ✓ | 102(b) | Determ. Acc. Dose & AEC-4 |
| | | ✓ | 102(c) | Records & Prep. of AEC-4 |
| | ✓ | | 103 | Exp. to Conc. in Restr. Area |
| | | ✓ | 104(a)(b) | Exposure of Minors - Material/Airborne |
| | | | 105(a)(b) | Levels in Unrestricted Areas - Except 2 mr/hr, 100 mr |
| | ✓ | | 106 | Effluents in Unrestricted Areas |
| | ✓ | | 108 | Orders Requiring Bioassays |
| | | ✓ | 201(b) | Surveys - 201(a) describes |
| | ✓ | | 202(a) | Personnel Monitoring Requirements |
| | ✓ | | 203(b) | Posting Rad. Areas w/CRA |
| | ✓ | | 203(c) | " High Rad. Areas w/CHRA |
| | ✓ | | 203(d) | " Airborne " w/CARA |
| | ✓ | | 203(e) | " Require. Rooms/Areas w/CRM |
| | ✓ | | 203(f) | Labeling Containers (ref. Append C) CRM |
| | | X | 204 | Lists posting exceptions - sealed/hospitals/ 8 hour limit |
| | | X | 205 | Exceptions for RM shipments |
| | ✓ | | 206(a) | Instruction of Personnel in Restr. Area |
| | ✓ | | 206(b) | Procedures, Regulations, License Available |
| | ✓ | | 206(c) | AEC-3 posted in/near Restr. Area |
| | ✓ | | 207 | Storage Security of Licensed Material |
| | ✓ | | 301 | Gen. Waste Disposal Requirements |
| | | X | 302 | Methods of obtaining approval for waste disposals |
| | | ✓ | 303(b) | Disposal to Sanit. Sewer - daily limits |
| | | ✓ | 303(c)(d) | " " " " - monthly/yearly limi |
| | | ✓ | 304 | " by burial - limits in (a)(b)(c) |
| | | ✓ | 305 | " " incineration - must be licensed |
| | ✓ | | 401(a) | Records - AEC-5 for persons req. per 202 |
| | ✓ | | 401(b) | Survey records per 20.201(b) |
| | | ✓ | 401(b) | Disposal records per 302, 303, or 304 |
| | | ✓ | 402 | Reports of theft or loss |
| | | ✓ | 403(a)(b) | Notification of incidents (a) (b) |
| | | ✓ | 404 | Report to former employees of exposure |
| | | ✓ | 405 | Report of overexposure/excessive levels |
| | | ✓ | 406 | Employees request for annual exposure |

B. 10 CFR 30

| N/C | OK | NA | Paragraph | Topic |
|---|---|---|---|---|
| — | — | ✓ | 3 | License requirements - use as lic. stipulates |
| — | — | ✓ | 9 | Exempt Concentrations per 30.73 |
| — | — | ✓ | 23 | Reg. for issuance of specific lic. - general |
| — | — | ✓ | 24 | Reg. " " " " " - specific i.e., human use by inst. & phys, radiographers etc. |
| — | — | ✓ | 41(a) | Records - receipt, transfer, export, disposal |

C. License Conditions: (refer by no.)

| | | | | |
|---|---|---|---|---|
| 11 | — | ✓ | — | 18 OK |
| 12 | — | ✓ | — | 19 OK. |
| 13 | — | ✓ | — | 16 deleted. |
| 14 | — | ✓ | — | |
| 15 | — | ✓ | — | |
| 17 | | ✓ | | |

D. Previous N/C, status, & discussed with: Dr. Foster.

N/C item noted on previous inspection all corrected.

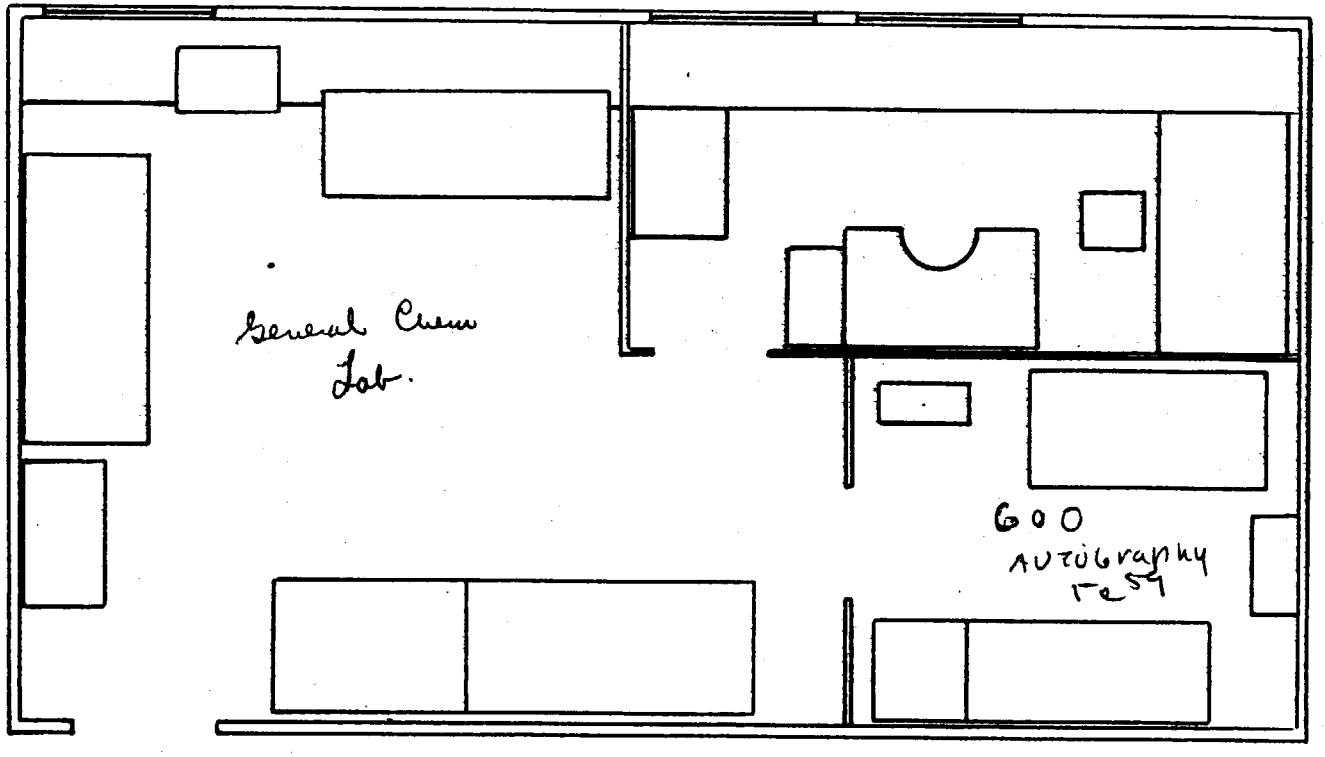
| | | |
|---|---|---|
| — | — | — |
| — | — | — |
| — | — | — |
| — | — | — |
| — | — | — |

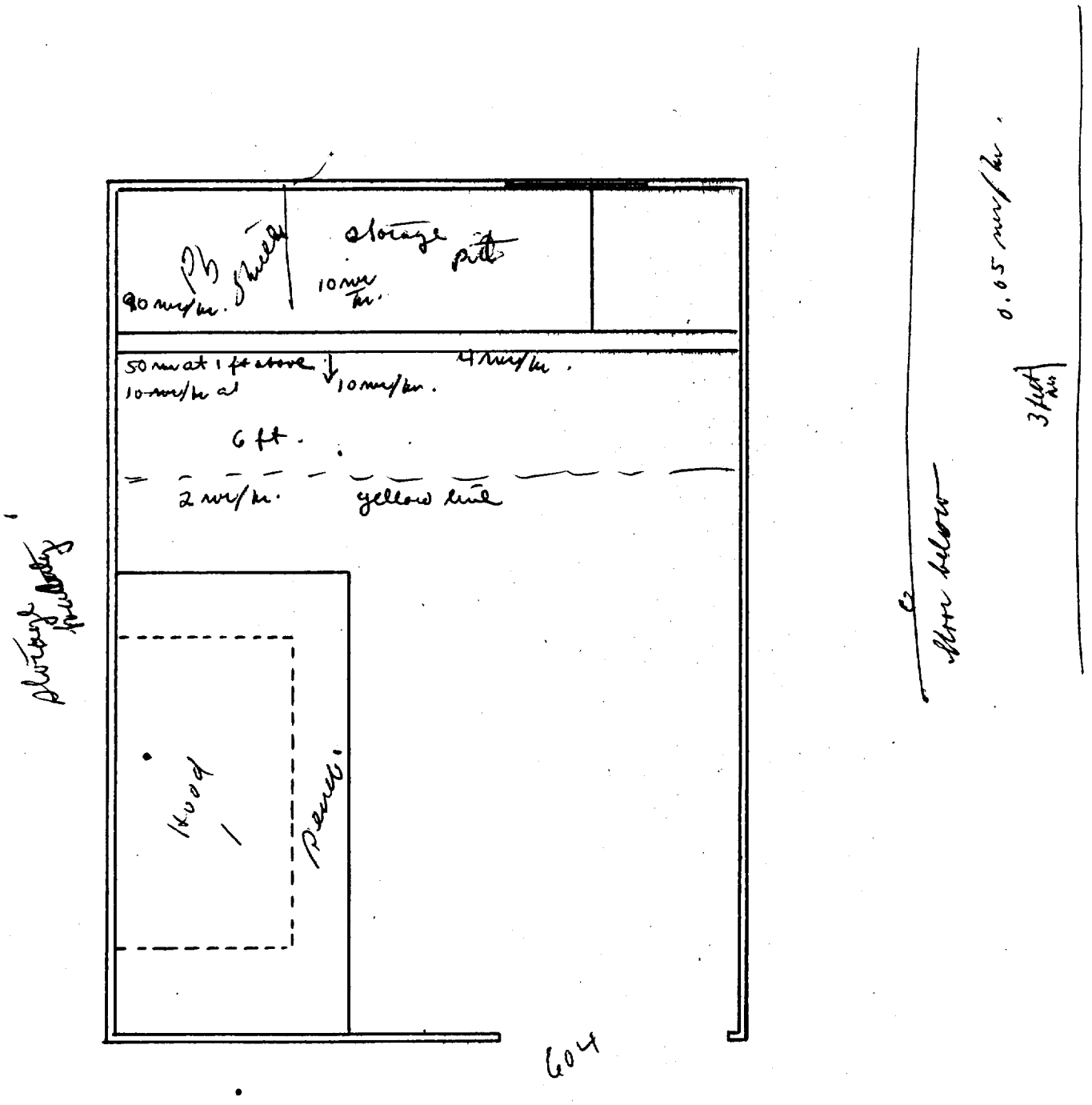
1 excessive radiation in floor below storage area
2 Corrected by additional shielding in storage bay.
2 Surveys made below bay.
3 Surveys were made of Beta gage with dummy film badges and newly procured Juno ionization chamber.
4 High radiation area no longer exists in storage room due to shielding
5 Records of surveys were maintained

E. 10 CFR 31 - Radiographic operations

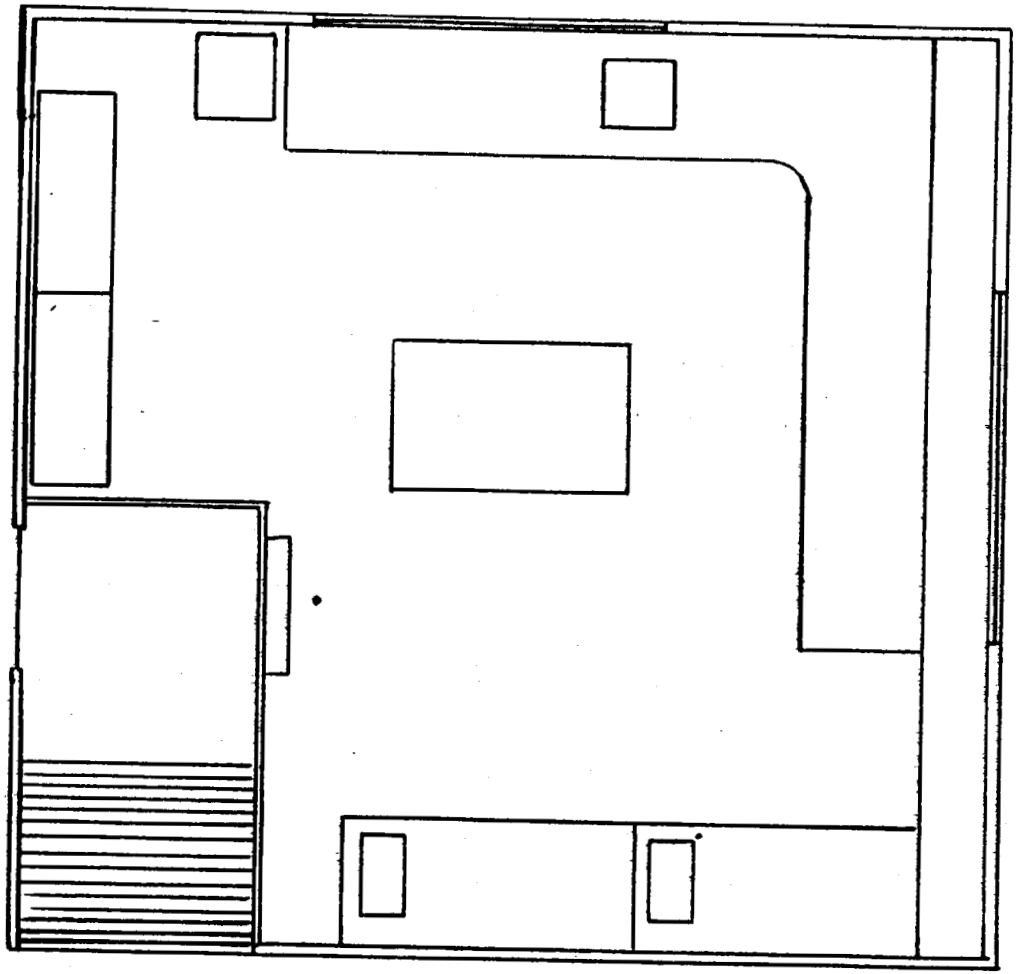
| | | | | |
|---|---|---|---|---|
| — | — | — | 101 | Limit of rad. level for devices & containers |
| — | — | — | 102 | Locking requirements for " " " |
| — | — | — | 103 | Storage precautions |
| — | — | — | 104 | Instruments, calibration & calib. record |
| — | — | — | 105(a) | Auth. personnel handle etc. sealed source |
| — | — | — | 105(b) | Leak test - 6 mo. interval |
| — | — | — | 105(c) | Detectable level .005 uc - record of tests |
| — | — | — | 105(d) | Level greater than .005 uc - withdraw & report |
| — | — | — | 105(e) | Tag for loose sealed source (i.e. not in/fastened |
| — | — | — | 106 | Quarterly Inventory |
| — | — | — | 107 | Utilization Logs (description/person/site) |
| — | — | — | 201(a) | Qualifications for radiographer |
| — | — | — | 201(b) | " " asst. radiographer |
| — | — | — | 202 | Licensees operating & emergency procedures |
| — | — | — | 203(a) | Film badge & dosimeter requirements for rad. |
| — | — | — | 203(b) | Badge & dosimeter records |
| — | — | — | 301 | Security of high rad. areas |
| — | — | — | 302 | Posting radiographic areas |
| — | — | — | 303(a) | Calibrated & Operable instr. at exposure site |
| — | — | — | 303(b) | Survey of device after each exposure |
| — | — | — | 303(c) | Survey when securing device & also container |
| — | — | — | 303(d) | Records of surveys conducted per 303(c) |

Note: Explain L&R's meaning of an adequate instrument calibration procedure. Check sources not adequate.


General Chem
Lab.
600
Autography
Test



Pb shield
90 mr/hr.
storage pit
10 mr/hr.
50 mr at 1 ft above
10 mr/hr at
10 mr/hr.
4 mr/hr.
6 ft.
2 mr/hr.
yellow line
Hood
Pencil
storage pulley
Floor below
0.05 mr/hr.
3 feet
604



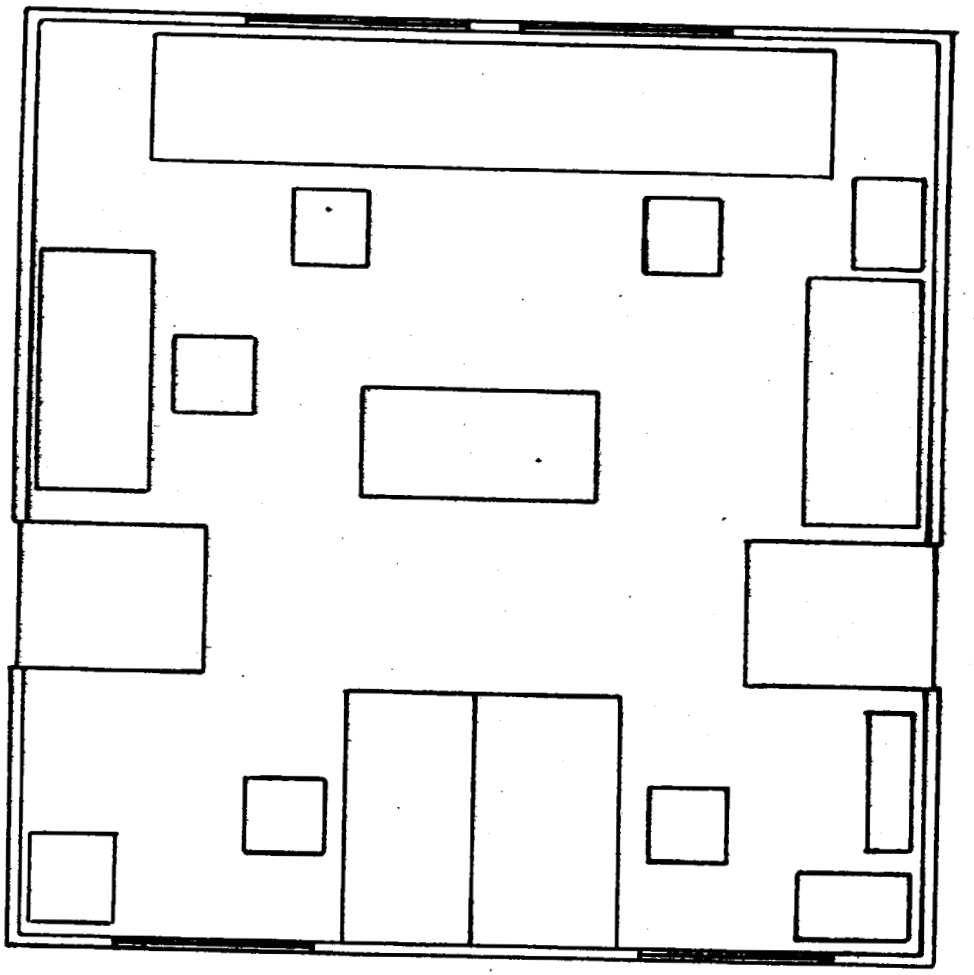
606
Chem Lab.

712




608

Counting Room.



614 Counting Room

# RADIATION PROTECTION PROCEDURES
## Alcoa Research Laboratories

1. The Radiological Safety Officer, Mr. John E. Lewis, is ultimately responsible for all radiological safety of these Laboratories. All new procedures, particularly when there is even a remote danger of ingestion or inhalation of radioactive material, should be cleared with the Radiological Safety Officer. The Radiological Safety Officer will advise where special protective apparel, such as inhalators or gloves, are required. The extent of shielding and safe working distances proposed in a given project should be approved by the Radiological Safety Officer.

2. Survey and Monitoring Procedures

   A. Isotope Shipments

   All incoming shipments should be surveyed to ascertain the safe working conditions before and after removal from shipping containers and during the working period as required.

   B. Personnel Monitoring

   Dosimeter pens and film badges are to be worn by all personnel. Accurate records of dosimeter pen readings must be kept, and cumulative weekly exposure should not exceed 300 milliroentgens (mr). Film badges are to be replaced bi-weekly unless otherwise indicated.

3. Work Area and Personal Cleanliness

   General good housekeeping is mandatory in all radiochemical work. Work area should be free from equipment not required for the current experimental program.

   A. Chemical Work

   Fume hoods, absorbent cloth, rubber gloves, laboratory coats, and other safeguards are to be employed as determined by consultation with the Radiological Safety Officer.

   B. Non-Chemical

   It is important to be aware of chemical reactions, mechanical operations, or other phenomena which might put radioactive material out of control.

4. Location of Work

   All hazardous operations with radioactive isotopes are to be carried out in the radioactive tracer laboratories, using its special equipment as required.

5. Internal Radiation Hazards

A. Ingestion

Ingestion of active material is exceedingly dangerous. It should be avoided at all costs. If accidental ingestion is suspected, inform the Radiological Safety Officer of full particulars and consult the Laboratory physician for remedial measures.

Note: Ingestion may take place by transfer of active material from work surfaces, containers, etc., to hands, cigarettes, clothing, food, or any material which you normally handle. On this basis, it is necessary to prohibit smoking, drinking, or eating in a vicinity which may be contaminated with radioactive material.

B. Inhalation

This hazard is as serious and as difficult to detect as ingestion. Use adequate ventilation and forced drafts where necessary to prevent active gases, dust, or fumes from being inhaled. Where a dangerous inhalation is suspected, contact the Radiological Safety Officer and the Laboratory physician.

6. Procedure in Case of Radioactive Spill

A. Notify the Radiological Safety Officer.

B. Stay out of the area, prevent other traffic through the area, do not spread the contamination.

C. All further action concerning the spill is to be supervised and directed by the Radiological Safety Officer.

7. External Radiation Accident

Report to the Radiological Safety Officer when an external radiation accident has occurred. For purposes of this discussion, a radiation accident will include any dosage within one week in excess of 300 milliroentgens. Avoid any further exposure to the radioactive source until qualified clearance has been obtained.

8. Storage and Transport of Radioactive Materials

A. Long-Term Storage

In locked radioactive storage rooms, only.

B. Short-Term Storage

In locked room unless completely impracticable. If

storage in locked room is not practicable, material must be properly labeled and shielded so as not to present a radiation hazards.

C. Transport

All transfer and moving of radioactive materials must be done in shielded containers as required. The responsible person must be especially careful to anticipate hazards which might result from spilling, breakage, or decomposition.

9. Disposal of Radioactive Isotopes

All radioactive material, including anything which may have been contaminated, must be monitored before disposal and if found active must be placed in marked and covered disposal containers to be shipped to Oak Ridge National Laboratory. Questionable materials are to be referred to the Radiological Safety Officer. Liquid wastes are to be concentrated by evaporation and/or solidified with plaster of Paris. The Radiological Safety Officer should be consulted before discharging radioactive gases or fumes into the atmosphere or radioactive materials into the public sewer system.