	INSPECTION FINDINGS ANI	D LICENSEE ACKNOWLEDGMENT				
. LICEN	Hidland Trichian 45640	L. REGIONAL OFFICE U. S. ATOMIC ENERGY COMMISSION REGION III, DIVISION OF COMPLIANCE 799 RODSEVELT ROAD GLEN ELLYN, ILLINOIS 60137				
LICEN	E NUMBER(6)	4. DATE OF INSPECTION				
21-	-265-4 21-265-51	storm 733 105				
. INSPEC	TION FINDINGS					
DA.	No item of noncompliance was found.					
□ B.	Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42					
□ c.	Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42					
🗆 D.	Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)					
□ E.	Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)					
□ F.	Containers were not properly labeled to indicate the 10 CFR $20.203(f)$ (1) or (f) (2)	presence of RADIOACTIVE MATERIAL.				
□ G.	A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)					
🗆 н.	Form AEC-3 was not properly posted. 10 CFR 20.	206(c)				
□ 1.	Records of the radiation exposure of individuals were	re not properly maintained. 10 CFR 20.401(a) or 34.33(b)				
D J.	Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)					
□к.	Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51					
UL	Records of leak tests were not maintained as prescrit	bed in your license, or 10 CFR 34.25(c)				
Пм.	. Records of inventories were not maintained. 10 CFR 34.26					
□ N.	Utilization logs were not maintained. 10 CFR 34.27	에는 그는 것이 아니는 것 같은 것이다.				
	4	nen Hutter (AEC Compliance Inspector)				
LICENS	EE'S ACKNOWLEDGMENT					
The A of no	AEC Compliance Inspector has explained and I ncompliance will be corrected within the next	I understand the items of noncompliance listed above. The 30 days.				
	(Date)	(Licensee Representative Tule or Position)				
IGINAL:	LICENSEE. COPIES COREGION CO HEAD	QUARTERS CO ENFORCEMENT				

REPORT COMPILED SHEET

Ide	ntifying Information	Type Report	(circle) (591) 592	
1.	Licensee Dow Chemical Co.			
2.	Address Midland, Michigan	n 48640		
3.	License No(s) 21-265-4 and 21-2	265-6		
4.	Date of Inspection October	7 and 8, 1968		
5.	Inspector Loren J. Hueter			
6.	Status of Compliance Compliance	ce		
Ite	ems of Noncompliance			
7.	Section of Regulation or		Details Para	graph
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Classified Information

8. This report contains classified or business confidential information. Yes (No)

Soren S. Hueter 11-1-68 Inspector Date 2 Ann 11-21-68 Reviewer Date

Dow Chemical Co. License No. 21-265-4 and -6 October 7 and 8, 1968

HEALTH PHYSICS ANALYSIS

The licensee's byproduct material programs, which were inspected, are deemed to be well organized, supervised, and controlled. This includes both the radiography program and the broad license covering research and development, etc. During this inspection, both the personnel who are responsible for health physics aspects as well as individuals responsible for use of material within various laboratories were visited and interviewed and from these interviews, observation, and review of records, it was concluded that the program is well conducted and no items of noncompliance or safety hazards were found. The licensee has established a Radiation Hazards Committee which has formulated various procedures and techniques for controlling the receipt, possession, use, and disposal and transfer of radioactive materials at Dow Company facilities. These procedures provide for a determination of the qualification of prospective users, training of prospective users, adequacy of laboratories and equipment, provision for disposal of material periodically, tests of sealed sources as well as periodic review and training and spot of the various laboratories for adequate control of radiation levels and contamination.

A visit to several of the laboratories and discussion **services** with responsible personnel within these laboratories revealed a thorough knowledge of the licensee's procedures, respect for radiation and procedures necessary to control the use of material in a safe manner. In all such cases, very good housekeeping was evident and use of plastic back absorbent paper on working surfaces and inside of hoods and use of gloves were evident. These responsible laboratory personnel also had available records pertaining to receipt and disposal of material and surveys conducted to determine radiation levels and any evidence of contamination within their own facilities.

Both filtered and nonfiltered hoods, glove boxes, shielded storage facilities, waste containers, etc., provided were necessary along with appropriate surveying and counting equipment. Bioassays have been taken where deemed necessary and revealed no evidence of significant injection or inhalation of radioactive materials. Based on discussion with licensee personnel, observations made of the licensee's facilities, equipment and procedures carried out by personnel, and a review of the licensee's records, it is concluded that the licensee is supervising, controlling, and conducting the programs with due regard for radiological safety.

Dow Chemical Co. License No. 21-265-4 and -6 October 7 and 8, 1968

DETAILS

GENERAL INFORMATION

- Both of these inspections were conducted on an announced basis. Dr. W. H. Beamer, Chairman of the Radiation Hazards Committee, having been contacted by telephone on October 3, 1968, concerning the plans for these inspections conducted on October 7 and 8, 1968.
- 10. Mr. Dennis Hahn, Michigan State Health Department, was contacted by telephone on October 3, 1968, concerning the plans for this inspection and stated that a state representative would not accompany the inspector.
- 11. Information contained in this report pertaining to these license programs was furnished by Dr. W. H. Beamer, Chairman of the Radiation Hazards Committee, and by Larry Silverstein, Health Physicist and RSO, for all Dow Chemical facilities. Additional information relating to License No. 21-265-4 (radiography) was furnished by Mr. Harry Field, Senior Welding Engineer. Additional information relating to License No. 21-265-6 (broad license) was furnished by Mr. H. S. Higgins, Analytical Chemist of the Analytical Service Laboratory in Building No. 294; Mr. Les McCarty, of the Bio-Chemistry Laboratory in Building No. 1701; and Dr. Fred Blanchert, of the Synthesis Laboratory in Building No. 1602. Mr. Ed Schneider, who performs all leak tests on sealed sources and is responsible for conducting leak tests at timely intervals provided information pertaining to leak tests conducted on all sealed sources is available under both of these licensed programs.

INSPECTION HISTORY

- 12. The last previous inspection of License No. 21-265-4 (Reinspection No. 2) was conducted on April 10 and 11, 1967, revealing one item of noncompliance. The licensee was found in <u>noncompliance with 10 CFR 34.43(a)</u> in that a survey had been used to conduct surveys during the performance of industrial radiography without having been calibrated as described in 10 CFR 34.24. As a corrective measure, the licensee indicated in reply to the 592 that survey instruments would in the future be calibrated at intervals not exceeding 90 days. A review of the licensee's calibration records revealed that the Victoreen Gamma Survey Meter (Model 592-B) bearing serial no. 1727 has been calibrated within the required three month interval in all cases since the last previous inspection with the latest date of calibration being July 18 \$ 1968, with the meter being calibrated at two points on each scale within 20% thereby correcting this item of noncompliance. The last previous inspection No. 6) was also conducted on April 10 and 11, 1967, which revealed no items of noncompliance.
- 13. On October 7 and 8, 1968, reinspection 3 of the radiography program under License No. 21-265-4 and reinspection 7 of the broad license program under License No. 21-265-6 were conducted revealing no items of noncompliance pertaining to either program. These reinspections are the subject of this report. All information in this report is in substance unless otherwise indicated.

PROGRAM

License No. 21-265-4

14. This license authorizes use of cobalt 60 for industrial radiography by "open-air" handling techniques and in exposure devices. As noted at the time of the last previous inspection, the licensee has disposed of all open-air type radiographic devices and sealed sources. The licensee still possesses the one nominal 5 curie TO Model A-429-5 cobalt 60 sealed source (Serial No. 1108) which was possessed at the time of the last previous reinspection. This source had a strength of 5 curies on October 6, 1966. This source is stored and used in a T.O. Model 525 exposure device. This source and exposure device are authorized in the license in Item C. Whenever possible, a T.O. Model 588 submission is used to restrict the angle of radiation and thereby reduce personnel exposure. This culturator culture contains approximately 7 pounds of depleted uranium which is authorized by License Condition 15.

- 15. The T.O. Model 525 radiographic exposure device is stored in the welding department inside a large steel cabinet constructed of approximately 1/8 inch thick steel as was the case at the time of the last previous inspection. The exposure device itself is locked in the closed position when not in use and in addition, the steel cabinet used for storage is also locked. Both were observed to be locked at the time of the inspection. The storage room was appropriately posted to indicate the presence of radioactive material and the locked storage cabinet and exposure device were appropriately labeled to indicate the presence of radioactive material and the exposure device was also labeled as to the isotopes, the activity and date, indicating the source was a 5 curie cobalt 60 source as of October 6, 1966. Leak tests conducted at six month intervals on the sealed sources since the last previous inspection by licensee personnel (Mr. Ed Schneider)) have all revealed less than 0.005 microcuries of removable contamination. The latest leak test was conducted on June 10, 1968.
- 16. Industrial radiography has been performed only within the confines of the large fenced area at the licensee's Midland, Michigan facility. The licensee has no fixed facility with work being conducted on an infrequent basis wherever needed at various locations in this large facility. Mr. Larry Silverstein, Health Physicist and RSO, is notified prior to any removal of the exposure device from the storage cabinet for "field use" at the licensee's facility. A company truck is used for transporting the exposure device to the location of use with the vehicle being placarded. The exposure device to the location are kept in the truck. Licensee personnel are involved more with x-ray work than byproduct material aradiographic work. A review of the records show that the radiographic exposure device had not been used within the past five months prior to the inspection with the latest use being May 10, 1968. These records also reveal that the exposure device has been used for a total of only nine days in 1968 up through the inspection date with a total of 25 exposures being made on tanks are various buildings.
- 17. Mr. Silverstein, RSO, makes occasional visits to the sites of use of the radiographic exposure device to supervise the use and storage of equipment, to assure the operating and emergency procedures are being followed and materials are being handled safely. Mr. Silverstein was present at all of the last uses of the device. which complete supervisions Mr. Silverstein has approximately two hour sessions semiannually with all radiographers to review and discuss license conditions, Federal regulations, operating and emergency procedures, and equipment. The key for locking in enditoching the radiographic exposure device is attached to the survey meter as a means of assuring that the survey meter is available and to remind radiographers of the requirements for the survey meter when the exposure device is used. As another safety measure the fellows are kept on the job to provide continous surveillance during performance of industrial radiography and to provide assistance in the event of any problem or mishap. In that the licensee does not have a fixed facility and exposures are made at various locations throughout the licensee's facility, efforts are made to conduct radiographic exposures before or after regular work hours to reduce the exposure problems for licensee personnel who might normally work in the areas involved.
- 18. Independent measurements with the inspector's Eberline Model E-500BGM type survey meter revealed a maximum reading of 70 mr/hr at contact with the projector with this reading to 1.2 mr/hr at contact with the locked cabinet enclosing the exposure device and this in turn reducing to 0.5 mr/hr at 18 inches from the cabinet.
- 19. The following individuals are still authorized to act as radiographers as the time of the last previous inspection: Harry Field, Chief Welding Engineer; Tye Bonter, who makes most radiographic exposures; Marion Smith; Harry Wienchell; John Berry Mill; Carl Narling. Mr. A.P. Granelli has transferred and is no longer involved with the radiography program. Two new individuals are to be trained shortly to act as radiographers, these being Mr. Ronald Garthe and Mr. Mikols. These individuals will be trained and tested by Mr. Larry Silverstein, Health Physicist and RSO.

License No. 21-265-6

- 20. This license authorizes use of byproduct material for a broad research and development program as defined in Section 30.4 of 10 CFR 30. This license also authorizes the use of byproduct materials for laboratory tracer studies, instruments, devices, and gauges as sealed sources for analytical chemical tracer experiments and storage and testing of instruments. The licensee is currently using various byproduct materials for research and development purposes, tracer studies as sealed sources in gauges and for instrument testing as authorized by this license. A complete list of the various sealed sources of byproduct material on hand as of July 1, 1968, is included in the files for reference. Most of the radiographic material which is currently on hand under this license is in the form of sealed sources. There has been no significant change in this byproduct material program since the last inspection. In fact there has been much less activity in the form of synthesis of tagged compounds since the last inspection due to the relative ease in currently obtaining compounds already tagged for those materials needed. In fact there has been no synthesis since the last previous inspection involving any large quantities of byproduct material. In addition, nearly all synthesis involves liquid materials rather than gases and are carried out in specially designed hoods, further reducing the potential for air activity. The isotope lab cubicles designed for the synthesis work have emergency means of stopping air flow, etcetera. Most waste is in the form of liquid waste which is stored and saved for future use, or disposal by approval of Mr. Silverstein, Health Physicist and RSO. The original #45
- 21. The licensee also has a Texas instrument neutron genertor in a specially designed facility in Building 1602 which involves trifiated targets having an activity of approximately & curie with one such target being used at a time. This is used for activation studies and has a rabbit facility for movement of samples in and out of the facility. The facility also has elaborate shielding and interlocked door mechanisms. This system has a nonrotating water cooled target and makes use of a vacuum system which is exhausted to the outside of the facility. To assure that no one is in the facility, a switch must be activated for 30 seconds inside the facility before the operator can turn the unit on. The door must then be closed to estate for several seconds before the neutron generator goes into operation. There is an overriding switch to shut off the device on the inside near the door in case someone should inadvertently be inside. The unit is not used for overnight exposures and has a limiting device such that it can not be operated for greater than one hour at a time with the instrument automatically shutting off after the elapse of an hour. and must be placed through the entire sequence of steps to activite the unit again. The samples are in the lanes fractional microcurie level.
- 22. A change of targets is performed in a hood after several hours of use. Wipe testing within the hood and on the equipment is performed at various stages of the souce replacement. The targets are stored in a ventilated hood. Gloves are worn at all times when handling material which may be contaminated.
- 23. The licensee does not have a triftium air monitor and does not consider this necessary to date based on smear surveys and bioassays conducted. Collection and analysis of urine samples submitted by personnel working with the neutron generator and during the target changes have revealed nothing detectable above background when analyzed by liquid work ation techniques. All individuals involved with this work are badged not only for beta gamma exposure, but also for neutron exposure and review of the data revealed no significant exposure to personnel involved with this equipment to date.
- 24. Surveys conducted of the neutron facility and it's surroundings during operation revealed nothing above background levels except on the roof of the facility which showed a radiation level of 5 mr/hr maximum due to gamma activity immediately above the neutron generator and no detectable neutron exposure levels. This area is fenced and posted. It is also required that the key to operate the neutron generator be taken by an individual doing any work on the roof thereby preventing the unit from being turned and while any individual is performing work on the roof.

25. A visit in several of the labs where material is used in the greatest quantities

revealed by observation and discussion with personnel who work in these labs that licensee personnel have appropriate use and storage facilities including filtered and nonfiltered hoods and glove box systems with the hoods having been evaluated for air flow at six month intervals and limitations posted if the hood velocities were not sufficient enough to provide adequate protection for work conducted in the laboratory. Most all of the hoods have very good air flow according to data available. The various rooms were observed to be posted to indicate the presence of radioactive material and individual containers and viles labeled to indicate the presence of radioactive material and the latter also labeled as to the isotope activity and date of assay. Various labeled waste containers for both liquid and solid waste were observed to be located in the laboratories along with records pertaining to their receipt, use and disposal of material. Approval must be obtained from the RSO prior to any disposal other than second and third rinses of material. All of the areas visited showed evidence of very good general housekeeping and cleanliness of the laboratories. The areas visited also revealed widespread use of plastic back disposal paper, appropriate surveying and counting equipment, the availability and use of rubber gloves when working with radioactive material, and familiarity with the licensee's procedures and requirements for safely handling materials, and storage and handling of radioactive wastes.

- 26. It was also learned that there is no field use of byproduct material under this license where activity is released nor is material used in products to be distributed to the public thereby meeting the requirements of License Condition 15.
- 27. Routine surveys of equipment, facilities, and personnel are conducted by the responsible users in each of the laboratories to assure that techniques; or prevention of contamination within the laboratory are adequate.

ORGANIZATION AND ADMINISTRATIVE CONTROL

- 28. There has been no change in the organization, administrative control, or Radiation Hazards Committee since the last previous reinspection. There has been no change in the procedure at procuring radioactive material under the broad license. The Purchasing Department still notifies Mr. Silverstein with a copy of the purchase order which is then maintained in Mr. Silverstein's file. The Receiving Department checks all shipments and compares these shipments with the purchase order and then notifies Mr. Silverstein that the shipment has been received. This is usually done by telephone or by memo (if Mr. Silverstein is not in his office). All pa kages which are labeled with either radioactive material information or high ICC hazardous material information ar mandled in this manner, are brought to the atten-tion of Mr. Silverstein. Each user of radioactive material at Dow Chemical Company prepares a "Radioisotope Safety Data and Material Record'sheet which shows detail of shipments received as well as the use and ultimate disposition of such material. These sheets are kept on file in Mr. Silverstein's office and he periodically reviews these records to determine what materials are currently on hand within the Dow Chemical Company's facilities, what materials have been used, and what materials have been disposed of by various methods. As previously indicated, however, Mr. Silverstein is notified and his approval must be received prior to disposal by any method.
- 29. The Radiological Safety Officer is Mr. Larry Silverstein of the Environmental Research Laboratory (ERL) which is directed by Mr. H. R. Hoyle, who is a member of the Radiation Hazards Committee. One additional person, Mr. Ed Schneider, Health Physicist, is directly in the health physics program. He performs the wipe test on all sealed sources at the Midland, Michigan facility and also compiles an inventory every six months on sealed sources on hand. Also Mr. Schneider has made radiation surveys on a routine basis throughout the various facilities. Mr. Schneider also makes visits at the other locations where gauges are located and inspects for posting, labeling, and instructions when he visits these facilities for purposes of conducting leak tests.

30. Gauges containing byproduct material are the only sources of byproduct material contained at the licensee's plant and laboratories located at Bay City, and Finley, Ohio, authorized place, of use. Two other authorized places of use, tudington and Clair, Michigan, have no byproduct material located at these facilities, however, radium sealed sources are involved at Ludington.

RADIOLOGICAL SAFETY PROCEDURES

31. There has been no significant changes in the radiological safety procedures since the last reinspection. Written instructions relating to procurement, use, and emergency procedures for handling the radioactive material are provided for individual users in the form of the licensee's radiation protection manual which was issued by the Radiation Hazards Committee. Each person who uses or supervises the use of radioactive material me been prvided with a copy of this manual. In addition, oral instructions are given to various users by their supervisors and/or by Mr. Silverstein personally, if necessary. A 16 hour radiation safety course is given approximately once each year by Mr. Silverstein to refresh old time users of radioactive material and to train new personnel who have joined the company within the previous 12 months.

- 32. Prior to authorizing use of material, in addition to the training, the RSO goes over the proposed procedures, the isotopes and quantities proposed for a project, the facilities and equipment, and assures that the individual has a copy of the manual and is familiar with the contents of the manual. Based on this discussion, the proposal is put before the Radiation Hazards Committee who determines whether the individual and the proposed project should or should not be approved. If the project is approved, a follow-up is conducted by Mr. Silverstein, RSO, to assure that the licensee, is complying with safety regulations and procedures. The safety manual requires, and in addition, Mr. Silverstein stresses, that no transfers of byproduct material are to be made even to other people within the company, who may be authorized to receive materials, without prior notification and approval of the Radiation Safety Officer. Also, Mr. Silverstein stated that he adks individuals if they will personally be doing the work or if they will be supervising work with others actually doing the work. If so, he requires that the individuals who will actually be doing the work sit in on the indoctrinati a also. No sealed sources have been fabricated by the licensee in the past 10 years.
- 33. Members of the Radiation Hazards Committee are Dr. W. H. Beamer, Radiochemistry Laboratory, Chairman of committee; Dr. B. B. Holder, Medical Department; Mr. A. W. Wilson, Safety Department; Mr. H. R. Hoyle, Biochemical Research Laboratory; and, Mr. J. H. LaBean, Engineering Department.

FACILITIES AND EQUIPMENT

- 34. Since the last reinspection there have been no significant changes in the licensee's facilities and equipment used in conjunction with byproduct material program which is conducted under these two licenses. The facilities are essentially as described in the previous reinspection report and as described in some detail previously in this report.
- 35. The licensee has a broad assortment of radiation decection and measuring equipment to safely conduct these byproduct material programs.

PERSONNEL MONITORING

36. Film badge service is provided on a monthly basis by R. S. Landauer, Jr., and Company with a control plus about 100 badges being supplied with about 75 of these being assigned on a regular basis and 8 assigned to radiography personnel. Neutron film badge service is also supplied for those involved with neutron generating equipment. A review of the film badge data for the period from December 15, 1966, through August 14, 1968, revealed no personnel exposures exceeding 200 millirem per calendar quarter. The RSO discusses with personnel involved be exposured above minimal on the monthly report. Personnel involved with the radiography program are also required to wear dosimeters and to record the readings on a daily basis. This information is recorded in the licensee's utilization log and revealed a maximum exposure for any individual of 10 mr on any one day with most being in the range of 0 to 3 mr. The licensee considers the film badge exposure as the official exposure of the individual. Form AEC-5 equivalent is maintained of film badge exposure data.

RADIATION SURVEYS AND/OR EVALUATIONS

- 37. In conjunction with the radiography program, the survey meter is used to conduct surveys before and after radiographic exposure, to ascertain that the source is in the shielded condition and prior to securing, with a record being maintained of this final survey, in the licensee's utilization log. Surveys are also made at the boundary of the restricted area to ascertain that levels do not exceed 2 mr/hr at the boundary of this restricted area and a diagram of the location and restricted area and radiation levels associated with the survey are maintained for each setup.
- 38. Appropriate survey and accounting equipment is provided to each laboratory area and responsible personnel are assigned responsibilities for conducting direct radiation and smear and contamination surveys at periods during and following each use of material, where a potential hazard exists. These personnel maintain records of these surveys. In addition, periodic surveys are conducted by Mr. Silverstein or Mr. Ed Schneider as an additional check to assure that proper surveys and precautions are being undertaken. When a new facility is completed or a new device installed which involves the use of radioactive moterial, a complete survey of the instal lation is made by Environmental Research Laboratory group and all such surveys are recorded.

POSTING AND LABELING

39. As previously noted, the AEC representative observed that posting and labeling throughout the licensee's facility at Midland met the requirements of 10 CFR Part 20 pertaining to posting and labeling of areas to indicate the presence of radioactive material and individual containers were also observed to be labeled to indicate the isotopes, the activity, and date of assay. Copies of Form AEC-3, "Notice to Employees", were observed to be posted in conspicuous places throughout the licensee's facilities.

LEAK TESTS

40. All sealed sources which the licensee currently possesses are leak tested at appropriate intervals. A review of the leak test records revealed that all sources tested revealed less than 0.005 microcuries of removable contamination since the last previous reinspection. The licensee also leak tests small sealed sources which are actually exempt due to the small quantities involved. The records also reveal that all leak tests have been conducted on a timely basis.

WASTE DISPOSAL

- 41. The licensee has in the past made use of several methods of waste disposal including incineration of byproduct material, dilution and discharge to the sanitary sewage system, burial on the licensee's own facilities, and transfer by shipment to an outside disposal agency. Since the last previous inspection, there have been no burials on the licensee's facilities (for low level waste only) and no transfer to a license' outside disposal agency. Material has either remained in storage or been disposed of by incineration or through dilution and disposal to the sanitary sewage system. The RSO's approval must be obtained prior to disposal of any radioactive material other than second or third rinses of containers which are being cleaned.
- 42. The licensee incinerates low levels of byproduct material. The licensee has a 200 foot stack which has an air output of 50,000 cfm. This is not used for disposal of radioactive materials under inversion conditions. The licensee has calculated that if one curie of radioactive material was instantaneously released from the stack that the maximum concentration at ground level would be at a distance of 2,375 ft. downwind from the stack and that the maximum air concentration at this distance would be 6 x 10⁻⁷ microcuries per ml. Records reveal that thus far 1968, byproduct materials have been disposed of on a total of five days and that the total quantities of material on these five days involved 54,3 millicuries of C¹⁴, 15 millicuries of sulfur 35. § millicurie of trigium, and 0.066 millicuries of calcium 45. If more than several millicuries are involved in an incineration event, then the

material is divided into lots not exceeding approximately 5 millicuries and incinerated at four hour intervals. Approximately 60 tons of solids are burned in the incinerator per day. Samples of ash have shown nothing above background levels.

- 43. The other method of disposal is through dilution and disposal through the sanitary sewer system. The licensee has their own water treatment system which handles the waste from their facility which involves 30,000 gallons per minute or 50,000,000 gallons per day. The latest disposal of material by way of the sanitary sewage system was in August of 1967, over a year prior to the inspection. This involved approximately 2.35 microcuries of americium 241 in liquid form and 3.75 microcuries of plutonium 239 which involved the disposal of the last of these two materials on hand by the licensee after the completion of the analytical chemistry tracer experiments authorized under Items D and E of the license. The licensee's water treatment system was more than adequate to dilute these combined activities to well below the concentrations allowed for an unrestricted area release. The information also indicates that it took five minutes to empty all/arr liquid waste into the stream before its entrance into the treatment plant. The use of this material activities closely planned and supervised with the aid of the RSO.
- 44. The only other method of "disposal" is the transfer on a rather infrequent basis of materials to an outside concern. In all such cases, the license number and/or copy of the license of the recipient was obtained prior to the transfer and ICC regulations were complied with pertaining to the shipment.
- 45. In addition to the sealed sources previously referred to, the licensee has trigium foils in the form of gas chromatography devices having 500 millicuries maximum per device with and the control devices on such devices and a 2.5 curie sealed light source as a reference source and a 500 millicurie sealed light source. The licensee also has four millicuries of strontium 90 in nonsealed form all in the Radiochemistry lab but the material is in doubly closed containers and closely checked for any spread of contamination. The licensee also has 17.4 millicuries of polonium 210 total in the form of static eliminators. The 10 curie polonium 210 sealed neutron source authorized under Item F of the license is no longer used under the broad license but under the reactor license as this source is used in asneutron source in the Triga Reactor.

RECORDS

- 46. The licensee maintains detailed records showing all receipts of byproduct material. The records show the isotopes, date, amount, vendor, and compliance with possession limits. The licensee also maintains detailed records showing all transfers of byproduct material. The licensee maintains records showing the results of direct reading and smear type radiation surveys as well as special surveys. Records are maintained which show personnel exposure, results of leak tests, waste disposal information, and inventory records.
- 47. The licensee maintains all records which are required by 10 CFR 34 in conjunction with the industrial radiography program. These records include the results of calibration of radiation survey instruments, leak tests of the cobalt 60 sealed radiography source, a quarterly inventory to show the quantity of byproduct material on hand at quarterly intervals, a utilization log is maintained which contains all information required by 10 CFR 34.27. A record is maintained showing personnel exposure information for radiography personnel also. This includes a daily reading of the pocket dosimeters when the radiography source is used and film badge information which shows exposure received by radiography personnel. A record is maintained showing the results of radiation surveys which are made at the end of each working day to insure the cobalt 60 sealed radiography source is at a safe storage position prior to securing the exposure device. A complete radiation survey is made for each radiographic exposure setup which shows the roped off area, the radiation level at the rope, and the radiation level outside the storage cabinet after the exposure device has been secured inside. All records reviewed were found to be well organized, detailed, and adequate to account for the various uses of byproduct materials under these two licenses.

INCIDENTS OR UNUSUAL OCCURRENCES

48. From information obtained by observation, review of records, and discussion with licensee personnel, it was concluded that the licensee has experienced no theft or loss of byproduct material, overexposure of personnel, serious malfunction of equipment, or other incidents or unusual happenings since the last previous inspection.

LICENSE CONDITIONS

49. During the course of the inspection, each of the license conditions with respect to each of the two licensed programs was reviewed and it was concluded that the licensee is conducting these programs in accordance with the respective license conditions.

MANAGEMENT DISCUSSION

50. At the conclusion of the inspection, the inspection findings were discussed with Dr. W. H. Beamer, Chairman of the Radiation Hazards Committee, who is the highest level of licensee management directly connected with these AEC licensed programs and with Mr. Larry Silverstein, Health Physicist and RSO. These individuals were informed that no items of noncompliance had been observed or otherwise noted during the course of the inspection and a Form AEC-591 indicating such was issued at that time.