

NOV 13 1969

United Aircraft Corporation
400 Main Street
East Hartford, Connecticut 06108

Attention: Mr. J. Martin, Manager of Health and Safety and Loss Prevention

Gentlemen:

This letter relates to the discussion Mr. Stohr of this office held with Mr. Martin and Mr. Patton following the inspection conducted on October 15, 1969 of the activities authorized under AEC Byproduct Material License Number 06-00550-03.

As noted during the discussion, it appears that certain of your activities were not conducted in full compliance with AEC requirements. The item and reference to the pertinent requirement are listed in Item 5 of the enclosed Form AEC-592.

The purpose of this letter is to give you an opportunity to advise us in writing of your position concerning this item, of any corrective action you have taken or plan to take with respect to it, and the date all corrective action was or will be completed. Your reply should be sent to us within 20 days of the date of this letter to ensure that it will receive proper attention in our further evaluation of this matter.

Should you have any questions concerning this matter, you may communicate directly with this office.

Very truly yours,

Robert W. Kirkman
Director

H-28

Enclosure:
Form AEC-592

OFFICE ▶	CO	CO	CO			
SURNAME ▶	Stohr:caz	Cleveland	Kirkman			
DATE ▶	11/13/69					

UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF COMPLIANCE

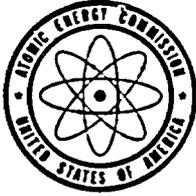
<p>1. LICENSEE</p> <p>Pratt and Whitney Division United Aircraft Corporation 400 Main Street East Hartford, Connecticut 06108</p>	<p>2. REGIONAL OFFICE</p> <p>U. S. Atomic Energy Commission Region I, Division of Compliance 970 Broad Street Newark, New Jersey 07102</p>
<p>3. LICENSE NUMBER</p> <p>6-550-3</p>	<p>4. DATE(S) OF INSPECTION</p> <p>October 15, 1969</p>

5. The following activities under your license (identified in Item No. 3 above) appear to be in noncompliance with AEC regulation or license requirements, as indicated.

Contrary to the requirements of 10 CFR 20.201(b), "Surveys", no surveys were performed to determine concentrations of airborne radioactivity existing in the hot cells while personnel were therein so as to evaluate hazards to the personnel and to determine compliance with 10 CFR 20 exposure limits.

Supplementary page NONE attached. John F. ~~Stacy~~ Compliance Inspector 11/13/69

ORIGINAL: LICENSEE. COPIES: CO REGION CO HEADQUARTERS L&R HEADQUARTERS.



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
970 BROAD STREET
NEWARK, NEW JERSEY 07102

201 645-

November 13, 1969

Richard S. Cleveland, Senior Radiation Specialist
Region I, Division of Compliance

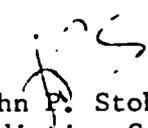
INSPECTOR'S EVALUATION
PRATT AND WHITNEY AIRCRAFT DIVISION
UNITED AIRCRAFT CORPORATION
400 MAIN STREET
EAST HARTFORD, CONNECTICUT 06108
LICENSE NUMBER 6-550-3

An announced reinspection of above license was conducted on October 15, 1969. In general, radiation safety program appeared well run. Operations have been confined primarily to Co-60 and Cs-137 encapsulation and loading.

There were no health and safety items.

Licensee indicated that the entire hot lab operation will be phased out after January, 1970 due to a lack of business.

A reinspection is recommended for October, 1970.


John P. Stohr
Radiation Specialist

BACKGROUND

Scope

1. Parts 20, 30 and License Conditions.

Previous Noncompliance

2. From last inspection on July 15 and 16, 1968.
 - a. 10 CFR 20.401(a) records of personnel exposure. Corrected - See paragraph 24 for details.
 - b. 10 CFR 20.401(b) records of surveys. Corrected - See paragraphs 15 and 16 for details.

Present Status (N/C)

3. 10 CFR 20.201(b) air sampling. See 592 letter for item and paragraph 17 for details.

Summary

4. In spite of increase in scope of license, program is essentially the same as noted in last inspection. Program has increased little. Management indicated that hot lab will be closed down some time after the first of the coming year. The only item of noncompliance found during this inspection was related to a failure to survey for concentrations of airborne radioactivity in the hot cells when people were working there. RPO relied on full protective clothing and full face mask respirators.

Organization and Administration

5. Patton stated that Parsons reports to Dr. Dooley, Head of health and safety at the Middletown facility. Patton stated that Parsons would be performing many of the health physics reviews of the whole area including the hot lab facility. Patton stated that when the Co-60 encapsulation contract runs out in January, 1970, Pratt and Whitney Aircraft (P&WA) will close down the hot lab. The warm chem. lab will be phased out also approximately three months after the encapsulation contract expiration.

Organization and Administration (Con't)

Patton stated that the only other change was the reassignment of R. Anderson to another area of the Middletown facilities (Anderson had been MacFarlane's assistant at time of last inspection).

Facilities and Equipment

6. Facilities involved in use of radioactive material remain essentially unchanged from previous inspection. The hot lab is the area of major use of byproduct material. Figure 10 of PWA-3255 contains a layout of the hot laboratory. Room 26 had been fully prepared for proposed polonium-210 and strontium-90 work. As P&WA did not receive the contract for preparation of these sources, this room has never been used.
7. New survey ^{equipment} on hand included instruments listed on page 8 of application letter dated October 25, 1968. Inspector also observed that licensee is using Victoreen Radector III for their remote cell monitoring. This instrument has a range of .1 mr/hr to 1 kr/hr. Licensee is also using an NMC Model GA2A area alarm in the office areas. Alarms are set at 5 mr/hr.

Use of Material

8. The following list of use of material at other than the hot lab facility was derived from Parsons inventory records:

Building 140

9. Room 96 - .75 curies Co-60 in calibration well. Parsons had record of leak tests for this source which are performed by East Hartford personnel indicating that leak tests were performed within six month intervals and results were less than .005 micro-curies.

5 millicurie Co-60 source (assay date 9/14/62) assigned to the Advance Material Research and Development Lab. This source remains in storage since the last inspection.

100 millicurie tritium source used in gas chromatography unit.

(In storage) 4 millicurie cesium-137 sealed source. Parsons stated that this is used for calibration of Ohmart density gauge.

Use of Material (Con't)

Building 275

10. A model A-2102 Ohmart fuel density gauge housing a 750 millicurie cesium-137 source (used in fuel pumping station). Parsons also had leak test records for this source indicating last leak test was performed on 4/8/69 and results were less than .005 microcuries. Inspector pointed out that this source was again due for a leak test. Parsons stated that this would be taken care of.

Hot Lab

11. Felber stated that approximately 100 microcuries/month continue to be received as irradiated samples from Westinghouse. Samples contain quantities of cobalt-60, iron-55, magnesium-54, nickel-63, and chromium-51. Processing continues to be wet chemistry in warm chemical lab under Felber's supervision. Felber stated that the contract with Westinghouse expires in February, 1970 and will not be renewed.
12. The following information was supplied by Felber:

Cobalt-60 - nickel plated pellets are received from GE, Valecitos, California for source fabrication (double encapsulation). There have been two specific activities; low/30 curies/gram (140 pellets/gram); high/200 curies/gram. Sources made up have varied from 1 curie to 2500 curies. Up to 12,000 curies as a multiple source have been loaded in irradiators. Other cobalt-60 handling activities have been loading irradiator sources. At the time of the inspection, the inventory on hand was 44,000 curies of cobalt-60. All fabrication operations have been performed in cell #4.

Cesium-137 Felber stated that cesium chloride pellets are sent by U. S. Nuclear from ORNL. Felber stated that these pressed pellets are doubly encapsulated at P&WA. Encapsulations were also performed in cell #4. Records indicated that much less cesium-137 had been handled than cobalt-60. Fabricated sources were up to as high as 10^3 Ci.

Hot Lab (Con't)

Antimony-124 - Felber stated that millicurie radiography sources have been encapsulated again under the ICN (U. S. Nuclear) contract. Inspector reviewed the records and observed that the maximum source was 850 millicuries.

13. A copy of the June, 1969 inventory is included as Attachment "A".

Shipping

14. Inspector observed that shipping containers were labeled with a DOT Special Permit Number or were SPEC.55. MacFarlane stated that shipping cask use is evaluated as to appropriateness for type of shipment. Felber stated that P&WA is responsible for placing the material in the containers and performing surveys, but these containers are supplied by customer, amount and type of material is specified by customer (as in container), and that shipping is under the customer's bill of lading. He stated that the customer (ICN - U. S. Nuclear) provides the transfer and is the party responsible for shipment, that P&WA provides the hot lab operations.

Surveys

15. MacFarlane stated that since the last inspection, he has been recording surveys both for radiation and contamination. He stated that he performs a monthly radiation and contamination survey and that many other surveys are performed on an as needed basis. Inspector reviewed records of routine and observed that contamination levels were quite low; usually less than 100 d/m and that radiation levels were as would be expected for this type of operation. In general, it appeared that MacFarlane was running a clean operation.
16. Inspector also reviewed a work log in which radiation levels, contamination levels, dosimeter readings, area wipes, surveys of personnel and respirator: etc. were included for any unusual jobs such as cell entries.
17. The air sampling program continues to be as described in paragraph 31, 32 and 33 of report of inspection conducted on July 15 and 16, 1968. Inspector asked MacFarlane where air sampler was located during cell entries. MacFarlane stated that the sampler in the warm service area behind the hot cells was not moved but left in its ordinary position near cell door #2.

Surveys (Con't)

Inspector observed that entries had been made into cell #4 for clean up operations. Inspector observed that air monitor was located approximately 20 feet away from point of entry. Inspector told MacFarlane that although air flow would be in open door into the cell that it still was appropriate to sample in that general location when the cell door was open and material was being transferred. Inspector also stated that during cell entries, air samples should be taken inside the cell in the breathing zone of the people who were performing the operations such as clean up. MacFarlane stated that although he did not take these air samples from the cell, he had people fully clothed in protective clothing and had them wear head covers, shoe covers, gloves and full face mask respirators. MacFarlane stated that after leaving cell area all personnel were monitored. Inspector stated that it was not so much concerned with the safety of the operation, as the wearing of full face mask respirators was an accepted practice if care was taken during the maintenance and fitting of the respirators, but that surveys have to be taken in order to demonstrate compliance with 10 CFR 20, especially since there is no provision in the regulations for using a protection factor for respirators without prior approval. Inspector also observed that the license did not contain any provision for using any protection factor for respirators.

18. Inspector stated that it would appear that there would be more contamination from the cesium work than the cobalt-60 work. MacFarlane stated that this was true-that the pressed cesium chloride pellets produce much more contamination than the nickel clad cobalt-60 pellets.
19. Inspector observed in work log that during installation of stainless steel floor and contamination survey taken prior to work, contamination levels were up to 10 mr/hr on wipes. Inspector stated that this was certainly a time when there might have been appreciable airborne contamination in cell.
20. Parsons stated that a lapel sampler was available for use. Patton stated that this lapel sampler would be used in the future for all cell entries. MacFarlane stated that in the future, cell air will be monitored and results recorded. Inspector reviewed air sample results for other areas and observed that after decay for radon and thoron results were usually a few d/m per sample. Inspector observed results were recorded in d/m and that MacFarlane had conversion factor in front of log to go from c/m sample to uCi/cc. MacFarlane uses a limit of 9×10^{-9} uCi/ml (40 hr mpca of insol Co-60).

Effluences to Unrestricted Areas

21. Inspector observed that stack sampler consisted of a Gelman pump, an in-line filterpaper holder and a 47 millimeter glass fiber filter. Inspector observed that sample was pulled from a 20 foot wide x 20 foot long x 8 foot high plenum which is on the stack side of the absolute filter bank. The probe extends approximately 3 feet into the plenum. MacFarlane stated that his previous experience has shown that there is much turbulence in this area and good mixing, and that he therefore gets a representative sample with this sampling setup. Inspector reviewed recorded results and observed that results were much less than the limit of 3×10^{-10} microcuries/cc which MacFarlane uses. Inspector observed that this was the mpc for insoluble cobalt-60 (the most restrictive mpc of the nuclides being used). Inspector observed that air from hot cells passes through a roughing filter and absolute filter in the hot cells and then is exhausted through another bank of roughing and absolute filters before going out the stack. Inspector also observed that recorded results were usually in the order to 10 to 20 d/m per 24 hour collection period, showing that essentially nothing was going out the stack.

Leak Test

22. MacFarlane stated that both the inner and outer capsule are leak tested on doubly encapsulated sources. He stated that the leak test on each stage consists of a swipe which is removed from the cell and counted and a liquid nitrogen leak test which involves emersion in liquid nitrogen allowing temperature to come down and then immersing the source in Vythene and watching for bubbles. He stated that any sources shown from these tests not to be adequate are discarded. MacFarlane stated that P&WA also performed tests for U. S. Nuclear for special form certification. Inspector spot checked leak test records verses records of source distribution and observed that, in all cases asked for, the licensee maintained leak test records, which indicated that leakage or removable contamination was less than .005 microcuries.

Miscellaneous Records

23. MacFarlane had a log, bill of lading information, and records for all receipts and transfers of sources. He had records of radiation and contamination surveys performed on receipt and transfers. This log also indicated DOT labeling, container, special permit numbers, etc.

Personnel Monitoring

24. Inspector reviewed personnel monitoring records and observed that licensee now maintains Form 5's. These were instituted after the last inspection. A review of these records indicated that quarterly totals since last inspection have not exceeded 1 rem. Inspector observed that about 10 persons were monitored since last inspection. Inspector also observed that dosimeter records are maintained by MacFarlane.
25. Patton stated that both 20.407 and 20.408 reports have been filed.

Posting and Labeling

26. Inspector observed that licensee had available copies of license, regulation and procedures. Inspector observed that Form AEC-3 was posted. Inspector observed that all material and areas appeared to be adequately posted, labeled with caution high radiation area, caution radiation area, and caution radioactive material signs as needed.

Waste Disposal

27. MacFarlane stated that all radioactive liquids have been solidified and disposed of as solid waste. MacFarlane stated there had been one shipment of radioactive materials as waste which was handled by Atcor. Inspector reviewed records and observed they indicated one shipment in December, 1968 which included 30 boxes, seven 55 gallon drums, and 1 concrete valut (5 feet cubed) all containing a total of approximately 5 curies.
28. The liquid waste system was previously described in paragraph 45 of report of inspection on July 15 and 16, 1968. Inspector reviewed records that indicated that 22 dumps of up to a maximum of 1,000 gallons had been made since the last inspection. MacFarlane stated that before each dump, the water is sampled and counted for activity. He stated that most of the activity, if not all, in the water is from the laundry area. He stated that the indexing system described earlier is still used and that 1×10^{-7} microcuries/milliliter is used as the limit. He further described the diluting system. The liquid waste tank can be pumped out at a maximum rate of 60 gallons/min. This is in a 3 inch line. The 3 inch line empties into a 48 inch line before discharge from the Middletown facility. The maximum of 60 gallons/min. empties into a minimum flow of 12,000 gallons/min. MacFarlane stated that this information had been supplied from the powerhouse people. By controlling the discharge pumping rate he can be sure that the limit of 1×10^{-7} microcuries/milliliter is not exceeded.

License Conditions

29. Inspector reviewed these and material referenced in #14 during inspection with Felber and MacFarlane. All appeared to be met.

Management Interview

30. The inspector discussed results of inspection with J. Martin and W. Patton. Inspector stated that in general, things appeared to be adequately supervised. Inspector stated that there was one item of noncompliance for failure to survey and determine concentrations of air for cell entries. Martin and Patton stated that this would be corrected in the future by use of lapel samplers for entries.

To: Mr. Edward E. Clark

From: D. E. MacFarlane Room 2442

Subject: Radioactive Material in Hot Laboratory

Frank Felber has forwarded to me your phone request for an inventory of radioactive material in the Hot Laboratory, Building 150.

The attached table shows the material on hand June 12. All values are measured values, except for the three sources in shipping containers (1700 Ci), and the "other materials" (0.5 Ci), which are estimated or calculated values.

In summary, the inventory consists of

30,476 curies of cobalt-60

687 curies of cesium-137

1 curie of miscellaneous materials

for a total of 31,164 curies.

D. E. MacFarlane

DL:ghg
Attachment

ATTACHMENT "A"

Isotope	Quantity	Description	Disposition
Cs^{137}	10,753 Curies	nickel plated pellets	storage pig in cell
Cs^{137}	858	5 doubly encapsulated sources ready for shipment	storage pig in cell
Cs^{137}	9,990	12 doubly encapsulated sources in an irradiator awaiting shipment	irradiator in cell
Cs^{137}	4,015	6 spent sources awaiting disposal as waste	storage pig in cell
Cs^{137}	3,164	6 spent sources awaiting disposal	storage pig in cell
Cs^{137}	1,700	3 spent sources in shipping containers, for disposal	warm storage area back of cell
Total Cs^{137}	30,478 Curies		
Cs^{137}	2.5 Curies	Cs^{137} pellets	in container in cell
Cs^{137}	835	doubly encapsulated Cs^{137} pellets	storage pig in cell
Total Cs^{137}	837.5 Curies		
Sr^{90}	0.5 Curie	Sr shot in glass vials	cell
Other materials	0.5 Curie (est.)	sealed calibration sources, liquid samples, miscellaneous waste	warm storage area back of cell
	31,316 Curies		