

BOX 10172 LAMBERT FIELD • ST. LOUIS, MISSOURI 63145 • 314 AX 1-0540

January 11, 1971

Mr. Lawrence D. Low, Director  
Division of Compliance  
United States Atomic Energy Commission  
1717 "H" Street  
Washington, D. C. 20545

Dear Mr. Low:

In your letter of December 22, 1970, referring to the inspection conducted during October, 1970, a number of items were set forth which appeared to be of less than full compliance. We are repeating these items below along with comments and statements regarding our actions intended to assure full compliance.

1. The levels of radiation existing from April 11 to May 11, 1970, in the unrestricted area on the roof of the building located across a driveway north of the company's facilities were such that an individual continuously present in the area could have received a radiation dose in excess of 100 millirems in any seven consecutive days, contrary to 10 CFR 20.105(b), "Permissible levels of radiation in unrestricted areas."
1. We acknowledge that the Commission, as a consequence of its independent measurement program utilizing monthly TLD's stationed around our facility, has reported radiation levels in excess of the limits specified in 10 CFR 20.105(b) during the period April 11 to May 11, 1970, at one of its monitoring stations. The Commission's report also indicates that radiation levels have been within specified limits at this location from January 9, 1970, through July 18, 1970, with exception of this one period and have been within specified limits at all other locations for the entire period.

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The station in point is located at the southwest corner of the roof of the Bennett Corrugated Box Company. An individual standing on the roof at this location could look down over the shielding walls of our radioactive waste storage area which is immediately adjacent across a driveway. Surveys routinely performed at ground level in the driveway area indicate that the shielding walls effectively minimize radiation levels in this unrestricted area. Radiation levels, a short distance back from the edge of the roof, drop off abruptly as the shielding effects of the radioactive waste storage area wall and the Bennett Corrugated Box Company wall and roof come into play. Only if an individual stood at the very edge of the roof for an extended period of time could any appreciable exposure be incurred. With this in mind, we requested that Mr. Bennett provide us his estimate of the maximum time an individual might spend at this particular location considering such possible circumstances as roof repair, and at many additional locations on the roof, within the building, and at ground level outside the building. We also requested and were granted permission to perform an extensive radiation level survey of the same areas. The results of his estimate of occupancy times and our radiation level survey were combined to determine the maximum credible exposure an individual might receive in any of the unrestricted areas adjacent to our radioactive waste storage area. These results and all supportive information were submitted to the Division of Materials Licensing by letter dated September 18, 1970, in the form of a request for amendment to our licence in accordance with the provisions of 10 CFR 20.105(a). You will note that on the attached page entitled "Maximum Credible Exposure" excerpted from the request for amendment, that the maximum exposure tabulated is 35 mrem/year. This is at the same location on the roof referenced during the April 11 to May 11, 1970, period.

In addition to making the request for amendment, we modified our radioactive waste handling procedures and added extensive shielding in the radioactive waste storage area to reduce radiation levels in unrestricted areas upon being informed of the problem by the Commission.

2. Contrary to 10 CFR 20.201(b), "Surveys," adequate surveys were not made to determine compliance with 10 CFR 20.203(b) with respect to the radiation area existing on the roof above the solid active waste storage room.
2. Radiation surveys of record are not normally made on the unoccupied roof area above the solid active waste storage room. However, radiation surveys are routinely made within the room itself which is occupied for a limited number of hours per week. In addition, a Victoreen Model No. 808B Vamp Area Monitor is installed in this room to provide continuous monitoring of radiation levels. We also know that the radiation levels on the roof are lower than within the room itself. We feel that we have adequately evaluated the relative radiation hazard existing on the roof through use of the available survey, monitoring, and occupancy information. Such an evaluation may be compared to the accepted technique of measuring radiation levels or concentrations at the boundary of a restricted area to determine compliance in nearby unrestricted areas without actually obtaining measurements in the unrestricted area. However, in event of the necessity to spend some time on the roof, such as repair of the exhaust blower at that location, we most certainly would perform a radiation survey at that time.
3. Contrary to 10 CFR 20.201(b), "Surveys," no surveys were conducted to determine compliance with 10 CFR 20 with respect to the radiation levels existing during the handling and receipt of waste packages containing radioactive materials. Also, contrary to 10 CFR 20.201(b), no surveys were made to determine the presence and extent of radioactive contamination existing on such packages.
3. These packages contain relatively small quantities of left-over radiopharmaceutical products returned to us by our customers for inclusion in our radioactive waste shipments to an authorized waste disposal agency. We understand that the shipper is required to perform surveys on the packages according to DOT regulations but are unaware of any regulations which require the receiver to perform similar surveys. If a package must be surveyed upon shipment and receipt,

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shouldn't it also be surveyed at any intermediate transfer points?

We feel that we have complied with 10 CFR 20.201(a) in that it is our evaluation that these packages don't represent a substantial hazard to our facility or personnel and that physical surveys are inappropriate unless the package is received in a damaged condition. We most certainly plan to perform a physical survey on any package received which shows signs of damage in shipment.

4. The radiation area existing on the roof of Building 100 above the solid waste room was not posted as required by 10 CFR 20.203(b), "Caution signs, labels, and signals."
4. The roof area and fenced-in radioactive waste storage area are included in our procedures manual under the common definition of an outside restricted area. Access to the roof may be gained only from the fenced-in area, the entrances to which are posted as required by 10 CFR 20.203(b) and are under the direct control of the radiological protection department. In this respect, we feel we have complied with posting requirements but have posted the top of the wall-mounted steel ladder leading to the roof in deference to the suggestion of your inspector.
5. Contrary to 10 CFR 20.206(a), "Instruction of personnel; posting of notices to employees," the individual preparing and filling iodine 125 capsules on June 18, 1970, was not adequately instructed in the safety problems associated with exposure to radioactive material or radiation and in precautions or procedures to minimize exposure.
5. We stated in our July 16, 1970, report to you that this individual was considered to be qualified to perform that operation by virtue of her prior experience in handling radioactive materials and application of general principles of radiation safety. We further stated that she had not applied good radiation safety practices to this operation and that specific radiation safety instructions have since been included in the (verbal) instructions given to subsequent operators as an additional supervisory step. During

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the October, 1970, inspection, the Region III Division of Compliance inspector suggested that a specific set of written radiation safety instructions be attached to the particular written processing instructions as an additional safeguard. We feel this is an excellent suggestion and intend to extend this concept to all of our processes as time permits. The value of this suggestion lies in the fact that we have over one hundred processes and that no one set of generalized radiation safety instructions can be written to provide the appropriate precautions at the thousands of steps involved. It is for this reason that generalized radiation safety instructions have been supplemented by verbal supervisory instructions.

6. Personnel monitoring records were incomplete, contrary to 10 CFR 20.401(a), "Records of surveys, radiation monitoring, and disposal." No personnel monitoring records were maintained for the week September 14 through September 20, 1970, nor were any such records available with respect to two technicians for the week beginning June 22, 1970.
6. A telephone inquiry was made to our filmbadge service in the presence of the Division of Compliance inspector regarding the September 14 to September 20, 1970, report. We were informed that the information was in their computer and would be sent to us within a few days. This report was received during the last week in October and is now in our records. We have encountered difficulties of this type in the past and began evaluations of the service of other filmbadge companies early in September. A gross of film-badges was ordered from each service and exposed to different energies under various conditions to known doses. One filmbadge company, the Radiation Detection Company of Mountain View, California, provided service far superior to the other two companies. In addition, their accuracy of reporting and ability to compensate for directionality effects also surpassed the other two companies. We began a parallel service on December 1, 1970, with Radiation Detection and the company we had been using. Effective January 1, 1971, all dosimetry service has been provided by the Radiation Detection Company. To date, we have not encountered any delays in receipt of reports such as that which resulted in this citation.

We cannot account for the filmbadges assigned to the two technicians for the week beginning June 22, 1970. We believe they were sent and either lost in the mails or misplaced at our filmbadge service company. At any rate, filmbadges were not worn by these individuals during the week in question, the previous week, or the week following this period. We received a telephone call from our filmbadge service on Friday evening, June 12, 1970, reporting high filmbadge results for these two individuals for the week starting May 25, 1970. These technicians were immediately restricted from further exposure effective Monday, June 8, 1970.

We look upon a filmbadge as a "passport" to work in controlled areas, and as part of our administrative procedure for placing restrictions on the work of individuals, we do not issue filmbadges to individuals under restriction. These individuals were not issued and did not wear filmbadges for the remainder of the quarter. The fact that they were not permitted to perform work involving exposure from June 8 to July 5, 1970, may be verified by production schedules and by interrogation of the individuals.

7. The company failed to make a timely report to the Commission with respect to the high wrist badge exposures for two employees during the second calendar quarter of 1970, contrary to 10 CFR 20.405(a), "Reports of overexposures and excessive levels and concentrations." Your written report of the exposures was not filed with the Commission until October 21, 1970.
7. We have been conducting extensive exposure studies with experimental filmbadges since early in the second quarter of 1970 which were completed during November, 1970. These studies have shown that under certain exposure conditions an incorrect interpretation can be made which results in reported exposures being higher than actual exposures ranging from a factor of 2 to a factor of 15. Reported filmbadge results have been and remain the basis upon which work restrictions are imposed upon our personnel. This was done despite the fact that we had reason to believe the actual exposures were much lower than reported. Little doubt existed that the actual exposures were below the limits specified in 10 CFR 20.101(a) or (b) based upon pocket chamber



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exposure records and the experimental studies performed earlier. A timely overexposure report wasn't submitted to the Commission because we did not and do not consider that these individuals were overexposed. Our letter of October 21, 1970, wasn't intended to be an overexposure report but merely to inform you of actions we were taking in this matter.

We are now preparing a letter to our filmbadge service in which we will instruct them to adjust the exposure records for the two individuals at our Maryland Heights, Missouri, facility and the records for two individuals at our Carlstadt, New Jersey, facility. None of the four exposures as determined by us are over specified limits. We will also state in our letter that we will have available all supportive information for review by a Division of Compliance inspector upon the next inspection of our two facilities.

8. Records showing the receipt and disposal of byproduct material were incomplete, contrary to 10 CFR 30.51, "Records." The records did not always identify the isotopes and the quantities of radioactive material received and disposed.
8. Review of our radioactive waste shipment records during the October inspection did show that some spaces were left blank on a few of the pages. Since the inspection, all radioactive waste shipment records have been reviewed by the group leader of the section responsible for this function. In case of his absence, the radiological protection officer will review the records prior to shipment to assure future compliance.
9. Contrary to License Condition No. 15 which incorporates the procedures entitled "Health Physics Procedures Manual," dated October 1, 1968, one of your employees failed to conduct radiation surveys, as specified in Paragraph IV.B.1 of the procedures, while handling and processing phosphorus 32 during the week of July 20, 1970. As a result, the individual received an exposure to his wrist of about 40 rems.
9. The technician processing Phosphorous-32 during the week of July 20, 1970, did not by his own admission conduct radiation surveys as required. Supervisory personnel have been made

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aware of this failure to follow our radiation safety procedures and have been instructed to pay closer attention to this aspect of their responsibilities. In addition, the requirement for making periodic radiation surveys will be included in the proposed written radiation safety instructions to be attached to the written processing instructions.

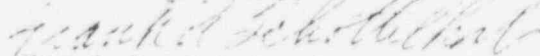
In response to your inquiry regarding Mr. Soldan's November 13, 1970, letter, the company's filmbadge study was completed late in November as anticipated. However, we felt a final evaluation of the exposures in question should not be made until after the additional information gained by the parallel service with the Radiation Detection Company was available. We are now firmly convinced that no overexposures did occur and as stated previously are taking appropriate action.

With respect to Item 1 above, certain of the corrective steps have been mentioned in our reply. In addition, a system has been designed to safely remove radioactive liquids from 10 milliliter glass bottles for storage and decay. This system will eliminate curie quantities of radioactivity from our present storage area. We anticipate that this system will become operational during the first quarter of 1971.

Regarding additional corrective actions that are planned, the Mallinckrodt Engineering Department has been commissioned to perform a site study to develop recommendations for further expansion. Included as part of this site study are our plans for an improved radioactive waste handling facility. The Engineering Department has advised us that they plan their in-depth study this coming week. At this point, we are unable to give a definite completion date for the waste facility although we do anticipate completion at the end of the present year.

If I can be of further assistance in providing additional information or in any other manner, please let me know.

Sincerely yours,



Frank A. Schottelkorb

General Manager Diagnostic Division

FAS:RS

Enclosure

Registered Mail

Copy to Region III, Oak Brook, Ill.



