

UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
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201 645.3943

APR 9 1969

File

Thru: H. W. Crocker, Senior Fuel Facilities Inspector
Region I, Division of Compliance

BACK-UP NOTES FOR FORM AEC 591

Whittaker Corporation

Nuclear Metals Division

West Concord, Massachusetts

License Nos. (SNM-65 (Docket No. 70-82) and 20-11972-1)

The production plans for the Nuclear Metals Division of the Whittaker Corporation only anticipated a re-order contract for CP-5 fuel elements during 1969. This will probably be run in May or June of 1969 and it only involves 16 Kgs of U-235. Mr. Kneppel estimated that the whole contract would probably be completed in a period of six weeks. If possible, an inspection should be conducted during the time that the CP-5 contract is being run, to check specifically on the procedures and controls used during the processing of SNM.

It was the inspector's observation that because they are not processing SNM, the program of health physics and nuclear safety is carried on at a very low level of effort. When the processing of SNM is started, it may require a significant effort and some special training to maintain an acceptable program. A properly scheduled inspection will make it possible to evaluate just how effective the programs are.

In discussions with Mr. Kneppel, it was evident that they did not have a "functioning" nuclear safety committee. The responsibility for the nuclear safety program rests entirely with Mr. Kneppel and he also makes the sole judgement on the need for obtaining a consultant's help. This "individual" control of all phases of the program, especially by a man who has limited experience in the field of nuclear safety, is a weakness in their control of SNM.

Since they depend heavily upon consultants, competence is available to them, but it is the inspector's opinion that adherence to established and approved procedures should be a key part of their program. A minimum amount of deviation should be allowed and the presence and use of moderators should be carefully controlled in any area that has potential criticality problems.

A13

Mr. Kneppel is so used to thinking that all operations are performed during the day shift only, that he did not think through the problems that can develop if an incident causes the evacuation of the plant between 5:00 PM and 8:00 AM. He will re-study his emergency procedures to properly cover all off shift emergencies.

Following a tour of the plant the Health Physics program was reviewed and discussed with Mr. Mario Perella. Mr. Perella is the Director of Safety and has responsibility for the complete Health Physics program. He stated that he was trying to maintain the same program that was in effect when he assumed responsibility. Mr. Perella also stated that any changes or new developments in the program would be suggested or recommended by consultants since he had very limited capability in any aspect of Health Physics. Mr. Perella reports to Mr. M. A. Abreu, Manager of Administrative Services, who also is not knowledgeable in Health Physics.

The requirements, needs and structure of the Health Physics program are dependent on the consultants to the company. Any time that Mr. Perella has Health Physics questions or what he believes to be a problem he contacts one of the consultants. In my opinion this does not constitute a ~~Health Physics~~ Health Physics program.

The plant will be inspected during the processing of radioactive material in the future to determine the adequacy of the Health Physics program as it relates to the license requirements.

No items of noncompliance were found for either of the two licenses so AEC Form 591s were issued in the field.

W. G. Browne

W. G. Browne
Fuel Facilities Inspector

U. S. ATOMIC ENERGY COMMISSION
Division of Compliance
Region I

Licensee: Whittaker Corporation
Nuclear Metals Division
West Concord, Massachusetts
License Nos. SNM-65 and 20-11972-1
Docket No. 70-82

Period of Inspection: March 19, 1969

This report does not contain any classified information.

Inspectors: W. G. Browne APR 9 1969
W. G. Browne, Fuel Facilities Inspector Date

R. H. Smith APR 9 1969
R. H. Smith, Radiation Specialist Date

Reviewed by H. W. Crocker 4/10/69
H. W. Crocker, Senior Fuel Facilities Inspector, CO:1 Date

BACK-UP NOTES TO FORM AEC-591

By : W. G. Browne, Fuel Facilities Inspector, Date
and R. H. Smith, Radiation Specialist, CO:I

Title : WHITTAKER CORPORATION, NUCLEAR METALS DIVISION
WEST CONCORD, MASSACHUSETTS
LICENSE NOS. SNM-65 (DOCKET NO. 70-82) AND 20-11972-1
INSPECTION DATE: MARCH 19, 1969

INTRODUCTION AND SUMMARY

1. An announced nuclear safety and health physics inspection was made of the Whittaker Corporation's Nuclear Metals Division facilities at West Concord, Mass., on March 19, 1969, by W. G. Browne, Fuel Facilities Inspector, and R. H. Smith, Radiation Specialist, CO:I. The purpose of this inspection was to review the controls and procedures that will be used for their next contract work and the controls currently in effect for the stored SNM and byproduct material at the plant. The last inspection of this facility was made on July 30, 1968.
2. No items of noncompliance were found, so AEC 591 forms were issued in the field for licenses SNM-65 and 20-11972-1.
3. No SNM has been processed by the Nuclear Metals Division since the inspection that was made on 7-30-68. Some contract work for the fabrication of CP-5 fuel elements is expected to begin in May or June, 1969 but this will only involve 16 Kgs of U-235. No other SNM processing is anticipated for 1969.
4. Mr. Jack Yoblin has been promoted within the company so Mr. P. Ulf Gummeson is the new Division Manager.
5. It was observed that the criticality detector head for the C building Mezzanine had been knocked down by an overhead crane and is inoperative. Tracer Lab has been contacted for repairing the damaged head and Mr. Kneppel estimated that re-installation will be completed by April 1, 1969. Since no SNM is being processed in this area the installation schedule was considered acceptable.

6. The film badge data for 1968 showed an average annual exposure of 20 mR for the employees with one unusually high annual exposure of 663 mR. The high exposure was to an operator who worked on the melting and casting operation for depleted uranium. This is still well below his allowable exposure of 5 R per year.
7. The only material currently possessed under license 20-11972-01 was a 1 mCi Co-60 sealed source and it was properly leak tested.

DETAILS

Scope

8. SNM was not being processed at the time of the inspection so the storage of SNM, procedures for control and the extent of the nuclear safety and health physics program currently in effect were reviewed.

Persons Contacted

9. David S. Kneppel, Criticality Officer
Mario A. Perella, Safety Director
Peter J. Zagarella, Nuclear Control Monitor

Production

10. Mr. Kneppel said that they had not processed any SNM since the inspection that was made on 7-30-68. The U-235 shot project that they had prepared a bid on, did not become a production contract, so he assumes that no further effort will be expended on the project. The only work that he expects they will do this year is on a re-order of CP-5 fuel elements. This contract work for Argonne Laboratory will probably start in May or June of 1969 and it will involve about 16 Kgs of U-235.

Organization

11. Mr. Jack Yoblin has been promoted to new company responsibilities, so Mr. P. Ulf Gummesson is the new Division Manager. Reporting to him are Mr. Alan S. Bufferd, Technical Director, and Mr. M. A. Abreu, Manager of Administrative Services. (See Exhibit A). Mr. Kneppel

was asked if the divided lines-of authority (Nuclear Safety under the Technical Director, Health Physics under the Manager of Administrative Services, and the Nuclear Control Monitor under Accounting) could result in any problems. He explained that the total number of supervisory personnel was small, so communications between groups was very good. In his opinion, the lines-of-authority were flexible enough to allow the system to function without friction.

12. Since the Nuclear Metals Division employs a large number of consultants, Mr. Kneppel was asked to explain what their responsibilities were. He said that Mr. Perella discussed health physics problems with Mr. Santangelo, by phone, whenever Mr. Perella found a problem he didn't know how to handle. Mr. Kneppel estimated that contacts of this type were probably made two or three times a week. In addition, Mr. Santangelo visits the plant at least once per month to talk with Mr. Perella and to tour the plant. Mr. Perella also can and does contact Mr. Levin by phone, particularly about air samples and smear surveys and this frequency is probably two or three times per month. Other consultant contacts are made as needed and they can be made by phone or by having the consultant come to the plant, depending on how serious or complicated the problem may be. If a problem of some emergency exists, Mr. Perella or Mr. Kneppel can consult with Mr. Al Gilman, a radiochemist who works at the plant. Mr. Gilman is the Manager of Custom Products and although his present work does not normally involve SNM or radioactive materials, Mr. Gilman once had the licensing and nuclear safety responsibilities that Mr. Kneppel has now.
13. Mr. Kneppel said that whenever he has some nuclear safety problem or when he needs to have a nuclear safety analysis made, he contacts Lincoln Clark by phone and arranges for him to come out to the plant for an examination of the equipment. Mr. Clark then makes the analysis for Mr. Kneppel and issues a written report. The last time Mr. Clark was contacted was for his study of the U-235 shot project.
14. Mr. Kneppel said that the decision as to whether the consultant was to be called, rested with Mr. Perella or himself, but the contacts with the consultants are frequent enough so they know what is going on at the plant, most of the time.

Nuclear Safety

15. During a tour of the plant, the following nuclear safety items were observed and discussed with Mr. Kneppel:

- a. It was observed that the five criticality monitoring instruments, at the guard-station entrance to building C, were set to alarm at 10 mr/hr. The four detector heads located in the Machine Shop, the Shipping and Receiving Area, the Butler building and the Foundry area were found to be properly installed. It was observed that the detector head near the C building mezzanine was missing. Mr. Kneppel said that it had been knocked off the column by an overhead crane, the week of 3-10-69. He had called Tracer Lab to have them repair the damaged detector head and he hopes to have it re-installed by April 1, 1969. Since they are not processing any SNM in the plant, the installation schedule was considered acceptable.
- b. The storage of special nuclear material in the Butler building was found to be according to the license conditions and consistent with good nuclear safety practices. It was noted that only four 5 - gallon pails of alloy, one 5 - gallon pail containing a plastic bottle of about a liter of contaminated cutting oil, nineteen 1 - gallon pails of CP-5 fuel element metal, and eight 1 - gallon pails of dry waste material were stored in the building. The eight 1 - gallon pails contained a total of 52.4 grams of U-235 and they were awaiting disposal to a commercial burial ground.
- c. The storage area for shipping drums, just southeast of the metallography laboratory in building A, was empty. An examination of the laboratory area next to the storage area showed that there is a small likelihood of any SNM being brought within 10 feet of the wall which forms one side of the storage area. Beginning at the southwest end of the building there is in the metallography laboratory: an office, a desk and filing cabinets, a desk and laboratory table on which there is a microscope, a storage room for supplies, and an electron microscope room.
- d. Mr. Kneppel was asked what the possibility was of SNM going to their liquid waste treatment plant. He said that they had never had any positive indication of U-235 in the liquid effluent. A tour of the liquid waste treatment building, which is located southeast of the plant and is called the "Acid Treatment" facility, showed that all of the liquid effluent from the plant runs into one of two 5000 gallon open top wooden-stave tanks. The two tanks are interconnected, about 2/3 of the way from the bottom, by a 6 inch overflow pipe.

Agitation of the tanks is done by a 9-arm ^{air-}sparger, which covers the bottom of the tank, and which can be raised or lower by a pulley arrangement.

Mr. Kneppel said that after neutralizing the tank of effluent, a sample is taken and placed in the sample storage rack. If the analysis is acceptable, the agitated waste solution is dumped into the pit behind the building by merely opening a valve and letting the solution flow out by gravity. The sludge settles out and the liquid seeps away.

Criticality Evacuation Drills

16. Mr. Perella's records showed that in addition to the Evacuation Drill held on 7-10-68, another drill was held on 10-9-68. Evacuation time for the last drill was 45 seconds.

Possession of SNM

17. As of 3-1-69, Mr. Zagerella's books showed 6.9 Kgs., of U-235 at enrichments of greater than 75% of U-235, and no U-235 from enrichments below 75% U-235. This is well below the Nuclear Metals Division's possession limit of 714 Kgs of U-235.
18. As of 3-1-69, they did not have any natural uranium, any depleted uranium, or any thorium at the plant.
19. Shipments made, between January, 1968 and March 1, 1969, for the commercial burial of source and special nuclear material were:

9.0 Kgs of thorium in an alloy

6.278 Kgs. depleted uranium scrap

34.0 Kgs of metal turnings containing trace quantities of depleted uranium

Emergency Procedures

20. The emergency procedures that the Nuclear Metals Division submitted in their new license application (dated 2-26-69) were discussed with Mr. Kneppel. The procedures are based on day shift operation of the plant and do not reflect the possibility of an off-shift incident. Mr. Kneppel said that this had not occurred to them so they will re-study their procedures and make proper provisions for handling emergencies between 5:00 PM and 8:00 AM, ^{and} on weekends and holidays.

Nuclear Safety Committee

21. Mr. Kneppel was asked if the Nuclear Safety Committee had met in 1968 or 1969 and if they had any records or meeting minutes that would show what had been discussed. He said that the only meeting had been of the Nuclear Emergency Committee, to discuss emergency procedures and criticality evacuation results.
22. Mr. Kneppel said that the U-235 shot project had been studied by their consultant, Lincoln Clark and that Mr. Clark had made the nuclear safety calculations. If the project had been put under contract, other consultants, as needed, would have been used to set up the production procedures. Mr. Kneppel did not believe that a formal meeting would have been set up to review the project, since each person responsible would have had to sign-off on the project.
23. Apparently, Nuclear Metals does not have a nuclear safety committee that would review the nuclear safety aspects of a project. Mr. Kneppel said that a review committee could be constituted, but that the small organization they have allows good communications so he wasn't sure that it would really make much difference. Mr. Kneppel said that having an individual responsible, seemed to him to be the most important control over nuclear safety. He did say that he would re-study this aspect of their nuclear safety program.

Film Badges

24. The film badge service is provided by Gardray Film Badge Service, Burlington, Mass., and the badges are exchanged on a 6 1/2 week frequency.

All personnel who routinely enter the plant area where radioactive materials are in use are provided a film badge. The film badge records for 1968 were reviewed and the maximum calendar year exposure was 663 mR. This was an employee who routinely works at melting and casting depleted uranium. The average calendar year exposure was 20 mR.

25. The reporting requirements of 20.407 and 20.408 of 10CFR20 were discussed with Mr. Perella. He had just received the revisions to 10CFR20 and was preparing to submit the required reports. It appears that Mr. Perella understands the reporting requirements.

Monitoring Instruments

26. The amount and type of instruments on hand were adequate for the work in progress. All instruments are on a calendar quarter frequency for calibration unless it is required more oftendue to malfunction and repair. Calibration work is performed by Mr. Edward Karaian who is employed by the MIT Radiological Safety Laboratory in Cambridge, Mass.

Stack Monitoring

27. There are 24 exhaust stacks that are continuously sampled. The maximum activity recorded in calendar year 1968 was 23.5×10^{-14} uCi/ml. This stack is the exhaust from the melting and casting operation of depleted uranium. All samples are obtained with glass fibre filter paper and counted for alpha activity. The counting and analysis is performed by S. Levin, a consultant who is employed by MIT.

Environmental Sampling

28. Air samples are continuously collected from 8 locations outside the plant buildings, but still on plant property. Samples are collected on glass fibre paper and counted for alpha. The maximum activity recorded during 1968 was 0.7×10^{-14} uCi/ml.
29. A total of 13 locations are sampled for alpha activity in water. Seventeen locations are on-plant and 6 are off plant. The sample results during 1968 were all <0.02 mg/ml.

Bioassay Program

30. Urine sampling -
 - a. All workers in direct contact with radioactive materials are routinely sampled on an annual basis.

- b. Action level for samples is 25 ugr/l.
 - c. All samples are processed and analyzed by consultants to Nuclear Metals.
 - d. If a sample is high the individual is resampled and investigated. No work with radioactive materials is permitted until sample results are known.
- 31. Fecal samples are obtained when recommended by consultants.
 - 32. Whole body counting and emergency bioassay sampling would be obtained as directed by consultants to Nuclear Metals.

Byproduct License 20-11972-01

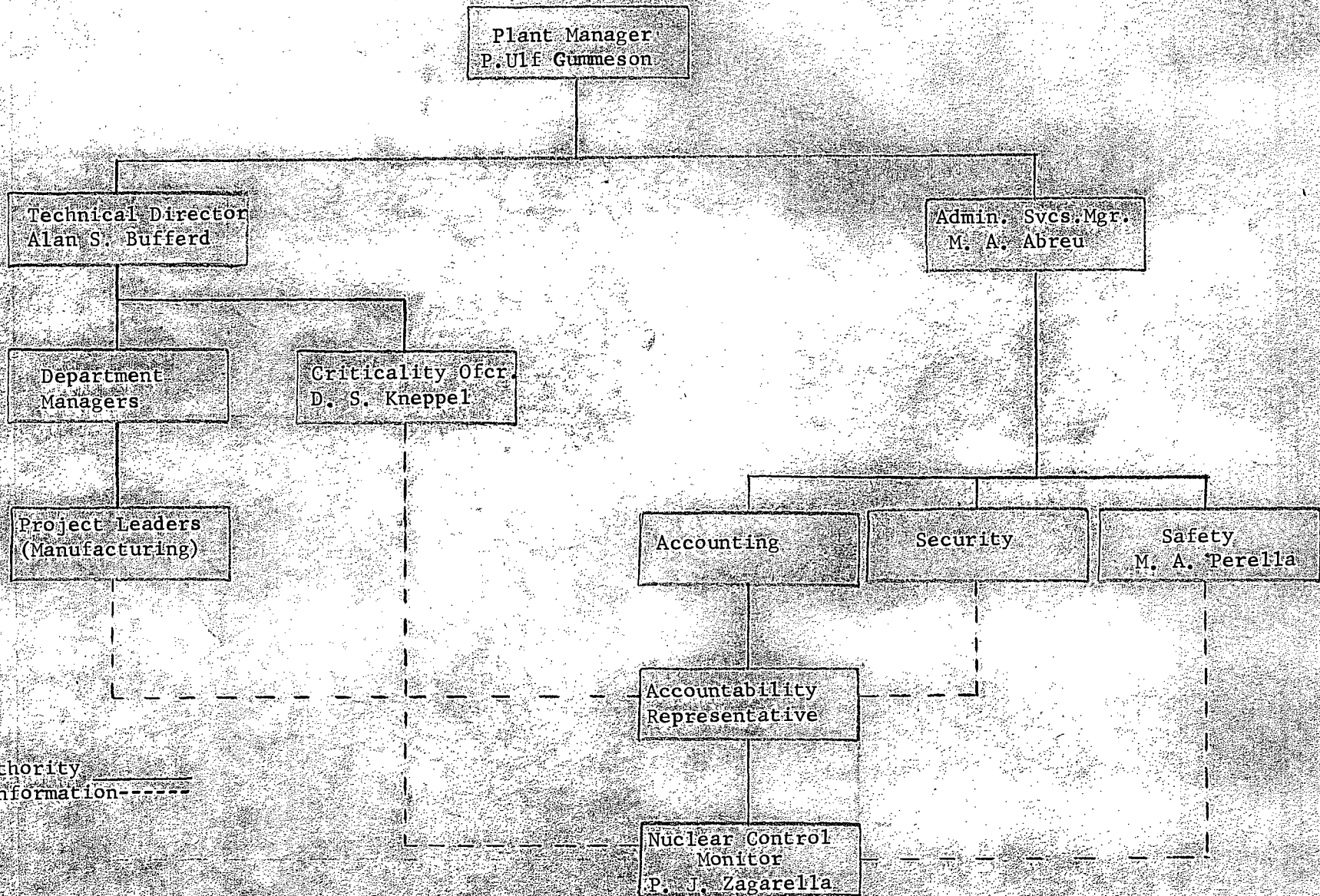
- 33. The only material currently possessed under this license is a 1 millicurie Co-60 sealed source that is used for instrument calibration. At the time of the inspection it was observed that the Co-60 source was not locked-up, but Mr. Perella said they would keep the Co-60 source under lock and key in the future.
- 34. The licensee had possessed several radium bromide sources and although these were not license material, they have been routinely smeared for leak tests. They were properly disposed of, on May 5, 1968, by delivery to Nuclear Engineering Co., of Morehead, Kentucky.
- 35. The amendment No. 1 to this license was for byproduct material to be used on an expected contract. At the time of the inspection the contract work had not been received and receipt was indefinite.

Management Discussion

- 36. Those present at the management discussion meeting were: P. Ulf Gummesson, Manager of the Nuclear Metals Division, D. S. Kneppel and M. A. Perella. R. H. Smith and W. G. Browne were the CO:I inspectors.
- 37. No items of noncompliance were found and AEC 591 forms were issued in the field for Licenses SNM-65 and 20-11972-01. Since Mr. Gummesson had only been at the plant for 4 months, he requested an explanation of the various forms used during the AEC inspections. The AEC-591, 592 and 417 type reports and his company's required response to the AEC correspondence were outlined.

38. The missing criticality detector head at the C building Mezzanine was discussed and it was pointed out that since no SNM was being processed, the re-installation schedule was considered acceptable. Mr. Kneppel said that no SNM would be brought into the area as long as the detector head was not functioning.
39. The emergency procedures were discussed and Mr. Kneppel said that an additional study would be made of the applicability of the procedure to incidents that might happen during off day shift hours.
40. The safety committee review of projects and procedures, rather than only informal and individual direction of the program was discussed. Mr. Kneppel said that he would re-study this aspect of their nuclear safety program.
41. It was pointed out that prior to performing the expected contract work under License No. 20-11972-01, all individuals doing the work should be familiar with the requirements of the license. Mr. Perella had previously stated that this would be done.
42. Although there was essentially no work being done with special nuclear or radioactive materials at the time of the inspection, Mr. Perella was having trouble keeping up with this minimal program of health physics work. It was pointed out that when SNM processing does start, the program effort will have to be increased to maintain adequate safety coverage. Mr. Perella stated they are planning to hire a technician before the SNM processing starts.

EXHIBIT A



Code:

Lines of Authority

Liaison & Information-----

PLANT ORGANIZATION FOR SNM CONTROL
WHITTAKER CORP. NUCLEAR METALS DIVISION