



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

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August 5, 1970

*HWC*  
H. W. Crocker, Senior Fuels Facilities Inspector  
Region I, Division of Compliance

WHITTAKER CORPORATION  
NUCLEAR METALS DIVISION  
WEST CONCORD, MASSACHUSETTS  
LICENSE NOS. SNM-65 (DOCKET NO. 70-82) AND  
SMB-179 (DOCKET NO. 40-672)

No items of noncompliance were observed during the inspection and an AEC-591 form was issued for licenses SNM-65 and SMB-179.

Dr. Saul Isserow, Criticality Officer has terminated employment with the Nuclear Metals Division. Dr. Isserow has been replaced by a consultant, Mr. Lincoln Clark. Dr. Allan Bufferd, Director of Engineering, is the technical liaison with Mr. Clark and the administrative liaison duties were assigned to Mr. M. Abreu, Manager of Administrative Services.

Dr. Bufferd, Mr. Abreu and Mr. Gummerson, Manager, Nuclear Metals Division were all absent during the inspection, however, their duties and responsibilities to assure nuclear criticality safety will be reviewed during the next inspection.

The fabrication of CP-5 fuel elements was completed in March, 1970 and there are no production plans requiring the use of SNM for the remainder of the calendar year. All SNM possessed by the licensee was being properly stored.

Work was in progress of fabricating shielding devices for radiography sources using depleted uranium and the present plans are to increase the use of depleted uranium in other fabrication processes.

Licenses No. SNM-65 and SMB-179 were renewed on March 25, 1970. The health physics program and monitoring requirements specified in SNM-65 also apply to SMB-179. The health physics requirements and Annex B of SNM-65 regarding the emergency procedure requirements were discussed with the licensee. The emergency procedures were being reviewed by the licensee during the inspection to assure compliance with license SNM-65. The inspector discussed the importance of defining individual responsibilities regarding the emergency procedures.

A/12

The licensee is experiencing delays of four to six months in receiving analytical results of air and water samples and film badge results. These delays were discussed and the licensee is attempting to reduce the time of receiving results to approximately 30 days. The corrective measures will be reviewed during the next inspection.

Although the air sample results were not available, the past air sample concentrations have always been well below MPC for the same routine work being performed. The work is primarily that of processing SNM in metal form and the potential for airborne problems are very low. The bioassay results were available for the personnel that had worked on the CP-5 fuel fabrication and the bioassay records showed no problems of internal deposition. Based on this information the inspector did not feel that a citation regarding the late sample analysis would be beneficial.



R. H. Smith  
Radiation Specialist

U. S. ATOMIC ENERGY COMMISSION  
DIVISION OF COMPLIANCE  
Region I

Title: WHITTAKER CORPORATION  
Nuclear Metals Division  
West Concord, Massachusetts  
License Nos. SNM-65 and SMB-179  
Docket Nos. 70-82 and 40-672

Period of Inspection: July 15 and 16, 1970

This report does not contain any company confidential information.

Inspector: R. H. Smith  
R. H. Smith, Radiation Specialist

Reviewer: H. W. Crocker  
H. W. Crocker, Senior Fuel  
Facilities Inspector

August 6, 1970  
Date

August 6, 1970  
Date

BACK-UP NOTES TO FORM AEC-591

By : R. H. Smith, Radiation Specialist, CO:I

AUG 6 1970

Title: WHITTAKER CORPORATION  
Nuclear Metals Division  
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License Nos. SNM-65 (Docket No. 70-82) and  
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INTRODUCTION AND SUMMARY

1. On July 15 and 16, 1970 an announced inspection was made of the Whittaker Corporation facilities at West Concord, Massachusetts, by R. H. Smith, CO:I. The primary purpose of the inspection was to review the current criticality safety and health physics practices, at the facilities. The last inspection of licenses SNM-65 and SMB-179 was made on December 2 and 3, 1969.
2. No items of noncompliance were observed and an AEC-591 form was issued for licenses SNM-65 and SMB-179.
3. The duties of the Nuclear Criticality Officer are now being performed on a consultant basis by Mr. Lincoln Clark. Dr. Allan Bufferd, Director of Engineering is the technical liaison representative with the consultant and Mr. A. Abreu is the administrative contact with Mr. Clark.
4. All SNM possessed by the licensee was in storage and there is no planned or scheduled work with SNM for the remainder of the year.
5. The casting of shielding devices for radiography sources using depleted uranium was in progress and work with depleted uranium may be increased depending on contract awards.
6. The CP-5 fuel element fabrication work was completed on March 9, 1970.
7. Licenses No. SNM-65 and SMB-179 were renewed on March 25, 1970. The health physics program and monitoring requirements specified for SNM-65 also apply to License SMB-179. The work performed on each license is in the same general area, however, the work stations are separated. Plant employees are not specifically assigned to perform work on only one license.

DETAILS

Scope

8. The scope of this inspection included a review of the health physics records and practices, observations of depleted uranium work, the nuclear criticality detection system, SNM storage and a review of emergency procedures.

Persons Contacted

9. M. A. Perella, Safety Director  
P. J. Zagarella, Nuclear Control Monitor  
G. C. Santangelo, Health Physics Consultant

Organization

10. Dr. Saul Isserow, Criticality Officer has terminated employment with the Nuclear Metals Division. The duties of the Criticality Officer are to be performed by Mr. Lincoln Clark, who is a consultant to Nuclear Metals. Dr. Allan Bufferd, Director of Engineering will serve as the technical liaison representative with Mr. Clark and Mr. A. Abreu, Manager-Administrative Services will serve as the liaison for administrative matters. Both Mr. Abreu and Dr. Bufferd were absent during the inspection so the organizational responsibilities for nuclear criticality safety were not reviewed.
11. Mr. M. A. Perella, Safety Director is responsible for the health physics program. He has one production technician that provides assistance in collecting air samples and performing smear surveys for about ten manhours each month.
12. Mr. Perella stated that he also had the additional duties and responsibilities for; Industrial Safety, Fire Chief, preparation of emergency procedures, training coordinator, functional direction of the plant guards and medical nurse, providing first aid treatment during the nurse's absence and recently was assigned the maintenance of the nuclear criticality alarm instrumentation system.
13. Mr. Perella said the present number of employees was about 100 and that from five to ten employees had been terminated during calendar year 1970. One plant technician that primarily used and operated the 1000 ton extrusion press recently terminated and Mr. Perella was concerned over being able to obtain a knowledgeable replacement for him.

### Plant Inspection

14. The Butler Building was inspected and it was observed that all SNM possessed by the licensee was properly stored and controlled. The depleted uranium was properly stored within the chain link fence surrounding the Butler Building.
15. The nuclear criticality monitoring system was inspected and all five monitors were set to alarm at 10 mR/hr and were observed to be functioning. A functional check of the alarm system is performed each week.
16. There was no SNM being processed and Mr. Zagarella stated that all the SNM being possessed was stored in the Butler Building. The CP-5 fuel element fabrication contract work was completed on March 9, 1970. Mr. Perella said that one small job was performed for Westinghouse from July 6 through July 10, 1970 that involved canning and extruding SNM. He stated that no problems had been encountered during the CP-5 work or the Westinghouse job.
17. The work of fabricating shielding devices for radiography sources using depleted uranium was observed and all work was being performed in accordance with the conditions of license SMB-179. This work is performed intermittently and is not a full time production type operation.

### Environmental Monitoring Program

18. Presently the environmental monitoring program consists of obtaining annual samples of soil and water both on-site and off-site. These samples had not been taken for 1970, at the time of the inspection.
19. The water samples (each one quart) are taken on-site from eight wells and from seven off-site streams and ponds. Each of the samples are analyzed for uranium content.
20. A soil sample (3" W x 5" L x ½" D) is also obtained at each of the water sampling locations and analyzed for uranium content.
21. The licensee does not plan to make any reduction in the environmental program or to increase it to include air sampling, vegetation or fall out sampling locations.

### In-Plant Air Samples

22. Continuous air samples are collected at eleven locations inside the plant and the samples are exchanged and analyzed on a monthly frequency. The air sample records were reviewed through January 5, 1970 and the analysis

for uranium alpha showed a maximum activity of  $3.8 \times 10^{-12}$  uCi/ml and an average of  $2.0 \times 10^{-12}$  uCi/ml.

23. Mr. Perella stated he had contacted the consultant that performs the analysis (Massachusetts Institute of Technology) regarding the delay in receiving the results of air sample data and had requested the results within 30 days after sample delivery.

#### Exhaust Stack Air Samples

24. The air sample records were reviewed for the exhaust stacks and results were available through January 3, 1970. The maximum concentration for a stack was  $1.8 \times 10^{-13}$  uCi/ml. Only two of the 27 stacks have particulate filters.
25. The stack sampling requirements for License SNM-65 and SMB-179 issued March 25, 1970 states that, "Stack samples will be changed monthly, weather permitting". Mr. Perella stated that his intent was to continue to collect samples on a monthly frequency except during the winter months when snow and ice were present on the plant roof which could be from four to five months.
26. Mr. Perella also said he had discussed the delay of obtaining sample analysis from the consultant (MIT) and requested an analysis within 30 days after the samples were delivered.

#### Contamination Surveys

27. There are 22 plant locations where contamination smears are collected on a monthly frequency. The maximum contamination level observed in reviewing the records was 4 dpm/100 cm<sup>2</sup>.
28. The 22 locations are also surveyed with a portable alpha survey instrument for fixed contamination levels. The maximum level observed in reviewing the records was 50 dpm/100 cm<sup>2</sup>.
29. Mr. Perella said that although the frequency of these surveys was termed, "periodic", by the license condition that he would attempt to perform the surveys on a monthly frequency or more often if deemed necessary.

#### Surveys During Work

30. During the complete process of fabricating radiography source shielding devices from depleted uranium a survey was performed to determine personnel exposures and contamination levels. The survey was performed by Mr. Perella and Mr. Samuel Levin, Consultant for Radiation Physics, Health and Safety.

31. A review of the survey results was made and it appeared that the personnel exposures for the work would be less than the limits of 10 CFR 20.101. Mr. Perella stated that he was obtaining some TLD and would use it to establish more definitive measurements of extremity exposure.
32. One work table was contaminated to a maximum of 10,000 dpm and several changes were made in the operating procedure of handling techniques to reduce the contamination levels.

#### Film Badge Results

33. There are about 70 personnel routinely wearing film badge dosimeters and these are exchanged monthly. The film badge service is provided by Landauer. The records of the film badge results were reviewed through April 30, 1970. The maximum whole body penetrating dose for calendar year 1970 was 230 mrem and the maximum whole body skin dose was 1740 mrem. All personnel exposures were properly recorded on Form AEC-5.
34. The Landauer Company was contacted by Mr. Perella during the inspection regarding the delay in forwarding the film badge results. Mr. Perella said he was told that Landauer was experiencing some equipment and personnel problems but that a company representative would visit him regarding the problem during July.
35. A review of the film badge results for calendar year 1969 showed that Landauer had corrected the records and the maximum calendar year exposures were: whole body penetrating dose - 1650 mrem and whole body skin dose - 1990 mrem. Mr. Perella had a rough draft prepared of the exposure report required by 10 CFR 20.407 and stated it would be forwarded to the AEC during the week beginning July 20, 1970.

#### Liquid Waste

36. There is no liquid waste generated from the processing of material possessed under License SNM-65 or License SMB-179, however, the liquid waste that is released from the facility that is generated from the non-nuclear work is analyzed for uranium content as a precautionary measure.
37. Liquid wastes are collected in two 5000 gallon tanks and treated prior to dumping into a fenced retention pit. An aliquot is obtained prior to dumping each tank and these aliquots are periodically combined into a single sample for analysis.
38. The following data were obtained from the liquid waste records:



<u>Period</u>	<u>Gallons</u>	<u>uCi/ml</u>
January 1, 1969 to March 28, 1969	15000	$1.0 \times 10^{-8}$
March 28, 1969 to June 27, 1969	15000	$6.6 \times 10^{-9}$
June 27, 1969 to December 31, 1969	140000	* $6.2 \times 10^{-9}$
December 31, 1969 to July 1, 1970	40000	* $3.04 \times 10^{-8}$

\*Analytical results were not available at the time of the inspection.

Solid Waste

39. The solid radioactive waste from the facility is buried by the Nuclear Engineering Company. During calendar year 1969 there was one waste shipment on September 15 and one on July 13, 1970. The major portion of the solid waste is generated from the processing operations authorized by License SMB-179.

Bioassay Program

40. At the completion of the CP-5 fuel element contract on March 9, 1970 urine samples were collected from eleven personnel that had been involved with material handling. A review of the bioassay sample results revealed that *the maximum sample result was 308 dpm/l and investigation revealed that the* sample was contaminated. The result of a resample on April 12, 1970 was 14 dpm/l. All personnel working in the facility will be sampled during calendar year 1970. The other sample results were less than 50 dpm/l.

Medical Program

41. The time that the nurse is available at the plant first aid medical facility has been reduced from one-half day for 5 days/week to one-half day for 3 days/week. Dr. A. Seeler, MIT Medical Director or Dr. J. Japp, Bedford, Massachusetts continues to report to the plant twice each month and are also on call for more frequent visits or consultation.
42. Medical examinations are provided for pre-employment, annually and upon termination. The examinations include complete chest X-ray, blood and urine tests. Approximately 95 percent of the employees also have an electrocardiogram test result in their medical records and the remaining 5 percent will be completed during 1970.

43. Mr. Perella provides first aid treatment for plant employees during the periods that the nurse is absent. Injuries other than those of a minor nature are treated by Dr. J. Japp.
44. In June, 1969, Dr. J. Japp attended a symposium on medical treatments during emergencies at Brookhaven Laboratory as a representative for the Nuclear Metals Division.

#### Protective Clothing

45. The protective clothing used at the facility is owned by the licensee and the laundry service is provided by the Interstate Laundry Company, Springfield, Massachusetts.
46. Mr. Perella said that for some work in the facility that disposable clothing was used and placed in the solid waste containers for burial. The containers for protective clothing are surveyed to assure that there is no smearable contamination prior to pick-up by the Laundry Service.

#### Training Programs

47. New employees receive an orientation by Mr. Perella regarding industrial safety, emergency procedures and basic radiation protection rules.
48. During May and June, 1970 a training course consisting of seven sessions, one hour each, was conducted by Captain Whalen, Training Officer, Concord, Massachusetts, Fire Department, for the fire brigade members. The course included classroom lectures, use of respiratory equipment and practical field problems of extinguishing various types of fires by using plant equipment.
49. Mr. Perella said that later this year a Radiological Training course would be provided for all plant employees and that the instructor would be Mr. S. Levin, MIT, Radiation Protection Officer.

#### Emergency Drills and Procedures

50. An unannounced emergency evacuation drill was conducted at 1:30 p.m. on April 13, 1970. The plant facility was evacuated by all personnel in 32 seconds. There were no deficiencies noted by Mr. Perella during the drill.
51. The requirements regarding emergency procedures that are contained in Annex B of License SNM-65 were discussed with Mr. Perella. The emergency procedures were in the process of being reviewed regarding the requirements, however, there have been delays due to the changes in personnel designated as the criticality officer.

52. Mr. Perella said that he would schedule a meeting with Dr. Bufferd, Mr. L. Clark and Mr. Gummerson to clarify the duties and responsibilities regarding the emergency procedures so that they can be re-issued.

Materials Inventory

53. The following quantities of licensed material was possessed by the licensee:

Uranium greater than 75% enrichment - 13.1 Kgs  
Depleted Uranium - 28000 pounds

All of the above quantities are within the possession limits of Licenses SNM-65 and SMB-179.

Management Discussion

54. Those present at the management discussion meeting on July 16, 1970 were: H. Sawyer, Design Engineer, M. A. Perella and J. C. Santangelo (a consultant) of the Nuclear Metals Division and R. H. Smith, CO:I. Mr. Sawyer was representing Mr. P. Gummerson, Manager, Nuclear Metals Division.
55. Mr. Sawyer, et al were informed that no items of noncompliance were observed during the inspection and an AEC-591 form was issued for licenses SNM-65 and SMB-179.
56. The delays of the film badge results and analysis results of air and water samples were discussed. Mr. Perella explained the delays to Mr. Sawyer and his plans for corrective action. Mr. Sawyer was informed that the corrective action of these items would be reviewed during the next inspection.
57. The requirements outlined in Annex B of license SNM-65 regarding emergency procedures were discussed and Mr. Sawyer stated that the procedures would be further reviewed for compliance. The inspector emphasized the necessity of defining duties and responsibilities regarding the emergency procedures.
58. Mr. Sawyer said that with the present production plans there was no work scheduled using SNM for the remainder of calendar year 1970. He said that the work with depleted uranium would be increased if the Nuclear Metals Division was awarded the contracts.