# UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF COMPLIANCE

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

- (a) Use of licerved materials has been under the supervision of C. Rupert and E. Barry, rather than F. M. Gain, Jr., centrary to License Condition 12.
- (b) Controry to License Condition 15B, the Pu-239 sources have not been given the required tests for leakage at least once every three months.
- (c) Concentration of liquid effluents released to the unrestricted Kinkiminetas River during 1964 emseeded the limits specified in 10 CFR 20, Appendix B, Table II, contrary to 10 CFR 20.106, "Concentrations in effluents to unrestricted areas".
- (d) The Loundry Area and the Waste Disposal Area have not been surveyed weakly for contamination, contrary to License Condition 13, which requires adherence to the procedures contained in the application dated July 10, 1959.
- (e) Contrary to 10 CFR 20.201(b), "Surveys", evaluations of airborne activity, conducted only about once per year and without specific determination of the most hazardous anclides that could be present from the handling of laundry from all customers (particularly Platemium 239), were not adequate to ensure compliance with 10 CFR 20.103, "Exposure of individuals to concentrations of redioactive material in restricted areas", and 10 CFR 20.106, "Concentrations in offluents to unrestricted areas".

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Supplementary page	attached.	ABC Compliance Inspector	Date
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#### BACK-UP. FOR AEC-592

#### PART 30 INSPECTION

Inspector: James E. Hyder

NUCLEAR DECONTAMINATION CORPORATION Apollo, Pennsylvania 15613 License No.: 37-7031-1

Date of Inspection: February 25, 1965

Persons Accompanying Inspector:

None

#### Persons Contacted:

Mr. Eugene Barry, RSO Mr. Clarence Rupert, Laundry Foremen Mr. Francis Cain, Jr., General Manager

DETAILS

#### Inspection History

1. This licensee was inspected on 4/5/62 at which time a clear 591 was issued.

#### Organization and Administration

2. The Nuclear Decontamination Corporation was reported by Mr. Barry as being half owned by Nuclear Materials and Equipment Company and half by private investors. Barry, as RSO for Nuclear Materials and Equipment Corporation also serves as RSO for Nuclear Materials and Equipment Corporation also serves as RSO for Nuclear Decontamination Corp. Mr. Francis M. Cain, Jr., is designated as General Manager of this facility with the day-to-day oparations of the leundry being performed under the supervision of Mr. Rupert, Laundry Foreman. Dr. Z. M. Shapire is president of Mr. Rupert, Laundry Foreman. Dr. Z. M. Shapire is president of Muclear Decontamination Corporation. At the time of this inspection, there were only two full-time employees of this knowleys. Moreover, These parts is any as eight persons here been supleyed it and there were any two full-time employees to this knowleys is the facility is periodically amount for the supervision of a December 1066, a large contenant to be the beaution of the supervision of the second of the seco

#### Scope and Conditions of License

3. License No. 37-7031-1 provides for the possession of up to 20 mc of byproduct material, 20 grams of source material and 20 mg of special nuclear material in any form with the authorized use designated as operation of the laundry facility for decontamination of clothing. In addition, this license was amended December 18, 1963 to provide for the possession and use of two small Pu-239 check source to be used for instrument calibrations.

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- License Condition 12 requires that licensed materials be used by or under the supervision of Francis M. Cain, Jr. Cain is also on supervision staff of NUMEC. It was stated by Mr. Rupert and later confirmed by Mr. Cain that the actual day-to-day operations of this facility were carried out under the instructions of Mr. Rupert with Cain conferring with Rupert approximately once a week, sometimes at the laundry, but usually at Cain's office in the NUMEC building. Cain stated that he was generally aware of the work load, customers, etc., from the billings that crossed his desk. Cain was not familiar with the concentrations of materials within the laundry or with the levels of materials released to Unrestricted areas License Condition of specifies that material will be used in accordance with statements, representations and procedures contained in the application dated 7/10/59, 6/21/61 and in a letter dated 12/1/60. These documents were reviewed with Mr. Barry and the only deviation noted was that liquid discharges were generally at levels exceeding those permitted by Part 20, and the process areas have not been surveyed weekly.
- 5. License Condition 14 permits incineration of licensed material. However, no incineration of material has been performed prior to the date of this inspection. License Condition 15 requires that the Pu-239 sources be stored in closed containers that are designed and constructed to contain plutonium which might otherwise escape during storage and to require at least every three months a test for leakage from these sources. According to Rupert, when not in use Pu-239 sources are kept in a metal container provided by the supplier in a locked cabinet in the office of the laundry building. These check sources were obtained on April 30, 1964. However, no test as required at three month intervals by License Condition 15 have been performed, according to Mr. Barry. Barry explained that he believes that these sources were now provided prior to the issuence of that general license and consequently were not labeled as specified by that section of the Federal Regulations.
- 6. Rupert stated that the Nuclear Decontamination Corporation now has 12 customers (contracts). Four of the above contracts are with NUMEC and account for approximately 75% of the current work load. Other customers include Battel Memorial Institute, Westinghouse Test Reactor, Westinghouse-Cheswick, Newport News Shipyard and Rique Ohio Reactor Group. In December 1964, NDE Lost their largest contract which was with Westinghouse-Bettis. The work force was decreased at that time from eight to two persons.
- 7. According to Rupert, they now launder between 3200 lbs and 3800 lbs of contaminated clothing each week with approximately 2500<sup>+</sup> lbs of this being obtained from NUMEC facilities. They now receive about 40 drums per week. In the past they have handled up to 100<sup>+</sup> drums/week.

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#### Facilities and Uses of Materials

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- 8. The laundry facilities are located within the fenced area of the NUMEC plant. The building, approximately 60' x 80', contains a receiving area, shipping area, change rooms, a laundry area approximately 30' x 60' and an office. The laundry area contains four commercial washers having capacities of 50 lbs, 100 lbs, 200 lbs and 400 lbs, two extractors and three dryers. In addition, the area contains tables for monitoring clean clothing prior to packaging, and sewing equipment. The area adjacent to the laundry area contains a hot water system, boiler and a waste disposal system.
- 9. Incoming laundry consisting of contaminated clothing, gloves, overshoes, etc. are brought in by common carrier, the customer's vehicles or licensee trucks to the receiving area. In the receiving area, the laundry is sorted and segragated according to origin and degree of contamination. Rupert stated that highly contaminated clothing from one customer is not washed together with clothing from other customers or with contaminated clothing from less hazardous operations. Respirators and gloves are worn by persons sorting dirty 1 undry and when loading laundry into the washer.
- 10. Neither respirators nor gloves are used when removing laundry from the washers or at any time afterwards. After drying, the clothes are placed into push carts and taken to the sorting and folding areas. The laundered articles are monitored, sorted, folded and stored for eventual shipment back to the customer. Clothing is monitored both before and after laundry using Nuclear-Chicago rate meters with GM detectors. Clothing from the NUMEC blutonium facility and from NUMEC Apollo, which is potentially contamibated with alpha emitters are monitored using an Eberline PAC-3G survey meters. According to Mr. Rupert, NEC will accept any level of contamina ad clothing and equipment up to 500 mr/hr. For articles above this level, they recommend disposal. They accept was levels stated by the customers as to amount of material in packages.

#### Radiological Safety Precautions and Procedures

- 11. Nuclear Decontamination Corporation has developed an "Operation, Health, and Safety Procedure Manwal," which describes the NDC plant facilities, the utilities, services and waste disposal, equipment and facilities for personnel health and safety in plant protection, procedures for operation of equipment, fire hazard and fire protection and a very brief of radioactive hazards. This manuel did not specify monitoring or survey frequency on Form AEC-3 was noted to be posted at the entrance to bette change room. According to Mr. Rupert, personnel are permitted to enter the facility only by way of the change rooms where shoe covers and lab coets must be obtained. Full time angle yells an aspplies with coversely, Corport a bost
- 12. According to Barry, the process area (Restricted Laundry Area) is smeared every other week and unrestricted areas (office and outside shipping and receiving areas) are smeared weekly, with all smears counted by NUREC. No records of surveys could be found for August, November or December of 1964. Application of 7/10/50 states weekly contamination surveys will be made and recorded. Permissible levels for smears in the process area are 5000 dpm/ft<sup>2</sup> alpha and 20,000 dpm/ft<sup>2</sup> betz-gamma. The levels permitted for unrestricted areas are 1/10 the above values.
- 13. Evaluation of In-plant air particulate hazards have been made twice since 1/1/64. On March 11, 1964 the following results were obtained while handling clothing from Bettis:

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(a)	Area - Receiving Room unpacking clothes	12	2 ×	10-12	uc/ml uc/ml	apha beta-gamma
(b)	Area-at top of washer	12 32	x	10 <sup>-12</sup> 10 <sup>-12</sup>	uc/ml uc/ml	alpha beta-gamma
(c)	Area-folding table Area	1 32	××	10-12	uc/ml uc/ml	alpha beta-gamma
(d)	Area-above filter press	12 32	××	10 <sup>±12</sup> 32	uc/ml uc/ml	alpha beta-gamma
(e)	Area at waste storage tanks	5 14	××	10 <sup>-12</sup> 10 <sup>-12</sup>	uc/ml uc/ml	alpha beta-gamma
(f)	Area-while unloading glowes from dryer	35 105	××	10-12 10-12	uc/ml uc/ml	alpha beta-gamma
(9)	At table while monitoring and felding gloves	35 114	××	10 <sup>-12</sup> 10 <sup>-12</sup>	uc/ml uc/ml	elpha beta-gamma
(h)	Area - Sewing and Shipping Room	8 62	××	10 <sup>-12</sup> 10 <sup>-12</sup>	uc/ml uc/ml	alpha beta-gamma
(1)	Area- Change Rooms: Mens	14 35	××	10 <sup>-12</sup> 10 <sup>-12</sup>	uc/ml uc/ml	alpha beta <b>⊖gam</b> ma
	Wommens	17 44	××	10-12 10-12	uc/ml uc/ml	alpha beta-gamma
(1)	Area - Office	11 21	x x	10-12	uc/ml uc/ml	alpha beta-gamma

14. Breathing zone samples obtained 3/11/64 were evaluated as follows;

(a) While folding clothing

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 22 x 10<sup>-12</sup> uc/ml alpha 33 x 10<sup>-12</sup> uc/ml alpha
 9 x 10<sup>-12</sup> uc/ml alpha 15 x 10<sup>-12</sup> uc/ml alpha
 5 x 10<sup>-12</sup> uc/ml alpha
 4 x 10<sup>-2</sup> uc/ml beta-gamma

(b) While unloading drums in receiving area

++	37	X	10-15	uc/ml	alpha
	113	x	10-15	uc/ml	beta-gamma
2.	18	x	10-12	uc/ml	alpha
	158	×	10-12	uc/ml	beta-gamma

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Barry stated that clothing from Bettis was contaminated with mixed fission products and uranium.

15. Several areas air samples collected 2/22/65 were evaluated with results of all being approximately

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 $3 \times 10^{-12}$  uc/ml alpha  $6 \times 10^{-12}$  uc/ml beta-gamma

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Barry stated that although contaminated clothing is obtained from NUMEC Flutonium Facility, the likelihood of plutonium contamination is very low, and therefore, all alpha is considered to be uranium. No evaluations have been made while handling clothing from the Plutonium Facility. 24

16. Evaluations of materials released to unrestricted areas from the dryers have been made as follows:

3/11/64	(1)	1.9	××	10-12 10-12	uc/ml uc/ml	alpha beta	
	(2)	2.3 8.7	××	10-12 10-12	uc/ml uc/ml	alpha beta	
/22/65		0.7	××	10-12 10-12	uc/ml uc/ml	alpha beta	

The dryers will only be exhausting while drying potentially contaminated clothing. These same les new orlieder peard the luit bags ontail the building 17. Air particulate samples have been obtained using a low-vol sampler,

- 17. Air particulate samples have been obtained using a low-vol sampler, with the filter paper being evaluated using a windowless flow propertional counter. Becausely o surveys have been performed while working with clothing from the Plutonium Facility; the attempt has been made to identify or determine the concentration of nuclides; and all radioisotope excluded from consideration have been done on intuition rather than evaluation. The determination of airborne activity appears inadequate to show compliance with 20.103(a) and 20.106(a).
- As stated earlier, no evaluations for leakage from the Pu-239 check sources have been made. Sources are used to check operation of alpha survey meters.
- 19. The Laundry Buildings located within the fenced area of the NUMEC, Apollo facility and in addition, the building is kept locked at all times even when attended.

#### Procurement Procedures and Controls

20. The Pu-239 sources were ordered by Mr. Barry. All other materials are received in the form of contaminated clothing and are shipped to this facility under contract for decontamination. Each receipt is monitored with records maintained with the approximate activity contained within each shipment and the principal activities specified by the customer. Westinghouse Test Reactor Facility as an example, generally specifies that each container contains mixed fission products at less than 10 uc/container. Records are also maintained on the same sheet of paper of the return of the cleaned laundry to the customer with an estimation of the activity, if any, being returned on the "clean" clothing.

#### Waste Disposal

21. Solid waste in the form of lint from the dryers, sludge, and discarded filter prover have been placed in metal drums which are still possessed by NDC. Liquid waste from the laundry operation flows into a sugg and is then pumped through the filter press into 2400 gallon tanks. When filled, the tanks are agitated, a sample collected, andaliquot of the sample is evaporated by NUMEC's Apollo plant and is counted in a flow proportional counter for gross apha and gross beta using a U-238 standard

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for alpha evaluation, and a C-14 standard for beta evaluations. Liquid waste is then released by gravity to the Kiskimingtas River. Barry stated that the beginning of a release, a river pump is started which pumps water from the river into the sewer line and dilutes the waste water by a factor of 9.3.

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- 22. According to Rarry, in early 1963 a sample of waste water was submitted to NSEC for analysis. The results indicated that about 1/3 of the activity was Sr-90. The customer (Atomic International) whose clothing had been washed in the water stated that the Sr-90 content could not possibly be that great. Barry was unable to find the written NSEC report. Barry stated that they had attempted to identify specific isotopes using a multichannel gamma spectrometer, but due to the large number of overlapping peaks this study was never completed.
- 23. A total of 195 tanks of 2400 gallons each were discharged in 1964. The activities released have been averaged monthly by Barry whose calculations included the dilution of 9.3 due to the river pump. The monthly results shown below were taken from the NDC waste disposal record book. No evaluation of specific isotope identity or concentration have been made. The presence of Sr-90 in this waste water effluent could not be ruled out.

	Alpha (uc/ml)	Beta (uc/ml)	Total (uc/ml)
1/64	0.72 × 10-6	.6 x 10-6	1.3 x 10-6
2/64	.28 × 10-6	.5 x 10"6	.8 x 10-6
3/66	1.1 × 10"6	5.6 × 10-6	6.7 x 10-6
6/60	-16 × 10-6	.9 × 10-6	1.1 x 10-6
1/60	-58 × 10"6	3.6 × 10-6	4.2 × 10-6
6/63	.46 × 10-6	3.6 × 10"6	4.1 x 10-6
2/64	A × 10-6	3. × 10-6	3.4 x 10-6
0/64	7 - 10-6	1.2 × 10-6	1.9 x 10-6
8/04	44 - 10-0	2.9 × 10-6	3.4 × 10-6
9/04	87 - 10-6	1.7 * 10-6	2.3 x 10-6
10/64	.5/ × 10-6	8.5 × 10-6	8.7 x 10-6
11/04	- x 10-6	3.5 - 10-6	3.9 x 10-6
12/64	.4 X 10	1 - 10-6	1.6 × 10-6
1/65	*D/ X 10 "	10 X 40 -	7 8 0 W W W

#### Storage and Security of Material

24. Solid waste which has been placed in 55 gallon metal drums is stored in a locked building located immediately behind the laundry, this building is shared with the NIMEC Corporation. Inspection of this building showed that it is crowded with discarded equipment, most from NUMBE. A New number of the drums of waste from NDC could not be inspected as they have been covered by materials from NUMEC facility. Several drums which could be inspected were labeled "Caution - Radios ctive Material" with an approximation of the activity/generally less than 5 uc) and printapel isotopes contained therein (M.F.P. and U) and the date on which such evaluations have been made. Radiation levels at contact .2 mr/hr or less using GM survey meter NYOO No. 5675 calibrated 1/18/65.

#### Personnel Monitoring

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25. Film badges are obtained monthly from Landauer. Prior to April 1964, Traceriab film badges had been used. Result were reviewed and it was noted that the usual level noted was 10 to 30 mrem/month. Prior to April 1964, when using Tracerlab badges, nothing detectable had been reported. In addition, bicassays have been performed annually

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which include a gross beta minus K-40, enriched uranium, and a gross alpha determination. These were inspected and it was noted that records have been maintained for W. Condo, D. Miller, L. Dotz, P. Sulava, C. Rupert and K. Mitchell. Results were noted as follows. For gross beta minus K-40 from 0 to 800 dpm/1, for enriched uranium 0 to 10 dpm/1, gross alpha from 0 to 40 dpm/1. 21

#### Records

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26. Records have been maintained of receipts and shipments of materials, waste disposals, film badge and bioassay results as well as mesults of smear surveys and of air particulate evaluations. No leak test of Pu-239 sources have been made.

#### Review with Management

27. At the conclusion of the inspection results were reviewed with Mr. Francis Cain, Jr., General Manager of Nuclear Decontamination Corporation. At which time it was pointed out that the actual supervisor at the present time of the facility as far as the day-to-day operations were concerned was Mr. Rupert contrary to License Condition 12/paragraph 4) and that leak tests of the Pu-239 sources had not been performed as required by the license (paragraphs 5 and 18) Weekly surveys have not been made time contrary to procedures, (paragraph 12) Also, as no evaluations of the isotopes or of their concentrations had been made, it appeared that the would have to be made levels of liquid waste released to the unrestricted river exceeded those permitted by Part 20, paragraphs 22 and 23) It should be noted that this licensee on December 11, 1964 had requested authorization to release into the river effluents at concentrations in excess of the limits of Part 20. By letter dated February 17, 1965 had been informed, the request had been denied because all of the information required had not been submitted. Barry indicated that he felt that the denial had resulted from consulting state authorities and that he had hoped to obtain permission from the Commission and use this to force the state to authorize the release of increased amounts as well. He stated that NUMEC had used this approach several years earlier in regard to their source material license. The surveys concerning evaluation of air-28. Rupert seemed quite capable to supervise decontamination is any rypul to the supervise decontamination is any rypul to the

28. Rupert seemed quite capable to supervise decontamination faundry. However, it appears that the difficulty of this licensee will hinge on the second willingness to provide some type of assay of this liquid waste effluent and/or the willingness to perform the necessary dilutions to comply with provisions of Part 20 as well as performing adequate surveys to prove compliance with 20.103(a) and 20.106(a) for air particules.

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## JAN 19 1968

Ext. 283

Mucloar Materials and Equipment Corporation Apollo, Punneylvania

Attention: Dr. L. Mapiro, President

Gantlamm:

This letter relates to the discussion Mr. Lorens of this office held with Dr. Shapiro on Movember 9, 1967 following the inspection conducted on October 23 - 26, 1967 of the activities authorized under ABC MyMroduct Material License Mumber 37-6456-8.

It appears that certain of your activities were not conducted in full compliance with ABC requirements, and conditions of the license. The items and references to the pertinent requirements are listed in Item 5 of the attached Form ABC-592.

Who purpose of this letter is to give you an opportunity to mavise us in writing of your position concerning these itsus, of any stope you have taken or plan to take with respect to them, 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.

Maculd you have any quastions concerning this matter, you may com-

very tray yours,

Robert W. Elrkonn, Mrector Region 2, Division of Steplines

Astachmant Form ANO-598

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# UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF COMPLIANCE

· For 190-592 (7/67)

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LICENSER	2. REGIONAL OFFICE	
MUCLEAR MATERIALS AND EQUIPMENT COMP. Apollo, Pennsylvania	U. S. Atomic Energy Cosmissio Region I, Division of Complia 376 Madson Street New York, New York 10024	
LICENSE NUMBER	4. DATE(8) OF INSPECTION	
S7. 10 Store The following activities under your license (identified in Iten or license requirements, as indicated.	n No. 3 above) appear to be in noncompliance w	th AEC regulatio
Contrary to License Condition 15, forth in the August 16, 1967 appli of these procedures were not follo	which requires procedures set cation to be followed, several wed:	
a. Cobalt-60 calibration sou 2 curies were not possess bration of survey maters tion 10.5.2.1.2.3 of the	rees of 10 milliouries and ed at the facility and cali- was not as se forth in Sec- application.	
b. Not Cell Mamber 1 was ope an air pressure different water, as required by Sab	reted to process cohelt-60 with iel of less then 0.4 inches of le 6.3 of the application.	
0.4 C. Access to the messarine a redistion levels existed equipped with an absolute Section 10.4 of the appli	rea over the hot cells, where up to 300 mr/hr, was not integrity look as required by catito.	
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applementary page attached	Malter B. Lorens	1/17/68
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UNITED STATES GOVERNMENT Memorandum

TO

THRJ: R. S. Cleveland, Senior Radiation Specialist DATE: January 18, 1968 Region I, Division of Compliance

W. R. Lorenz, Radiation Specialist FROM Region I, Division of Compliance

SUBJECT: NUCLEAR MATERIALS AND EQUIPMENT CORPORATION QUEHANNA, PENNSYLVANIA LICENSE NUMBER: 37-4456-8 (INSPECTION OF 10/23-26/67 and 11/9/67)

#### Inspector's Evaluation

In the inspector's opinion, the facility as existed during the period when the Martin Company operated the facility is essentially the same as currently used by NUMEC. Although the operations currently culy involve encapsulation of Co-60 in Cells 1 and 2, and only on a day shift basis, it appears to the inspector that additional staffing of the facility is in order in that the licensee plans to expand the use of the facility in the future. As of this inspection, there is no plant manager nor resident administrator. In addition, no plant safety committee, as such, functions at the Quehanna site.

Individual users for the licensed material drive to the facility from Leechburg, Pennsylvania, when such isotope work will be conducted. However, when no isotope work is in progress, just the minimal operating staff is left at the facility to do routine work and maintain the equipment in readiness. Since the NUMEC takeover in September, only one HP technician has been on the site on a continuous basis. HP assistance has been periodically loaned to the facility from either their Apollo or Leechburg facility. Such multiple use of personnel leaves these other facilities understaffed for the period in which they are used at the Quehanna site.

A new resident HP has accepted work and will report to work on November 6, 1967. This will help alleviate some of the HP burden on the HP technician. (Subsequently, in December, R. Caldwell informed the inspector that the new resident HP had been fired early in December.) In effect, there are only two hot cell operators at the facility. These hot cell operators will, as work progresses, become supervisors. One is for the hot cell work and the other is for the irradiation work proposed for the facility. It is the opinion of the inspector that much work is to be done to make the plant operational on an organized fashion.

Currently, the work, though small, requires the full attendance of the



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people at the facility and established procedures and routine systems have not been able to be fully developed prior to such productions. It is the inspector's opinion that NUMEC expects the operational procedures will develope as the work load increases. Thus, NUMEC expects to establish good health physics procedures, policies and routines, as operations grow instead of just prior to operational growth.

The facility will be reinspected in the latter part of February as is the policy for inspecting Priority I licenses.

One factor on the plus side of the new licensed uses at the Quehanna facility is that several of the former hot cell operators have been re-employed by NUMEC at this facility. These persons are familiar with the facility and its systems, and less time would then be required for training of persons prior to operations.

It is the inspector's opinion that no immediate hazard is apparent at the facility. However, the facility will be under the continuous observance of personnel from this office. lease for the first five years, then a five year renewable lease. NUMEC, per the contract, has control of the Quehanna site and a radium of approximately 1 mile from the site center. This area is posted as a restricted area with no trespassing or stealing allowed signs at 100' intervals, about the distance of 1 mile radium from the facility. The immediate area of the hot cell facility is cyclone-fenced and all entrances locked to the immediate facility.

#### Organization

2. The organization which will eventually be in effect at the Quehanna facility is as indicated in Figure 4.1, Organizational Chart, of the licensee's operating manual. The following information was obtained from Caldwell and Egarlats. The Corporate Hazards Review Committee includes the following persons: L. Weber, Karl Puechl, Roger Caldwell, and F. Foster. This corporate committee for NUMEC operates from the main office in Aprilo. The personnel at the Quehanna facility are as follows:

> Acting Plant Manager - T. Vizzini Plant Safety Committee has not yet been established Resident Administrator has not yet been assigned to the Plant Plant Safety Committee duties are assigned temporary to the following from the Leechburg facility:

Dr. Fisher

- Mr. Roth
- Mr. Zambernard
- Mr. Potter

This committee will be superseded by a Flant Safety Committee when the Quehanna Specility is sufficiently staffed with personnel. Currently, procedures at the Quehanna facility are drawn up by any of the following persons: Miles, Sgarlata, Vizzini or Roger Caldvell. These procedures are then reviewed

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by M. Stein, Manager of Radiation Process Development, assisted by Dr. C. Caldwell of the Leechburg Plutonium facility. The procedures are then saumitted to the Quehanna temporary Safety Committee for their review and approval and are then sent to the corporate committee for their final approval.

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 The operating personnel at the Quehanna facility, according to Sgarlata, are as follows:

- R. Duff Operations Supervisor\*
  W. McKimm Operations Supervisor\*
  Spencer Campbell Hot Cell operator
  E. Dunn Maintanance
  E. Helm Machine Shop Technician
  R. Kelly Janitor
  P. Hodge Secretary-receptionist
  Don Sgarlata Irradiating Operations Supervisor
  J. Miles Hot Cell Supervisor
  George Paul Welding and Loading Supervisor
  J. Andrecjik Instrument and Electronic Repairs Techincian
  J. Campbell Health Physicist Technician
- 4. A resident Realth Physicist has agreed to accept employment at the facility and was scheduled to report to the facility on November 6 to assume resident health physics responsibilities. (R. Caldwell informed the inspector during a 12/12-14/67 inspection of the Apollo facility that the new resident health physicist at this Quehanna facility was fired early in December and that the position is again vacant.

\* When sufficient work comes to the Quehanna facility, one person will be assigned as Cell Operations Supervisor, andthe other as the Irradiating Operations Supervisor. 5. Former Martin-Marievts personnel from the Quehanna site now employed by NUMEC are as follows: Duff, McKimm, Campbell, Dunn, Helm, Andrecjik, and Campbell. These persons are serving NUMEC in the same capacity in which they were employed by the Martin Company. In addition, Roger Caldwell stats! that NUMEC has hired, but does not have on board, t imager of Radiation and Process Development to work for the company. This person will be located at the Quehanna site and is Dr. Taylor from the University of Virginia.

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#### Facilities

6. The inspector observed the facility at the Quehanna site to be as reported in the licensee's Facility Description and Radiation Safety Program manual. The hot cells and air handling system are used by the Martin people when Martin operated the facility. The facility has been decontaminated me and a report of this decontamination is as shown in the licensee's backup for his license. This survey was made during the period April 24 - 26, 1967. The cells to be used for the licensed Co work at the facility will be Cells 1 and 2, according to Caldwell. Currently, under this license no use is planned for cells 3, 4, and 5. The only major change in the facility is the installation of continuous air monitors. NUMEC has two CAM units for air sampling; one for the service area and one for the stack echaust.

#### Pre-Operational Work

- 7. NUMEC personnel first arrived at the facility on 8/22/67. Prior to operations at the facility, work was conducted to establish the facility in a working order for the licensed work. This work, according to Caldwell, included the following:
  - 1. An inventory of all equipment
  - 2. A check-out of all equipment

- 3. A contamination and radiation survey of Cells 1, 2, 3, 5, 6,; Cell 4 was not entered. (Cell 6 is unused cell located below Cell 1.)
- 4. Set up of equipment in Cells 1 and 2 only for the licensed work.
- Survey of Cells 2 and 5 using a 35,000 Ci Co-60 source as received in a shipping cask. This survey was made to comply with License Condition 16.
- Receipt of the shipping cask at Quehanna was on 9/15/67 along with a sealed irradiation source possessed by NUMEC under a different license. See paragraph 27 of report.
- 7. Install under license 37-8467-3, the irradiation set up, cinderblocks, shielding and conveyor system for the irradiation work. This setup is located in the beam room by the reactor.
- 8. A general cleanup of the facility.
- 9. Conduct air flow surveys of Cells 1 and 2.
- 10. Check fire extinguishing equipment at the facility.
- Proceed with dry runs for the preparation to load Co.60 capsules. These dry runs were conducted on 10/20 and 10/21, in Cells 1 and 2.
- 12. Set up emergency procedures with Dr. Wechsler, Presbyterian Hospital in Pennsylvania, with an attending physician (Dr. Howell) at Clearfield Hospital. A visit to Clearfield Fospital by the inspector indicated that the hospital personnel had no knowledge of such a setup through Dr. Howell. Dr. Howell was unable to be contacted at this visit.
- 8. The contamination survey made by R. Caldwell, T. Potter (RSO, Leechburg) and E. Swell (Foreman, H&S, Apoulo) as indicated in Item 3 above, essentially confirmed the closeout survey made by this office at the termination of Martin's license, according to R. Caldwell and E. Swell

9. The highlights of the radiation survey made of Cells 2 and 5 are referenced

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in paragraph 7(5) above, indicated the following: The Cell 2 survey made on 10/9/67 using a 35,000 Ci, Co-50 source, assayed on 8/67, indicated radiation levels at the center of the window of 3.5 mr/hr maximum at the manipulator ports; 25 and 50 mr/hr at the Cell 2 roof plug; 600 mr maximum. The Cell 5 survey was made using the same Co source as was used in the Cell 2 survey. This survey was conducted on 9/19/67. The maximum level at the Cell window was 200 mr/hr and the maximum level at the Cell 5 roof plug was 500 mr/hr. Caldwell, from his survey, had concluded that Cell 5, having 2" thick concrete walls, is unable to contain 35,000 Ci of Co-60 and as such tends to limits the cell for use with approximately 1000 Ci of Co-60. See letter **us** Caldwell to DML dated 10/30/67.

- 10. License Condition 16 states that after installation of the Co-60 in the hot cells, a radiation survey shall be conducted to determine that the maximum radiation levels in each area for joining the cells. A detailed report of the results of this survey shall be sent to the Isotope Branch, DML, no later than 30 days following installation of the source. A copy is also to be sent to CO:I. The survey report distance dated 10/30/67 was received by CO:I and HQ.
- 11. According to Caldwell, his felling is that Cell 2 has demonstrated its capability of holding and containing the 35,000 curies of Co and yet not have excessive levels or radiation in **marks** other adjoining areas. Caldwell assumes that Cell 1, which is designed the same as Cell 2, would also be capable of containing 35,000 Ci of Co. Cell 5, having only 2' thick high density walls, has not capability of holding 35,000 Ci of Co. He is proposing to limit the cell to a maximum use of 1000 curies when such use becomes necessary.

#### Operations

12. On 10/24/67, the licensee commenced Co+60 encapsulations for the production

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of irradiators. The material received at the facility on 9/19/67 was assayed at 35,300 curies of Co-60. The material was received from GE Vallacitos. The material was in two forms; one of 10,000 curies of 4.5 curies of Co-60 per gram of Co metallic pellets coated with nickel; the other quantity of Co in a separate container was approximately 25,000 curies at 22.5 curies per gram of Co. The first source irradiator to be made is a 5000 curie irradiator for the U.S. Army Quartermaster Corps in Massachusetts. The capsules are to contain 30 individually double encapsulated sources, according to Sgarlata. The first loading of the first tube was observed by the inspector. The only problem encountered was that of assaying the first capsule for activity. The procedure included placing a Victoreen ion chamber through the alpha port in Cell 1 to obtain a measurement from a specified listance from the capsule. Several entries into the isolation room were made to finally assay the capsule at the specified activity. The work is performed on a large s/s table in a large white porcelin pan such that should a pellet go astray, it would be more easily located against the white porcelin. During the initial unloading, the dusting from the pellets was noted. Sgarlata stated that the pellets were to be washed prior to shipment. Only one or two small flakes of material appeared in the white procelin inner tray as a result of the first unloading. A radiation survey made by the inspector of the Cell 1 window indicated levels of less than 0.1 mr/hr. First observations by the inspector indicated that no problems are apparent in their cobalt encapsulation. Only one minour change in the procedures would pr we beneficial in the inspectors opinion. That is, the unloading of the shipping container into the cells, via the isolation room that rather than loading through the cell roof plugs. This was discussed with Sgarlata, the Supervisor in charge, and it appears that future loadings of the shipping containers into the cells will be done through the iso, will room rather than the cell roof plug. Pressure differentials during the operations were noted and are as follows;

-7-

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	AP ID. OI WALL
Cell 1 to Isolation 1	.1
Cell 2 to Isolation 2	.2
Cell 3 to Isolation 3	.41
Cell 4 to Isolation 4	.45
Cell 5 to Isolation 5	.02
Cell 1 to Operations area	.35
Cell 2 to Operations area	.41
Cell 3 to Operations area	1.00
Cell 4 to Operations area	.94
Cell 5 to Operations area	.69

13. The operating procedures for cells per the licensee's manual states that the cells to operating area pressure differentials shall be maintained at a minimum of .4 inches of water (except Cell 4). During initial operations of Cell 1 with the Co on 10/24/67, the Cell to operation area pressure differential was less than .4 inches, that is .35 inches. This was observed by the inspector and brought to the attention of the my supervisor. The pressure differentials for Cells 1 and 2 were adjusted by opening the fan vortex for each cell in the fan rooms. After Duff adjusted the vortex, the cell to operating area pressure differential indicated .45 inches of water and cell 2 to operating area pressure differential indicated .5 inches of water.

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anarching to Sycilate 14. To date the operations at this facility have been on a one shift basis, five days per week. The facility, at the close of the day, is locked by NUMEC personnel.

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## Health Physics Routine

15. In an effort to retermine the health physics required at the facility, a review was made with John Campbell, the HP technician, at the site, of his routine at the facility. Campbell replied that his daily routine included the following. Collection of nine mir sumples, changing air samples, counting and recording the results, smearing the operational area, counting and recording the results, reading Hayes Gauge readings of the filter pressure differentials on a daily basis and recording the results, collecting composite water samples for weekly analysis and radiation surveys of the areas in the service area and as necesary in isolation and operating areas, maintaining a log of his activities, maintaining an instrument daily check for his scaler type equipment. In addition to this, Campbell is on call for any entries by operating personnel into high radiation areas, such as isolation rooms and cells. In addition to the above, Campbell, on a weekly basis, smears the entire facility, counts and records the results and direct surveys all the facilities. On a monthly basis, the creeks about the area are sampled and analyzed for activity as is the gamma storage pool and reactor storage pool. Instruments are to be calibrated on a monthly basis and waste tanks sampling is to be done on as needed basis.

16. The above routing has been in effect since the pre-operational work at the facility as of NUMEC's takeover of the facility since approximately 9/1/6%.

#### Instrumentation and Calibration

17. The following survey instrumentation 's available at the facility:

#### Portable

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1 Jordan Rad Gun, 0 - 10 Kr/hr, Mode. AGB-SR-10KE

1 Nuclear Chicago 2612, MAI Side Window GM Survey meter range 0 - 20 mr/hr

l Precision Radiation Instrument, Model 111B, Deluxe Scintillator, O - 5mr/hr

Low Level Bench Monitors

1 Atomic Scaler Model 1095 with an end window GM tube in a lead mix pig

1 NMC Model PC-3A proportional counter.

#### Lab Type Count Rate Meter

- 1 Muclear Chicago
- 2 Trace.
- 1 RIDL

#### Continuous air Monitors

2 Tracerlab, one with fixed filter; one with moving filter

According to Campbel', a NUCOR CS-40A portable survey meter and an Eberline E-500 B portable survey meter have been ordered.

18. According to their manual, Section 10.5.2.1.2.3., one two curie Co-60 source will be used to calibrate the survey meters and one 10 MCi source will be used to check the portable instruments for proper functioning. At the time of this inspection, prither of these two instruments was available for such calibration at the facility. The only sources at the facility for calibration or instrument check were as follows:

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1 - 25 mCi Ra-226 sealed source, assayed on 8/66 and one home-made 53,000 dpm Co-60 standard and one 16,000 dpm Sr-90 standard, manufactured by Eberline, Model SD-2.

#### Air Sampling

19 22. The air sampling program at the facility was only recently started approximately 2 to 3 weeks ago. Samples are collected by various means from various locations, the resulting being recorded by John Campbell; the various areas from which air samples are collected are as follows:

- The 24 hour sample is collected from the main stack and has read less than 10<sup>-12</sup> uCi/ml since starting.
- 2. From the service area using a continuous air monitor operating on an 8 hour per day basis, the levels have indicated less than 10<sup>-12</sup> uCi/ml, scept on one occasion, 10/25/67, in which the results indicated 4.18 x 10<sup>-10</sup> ut./ml. John Campbell immediately took a 6 minute high volume air sample of the service area and obtained the results of 53 x 10<sup>-12</sup> uci/ml.
- Cell 5 using an 8 hour per day in place filter, results continuously less than 10<sup>-12</sup> uCi/ml.
- Cell 4 collecting an 8 hour in place sample, results indicating background to a maximum of 5 x 10<sup>-12</sup> uCi/ml.
- Cell 3 using an 8 hour in place filter, "esults continuously less than 10<sup>-12</sup> uCi/ml.
- Cell 2 using an 8 hour in place filter, results indicated background
- Cell 1 using an 8 bour in place filter, results indicating
   less than 10<sup>-12</sup> uCi/ml.
- 8. The Decon room 8 hour in place filter, results less than 10-12

-11-

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9. Chem Lab - 8 hour in place filter - results less than 10<sup>-12</sup> uC1/ml
 10. Operations Ares - 8 hour in place filter - results less than 10<sup>-12</sup> uC1/ml

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20. According to Campbell, each of the in place filter samples are collected using a m vacuum pump drawing air through a Whatman 41 filter paper which is in series with an air flow regulator, measuring air flow through the filter paper. These filters are left in place for the specified period of time and then counted the following day. Samples are changed daily.

#### Locking System

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21. License Condition 14 exempts the licensee from the requirements of an interlock system per Section 20.203(c)(2), of 10 CFR 20, in lieu of an administrative procedure and locking arrangements as described in Chapter 10 of the manual. In the facility, all areas were noted by the inspector to be locked as prescribed, unnight action except as noted below. These locks are specially designed to be sold by the Best Company, according to Caldwell, with the guarantee that no person may order locks and tumblers, except those designated. The only exception noted during the inspection was the gate lock to the mezzanine over the cells from the service. This gate did not have any lock control. The radiation levels over Cell 1 at the time was 300 mrad/hr on contact with the Cell 1 roof slab, according to Campbell's survey reports. Caldwe'\_1 agreed ti t whole body radiation levels in excess of 100 mr would be seceived in one hour in this area, and agreed to install a lock on the memmanine door. Other general levels over the isolations and cells in the wirvice area were generally 1.5 mr/hr. Access to this area is required to 'e locked per their procedures.

Ricessays

22. Caldwell said he is attempting to establish a urinalysis sampling program for

-12-

personnel at the Quehanna facility. The program is as stated in the manual, Section 10.5.2.1.2.2. To date, urine samples have been collected by the linear from all persons, however, no results have been received as yet, on the samples taken. No fecal sampling is anticipated as jot. The manual, pertaining to internal dose evaluations. speaks not to fecal sampling but to whole body counting at Presbyterian Rospital in accidental exposures. No accidential overexposures have occurred to date.

#### Emergency Pr meaures and Equipment

John Campbell, since the start of work at the facility, has tested the emergency alarms on a weekly basis and records such tests. During this inspection, we upannounced emergency alarm was set off, such that personnel were required to evacuate the facility. All persons evacuated the facility, however, two persons evacuate via the south of the building and the remainder via the main north entrance to the facility. Asthough During this unannounced evacuation, no emergency equipment was removed from the building for use upon re-entry and no emergency equipment was available for removal.

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The sugarboy mater that The company has available a trailerlocated in the rear of the facility which was fully equipped for emergency procedures when the Martin Co. operated the facility. However, pince they left, this trailer has been stripped of all its equipment. NUMEC has not as yet re-equipped the trailer for such emergency uses.

### Additional Information

. At this facility, the University/Pennsylvania has under its control in one

-13-

locked vault, a reactor mane fuel which has been dirradiated. The labeling on the door to the vault states that 5.24 kg of U-235 are stored in 30 fuel elements as of 9/22/65. An emergency call number and name is also posted on the door. The vault door is locked and the key is controled by Penn State University. Caldwell said this fuel is in the process of being transferred from Penn State's control to their (NUMEC's) control the approprint literating a Time a range tid.

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- 6 25. Core 1 fuel which was slightly irradiated, was shipped to Savannah River on 8/23/67, according to Caldwell. This fuel was also licensed to Penn State University.
- As previously mentioned the licensee has installed at the facility in the beam room area of the reactor, an irradiator containing 40,000 C1 of Co-60 and 12/66. This irradiator has been set up for possible future use on a job irradiation basis. This irradiator is licensed to NUMEC for use at any of their facilities under License 37-8467-3. No inspection was made of this license at the time of this visit.

According to Caldwell, the future of the Quehanna facility in the use of radioisotopes, appears that within 6 months to 1 year, they expect to request an amendment to their license for a large irradiator for use in the reactor pool. In addition, they have future plans for doing post irradiated plutonium fuel studies in the cells of the facility. When such work will be done appropriate license amendments will be made.

Items of Noncompliance

incense condition 16 requires a redisting survey be made of the educed

#### Management Discussion

- 29. On 11/9/67, a management discussion was held with Dr. Shapiro and others regarding the inspection. Shapiro agreed with the items of noncompliance and assured the inspector that the two remaining noncompliance items would be corrected.
- 30. In addition, the staffing of the facility was discussed with regard to Rp personnel, and operational personnel. Shapiro assured the inspector that several of the unfilled organizational positions were being finalized and on board shortly and the full staffing of the facility was actively being negotiated.
- 31. Regarding HP instrumentation, Shapiro assured the inspector that instrumentation, in addition to that mentioned in the report, was on order and would be available for use at the facility by the next inspection.
- 32. Regarding the lack of emergency equipment, empty emergency trailer, emergency food, etc, Shapiro agreed these items were valid considerations. He said appropriate attention would be given to equipping the facility for all such emergencies and max expected this to come about as full staffing of the facility was reached.

#### Items of Noncompliance

Item a - See paragraph 18 Item b - See paragraph 13 Item c - See paragraph 21 z.

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JUI: 4 1968

COIXIWEL

MUCLEAR MATERIALS & EQUIPMENT CORP. Apollo, Pennsylvania

Attention: Mr. G. Taylor, Flant Manager, Quehanna Facility

Gentleman:

This letter relates to the discussion Mr. Lorenz of this office held with Mr. G. Taylor on May 2, 1968, following the inspection conducted April 29 - May 2, 1968, of the activities authorized under AMC Byproduct Material License No. 37-4456-8.

It appears that cartain of your activities were not conducted in full compliance with ABC requirements and conditions of the license. The items and references to the pertinent requirements are listed in Item 5 of the attached Form ABC-592.

The purpose of this letter is to give you an opportunity to advise as in writing of your position concerning these items, of any steps you have taken or plan to take with respect to them, 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 aptention 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

	DCC: CO:HQ (2)	w/back-up notes
OFFICE P		LORENZ: MAZ NELSON KIRKMAJ
SURNAME ME. B. BILLEY,	Manager, Research & D	evelopment, w/attachment
DATE	U.S. BOVERHMENT PRINTING OFFICE (1860-0-214	NT NY

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# UNITED STATES ATOMIC ENERGY COMMISSION

BRELEAR MATERIALS & BOREFORME CORPORATION Apollo, Ponnsylvania	U. S. ATOMIC BRERAY CO Region I, Division of 970 Brand Streat	Compliance
LICENSE NUMBER	A. CHIMMENTAS HEAVENDERENT	7102
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Contrary to Linemas Condition 15 forth in the August 16, 1967 app these procedures were not follow	i which requires procedure plication to be followed, red:	s sat two of
A. In that no remident health ; facility as required by sect	mysicist is employed at t tion 4.4.2.1 of the syplic	he stion.
S. In that control of access to required by section 10.4.1	the operations area is a sf the application.	ot as
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Nuclear Materials and Equipment Corporation

. 48 655

Apollo, Pennsylvania 15613

Telephone 412-842-8111

Cable NUMEC

June 14, 1968

Mr. Robert W. Kirkman, Director Division of Compliance, Region 1 970 Broad Street Newark, New Jersey 07012

54.97 200

Subject: R. W. Kirkman's June 4, 1968 letter to NUMEC

Dear Mr. Kirkman:

This is in answer to your letter of June 4, 1968. We were concerned about the items of non-compliance listed in your letter and investigated them to eliminate recurrences. Our investigation shows the following facts on each of the items.

- A. We changed the Radiation Safety Officer from R. Caldwell to A. Breuer in our March 1, 1968 letter to the Division of Materials Licensing. A resume of his training and experience was attached to the application. We received approval of our application on March 15, 1968. Mr. Breuer has been in residence during periods of operation at the Clearfield Facility since then.
- B. Section 10.4.1 of our August 16, 1967 application indicates that all access to the Clearfield Hot Cell operation area must be only through the change room area. This operation area is not a contaminated area. Therefore, protective clothing is not required, and a change line need not be crossed to enter. At the time of the inspection, an alternate door was being used. Although this does not constitute a violation of change line procedure, we recognize that the license is so worded that the door may be used only for emergency exit. We have stopped using the door and are using the approved operation entrance exclusively. We will continue this way until we apply for and receive approval for the other entrances.



A Subsidiary of Atlantic Richfield Company

10. 111

# Mr. Robert W. Kirkman

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June 14, 1968

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If further information is desirable please call on us.

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Very truly yours,

Rogen Caldwell

Roger D. Caldwell, Manager Health and Safety

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JUN 4 1968

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BUCLEAR MATERIALS & BOULFRENT CORP. Apollo, Penneylvania

Attention: Mr. G. Taylor, Plant Managar, Quahaama Facility

Cleme La main :

This letter relates to the discussion Mr. Lorenz of this office held with Mr. G. Taylor on May 2, 1968, following the inspection conducted April 29 - May 2, 1968, of the activities authorized under ABC Byproduct Meterial License No. 37-4456-8.

It appears that cartain of your activities were not conducted in full compliance with AMC requirements and conditions of the Linempe. The items and references to the partiment requirements are listed in Item 5 of the attached Form ANC-592.

The purpose of this letter is to give you an opportunity to advise te in writing of your position concarning these items, of any stand you have taken or plan to take with respect to them, and the date all corrective action was ar 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 aptention in our further evaluatime of this matter.

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

VERY SEULY YOURS,

Babart W. Kirkman, Director

Attantament : PARM ABC-592 bcc: CO:HQ (2) w/back-up notes

COMPLIANCE LORKSE : MAR MILLSON KIRKMAN

ce: Dr. Shapire, President w/attachment 6/4/68

88-11180280 IF

Mr. R. Smiley, Managar, Basearch & Development, w/attachment

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TAN NO

Form A \$00-669 (6-68)

1250311188-

# UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF COMPLIANCE

required by section 10.4.1 o	f the application.
facility as required by sect	ion 4.4.2.1 of the application.
A. In that no resident health p	aysicist is employed at the
forth in the August 16, 1967 any these procedures were met fallow	lication to be followed, two of
r license requirements, as indicated.	
The Wio and Well Mies under your license (identified in Item	No. ADELL 28 too Mayon Long Los Brith AEC regulati
Apollo, Pennsylvania	970 Bread Screet
Corpora 7 lon	Region I, Division of Compliance
MUCLEAR MATERIALS & BOUIPHENT	U. S. ATOMIC EMEMOY COMPLESION

P. R. Nelson, Senior Radiation Specialist Region I, Division of Compliance

June 7, 1968

W. R. Lorenz, Radiation Specialist Region I, Division of Compliance

INSPECTOR'S EVALUATION NUCLEAR MATERIALS & EQUIPMENT CORP. APOLLO, FENNSYLVANIA LICENSE NO. 37-4456-8

-8811180284 MPP

In the inspector's opinion, the licensee is slowly gearing up in personnel and activities to effect a large scale operation.

The health physics staff has increased threefold, but is still lacking a resident health physicist. It is felt that the size of the operation at this facility dictates the need for a resident health physicist. The function is currently being covered on an interma basis by Ted Brener, the health physics hot cell technician from their Leechburg facility.

As yet, the facility isotope committee has not yet been formed but should come about shortly.

Since the last inspection, the major advances at the facility include obtaining adequate health physics instrumentation, health physics staffing, a plant manager, and additional operating personnel.

The future ( $\sim 6$  months) plans call for installation of a 4 megacurie irradiator and post irradiation fuel studies. The facility is expected to grow substantially.

Currently, no hazard is apparent in their operations but the facility bears close watching. The facility will be inspected on a three times per year basis.

· River to our prom 2.5 i gat Jaler Back up for 592 Part 30 Suspection - Zi 20 37 - 4456 - 8 (Quehanna) APOLLO PA April 29, 30, May 1,2, 1968 announced Biniscetor Rateo Inspection derson becom ranging low pecto. Busons Contacted . Stat Dept of Health. George Faylow Plant Mgr. Leaf Brener action Health Physicist J. Campbell .- N.P. Sectucia Other persons lacated at guelanna Site 1 port Details Premains newcomplia es Round the initial instaction of this facility conducted in Octobe 1967, there ilem of noneoffic were noted withich resulted in a 592. The licensel was infairied of the noncompliance by dated 2/15/68. The first noncomplicity related to failing to

sources, to which the licensel informed this office of that a 25 mg have power man powerded inspection The becard noncompliance involved the differential less the geofier. Daring this licensed limits . The Third noncon shares invalued, the lacken I the access lastoles to the meganine when light radiation levels whisted. Doing this impedia the access lastoler was noted looked. Scape of the operations to date, personal monitory status of famility personnel stoffin, millant an encentration, anterity are liphant an remetter, material on land broassonp, the material on land broassonp, instruction enlegency remponent, health physics instruction

ananization Since the fait inspection the license has bired and filed a resident health shipiaist and is surrently lacking a built alipireist as required by beine. Mr. George Faylor is now employed so the Plant manager assisted to Mr. J. Barty, Project enqueer. The establishment of a Regardos committes is still in the maken and its function carriently is somered by the two major operations at the facility the jes. tat cell opuation and machiation opuation are now obvided between two former Martin employees, WM Kim and R. Daff respectively. m Gimian is essisted by two fot Celloquations and buff is assisted by several intertion leadnicians The health physics arganization although still lacking the required resident bealt shypicist as required in section 4.4.2.1 of the beensel operating manual, has increased in staff. In ac interin fairs, ted Brener forment the hat sell technicia at the platomin facilet,
4) is substitution as resident health physicant with a qualified health physicial can be hied bee minimin requirements for resident health physiciat is Section 4.4.3.1 of lyeat manuald. In addition to John Comphell, a new H.P. Jelian Dennis Derichak was bired on 4/20/18. The reall Physics stoff at the facility is ensenth three persons, a three fold increase since the last inspector a Dennis Demekah is a high school quadrate with 2 years ling service in the medical corp. He has had no previous. health physics thaining . aperntion The dost elle asuations since the fast infector were rounde reviewed with W. M. Gening In november 1967 some loading, relating decontamination, salibiation, and lead thating of someses to be loaded in a 5000 pi - Co- WRI-300 mischistion was some in addition to proceeding appropriately 25,000 pi, of contractional Co to. In Necember, a second 37,000 puil NRI-300-2 isractiator was loadled with bes - caparles as well as & 5000 curis loading of dURI-300-1 madiely

The ail in hat cell 1 viewen window was also changed. In January, three shisments of 40,000 29,100, and 31,000 care of lo 60 were received from S. E. Valiceotos. The 40,000 and 29,000 separates were unleaded into protente NUMEC cartisfor stores in al 5000 cuil NRI- 300-3 preachator was loaded. In televery coprile were made for the NUMEC Buterin Pool Inadiator (NIPI) were made. The last A. E. cobalt shipment was unloaded a The NRI-300-2 unactiates was unloaded and loaded sweed time so as to work out operational proplems associated at with This inadictor . In march, final capsalles were made In from the S. C. alignents and loaded into the NIPI unadiator, tatal anies 100,000; heared finit 150,000. Het cell are was decontaminated. on 3/29/68, a . Yos ci lo " amuel was made for N.B.S. and is carrently in storage awaiting stipment. 20,000 to of Co- 60 mas received from NUME Copollo, sealoaded and stared at the facility . In spil, unloading and beding of the NRI-300 -2 irractictor was above soi further attempts to debug this mediator Att the The flat sell windows of lell 2 were removed

) ..... D. for cleaning Material Bu Hand to of this inspection the linet bas on hand following quantities of Co-60. 100,000 caries in the 2171. an fulles -" NUMEC cath mathefeld 20,000 8640 in NBS. cash on stand. 463 37,000 " in NRI. 300 establisher 188 In addition to the above the licence also possessons three 3 uc & 90 sealed sources in Juden Radecters. Status of Facility Since the last importion the ficines has made son one change in the method of operating the facility. This change involves personnel access to the operating side of the lat cello, the operations area. Access to this area is I now Three non air lock doors from the office area. one entrance is to the relocated health physics office the other from an finer enoy int door

) ..... ----D .. to the operations area is in vealation of section 10.4.1 fitheir heene annended Facility Description and Radiation Safety Program manual. In addition the acciner has third and MMM antriale contractor to temporarily enlarge the hat sell # 3 door to that a sky box can plin The cell "3 door spining will be repared when installation is complete. The cell 3 S.O.T.S. dourcomer bas also been sealed. Radiation levels in cell 3 are low with madimen contact level at 2 milde. An concentrations staring this week are summing less than 5% of permissible Si 90 unalastle limits. tuture plans for this facility call for the installation of a 4 mejecurie co 60 inadietor in the larger parties of the all reactor pobl. begarding the small (40 bilocurie) co-60 food insolicitor fucescol under 37 - 8467 - 3, The license plane on discoverthis The Co- 60 for use in the main larger madiator. The new large inradiator will be ared for rovewood production, as is the NIPI. the state of the s and the second

101. In Plant an sampling In plant air samples are collected using an in part vacuum system. Samples are callected from the locations as indicated in Figure 6.2 of the much lising application manual. These focations are essentially the same as quated by the former tenents, Martin marcetta. a review of the sampling results indicate the concentrations below 10 % of the Si " insaladele persensinly limit. Samples to date have been callected on an & he pu day basis ( work is also single shift besid) . However in early may the license will start 24 hr sampling of the siglant sets. Ethant Sampling, 24 hour air samples are cullected from the main stack decontamination room exhaust, radiochenisal room exhaust and the west end of the building exhaust. Sample recalls to date have indicated less then 5% of the Si " insulachly permissible limit.

. Pirsonnel Monitoring . In addition to 0-200 me packet dosincters, The ferensel wir monthly Chester beto game film padys for personnel manitoring. AEG-4 and AEC-5 forms see maintained for all sessoned at the facility. a review of the the interties informes for the 4st quarter 1967 and the 1st quarter 1968. indicated thee high sparse The maximum heir 1.8n. all the personal exposed result indicate less the 50 ml gravita. Bloassays quarticly paris samples are rallected from all radiation weithers at the site. Samplesare sinching activitie. The first samples set and Specific Si 90 sample submittels are on file at the becerved apalle facility. The 1/68 sample results the indicated gross bets activities waring between 10-50 DPin/ land specific Sr- 90 pesitt are reviewed by R. Caldwell. as yet no action or quick points have been established based on wine results. Samples have been collected in 4/68 however no resulto have been received there

UT Enercheres The licensee has shown up a set of energing proceatures which have been sent to the Hadasards Committee for Their approval. hu general the topics concred in the procedures includy General Everyence Equipment, Skattown of sie Inline Exit Routhe, notification of greating action for verien personnel, & capy of this proceeding in in this officers filas. at In confunction with emergencing proceedures, the the license to finally gotten sound to equiping an emergency trailer. This Traily equipted will to own noto generator, is partied in the particing lat Equipment contained in the traily include tothe health physics instrumentation, and other associated emergency equipment. & somplete list of the equipt is on file with the detailed energency procedures. syster is performed weeks on Fridays by & Carptak

1. Health Plepics Sustiementation. Since the last inspection the because has obtained the additional needed health physics instrumentation. The equipment currently on hand is a follows. One Eberline Teletector Thee Jordon Radectors 0-101 1/hi. Cherline E-400 0-200 melle. Luo. One Huclean Chicago 0-200 milhe p& punagmeter. One Oberline E-120 0-50 milhe. one " tas-Proportional alpha servey meter one Que Eberline, peter-gamina floor monitor. one Baria atomic scaler w/ Eberline, large Bue area gas-proportional alpha - beta detector. Gionic accessories sealers and country These Tracerlab Labritions. tour Victoreen Redocon Remeter w/ 10-30-100 One N/ minute propes. Victorie 444 for alpha - beta - farmer One -" addition to the above the licence also possives area monitors located throughout the plant.

Management Discussion buring this inspection the inspection meet with No. Shapiro, president, and Mr. S. Smeley, mgs. Research and Nevelopment. During This bisk meeting the inspector proposed soutine management summation meetings resulting from this and fature inspection with the local management, to which the Shapiro was aggreeable. However, should major puchlen arise, wack puchlers would be chicased directly with Ra. Shipiro. the Shapino and My Smilly requested that be apprised of the inspection results by Shone. This management pusimation problem arises only as a result of the plipical dutances between the NUMEC main office at spallo la and the quehenna facility. sametion and would if this inspection was held with Mr. Gelange Saylor, Plant Manager. The stews of noncompliance were pleased and he has aggreed to correct the nonconfling as soon as possible. Will regard to the

hering of a resident health physicist, Taylor hinsely the sompany an that farming such a puse tine ited by ompliances well ille 18 phone cal compliances, tinuer We state Lipsiai resident. have a deline on . and the second second second and the second Marine Marine · · · · · · · · · · · · · the state of the state of the



**Nuclear Materials and Equipment Cerporation** 

Apollo, Pennsylvania 15613

February 15, 1968

Telephone 412-842-8111

Cable NUMEC

Mr. Robert W. Kirkman, Director U. S. Atomic Energy Commission Region 1 - Compliance Room 806 970 Broad Street Newark, New Jersey

Subject: Items of Non-compliance, January 19, 1968 592 Form, By-Product License No. 37-04456-08

Dear Mr. Kirkman:

This is in reply to the items of non-compliance listed in your January 19 letter.

- a. The inspector was correct in stating that the Cobalt calibration sources were not at the site. Instead we are using a 25 millicurie radium source for calibration. We have applied for a license amendment to reflect this. After each calibration we now hold to the practice of placing a dated sticker on each instrument.
- b. The sub-permissible pressure drop in Cell 1 was corrected in the inspector's presence. A weekly verification check is carried out by the Health and Safety technician who notifies the operations supervisor when any ventilation adjustment is required. Operations personnel continuously monitor the primary ventilation indicators.
- c. A padlock and key was obtained for the mezzanine ladder the day following the inspection. The Health and Safety technician retains the key. No one enters the mezzanine area without a prior radiation survey by the Health and Safety technician. All individuals in this service area are provided with self-reading dosimeters so that continuous evaluation of radiation exposures can be carried out.

We appreciate the detailed concern of the compliance inspector for our radiation safety program and we have made an effort to correct the items brought to our attention.

A Subsidiary of Atlantic Richfield Company

Very truly yours,

Roge Caldwell

Roger D. Caldwell, Manager Health and Safety

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Bey 3-15-68

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Moslaws Materials and Equipment Corporation Apollo, Fennsylvania

Attention: Mr. E. Shapiro, President

Gaset3.comm.

This letter relates to the discussion Mr. Lorens of this office held with Dr. Shapire on November 9, 1967 fellowing the inspection conducted on October 23 - 26, 1967 of the activities authorized under ABC Hyproduct Material License Mumber 37-4456-8.

It appears that certain of your activities were not conducted in full compliance with ABC requirements, and conditions of the license. She items and references to the pertinent requirements are listed in Item 5 of the attached Form ABC-592.

The purpose of this letter is to give you an opportunity to advise us in writing of your posit're conserning these items, of any steps you have taken or plan to take with respect to them, 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 quastions concerning this matter, you may com-

Wary truly paterne.

Robert W. Elrisman, Edrector Region X, Division of Sompliance

Attachment Form ANO-598

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bee: CO:NQ (2), w/cy backup notes

Ext. 883

Fons AEC-592 (7/67)

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## UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF COMPLIANCE

NUCLEAR MATERIALS AND EQUID Apollo, Pennsylvania	PMENT CORP. U. C. Atomic Energy Commis Region I, Division of Comp	sion
And start and an an an and an an and an an an an and an	376 Hudson Street New York, New York 10014	118006
LICENSE NUMBER	4. DATE(S) OF INSPECTION	
The following activities under your licens or license requirements, as indicated.	se (identified in Item No. 3 above) appear to be in noncomplian	ce with AEC regulet
Contrary to License Conforth in the August 10 of these procedures we	ondition 15, which requires procedures set 5, 1967 spplication to be followed, severa ere not followed:	1
a. Cobalt-60 cal 2 curies very bration of su tion 10.5.2.	libration sources of 10 millicuries and e not possessed at the facility and cali- urvey meters was not as set forth in Sec- 1.2.3 of the application.	
b. Hot Cell Mumal an air press water, as rea	ber 1 was operated to process cobalt-60 wi ure differential of less than 0.4 inches o quired by Table 6.3 of the application.	th f
c. Access to the rediction lev equipped with Section 10.4	e mezzanine area over the hot cells, where vels existed up to 300 mr/hr, was not h an alsolute integrity lock as required b of the application.	Ŋ
applementary page	attached	1/17/68 Date
IIGINALI LICENSEE. COPIES: CO	EGION CO HEADQUARTERS CO-ENFORCEMENT	

THENJ: R. S. Cleveland, Senior Radiation Specialist Region I, Division of Compliance V. E. Lorenz, Radiation Specialist Region I, Division of Compliance

HERCIEAR MATERIALS AND EQUIPMENT COMPORATION QUERNAMMA PERMITIVANIA LECHNERE MURCHER: 37-4456-3 (INSPRCTICE OF 10/23-26/67 41 1/9/67)

#### Inspector's Evaluation

In the inspector's opinion, the facility as existed during the period when the Martin Company operated the facility is essentially the same as currently used by NUMEC. Although the operations currently only involve encapsulation of Co-60 in Cells 1 and 2, and only on a day shift basis. it appears to the inspector that additional staffing of the facility is in order in that the licensee plans to expand the use of the facility in the future. As of this inspection, there is no plant manager nor resident administrator. In addition, no plant safety committee, as such, functions at the Quebance site.

Individual users for the licensed material drive to the facility from Leechburg, Pennsylvania, when such isotope work will be conducted. However, when no isotope work is in progress, just the minimal operating shaff is left at the facility to do routine work and maintain the equipment in readiness. Since the MOMSC takeover in September, only one MP technician has been on the site on a continuous basis. MP assistance has been periodically loaned to the facility from either their Apollo or Leechburg facility. Such multiple use of personnel leaves these other facilities understaffed for the period in which they are used at the Quehanna site.

A new resident EP has accepted work and will report to work on Hovember 6, 1967. This will help alleviate some of the HP burden on the HP technicism. (Subsequently, in Eccember, R. Caldwell informed the inspector that the new resident MP h. Lean fired early in December.) In effect, there are only two hot call operators at the facility. These hot cell operators will, as work progresses, become supervisors. One is for the h hot cell work and the other is for the irrediction work proposed for the facility. It is the opinion of the inspector that much work is to be done to make the plant operational on an organize. fashion.

Currently, the work, though small, requires the full attendance of the

OPP

January 18, 1968

people at the facility and established procedures and routine systems have not been able to be fully developed prior to such productions. It is the inspector's opinion that MAMEC expects the operational procedures will develope as the work load increases. Thus, MFIS expects to establish good health physics procedures, policies and routines, as operations grow instead of just prior to operational growth.

The fagility will be reinspected in the latter part of February as is the policy for inspecting Priority I licenses.

One factor on the plus side of the new licensed uses at the quehanne facility is that several of the former hot cell operators have been re-employed by NUMEC at this facility. These persons are familiar with the facility and its systems, and less time would then be required for training of persons prior to operations.

It is the inspector's opinion that no immediate hazard is apparent at the facility. However, the facility will be under the continuous observance of personnel from this office.

-2-

Date: \_\_\_\_\_\_\_

#### BACK-UP FOR ABO-598

#### PARE 30 INSPROFICE

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BURLEAR MAPPRIALS AND ROUIPMENT CORPORATION 609 Burch Warren Avenue Apollo, Penneylvania

11a. No.: 37-4456-8

Entes of Inspection: October 23 - 36, 1967 (Announced Initial) November 9, 1967, Management Summation

#### Persons Assomptnying Inspector

Name, Founsylvania State Department of Baalth contacted, but not represented

#### Persons Contected

Mr. Don Sgarlata, Supervisor Roger Caldwell, MRSEC 2000 Verious other persons lossted at the Quehauma site

#### REFORT DEBALLS

#### Maria M

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the Reality by Rillor one down a with the supertment of Maker Presserve State of Frankrittenia and is administered by the Department of Maker Presserve the selector the rights to stil Skills written the vertice Cally as still.

HENDE contrast with the State of Fermapivania is besteally a ene-geor removable

a water company

lease for the first five years, than a five year renevable lease. HOMED, per the contrast, his control of the Quebaums site and a radium of approxinately 1 mile from the site center. This area is posted as a restricted area with no traspassing or steal/ allowed signs at 100' invervals, about the distance of 1 mile radius from the facility. The immediate area of the hot cell facility is systeme-franced and all entrances looked to the immediate facility.

.. 2.

#### Organization

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2. The organization which will eventually be in effect at the Quahanne facility is as indicated in Figure 4.1, Organizational Chart, of the licensee's operating manual. The following information was obtained from Oxiderall and Agarlats. The Comparate Basards Review Committee includes the following persons: L. Weber, Earl Fuechl, Roger Caldwall, and F. Poster. Shis comparate essentities for MEGHC sperates from the main office in Apollo. The personnel

et the Quaherne facility are as follows:

Asting Plant Managor - 2. Vissini

Flamt Safety Gammittee has not yet bear established

Resident Administrator has not yet been satigated to the Finat

Float Safety Consistes dation as ansigned temperary to the following

from the Leechburg facility:

Br. Fisher

Mr. Roth

. 7 M.C. (1)4

C. Atom

Mr. Baakarnerd

Mr. Fotber

Ship countities will be supersoned by a shant Cafety Countities when the Guidennia furflity is sufflictened with some sufflict still presented. Association pain sectored at the Quidenna Smellity are grant up by any of the fullening persons: Milone Symplete, Vieniai or Seyer Caldwell. Show propadares are then reviewed

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by M. Stein, Manager of Radiation Process Development, assisted by Dr. C. Onldwell of the Locabburg Plutonium facility. The procedures are then submitted to the Quahanna temporary Safety Committee for their review and approval and are then sent to the corporate committee for their final approval.

-3-

· is the work

3. The operating proceed at the Quebanna facility, according to Sgarlate, are as follows:

R. Duff - Operations Supervisor\* V. Maximm - Operations Supervisor\* Spencer Compbell - Not Cell operator E. Dann - Maintanance E. Helm - Machine Shop Sechnician R. Emlly - Janitor F. Hedge - Socretary-receptionist Dan Sgarlats - Irredicting Opdarations Supervisor J. Miles - Not Cell Supervisor George Faul - Wolding and Loading Supervisor J. Andreajik - Instrument and Electronic Supervisor J. Andreajik - Instrument and Electronic Supervisor

S. Gampbell - Baalth Physicist Sochnician

b. A resident Machth Physicist has agreed to accept amployment at the facility and was scheduled to report to the facility on November 6 to assume resident health physics responsibilities. (R. Caldwell informed the inspector during a 12/10-10/67 inspection of the Apello facility that the new resident health physicist at this Quehanne facility was fired early in Recember and shot the position is egain vecame.

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then sufficient work onnes to the Queimann facility, one person will be absigned as thil Spinwtians Reportions, antiho other of the Dradicting Quartiese Superviser.

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5. Former Martin-Mariette personnel from the Quehanne site now employed by MUMBEC are as follows: Duff, Makima, Ommphell, Dunn, Halm, Andreajik, and Ommphell. These persons are serving MUMBEC in the same ompacity in which they were employed by the Martin Osmpany. In addition, Amper Omldwell stated that MUMBEC has hired, but does not have on board, a Manager of Radiation and Process Development to work for the company. This person will be loosted at the Quehanne site and is Dr. Taylor from the University of Virginia.

#### Pacilities

6. The inspector observed the facility at the Quehanne site to be as reported in the licenses's Facility Description and Mediation Safety Program manual. The hot calls and air handling system are "used by the Martin people when Martin operated the facility. The facility has been descentaminated me and a report of this decontamination is as shown in the licenses's basing for his license. This survey was made during the period April 24 - 35, 1957. When cells to be used for the licenseed On work at the facility will be Calls 1 and 2, according to Oaldwell. Ourrestly, under this license as use is planmed for cells 3, 4, and 5. The only major change in the facility is the installation of continuous air monitors. Middle has two CAN units for air compling; one for the survice area and one for the stack eximpt.

#### Pre-Gearationel Mark

7. HOMBO personnel first arrived at the facility on 8/25/67. Prior to operations at the facility, work was conducted to establish the facility in a working order for the licensed work. Shis work, according to Caldwell, inalashed the fullowing:

and the second second

1. An inventory of all equipment

2. A check-out of all equipment

- 3. A contemination and rediction survey of Cells 1, 2, 3, 5, 6,; Cell 4 was not entered. (Cell 6 is unused cell located below Cell 1.)
- A. Bet up of equipment in Cells 1 and 2 only for the licensed work.
- 5. Sharvey of Calls 2 and 5 using a 35,000 Ci Co-60 source as received in a shipping cask. This survey was made to comply with License Condition 16.
- Receipt of the shipping cash at Quebanne was on 9/15/67 along with a scaled irrediction source possessed by RIMEC under a different license. See paragraph 27 of report.
- 7. Eastell under license 37-8467-3, the irrediction set up, cinderblocks, shielding and conveyor system for the irrediction work. Shis setup is loosted in the beam room by the reactor.
- 8. A general cleams of the facility.

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- 9. Conduct air flow surveys of Cells 1 and 2.
- 10. Check fire extinguishing equipment at the facility.
- Presend with dry runs for the preparation to load 00.60 oppulse.
   Shape dry runs were conducted on 10/80 and 10/81, in Galls 1 and 2.
- 12. Set up energency procedures with Dr. Mocheler, Freshyberian Hedpitel in Pennsylvania, with an attending physician (Dr. Movell) at Clearfield Hespitel. A visit to Clearfield Hespitel by the inspector indicated that the hespitel personne, had no knowledge of such a setup through Dr. Howell. Br. Howell was unable to be asubacted at this visit.
- 8. The contemination survey made by R. Caldwall, S. Potter (290, Leochburg) Schull and E. Beald (Peressa, MaS, Apollo) as indicated in Item 3 above, essentially confirmed the closecut survey make by this office at the termination

of Merbin's license, according to E. Caldenil and E. Sundi.

9. The highlights of the rediction survey made of Golle 2 and 5 are referenced

is paragraph 7(5) above, indicated the following: The Cell 3 survey made on 10/9/67 using a 35,000 CL, Co-60 source, assured on 8/67, indicated rediction levels at the center of the window of 3.5 mm/hr maximum at the manipulater parts; 85 and 50 mm/hr at the Gall E read plug; 600 mm maximum. Whe Call 5 survey was made using the same Ce source as was used in the Gall E survey. Made entry was conducted on 9/19/67. The maximum level at the Call vindow was 200 mm/hr and the maximum level at the Call 5 road plug was 500 mm/hr. Caldwell, from his survey, had concluded that Call 5, having E" thick concrete walls, is unable to contain 35,000 Ci of Co-60 and as such tends to limits the cell for use with approximately 1000 Ci of Op-60. See letter we Caldwell to ISE dated 10/30567.

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- 10. License Condition 16 states that after installation of the Co-60 in the hot cells, a rediction survey shall be conducted to determine that the maximum rediction levels in each area ajoining the cells. A detailed report of the results of this survey shall be sont to the Isobaye Skanoh, ISE., no later than 30 days following installation of the source. A copy is also to be sent to CO:I. The survey report diskums dated 10/30/67 was received by CO:I and NQ.
- 11. normeding to Caldowil, his folling is that Call 2 has demonstrated its unpobility of holding and containing the 35,000 suries of Co and yet not have excessive levels or rediation in minks other adjoining arcas. Caldwoll assumes that Call 1, which is designed the same as Call 2, would also be empatize of combaining 35,000 Ci of Co. Call 5, having only 2' thick high density walls, has not capability of holding 35,000 Ci of Co. Be is proposing to limit the call to a maximum use of 1000 suries when such use because neoestery.

12. On 10/84/67, the licensee commanded Co-50 encapsulations for the production

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of irradiators. The material received at the facility on 9/19/67 was assered at 35,300 suries of 00-60. The material was received from GE Wallacitos. The seterial was in two forme; one of 10,000 ouries of 4.5 suries of Co-60 per grow of Go metallic pellets opshed with nickel; the other quantity of On in a segmente container was approximately 25,000 ourice at 22.5 ouries per gram of Or. The first source irredistor to be made is a 5000 ourie irrediator for the U. S. Army Quartermaster Corps in Massachusetts. The supsules are to contain 30 individually double encapsulated sources, according to Sgarlate. The first loading of the first tube was observed by the inspector. The only problem encountered was that of easying the first expaule for activity. The procedure included placing a Victoreen ice chamber through the alpha part in Call 1 to obtain a measurement from a specified distance from the expanie. Several entries into the isolation room were made to finally assay the espaule at the specified activity. The work is performed on a large s/s table in a large white pervelin pan such that should a pellet go estray, it would be more eagely located against the white percelin. Dering the initial unloading, the dusting from the pallate was suppod. Semulate stated that the pollets were to be usehed prior to skipseet. Only one or two small flakes of unterial appeared in the white provils. isser tray as a result of the first unloading A rudintion curvey were by the inspector of the Cell 1 winds indicated levels of lose than 0.1 mm/hr. First observations by the insportor indicated that no problems are apparent in their cobalt encapsulation. Only one minotr change in the procedures would prove "enoficial in the inspectors spinion. Shet is, the unloading of the shipping container into the cells, via the isolation room that rather than loading through the coll roof plags. This was discussed with Sgarlats, the Supervisor is charge, and it appears that febure lundings of the chipping scatalaste into the calls will be done through the isolation room rether than the coll roof plag. Fromenre differentials dering the operations were nated and are as fallows:

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					AP in. of water
(	0011	1	to	Isolation 1	.1
(	3011	8	-	Isolation 2	.1
(	<b>L</b> [ <i>m</i> ]	3	to	Indistion 3	.41
4	11.0	h	50	Inclation 4	.45
C	211	9	-	Imalatic: 5	.08
¢	211	1	60	Operations area	.35
0	11	8	to	Operations area	.41
0	w1.1	3	80	Operations area	1.00
· 0	11	4	20	Operations area	.94
0	11.	5	10	Operetions area	.69

13. The operating procedures for calls per the licensee's manual states that the calls to operating area pressure differentials shall be maintained at a minimum of .4 inches of water (encept Call 4). During initial operations of Call 1 with the Go on 10/84/67, the Call to operation area pressure differential was less than .4 inches, that is .35 inches. Skis was observed by the incoparator and brought to the strention of the sp supervisor. The pressure differentials for Calls 1 and 2 were adjusted by opening the fan varies for mach call in the fan roome. After Buff edjusted the vertex, the call to operating area pressure differential indicated .55 inches of water and call 2 to operating area pressure differential indicated .5 inches of water.

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# according to Spellate

14. "To date the operations at this facility have been on a one shift basis, five days per week. The facility, at the close of the day, is locked by NUMEC personnel.

#### Health Physics Routine

15. In an effort to determine the health physics required at the facility, a review was made with John Campbell, the HP technician, at the site, of his routine at the facility. Campbell replied that his daily routine included the following. Collection of nine air samples, changing air samples, counting and recording the results, smearing the operational area, counting and recording the results, reading Mayes Gauge readings of the filter pressure differentials on a daily basis and recording the results, collecting composite water samples for weekly analysis and radiation surveys of the areas in the service area and as necessary in isolation and operating areas, maintaining a log of his activities, maintaining an instrument daily check for his scaler type equipment. Ir addition to this, Campbell is on call for any entries by operating personnel into high radiation areas, such as isolation rooms and cells. In addition to the above, Campbell, on a weekly basis, smears the entire facility, counts and records the results and direct surveys all the facilities. On a monthly basis, the creeks about the area are sampled and analyzed for activity as is the gamma storage pool and reactor storage pool. Instruments are to be calibrated on a monthly basis and waste tanks sampling is to be done on as needed basis.

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16. The above routine has been in effect since the pre-operational work at the facility as of NUMEC's takeover of the facility since approximately 9/1/67.

#### Instrumentation and Calibration

17. The following survey instrumentation is available at the facility:

#### Portable

1 Jorden Red Gan, 0 - 10 Kr/hr, Model ACH-ER-LORCE

1 Banlasr Chicano 2612, SEX Side Window GM Survey meter range 0 - 20 mr/hr

1 Precision Radiation Instrument, Model 1118, Delume Scintillator, 0 - 5 mm/hr

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#### Low Level Bench Monitors

1 Atomic Soular Model 1095 with an end window GM tube in a load make pig

1 Mec Model PC-3A propositomal counter.

#### Lab Type Count Ante Meter

- 1 Buslear Chicago
- 2 gracerlab
- 1 RIME

A and a and a

#### Condinuous air Monitors

2 Broomylab, one with fixed filter, one with moving filter

Accarding to Campbell, a MUSCE CE-bOA pertable survey motor and an Eberline 2-500 E portable survey motor have been ordered.

18. Assaurding to their remain, Soction Mo.5.2.1.2.3., one two surie Co-50 source will be used to calibrate the carvey motore and one 10 MCI source will be used to shock the portable instruments for proper functioning. At the time of this imspection, methods of these two Shiruments and and uvailable for such calibration at the facility. Whe tally sources at the facility for exhibitables, or instrument shock were as follows:

#### -10-

1 - 25 mCi Ra-226 sealed source, assayed on 8/66 and one home-made 59,000 dpm Co-60 standard and one 16,000 dpm Sr-90 standard, manufactured by Eberline, Model SD-2.

-11-

#### Air Sampling

19 22. The air sampling program at the facility was only recently started approximately 2 to 3 weeks ago. Samples are collected by various means from various locations, the resulting being recorded by John Campbell; the various areas from which air samples are collected are as follows:

- The 24 hour sample is collected from the main stack and has read less than 10<sup>-12</sup> uCi/ml since starting.
- 2. From the service area using a continuous air monitor operating on an 8 hour per day basis, the levels have indicated less' than 10<sup>-12</sup> uCi/ml, except on one occasion, 10/25/67, in which the results indicated 4.18 x 10<sup>-10</sup> uCi/ml. John Campbell immediately took a 6 minute high volume air sample of the service area and obtained the results of 53 x 10<sup>-12</sup> uci/ml.
- Cell 5 using an 8 hour per day in place filter, results continuously less than 10-12 uCi/ml.
- Cell 4 collecting an 8 hour in place sample, results indicating background to a maximum of 5 x 10<sup>-12</sup> uCi/ml.
- Cell 3 using an 8 hour in place filter, results continuously less than 10<sup>-12</sup> uCi/sl.
- Gell 2 using an 8 hour in place filter, results indicated background
- Oell 1 using an 8 hour in place filter, results indicating less than 10<sup>-12</sup> uCi/ml.

8. The Secon room - 8 hour in place filter, results less than 10-12

Ohome Lab - 6 hour in place filter - results less than 10<sup>-12</sup> uCi/ml
 Operations Area - 8 hour is place filter - results less than 10<sup>-12</sup> uCi/ml

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80. According to Campbell, each of the in place filter samples are collected using a m vacuum pump drawing air through a Whatman 41 filter paper which is in series with an air flow regulator, measuring air flow through the filter paper. These filters are left in place for the specified period of time and then counted the following day. Samples are changed daily.

#### Looking System

21. License Condition 14 exempts the licenses from the requirements of an interlook system per Section 20.203(c)(2), of 10 GPE 20, in lieu of an administrative procedure and looking arrangements as described in Chapter 10 of the manuel. In the facility, all areas were noted by the inspector to be looked. as preseribed, emsignments surpt as noted below. Toose locks age specially designed to be sald by the Bost Osmpony, according to Caldwell, with the guarantee that no person may order looks and tunblors, enouge these designated. The only edges ion need during the inspection was the gate look to the monsenine over the calls from the service. This gate did not have any look control. The rediction levels over Gell 1 at the time was 300 mrad/ar on contact with the Call 1 roof alab, according to Campbell's survey reports. Caldwell agreed that whole body redistion levels in excess of 100 me would be received in one hour in this area, and agreed to install a lock on the memunine door. Other general levels over the isolations and calls in the service area were generally 1.5 sm/hr. Access to this area is required to be looked per their pressures.

BLOBORATE

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st. Coldwall said he is attauting to establish a urinalysis sampling program for

all with the second particle sharps drive has what is pre-second strangers , did is so

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personnel at the Quehanna facility. The program is as stated in the manual, Section 10.5.2.1.2.2. To date, urine samples have been collected by the line of from all persons, however, no results have been received as yet, on the samples taken. No fecal sampling is anticipated as yet. The manual, pertaining to internal dose evaluations, speaks not to fecal sampling but to whole body counting at Presbyterian Hospital in accidental exposures. No accidential overexposures have occurred to date.

## Emergency Procedures and Equipment

John Campbell, since the start of work at the facility, has tested the emergency alarms on a weekly basis and records such tests. During this inspection, one unannounced emergency alarm was set off, such that personnel were required to evacuate the facility. All persons evacuated the facility, however, two persons evacuate via the south of the building and the remainder via the main north entrance to the facility. through Buring this unannounced evacuation, no emergency equipment was removed from the building for use upon re-entry and no emergency equipment was available for removal.

### the inspector notes that

Fire company has available a trailer/located in the rear of the facility which was fully equipped for emergency procedures when the Martin Co. operated the facility. However, since them laft, this trailer has been stripped of all its equipment. NUMEC has not as yet re-equipped the trailer for such emergency uses.

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State Carlo A. C.

Additional Information 28. At this facility, the University/Pennsylvania has under its control in one

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locked vault, a reactor one fuel which has been mirradiated. The labeling on the door to the vault states that 5.24 kg of U-235 are stored in 30 fuel elements as of 9/22/65. An emergency call number and name is also posted on the door. The vault door is locked and the key is controled by Penn State University. Caldwell said this fuel is in the process of being transferred from Penn State's control to their (NUMEC's) controled and appropriate Accessing a time army lited.

. Core 1 fuel which was slightly irradiated, was shipped to Savannah River on 8/23/67, according to Caldwell. This fuel was also licensed to Penn State University.

As previously mentioned the licensee has installed at the facility in the beam room area of the reactor, an irradiator containing 40,000 Ci of Co-60 and 12/66. This irradiator has been set up for possible future use on a job irradiation basis. This irradiator is licensed to NUMEC for use at any of their facilities under License 37-8467-3. No inspection was made of this license at the time of this visit.

According to Caldwell, the future of the Quehanns facility in the use of radicisotopes, appears that within 6 months to 1 year, they expect to request an amendment to their license for a large irradiator for use in the reactor pool. In addition, they have future plans for doing ppst irradiated plutonium fuel studies in the cells of the facility. When such work will be done appropriate license amendments will be made.

Items of Noncompliance

Dicense Condition 16 requires a radiation survey be made of the by the hot colle after installation of Do-60 and at this areas

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STOP OF PROPERTY A DESCRIPTION

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#### Management Discussion

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29. On 11/9/67, a management discussion was held with Dr. Shapire and others regarding the inspection. Shapire agreed with the items of noncompliance and assured the inspector that the two remaining noncompliance items would be expressed.

-15-

- 30. In addition, the staffing of the facility was discussed with regard to Bp personnel, and operational personnel. Shapiro assured the inspector that several of the unfilled organizational positions were being finalized and on board shortly and the full staffing of the facility was actively being negotiated.
- 31. Regarding HF instrumentation, Shapiro assured the inspector that instrumontation, in addition to that mantioned in the report, was on order and would be evailable for use at the facility by the next inspection.
- 32. Regarding the lack of emergency equipment, empty emergency trailer, emergency food, etc. Shepire agreed these items were valid considerations. He said appropriate attention would be given to equipping the facility for all such emergencies and must emperted this to some about as full staffing of the facility was reached.

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#### Ttems of Noncompliance

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Item	8	•	See	paragraph	18	
Item	b	-	See	paragreph	13	
Item	c		See	paragraph	21	

## NOV 20 1968

Buclear Materials and Equipment Corporation Redistion Process Center Post Office Box 115 Karthaus, Pennsylvania 16845

Attention: Dr. A. Witt, Manager

Gent Lesson :

This latter refere to the discussion Mr. Eugene Epstein of this office he'd with Dr. A. Witt during the inspection conducted October 28-31, 1968 of the activities authorized under AEC Syproduct Material License No. 37.4456-8.

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

It is noted that corrective action has been instituted to correct thase items of noncompliance as indicated in a letter signed by Roger D. Caldwell, Manager, Health and Safety dated November 6, 1968, and no further correspondence is required regarding this matter.

Should you have any questions, you may considered directly with this office.

Very truly yours,

Robert W. Kirkman Director

Enclosure: ABC-592

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	OFFICE .	COMPLIANCE:			
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-	DATE .	11/19/68	1		



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## UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF COMPLIANCE

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Corp 609 M Apoll	ar Materials and Equipment oration orth Warren Avanue o, Pennsylvania 15613	2. REGIONAL OFFICE U. S. ATOMIC EMERGY CONMISSION Division of Compliance, Region I 970 Broad Street Newark, N.J. 27102			
LICENSE NU	37-04456-08	4. DATE(S) OF INSPECTION October 28-31, 1968			
The follow or license	ing activities under your license (identified in I equirements, as indicated.	tem No. 3 above) appear to be in noncompliance	with AEC regulation		
•.	Contrary to 10 CFR 20.201(b), Evaluations to determine the c which personnel were exposed u to determine compliance with 1 to concentrations of radioacti paragraph 10.5.2.2.4.2 of proc dated 8/16/67. Specifically, were not made during cell entr evailable before entering.	"Surveys", and License Condition oncentrations of radionuclides is pon entry into hot cells were in O CFE 20.103(a), "Exposure of in we materials in restricted areas edures in luded in license appli air concentration surveys on occ ies, nor prior to entry with the	No. 15, In air to adequate adividuals ", and ication cation a results		
b.	Contrary to 10 CFR 30.51 "Reco solid waste did not adequately being transferred for disposal	ords", the records showing the di describe the quantity of waste	isposal of meterials		
с.	Contrary to License Condition of the restricted Fan Room cor paragraph 10.5.2.1.2.6 of the dated 8/16/67.	No. 15, removable contamination stantly exceeds the limits set is procedures included in license a	in sections forth in application		
		No. 15. airflow belances of hot	cell str		
d.	Contrary to License Condition were not made at regular inter conducted no chronological log 10.5.2.2 of the procedures ind 8/16/67.	rvals, and for these surveys white y was maintained as required by p cluded with the license applicat:	ch were peragraph ion dated		
d.	Contrary to License Condition were not made at regular inter conducted no chronological log 10.5.2.2 of the procedures in 8/16/67.	rvals, and for these surveys white y was maintained as required by p cluded with the license applicat:	ch ware paragraph ion dated 11/19/68		

DRAFE EPSTEIN:ee 11/12/68

Reviewed by: 687 Halan 1:49 11/18/68 Date:

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#### BACK-UP FOR AEC-592

609 North Warren Avenue	Inspector: Eugene E Epstei
Apollo. Pennsylvania 15613	Lic. No.: 37-4456-09
Date of I "eution: October 28 - 31, 1969	(A nounced Reinspection)

#### Persons Accompanying Inspector

Unaccompanied - State Officials notified.

#### Persons Contactud

Dr.	A.	W1	t	t,			
Edu	ard	κ.		Ret	21		
1, 1	Camp	ba	1	1.			
L .	Swar	ts	,				

Manager, Quehenna Facility Resident R.S.O. Health Physics Technician Acting Supervisor Hot Cell Activity

#### REPORT DETAILS

#### Background Information

1.

The last previous inspection was performed 4/29 and 5/1, 2/68. The results of the inspection were reported using Form AEC-592 noting two items of noncompliance.

- a. No resident health physicist is employed at the facility as required by 4.6.2.1 of Licensres application dtd 8/67.
- b. Control and access to operations area is not controlled as required by 10.4.1 of the above application.
- 2. Corrective action was reviewed and it was noted for the past two months a resident health physicist Mr. Edward Reitler has been on board. Reitler is an AEC fellow from University of Rochester and was RSO at University of Pittsburgh prior to his present employment. For nine months the licensee was without a full time resident health physicist. Health physics functions were performed by Mr. J. Campbell, a technician, with guidance from Apollo, Pa.
- 3. The access to the operations area was noted now to be controlled with only one entrance rather than three as noted in the prior inspection.

#### Organization and Administration

6. A. Witt PR.D is now resident plant manager replacing Mr. G. Tayler, who has left the licenses's employ on 8/15/68 along with hot cell operators Namean, Duff and McKinn. L. Swarts and one trainee now perform hot cell operations decontemination and waste removal. Bealth physics at Quehanna is supervised by E. Buitler and two technicians. Reitler reports directly to Dr. Witt as well as Reger Caldwell corporate E.S.O. located at Apollo.

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#### Pacilities and Use of Material

5. The scope of the licenses was reviewed with Reitler and examination of records of

receipt show the following materials on hand:

Lic Item	Form	Amt Auth		On Hand	Use
C-Co-60	AECL Type	200 000	Ci	121,294 C1	In small pool for irradia- tion of wood products.
C-110	ensepeulated source pencils also	61,000	CI	61,000 Ci	In decontamination room to be encapsulated into pencil: for use in the small pool.
A-Co-60	metallic pellets wafere { strips and scaled sources	50,000	Ci	42,000 Ci	I hot cells 1 & 2 used for irradiators manufactured by NumeC. 3 irradiators manufactured to date.
B-Sr-90	Residual contamination in ductwork and fixed contamination in re- stricted areas.	n 200	BC1	100 mCi	Estimated as existing hot cells and duct work of exhaust system.
D 0=-0/	Sealed Jordon Flactr	ante			2 sources 3 uCi each in

Juci pot/source

2 sources 3 uCi each in Jordon area monitor. 2.1

- Item C, above is used in the small pool and currently contains 121 294 Ci used for experimental irradiation of wood products to create "Novewood", An adjacent pool called the large pool, is being prepared to receive 1,000 000 a Co-60 as soon as libenee suthorization is remeived for actual production of Novewood. A description of the small pool and its equipment is contained in license backup in enclosures to an application dated 9/14/68 Chapter '12 "Numer Pool Irradiator" pgs 1-15. Sources used were AECL stainless steel encapsulated model C-110 carsules. These were loaded into stainless steel pencils which were welded and then the pencils find were placed in two pool irradiators.
- 7. The license also has encapsulated Co-60 pellets as above into pencils to supply sources for 3 irradiators manufactured by Numee and sold commercially. One irradiator containing 35,000 Ci was manufactured and shipped to the US Army Quartermaster at Nagitick Mass. and two other irradiators each containing 5,000 Ci Co-60 were transferred to the Dept of Agriculture for potate tradiation. These irradiators are similar to the AECL Gammacell, in that sources a t contained in a collar which surrounds a center piston with a hollow agree in which samples are placed for irradiation. These is more upward and downward via pignion and gear drives. Reitler stated that at no time is work on the irradiators performed while sources are present. The sources and collar are removed from hotcell \$ 1 or 2 and placed around the piston after all mechanical systems are installed and checked.

The licensee had 6 hot cells constructed by Wright Patterson, 5 of which are on the main floor and cell # 6 in the basement below cell. The entrance to the cell is vis a locked separate service room directly behind each cell. The shielded doors are locked with two separate padlocks and the inspect. noted that one key to one lock is held by the operations group which one key to the other cell padlock is held by the health physics group. This procedure ensures that Amember of the health physics group is always present when entry is made into the service room or the hot cell itself. The license contains an exemption from 10 CFR 201. provided the above locking procedures are followed.

- 9. Reitler stated that only cells #1 and #2 have been used and that entries into the cells are not made when sources are present and that should an entry be required sources are transferred through pase ports between the cells. A review of the records of the operation log and the health physics log indicate that entries are made almost daily and sometimes several times a day for decontamination, changing of rough filters cleaning of cell viewing windows, repair of manipulators on slave units and repair of a periscope located in cell #1 only. These entries are made mainly by Leroy Swarts acting hot cell operations manager. A complete description of the hot cell, operations area, and service area is contained in license backup in a booklet part of application of 8/16/67 entitled Radiation Processing Plant Quehanna Pa. Facility Description and Radiation Safety Progrem.
- 10. The licenses is preparing to use cell #3, and has removed and cleaned the viewing window and placed inside a large ventilated glove here for taking spart spent Pu fuel rods for mechanical measurements and examination and has applied for a license to do so. The licensee now has SNM lic 1088 dated 9/27/68 to possess for storage only 800 gms. Pu and U-235 with 25,000 Ci associated fission products which will be used when license authority is received. This material was noted on hand in storage in a large steel case in storage in the licensee's decontamination room.
  11. The ventilation system is also completely described in the August 16, 1967 booklet
  - and briefly consists of hot cells being under negative pressure with respect to the surrounding operations and service areas. Air is drawn into the hot cells and exhausted through independent rough filters and then into one plenum and two absolute type filters prior to being exhausted through one roof stack. An emergency suxiliary exhaust system cuts in should any cell differential or static pressure drop below acceptable limits. This occurs momentarily during cell entries.

#### Surveye

12. A direct physical survey is made prior to each cell entry and recorded, attendant air surveys of hot cell environment if made, are also recorded, Also recorded are domested pen readings. These reconcis indicare wediction dereis up to DR/h. ard Pursuates D

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during cell entries and that these levels are the result of materials in the adjoining cell. Dosimeter pen reading indicate no whole body exposure greater than 100 mrem during any cell entry.

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- The licensee has a continuous sir monitor which draws in air from the point of exhaust of the roof stack and continuous monitors which draw in air from each cell after passing through a rough filter. Reitler agreed that cell air itself is not continuously monitored and the results only indicate cell air after passing through a rough filter. He stated he would change the system to monitor the cell environment directly. Records i dicated that 27 air collection samples of particulates are counted daily. These samples include air exhausted from a defunct radiochemistry lab and the decontamination room. Samples are counted daily using a shielded GM tube with a 3 mg/cm2 window a d scaler to determine bets activity. Reitler stated that efficiencies of from 23-33% are used on the assumptio: that all activity is SR-90 in spite of the fact that a portion of the activity is Co-60. We stated he has ordered Co-60 standards and in the future will determine the Co-60 fraction and use appropriate efficiency factors. Reitle stated however that he uses the most restricted limit that for Bel Sr-90 as expressed 1 tables I and II of Appendix A and 10 CFR-20, and indicated results show that even if the results were multiplied by a factor of three they would not exceed the MPC for Sr-90. The results are as follows:
  - a. Stack samples from hot cell normally  $0.5 \times 10^{-12}$  uc/ml air and occassionally  $3.6 \times 10^{-12}$  highest activity.
  - b. Decontamination Room exhaust stack map 20 x  $10^{-12}$  uc/ml air usually 0.2 x  $10^{-12}$  uc/ml air.
  - c. Radiochemistry Lab stack never greater than 0.5 x 10"12 uc/ml air.
  - d. In plant restricted area air Surveys are provided by a CAM continuous air monito in the service area and maximum concentrations did not exceed 0.91 x 10<sup>-12</sup> uc/ml air after 24 hr. decay.
- e. The restricted fan room which is located in the basemant and which contains have heavy 9r-90 contamination gives the highest air concentration's up to  $85.6 \ge 10^{-12}$  uc/ml air but normaly  $10 \ge 10^{-12}$  uc/ml air.

Cell #1 air after passing out of the cell through a rough filter has normal concentrations of  $7 \times 10^{912}$  uc/ml with occasional extremely high concentrations during rough filter change.e Counts on filter paper exceeded 50,000 cpm after decay and were considered too hot to count. Fill protective clothing was worn however including full face mask full coveralls and coating which covered the entire face and mask. Thick plastic gloves and shoe covers. Cell entries did not exceed 15 minutes duration. Namel emeans revealed no detectable activity.

- 4 -

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- Cell 2 air monitored similarly had the same concentrations as above or close to it.
- 15. Individual air samplings were made inside Cell #1 and Cell #2 during all special operations such as decontamination, filter change and window removal. Cell #1 air during decontamination 80 + 10<sup>-12</sup> uC/ml air and occasionally as high as 185 ¥ 10<sup>-12</sup> uC/ml air. Cell #3 during chopping cleaning and painting 188 ¥ 10<sup>-12</sup> uC/ml air.
- 17. The H.P. records indicated that air samplings were not always taken prior to entry or at all during some entries into hot cells into cell #1 or #2<sup>m</sup>/which thousand curies quantities Co-60 had been used or stored. HP journal indicates the following: 7/15/68 Entry in cell #2 where storage cask 2500 Ci was un-

loaded. No air survey indicated prior or during entry. 7/10/68 McKimms entered cell #2 to remove tables and other meterial. No air survey indicated prior or during entry.

- 18. J. Campbell stated that during July 1968, there was no resident H.P. and he was working alone with a great workload and at these entries no air survay was performed and no special protective clothing other than show covers gloves and coveralls were worn. The licensee's procedures, however, listed in 10.5. 2.1.2.4 Air Sampling of the booklet included with the application of 8/18/67 stated that Hi Vol sampling is required when removable contamination exceeds 2000 a/m/100 am<sup>2</sup> are detected. Removable contamination inside cells #1 and #2 generally exceed53000 dpm/100 am and are on occasion as high as 35000 dpm/ 100cm<sup>2</sup> noted on 8/13/68 during cleaning according to records of emear surveys maintained by Campbell.
- 19. Compbell stated and Reitler confirmed that no breathing some surveys had been performed but stated that even if breathing some air ware 100 times that noted inside cells by Hi Vol sampling and after rough filtration by 24 hr. continuous monitoring no operscopeoures would occur even based on a restrictive Sr-90(eel) limit. Reitler stated that he is intending to start a breathing some air evaluation program shortly.
- 20. Unrestricted office areas had gross beta concentrations no greater than 0.2 x 10<sup>-12</sup> uc/ml air according to records.

- 5 -

2 Super Surveys

- 21. Remear surveys are performed weakly in all areas and the semars counted in the same manner as air collected on filter paper. The results of 100 semars taken in restricted and unrestricted areas indicate removable activity is unrestricted areas no greater than 50 dpm/100 exe and in restricted areas no greater than 300/dpm except for hot cells as noted previously.
- 22. The linename, however, does have one problem, the basement fan room is also the emgranes to cell #6. The licensee in his booklet included as part of the application dated 8/16/67 in 10.5.2.1.2.6 permissible levels has set a limit for beta contemination (removable) of 500 d/m 100 cm<sup>2</sup>. Removable beta contemination in the fan room constantly exceeds this value. The records show the following:

10/31/68	10/10	9/24	9/16
1200 den/200022	620 dpm/100 cm <sup>2</sup>	620 dpm/100 <sup>2</sup>	6442 dpm/100 cm <sup>2</sup>
1276 "	70,000 " "	1940 " "	1224 "
848 *	2 of 10 smears	1088 " "	11160 "
2656 "		45400 " "	2504 "
800 "		4 of 10 sesars	4 of 10 emeans

5 of 10 smaars

 Esitler stated activity noted is Br-90 contamination which is constantly being released from duct work. He stated more frequent cleanup is needed. Personnel Monitoring

- 24. Reitler stated that Sherline Co. film badges which are processed monthly are used for personnel monitoring. The beta-gamma film badges are worn by 35 persons. Persons who enter hot cells in addition wear self reading pocket Cosimeters and record daily dosimeter exposures.
- 25. The records indicate that McKimm, former hot cell supervisor who left the licenses's employ in August 1968, had the highest whole body gamma emposure as noted by film badges. 1720 mrem let calendar quarter 1968, and 1280 mrem whole body exposure 2nd calendar quarter 1968. Swarts who has taken over McKimm's duties has the next highest exposure, 2610 mrem whole body exposure for 1968 until 10/1/68, and a maximum of 1000 mrem during the first calendar quarter year 1968. All others had whole body gamma emposures less than the above, usually no greater than 700 mrem/ calendar quarter except for S. Campbell who received 1490 mrem whele body gammas emposure during the let calendar quarter 1968, due to handling and packaging solid wests. He has been removed from hot cell operation.

- 6 -

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26. The licenses records exposures using form AEC-4 with all entries completed for all persons.

- 7 -

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- 27. Reitler stated he has not used wrist or ring hadges because there is little or no hand handling of radionuclides. Thick plastic gloves are worn to reduce or eliminate bets exposure and remote handling devices are used almost exclusively.
- 28. BLOSSARY
- 28. Urine is cellected over several days every three months and forwarded to Eberline New Mexico for assay to determine Sr-90 and gross beta above K 40, for those persome performing hot cell operations. The results show the following:

Urine date	Person	Gross beta dpm liter urine	Sr=90 uuc/liter utine
A/7/68	S. Campbell	15.8dpm	2.0
4/100		7.4	4.1
6/30/00	1 Guarte	24.8	4.7
4/7/68	L. DERFLA	\$7.5	22.4
6/30		43.8	15.7
4/10/68	Mic K.1.mm	47.0	4.83
7/1/68		11.8	

The above results indicate little or no body burdens of bets emitters.

#### Waste Disposal

29. The licenses disposes of solid waste removed from hot cells by transfer to NUMEC Apollo. Swarts demonstrated that he takes a 55 gallon drum and reduces its capasity to 25-30 gallons by the addition of lend shielding. The outside of the drums after lead shielding must have surface levels which do not exceed 200 wm/hr. Source stated and survey record confirm that these drums after the addition of 14" thick lead have surface radiation levels of 700 - 800 mm /hr. and further shielding or subdivision was performed.

# Solid Waste

30. Records of transfer were maintained showing two transfers of waste removed from hot cell.

> 3/15/68 19 Drume 1600 10 uc. Co-60 5/20/68 31 Drume 9500 10 uc. Co-60

Reitler stated the 10 us figure was totally in error and was entered by J. Campbell without any estimate of the total quantity. Compbell stated he had no idea of what activity or quantity was transferred and entered 10 us on each invoice. He repeated that at the time of these transfers there was no resident health physicist at Quehanns. Reither estimated that the quantities transferred on each occasion were more nearly one Ci. Solid waste disposal is being transferred in accordance with procedures included in the license.

Liquid Waste

31. Liquid waste is generated by pool overflow from the small pool using 121,25%. Ci Co-60. The pool water passes through two deionising beds and then into two 3000 gal hold up tanks. Pool water is analyzed daily for bets activity and daily analyzis reveals less than 10<sup>-6</sup> up bets act/s water. Disposals from the 3000 gallon tanks are made every two months after assay and highest activity ever disposed was 0.785 up. Con centrations news7 exceeded 0.058x10<sup>-6</sup> up/ml water. The waste water runs into a creek which flows into Mosquito Creek and then to the Susquehanna River. Reitler stated that they use a thin window gas flow proportional counter to analyze this activity. Records were noted maintained showing kind quantity and date of disposal. Posting and Labeling

- 8 -

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- 32. The entire area of the Quehanna facility except the front office area is fenced in by a closed chain link fence and is considered a restricted area. The fence was posted at each 20 foot distance with signs reading "Caution Radioactive Materials" and "Caution Radiation Area" both with symbol. All areas of use and storage were similarly posted. The hot cells, decontamination room, fan room and adjacent areas were in addition posted "Caution High Radiation Areas". Form AEC-3, "Notice to Employees", was noted posted at all entrances to operations area, pool area, survice area and fan room. Each entrances to operations area, pool area, "Caution Radiactive Materials" w/symbol as well as indicating kind quantity and date of assay. Training
- 33. All employee's in the service area are old time employees of the licenses's predecessor at Quehanna. The Martin Co. and received training in rediation safety hamards and protective measures. Reitler stated new employees were instructed by him upon his arrival in addition to the above in the licensees procedures to avoid exposure.

### Instrumentation and Calibration

34. The licenses was noted to have a variety of instrumentation including several Jordon Red-guns for measuring high rediation. Each area was noted equipped with two or more remote area monitors set to slarm at rediation lowels from 2 to 10 mr/Mr. Reitlar has a 25 mg Rn-226 source a 775 mCi Co-60 source and a 30 mCi Co-60 source used for calibration of survey meters and remote area monitors. Records indicate that mellers and monitors were calibrated at 3 month intervals with at least two points checked so each instrument scale. License Conditions

- 35. 10. Place of use was noted to be only at the location listed in item 2 of the license.
- 36. 12. Records indicate that byproduct material is used under the direct supervision of L. Swartz, J. Andrejik, H. Hel@m, Js Campbell and A. Witt. Hot cell operations are in progress only in the day shift. Pool irradiation is in progress continuously.
- 37. All sealed sources are checked for linkage and removable contamination by Swarts immediately upon arrival. Casks are emsared and decontaminated in the decontamination room. Casks are opened inside het cells 1 or 2 using ensure unit manipulators. Wipes are taken at each stage of opening and all contamination is removed by remotely wiping with organic solvent. All point placed in the pool or irradiators are remotely wiped and emmars counted by health physics prior to release and activity must not exist above 50 dpm on any wipe sample bets activity. Reitler stated and remords confirm t. I this limit is adhered to and pencils are continuously wiped until below the above limit. Leak tests are performed also at three month intervals of CO-60 sources used for calibration. Mecords indicate leakage as less than 0.001 uc.
- 38. 14. License adheres to the locking procedures described in application of 8/16/67 in line of interlocks.
- 39. 15. Lisense Condition #15 requires possession to use according to applications dtd 8/16/67 and 1/19/68 as well as letters dtd 1/19/68 and 3/1/68. Adherence was noted with these documents encept as noted in paragraphs 17, 18, 22 report details end in the following instances:

a. The application dated 8/16/67 has H P procedures in an attached booklet. H 10.5.2.2.4 "Cell entry via doors" and 10.5.2.2.4.2 states a sample of hot cell air shall be obtained and evaluated before personnal entry. Reitler and Campbell stated this is not always done and many entries are made without independent air evaluation moreover the CAM-1 continuous monitor of which filter paper samples for each cell are counted daily does not collect hot cell air itself, but cell after primary rough filter particulate separation.

b. If 10.5.2.2 of the procedures dated 8/16/67, funtilation stated that "ventilation balance shall be shocked by velocater and snoke testing: also elteration of air balance following filter change or routine summer/winter supply air dust changeover will modessitate air flow pattern measurement and adjustment under direction of health and safety. Such changes will be entered in the chronological ventilation log for the area. The inspector noted and Baitler confirmed that a chronological ventilation log is not maintained nor were airflore to calls noted after hotcell filter changes, removal of windows, esting shields. Baitler meted that the last welember measurement of air flow was made in ing 10/67 and more since them.

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Compliance was noted with respect to all other provisions of the license condition.

- 10 -

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## Items of F. compliance

40. s. 20.201(b) and License Condition 15.

Evaluations to determine the concentrations of radionualides in air to which personnel were exposed to upon entry into hot cell were not made at all on occasions and when unde were not always made and results evaluated prior to entry in order to determine compliance with 10 CER 20.103(a) Exposure of individuals to concentrations of radioactive materials in restricted areas and section 10.5.2.2.4.2 of the licensee's procedures included as part of License Condition #15. (see paragraphs 17, 18, 30a. report details)

b. Contrary to 10 CFR 30.51 "Records" the records showing the disposal of solid waste did not with any accuracy describe the quantity of waste materials being transferred for disposal. (See paragraphs 30 report details)

c. Contrary to Lisense Condition No. 15, which includes the procedures attached to an application dated 8/16/67 removable contamination in areas of the fan room, restricted area constantly exceeds the limits set forth in 10.5.2.1.2.6 of the referenced procedures. (See paragraphs <u>22</u> report details)

d. Contrary to License Condition 15, which includes the procedures attached to an application dated 3/16/67. Air flow balances by velometer measurements were not made at regular intervals nor after hotcell filter changes, call window changes cell reof removals or summar/window changes nor was a chronological log of such required ourveys maintained. (See paragraphs <u>NG(b)</u> report details)

#### Management Review

A conference concerning the items of noncompliance ware discussed at a conference held with 5. A. Witt, Facility Manager. Witt indicated his intention to comply with the regulations. He stated they occured because from 1967 through 8/1/58 the facility was unable to obtain a residenthhealth physicist and J. Campbell, a technician, could not help up with the workload. This situation has been cleared up and a resident health physicist is on beard and Campbell has in addition an assistant.

Copies of letter and 592 form to Mr. E. Raitler NUMBC RADIATION PROCESS CENTER.

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