205. Technical Qualifications

205.1 Corporate

The Chemicals Division of United Nuclear Corporation originated as the Special Metals Division of the Mallinckrodt Chemical Works in July of 1956. The Hematite plant was among the first privately owned facilities to be licensed by the AEC for processing special nuclear material. Since that time, much experience and technical knowledge related to the safe processing and handling of special nuclear material has been accumulated.

205.2 Technical and Supervisory Personnel Qualifications

The training and experience of technical supervisory personnel is:

1. General: Bachelor of Science Degree in Engineering or Chemistry from an accredited college or university.
2. Plant Manager: Ten years experience in chemical plant operation.
3. Process Engineers: One to five years experience in chemical plant operation.
4. Research and Development Group Leaders: Five to ten years experience in engineering or development.
5. Research and Development Engineers: One to five years experience in engineering or development.
6. Supervisor, Nuclear Safety:
   Education- Minimum, B.S. Degree in engineering, chemistry or physics.
   Training- On the job training in an AEC, AEC Contractor, or AEC Licensee Facility supplemeted with specialized training courses in nuclear safety and health physics.

The training and experience of plant foreman is:

a) Education: High school.

General Foreman: Ten years experience in chemical plant operation.

Foreman and Assistant Foreman: Two to three years plant experience.

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206. FINANCIAL QUALIFICATIONS

A COPY OF THE 1963 ANNUAL REPORT OF THE UNITED NUCLEAR CORPORATION IS INCLUDED IN THE APPENDIX AS EVIDENCE OF FINANCIAL QUALIFICATIONS.

207. ADMINISTRATIVE PROCEDURES TO INSURE LICENSE COMPLIANCE

207.1 GENERAL ORGANIZATION OF THE CHEMICALS DIVISION

THE GENERAL ORGANIZATIONAL STRUCTURE OF THE CHEMICALS DIVISION IS SHOWN ON FIGURE 1.

VICE PRESIDENT

THE VICE-PRESIDENT, FUELS DIVISION, HAS GENERAL OVERALL RESPONSIBILITY FOR THE CHEMICAL DIVISION.

MANAGER, CHEMICAL OPERATIONS

THE MANAGER, CHEMICAL OPERATIONS IS RESPONSIBLE TO THE VICE PRESIDENT, FUELS DIVISION, FOR ALL ACTIVITIES OF THE CHEMICALS DIVISION.

207.1.1 OPERATIONS

PLANT MANAGER

IN GENERAL, THE PLANT MANAGER HAS GENERAL RESPONSIBILITY TO THE MANAGER, CHEMICAL OPERATIONS, FOR PRODUCTION AND CONTINUED SAFE AND EFFICIENT PLANT OPERATION. THIS INCLUDES NUCLEAR SAFETY, RADIATION AND INDUSTRIAL HYGIENE, GENERAL SAFETY AND URANIUM ACCOUNTABILITY.

PROCESS ENGINEER

A PROCESS ENGINEER IS ASSIGNED TO EACH PRODUCTION AREA AND IS RESPONSIBLE TO THE PLANT MANAGER FOR THE PROPER AND SAFE OPERATION OF THE PROCESS AND PRODUCT QUALITY. THE PROCESS ENGINEER WRITES DETAILED PROCESS PROCEDURES SPECIFYING THE EQUIPMENT TO BE USED AND MAKING SPECIAL NOTE OF REQUIRED NUCLEAR SAFETY PROCEDURES.

THE PROCESS ENGINEER ALSO HAS THE RESPONSIBILITY IN CONJUNCTION WITH THE FOREMAN TO TRAIN THE PLANT OPERATORS IN THE PROPER AND SAFE USE OF THE EQUIPMENT.

SAFETY DIRECTOR

ONE OF THE PROCESS ENGINEERS HAS BEEN DESIGNATED BY THE PLANT MANAGER AS SAFETY DIRECTOR. IN THIS CAPACITY, THE SAFETY DIRECTOR IS RESPONSIBLE FOR OVERALL GENERAL PLANT SAFETY.

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THIS INCLUDES INDUSTRIAL HYGIENE, HOWEVER, THESE DUTIES OVERLAP WITH THE NUCLEAR SAFETY GROUP.

FOREMEN

THE FOREMEN HAVE THE RESPONSIBILITY FOR THE DAILY SUPERVISION OF THE PLANT OPERATORS. THIS INCLUDES JOB ASSIGNMENT, INSTRUCTION OF THE OPERATORS IN THE USE OF THE EQUIPMENT AND FOLLOW-UP SURVEILLANCE TO INSURE CONTINUED ADHERANCE TO GENERAL AND SPECIFIC PROCEDURES. WHEN NEW EQUIPMENT IS STARTED FOR THE FIRST TIME, THE FOREMAN AND PROCESS ENGINEER WORK TOGETHER TO INSTRUCT THE OPERATOR.

TECHNICIANS

TECHNICIANS ARE ASSIGNED TO THOSE PROCESSES REQUIRING CLOSE AND CONSTANT CONTROL OF THE PROCESS TO INSURE AN ACCEPTABLE END PRODUCT. ANY DEVIATIONS FROM THE DETAILED PROCESS PROCEDURES ARE REPORTED TO THE FOREMAN AND PROCESS ENGINEER FOR CORRECTION.

207.1.2 TECHNICAL DEPARTMENT

THE TECHNICAL DEPARTMENT HAS THE RESPONSIBILITY FOR DEVELOPING PROCESS AND EQUIPMENT DESIGN CRITERIA AND OPERATION PROCEDURES FOR NEW PRODUCTS. THE TECHNICAL DEPARTMENT ALSO DEVELOPS AND PERFORMS TESTS ON THE VARIOUS PRODUCTS PRODUCED BY THE CHEMICALS DIVISION.

207.1.3 MANAGER OF ADMINISTRATION/ENGINEERING

THE MANAGER OF ADMINISTRATION/ENGINEERING REPORTS TO THE MANAGER, CHEMICAL OPERATIONS, AND IS RESPONSIBLE FOR ADMINISTRATION, ENGINEERING, INDUSTRIAL/PERSONNEL RELATIONS, PLANNING AND OTHER SUPPORT PLANNING OF THE DIVISION.

SUPERVISOR, NUCLEAR SAFETY

THE SUPERVISOR, NUCLEAR SAFETY HAS THE RESPONSIBILITY FOR:

1. AUDITING ALL ACTIVITIES AS RELATED TO CRITICALITY, RADIATION PROTECTION AND HEALTH PHYSICS.
2. OBTAINING AEC APPROVAL OF PROCEDURES AND EQUIPMENT INVOLVED IN PROCESSING SOURCE AND SPECIAL NUCLEAR MATERIAL.
3. AUDITING PLANT PROCEDURES TO INSURE CONTINUED COMPLIANCE WITH APPROVED PROCEDURES RELATED TO CRITICALITY AND RADIATION PROTECTION.

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207.2.5 SEPARATION OF LICENSED AND ACCOUNTABILITY STATION MATERIAL

LICENSED AND ACCOUNTABILITY STATION MATERIAL ARE SOMETIMES PROCESSED CONCURRENTLY IN THE SAME PLANT AREA. IN THIS EVENT, THE APPLICABLE CRITICALITY, RADIATION PROTECTION AND HEALTH PHYSICS PROCEDURES IN EFFECT IN THE AREA ARE UNIFORMLY APPLIED TO BOTH TYPES OF MATERIAL.

THE PROCEDURES FOR MATERIAL IDENTITY DISCUSSED IN PARAGRAPH 207.2.4 APPLIES TO BOTH STATION AND LICENSED MATERIAL. HOWEVER, TO MAINTAIN THE IDENTITY OF STATION AND LICENSED MATERIAL, THE ACCOUNTABILITY STATION IDENTIFICATION LETTERS "UNC" ARE STAMPED IN ONE INCH HIGH LETTERS ON THE TAGS OF ALL CONTAINERS OF STATION MATERIAL.

207.3 SPECIAL NUCLEAR MATERIAL QUANTITIES

THE ESTIMATED ANNUAL THROUGHPUT IS EXPECTED TO BE APPROXIMATELY:

ENRICHMENT RANGE	KILOGRAMS URANIUM
DEPLETED	5,000
NORMAL-5%	100,000
5%-50%	2,000
50%-90%	500
90%-93%	3,000

THE ABOVE QUANTITIES REFER TO MATERIAL ALLOCATED UNDER SEC. 53 OF THE ATOMIC ENERGY ACT OF 1954 ONLY AND DO NOT INCLUDE MATERIALS RECEIVED FROM OTHER SOURCES.

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THE LIQUOR IS DRAINED FROM THE FIVE INCH DIAMETER TANKS INTO ONE GALLON BOTTLES OR 4 LITER BEAKERS AND FILTERED ON THE BUECHNER FILTER FUNNELS.

THE SOLID ANGLE OF INTERACTION BETWEEN UNITS IN THIS HOOD IS A MAXIMUM OF .641 STERADIANS AND OCCURS AT FILTER FUNNEL No. 1. THE CORRESPONDING SAFE SOLID ANGLE IS 3 STERADIANS USING A "K" FACTOR OF 0.6 (REFERENCE PARAGRAPH 301.3.6).

Recovery Hood 240-2-25

THIS HOOD IS ALSO USED FOR DISSOLUTION, PRECIPITATION AND FILTRATION OF URANIUM COMPOUNDS. AS SUCH, FOUR LITER BEAKERS ARE USED FOR DISSOLUTION AND PRECIPITATION. TEN INCH DIAMETER BY FOUR INCH DIAMETER HIGH BUECHNER FILTER FUNNELS AND 4 LITER FILTER FLASKS ARE USED FOR FILTRATION. IN ADDITION, AN OVEN IS AVAILABLE FOR DRYING THE FILTER CAKE.

WHEN MORE THAN ONE SAFE VOLUME OR SAFE GEOMETRY PIECE OF EQUIPMENT IS USED, THE HOOD IS PARTITIONED INTO ZONES SUCH THAT EACH ZONE CONTAINS ONLY ONE ITEM SUCH AS A BEAKER OR FILTER FUNNEL AND FLASK. METAL PARTITIONS ARE ARRANGED TO PROVIDE A MINIMUM OF ONE FOOT SPACING BETWEEN UNITS. AS SUCH THE HOOD CAN BE DIVIDED INTO A MAXIMUM OF FOUR SUCH ZONES ALL ON THE SAME LEVEL.

THE OVEN IN THE HOOD IS THE SAME SIZE AS THAT USED FOR DRYING UF_4 IN THE UF_6 TO UF_4 HOOD (240-2-21). AGAIN, TWO SHELVES SPACED 16 INCHES APART ARE USED.

THE ONE FOOT SPACING (SURFACE TO SURFACE) IS SAFE FOR VOLUMES UP TO 4.8 LITERS. IT WAS PREVIOUSLY CALCULATED (PARAGRAPH 301.2.8) THAT THREE BUECHNER FUNNELS IN LINE SPACED ONE FOOT APART SUBTENDED A SOLID ANGLE LESS THAN 1 STERADIAN AT THE CENTRAL UNIT WHEREAS THE SAFE SOLID ANGLE FOR THE BUECHNER FUNNEL IS 3 STERADIANS.

THE SOLID ANGLE SUBTENDED BETWEEN TWO 4.8 LITER SAFE VOLUME SPHERES SPACED 12 INCHES SURFACE TO SURFACE IS 0.25 STERADIANS. THE ALLOWABLE SOLID ANGLE FOR 4.8 LITER VOLUMES IS 1.9 STERADIANS (K-1019, FIFTH REVISION, TABLE XVII). THUS THE CONTRIBUTION TO THE SOLID ANGLE BY THE TWO TRAYS IN THE OVEN (0.14 STERADIANS) TO OTHER UNITS IN THIS HOOD CAN BE NEGLECTED.

Recovery Hood 240-2-26

THE EQUIPMENT USED IN THIS HOOD IS THE SAME AS THAT DESCRIBED ABOVE FOR HOOD 240-2-25 EXCEPT IN PLACE OF AN OVEN, A SAFE DIAMETER DISSOLVING SYSTEM IS INSTALLED. THIS IS SHOWN IN FIGURE 19. THERE HAS BEEN SUFFICIENT DISCUSSION PRIOR TO THIS TO MAKE FURTHER COMMENT ON THE NUCLEAR SAFETY OF THIS EQUIPMENT UNNECESSARY.

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