

APPLICATION FOR  
SPECIAL NUCLEAR MATERIAL LICENSE

CLEVITE RESEARCH CENTER  
Division of Clevite Corporation

July 27, 1957  
Cleveland, Ohio

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APPLICATION FOR  
SPECIAL NUCLEAR MATERIAL LICENSE

I. Applicant

Clevite Research Center, Division of (Clevite Corporation) a corporation incorporated in the State of Ohio and having its principal offices at 17000 St. Clair Avenue, Cleveland 10, Ohio.

Full names, addresses, and citizenship of Applicant's principal officers:

James L. Myers, Chairman of the Board  
2841 Weybridge Road, Shaker Heights, Ohio

W. Russell Burwell, Vice-Chairman of the Board  
291 Corning Drive, Bratenahl, Ohio

William G. Laffer, President  
Brookwood Road, Lyndhurst, Ohio

O. P. Gokay, Vice President-Finance and Treasurer  
3189 Onaway Road, Shaker Heights, Ohio

Frank Fraser, Secretary  
2534 Bolton Road, Cleveland Heights, Ohio

All the corporate officers listed above are citizens of the United States.

There are no corporate officers located at Clevite Research Center.

The Applicant is neither owned nor is it controlled directly or indirectly by any alien foreign corporation or foreign government.

II. Activity

The special nuclear material license is requested for the production of fuel elements and other components for nuclear reactors.

The Applicant intends to process special nuclear material of all enrichments to the requirements of its customers. The work will be performed at Clevite Research Center, 540 East 105th Street, Cleveland 8, Ohio. The processes will involve melting, alloying, forging, rolling, welding, pickling, chemical

analysis, metallographic analysis, machining, stamping, and the sintering of powders and ceramic materials.

The initial processing operation under the present license application may be the production of fuel element assemblies for ACF Industries, Inc., Nuclear Energy Products Division (Request for Quotation No. 75) to be used by them in the fulfillment of their Contract No. 16-4831 with the Comitato Nazionale Per Le Ricerche Nucleari.

### III. Period

The license is requested for a period of two (2) years.

### IV. Uses of Materials

The Applicant requests permission to possess and maintain a supply of up to 10 kilograms of contained uranium in the isotope-235. This special nuclear material will be used by the Applicant in the development and fabrication of reactor components. Additionally, the Applicant will process material allocated to prime users who, in turn, will furnish material to Applicant in the enrichment and quantity they desire to be processed. Thus quantity and enrichment cannot be specified in advance of specific orders from prime users. Normally, it is expected that the material will be received in metal or oxide form. In the event a contract is awarded to Clevite Research Center by ACF Industries, Inc., it is planned that sufficient uranium of 20% enrichment will be supplied to the Applicant under arrangements made by the Comitato Nazionale Per Le Ricerche Nucleari to promote the production of fuel element assemblies.

### V. Material Requirements

In the case of the fabrication of fuel element assemblies for ACF Industries, Inc., the first shipment of special nuclear material is desired on or about

October 1, 1957, and all shipments of the completed fuel element assemblies are to be made on or about February 15, 1958. The request for the delivery of the material from the Atomic Energy Commission will be made by the Comitato Nazionale Per Le Ricerche Nucleari, although it is presently planned that the material will be delivered into the Applicant's custody at facilities of the Atomic Energy Commission.

The Applicant requires special nuclear material in the amount of 10 kilograms as stated in paragraph IV. When a commercial contract is awarded, additional ascertainable amounts of special nuclear material will be required.

The Applicant's present estimates are that operating losses should not exceed 1%

#### VI. Technical Qualifications

The Applicant makes products where problems associated with purity, toxicity, and value of the material require rigid control from the technical, health, safety, and accountability standpoints. The Applicant has a technical manpower team well qualified to handle problems associated with the processing of special nuclear materials.

The principal staff members who will carry out the work covered by this license have experience in the nuclear field. A brief description of their experience and training will be found in Appendix A attached.

The Applicant was approved by the Chicago office of the Atomic Energy Commission on February 5, 1957 for accountability and authorized to use the facility symbol CRX. The Clevite Research Center was inspected by representatives of the Health and Safety Division of the Chicago Operations Office of the Atomic Energy Commission on January 24, 1957 and approval was granted on February 14th through the Pittsburgh Area Office of the Atomic

## VII. Safety

The general equipment and facilities used by the Applicant to protect health and minimize danger to life and property are as follows:

- Separate "clean" and "dirty" locker facilities
- Showers
- Protective clothing
- Laundry facilities
- Film badges
- Survey meters
- Room monitors sensitive to gamma radiation connected to an alarm system
- Air filters
- Air samplers
- Vacuum cleaning system
- Dry boxes for handling all uranium containing material of a dusty nature
- Hoods for use in processing material
- "Always safe" containers for enriched material received from the customers or from the Atomic Energy Commission
- "Always safe" containers for packing the product
- Separate processing facilities for each enrichment handled at any one time
- Process equipment designed to conform insofar as possible to "always safe" geometry and to contain no more than "always safe" quantities of the enrichment being processed.

## VIII. Operating Procedures

There are, at Clevite Research Center, procedures to protect health and minimize danger to life and property. In the following paragraphs some of the procedures applicable to the handling of special nuclear material are outlined. The complete operating procedures are attached as Appendix B. They are based on providing maximum safety to operating personnel, other employees, and to the public.

A. Health Control

1. All employees engaged in the nuclear program will be thoroughly screened prior to employment to determine that they are in excellent physical condition, have no noticeable lung defects as detected by X-ray apparatus, have no detectable urinary albumin, and have normal blood count.
2. A quarterly check-up for blood count and urine analysis on all employees engaged in the Clevite Research Center nuclear program will be made regardless of their work activities, and more frequent check-ups will be made if it is suspected that an employee may have been exposed to large concentrations of uranium dust, or if his radiation film badge indicates high radiation dosages.
3. Radiation film badges, supplied by R. S. Landauer, Jr. & Company, Park Forest, Illinois, will be furnished to all employees engaged in the nuclear program and developed on a bi-weekly basis to determine their body exposure. A wrist-type film badge for employees operating dry boxes, also to be developed on a bi-weekly basis will be used to determine radiation exposure to hands and forearms.
4. A physical examination, including chest X-rays, will be given annually to all employees engaged in the nuclear program.
5. A dispensary staffed by a Registered Nurse under the supervision of the Clevite Research Center physician is maintained on the premises.

6. Other personnel safety.

- a) To protect other personnel from radiation and air-borne dust hazards, all operations not performed in dry boxes will be carried out under hoods. These hoods will be accessed to the outside atmosphere through dust collectors or wet scrubbers to stop dispersal. At any stage in the process, material from which dust might be released will be handled by operators wearing approved dust respirators, and all points that may be dust generating will be surrounded by local pick-up to minimize the general atmospheric dust burden.
- b) Extreme dust operations, such as grinding or transfer of drawing material from one tray to another, and packaging will be performed in dust hoods to localize air-borne dust and to simplify the ventilation problems for the general manufacturing area.
- c) Periodic air samples of the general room atmosphere will be taken by representatives of the Health Physics Department to determine the actual air-borne dust as well as to localize dust generation. If it is found that any operation is producing more than the permissible amount of dust, additional precautions and/or changes in design will be undertaken.
- d) "Smear samples" will be taken periodically on equipment and floors to ascertain the level of radioactivity. Should any sample indicate radioactivity beyond safe limits, that piece of equipment or area will be isolated. Decontamination will be carried out by trained personnel. Following

decontamination, the equipment or area will be rechecked by smear sampling, prior to being returned to service.

- e) The Health Physics Department will also make periodic checks of the air-borne dust contamination down wind from the plant to determine stack losses. Health Physics monitors will also check the ground around the plant site on a periodic basis to determine what fall-out is occurring as a result of stack losses.

#### B. Material Control

1. In order to comply with Atomic Energy Commission health recommendations for both air and water contamination, special precautions will be taken to minimize stack losses and soluble enriched materials in waste water. All hoods will be vented through filters or wet scrubbers. All dust operations will be exhausted through high-efficiency dust collectors, either of the wool bag type, or of the disposable-bag type such as designed by the Chemical Warfare Service.
2. All plant effluent will be treated in two (2) ways:
  - a) If the value of the enriched material is less than \$200 per pound, liquid will be filtered and filter paper burned with other burnable materials which have been contaminated. Ashes will be disposed of by approved methods. Filtrate will be checked for activity prior to dumping.
  - b) In the case of higher value material in excess of \$200 per pound, waste waters will be checked for concentration of enriched material. If the concentration is sufficiently high, liquid will be evaporated and residue salvaged and returned.



to the assigned Atomic Energy Commission facility as reclaimable scrap.

These provisions are planned to insure that the Applicant will not contaminate either the surrounding atmosphere or the drainage system into which the drainage is discharged.

C. Criticality Control

1. To prevent the assembly of a critical mass, the following safety precautions will be in effect.
  - a) All incoming material in excess of 15 kilograms of contained uranium in the isotope-235 will be received in "always safe" containers. The geometry of these containers will be that approved by the Atomic Energy Commission.
  - b) Room monitors for the detection of excessive gamma radiation will be connected to an alarm system.
  - c) The finished product will be shipped in "always safe" containers, and in the case of highly enriched material the Applicant will use a combination of safe batch size and safe geometry.
  - d) Any process where safety is dependent on batch size control rather than "always safe" conditions, a system of checks and balances to insure proper control will be established.

#### D. Transport of Enriched Material

1. All enriched material to be processed at Clevite Research Center is expected to be supplied packaged in "always safe" containers by the Atomic Energy Commission's contractor from whom it is obtained. The material will be transported from an Atomic Energy Commission site of origin to Clevite Research Center in the Applicant's vehicle, or in a vehicle leased for this purpose. A "Q"-cleared technically-trained employee of the Applicant will accompany each shipment. Upon arrival at Clevite Research Center the enriched material will be placed in an AEC-approved storage vault or safe where it will remain in storage, and no container will be removed until the material is to be introduced into the manufacturing process under the strict control of technically trained, supervisory personnel.

#### E. Processing of Enriched Material

1. No enriched material will be removed from the vault or safe to the manufacturing floor until a need for the enriched material exists upon the manufacturing floor, and no material will be removed from the "always safe" container on the manufacturing floor until it is required in the fabrication process. Movements as outlined above will be under the personal supervision of the technical supervisor.

#### F. Shipment of Finished Product

1. When the processing operation is completed, the finished product will be packaged in shipping containers acceptable to the Atomic Energy Commission, the Interstate Commerce Commission, and the customer, and will be stored in a vault or safe. Upon accumulation of a lot, the packaged product will be shipped to the purchaser in accordance with contractual arrangements.

G. General - Accident Control

1. The possibility of a non-nuclear accident at Clevite Research Center is remote. The entire arrangement of the building and equipment was directed towards minimizing such accident possibilities. For example:
  - a) The main production building is fire resistant. The entire structure is steel and concrete.
  - b) The storage vaults or safes are non-combustible of conforming concrete construction. This affords maximum protection at the point of maximum enriched material concentration.
  - c) There are no direct openings to the sewer in the production areas thus preventing a spread of radioactivity in case of a liquid spill or accidental water spray. Excess water will be stored in tanks.
  - d) Raw enriched material and finished products will be stored in "always safe" containers of fireproof design.
  - e) The floor elevation of all working storage areas is more than ten (10) feet above the 100-year flood maximum.
  - f) All dusty operations will be enclosed in dry boxes to isolate dust and minimize air-borne contamination.
  - g) Suitable fire extinguishers will be available in the production building and in the storage vaults or safes.

- h) All movable equipment such as dollies, fork trucks, etc. will have rubber tires.
- i) Storage vaults or safes are designed to permit a large central working aisle to facilitate accessibility.

It is believed that these features should preclude the possibility of a non-nuclear accident causing a spread of radioactivity.

- 2. In case of a non-nuclear accident such as a fire or violent chemical reaction, the following provisions have been made to limit the extent of damage, and to minimize the spread of radioactivity outside the premises under the Applicant's control.
  - a) Personnel are organized into fire brigades and have been given thorough instructions in handling emergencies both from the standpoint of personal and property protection.
  - b) Adequate equipment such as fire extinguishers, gas masks, chemical resistant suits, and first-aid supplies will be maintained at Clevite Research Center.
  - c) Close liaison with the local fire protection authorities has been established and will be maintained to be certain that the special nature of any problems that might arise are completely understood by these public officials. The program will be a continuing one with frequent contacts between Clevite Research Center safety personnel and the local fire department. It will include such items within the limits of security as plant visits and inspections by the local fire marshal, explanations of special situations that might occur, and how they should be handled. The Applicant's past ex-

perience with the fire prevention authorities has demonstrated that the local fire fighting personnel are willing to cooperate in such a program.

IX. Petition

Applicant respectfully requests that the Atomic Energy Commission grant Applicant a license for special nuclear material as specified herein. Applicant agrees to accept the responsibility connected with the license as stated in Title 10, Code of Federal Regulations, Part 70, for special nuclear material.

IN WITNE<sup>S</sup> HEREOF, Clevite Research Center, a division of Clevite Corporation has caused its name to be hereunto signed and its corporate seal to be hereto affixed by its duly authorized officers, this 22 day of July, 1957.

CLEVITE RESEARCH CENTER  
Division of Clevite Corporation

By William S. Laffer  
W. G. Laffer

Title President  
Clevite Corporation

Attest:

E. J. Gilmore  
E. J. Gilmore, Assistant Secretary  
Clevite Corporation

(CORPORATE SEAL)

Sworn to before me this 22 day of  
July, 1957.

Carolyn Ward  
Notary Public

CAROLYN WARD, Notary Public  
My Commission Expires May 19, 1958

(NOTARY SEAL)

GLOSSARY

SOURCE MATERIAL      Source material means any material except special nuclear material which contains by weight 1/20 of 1% (0.05%) or more of 1) uranium, 2) thorium, or 3) any combination thereof.

SPECIAL NUCLEAR MATERIAL      Special nuclear material means:  
1) Plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Atomic Energy Commission, pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, determines to be special nuclear material, but does not include source material; or  
2) Any material artificially enriched by any of the foregoing but does not include source material.

CLEAN      A condition which by control and checking is below the allowable contamination limits for nuclear materials.

DIRTY      A condition which takes place when there is a good possibility of contamination by nuclear materials.

ALWAYS SAFE      Conditions which make it impossible for a fission reaction to begin.

FUEL ELEMENT      Any individual element, or plate, or assembly of plates.

