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APPLICATION FOR
SPECIAL NUCLEAR MATERIAL LICENSE

*Class Review
not required
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*Docketed
1-28-58
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CLEVITE RESEARCH CENTER
Division of Clevite Corporation

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January 24, 1958
Cleveland, Ohio

Appendix B is Co. Conf

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

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

The initial processing operation under the present license application will be the production of fuel element assemblies for Nuclear Products-ERCO, Division of ACF Industries, Inc., to be used by them in the fulfillment of their Contract with Aktiebolaget Atomenergi, Lovholmsvegen 5-7, Stockholm 9, Sweden.

III. Period

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

IV. 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 before April 1, 1958, and all shipments of the completed fuel element assemblies are to be made on or before September 1, 1958. The request for the delivery of the material from the Atomic Energy Commission will be made by the Applicant.

The Applicant requires special nuclear material in the amount of 9,010 grams 90% enriched in U-235.

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

V. 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. 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; approval was granted on February 14th through the Pittsburgh Area Office of the Atomic Energy Commission, reference MAT-RBL-7/78 for natural uranium, and on October 28th 1957, reference MAT-CJB-7/100 for enriched uranium. The latest facility security approval was received from the Chicago Operations Office of the Atomic Energy Commission on November 29, 1957.

VI. 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
- 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

VII. 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, or radioactive contaminant, and have normal blood count.
2. A semiannual blood test and a quarterly 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 identical to the pre-employment 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 personnel from air-borne radioactive contaminants, the area ventilating system and 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 or fumes might be released will be handled by operators wearing approved dust respirators, and all points that may be dust or fume generating will be surrounded by local pick-up to minimize the general atmospheric dust or fume 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 Safety 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 decontaminated by trained personnel. Following decontamination, the equipment or area will be rechecked by smear sampling, prior to being returned to service.

- e) The Health Safety Department will also make periodic checks of the air-borne dust contamination down wind from the plant to determine stack losses. Health Safety inspectors 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.
2. All plant effluent will be treated as follows:
 - a) All air effluent will be discharged from the control area through filters and the filters retained.
 - b) All liquid effluent will be filtered and evaporated into sludge form and retained in storage drums.

These provisions are planned to insure that the Applicant will not contaminate either the surroundings or the drainage system.

C. Criticality Control

1. To prevent the assembly of a critical mass, the following safety precautions will be in effect.
 - a) All incoming special nuclear material will be received in "always safe" containers. The geometry of these containers will be that approved by the Atomic Energy Commission.
 - b) 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.

- c) All material flow associated with the process operation will be under the direct control of one individual.

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. Upon arrival at Clevite Research Center the enriched 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. 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.

F. 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 drums.
- d) The floor elevation of all working storage areas is more than ten (10) feet above the 100-year flood maximum.
- e) All dusty operations will be enclosed in dry boxes or performed under hoods to isolate dust and minimize air-borne contamination.
- f) Suitable fire extinguishers will be available in the production building and in the storage vaults or safes.
- g) All movable equipment such as dollies, fork trucks, etc. will have rubber tires.
- h) 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 experience with the fire prevention authorities has demonstrated that the local fire fighting personnel are willing to cooperate in such a program.

VIII. 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 WITNESS WHEREOF, 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 27th day of January 1958.

CLEVITE RESEARCH CENTER
Division of Clevite Corporation

By William G. 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 27 day of
January 1958

Carleton Ward
Notary Public

(NOTARY SEAL)

CARLETON WARD, Notary Public
My Commission Expires July 19, 1958

APPENDIX A

Experience and Training
of Principal Staff Members
Engaged in Clevite Research Center
Nuclear Program

ARTHUR D. SCHWOPE - Manager, Materials Division, has been with Clevite Research Center since 1953. Previously he had spent several years with Battelle Memorial Institute. His work in the nuclear field includes extensive experience in the research and development of nuclear reactor fuel element alloys and the fabrication of the elements. He received his B. E. in Chemistry from Marquette University and his M. S. in Metallurgy from Ohio State University.

JOSEPH F. CERNESS - Head, Bearing and Friction Materials Section, transferred to Clevite Research Center in 1953 after having been with Cleveland Graphite Bronze Company since 1940. He has a B. S. and M. S. in Metallurgy from Case Institute of Technology. He has extensive experience in research and development of alloys for bearing purposes with emphasis on bonding to form bi-metallic materials which can be rolled, formed and worked into various shapes and still maintain specified structures and properties; fundamental work on single crystal, high-purity metals for semiconductors; and research on materials for use with reactors and air-borne power systems.

GAIL F. DAVIES - Staff Engineer, Process Engineering Section, performed research on titanium and its analysis and fabrication; worked with explosive powders, high vacuum equipment, etc. He has been with the Clevite Research Center and a predecessor, Brush Laboratories Company, since 1948. Prior to that he was with Johnson Bronze Company and Cleveland Graphite Bronze Company.

HANS JAFFE - Manager, Physics Division, received his Ph. D. in Physics from Goettingen. He has been with Clevite Research Center and Brush Laboratories, a predecessor, since 1940. His work has been in piezoelectricity, crystal optics, electric properties of metal-ammonia compounds, growth of single crystals and ferroelectric compounds.

ROBERT D. JOHNSON- Head, Materials Research Section, joined Clevite Research Center in 1956. He received a B. S. in Physics from Baldwin-Wallace College, and M. S. in Physics and a Ph. D. in Physical Metallurgy from Case Institute of Technology. While with North American Aviation and Battelle Memorial Institute he conducted fundamental studies on creep and plastic deformation of metals, dimensional instability of uranium, and the effects of reactor and cyclotron irradiation on intermetallic and self-diffusion and on physical and mechanical properties of alloys.

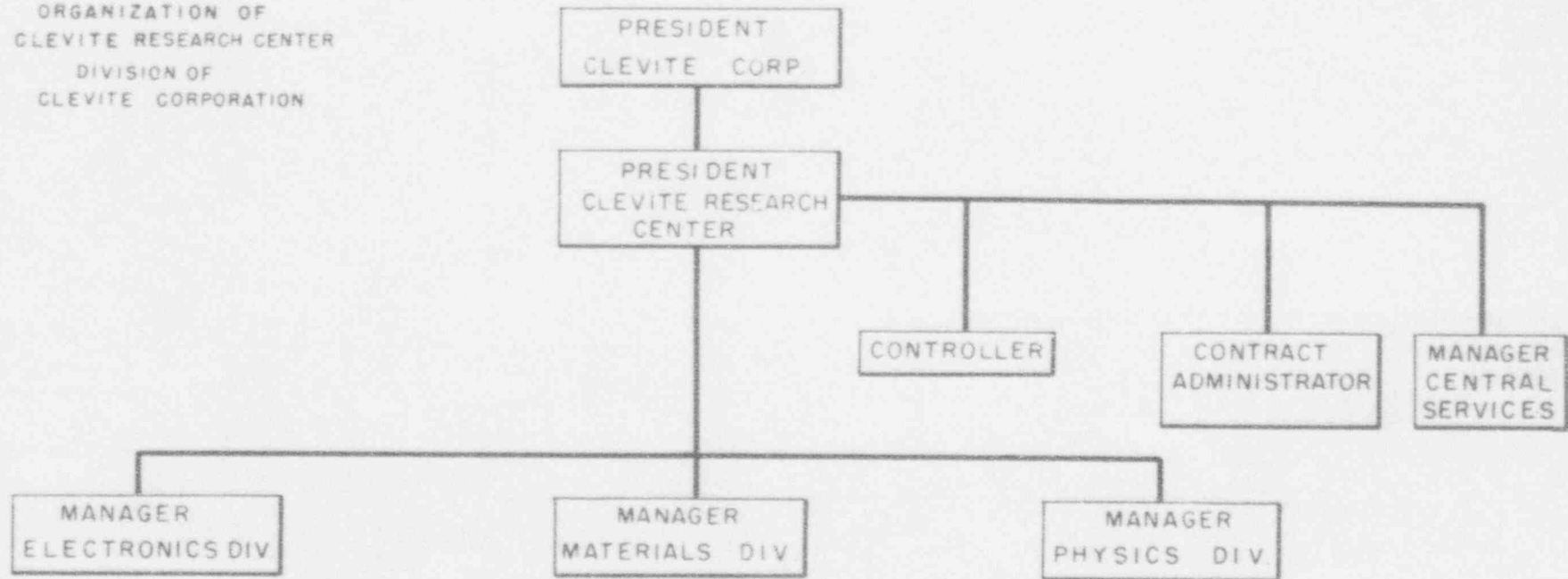
GRANT W. LA PIER - Head, Process Engineering Section, has had experience in the development of metals and alloys to meet specific physical properties. He has supervised the metallurgical control for the production of sleeve bearings for strategic war equipment. He has managed plant operations for the production of aircraft and diesel engine bearings which involved detailed specifications and standards. He has supervised the production of fuel elements and parts thereof and currently is engaged in this type of work. He has cooperated with other companies in the study of nuclear projects.

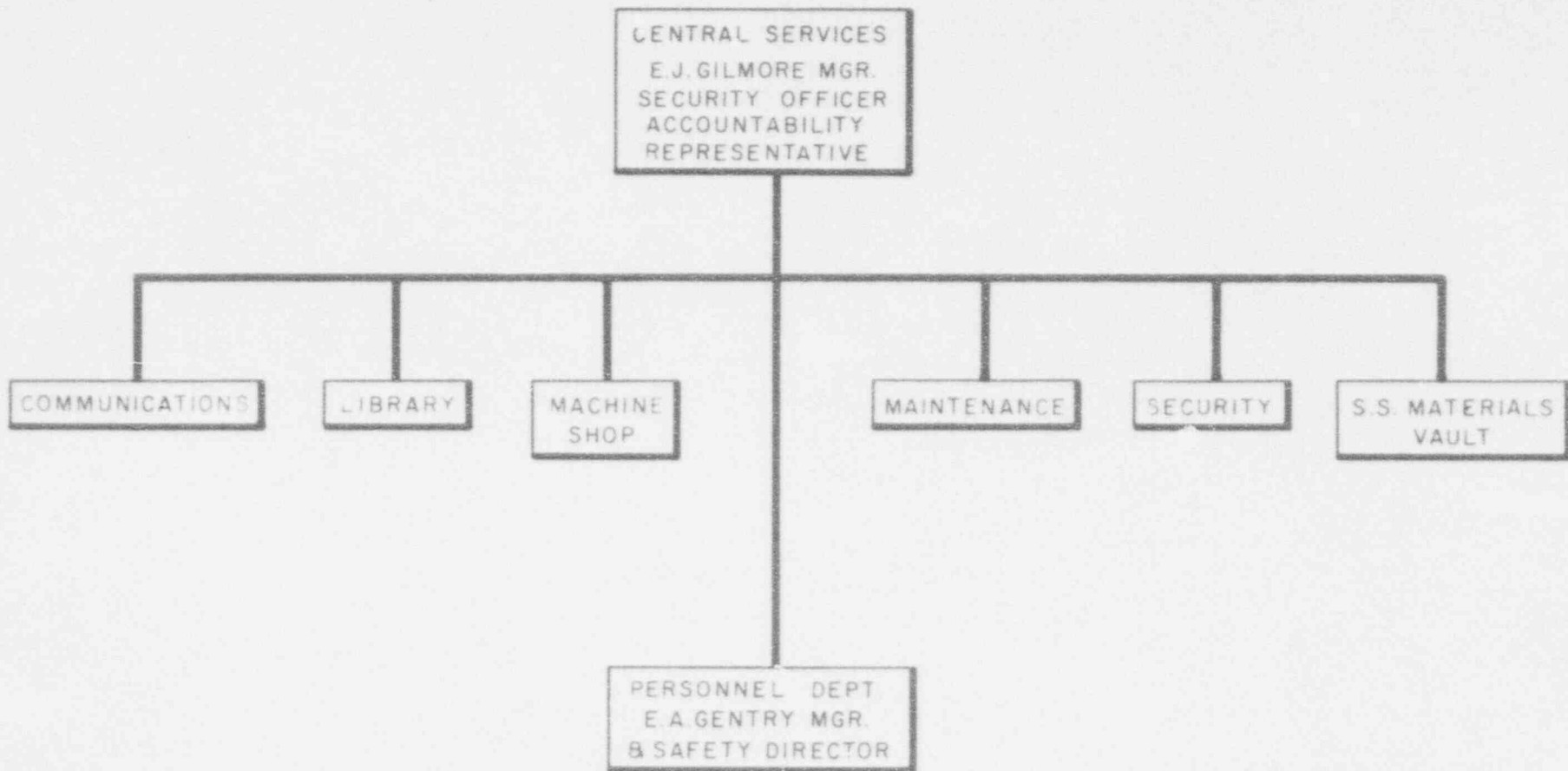
EMIL PEROUT - Senior Metallurgist, Materials Division, has considerable experience in the field of radiation instrumentation and has conducted research and development on rolling, bonding and cladding of dissimilar metals. He received a B. E. of Metallurgy from Fenn College and an M. S. in Metallurgy from the University of Cincinnati. He was with Fenn College and National Spectrographic Laboratories before joining Clevite Research Center in 1953.

MILTON L. SELKER - Head, Chemistry and Rubber Section, received his B. A. and M. A. in Chemistry and his Ph. D. in Physical Organic Chemistry from Western Reserve University. Prior to joining Clevite Corporation in 1952, he was with Bell Telephone Laboratories. His experience includes work on single crystal techniques with high-purity metals, the plating of materials and inquiries into friction materials.

CLEVITE RESEARCH CENTER
DIVISION OF
CLEVITE CORPORATION
JANUARY 1, 1958

ORGANIZATION OF
CLEVITE RESEARCH CENTER
DIVISION OF
CLEVITE CORPORATION





CLEVITE RESEARCH CENTER
CENTRAL SERVICES

JANUARY 1, 1958