

CURTISS-WRIGHT CORPORATION  
RESEARCH DIVISION

BRIGHTON ROAD  
CLIFTON, NEW JERSEY  
U. S. A.

APPLICATION NO. *72*

*exp. to make  
for...*  
October 24, 1956

To: Atomic Energy Commission  
1901 Constitution Avenue  
Washington 25, D. C.

Attention: Division of Civilian Application

Via: United States Atomic Energy Commission  
Schenectady Operations Office  
P.O. Box 1069  
Schenectady, New York

Subject: Application for Class 104-c License for Research and  
Development Facility and By-Product Material License

Enclosures: (A) Six (6) copies of Application for License  
(B) Six (6) copies of Hazards Summary Report  
(C) Six (6) copies of Curtiss-Wright Corporation  
1955 Annual Report

1. Curtiss-Wright Corporation, Research Division, currently engaged in atomic energy programs of military importance, requires a research and development facility to further its work in both military and commercial applications of atomic energy. It is therefore requested that a Class 104-c License be granted for the erection and use of a research and development facility at this Company's Research and Development Center in Quehanna, Pennsylvania. Additionally, it is requested that a license be issued for the production, use and transfer of by-product material.
2. Appendix I attached hereto indicates the extent of Research Division's participation in nuclear energy programs for both Air Force and Atomic Energy Commission. It is the intention of this Division to further investigate new and expanded uses of atomic energy. Specific programs planned include design and development of nuclear propulsion systems for aircraft, processing of nuclear fuels, development of reactor materials, design and development of shipboard and stationary powerplants, nuclear instrumentation, design and development of nuclear equipment, study of radiation damage, and investigation of shielding materials and techniques.

*6*  
2004-0043

*E-1*

To: AEC, Washington 25, D. C., Attn: Division of Civilian Application  
Subj: Application for Class 104-c License for Research and Development  
Facility, and By-Product Material License

3. Curtiss-Wright Corporation's Annual Report for the year 1955 is submitted in evidence of the Contractor's financial qualifications to engage in the proposed atomic energy activities and to assume financial responsibility for the special nuclear material required.
4. Six (6) copies of Application for License (with attached Hazards Summary Report), executed in accordance with instructions of the Atomic Energy Commission, are herewith submitted for consideration.

Respectfully,

CURTISS-WRIGHT CORPORATION  
RESEARCH DIVISION



George R. Hill  
Vice President for Finance



EJK:wcb

*Cop. to Helen Stettin  
for Bessie  
10/17/48*

U. S. ATOMIC ENERGY COMMISSION  
Washington 25, D. C.

Application for Class 104-c Research and Development Facility License  
and By-Product Material License

- A. Name of Applicant: Curtiss-Wright Corporation, Research Division
- B. Address of Applicant: Quehanna, Pennsylvania
- C. Description of Business or Occupation of Applicant: Research Division of the Curtiss-Wright Corporation is engaged in research and development in numerous fields of science including aerodynamics, thermodynamics, metallurgy, chemistry, nuclear energy, ultrasonics, electronics, and plastics. Nuclear Power Department of the Research Division is presently actively participating in classified nuclear programs for both the Department of Defense and the Atomic Energy Commission.
- D. (1) Curtiss-Wright Corporation, is incorporated in the state of Delaware; its principal office is 50 Rockefeller Plaza, New York 20, New York.
- (2) The names, addresses and citizenship of the corporate directors and principal officers are as follows:

<u>Name and Address</u>	<u>Office Held</u>	<u>Citizenship</u>
Edwin J. Beinecke Sperry & Hutchinson Co. 114 Fifth Avenue New York 11, New York	Director	United States
6 T. Roland Berner 	Director	United States
James G. Byron Curtiss-Wright Corporation Wood-Ridge, New Jersey	Director and Vice President	United States
6 Levin H. Cambell, Jr. 	Director	United States
J. Cheever Cowdin Cady, Roberts and Co. 488 Madison Avenue New York 22, New York	Director	United States
Nicholas Dykstra Curtiss-Wright Corporation Wood-Ridge, New Jersey	Vice President	United States

<u>Name and Address</u>	<u>Office Held</u>	<u>Citizenship</u>
Lou R. Crandall George A. Fuller Co. 597 Madison Avenue New York 22, New York	Director	United States
6 Charles A. Dana [REDACTED]	Director	United States
George R. Hill Curtiss-Wright Corporation Wood-Ridge, New Jersey	Director and Vice President for Finance	United States
Roy T. Hurley Curtiss-Wright Corporation Wood-Ridge, New Jersey	Chairman and President	United States
Robert W. Lea Olin Mathieson Chemical Corp. 460 Park Avenue New York 22, New York	Director	United States
6 Stuart R. Reed [REDACTED]	Director	United States
Lloyd H. Smith 1838 Bank of the S.W. Building Houston, Texas	Director	United States
Henry S. Sturgis [REDACTED]	Director	United States
Thomas C. Coyne Curtiss-Wright Corporation Wood-Ridge, New Jersey	Vice President	United States
Wilton G. Lundquist Curtiss-Wright Corporation Wood-Ridge, New Jersey	Vice President	United States
Stanley B. Kurzina, Jr. Curtiss-Wright Corporation Wood-Ridge, New Jersey	Vice President	United States
William T. Lake Curtiss-Wright Corporation Wood-Ridge, New Jersey	Controller	United States

<u>Name and Address</u>	<u>Office Held</u>	<u>Citizenship</u>
M. E. Jordan, Jr. Curtiss-Wright Corporation Wood-Ridge, New Jersey	Secretary	United States
Gordon J. Staub Curtiss-Wright Corporation Wood-Ridge, New Jersey	Treasurer	United States

- (3) Curtiss-Wright Corporation is neither owned, controlled nor dominated by an alien, a foreign corporation, or foreign government.
- (4) Applicant is not acting as an agent or representative of another person in filing this application but is acting in its own behalf.
- E. Application is made for a class 104 license to construct and operate a utilization facility. This facility is to be used for research and development activities leading to additional and new uses of atomic energy for both military and commercial purposes. The license sought is to cover a twenty-year period of time. Another license applied for in connection with this proposed facility is one to produce, use and transfer by-product material. ✓
- F. The financial qualifications of the applicant are demonstrated by the attached annual report. The Balance sheets contained therein demonstrate the applicant's ability to engage in the proposed activities.
- G. Curtiss-Wright Corporation, Research Division, has been actively engaged in nuclear work for the past three years as a direct contractor of the U. S. Air Force and Atomic Energy Commission. The technical qualifications of the Nuclear Power Department, Research Division, are further illustrated in Appendix I.
- 
- H. The earliest and latest dates for completion of construction of the proposed utilization facility are June 1, 1957, and December 31, 1957, respectively. ✓

State of New Jersey)  
County of Bergen)

George R. Hill, being duly sworn, deposes and says that he is Vice President for Finance of the Curtiss-Wright Corporation mentioned in the foregoing application, that he has read the said application and knows the contents thereof and that the same is true to his own knowledge except as to the matters therein stated on information and belief and as to those matters he believes it to be true.

Sworn to before me  
this 24<sup>th</sup> day of October, 1956

  
Notary Public of NEW JERSEY  
My Commission Expires February 23, 1958



I, M. E. Jordan, certify that I am the Secretary of the Corporation named as applicant herein, that George R. Hill, who signed this application, was then Vice President for Finance of said Corporation; that said application was duly signed for and in behalf of said Corporation by authority of its governing body, and is within the scope of its corporate powers.

M. E. Jordan

---

## APPENDIX I

### TECHNICAL QUALIFICATIONS AND RESUMES OF NUCLEAR PERSONNEL

Curtiss-Wright Corporation has been active in the fields of nuclear and reactor physics since 1947 beginning with the NEPA project in Oak Ridge, Tennessee. The Corporation made a major contribution to this effort, and after its termination in 1950, continued to study promising proposals for nuclear aircraft powerplants.

The ANP effort is continuing at Curtiss-Wright under contract with the Air Force. In addition, work is currently being performed under contract with the Atomic Energy Commission. These efforts are concentrated in the Nuclear Power Department of the Research Division. Since this Division was established in January, 1955, the nuclear group has expanded rapidly. The Nuclear Power Department now employs about two hundred (200) persons of which fifty (50) are engaged directly in nuclear physics and instrumentation, and health physics. The remainder of the Department's personnel are engaged in chemistry, metallurgy, advanced design and performance analysis. A Computing Department works in close support of the physics and performance analysis groups. Its equipment includes an IBM-704 machine and an analog computer.

ANP work has included the study of various reactor concepts and calculation of large numbers of specific reactor types. Curtiss-Wright Report WAD-1901 presents in part the results of extensive calculations involving approximately 400 reactors. This work was completed several years ago at the specific request of ORNL. Subsequent experimental work has verified the results. The progress of reactor physics and instrumentation work during the last few years may be ascertained from the following classified documents: WAD-1800 and 1935, CWR-400, 410, 411, 413, 414, 415, 417, 418, 423, 424 and 435. The extent of current participation in classified programs, both Air Force and Atomic Energy Commission, is shown in the June, 1956, Progress Report, CWR-440.

Supporting facilities currently operated or scheduled for operation by the Research Division at the Quehanna site of the reactor include a research laboratory, a radioactive materials laboratory, a critical facility and a waste disposal plant. The research laboratory is already staffed and in operation. The groups which are active include nuclear controls and instrumentation, nuclear physics, health physics, chemistry and radiochemistry. The personnel comprising these groups will actively assist in the design, construction, operation and utilization of the Curtiss-Wright Research Reactor.

APPENDIX I

TECHNICAL QUALIFICATIONS AND RESUMES  
OF NUCLEAR PERSONNEL

To provide a group of trained operating personnel familiar with the specific type of reactor being proposed, four Research Division personnel are currently working at the Pennsylvania State University Reactor. Several of these people have already had more than one year's experience, and one is a licensed operator.

The training and experience of some of the individuals who will be active in managing reactor operations are attached hereto.



HARRY REESE, JR.  
TECHNICAL MANAGER  
Nuclear Power Department

EDUCATION:

Degree

Carnegie Institute of Technology  
Carnegie Institute of Technology

B.S., Electrical Engineering, [redacted] 1946  
M.S., Electrical Engineering, 1948

EXPERIENCE:

1944-1946

U. S. Navy - Lt. (jg)

Attended Navy RADAR School at Massachusetts Institute of Technology - ultimately in charge of Radio and Radar Maintenance on U.S.S. Croatan (CVE-25).

1946-1949

Minneapolis-Honeywell - Senior Development Engineer

Employed in Research Division in charge of Vibrating Reed Electrometer Project for Knolls Atomic Power Laboratory. Received patent on Vibrating Reed Electrometer and published paper "Design of a Vibrating Reed Electrometer" in Nucleonics 1950. Research on various temperature, humidity, liquid level and pressure detectors. Wrote thesis paper on wide band, high gain amplifier while working as a teaching assistant at Carnegie Institute of Technology on leave from Minneapolis-Honeywell.

1949-1952

Oak Ridge National Laboratory - Development Engineer

Employed in Special Projects Section of Instrument Division assigned to High Voltage Accelerator Laboratory. Worked on various high voltage and high vacuum problems connected with Cockcroft-Walton and Van de Graaff accelerators. Participated in various light particle nuclear reaction experiments. Co-developed a new type of radio frequency ion source and published paper in Nucleonics 1951. On loan to ANP project at Oak Ridge for four months. Taught Basic Electronics at the University of Tennessee extension school at Oak Ridge for one year. Attended various reactor physics and materials courses at Oak Ridge National Laboratory as a staff member.

1952-1955

Curtiss-Wright Corporation - Project Engineer

Project Engineer at Wright Aeronautical Division in charge of Nuclear Physics Section of New Propulsion Systems Division.

Responsible for setting up group to pursue industrial applications of radioisotopes. Built up group to do static and dynamic reactor calculations and shielding calculations. Supervised setting up of a one-dimensional and a two-dimensional multigroup reactor program for an IBM 704 Computer.

1955-1956

Curtiss-Wright Corporation - Physics Division Chief

Supervised activities of approximately 40 physicists and research assistants in Nuclear Power Department of newly formed Research Division.

1956-present

Curtiss-Wright Corporation - Technical Manager, Nuclear Power Dept.

Coordinating research and development programs of entire department.

**PUBLICATIONS:**

Published various Curtiss-Wright ANP classified reports concerning reactor and shield calculations.

PAUL R. LILLER  
PHYSICIST  
Physics Division

EDUCATION:

Franklin Marshall College  
University of Delaware

Degree

B.S., Physics, [redacted] EX6  
M.S., Physics, 1951

EXPERIENCE:

1951-1952

E. I. duPont de Nemours and Co. - Physicist

Member of Instrument Development Division of Argonne National Laboratory (duPont employee); training in reactor principles, reactor control instrumentation; chief project: investigation of fission product gamma ray spectra (ANL-4904, Secret).

1952-1953

Physicist

Member of Instrument Development Division of Savannah River Plant. Development of instrumentation for monitoring and controlling production facilities with emphasis on nuclear instrumentation.

1953-1954

Physicist

Member of Reactor Technology Physics Group (see below)

1954-1955

Process Supervisor (Physics)

Supervisor of Reactor Technology Physics Group. Advising operational personnel of production reactor at Savannah River Plant. (all work classified)

1955-present

Curtiss-Wright Corporation, Research Division - Physicist

Head of Nuclear Controls and Instrumentation Section - supervision of about 20 physicists, electrical engineers and technicians. Designed instrumentation and control circuits for classified reactor system; designed automatic control system for radioactive waste disposal facilities; assembly and evaluation of gamma ray spectrometer.

GEORGE C. GEISLER  
RESEARCH ENGINEER  
Physics Division

674

EDUCATION:

Degree

Virginia Military Institute  
Bucknell University  
University of Pennsylvania  
Penn State University

B.S., Electrical Engineering,

EXPERIENCE:

1950-1952

Brown Instrument Division, M-H Reg. Co. - Test Engineer

Testing of industrial control and measuring devices  
Investigation of failures in the field  
Evaluation of competitive equipment

1952-1955

Brown Instrument Division, M-H Reg. Co. - Application Engi

Selection of measuring and control devices for specific applications  
Design of control systems  
Sales - Engr. Liaison  
Handling of customer complaints

1955-1956

Curtiss-Wright Corporation, Research Division - Asst. Proj.

(Stationed at Pennsylvania State University)  
Maintenance of "swimming pool" type nuclear reactor, and associated equipment.

Received training in operation and use of nuclear reactor  
Assisted in supervision of reactor staff.  
Attended courses in nuclear physics and feedback control theory.

1956-present

Curtiss-Wright Corporation, Research Division - Research Eng

Received AEC Reactor Operators license.  
Operation of reactor for irradiations and experiments.  
Supervision of reactor operator training.  
Supervision of reactor maintenance.  
Presented lectures on reactor control to AEC School of Nuclear Science and Engineering.

JOSEPH A. AGRESTA  
ASSISTANT DIVISION CHIEF  
Physics Division

EDUCATION:

Cooper Union School of Engineering  
New York University  
Oak Ridge School of Reactor Technology

Degree

B.S., Electrical Engineering,  
M.S., Physics, 1952

EXPERIENCE:

1950-1953

New York University - Research Assistant

Research on fundamental properties of Geiger counters under  
S. A. Korff. Taught physics part-time at the University.

1953-1954

Curtiss-Wright Corporation

Worked on ANP project at Curtiss-Wright Corporation doing reactor  
and shielding calculations.

1954-1955

Attended Oak Ridge School of Reactor Technology as a Category B  
student sponsored by Curtiss-Wright Corporation.

Studies of theory of nuclear reactors and associated components  
and technologies. Practical sessions involving classical nuclear  
experiments and familiarization with operation of Oak Ridge swim-  
ming pool reactor, "X" pile and sub-critical assemblies.

1956-

Now supervising about ten physicists and assistants engaged in  
theoretical reactor physics.

WILLIAM F. SJOBORG, JR.  
PHYSICIST  
Physics Division

EDUCATION:

University of Maryland  
University of Maryland  
Oak Ridge Institute of Nuclear Studies  
(radioisotope course)

Degree

B.S., Physics, [redacted]  
M.S., Physics, 1953

Ex 6

EXPERIENCE:

University of Maryland, Physics Department -  
Research Assistant in gaseous electronics

1950

Worked for professor in construction and operation of apparatus for measuring the halflife of the metastable triple-P-two state of the neon atom.

1951-1953

Designed constructed and performed experiments to measure the effect of impurities on the halflife of the triple-P-two state in neon. Results of the investigation appear in the author's thesis and in progress reports to the Bureau of Ships.

1953-1955

Curtiss-Wright Corporation, Wright Aeronautical Division -  
Senior Engineer (Physics)

Application of radioisotopes to aircraft research and development; co-author of booklet for the Corporation to acquaint personnel with the possible use of radioisotopes. Conferred with engineers and scientific personnel for the application of radioisotopes; when a suitable application was found, an experiment was designed, the use of radioisotopes supervised and consultation was given for its effective use. Projects investigated were: piston ring rotation, radiography, neutron activation, dosimetry, scattering, health physics beta thickness gauging. Participated in the design and construction of a radioisotope laboratory.

1955-

Joined the staff of the Penn State Reactor while remaining on the payroll of Curtiss-Wright as a physicist. At that time the reactor had been brought critical once for the AEC licensing, but was then closed down until a staff was assembled.

Was present and assisted in all the experiments necessary to put the reactor into operation at full power:

1. Critical mass for various loadings
2. Compensation of chambers

3. Calibration of control rods by:
  - a. Distributed poison
  - b. Sub-critical multiplication
  - c. Inhour equation
4. Flux distribution in lattice
5. Power calibration by flux distribution
6. Approximate value of fuel element in various positions of lattice
7. Measurement of the effect of placing samples for irradiation against core
8. Measurement of effect of beam holes and their flooding
9. Measurement of effect of graphite reflector (approximating a thermal column)

Co-authored final report to AEC on start-up experiments.

After reactor was at full power assisted in operation for irradiations and experiments. For the most part, the experiments have been for the International School of Nuclear Science and Engineering, Penn State University and Argonne National Laboratories, where I acted as co-instructor for experiments performed at the reactor facility.

At present there is a theoretical and experimental program devoted to the study of the slowing down and attenuation of neutrons in water, for which I have been asked to assist in the experimental part at the reactor.

C. J. ROBERTS  
PHYSICIST  
Physics Division

EDUCATION:

Lehigh University  
University of Rochester  
Oak Ridge Institute of Nuclear Studies  
(Radioisotopes Techniques)

Degree

B.S., Engineering Physics,  
Ph.D., Biophysics, 1954



246

EXPERIENCE:

1950-1954 University of Rochester Atomic Energy Project - Research Associate

Measurements of X-ray depth dose and quality determinations using metal lined ionization chambers

Classified research program in connection with 1953 tests at Nevada Proving Grounds

Study of the effects of aging, X-radiation, and radium poisoning on the properties of the rat aorta

Instruction of AEC Radiological Health Fellows in radiological physics

1954-present Curtiss-Wright Corporation, Research Division - Physicist

Shield design for ANP projects  
Coordinated design of radioactive materials laboratory and waste disposal system  
Establishment of SS accountability station  
Applications of radioisotopes to industrial processes  
Head of Health Physics Section - supervision of about ten health physicists and surveyors. Health physics activities include monitoring of atmospheric contamination, radiation surveys of plant facilities, preparation of instruction manuals and handling procedures for radioactive materials, evaluation of leak test procedures for sealed sources, instruction of plant personnel in the use of radioisotopes, determination of background radiation levels in plant environs, establishment and maintenance of meteorological monitoring network, development of radiation monitoring and surveying instruments.



WILLIAM J. ROBERTS  
PHYSICIST  
Physics Division

EDUCATION:

Alabama Polytechnic Institute  
Alabama Polytechnic Institute  
Pennsylvania State University  
ORSORT

Degree

B.S., ChE, [1947] Ex 6  
M.S., Physics, 1949  
----- 1949-1951  
1956

EXPERIENCE:

1946-1947      Laboratory Assistant, Physics and Chemistry, Alabama Polytechnic Institute.

1947-1949      Graduate Assistant, Physics, API. Research in x-ray crystallography under R. Pepinsky.

1949-1951      Research Assistant, Physics, Penn State.  
  
Research in x-ray crystallography and theoretical solid state physics under R. Pepinsky and V. Myers.

1951-1954      Ship. Supt., Submarines, Phila. Nav. Shipyard.  
  
In charge of overhaul, conversion and repair of submarines as an EDO while on active duty.

1955            Associate Physicist, Theoretical Physics Department, Op. Analysis Div., K-25, Union Carbide Nuclear.  
  
Theoretical studies of absorption and diffusion phenomena.

1955-1956      Category A Student (unsponsored) at ORSORT.  
  
Studies of theory of nuclear reactors and associated components and technologies. Practical sessions involving classical nuclear experiments and familiarization with operation of Oak Ridge swimming pool reactor, "X" pile and sub-critical assemblies.

1956-           Curtiss-Wright Corporation.  
  
Reactor kinetics studies.