MA.09-1

MA.9

MEMORANDUM

TO: FILE

DATE 8/26/87

FROM: D. Levine

SUBJECT: Elimination Recommendation

SITE NAME: Nuclear Metals, Inc. ALTERNATE NAME: --

CITY: Concord STATE: MA

also, 155 Massachusetts Ave., Cambridge, MA (up through at least 10/11/56)

OWNER(S)

Past: unknown Current: unknown

Owner contacted ☐ yes ☒ no; if yes, date contacted ____

TYPE OF OPERATION

☒ Research & Development

- ☐ Production scale testing
- ☐ Pilot Scale
- ☒ Bench Scale Process
- ☐ Theoretical Studies
- ☐ Sample & Analysis

☐ Facility Type

- ☐ Manufacturing
- ☐ University
- ☐ Research Organization
- ☐ Government Sponsored Facility
- ☐ Other ____

☒ Production fabrication of thorium/uranium rods for Brookhaven National Laboratory

☐ Disposal/Storage

TYPE OF CONTRACT

☒ Prime SR00, NY00

☐ Subcontractor

☐ Purchase Order

☒ Other information (i.e., cost + fixed fee, unit price, time & material, etc) cost plus fixed fee

Contract/~~Purchase Order~~ # AT(30-1)-1565 Appendix C, Agreements S-7 and S-3

CONTRACTING PERIOD: 7/1/55-6/30/58; records indicate work as early as 7/31/54 and as late as 12/5/63

OWNERSHIP:

	AEC/MED OWNED	AEC/MED LEASED	GOVT OWNED	GOVT LEASED	CONTRACTOR OWNED	CONTRACTOR LEASED
LANDS	☐	☐	☐	☐	☐	☐
BUILDINGS	☐	☐	☐	☐	☐	☐
EQUIPMENT	☐	☐	☐	☐	☐	☐
ORE OR RAW MATL	☐	☐	☐	☐	☐	☐
FINAL PRODUCT	☐	☐	☐	☐	☐	☐
WASTE & RESIDUE	☐	☐	☐	☐	☐	☐

unknown

AEC/MED INVOLVEMENT AT SITE

Control
- ☐ AEC/MED managed operations
- ☐ AEC/MED responsible for accountability
- ☐ AEC/MED overviewed operations
- ☐ Contractor had total control
- ☒ unknown

☐ Health Physics Protection
- ☐ Little or None
- ☐ AEC/MED responsibility
- ☐ Contractor responsibility

MATERIALS HANDLED:

Type (on basis of records reviewed)

- ☐ No Radioactive
- ☒ Natural Radioactive from Feed Materials Production
  - ☐ Ore
  - ☒ Refined Source Material
  - ☐ Residue
- ☐ Natural Radioactive Material from Non-Nuclear Activities
- ☐ Man-Made
- ☐ Other _____

Comment thorium / uranium

Quantities (on the basis of records reviewed)

- ☐ None
- ☒ Production Quantities
- ☐ Small Amounts

Comment 7+ kg of thorium metal in one shipment (mid-1955), for example

OTHER PERTINENT FACTS:

☒ Facility was Licensed
- ☒ During AEC/MED-Related Operations
- ☒ For Similar Activities (see 1956 + 1958 AEC Reports to Congress, attached)
- ☐ For Other Activities

Comment _____

☐ Commercial Production Involving Radioactive Material during AEC/MED Operations

☐ Facility was Decontaminated and Released

☐ Availability of Close Out Records

☐ None ☐ Some ☐ Sufficient

☐ Radioactive Status:

	YES	MAYBE	PROBABLY NOT	NOT
Contaminated	___	X	___	___
Potential for Exposure (accessible)	___	X	___	___

QUANTITY OF RECORDS AVAILABLE:

☐ Very Little ☒ Some ☐ Sufficient

PROBABILITY OF FINDING ADDITIONAL RECORDS:

☐ Low ☒ Possible ☐ High

RECOMMENDATIONS:

☒ Eliminate
☐ Consider for Remedial Action
☐ Collect More Data

Comment _____

REFERENCES: see attached list
also,
letter, E.J. Bloch to S.R. Sapiro, "NYOO Request for Thorium Metal" (March 10, 1955).
1956 and 1958 AEC Reports to Congress (see attached)

SUMMARY Nuclear Metals, Inc., fabricated thorium/uranium rods for Brookhaven National Laboratory. This site is currently operating under license; therefore, no FUSRAP action is warranted for this aspect of Nuclear Metals' operations. In addition, Nuclear Metals ~~performed~~ developed methods of producing extended-surface elements for use in Savannah River reactors, under prime contract to SROO. Due to the research nature of this work, no FUSRAP action is warranted.

It should be noted that a Nuclear Metals Corporation proposed construction of a 300 TPD uranium mill in White Canyon, Utah. It is not known whether this is the same company as Nuclear Metals, Inc. However, the mill construction proposal was "not expected to mature into a contract because the principal mine has been purchased by others."

NUCLEAR METALS
6/18/87

DATE	FILE#	FROM	TO	SUBJECT	SITES	BOX #
08/04/60 ~~MA.6~~ MA.9			RUSSELL, R.	CHEMICAL ANALYSES OF NORMAL URANIUM AT NUCLEAR METALS	NUCLEAR METALS	61
09/30/62	3.4	MATERIAL RECEIPTS LIST		NLO MATERIAL RECEIPTS FOR 10/1/61 - 9/30/62 6,891 kg of normal uranium received by NLO from Nuclear Metals; also enriched uranium	GE,ATOMICS,AMERICAN MACHINE,ANL,ADVANCED TECH,BRIDGEPORT BRASS,BATTELLE,BRUSH BERYLLIUM,UNION CARBIDE,DAVISON CHEMICAL,GOODYEAR,GLEASON WORKS,AJAX MAGNATHERMIC,ITHACA GUN,IOWA STATE,MCW,NUCLEAR METALS	
01/24/56	3.1RMD	JONES, A.	JOHNSON, J.	NEGOTIATIONS FOR COLORADO PLATEAU PLANT OPERATIONS AND NEW PROCESSING FACILITIES Nuclear Metals Corporation proposed construction of 300 TPD Plant in White Canyon, Utah	WHITE CANYON MILL - NUCLEAR METALS CORP, MEXICAN HAT, SALT LAKE CITY, GREENRIVER, CROOKS GAP, BIG INDIAN WASH, BEDROCK PLANT, MAYBELL, SHIPROCK, AMBROSIA LAKE, MOAB PLANT, MULTIPLE	14/12
03/23/56	3.1RMD	TONEY, C.	JONES, A.	STATUS OF URANIUM MILL PROPOSALS NEW URANIUM MILLS the mill construction proposal was "not expected to mature into a contract because the principal mine has been purchased by others"	UNION CARBIDE NUCLEAR CO., TRACE ELEMENTS CORP, FOUR CORNERS URANIUM CORP, NUCLEAR METALS CORP, ATOMIC FUEL EXTRACTION CORP, NEW-SHAT-TEX CORP, VITRO, UTAH CONSTRUCTION CO, UTE MILLING CO, UNIVERSAL	14/12
07/31/54	3.0		REPORT	STATUS OF THORIUM AS OF 7/31/54 (PIPELINE REPORT) Nuclear Metals had 1213 kg of uranium metal and 180 kg of miscellaneous residues for R&D as of 7/31/54	NLO, UNITED LEAD, MIDDLESEX, GE-RICHLAND, PHILLIPS PETROLLEUM, ORNL,GE-CINCINNATI ANL, BMI, WESTINGHOUSE-PITTSBURGH NUCLEAR METALS, MULTIPLE	15/3
12/05/63	3.1FMD	RUCH, J.	ARMSTRONG, R.	CLASSIFICATION OF WASTE MATERIAL AND WASTE DISPOSAL OPERATIONS feed material activities under NY00 contract: small quantities of normal uranium	NELCO, BRIDGEPORT BRASS, GENERAL CHEMICAL, NUCLEAR METALS	FOIA
10/11/56	MA.9	MORRIS, J.	STRAUCH, S.	PROGRAM FOR URANIUM RECOVERY - NUCLEAR METALS no facilities for scrap recovery	NUCLEAR METALS, NLO, Y-12, UNION CARBIDE	FOIA
01/02/57	3.1SROD	WORTHINGTON, H.	KILBURN, H.	RESEARCH PROGRAMS IN SUPPORT OF SAVANNAH RIVER $700,000 estimate for FY 1957	NUCLEAR METALS, INC. SUPERIOR STEEL, AMERICAN BRASS, ATLAS STEEL, BUREAU OF MINES, DuPONT, ORNL, KNOLLS., BNL	634

✓ 04/19/56 3.1SROO	WORTHINGTON, H.	KILBURN, H.	RESEARCH PROGRAMS IN SUPPORT OF SAVANNAH RIVER 1956-58: developed methods of producing extended-surface elements for use in Savannah River reactors	NUCLEAR METALS, SUPERIOR STEEL, ATLAS STEEL, SYLVANIA ELECTRIC, HORIZONS, BUREAU OF MINES ALBANY, OR, KNOLLS, BNL, MOUND	634
✓ 03/26/57 3.1SROO	WORTHINGTON, H.	KILBURN, H.	RESEARCH PROGRAMS IN SUPPORT OF SAVANNAH RIVER $350K FY58, $250K FY 1959	NUCLEAR METALS, SUPERIOR STEEL	634
✓ 12/31/57 3.1SROO	SUMMARY OF CONTRACTS		DRAFTS FOR BRIEFING MANUAL - SUMMARY OF SROO ACTIVE CONTRACTS Prime with SROO: contract AT(30-1)-1565 Appendix "C," Agreement S-7, CPFF, 7/1/55-6/30/58, $1,473,280.00: metallurgy R+D including zirconium cladding of tubes	MULTIPLE, BoM, COE, COLUMBIA, DuPONT, GENERAL NUCLEAR, NUCLEAR METALS, SYLVANIA, UNIVERSITY OF SOUTH CAROLINA, ALABAMA POLYTECHNIC INSTITUTE, NC STATE, UNIV FLORIDA, AMERICAN BRASS, BATTELLE	112
✓ 11/27/56 3.3	SAPIRIE, S.	BLOCH, E.	NORMAL URANIUM SCRAP PROCESSING FY 1956 AND 57 Nuclear Metals returned 18,0 tons of scrap in 1956	MCW, NLO, ANL, BMI, WESTINGHOUSE, IOWA STATE, AMES, BNL, NUCLEAR METALS, SYLVANIA, WATERTOWN, ELECTRO CIRCUITS, LASL, DOW CHEMICAL ROCKY FLATS	2A

agreement S-31, 3/1/57-6/30/58, $331,545: R+D in connection with power program

Carnegie Institution of Washington applied for a license to authorize its possession and use of 500 milligrams of uranium 235 in coulomb excitation studies and mineral age investigations.

Department of the Navy (Bureau of Ships) applied for a license to receive and possess a plutonium-beryllium source to be used by the Material Laboratory of the New York Naval Shipyard at Brooklyn, N. Y., to measure the neutron absorption characteristics of various overlays of fiberglass and resinous materials.

Hercules Powder Co., Wilmington, Del., applied for a license to receive and possess 25 grams of uranium (20 percent enrichment in uranium 235) in the form of uranyl nitrate, for radiation chemistry experiments.

Mallinckrodt Chemical Works, St. Louis, Mo., applied for a license to receive and possess up to fully enriched uranium hexafluoride for conversion to uranium oxide for various customers.

Glenn L. Martin Co., Baltimore, Md., was issued a license authorizing the firm to receive 50 grams of uranium oxide, the uranium content of which is enriched to not more than 90 percent in uranium 235, for use in research and development work. The company later requested an amendment to its license authorizing receipt of 1 kilogram of uranium oxide, of not more than 90 percent enrichment, for fuel element research.

Metals and Controls Corp., Attleboro, Mass., applied for and was issued a license authorizing the firm to receive 11.3 kilograms of uranium enriched to about 90 percent in the isotope uranium 235 for use in the fabrication of fuel elements for the Battelle Research Reactor.

Norton Co., Worcester, Mass., applied for and was issued a license to receive from Atomic Energy of Canada Ltd. 25 pounds of uranium dioxide containing uranium enriched to 7.1 percent in uranium 235 for fabrication into a ceramic of type fuel elements and return to the Canadian organization. The license provides that the material will be received and returned by Norton Co. via the Commission's Schenectady Operations Office.

Nuclear Development Corp. of America, White Plains, N. Y., was issued a license authorizing receipt from other licensees of 500 grams of uranium enriched to 30 percent in uranium 235 for use in studies of the effects of reactor-produced radiation on simulated fuel elements.

Nuclear Metals, Inc., Cambridge, Mass., applied for and was granted a license to receive from Atomic Energy of Canada Ltd. 1.41 kilograms of uranium 235 for fabrication of prototype fuel elements and return

1956 Report to Congress

to the Canadian organization. The application states that the material will be received and returned by Nuclear Metals, Inc. via the Commission's New York Operations Office. Nuclear Metals later requested an amendment to its license to authorize receipt of an additional 60 grams of uranium 235 for fabrication of fuel element test specimens for Atomic Power Development Associates.

Nuclear Science and Engineering Corp., Pittsburgh, Pa., requested and was granted an amendment to its license to increase from 10 to 25 grams the contained uranium 235 the firm is licensed to receive and use in its research and development work. The additional 15 grams will be received from other licensees.

Owens-Corning Fiberglas Corp., Newark, Ohio, was issued a license authorizing receipt of 50 grams of uranium oxide containing uranium enriched to 90 percent in the isotope uranium 235 for incorporation in glass fibers which will be used by Rensselaer Polytechnic Institute for experimental work under a Commission contract.

Sinclair Research Laboratories, Inc., Harvey, Ill., applied for a license to authorize the firm to receive and use spent Materials Testing Reactor fuel elements as a source of radiation for petroleum research.

Sylcania Electric Products, Inc., Bayside, N. Y., applied for a license authorizing its receipt from other licensees of uranium enriched in uranium 235 for fabrication into fuel elements. The firm requested that its license authorize its possession of up to 50 kilograms of contained uranium 235 at any given time.

The Babcock & Wilcox Co., Lynchburg, Va., was issued a license authorizing its receipt of 50 grams of uranium enriched to about 90 percent in uranium 235 for use in research upon effects of reactor-produced radiation on simulated nuclear fuel elements. This company also applied for a license to authorize its receipt at its Alliance, Ohio, Research and Development Center of 900 grams of uranium 235 contained in uranium enriched to 22 percent in uranium 235. This material is to be used in a fuel pin fabrication project for Atomic Power Development Associates.

The University of Chicago applied for and was issued a license authorizing the university to receive trace quantities of plutonium which will result from irradiation of small quantities of uranyl nitrate hexahydrate in the CP-5 reactor at Argonne National Laboratory.

The University of Michigan, Ann Arbor, Mich., was issued a license authorizing receipt for use as a gamma ray source at its Phoenix Memorial Laboratory of up to 800 grams of uranium 235 contained in four irradiated fuel elements, and such byproduct material as may be contained in these fuel elements.

1956 Report to Congress, continued

1958 Report to Congress

The Commission's thorium procurement program will be fulfilled through deliveries under contracts entered into several years ago.

Enriched Uranium Fuel Materials

With entry of Spencer Chemical Co. four companies were engaged at the year's end in converting enriched uranium hexafluoride obtained from Commission plants to the forms needed for the manufacture of fuel elements and for research and development:

Davison Chemical Co., Erwin, Tenn.
Mallinckrodt Chemical Works, Hematite, Mo. plant.
Nuclear Materials and Equipment Corp. (NUMEC), Apollo, Pa.
Spencer Chemical Co., Kansas City, Mo.

Davison, Mallinckrodt and NUMEC also began to prepare enriched uranium metal. Prior to 1958 these companies furnished oxide and other compounds, but the Commission was the sole source of supply for enriched uranium metal.

Enriched Fuel Fabrication

During 1958 three companies—the Clevite Corp., Carborundum Co., and Englehard Industries—were licensed to fabricate reactor fuel elements in their own facilities, bringing to 13 the companies licensed in this field. These concerns fabricate fuel for private reactors and also for Government research, testing, and power reactors:

The Babcock & Wilcox Co., Lynchburg, Va., plant.
Battelle Memorial Institute, Columbus, Ohio and W. Jefferson, Ohio plants.
Carborundum Co., Niagara Falls, N. Y.
Clevite Corp., Cleveland, Ohio.
Davison Chemical, Erwin, Tenn.
Englehard Industries, Inc., D. E. Makepeace Div., Plainville, Mass.
General Electric Co., Atomic Power Equipment Dept., San Jose, Calif.
The Martin Co., Middle River, Md.
M & C Nuclear Inc., (formerly Metals & Controls Corp.) Attleboro, Mass.
Nuclear Materials and Equipment Corp., Apollo, Pa.
Nuclear Metals, Inc., Concord, Mass. (formerly located at Cambridge, Mass.)
Sylvania-Corning Nuclear Corp., Hicksville, N. Y., plant.
Westinghouse Electric Corp., Blairsville, Pa. and Forest Hills, Pa. plants.

Two additional private companies manufacture for the Commission only and do not require licenses. They are:

Combustion Engineering, Inc., Windsor, Conn.
Olin Mathieson Chemical Co., New Haven, Conn.

One of the licensed companies announced in December that it will market "off the shelf" four standard types of fuel elements for research reactors.

Unirradiated Enrich

As of December 3
unirradiated enriche
and fuel material pr
during 1958.

Davison Chemical Co
Englehard Industrial,
Mallinckrodt Chemic
Nuclear Materials an
Spencer Chemical Co.

Disposal of radioact
provide a commerci
wastes were received
As of December 31,
the Atlantic or Pacifi
returning wastes to
authorizing commerci
The companies lice
including two license

American Mail Line, S
Atomic Energy Waste
Crossroads Marine and
Isotopes Specialties Co.
New England Tank Cl
Nuclear Engineering C
Radiological Service Co
American Electronics, I
Calif.

Because varied and
of radioactive waste
regulation, 10 CFR 20,
does not spell out pre
permissible concentrat
ment; it allows only
released into sewage s
activity are low enoug
ditions of disposal. Th
consider on the basis
posing of such low-level

An application for a
ocean must include a d
of material and the p
The applicant must giv