MEMORANDUM

TO: FILE
FROM: Andrew Wall

SUBJECT:

SITE NAME: Coors Porcelain
CLOSE NAME: ___________________

CITY: Golden STATE: CO

OWNER(S)
Past: Coors Current: Coors
Owner contacted yes no; if yes, date contacted 1/5/87 11/10/87

TYPE OF OPERATION
☐ Research & Development
☐ Facility Type
☐ Manufacturing
☐ University
☐ Research Organization
☐ Government Sponsored Facility
☐ Other

☐ Production
☐ Disposal / Storage

TYPE OF CONTRACT
☐ Prime
☐ Subcontractor
☐ Purchase Order
☐ Other information (i.e., cost + fixed fee, unit price, time & material, etc)

Contract / Purchase Order #

CONTRACTING PERIOD: In the 1950's Coors produced ceramic insulators for the AEC.

OWNERSHIP:

<table>
<thead>
<tr>
<th>LANDS</th>
<th>BUILDINGS</th>
<th>EQUIPMENT</th>
<th>ORE OR RAW MATL</th>
<th>FINAL PRODUCT</th>
<th>WASTE &amp; RESIDUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEC / MED OWNED</td>
<td>AEC / MED LEASED</td>
<td>GOVT OWNED</td>
<td>GOVT LEASED</td>
<td>CONTRACTOR OWNED</td>
<td>CONTRACTOR LEASED</td>
</tr>
</tbody>
</table>

The 1940's contracts involved the construction of a ceramics plant for the Federal government. The facility did not involve radioactive material and was sold to Coors. The 1960's fuel processing facility was a joint facility that provided some materials for the AEC.
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: The early contract was for insulation and involved no radioactive material. The later work involved uranium fuel.

Quantities (on the basis of records reviewed)
- None
- Small Amounts
- Production Quantities

Comment: It is not clear how much fuel was processed but it is a production facility.

Other pertinent facts:
- Facility was Licensed
  - During AEC/MED-Related Operations
  - For Similar Activities
  - For Other Activities

Comment:

Commercial Production Involving Radioactive Material during AEC/MED Operations

- Facility was Decertified and Released
  - Availability of Close Out Records (held by owner)
    - None
    - Some
    - Sufficient

Radioactive Status:

Contaminated: (X)
- Yes
- Maybe
- Probably
- Not

Potential for Exposure (accessible): (X)
- Yes
- Maybe
- Probably
- Not
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: Facility was adequately decontaminated by the owner. No further FUSRAP actions are needed.

REFERENCES:

SUMMARY:
The facility was involved with the AEC for two operating reactor units in the 1940's and fuel elements in the 1950's -1960's. In 1940's work involved no radioactivity. Crews got out of the fuel business in the 1960's. The plant was decontaminated and re-used for Beryllium work. In the early 1980's, this activity ceased and the owner contracted M.K. to clean up decontaminate the site. M.K. decontaminated the site and also verified its radiological status. They repeated a Coor survey of the building and found no radio activity. The facility was declared free of debris via high pressure steam and the site was demolished. No further FUSRAP actions are needed.
DATE FILE# FROM TO SUBJECT SITES BU#1

09/23/48 CO.12 ROBINSON, J. SAPIRIE, G. SALE OF CERAMIC INSULATOR PRODUCTION FACILITIES AT RINDN, COORS PORCELAIN 167/16 1370

04/05/65 CO.12 TOPE, W. WASSON, K. REQUEST FOR FUEL SPECIMENS FROM COORS PORCELAIN COORS ANL. 201 3802

11/5/87

Coors Porcelain Co, Golden Co.
(303) 278-1000
Larry Collom - 278-4122
Manager Envir. Quality/CP

Kelly Turnwell
Sept 1985 - MK found on minor (Steel Hunt)
(303) 278-1006
Fuel element nation check 6.7t

reason for decommission was
07 out of fuel elements 1960's

Here fuel element project - at the Golden facility out of beryllium in 1972
decommissioned by MK - Build been since cleaned

decommissioned (used for Ceramic R&D)
edey 1980s 1985 - Decommissioning

MK Contact - Bob White Jr Mor - Denver - (303) 831-6200

11/20/87

Douglas Steffen
District Mgrs
230 Lincoln
(208) 386-6732 (Boise, Idaho)

MK completed decontaminated Coors plant. Decommissioned. Beryllium not a rad survey was completed to verify that previous rad.
decom was adequate. Found background "background. The MK survey followed a bar survey MK did their operated adequate calibration checks.
Mr. K. G. Wasson  
Coors Porcelain Company  
Fuel Element Building  
Golden, Colorado

Dear Mr. Wasson:

Under separate cover our Purchasing Department is requesting a quote for six fuel specimens. Except for composition, the specimens are to be identical to the pieces identified by requisition number 702881. The six specimens shall have the following composition:

\[
\begin{align*}
\text{UO}_2 &: \quad 48 \pm 3 \text{ w/o} \\
\text{Gd}_2\text{O}_3 &: \quad 3.3 \pm 0.2 \text{ w/o (i.e. } 6.9 \text{ w/o of the total oxide)} \\
\text{W} &: \quad \text{Remainder} \\
\text{C} &: \quad \text{Less than } 50 \text{ ppm}
\end{align*}
\]

The fabrication of these specimens is to be identical to the fabrication of similar pieces made for Argonne National Laboratory. The gadolinium sesquioxide should be introduced with the uranium dioxide in the body preparation process. The desired structure for the oxides is a homogeneous solid solution. A 1700°C soak for four hours should give the desired structure.

As before, a minimum density of 95% of theoretical is desired. Theoretical density for the solid-solution oxides is calculated to be 10.67 gm/cc.

Very truly yours,

William G. Tope
compounds will be increased considerably due to the large requirements for commercial domestic and foreign reactor projects. This segment of the industry, should, therefore, experience a substantial increase in volume of work commencing in FY-1965 providing the industry continues to be successful in the foreign market.

4. Fabrication

Industrial capability exists to produce various types of fuels and shapes from metal and compounds.

No new firms entered this area of activity. During the year American Radiator and Standard Sanitary Corporation withdrew from this area and assigned all incompletes fuel contracts to Sylvania Electric Products, Inc. The principal fabricators of uranium fuels are listed in Table 4 below.

**TABLE 4**

**Principal Fabricators of Uranium Fuel**

Aerojet-General Nucleonics, San Ramon, California
Allis-Chalmers Manufacturing Co., Greendale, Wisconsin
Atoms International, Canoga Park, California
Babcock & Wilcox Company, Lynchburg, Virginia
Battelle Memorial Institute, Columbus, Ohio
The Carborundum Company, Niagara Falls, New York
Combustion Engineering, Windsor, Connecticut
Coors Porcelain Company, Golden, Colorado
General Dynamics Corporation, San Diego, California
General Electric Company, San Jose, California
Martin-Marietta Company, Baltimore, Maryland
Metals & Controls, Inc., Attleboro, Massachusetts
National Lead Company, Albany, New York
Nuclear Fuel Services, Inc., Erwin, Tennessee
Nuclear Materials & Equipment Corp., Apollo, Pennsylvania
Nuclear Metals, Inc., Concord, Massachusetts
Sylvania Electric Products, Inc., Hicksville, New York
United Nuclear Corporation, New Haven, Connecticut
Westinghouse Electric Corp., Pittsburgh, Pennsylvania

AEC orders placed with commercial suppliers for the fabrication of fuel are reflected in Table 5 on the following page.
than five feet without exceeding an acceptable temperature rise unless special cooling was provided. Other geometric configurations for possible storage are also being studied.

At the National Reactor Testing Station (NRTS), a 60-gallon-per-hour fluidized bed calciner, designed to demonstrate the feasibility of calcination to dry solids of aqueous aluminum nitrate wastes is undergoing initial tests. Full scale demonstrational studies are expected to commence in 1962. Laboratory studies are also being made to evaluate the applications of the fluidized bed technique to the handling of wastes from reprocessing of zirconium and stainless steel fuels.

Detailed design has been completed at Hanford for a pilot plant of the radiant heat spray calciner developed on a laboratory scale last year. Engineering cold tests and hot cell small-scale experiments will be conducted this year.

Cold laboratory and engineering scale studies are being carried out by ORNL on a pot calcination process for handling power reactor fuel reprocessing wastes. This work is being done in preparation for a hot pilot demonstration program on the pot and rotary ball kiln calciner which will be initiated at NRTS in 1962. Use of a rotary ball kiln for calcination of zirconium-alloy reprocessing wastes has been under study at Brookhaven National Laboratory with non-radioactive pilot plant tests being run during the past year.

Brookhaven also is working on a process in which the entire conversion from raw aqueous waste to final phosphate glass would be accomplished in an all-liquid system. Design and construction of a continuous process pilot plant is planned to demonstrate phosphate-glass fixation on a larger scale.

During the past year the Acres Forestrawl Corporation and the Los Alamos Scientific Laboratory (LASL) have jointly studied the fixation of liquid radioactive waste in ceramic sponges. A 10-gallon-per-day pilot plant will be installed at LASL during the coming year, which will operate with simulated waste to demonstrate the feasibility of this system.

The E. I. du Pont de Nemours Co., which operates the Commission's Savannah River Plant, has been investigating the practicability of storing long-cooled, semi-liquid fuel reprocessing wastes in underground caverns mined out of impermeable deep bedrock beneath the plant. In January, 1961, du Pont, in conjunction with the U. S. Army Corps of Engineers and the U. S. Geological Survey, initiated an exploratory drilling program in which approximately ten holes will be drilled. The first hole was completed to 1,000 feet, of which 1,000 feet were in bedrock.
the next few years due to the lack of immediate construction starts on new large power reactors, military and space requirements are expected to increase which may result in a small net increase in work for this segment of the industry over the next several years.

Almost all of the uranium metal required is for use in the production-weapons program, the naval program and for the test reactors at Idaho. This metal is produced almost entirely in AEC facilities, although private companies also have this capability. The industrial and non-production program needs for metal have been declining and are expected to continue to decline over the next several years.

Unlike uranium metal, almost all uranium oxide is produced in privately-owned facilities. The demand for oxides and other compound forms is increasing and is expected to continue to increase. At the present time nine firms have a capability of converting UO$_2$ to the forms needed for fabrication of fuel elements. These are listed in the following table:

**Table 2**

<table>
<thead>
<tr>
<th>Commercial Organizations Producing Uranium Oxides and Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Courta Porcelain Company, Golden, Colorado</strong></td>
</tr>
<tr>
<td><strong>Davidson Chemical Division, W. R. Grace &amp; Company, Erwin, Tennessee</strong></td>
</tr>
<tr>
<td><strong>General Dynamics Corporation, San Diego, California</strong></td>
</tr>
<tr>
<td><strong>Minnesota Mining and Manufacturing Company, St. Paul, Minnesota</strong></td>
</tr>
<tr>
<td><strong>National Carbon Company, New York, New York</strong></td>
</tr>
<tr>
<td><strong>National Lead Company, Albany, New York</strong></td>
</tr>
<tr>
<td><strong>Nuclear Materials and Equipment Corporation, Apollo, Pennsylvania</strong></td>
</tr>
<tr>
<td><strong>Spencer Chemical Company, Pittsburg, Kansas</strong></td>
</tr>
<tr>
<td><strong>United Nuclear Corporation, Hematite, Missouri</strong></td>
</tr>
</tbody>
</table>

*All nuclear operations of Spencer have recently been taken over by Kerr-McGee.*

**U-233, Plutonium and Thorium** -- The need for these materials as reactor fuel is limited at this time and is primarily for research and development purposes. There is some (although limited) capability, however, for conversion of these materials in private industry. Commercial firms known to have some capability in this work are as follows:
b. Oxide. Almost all of the oxides and compounds required by the Commission and industry are produced in privately-owned facilities. The demand for oxides and compounds in FY 1963 decreased as compared to FY 1962. Although AEC orders increased slightly in FY 1963, the lack of orders for new private reactor projects in previous years caused a slight decrease in the volume of business. It is anticipated that this downward trend may extend into FY 1964; however, by the end of FY 1964, the volume of business will increase, and continue to rise, as requirements for the announced new private projects start to materialize.

4. Fabrication

As reported at last year’s meeting, industrial capability exists to produce various types of fuels and shapes from metal and compounds. Competition in this highly-competitive field has been further increased in the past year with the entrance of Allis-Chalmers, Coors Porcelain and American Radiator & Standard Sanitary Corporation in this area. Although no major fabricators ceased operations in the past year, there may be realignment of firms in this regard over the next few years due to competition and changing fuel types. The principal fabricators of uranium fuels are:

Aerojet General Nucleonics, San Ramon, California
Allis-Chalmers Manufacturing Co., Greendale, Wisconsin
American Radiator & Standard Sanitary Corp., Mountainview, California
Atomics International, Canoga Park, California
Babcock & Wilcox Company, Lynchburg, Virginia
 Battelle Memorial Institute, Columbus, Ohio
The Carbortum Co., Niagara Falls, New York
Combustion Engineering, Windsor, Connecticut
Coors Porcelain Co., Golden, Colorado
Davison Chemical Co., Erwin, Tennessee
General Electric Co., San Jose, California
General Dynamics Corp., San Diego, California
Martin-Marietta Co., Baltimore, Maryland
Metals & Controls, Inc., Attleboro, Massachusetts
National Lead Co., Albany, New York
Nuclear Materials & Equipment Corp., Apollo, Pennsylvania

(more)
The reactor is being developed by the Lawrence Radiation Laboratory at Livermore, Calif., which is operated for the Commission by the University of California. The laboratory's program, in addition to research in high temperature materials, ceramic fuel elements, control systems, and neutronics of a hitherto largely unexplored reactor concept, includes a major effort in designing, fabricating, assembling, and ground testing at the Nevada Test Site (NTS) two reactors designated Tory IIA-1 and Tory IIC.

Tory IIA-1 was operated at the test site on May 14, September 25, October 5 and 6, 1961. During these power runs, temperatures in excess of 2,000° F. were attained in the reactor core. At year's end, the reactor was being disassembled in the special shielded disassembly building at the NTS to permit detailed studies of its components. This signaled the end of small reactor tests in this feasibility program.

The ultimate objective in the feasibility program is the testing of the Tory IIC flight-type reactor. The final design of the Tory IIC was completed during 1961 by the laboratory, and component procurement initiated. The Tory IIC was designed for power, temperatures, power density and size suitable for a propulsion system for low altitude supersonic flights. The reactor control system and reflector are of the flight type. Fuel elements for the Tory IIC are being manufactured by Coors Porcelain Co., Golden, Colo.

During fabrication and assembly of the reactor, the test facilities at the Nevada Test Site will be augmented to meet the Tory IIC experiment test requirements. Diversified Builders, Inc., and Industrial Contractors, Inc. (joint venture), of Paramount, Calif., were awarded a $3,975,000 contract in November to expand and modify the PLUTO test facilities. Construction is expected to take 14 months. Norman Engineering Co., Los Angeles, is architect-engineer.

The Marquardt Corp., Van Nuys, Calif., renders engineering support to the Lawrence Radiation Laboratory Tory test program. A number of other companies have contributed significantly in support of materials research, controls development, and test vehicle and component design and fabrication.

Simultaneous with the Commission program, the Air Force during 1961 has continued its support of engineering studies on ramjet engine design, guidance of vehicles at high speeds, hazard studies of testing and operation, and aero thermodynamic studies to outline iteration problems of the nuclear reactor, the other ramjet components, and the air frame. This work is being performed primarily by Marquardt and Chance-Vought Aircraft Inc., Dallas, Tex.

Upon demonstration of feasibility of Tory IIC, the next logical step in the program would be fabrication and ground testing under simulated flight conditions of a prototype nuclear ramjet engine.
Subject: List of Manhattan District Facilities.


1. Attached is copy of memorandum 6 October 1944, transmitting lists of Manhattan Engineer District facilities under each regional intelligence office. Also attached are the lists of those facilities under the following offices:

   Boston Office
   New York Office
   Baltimore Office

2. This office has been advised by Captain Haley of the District Intelligence Office that the regional intelligence officers have been authorized to give you information about the facilities listed.

3. It is understood that certain research contractors have been omitted from these lists for reasons understood only by the Intelligence Department.

4. The following facilities under the Cleveland Office are also under your jurisdiction:

   204A 017
   6. 5 International Nickel Co., Harrisonburg, Va.
   6. 18 National Carbon Co., Phillipi Road, Amherst, Va. (Lexington, Va.)

      The District Engineer

      DISPATCHED

      OCT 10 1944

      S.G.O. LAFON D. GEIGER,
      Captain, Corps of Engineers,
      Assistant.

5 Incl:

   Incl. 1 - Baltimore Facility List
   Incl. 2 - Boston Facility List
   Incl. 3 - New York Facility List
   Incl. 4 - Memo to Col. Parsons and 10/5/44

   CLASSIFICATION CANCELLED BY
   CHANGED TO: Unclassified
   BY AUTHORITY OF:
   MW. WALTER 6/11/84
   FY. P. KAHLE 6/12/84

   ACU. 52
   S. D. 21
Subject: Plant Facilities of Importance to the California Area.

To: The District Engineer, Manhattan District, P. O. Box E, Oak Ridge, Tennessee.

1. Reference is made to your letter dated 17 June 1944, subject: District Policy Regarding Physical Plant Security, which requested information of important facilities engaged upon work of interest to the California Area. The following list includes pertinent contractors and purchase order suppliers grouped as specified in your letter.

**Class "A" Facilities:**

University of California - Contract No. 3-7405-eng-48.

**Class "B" Facilities:**

None

**Class "C" Facilities:**

Corning Glass Company, Corning, New York.


Gardner Electrical Company, Emeryville, California.

General Electric Wire Works, Cleveland, Ohio.

International Graphite Corporation, Niagara Falls, New York.


Pacific Gas & Electric Company, Oakland, California.

Pacific Telephone & Telegraph Company, Oakland, California.
Reference is made to the letter of August 30, 1943, from Coors Porcelain Company making an offer of $5,000 for the ceramic insulator production facilities erected under Contract W-28-094-eng 27. A review of the history of this contract, and other relations with the Coors Porcelain Company shows that in mid-1945, Coors was one of three suppliers of ceramic bushings and insulators for the Y-12 plant. Coors was admittedly the best in quality and price. At this time, procurement of suitable high voltage insulators became highly critical, and an additional source was required. It was therefore decided to have Coors expand their facilities to cope with the expanded requirements. This was to be done by construction of a high temperature, continuous tunnel kiln, specifically designed for the Y-12 insulators, and necessary storage facilities. Originally, the construction was to have been done at Coors' expense, with a WPA Certificate of Necessity allowing them to amortize the cost over a two year period. However, WPA ceased issuance of these certificates prior to the start of construction. It was then decided to have the Manhattan District negotiate a lump sum contract with Coors to do the work.

Work was started on August 18, 1945, and at the time of the Alpha Process shutdown, the insulator requirements were reviewed. A letter from Tennessee Eastman Corporation dated September 4, 1945, reviewed the insulator situation, and requested that the construction of these facilities be continued. This was done, and work was completed on April 19, 1946.

By the time of final completion, the future requirements for insulators had again changed due to further Y-12 curtailment. Due to the decrease in requirements, all ceramic work could be handled in the Coors Company's own plant, and the new tunnel kiln never produced any items other than the initial test pieces fired to check the kiln.
At the present time, due to the uncertain requirements of the AEC for materials that might be produced in this kiln, it is deemed advisable to retain these production facilities under some degree of availability. Under the terms of the contract, the AEC will have to reimburse Coors for any major repairs or maintenance that may be necessary after December 1, 1948. Therefore, it is felt by this office that the best possible solution to the entire problem would be to sell the facility to Coors Porcelain Company with a firm agreement that they will maintain this equipment available to supply our possible requirements for a specified period of years. In this way, the government can be relieved of maintenance expense while retaining production capacity for possible future requirements.

Coors' offer of $5,000 is very small in relation to the original total cost of $105,500 and present excellent condition of the plant. However, an analysis of the plant and equipment shows that the cost of the building and kiln which are respectively of reinforced concrete and refractory and brick construction would not be recoverable and would in all probability cost a considerable amount to demolish. It is not believed feasible to attempt sale of the building and kiln to a third party since Coors retains title to the land upon which the buildings are located and could not be expected to allow a competitor to set up business within the Coors plant area. Some salvage or scrap value from equipment with an original book value of $125,000 might be realized; however, the net amount realized by the government would probably be less than the $5,000 offered by Coors for the entire plant.

It is recommended that the offer of Coors Porcelain Company to purchase these facilities be accepted contingent upon an agreement to retain the facilities in good condition and available for possible future AEC orders.

J. C. Robinson

CC: Mr. J. C. Robinson

Millar/cw