

3741

NV.06-1

NV.6

MEMORANDUM

TO: FILE

DATE 10/5/87

FROM: Andrew Wallo III

SUBJECT:

SITE NAME: U.S. Bureau of Mines

ALTERNATE U.S. Bom Metallurgy Research Center; NAME: Department of Interior, 1605 Evans Ave.;

CITY: RENO STATE: Nevada

Bom Reno Research

OWNER(S)

Past: U.S. Bureau of Mines Current:

Owner contacted  yes  no; if yes, date contacted

Phone# Nevada - 784-5391

TYPE OF OPERATION

Research & Development

Facility Type

Production scale testing

Manufacturing

Pilot Scale

University

Bench Scale Process

Research Organization

Theoretical Studies

Government Sponsored Facility

Sample & Analysis

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 late 1950's the AEC contributed \$40,000 to support an ongoing

OWNERSHIP: U.S. Bom electrowinning Project.

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

Facilities and equipment belonged to the U.S. Bureau of Mines. The project was initiated and conducted as a Bom research project. The AEC subsidized the project and coordinated their own activities with the Bom project. There was no significant on site control indicated in the records.

AEC/MED INVOLVEMENT AT SITE

Control

- AEC/MED managed operations
- AEC/MED responsible for accountability
- AEC/MED overviewed operations
- Contractor had total control
- unknown
- managed/operated by Bom

Health Physics Protection

- Little or None
- AEC/MED responsibility
- Contractor responsibility
- Bom 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 Bom conducted research with various metals including Uranium

Quantities (on the basis of records reviewed)

- None
- Production Quantities
- Small Amounts

Comment Uranium was used in research amounts

OTHER PERTINENT FACTS:

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

Comment The Bom/DoE facility has or had licenses to handle or use

Commercial Production Involving Radioactive Material during AEC/MED Operations

Facility was Decontaminated and Released

Availability of Close Out Records

- None
- Some
- Sufficient

Radioactive Status: (Bom Responsibility) YES MAYBE PROBABLY NOT Little potential from research work investigated here.

Contaminated Potential for Exposure (accessible)	---	---	<u>X</u>	---
			<u>X</u>	

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 Records identified covered a research project that was under the Jurisdiction of Bom and the Facility had Licenses to handle radioactive material

REFERENCES:

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SUMMARY

These records describe one of <sup>probably</sup> many Bureau of Mines Research projects. While AEC appears to have supported the effort it was under the Bureau's jurisdiction and they were licensed to handle radioactive materials. In addition potential for contamination in excess of Guidelines is small based on the research quantities of material that would have been associated with this type of project. Because this was a Bom project and they were licensed any clean up would be Bom and NRC responsibility; No FUSRAP action is warranted.

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11/05/87

RENO BUREAU OF MINES

DATE	FILE#	FROM	TO	SUBJECT	SITES	BOX #
10/17/62	NV.6	SHAW, W.	MARSHALL, S.	TRIP REPORT TO BUREAU OF MINES, RENO 10/9/62	BUREAU OF MINES, RENO	1581

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N.V. 6

B4-1-3  
27

October 17, 1962

**GENERAL FILES**

TRIP REPORT TO BUREAU OF MINES, RENO, NEVADA ON OCTOBER 9, 1962

S. Marshall

W. E. Shaw

OBJECTIVE OF TRIP

Information had been received that the Bureau of Mines Station was actively engaged in studying the electrowinning of uranium from  $UO_2$ . It was desired to see the equipment used and determine the status of the project.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. A relatively simple cell that could be scaled up has been designed for the successful production of coalesced uranium from  $UO_2$  feed at reasonable efficiency.
2. It is recommended that management take a long, hard look at the possibility of electrolysis becoming the technique of producing uranium; perhaps going as far as having Dr. Henry of the Bureau of Mines describe their process and comment on the possibility of scale up (at one of management's meetings.) - no.
3. The investigation of electrowinning of uranium from  $UO_2$  has been terminated and two reports covering the period from inception to 1960 and from 1960 to date will be released shortly.
4. Investigations of electrowinning of the rare earth metals, electrowinning of molybdenum, tungsten and other so-called ferro alloys, as well as the electro-production of the phosphides are under way and are prime projects of this station. Physical metallurgy and other related activities, individually or in support of the prime projects, are also under way.
5. An offer was made by the head of the station to provide whatever support was necessary if we desired to enter the electrowinning field. This offer went so far as to permit use of their facilities to undertake whatever studies we deemed necessary using either our men or their men or any combination feasible.

TRIP REPORT TO BUREAU OF MINES, RENO, NEVADA ON OCTOBER 9, 1962  
S. Marshall  
October 17, 1962

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6. A technique for solid state purification of metal is being developed and shows some merit.

#### BACKGROUND FOR TRIP

The Technical Division of the National Lead Company of Ohio has been charged with the responsibility for keeping abreast of the developments in the electrolytic investigations concerned with uranium. The electrowinning of uranium from  $UO_2$  has been investigated by the Reno Station of the Bureau of Mines. The work has been under way since approximately 1957 and as yet no reports have been issued. We have recently become aware of this work and were desirous of obtaining first hand information of the project. Contacts were made with the head of the project, Dr. Tom Henry, and a visit was arranged.

#### PERSONS VISITED

Mr. Ed Graham - Head of Station  
Dr. Tom Henry - Project Manager  
Mr. Don Baker - Project Manager  
Mr. Don Kesterke - Project Leader

#### DESCRIPTION OF TRIP

Dr. Tom Henry welcomed me. He described his job as heading the project group preparing rare metals. He has been on this job some two years, having taken over from a Mr. Knickerbocker. They have prepared lanthanum, yttrium, cerium as well as uranium by the same basic techniques. Dr. Henry's background was in titanium metallurgy and prior to coming to Reno he was employed at Boulder City.

Don Kesterke, who is a group leader working for Dr. Henry, came in and we discussed the cell and process used for electrolysis of uranium.

The best results were obtained in an 8" diameter carbon crucible made of National Carbon AQX grade. A partially slotted cylinder was set up inside this crucible. The  $UO_2$  was fed into the annulus so formed. (See sketch).

The salt bath used was a ternary mix of:

	$BaF_2$		$LiF$
$UF_4$	:	or	:
	$CaF_2$		$MgF_2$

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Two anodes 1-1/4" in diameter and immersed 3" were used and two cathodes 0.45" in diameter stepped down from 0.75" and also immersed 3" in the bath were also used.

Heat was supplied by a carbon resistor in the base of the crucible in addition to the heat supplied by the electrolysis. The temperature of the bath was maintained at 1300 to 1350°C.

In operation the cell required 15-16 volts DC at 400 amps, the efficiency was calculated as approximately 30%. The cell was maintained under a helium atmosphere in a large cooled glove box. UO<sub>2</sub> was fed into the annulus of the cell at a predetermined rate and adjusted by following the composition of the atmosphere and the voltage-ampere relationship. Six lbs. of U were produced in approximately an eight-hour period.

There have been some difficulties but the process is deemed a successful one and is now being terminated. The attitude was expressed that they feel their work is complete when the feasibility of a process is shown. If it is of commercial value, the transition to a producing unit is the job of the engineers of the group planning to use the process.

Reports are being prepared; the first report which should be published shortly deals with the work up to 1960. This report has caused some difficulty with MCW and I gather they are not on very friendly terms. A second report should be forthcoming shortly and this will be the wrap-up of their work.

Some work was being done in the laboratory on solid state migration of impurities in metals. A rod of relatively pure metal was placed in a furnace and a potential applied to the ends of the rod. The impurity migrated to the end of the rod. An example of the migration of radioactive tagged iron in cerium was shown. The results were quite startling. The curve of count vs. distance showed a uniform level prior to treatment and a very sharp spike quickly dropping to well below the original count with only an eight-hour treatment. This may have possibilities if applied to ingots.

After lunch I talked with Mr. Don Baker who is working on electrolysis of tungsten and molybdenum and similar so-called ferro alloys, also some of the phosphides.

In discussion with Mr. Graham, after a tour of the facility, we learned that there had been contacts with George Rennich of Oak Ridge AEC. There has been an offer of financial support from Oak Ridge AEC even though the Reno Station did not desire this financial support.

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Apparently some contacts were made approximately in 1957 by people concerned with electrowinning  $UO_2$ . The Bureau prepared a project proposal and asked for evaluation by the AEC. They received no response and upon re-inquiry were offered \$40,000 from the Oak Ridge AEC to support such a project. Reno did not want the money. They had their own and all they wanted was an evaluation. Finally the financial offer was accepted so that they could get an evaluation of the project. MCW was to be the coordinating or liaison agent with Arch Ruehle serving as the contact. An agreement was reached with MCW regarding the routes to be followed. MCW would use the C- $UO_2$  compact technique and Reno would stay away from that procedure. The relations recently with MCW have been strained and this may have contributed to their termination of the project.

The works of Dr. Henry and Mr. Baker are becoming quite recognized in the AEC. They have been asked to evaluate the plutonium electrolysis program; they soon will visit Argonne and Hanford to discuss electrolysis programs or work in process.

#### MISCELLANEOUS COMMENTS

The attitude toward releasing information was very cooperative. It was stated many times during the visit that their job was to supply this information to all concerned parties. Some wonder was expressed by the personnel at the Bureau of Mines Station about the lack of inquiry from Fernald after they had learned of our function in the uranium chain. They were most cooperative and promised to keep us informed regarding their future developments. They are engaged in investigating production and physical properties of the rare earth metals. They have no desire to bring these processes or metals to commercial utilization but would depend on the commercial producer to attempt this fruition.

Some of the physical testing, both destructive and non-destructive, would be of interest to our metallurgy personnel. These tests involve, besides the more usual tensile, charpy and hardness tests, tests of cryogenic properties and utilization of X-ray techniques for investigation of metallurgical behavior.

#### COMMITMENTS

None.

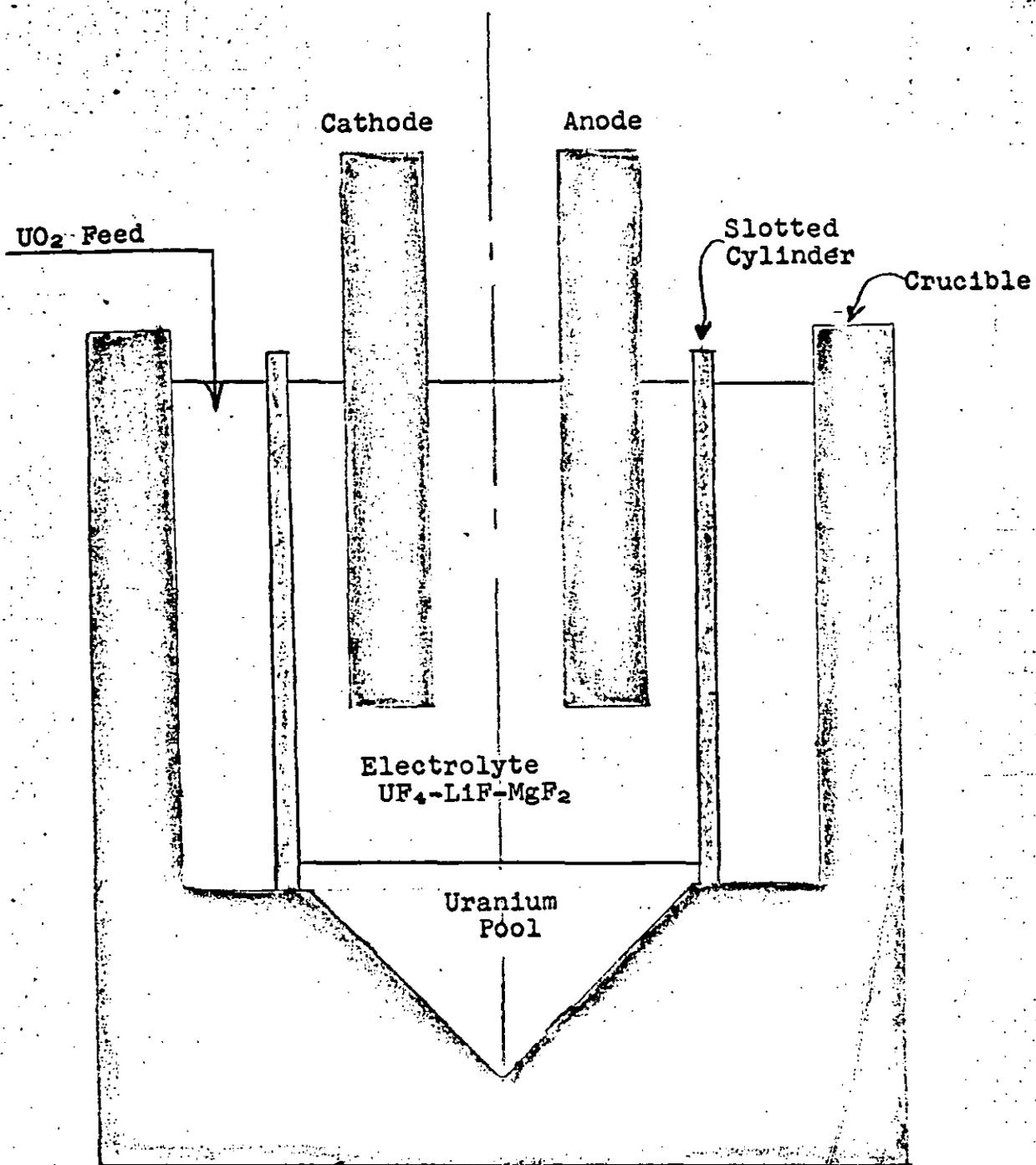
ORIGINAL FILED  
BY W. E. SHAW

W. E. Shaw

WES/rb

cc: J. H. Noyes (3)  
C. E. Polson  
G. J. Morgan

BUREAU OF MINES  
ELECTROLYSIS  
CELL



NATIONAL LEAD COMPANY OF OHIO  
FERNALD, OHIO  
DEPARTMENT:

SCALE None  
DATE Oct. 17, 1962  
CHARGE  
DRAWN BY Shaw  
APPROVED BY

SK. NO.

AS OF 3/18/85

PART 40 LICENCES  
Domestic licensing of  
Source material

MAR 18, 1985

## LIST OF ALL PART 40 LICENSES

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NAME AND ADDRESS	DOCKET NUMBER	LICENSE NUMBER	PROGRAM CODE	EXPIRATION DATE	STATUS
INTERIOR, DEPARTMENT OF THE 1605 EVANS AVENUE RENO NV 89512	040-08826	21286	11200	/ /	4 => retired
NEVADA, UNIVERSITY OF RENO NV 89507	040-03488	SUD-332	11300	06/30/72	4
AFRICAN METALS CORPORATION 1212 AVENUE OF AMERICAS NEW YORK NY 10036	040-08331	SUC-1211	11300	08/31/79	4
AGIP U.S.A. INC. 1221 AVE. OF THE AMERICAS NEW YORK NY 10020	040-08335	SUE-8211	11600	08/01/75	4
AGIP USA 1221 AVENUE OF THE AMERICAS NEW YORK NY 10020	040-08643	77209	11600	/ /	4
AGIP USA INC 1221 AVENUE OF THE AMERICAS NEW YORK NY 10020	040-08450	SUE-8282	11600	08/01/76	4
ALTON COMPANY 909 THIRD AVE. NEW YORK NY 10022	040-08421	00780	11600	/ /	4
ARMY, DEPARTMENT OF THE WEST POINT NY 10996	040-05828	SUD-311	11300	01/31/85	2
ARMY, DEPARTMENT OF THE WATERVLIET ARSENAL WATERVLIET NY 12189	040-08126	STB-1121	11300	08/31/87	0

MAR 18, 1985

## LIST OF ALL PART 40 LICENSES

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NAME AND ADDRESS	DOCKET NUMBER	LICENSE NUMBER	PROGRAM CODE	EXPIRATION DATE	STATUS
ARMY, DEPARTMENT OF THE ROMULUS NY 14541	040-08526	SUC-1275	11300	10/31/86	0
ASSOCIATED METALS & MINERALS CORP 733 THIRD AVENUE NEW YORK NY 10017	040-08494	SME-8312	11600	02/01/77	4
ASSOCIATED METALS & MINERALS CORP 733 THIRD AVE NEW YORK NY 10017	040-08497	SME-8315	11600	02/01/77	4
ASSOCIATED METALS & MINERALS CORPOR 733 THIRD AVENUE NEW YORK NY 10017	040-08317	SME-8198	11600	07/01/75	4
ASSOCIATED METALS & MINERALS CORPOR 733 THIRD AVE NEW YORK NY 10017	040-08443	SME-8262	11600	05/01/76	4

ST. MARY'S HOSPITAL S. MAIN AT CHISUM ST ROSWELL	NM 88201	040-08162	SUB-1154	11300	02/28/78	4
TETON EXPLORATION P. O. DRAWER QQ GALLUP	NM 87301	040-08728	SUA-1373	11500	01/31/85	0

NAME AND ADDRESS		DOCKET NUMBER	LICENSE NUMBER	PROGRAM CODE	EXPIRATION DATE	STATUS
UNC TETON EXPLORATION DRILLING, INC C/O P. O. DRAWER QQ GALLUP	NM 87301	040-08782	SUC-1389	11210	01/31/86	0
UNITED NUCLEAR GRANTS	NM 87020	040-01822	SUA-1082	11100	04/30/76	4
UNITED NUCLEAR CORPORATION P.O. BOX 1688 SANTA FE	NM 87501	040-08229	SUE-8074	11600	01/01/75	4
UNITED NUCLEAR CORPORATION P.O. BOX 3951 ALBUQUERQUE	NM 87110	040-08263	SUE-8150	11600	11/01/76	4
UNITED NUCLEAR-HOMESTAKE PARTNERS PO BOX 98 GRANTS	NM 87020	040-00646	SUA-708	11100	02/29/76	4
VITRO-CANONSBURG P. O. BOX 5400 ALBUQUERQUE	NM 87115	040-06500	SUC-315	11800	11/11/11	1
AIR FORCE, DEPARTMENT OF THE 57 FLIGHTER WEAPONS WING/DT PR HELLIS AFB	NV 89191	040-08431	SUB-1244	11220	09/30/86	0
ARMY, DEPARTMENT OF THE HANTHORNE	NV 89415	040-08627	SUC-1309	11200	07/31/82	4
INTERIOR, DEPARTMENT OF THE RENO METALLURGY RES. CTR. RENO	NV 89505	040-06497	SMB-358	11300	07/31/82	1 => expired

Vol. II

KY-OH

PART 30 LICENSES

Domestic Licensing &  
By-Product Material

UNIVERSITY HEIGHTS HOSPITAL  
1127 UNIVERSITY BOULEVARD NORT  
ALBUQUERQUE NM 87106

US POTASH AND CHEMICAL CO  
P O BOX 101  
CARLSBAD NM 88220

V. A. MEDICAL CTR.  
2100 RIDGECREST DRIVE, S.E.  
ALBUQUERQUE NM 87108

VAN ATTA LABORATORIES  
8307 CONSTITUTION N. E.  
ALBUQUERQUE NM 87106

030-05478

30-01494-01

03120

11/30/72

4

030-02583

30-01747-02

02120

03/31/88

0

030-02585

30-02442-01

02120

03/31/75

4

LIST OF ALL PART 50 LICENSES

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NAME AND ADDRESS	DOCKET NUMBER	LICENSE NUMBER	PROGRAM CODE	EXPIRATION DATE	STATUS
VAN ATTA LABORATORIES 801 ENCINO N E ALBUQUERQUE NM 87106	030-07513	30-02442-02	02300	04/30/75	4
VANN TOOL COMPANY ROSEWELL HIGHWAY P. O. BOX 38 ARTESIA NM 88210	030-08735	30-15210-01	03110	07/31/77	4
WILLIAMS M.D., DAVID A. LOS ALAMOS MEDICAL CENTER LOS ALAMOS NM 87544	030-08386	30-14999-01	02200	02/28/77	4
EO&G, INC. 680 EAST SUNSET LAS VEGAS NV 89101	030-05188	27-03732-01	03610	02/28/89	4
EGLIT, BARNEY P. O. BOX 652 SPARKS NV 89451	030-05191	27-06309-02	03120	04/30/73	4
ENVIRONMENTAL PROTECTION AGENCY P.O. BOX 15027 LAS VEGAS NV 89114	030-05189	27-05861-01	03610	06/30/89	0
ENVIRONMENTAL PROTECTION AGENCY P.O. BOX 15027 LAS VEGAS NV 89114	030-06981	27-05861-02	03120	03/31/87	0
INTERIOR, DEPARTMENT OF THE 1605 EVANS AVENUE RENO NV 89520	030-05187	27-03106-01	03610	06/30/83	1 => expired
INTERIOR, DEPARTMENT OF THE P.O. BOX 427 BOULDER CITY NV 89005	030-11437	27-16664-01	03121	08/31/85	0