Grand Junction and the Manhattan Project*

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Abstract

The carnotite deposits in the Salt Wash Member of the Morrison Formation in southwestern Colorado and southeastern Utah had been mined for radium, vanadium and minor uranium since the 1910's. During vanadium mining, the uranium in the ores was discarded in the mill tailings. The Manhattan Project was the code name of the project to develop an atomic bomb during World War II, and under the direction of the Army's Manhattan Engineer District (MED). After making a survey of nine vanadium mills in December 1942, the MED concluded that the tailings were the best source of domestic uranium. Grand Junction became the center of this secret operation. By 1946, 2,698,000 pounds of uranium oxide had been produced from Colorado Plateau material. This represented 14 percent of the total uranium acquired by the entire project. A civilian geological contractor, based in Grand Junction, evaluated the uranium resources of the Salt Wash Member of the Morrison Formation for the MED. On January 1, 1947, all functions and facilities of the MED became the new U.S. Atomic Energy Commission, with domestic uranium procurement headquarters in Grand Junction.

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GRAND JUNCTION

and the

MANHATTAN PROJECT

Secret Domestic Uranium Production During World War II

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CARNOTITE

$K_2(UO_2)_2V_2O_8 \cdot 3H_2O$

CARNOTITE MINING
S.W.CO, S.E.UT, N.E.AZ, N.W.NM
Salt Wash Mbr., Morrison Fm.

Years	Tons of Ore	Commodity
1910-1923	67,000	Radium, Some Vanadium, Some Uranium
1924-1935	8,000	Vanadium, Some Uranium, Some Radium
1936-1947	1,318,000	Vanadium, Some Uranium

Fischer (1968)

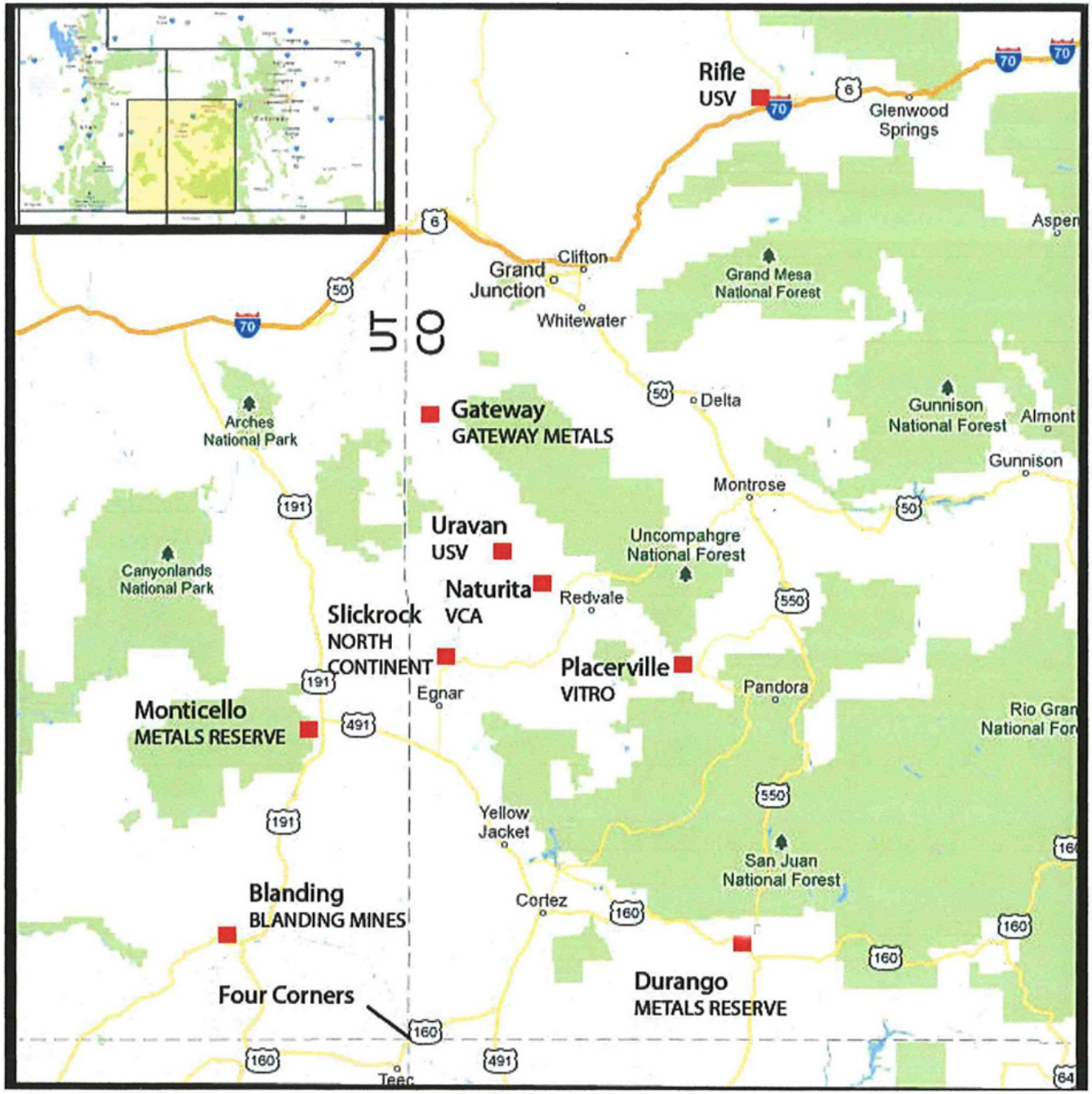
MANHATTAN PROJECT

- Code name for the development of an atomic bomb.
- Army's Manhattan Engineer District (MED).
- Determined a domestic source of uranium was in the tailings at Western Vanadium mills.
- December 1942 – Survey of nine vanadium mills.

Blanding, UT
Durango, CO
Gateway, CO
Monticello, UT
Naturita, CO
Placerville, CO
Rifle, CO
Slickrock, CO
Uravan, CO

- 1,085,875 pounds of "available material" (U_3O_8)

Merritt (1942)
NGR 434-00-261


Rifle
USV
Glenwood Springs
Aspen
Clifton
Grand Junction
Whitewater
Grand Mesa National Forest
UT
CO
Gateway
GATEWAY METALS
Delta
Gunnison National Forest
Almont
Gunnison
Montrose
Arches National Park
Uravan
USV
Uncompahgre National Forest
Canyonlands National Park
Naturita
VCA
Redvale
Slickrock
NORTH CONTINENT
Egnar
Placerville
VITRO
Pandora
Monticello
METALS RESERVE
Rio Grande National Forest
Yellow Jacket
San Juan National Forest
Cortez
Blanding
BLANDING MINES
Durango
METALS RESERVE
Four Corners
Teec
6
50
70
191
491
550
160
64

GRAND JUNCTION, COLORADO

- March 23, 1943 – 2nd Lt. Philip C. Leahy arrives in GJ.

  Orders: *"Call Blair Burwell at this number and he will tell you what needs to be done."*

  Letter: *To whom it may concern*

  If this officer needs help, please assist.

  Brigadier General L.R. Groves

- Established the Colorado Area Engineers Office, NE Corner, 3rd and Main

Leahy (1993)

GREEN SLUDGE PLANTS

- Built by Stearns-Roger Manufacturing Co.
- Operated by U.S. Vanadium Corp. 1943-1945

DURANGO, CO (110 tpd)

- Metal Reserve Tailings
- U.S. Vanadium Tailings
- Blanding Mines Tailings

URAVAN, CO

WAA Plant (300 tpd)

- U.S. Vanadium Tailings

WSP Plant (300 tpd)

- Naturita Tailings
- Gateway Tailings
- Placerville Tailings
- Other Tailings

Sludge Shipped to Grand Junction

Burwell (1946)

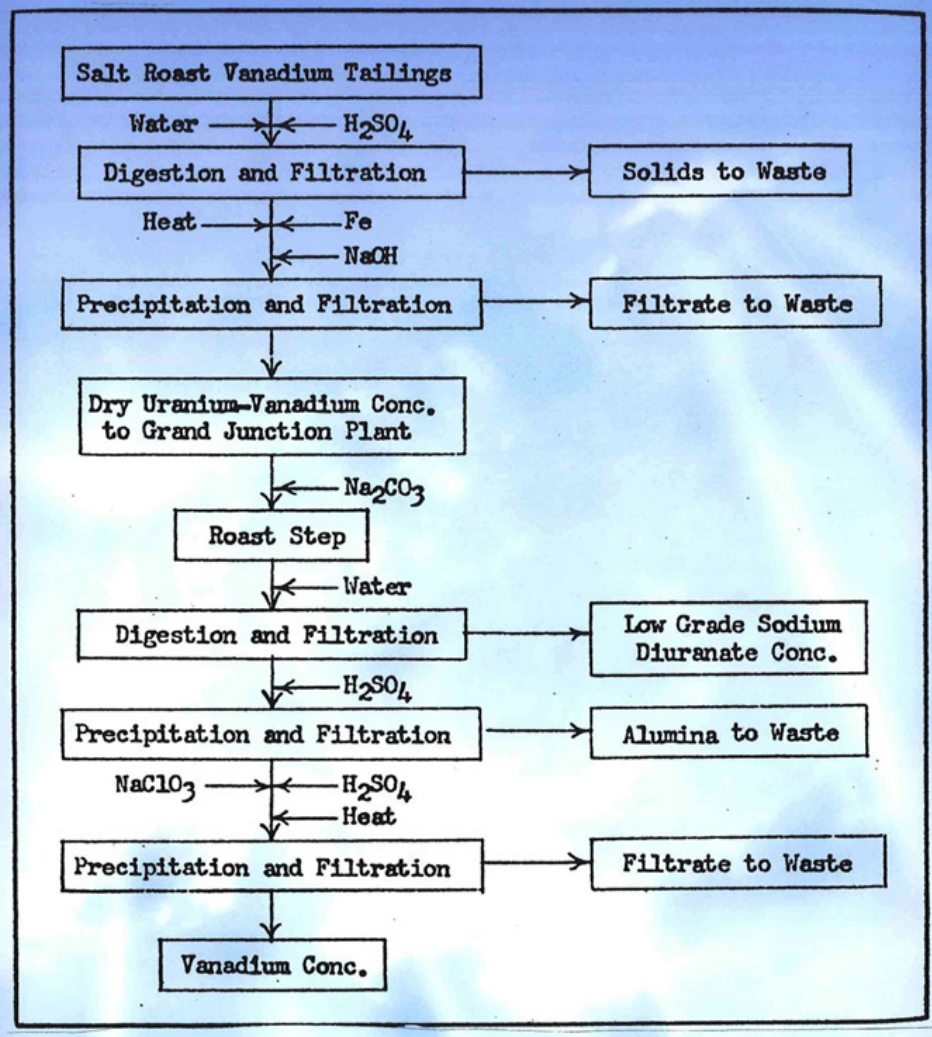
WSP PLANT – URAVAN, CIRCA 1944

National Archives

GJ REFINERY

- Leased a 55.7 acre site along the Gunnison River. Contained a railroad spur and a gravel pit.
- August 14, 1943 purchased site from Mr. L.H. Hall for $10,000.00 for Project X.
- Stearns-Roger constructed a plant operated by U.S. Vanadium 1943-1946.
- Processed green sludge from Uravan and Durango and other miscellaneous uranium-bearing materials. Rated at 18 dry tons per day.
- Plant removed excess vanadium from the sludge.
- Uranium concentrate (15% U_3O_8, 1.10% V_2O_5) shipped to Linde Air Products Co. at Tonawanda, NY to produce black oxide.

Burwell (1946)



FLOW SHEETS OF MED PLANTS

Lundquist & Lake (1955)

TRANSPORTATION DIVISION

- Located at 640 Struthers Avenue
- 34 trucks
- Staff
  - 1 Foreman
  - 4 Mechanics
  - 2 Tire Men
  - 2 Parts Men
  - 2 Lubrication Men
- Trucks hauled supplies to plants at Durango and Uravan. Brought drums of green sludge to Grand Junction.

Burwell (1946)

STAFF, COLORADO AREA ENGINEERS OFFICE, CIRCA 1944

NRG-434-99-201

VANADIUM MILLS WITH URANIUM CIRCUITS

- **MONTICELLO, UTAH**
  - **Metals Reserve 1943-1944**
  - **VCA 1944-1945**
- **NATURITA, COLORADO**
  - **VCA 1943-1945**
- **Produced a 45-50% U_3O_8 and 25% V_2O_5 sludge.**
- **Shipped to Vitro Manufacturing Co., Canonsburg, PA.**

Manhattan District Engineer (1948)

MOAB STOCKPILE

- Howard Balsley – ore buyer for Vitro Manufacturing Co.
- Carnotite ore averaging 1.50% U_3O_8.
- March 1945, MED purchased stockpile for $71,880.00
- Contained 52,000 pounds U_3O_8.
- Hauled to Grand Junction for processing.

Leahy (1993)

TELEGRAM

JULY 17, 1945

"MED'S mission has been accomplished."

General Groves

Leahy (1993)

MANHATTAN ENGINEER DISTRICT
DOMESTIC URANIUM PROCUREMENT

COMPANY	POUNDS U_3O_8	COST
U.S. Vanadium Corp.	1,782,000	$941,800
Vanadium Corp. Amer.	460,000	692,350
Metals Reserve Co.	270,000	216,300
Vitro Manufacturing Co.	52,000	71,880
Others	134,000	150,000
	2,698,000	$2,072,330

(Avg. Cost Per Pound U_3O_8 – 77 cents)

Manhattan District Engineers (1948)

MANHATTAN ENGINEER DISTRICT
URANIUM PROCUREMENT

AREA	POUNDS U_3O_8	COST
COLORADO PLATEAU	2,698,000	$2,072,330
PORT RADIUM MINE	2,274,000	5,082,300
SHINKOLOBWE MINE	13,966,000	19,381,600
	18,938,000	$26,536,230

(Avg. Cost Per Pound U_3O_8 - $1.40)

Manhattan District Engineers (1948)

UNION MINES DEVELOPMENT CORP.
GRAND JUNCTION FIELD OFFICE

Goal: To Appraise the Uranium Resources of the Colorado Plateau.

Areas Investigated

- Salt Wash Mbr., Morrison Fm. – All known outcrops.
- Glen Canyon and Entrada Ss. – Areas of roscoelite deposits.
- Chinle Fm. – Temple Mt. UT Area.

By February 1, 1944, the office had 48 geologists in 11 field parties and a small administrative staff.

COLORADO PLATEAU ORE RESERVES AS OF 1946

POSITIVE INDICATED INFERRED

State	Tons of Ore	%SOQ	Pounds SOQ
Colorado	2,629,963	0.24	12,370,826
Utah	1,334,295	0.14	3,679,311
Arizona	157,570	0.14	441,135
New Mexico	3,300	0.14	9,240
	4,125,128	0.20	16,500,512

Geologic Potential – An additional 4,000,000 pounds.

SOQ – Code for U_3O_8

Webber (1947)

JANUARY 1, 1947

All Functions and Facilities of the

Manhattan Engineer District

Were Transferred to the Newly Created

U.S. Atomic Energy Commission