CO.0-10-1 CO.0-10 10/14/85

MEMORANDUM

TO: FILE

FROM: S. Jones

SUBJECT: Elimination report - Project Rulison

SITE NAME: Project Rulison ALTERNATE NAME:

CITY: Garfield County STATE: CO

OWNER(S) testing co-sponsored by AEC + Austral Oil Co.
Past: Current:
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

☐ Production
☐ Disposal/Storage

☐ Facility Type
- ☐ Manufacturing
- ☐ University
- ☐ Research Organization
- ☒ Government Sponsored Facility
- ☒ Other underground nuclear testing

TYPE OF CONTRACT

☐ Prime
☐ Subcontractor
☐ Purchase Order

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

w/ austral oil Co.
Contract/~~Purchase Order~~ # E(26-1)-429, E(26-1)-667

CONTRACTING PERIOD: 9/10/69 - 4/71

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	☐	☐	☐	☐	☐	☐

The owner, Claude V Hayward (now Lee Hayward) deeded the property to ERDA in 1969

AEC/MED INVOLVEMENT AT SITE

Control

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

* LASL directed test

- ☐ 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 underground nuclear detonations

Quantities (on the basis of records reviewed)

- ☐ None
- ☐ Production Quantities
- ☐ Small Amounts

Comment _____

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 Decontaminated and ~~Released~~ STET and is being monitored
- ☒ Availability of Close Out Records
  - ☐ None
  - ☒ Some
  - ☐ Sufficient
- ☒ Radioactive Status:

	YES	MAYBE	PROBABLY NOT	NO
Contaminated	___	___	___	X
Potential for Exposure (accessible)	___	___	___	___

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 The site is being monitored for tritium in groundwater.

REFERENCES: 1. Project Rulison Well Plugging + Site Abandonment Plan, U.S. Energy Research + Development Administration, Nevada Operations Office, August 1976

2. Nork, W.E., Radioactivity in the Hydrologic Environment Project Rulison, Final Pre-Short Report (U), August 13, 1969.

3. Radiological Safety Guides for Experiments Involving Nuclear Explosive Stimulation of Natural Gas Wells, April 5, 1972.

4. Project RULISON Radiological Operations Rollup Plan, July 1972.

5. Addendum No. 3 (Site Rollup and Long-Term Hydrologic Surveillance) to Project RULISON Planning Directive PL-45-69, U.S. Atomic Energy Commission, August 7, 1972

6. Project RULISON Well Plugging and Site Abandonment Plan, U.S Energy Research and Development Administration, Nevada Operations Office, August 1976.

Summary:

The site has been decontaminated. Periodic environmental monitoring of the site is being conducted.

P.M

PROJECT RULISON

Radiological Summary

INTRODUCTION

Project RULISON was a Plowshare experiment to determine the Commercial feasibility of nuclear stimulation of natural gas reservoirs. Surface ground zero was located on the southwest limb of the Piceance Creek Basin in Garfield Country, Colorado. The location of the site relative to the environs of Colorado are shown in Figure 1. The nuclear detonation, with a yield of 40 kilotons, [illegible] at an underground depth of 8430 feet in rocks of the Mesaverde Group. All rocks in the Project RULISON region contain groundwater

RADIOLOGICAL STATUS

According to an August 7, 1972 AEC document entitled "Addendum No. 3 (Site Rollup and Long-TERM Hydrologic Surveillance) to Project RULISON Planning Directive PL-45-69", the Rulison [illegible] was in a relatively uncontaminated condition as of April 23, 1971.

Site soil surveys identified only a small area near the flare stack (where rainout of tritiated water occurred on several occasions) that had tritium soil concentrations in excess of a few thousand pico curies per gram.

Approximately 80 barrels of drilling chips, sludge, solid and mud containing tritium below a few thousand pCi/g were dumped in a drilling mud pit and buried. The remaining material averaging above 3000 pCi/g was placed in 55-gallon drums; tagged and locked in a shed. There were 5 drums of soil, sludge and drilling chips, and 3 drums of slightly contaminated scrap being stored. In addition, there were an estimated 30 to 50 barrels of sludge and drilling chips being stored in three large (200-barrel) water tanks on site. This material,

plus water in the production system itself (pipes, separators, etc.) were supposedly to be disposed of by Nuclear Engineering Corporation. During the decontamination of the interiors of the production equipment, substantial volumes (perhaps hundreds of barrels) of low level tritiated water were expected to be generated. Plans called for this low level water to be disposed of by "steaming" to the atmosphere.

The stored liquid and solid wastes contained the following tritium levels:

Tritium levels in water:	0.4 uCi/ml
Tritium levels in sludge:	0.04 to 0.1 uCi/ml
Tritium levels in stored barrels of soil:	0.003 to 0.03 uCi/g

The off-site radiation safety program included extensive sampling of air, vegetation, crops, soil, animal tissues, urine from local residents, precipitation and local water sources (wells, springs, streams, Colorado River, etc.).

Within a few thousand feet of the site boundary minor increases above background were detected in tritium levels in precipitation, soil and vegetation. Some tritium levels above background were also found in off-site residents possessing luminous dial watches containing tritium. All other soil, precipitation, vegetation and urine samples were at background levels. All off-site air samples were orders-of-magnitude below the CG's* for tritium and krypton-85 in

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* An abbreviation for Concentration Guides. CG's are reference concentrations as given in November 8, 1968 revision of USAEC Manual, Chapter 0524, Standards for Radiation Protection, Annex A, Table II, Column 2, reduced by a factor of three to be consistent with standards applicable to Individuals and Population Groups in Uncontrolled Areas. These guides are applied as per instructions in TN NV 0500-23, dated May 12, 1969. A CG is used in the same context as an MPC had previously been applied.

off-site areas (maximum probable public exposure from Project RULISON was estimated to be on the order of a few microrem)

It was difficult to postulate any groundwater route which might carry water from the RULISON site into the Battlement Creek and/or Colorado River drainage. However, due to the flaring of nearly 3,000 curies of tritium into the atmosphere, it was expected that some of the tritium would eventually find its way (via the hydrologic cycle) into the Battlement Creek drainage. Extensive combined sampling efforts have been conducted by the EPA, USGS, LLL, and Colorado State Department of Health. As of 1972, no tritium in excess of background was identified in the hydrologic environment below the site.

Long term hydrological monitoring results reported (ref. 5) in 1982 indicated tritium concentrations in creeks, springs and wells in the vicinity of Project RULISON ranged in values from 74 to 370 pCi/l.

CURRENT USE

At the present, there are no known projects planned or underway at the RULISON test site. It appears the only currently active projects underway at the test site involve environmental monitoring

Bibliography

1. Project Rulison Well Plugging and Site Abandonment Plan, U.S. Energy Research and Development Administration, Nevada Operations Office, August 1976.

2. Nork, W.E., Radioactivity in the Hydrologic Environment Project Rulison, Final Pre-Short Report (U), August 13, 1969.

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