

Calculation Cover Sheet

MKE DOCUMENT NO. 5025-GRJ-C-01-01003-04



Contract No. 5025

Discipline ESC1

Calc. No. 05-626-02-00

No. of Sheets 19-39-52

Project

UMTRA/GRJ

Feature

Tailings Excavation

Item

Off-Pile Excavation Limits and Quantities

Sources of Data

Sources of Formulae & References

1. U.S. Dept. of Energy "Remedial Action Plan and Site Conceptual Design for Stabilization of the Inactive Uranium Mill Tailings at Grand Junction, Colorado" Draft, June 1986 (MKE Doc No. 5025-GRJ-R-03-00326-00 Draft RAP Volume 1)

Preliminary Calc. ☐

Final Calc. ☒

Supersedes Calc. No.

4	"	S. F. Bateman	12-17-86	H. LUBIS	12-20-86	P. Sivara	12-20-86
3	LAST DATA	H. LUBIS	8-14-86	S. F. Bateman	8-14-86	S. F. Bateman	8-14-86
2	Revised to respond to TAC comments	S. F. Bateman	4-19-88	WY Lin	4/19/88	J. S. S. S.	4/20/88
1	CNSI DATA INCLUDED	S. F. Bateman	2/31/87	WY Lin	1/15/88	J. S. S. S.	1/19/88
0	—	W. H. H. H.	9/10/86	S. F. Bateman	9/10/86	J. S. S. S.	10/7/86
Rev. No.	Revision	Calculation By	Date	Checked By	Date	Approved By	Date

9109200112 910912

PDR WASTE

WM-54

PDR

Form 42-110



MK-ENVIRONMENTAL SERVICES
A DIVISION OF MK-FERGUSON

Project UMTRA - GRJ

Contract No. 885-54

Sheet 1

Feature TAILINGS EXCAVATION

Designed SLB

File No. _____

Item OFF-PILE EXCAVATION

Checked HL

Date 12.17.90

Date 12.20.90

REVISION 4

THE LATEST QUANTITY ESTIMATE IS GIVEN
IN A LETTER FROM J. G. OLDHAM TO M. MATTHEWS
(ATTACHED, SH. 14-1B)
DATED OCTOBER 4, 1990 ✓ ALTHOUGH OFF-PILE
TAILINGS QUANTITIES REMAIN UNCHANGED FROM
REVISION 3, THE LETTER IS INCLUDED FOR
CLARIFICATION,

ENGINEERS
AND
CONSTRUCTORS



MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

HEADQUARTERS OFFICE
ONE ERIEVIEW PLAZA
CLEVELAND OHIO U.S.A. 44114
PHONE (216) 523-5600 TELEX 985547

5-14
MKE Doc. No.
J85-GRJ-L-02-04641-00 -B

REPLY TO: MK-FERGUSON COMPANY
REMEDIATION ACTIONS
CONTRACTOR-UMTRA PROJECT
P.O. BOX 9136
ALBUQUERQUE NEW MEXICO U.S.A. 87119
90-3050-709

RECEIVED-MKE

OCT 8 1990

October 4, 1990

UMTRA-S.F.

Mr. Mark L. Matthews
Project Manager
U.S. Department of Energy
Uranium Mill Tailings Remedial Action Project Office
First National Bank Building
5301 Central Avenue N.E.
Suite 1700
Albuquerque, New Mexico 87108

SUBJECT: Grand Junction, Phase II
Test Pit Results - Processing Site

REFERENCE: 1. DOE letter dated August 8, 1990.
2. Contract No. DE-AC04-83AL18796

Dear Mr. Matthews:

The referenced letter directed MK-Ferguson to excavate test pits at the Processing Site to determine the levels of radioactive contamination found below the tailings piles. This was done in early September, and our report is attached.

The results of this program indicate that the cobble/gravel zone underlying the tailings pile is uncontaminated at depths greater than one foot below the tailings materials. This suggests that extensive excavation of cobbles and gravel will not be required. This conclusion has led to a revised quantity estimate; the total volume of contaminated material is now estimated to be 5,260,100 cubic yards.

Please note that although this investigation included testing for thorium, and found none at depth, still thorium may exist at depth in other areas of the Processing Site, particularly beneath the VP piles in the former ponds areas. It was not thought feasible to excavate test pits to the bottom of these very deep piles.

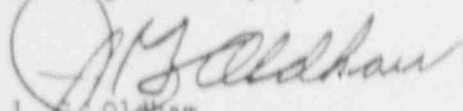
MK-FERGUSON COMPANY
ENGINEERING CONSULTANTS

Mr. Mark L. Matthews
90-3050-709 - Page 2
October 4, 1990

If you have any questions, please contact Tom Jennings or Rob Cooney
of my staff at 766-3093.

Sincerely,

MK Ferguson Company



J. C. Oldham
Project Director

JGO/REC/TPJ/sls

Enclosures

cc: M. L. Matthews - DOE/UMTRA (w/enc.)
C. Smythe - DOE/UMTRA (w/enc.)
C. Cormier - DOE/UMTRA (w/enc.)
D. Leske - DOE/UMTRA (w/enc.)
R. Rager - TAC/UMTRA (w/enc.)

bcc: R. E. Cooney (w/enc.)
T. P. Jennings (w/enc.)
J. G. Pepin - GRJ (w/enc.)
M. F. Petelka (w/enc.)
D. R. Sanders - MKES (w/enc.)
File - EDT (w/enc.)
File (w/o enc.)

1C
JAN 11 - 1991
3855-24
12/10/90

GRAND JUNCTION PROCESS SITE

Test pit results and conclusions concerning estimated quantities of contaminated materials at the Grand Junction Process Site.

FORWARD

On September 4, 1990, a Test Pit Program was started at the Grand Junction process site, under the direction of MK-Ferguson and performed by Industrial Constructors Corporation. The program was undertaken in an effort to more accurately determine quantity of contaminated materials underlying the process site tailings pile. Three test pits (1 thru 3) were excavated to the tailings/alluvial interface, and samples were taken on one foot intervals, from the interface down into alluvial material. Excavation depths below the tailings varied because of dewatering difficulties and access into the excavations. Three small test pits (A through C) were also excavated to locate the tailings/alluvial interface and verify clean material below the tailings (see attached drawing). Test pit operations were completed on September 10, 1990. All test pits were backfilled for safety considerations.

CONCLUSION

Radiological results from the 6 tests pits at the process site indicate contamination does not extend more than 1 foot below the tailings/alluvial interface. Therefore, a safety factor of 5%, representing approximately 134,000 cubic yards, is believed to be a prudent number to use for quantity calculations on the main tailings pile. At this time we estimate the quantity of tailings to be moved at 5,260,100 cy with main pile quantity at 2,830,800, including contingency.

Considering that the original bid quantity is 4,060,200 cubic yards, an overrun of 30% is expected.

TEST PIT LOCATIONS AND DEPTHS

Test Pit #1

Test Pit #1 was located south of the BESS Warehouse at coordinates; N59,770, E33,660. Depth from original ground level to tailings/alluvial interface was approximately 20 feet. The excavation continued 7 feet below the tailings and samples were taken at approximately 1 foot intervals. Radiological results of samples taken and reported by CNES are attached (see Page 5).

Sh. 1D
W-24-605
3885-34
OFF. FILE EXCH
12/20/90

Test Pit #2

Test Pit #2 was located east of the wastewater retention pond at coordinates; N59,740, E33,020. Depth from original ground level to tailings/alluvial interface was approximately 13 feet. The excavation continued 3 feet below the tailings and samples were taken at approximately 1 foot intervals. Radiological results of samples taken and reported by CNES are attached (see Page 5).

Test Pit #3

Test Pit #3 was located north of the Colorado River at coordinates; N59,340, E33,450. Depth from original ground level to tailings/alluvial interface was approximately 15 feet. The excavation continued 3 feet below the tailings and samples were taken at approximately 1 foot intervals. Radiological results of samples taken and reported by CNES are attached (see Page 5).

Test Pit A

Test Pit A was located on the tailings pile, west of the State Repository at coordinates; N59,540, E35,160. Depth from original ground level to tailings/alluvial interface was approximately 2 1/2 feet. The excavation did not continue any further below the tailings then needed to verify alluvial material. One sample was taken from approximately 1 foot below the tailings/alluvial interface. Radiological results of samples taken and reported by CNES are attached (see Page 6).

Test Pit B

Test Pit B was located in the extreme northeast corner of the process site at coordinates; N60,040, E35,160. Depth from original ground level to tailings/alluvial interface was approximately 9 feet. The excavation did not continue any further below the tailings then needed to verify alluvial material. One sample was taken from approximately 1 foot below the tailings/alluvial interface. Radiological results of samples taken and reported by CNES are attached (see Page 6).

Test Pit C

Test Pit C was located north of the main tailings pile, adjacent to the wood-lot property at coordinates; N60,080, E34,800. Depth from original ground level to tailings/alluvial interface was approximately 16 feet. The excavation did not continue any further below the tailings then needed to verify alluvial material. One sample was taken from approximately 1 foot below the tailings/alluvial interface. Radiological results of samples taken and reported by CNES are attached (see Page 6).

Sheet 1E
INTER-SCT
3885-34
94-0100 2411
12/10/92

GROUNDWATER

Water samples were taken from Test Pit #1 and #2 and sent to Barringer Laboratories, Inc. for analysis. Test results are attached (see Page 7).

REVISED TAILINGS QUANTITY

Main Pile -	2,696,000 cy	(ICC take-off)
5% for 1' Bottom Interface -	134,800 cy	
VP Pile	2,219,300 cy	
Pond #1	31,000 cy	(Actual)
Pond #2	28,000 cy	
Pond #3	100,000 cy	
Adjacent Areas	51,000 cy	(ICC take-off)
TOTAL	<u>5,260,100 CY</u>	



Sheet 1G
UNTH-303
3835-24
OFF - P. 12, 13, 14
7/20/90

RADIOLOGICAL DATA
TEST PITS #1, #2, #3
GRAND JUNCTION PROCESS SITE

9/20/90

TEST PIT #1

SAMPLE LOCATION	CNES Ra-226 pCi/g	BARRINGER Ra-226 pCi/g	BARRINGER Th-230 pCi/g
Tailings/Gravel Interface	10.6	*	*
2' Below Interface	2.8	4.0	3.1
3' Below Interface	1.9	*	*
4' Below Interface	1.3	1.4	1.1
5' Below Interface	2.3	*	*
6' Below Interface	1.0	1.3	1.4
7' Below Interface	0.6	*	*

TEST PIT #2

SAMPLE LOCATION	CNES Ra-226 pCi/g	BARRINGER Ra-226 pCi/g	BARRINGER Th-230 pCi/g
South Area of Pit			
Tailings/Gravel Interface	5.8	*	*
1' Below Interface	4.5	3.4	1.0
2' Below Interface	3.2	*	*
3' Below Interface	2.9	2.1	1.9
North Area of Pit			
Tailings/Gravel Interface	108.4	*	*
1' Below Interface	2.4	0.9	1.2
2' Below Interface	1.4	*	*
3' Below Interface	1.8	1.5	1.6

TEST PIT #3

SAMPLE LOCATION	CNES Ra-226 pCi/g	BARRINGER Ra-226 pCi/g	BARRINGER Th-230 pCi/g
Tailings/Gravel Interface	1.5	*	*
1' Below Interface	2.2	2.0	0.7
2' Below Interface	1.2	0.9	0.6
3' Below Interface	3.2	*	*

* Sample not sent to Barringer for analysis

Sheet 1H
UNITA - Cont. 2
2285.14
97.51 WTA W102
12/24/90

<u>SAMPLE</u>	Estimated (20 day) Ra 226 pCi/gm
Test Trench A	14.4
Test Trench B	25.6
Test Trench C	5.1



BARRINGER LABORATORIES INC.

Helene Langlois
MK-FERGUSON (Grand Jct)
P.O. Box 9136
Albuquerque, NM 87119

16000 W. 8TH AVE. SUITE 300
GOLDEN, COLORADO 80401
PHONE (303) 277-1887

1488 DEMING WAY. SUITE 15
SPARKS, NEVADA 89431
PHONE (702) 286-1168

19-Sep-90

Page: 1
Copy: 1 of 3
Set: 1

Attn:
Project: Grand Junction

Received: 12-Sep-90 11:16
PO #: 3050-511-9451 #073

Job: 903152E

Status: Final

Sample Type: Water

Sample Id	As Total mg/l	Ba Total mg/l	Ca Total mg/l	Cr Total mg/l	Pb Total mg/l
GRJ-PS-WWS-028	0.212	0.03	524	<0.01	<0.02
GRJ-PS-WWS-029	0.153	0.04	506	<0.01	<0.02

Sample Id	Hg Total mg/l	Se Total mg/l	Ag Total mg/l	NH4 as N mg/l	TOC mg/l
GRJ-PS-WWS-028	0.0002	1.05	<0.01	123	26
GRJ-PS-WWS-029	0.0004	1.36	0.01	184	39

Sample Id	Ra-226 Error Total pCi/l 2σ*
GRJ-PS-WWS-028	13 ±1
GRJ-PS-WWS-029	39 ±2