040wm039510E

NOTE:
SUPPLEMENTAL
STANDARDS

wm-39

DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
CONTRACT NO. DE-AC04-83AL18796

Vicinity Property

Completion Report

Remedial Actions
Contractor
for the
Uranium Mill Tailings
Remedial Actions
Project

URFO-10

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

Vicinity Property No. SK-0001S

91-0100

VICINITY PROPERTY COMPLETION REPORT
AT

SK-001S
1558 ROSS ROAD
DOUGLAS, WYOMING 82633

JULY 23, 1990

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE
ALBUQUERQUE OPERATIONS OFFICE
U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NM

BY

MK-FERGUSON COMPANY
AND
CHEM-NUCLEAR ENVIRONMENTAL SERVICES, INC.

MK-Ferguson Company has been granted authorization to perform remedial action under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604. Remedial action was done in accordance to the EPA Standards for Cleanup of Lands and Buildings Contaminated with Residual Radioactive Material from Inactive Uranium Processing Sites, 40 CFR 192.12, 192.20-23.

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1.0 SUMMARY

PROPERTY NUMBER:	SK-001S
PROPERTY ADDRESS:	1558 ROSS ROAD DOUGLAS, WYOMING 82633
PROPERTY OWNER:	KIRK HORNBUCKLE GENERAL MANAGER
PROPERTY CATEGORY:	OPEN LAND
REMEDIAL ACTION CONTRACTOR:	MK-FERGUSON COMPANY
CONSTRUCTION SUBCONTRACTOR:	JWS/S & M CONSTRUCTION
RADIOLOGICAL CONTRACTOR:	CHEM-NUCLEAR SYSTEMS, INC.
REA APPROVED:	MARCH 30, 1989
REMEDIAL ACTION STARTED:	JUNE 27, 1989
REMEDIAL ACTION COMPLETED: (APPENDIX C SIGNED)	OCTOBER 30, 1989
VOLUME OF MATERIAL REMOVED:	OUTDOOR: 41,202 cy INDOOR: N/A

1.0 SUMMARY

Remedial action was completed on Vicinity Property SK-001S. A total of 41,202 cubic yards of soil was removed from the property.

Radiological surveys were conducted following removal of contaminated materials, but before property restoration, to document "as-built", supplemental standards conditions. This completion report delineates the application of supplemental standards.

2.0 OPERATIONS SUMMARY

2.1 Remedial Action Plan

The basic remedial action on this property was performed according to the Remedial Action Plan. A total of 41,202 cubic yards of soil was removed from the property, compared with an estimated excavation of 37,700 cubic yards of soil.

2.2 Previously Unidentified Contamination

No new areas of contamination were identified during remedial action.

2.3 Unanticipated Items During Remedial Action

No unanticipated items occurred during remedial action on this property.

3.0 SUPPLEMENTAL STANDARDS SUMMARY

3.1 Radiological Survey Data

All survey data were acquired according to approved procedures.

3.1.1 Pre-Remedial Action Survey

The results of the survey defining the contaminated area requiring remedial action are presented on Drawing SPK-PS-10-0204.

3.1.2 Pre-Restoration Survey

Exterior:

After removal of contamination, and prior to backfilling, a soil sample survey was conducted in the excavated area. Soil samples were aliquoted from the 68 verification-style grids and analyzed by an approved radiochemistry vendor. The radium concentration in these soil samples ranged from 1.1 to 25 pCi/g, as described in Table 3.1. The thorium concentration in these soil samples ranged from 1.9 to 750 pCi/g, also described in Table 3.1

Drawing SK-PS-10-0202 shows the actual areas of excavation.

These results detail the exterior contamination at the surface of the excavated area. Background for the Spook site is 1.5 pCi/g Ra-226.

Interior:

There are no structures on this property.

3.1.3 Supplemental Standards

Radiological surveys of the Acid Pond indicate the existence of contamination in excess of 40 CFR 192 criteria and DOE guidelines to a depth of approximately 80 feet. Analyses of the data demonstrate that an excavation depth of 20 feet will reduce the surface effects of the uranium mill tailings and naturally occurring deposits of Ra-226 and Th-230 to levels that meet 40 CFR 192 requirements. Supplemental Standards are applicable.

Justification Checklist for Application of Supplemental Standards

Application of Supplemental Standards (SS) is in accordance with 40 CFR 192.21, Subpart (x) (check appropriate Subpart):

_____ a) Risk injury to worker/public

_____ b) Environmental harm

_X_ c) High cost relative to long-term benefits

_____ d) High cost of cleaning up building relative to benefits

_____ e) No known remedial action

_X_ f) Radionuclides other than Ra-226 exist

40 CFR 192.22(a) states "when one or more of the criteria of 40 CFR 192.21(a) through (e) applies, the implementing agencies shall select and perform remedial actions that come as close to meeting the otherwise applicable standard as is reasonable under the circumstances". 40 CFR 192.22(b) states "when 40CFR 192.21(f) applies, remedial actions shall, in addition to satisfying the standards of Subparts A and B, reduce other residual radioactivity to levels that are as low as is reasonably achievable".

Ra-226 concentrations in excess of the standards exist in the soil at this vicinity property. The source of this radioactivity is debatable since the general locale is underlain by naturally occurring uranium deposits which contains quantities of Ra-226 in excess of EPA standards. However, effluent from the milling process was dumped on this property and the likelihood that Ra-226 from the processed ore was deposited in the soil is accepted by the DOE. Therefore, 40 CFR 192.21(c) is applicable. (The cost of determining the precise demarcation between the naturally occurring Ra-226 and that deposited from the milling of uranium ore is considered unacceptable.)

Similarly, Th-230 concentrations which are considered hazardous by the DOE exist in the soil and, as above, are suspected of being deposited on the property either by the radioactive decay of naturally occurring uranium ore and/or via the uranium milling process effluent. Therefore, 40 CFR 192.21(f) is applicable.

There are no habitable structures on the property. The property is located about 45 miles from the nearest, reasonably sized community, is located in a slight depression, and is part of a rather large ranching operation. The groundwater in the area is naturally contaminated by materials indigenous to the area and is not suitable for human consumption. It is not expected that any habitable structures will ever be erected on the property.

Because there are no habitable structures on the property, the standard that is applicable and for which Supplemental Standards are recommended is 40 CFR 192.12(c). However, in order to conservatively demonstrate that the proposed action will adequately reduce radon levels, consideration has been given to the criteria of 40 CFR 192.12(b) as described below.

The recommended Supplemental Standard for the property is to excavate the radioactive material, both that naturally occurring and that deposited by the uranium ore milling process effluent, to a depth requiring 20 feet of backfill to restore the property to its original conditions. The primary purpose of this excavation is to remove existing Ra-226 contamination near the surface so that the effects on humans of the existing Ra-226 left in place will be minimized and

reasonable isolation from humans will be achieved. A secondary purpose of the 20 foot backfill recommendation is to comply with DOE guidance to reduce Th-230 contamination so that radon daughter products from its radioactive decay will not, at the end of a 1000 year period, exceed EPA standards, as published today.

It should be noted that proposed ground water standards and cleanup at the Spook locale will be addressed when the new regulations are enacted. Any contribution to contamination of the groundwater by this Vicinity Property will be remediated at that time.

Brief Description and Justification

Based on an analysis by the TAC, Ra-226 and Th-230 contamination exists to a depth of 70 to 80 feet. An excavation requiring 20 feet of backfill to restore the property to its original condition will isolate the contamination remaining in place from human contact. Gamma radiation dose rates at the surface of the restored property will be reduced to near background levels. Radon produced in the more deeply buried material will be attenuated by the clean fill. In order to provide a conservative estimate of radon concentrations in the open land area of the acid pond, DOE has elected to apply radon working levels, the usual concept understood by the public health sector. However, a working level (WL) is an indoor concentration concept; so to apply the concept, DOE has postulated a box-like structure placed on the surface of the site. With this structure and some further assumptions detailed in Appendix E of the REA, it is readily demonstrated that radon gas concentration in the structure results in WLs that are below the permissible criteria in 192.12(b), even though 192.12(b) does not really apply. The results of this hypothetical situation indicate that the open air concentration of radon would pose little or no health risk due to radon emanation from the pond area after remedial action. This exercise has been done to substantiate the proposed supplemental standard comes as close to meeting the otherwise applicable standard as is reasonable under the circumstances.

The cost of excavation at SPK-001s varies from $157,421.00, the proposed remedial action, to $2,238,125.00, total cleanup, depending on additional depth. Because of the isolation of this property from mankind, little or no benefit is gained by excavating beyond 20 feet. Therefore, 40 C.F.R. 192 intent is met - a reasonable effort has been made to protect man from the effects of Uranium Mill Tailings.

The additional cost for not applying Supplemental Standards is $2,238,125.00.

Yes	No	If Supplemental Standards are Applied:
X		1. Open Land?
	X	2. Occupied Building?
N/A		3. If yes to No. 2, is contaminated area beneath or within 10 feet of a building?
	X	4. Anticipated change of land use within the next 5 years?
N/A		5. If yes to No. 4, then will land use produce health risk?
	X	6. Is contamination in a habitable area?
X		7. Have owners comments been solicited? (Attach comments or record of teleconference). (See Appendix D).

Estimated volume of contaminated material to remain = 107,800 (cy).

Contaminated area to remain = None at surface.

Range for contaminated areas = background (micro R/hr)

Range Ra-226 concentration in soil in contaminated area = 1 to 181 pCi/g.

Range Th-230 concentration in soil in contaminated area = 1 to 1,373 pCi/g.

If tailings are below or within 10 feet of the structure, radon daughter concentration = N/A (WL).

3.2 Recommendation

3.2.1 Exterior:

One area of contamination was identified and partially removed. Soil samples after excavation and prior to backfilling indicate that the limit of 15 pCi/g Ra-226 in any 15 cm. layer below the surface is exceeded. In addition, the DOE guideline for Th-230 contamination in soil of 35 pCi/g is exceeded. Supplemental standards have been implemented on this property. Based on this information, we recommend that the property record of SK-001S be annotated to reflect the presence of identified contamination.

3.2.2 Interior:

There are no structures on the property.

Table 3.1
SUPPLEMENTAL STANDARDS SOIL SAMPLE SURVEY
Property SK-001S

SAMPLE No.	GRID ID	DEPTH (cm.)	CONCENTRATION(pCi/g) Ra-226	Th-230
Spk-001-01	1	Side Wall	2.1	5.3
Spk-001-02	2	Side Wall	17.0	24.0
Spk-001-03	3	Side Wall	3.6	6.9
Spk-001-04	4	Side Wall	1.9	4.9
Spk-001-05	5	Side Wall	5.0	11.0
Spk-001-06	6	Side Wall	6.5	9.2
Spk-001-07	7	Side Wall	6.6	6.4
Spk-001-08	8	Side Wall	1.9	4.1
Spk-001-09	9	Side Wall	1.4	15.0
Spk-001-10	10	610/Side Wall	3.2	115.0
Spk-001-11	11	610/Side Wall	14.0	30.0
Spk-001-12	12	610/Side Wall	2.0	27.0
Spk-001-13	13	610/Side wall	2.9	19.0
Spk-001-14	14	610/Side Wall	3.3	49.0
Spk-001-15	15	610/Side Wall	3.5	55.0
Spk-001-16	16	Side Wall	9.1	15.0
Spk-001-17	17	610	4.4	98.0
Spk-001-18	18	610	4.2	190.0
Spk-001-19	19	610	4.4	160.0
Spk-001-20	20	610	3.8	102.0

Table 3.1
SUPPLEMENTAL STANDARDS SOIL SAMPLE SURVEY
Property SK-001S

SAMPLE No.	GRID ID	DEPTH (cm.)	CONCENTRATION(pCi/g) Ra-226	Th-230
Spk-001-21	21	610	4.3	94.0
Spk-001-22	22	610	3.2	112.0
Spk-001-23	23	610/Side Wall	6.7	63.0
Spk-001-24	24	Side Wall	2.7	31.0
Spk-001-25	25	Side Wall	1.4	5.1
Spk-001-26	26	610	4.7	170.0
Spk-001-27	27	610	7.3	190.0
Spk-001-28	28	610	5.1	240.0
Spk-001-29	29	610	12.0	390.0
Spk-001-30	30	610	5.3	230.0
Spk-001-31	31	610	5.8	330.0
Spk-001-32	32	610	5.5	106.0
Spk-001-33	33	Side Wall	3.5	29.0
Spk-001-34	34	Side Wall	2.6	26.0
Spk-001-35	35	Side Wall	1.6	10.0
Spk-001-36	36	610	2.7	72.0
Spk-001-37	37	610	3.9	300.0
Spk-001-38	38	610	8.4	660.0
Spk-001-39	39	610	25.0	530.0
Spk-001-40	40	610	16.0	310.0

Table 3.1
SUPPLEMENTAL STANDARDS SOIL SAMPLE SURVEY
Property SK-001S

SAMPLE No.	GRID ID	DEPTH (cm.)	CONCENTRATION(pCi/g) Ra-226	Th-230
Spk-001-41	41	610	21.0	750.0
Spk-001-42	42	Side Wall	1.6	21.0
Spk-001-43	43	Side Wall	1.7	33.0
Spk-001-44	44	610	4.4	49.0
Spk-001-45	45	610	14.0	450.0
Spk-001-46	46	610	8.5	340.0
Spk-001-47	47	610	5.4	330.0
Spk-001-48	48	610/Side Wall	1.6	74.0
Spk-001-49	49	Side Wall	1.3	3.7
Spk-001-50	50	Side Wall	2.3	5.8
Spk-001-51	51	Side Wall	2.1	4.6
Spk-001-52	52	610/Side Wall	2.6	35.0
Spk-001-53	53	610	4.1	160.0
Spk-001-54	54	610/Side Wall	3.6	61.0
Spk-001-55	55	Side Wall	3.3	71.0
Spk-001-56	56	Side Wall	2.2	44.0
Spk-001-57	57	610/Side Wall	1.9	25.0
Spk-001-58	58	610/Side Wall	1.9	15.0
Spk-001-59	59	Side Wall	2.4	8.1
Spk-001-60	60	Side Wall	1.8	7.8

Table 3.1
SUPPLEMENTAL STANDARDS SOIL SAMPLE SURVEY
Property SK-001S

SAMPLE No.	GRID ID	DEPTH (cm.)	CONCENTRATION(pCi/g) Ra-226	Th-230
Spk-001-61	61	610/Side Wall	1.8	4.9
Spk-001-62	62	Side Wall	1.8	15.0
Spk-001-63	63	Side Wall	2.3	4.8
Spk-001-64	64	610/Side Wall	1.9	8.5
Spk-001-65	65	Side Wall	2.1	2.6
Spk-001-66	66	Side Wall	2.0	1.9
Spk-001-67	67	610/Side Wall	1.4	20.0
Spk-001-68	68	Side Wall	1.1	2.6

4.0 REFERENCES

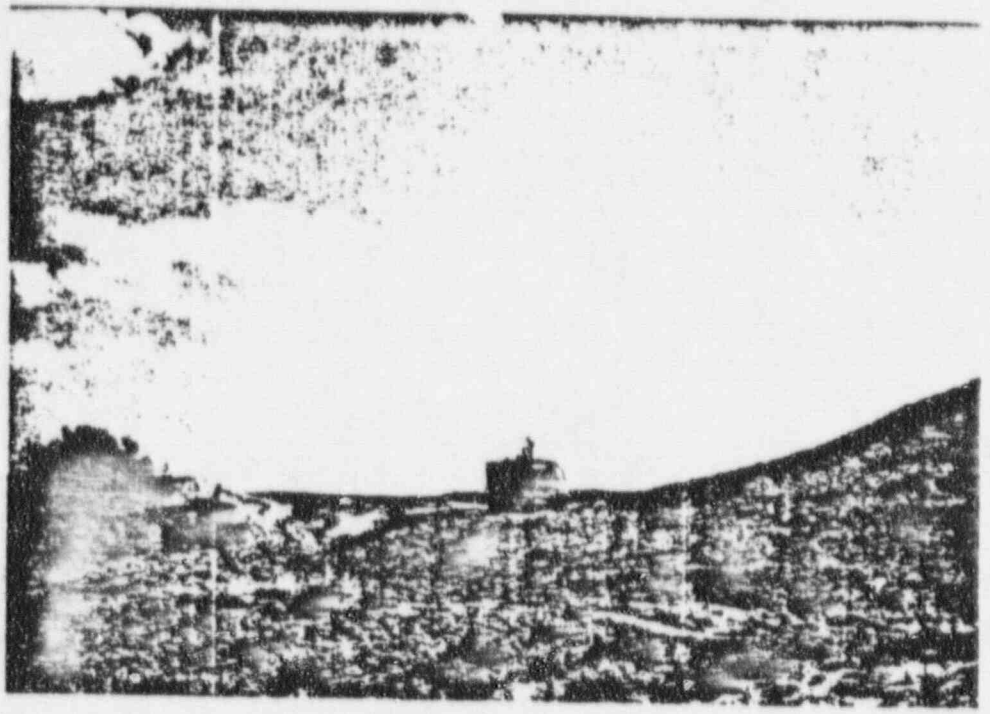
4.1 Results of the Radiological Survey of Property SK-001; Oak Ridge National Laboratory; Oak Ridge, Tennessee; November, 1986.

4.2 The Radiological and Engineering Assessment for Riverton, Property SK-001S; MK-Ferguson Company/Chem-Nuclear Systems, Inc.; Albuquerque, New Mexico May 31, 1989.

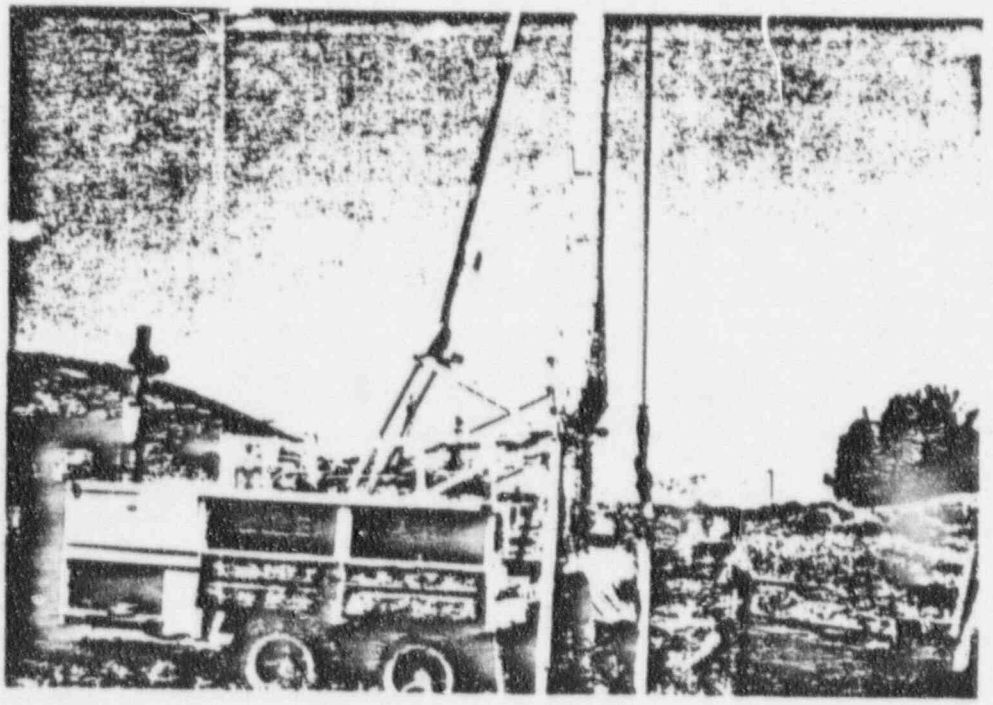
4.3 Health Physics Procedures; Chem-Nuclear Systems, Inc., for MK-Ferguson Company, Remedial Action Contractor; Albuquerque, New Mexico; June 1986.

4.4 Vicinity Properties Management and Implementation Manual; UMTRAP, U.S. Department of Energy; Albuquerque, New Mexico; August 1986.

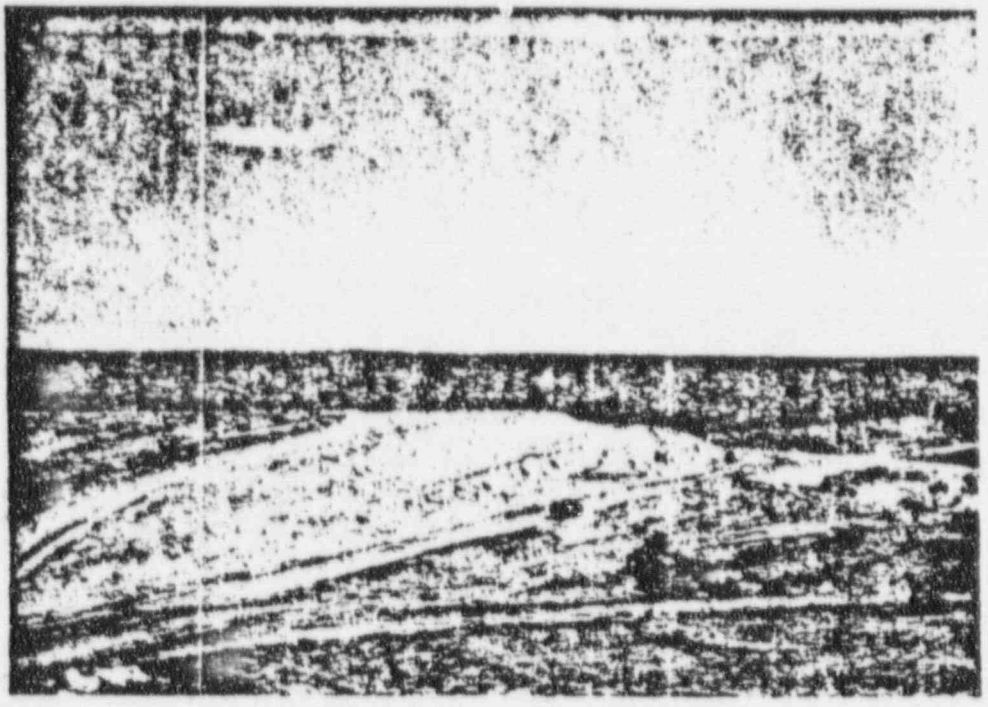
4.5 Title 40, Code of Federal Regulations, Part 192.12-23; U.S. Environmental Protection Agency; Washington, D.C.; July 1983.



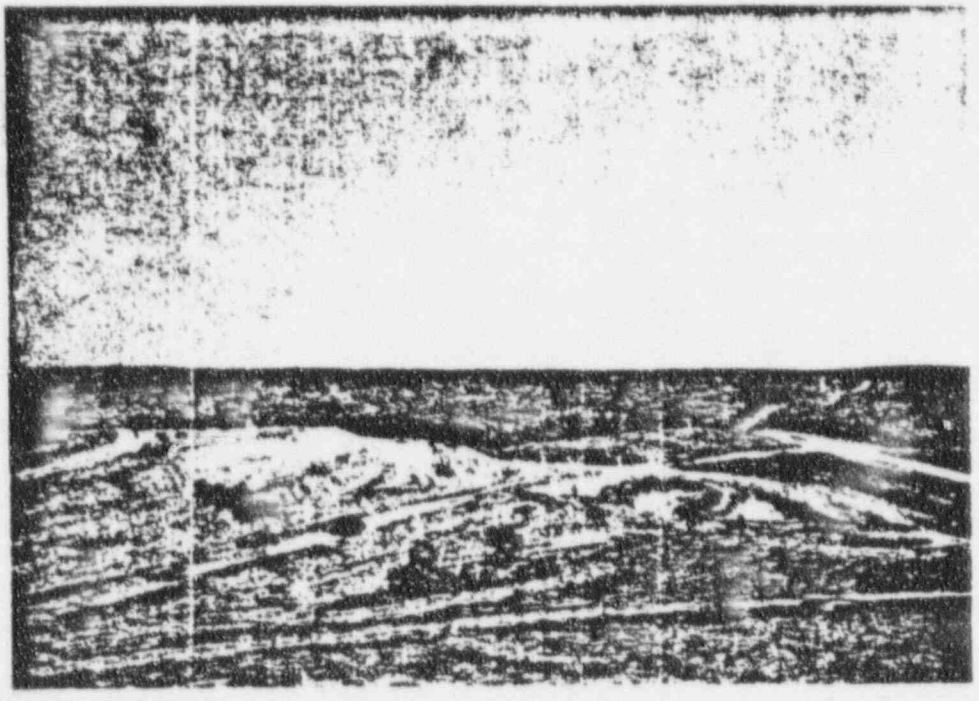
5-19A
Scrapers stockpiling material excavated from the west side of Pile 100. This material had to be removed to allow the excavation of the east end of the Acid Pond. Looking south.



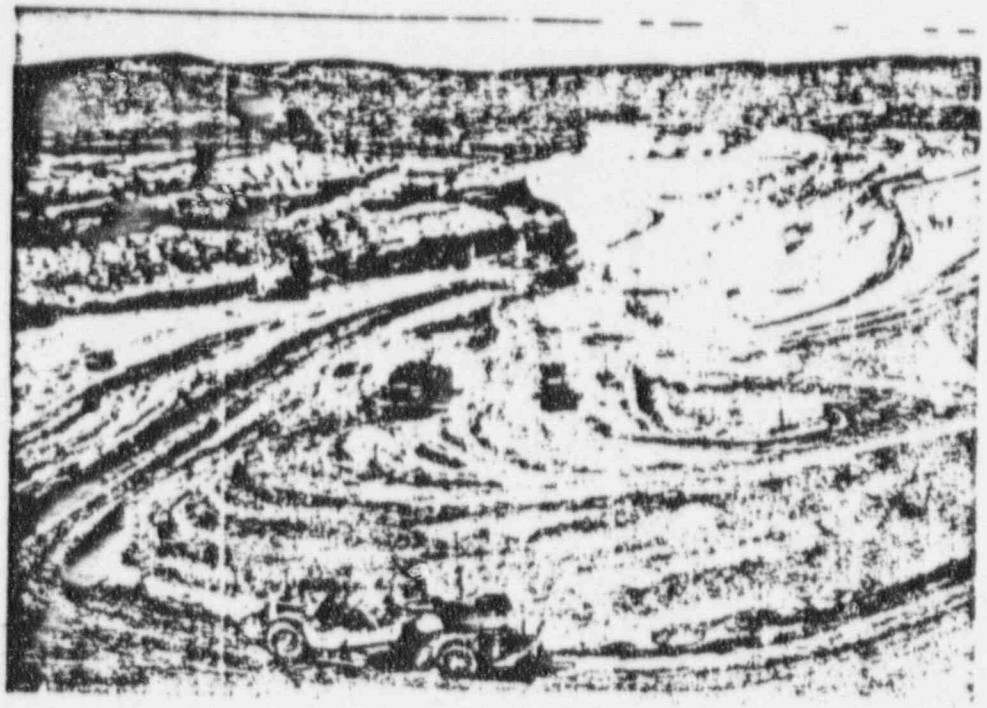
5-22A
Ruby Drilling (second-tier subcontractor) pulling the well casing prior to sealing monitor well #910, which is located in the Acid Pond. Looking northeast.



6-0
West side of Pile 100 excavated and stockpiled to permit the excavation of the Acid Pond. Looking south from Pile 300.

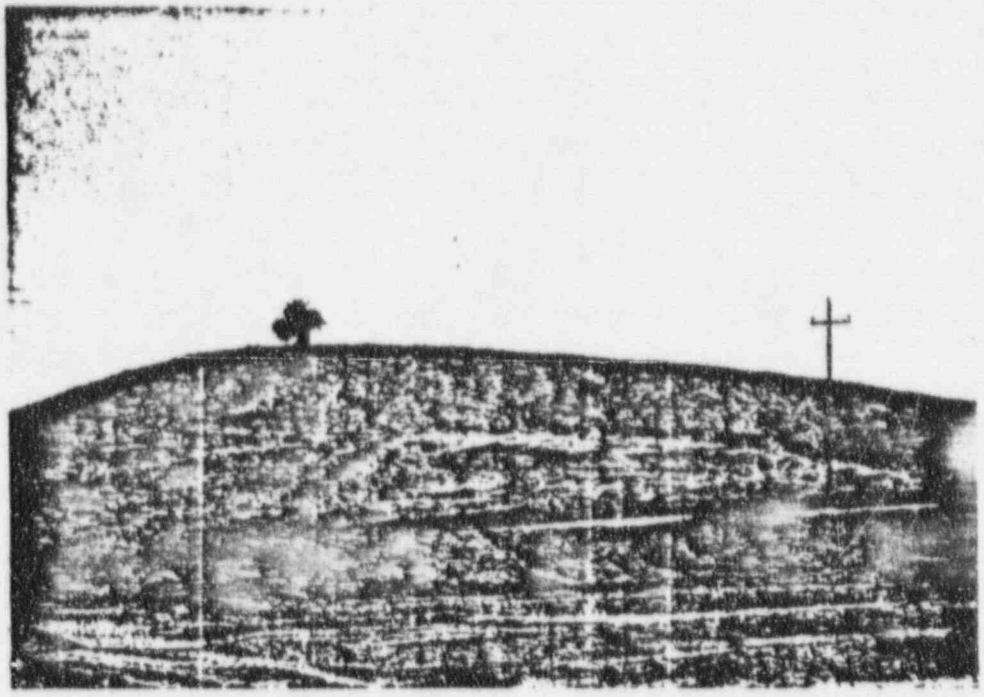


6-2
Excavation of the Acid Pond. Looking south.

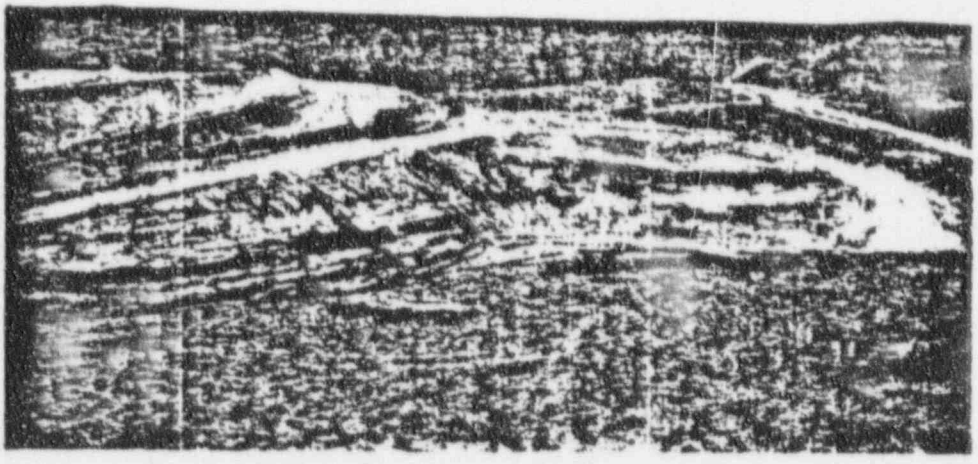


6-3
Excavated contaminated material from the Acid Pond being placed within the Tailings Embankment. Looking north from the south edge of the pit.

6-5
Excavation of the Acid Pond. Looking west from Pile 100.

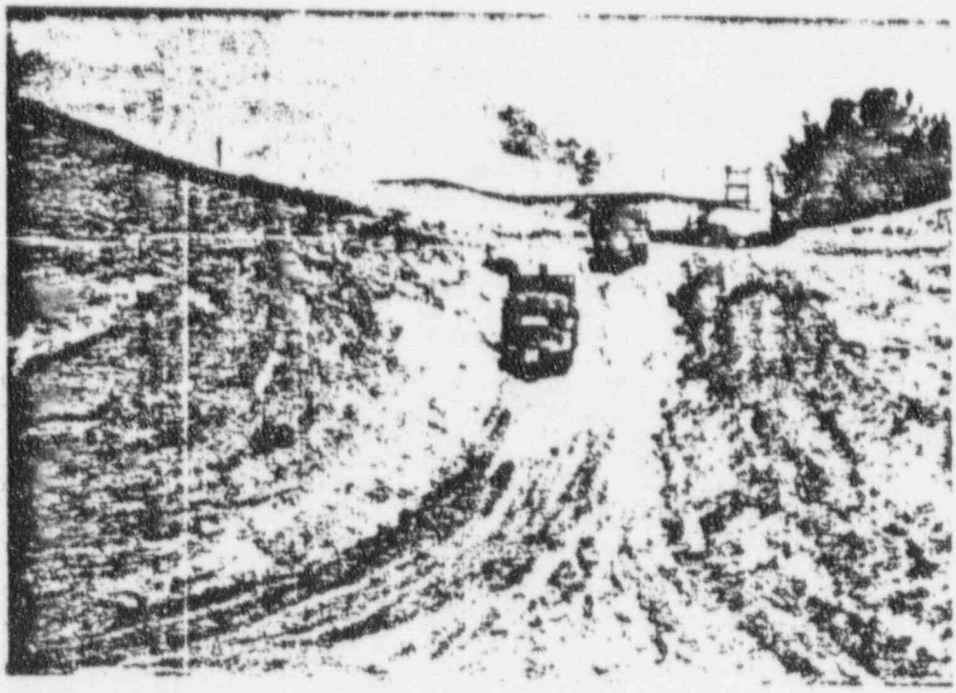


6-7
Stockpiled material from Pile 100. Looking southwest.

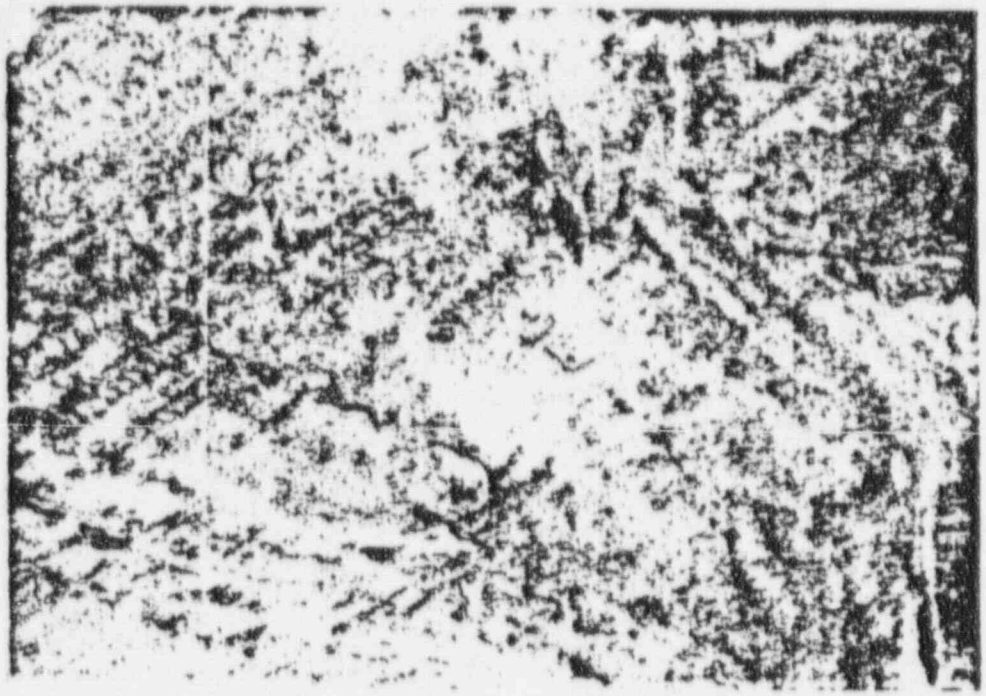


10-20A
The Acid Pond excavated, cross-sectioned, sampled and ready for backfilling. Looking south.

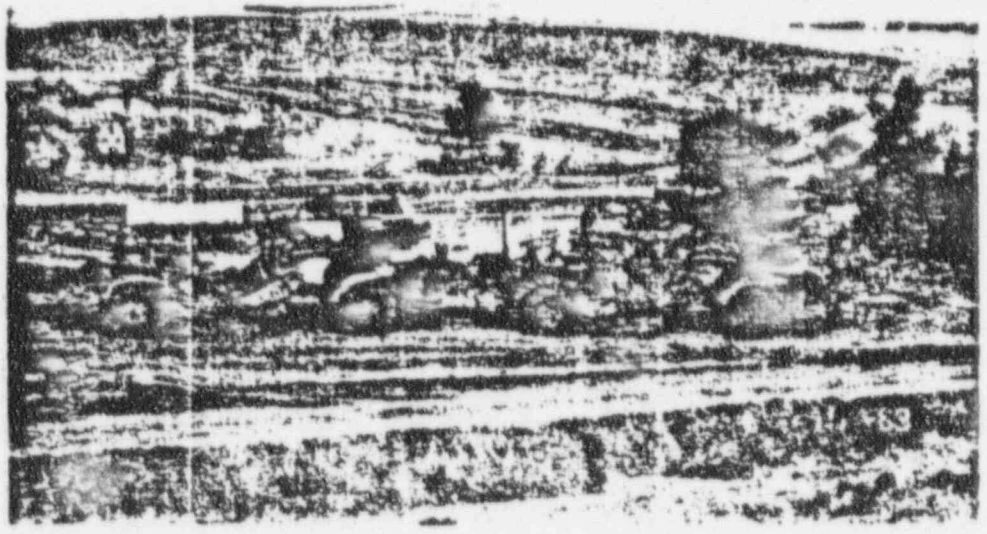
10-21A
Excavated Acid Pond. Looking southwest from the excavated ditch.



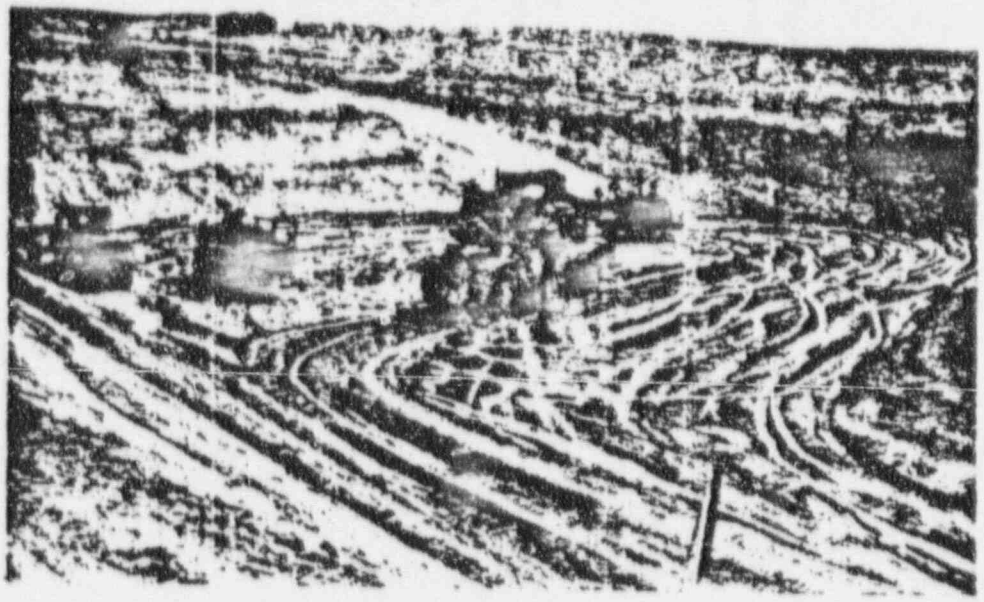
10-22A
637 Scrapers entering the Acid Pond through the excavated ditch to place backfill material. Looking north.



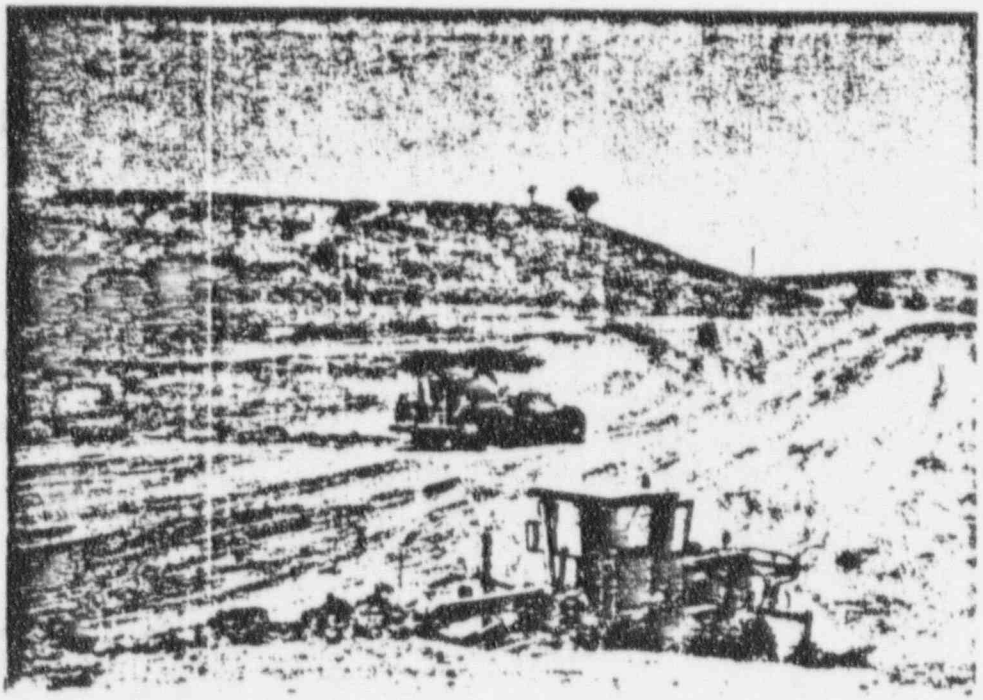
10-23A
Verification grid marks on the east slope of the Acid Pond. Looking north.



11-0
537 Scrapers excavating the stockpiled material from Pile 100 for use as backfill in the Acid Pond. Looking east.

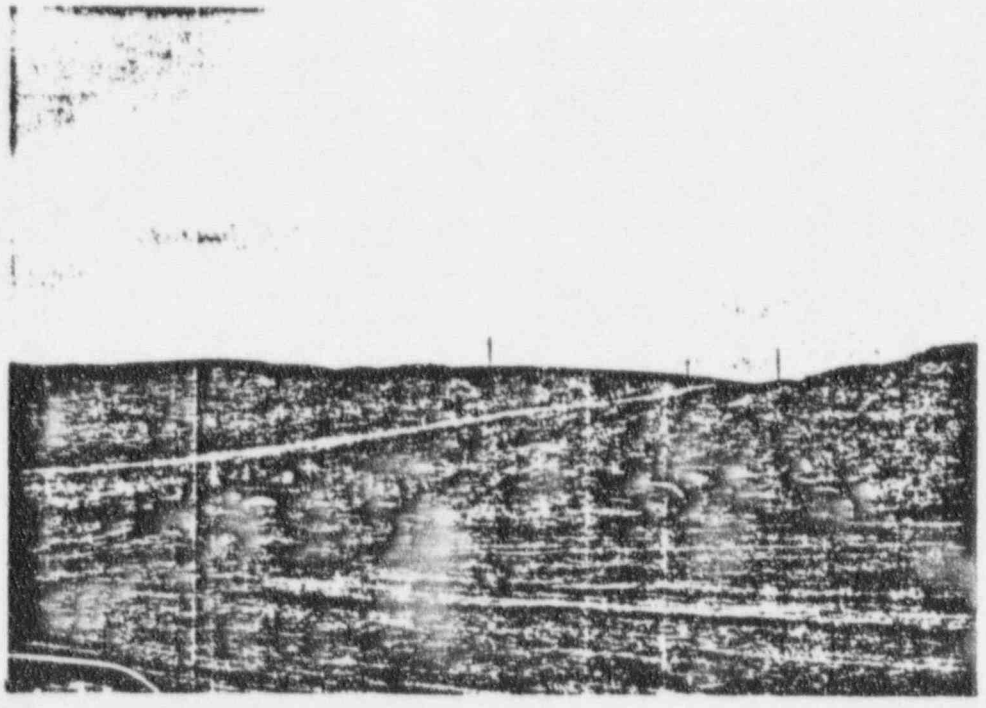


11-1
Backfilling the excavated Acid Pond. Looking southwest.

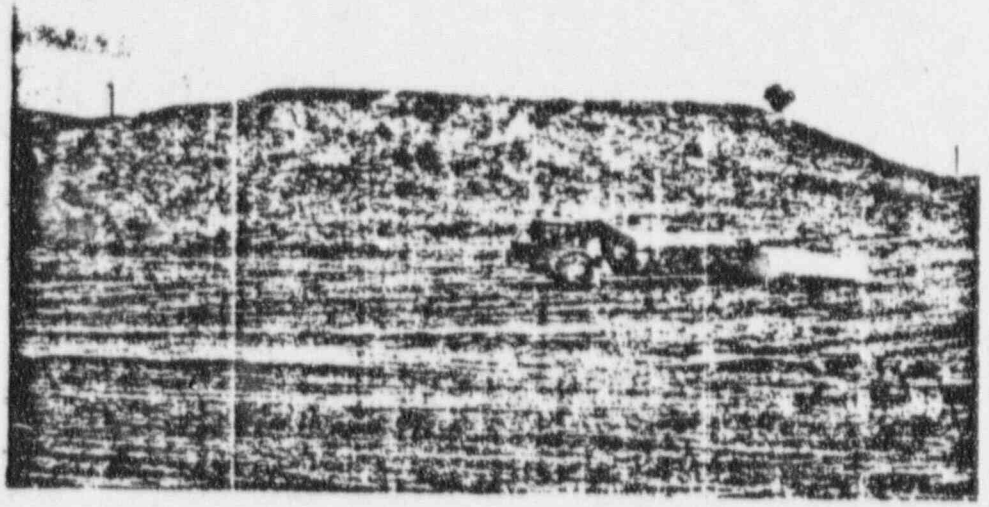


11-7
Backfilling the excavated Acid Pond. Looking north.

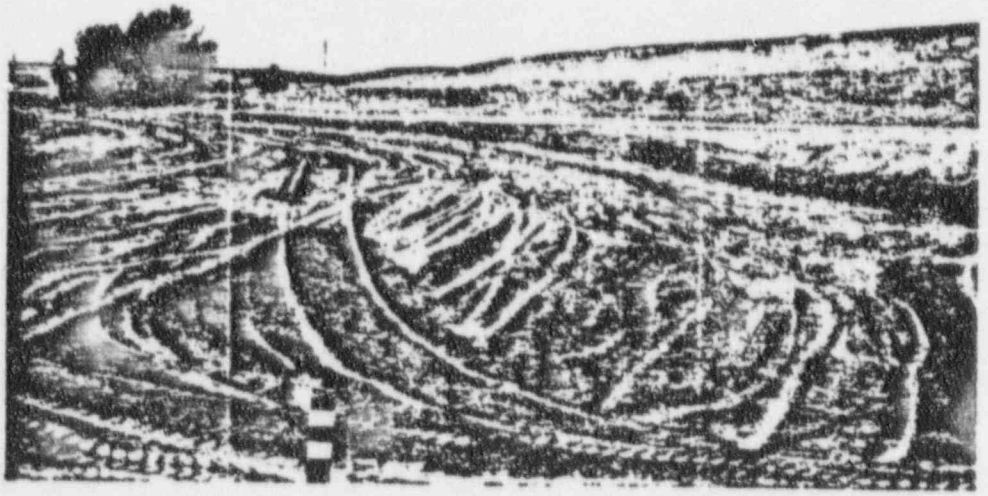
11-9
Excavating Zone 3 material from Pile 100 for use as the top 5 foot of backfill in the Acid Pond. Looking southwest.



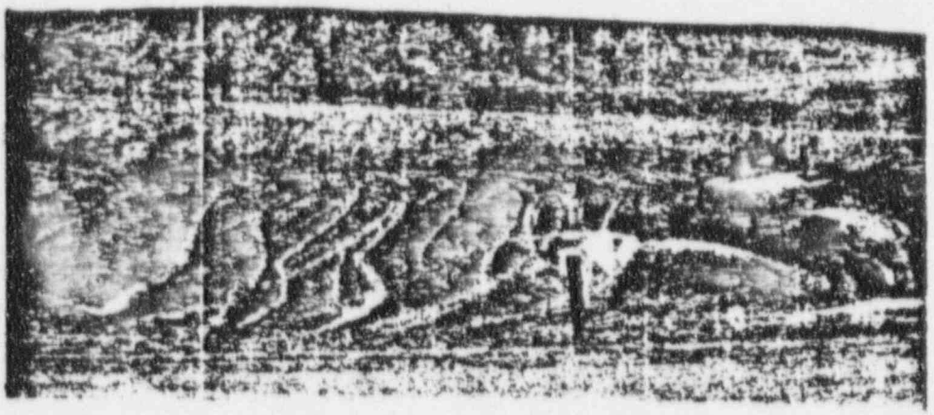
11-10
637 Scrapers placing the top 5 foot of backfill in the Acid Pond. Looking northwest.



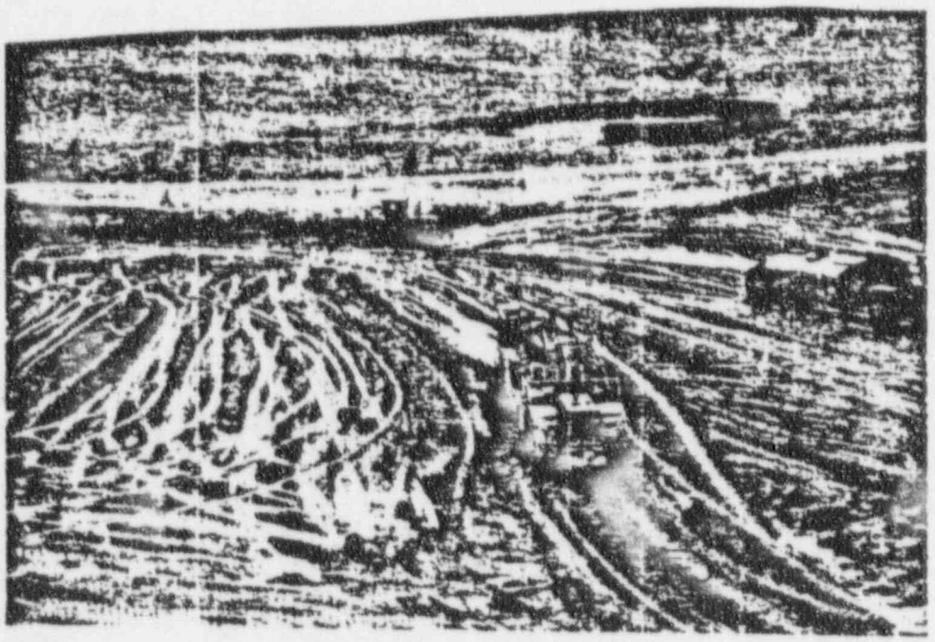
11-11
Waterwagon providing moisture conditioning during the backfilling of the Acid Pond. Looking north.



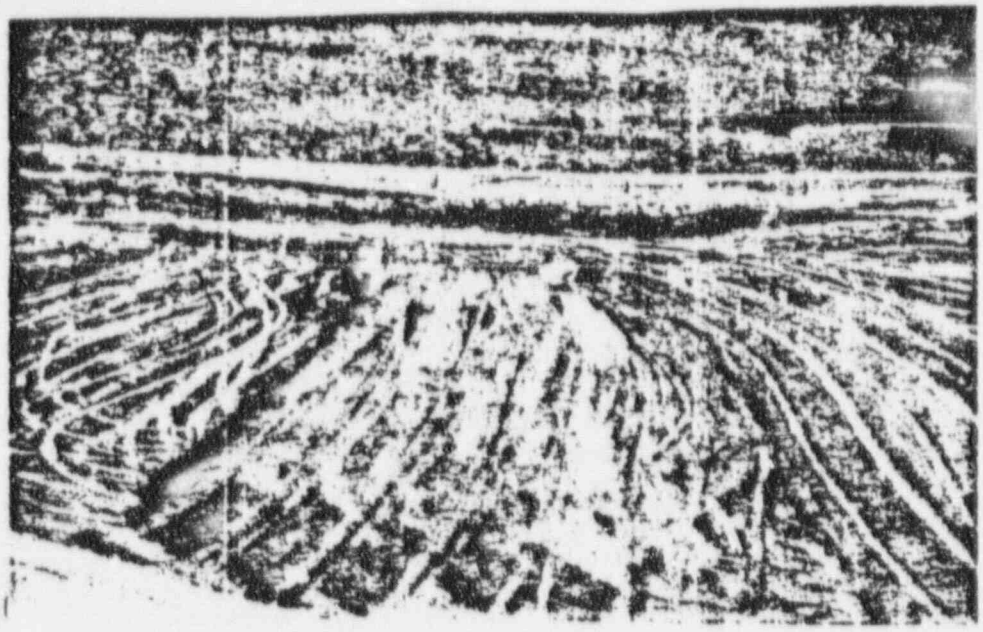
11-12
North half of the Acid Pond. Looking east from the site access road.



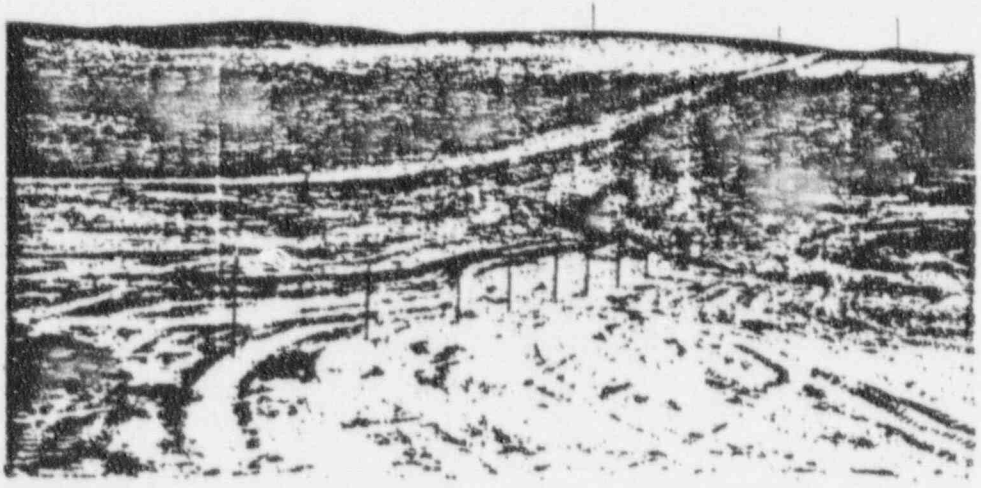
11-13
South half of the Acid Pond. Looking east from the site access road.



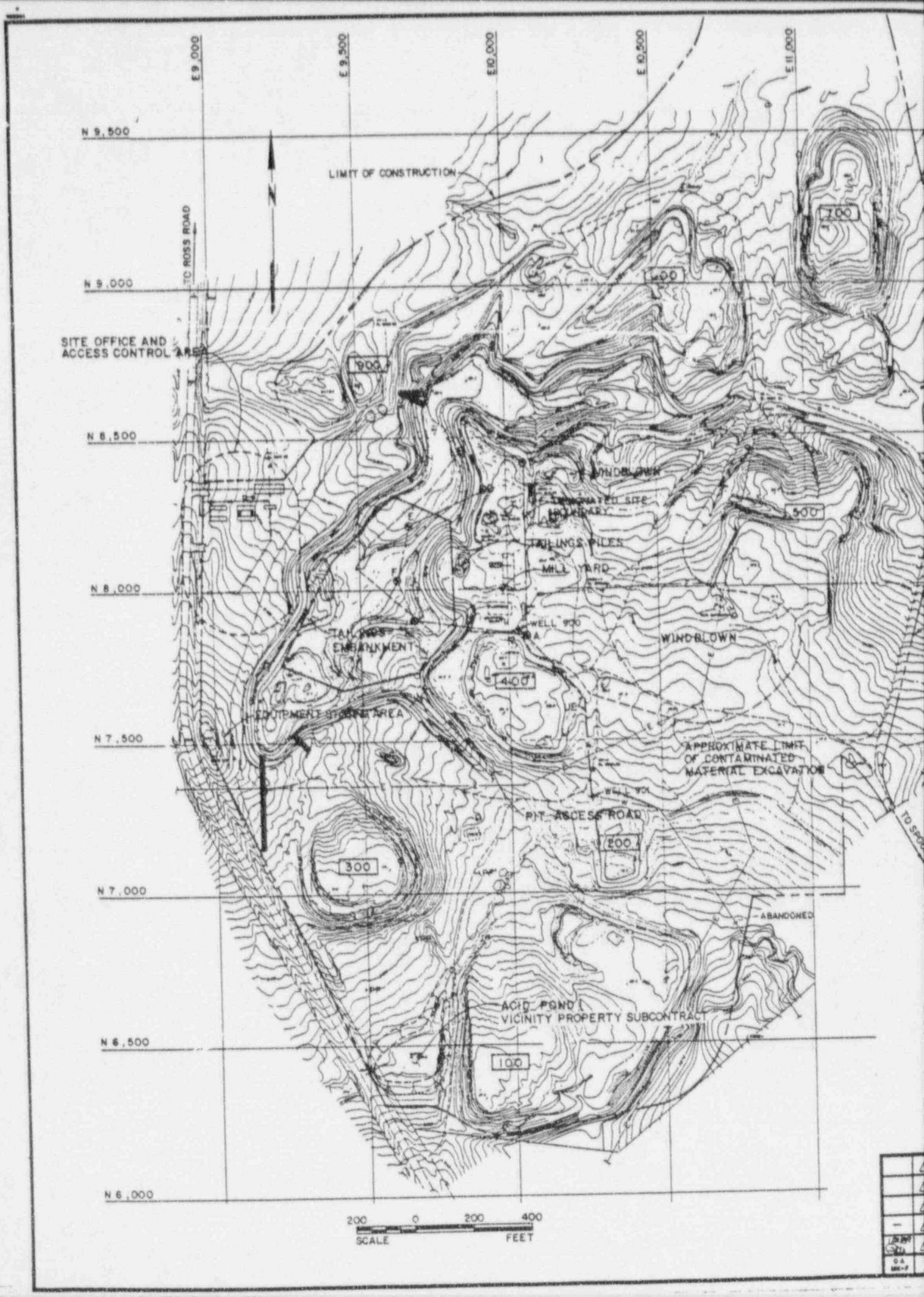
11-14
Placing the top 5 foot of backfill in the Acid Pond. Looking west.



11-16
140G Motor Grader grooming the south slope of the channel which runs through the Acid Pond area. Looking west.



12-1
Fencers reinstalling the removed fence at the Acid Pond. Looking northwest.


E 9,000
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E 10,500
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N 8,000
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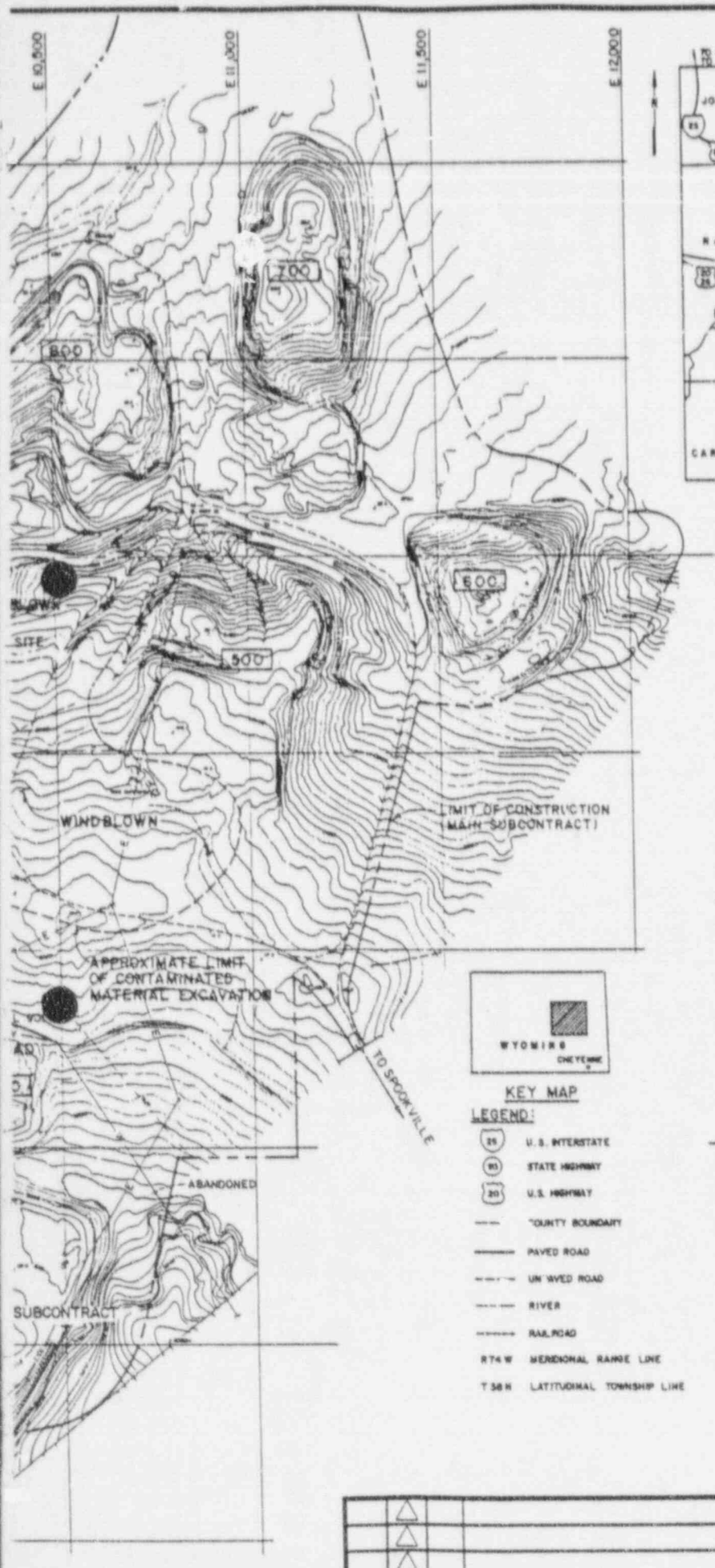
N 6,000
LIMIT OF CONSTRUCTION
TC ROSS ROAD
SITE OFFICE AND ACCESS CONTROL AREA
900
400
500
300
200
100
WINDBLOWN
DESIGNATED SITE BOUNDARY
TAILINGS PILES
MILL YARD
WELL 930
TAILINGS EMBANKMENT
EQUIPMENT STORAGE AREA
APPROXIMATE LIMIT OF CONTAMINATED MATERIAL EXCAVATION
PIT ACCESS ROAD
ABANDONED
ACID POND 1
VICINITY PROPERTY SUBCONTRACT
200 0 200 400
SCALE
FEET



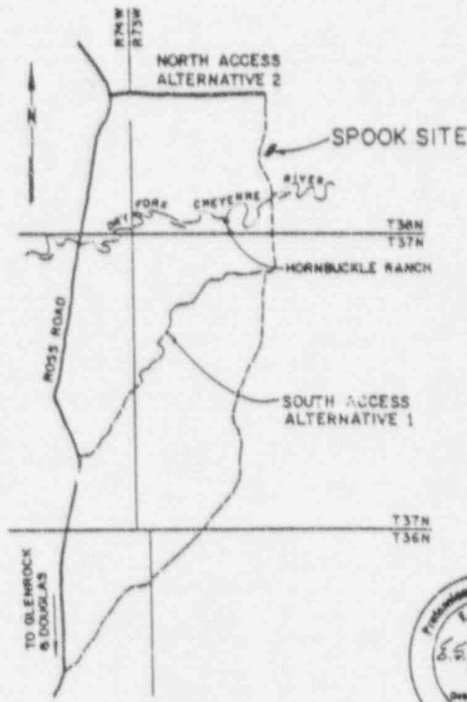
LOCATION MAP

SCALE 20 0 20 40 MILES

KEY MAP

LEGEND:

- U.S. INTERSTATE
- STATE HIGHWAY
- U.S. HIGHWAY
- COUNTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- RIVER
- RAILROAD
- R74W MERIDIONAL RANGE LINE
- T38N LATITUDINAL TOWNSHIP LINE



VICINITY MAP

SCALE 2 0 2 4 MILES

NOTES:

1. TOPOGRAPHY PROVIDED BY
2. ORIGIN OF GRI E10,000 AND ALUMINUM CA CORNER OF S MERIDIAN, CO N10,000, E1 SPOOK SITE HILL, DATED

REFERENCE

SPK - PS - 10 - 0
SPK - PS - 10 - 0
SPK - PS - 10 - 0

LEGEND:

N9,500
E9,000

800

E

PP

W

UE

Professional Engineer (Civil) E. E. ARMS 2455 WYOMING

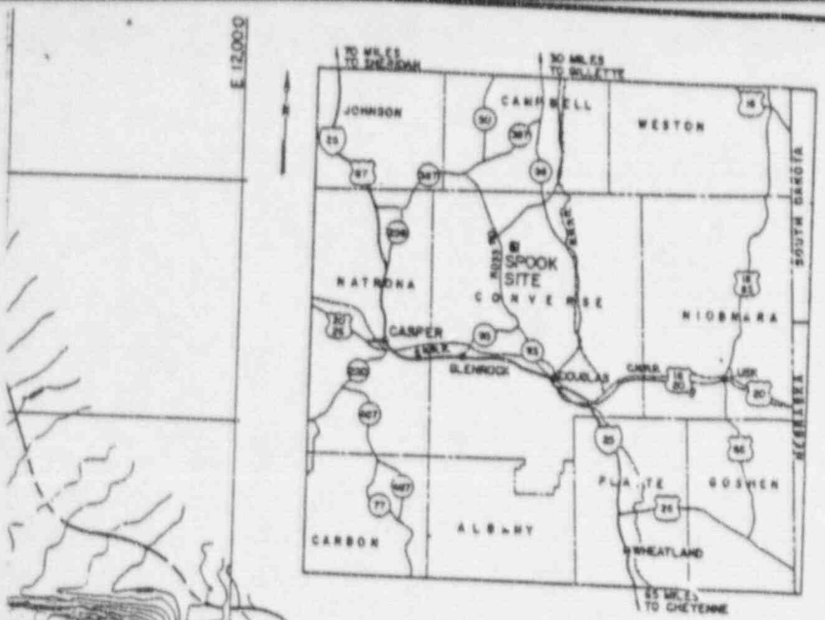
U. S. DEP
ALBUQ

DESIGNED
DRAWN BH
CHECKED
INSPECTED
RECOMMENDED 1-10-89
APPROVED P. FELIX DATE 1/10/89

ACID
SITE PL

—	1	6-19-90	AS-BUILT	SAB							—
—	0	1-31-89	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—	—	—

MORRISON-KNUDSEN ENGINE
UMTRA PROJECT



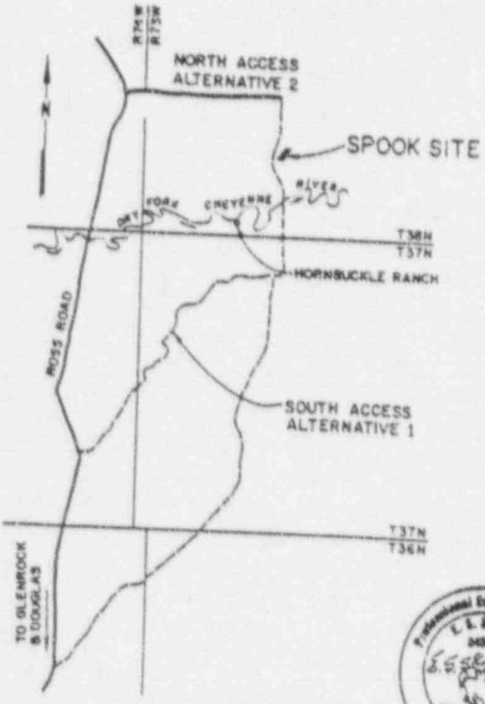
LOCATION MAP

SCALE 20 0 20 40 MILES

MAP

LEGEND:

- 80 U.S. INTERSTATE
- 85 STATE HIGHWAY
- 20 U.S. HIGHWAY
- COUNTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- RIVER
- RAILROAD
- 174 W MERIDIONAL RANGE LINE
- 38 N LATITUDINAL TOWNSHIP LINE



VICINITY MAP

SCALE 2 0 2 4 MILES

NOTES:

1. TOPOGRAPHY BY OLYMPUS AERIAL SURVEYS, INC. CONTROL PROVIDED BY FORD, BACON AND DAVIS UTAH, INC.
2. ORIGIN OF GRID COORDINATES AND BENCH MARK ARE N10,000, E10,000 AND USGS ELEVATION 5111.00 FT, MARKED WITH AN ALUMINUM CAP ON A 1/2" REBAR, LOCATING THE NORTHWEST CORNER OF SECTION 27, T38N, R73W, 6TH PRINCIPAL MERIDIAN, CONVERSE COUNTY, WYOMING. COORDINATES N10,000, E10,000 IS EQUAL TO N60,000, E60,000 OF THE SPOOK SITE DESCRIPTION AND LAND SURVEY MAP BY J. DEAN HILL, DATED AUGUST 26, 1982.

REFERENCE DRAWINGS:

- SPK-PS-10-0202, ACID POND VICINITY PROPERTY EXCAVATION AND BACKFILL PLAN
- SPK-PS-10-0203, ACID POND VICINITY PROPERTY SECTIONS
- SPK-PS-10-0204, BORE HOLE LOCATION PLAN

LEGEND:

- N9,500 / E9,000 — CONSTRUCTION GRID COORDINATE
- LIMIT OF CONSTRUCTION (MAIN SUBCONTRACT)
- EXISTING FENCE
- TEMPORARY WOVEN WIRE FENCE
- APPROXIMATE LOCATION OF ABANDONED MINE DRIFT
- 800 — OVERBURDEN STOCKPILE
- -E- EXISTING OVERHEAD POWER LINE ON WOOD POLE
- PP EXISTING WOOD POWER POLE
- -W- EXISTING WATER LINE
- EXISTING LIVESTOCK WELL
- -UE- EXISTING UNDERGROUND POWER LINE
- EXISTING BRASS CAP MONUMENT

QA APPROVED FOR QUALITY REQUIREMENTS

REVISIONS	BY	QA	E&D MGR.	CHIEF ENG.	QA MGR.	DOE APP.
BUILT						
ED FOR CONSTRUCTION						

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED — DRAWN TH — CHECKED — INSPECTED — RECOMMENDED — APPROVED P.J. FELIX 1/1/89

SPOOK SITE
SPOOK, WYOMING

ACID POND VICINITY PROPERTY SITE PLAN, LOCATION & VICINITY MAPS

MORRISON-KNUDSEN ENGINEERS, INC.
UMTRA PROJECT

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. SPK-PS-10-0201

NOTES:

1. TOPOGRAPHY BY OLYMPUS SURVEYS, INC. CONTROL PROVIDED BY FORD, BACON AND DAVIS UTAH, INC.
2. FINISHED GRADING CONTOURS SHOWN ARE THE TOP OF UNCONTAMINATED BACKFILL. FINAL GRADING AND REVEGETATION IN THE ACID POND AREA WAS DONE UNDER A SEPARATE SUBCONTRACT. UNCONTAMINATED BACKFILL MATERIAL WAS OBTAINED FROM APPROVED ON-SITE OVERBURDEN PILES. FINISHED GRADING TAKEN FROM TOPOGRAPHY DRAWING TITLED "RECLAIMED LAND SURFACE ELEVATIONS - SPOOK SITE," BY STATE OF WYOMING, DEPARTMENT OF ENVIRONMENTAL QUALITY, DATED JANUARY 1990.
3. EXCAVATED CONTAMINATED MATERIAL WAS PLACED AND COMPACTED IN THE SPOOK PIT TAILINGS DISPOSAL EMBANKMENT.
4. CONTAMINATED WATER PRESENT IN THE POND OR COLLECTING IN THE EXCAVATION DURING CONSTRUCTION WAS PUMPED OUT AND DISPOSED OF IN SPOOK PIT. UNCONTAMINATED RUNOFF WAS DIVERTED AWAY FROM UNCONTAMINATED AREAS.

REFERENCE DRAWINGS:

SPK-PS-10-0201	SITE PLAN, LOCATION & VICINITY MAPS
SPK-PS-10-0203	ACID POND VICINITY PROPERTY SECTIONS
SPK-PS-10-0204	BORE HOLE LOCATION PLAN

LEGEND:

5100	EXISTING SITE FEATURES & CONTOURS
5090	TOP OF UNCONTAMINATED BACKFILL (SEE NOTE 3
	CONTAMINATED MATERIAL EXCAVATION (SEE NOTE 2
	EXISTING FENCE

QA REVIEW FOR QUALITY REQUIREMENTS BY [illegible] 1/31/89

SCALE 50 0 50 100 FEET

REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	QA MGR.	DOE APP.
AS-BUILT (REVISED)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—
AS-BUILT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—
ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

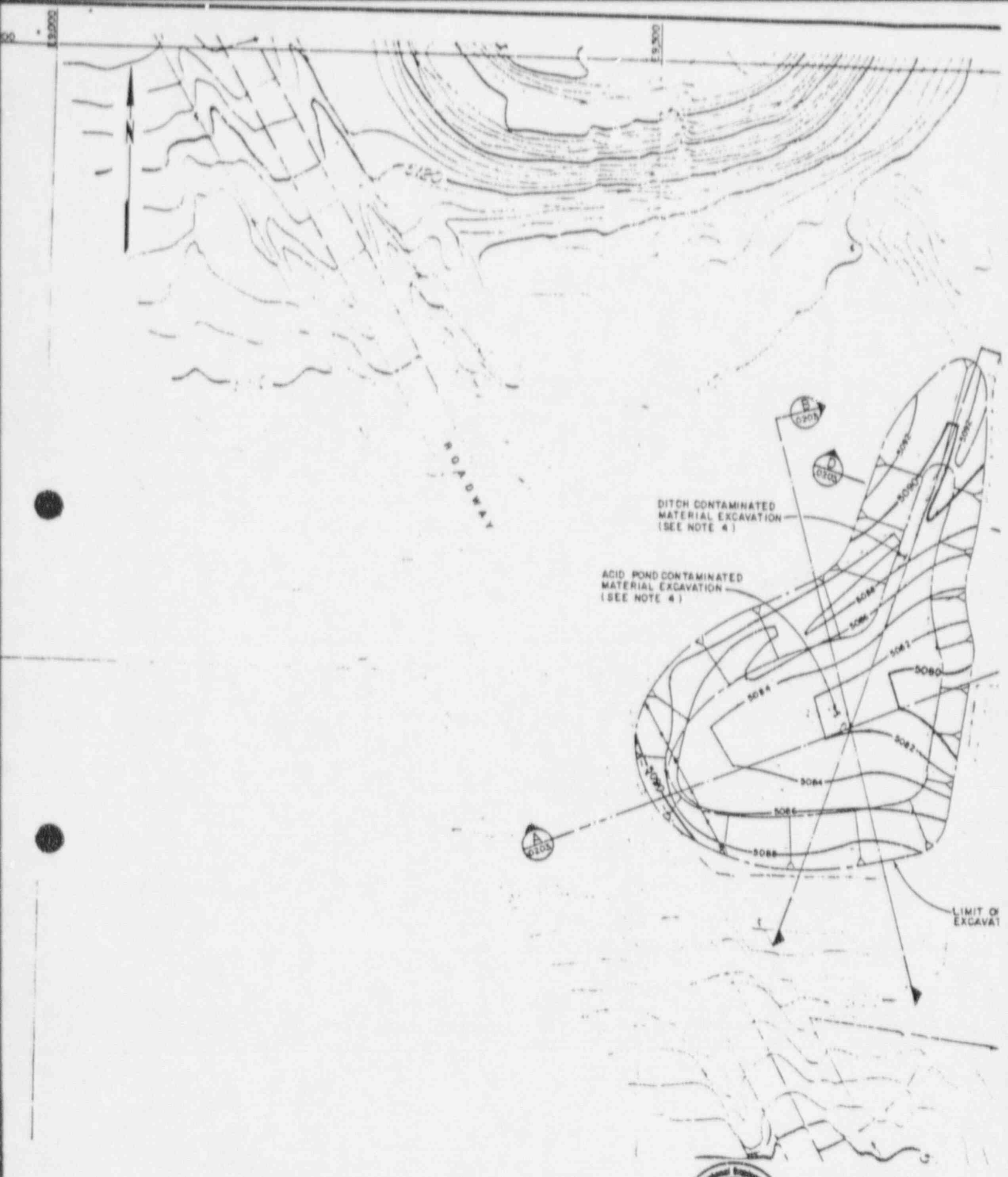
DESIGNED [illegible] DRAWN RBG
CHECKED [illegible]
INSPECTED
RECOMMENDED [illegible] 1-10-89
APPROVED F.J. Fehlig DATE 1/11/89

SPOOK SITE
SPOOK, WYOMING

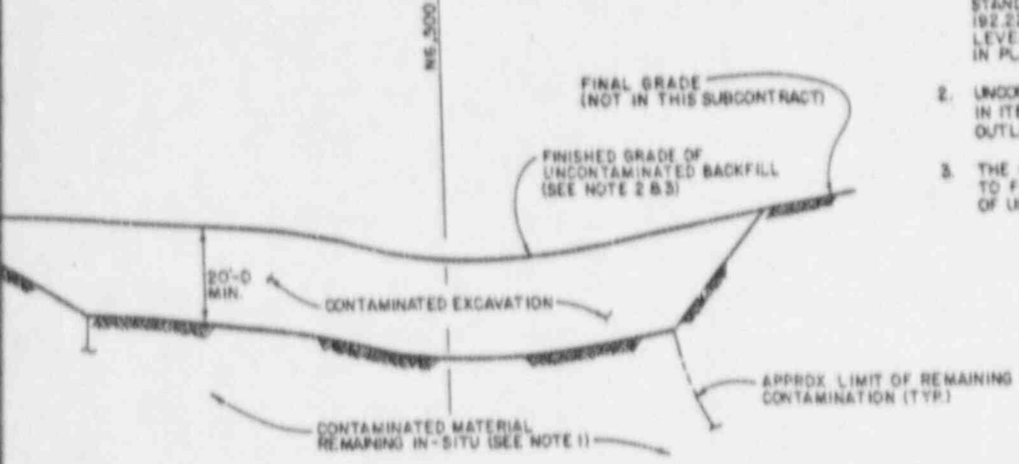
ACID POND VICINITY PROPERTY EXCAVATION AND BACKFILL PLAN

DOE PROJECT MANAGER [illegible] DATE 1-31-89

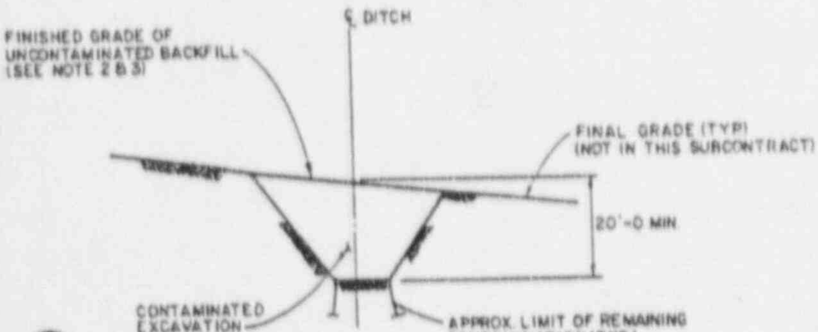
MORRISON-KNUDSEN ENGINEERS, INC.
UMTRA PROJECT
PROJECT NO. DE-AC04-83AL18796
DRAWING NO. SPK-PS-10-0202 REV. —



–		7-17-90	AS-BUILT (REVISED)
–		5-19-90	AS-BUILT
		10-89	ISSUED FOR CONSTR
DA	NO.	DATE	



SECTION C / 0202



SECTION D / 0202

NOTES:

1. SECTIONS A AND B SHOW THE AREA TO WHICH SUPPLEMENTAL STANDARDS WERE APPLIED IN ACCORDANCE WITH 40 CFR 192.22. APPROXIMATELY 107,800 CUBIC YARDS OF LOW LEVEL RADIOACTIVELY CONTAMINATED MATERIAL REMAINS IN PLACE.
2. UNCONTAMINATED BACKFILL MATERAL WAS AS SPECIFIED IN ITEM 1.3.C.3. IN THE ACID POND VICINITY PROPERTY OUTLINE SPECIFICATION.
3. THE CONTAMINATED MATERIAL EXCAVATION WAS BACKFILLED TO FINISHED GRADE WITH A MINIMUM DEPTH OF 20 FEET OF UNCONTAMINATED MATERIAL.

REFERENCE DRAWINGS:

SPK-PS-10-0202, ACID POND VICINITY PROPERTY EXCAVATION AND BACKFILL PLAN

50 0 50 100
HORIZ. SCALE FEET

20 0 20 40
VERT. SCALE FEET

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

SPOOK SITE
SPOOK, WYOMING

ACID POND VICINITY PROPERTY SECTIONS

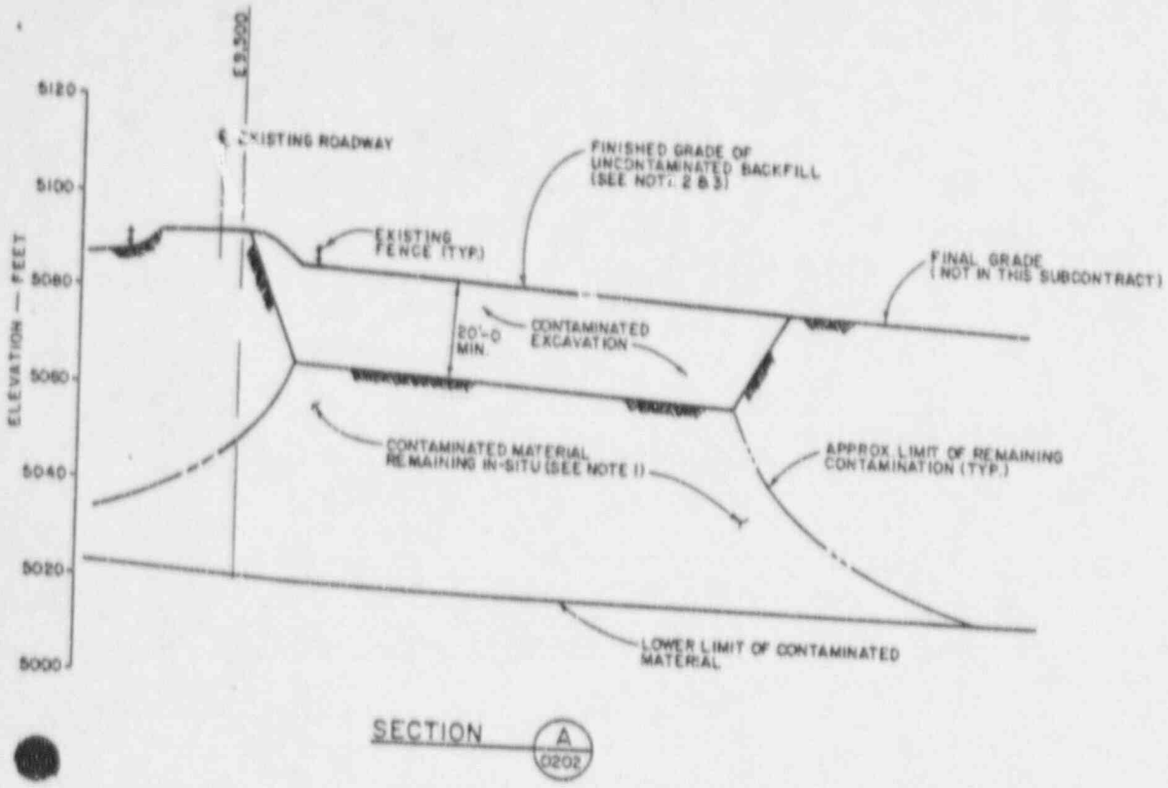
DESIGNED	DRAWN RBC/
CHECKED	
INSPECTED	
RECOMMENDED	1-10-89
APPROVED F.J. Feliz	DATE 1/11/89

MORRISON-KNUDSEN ENGINEERS, INC.
UMTRA PROJECT

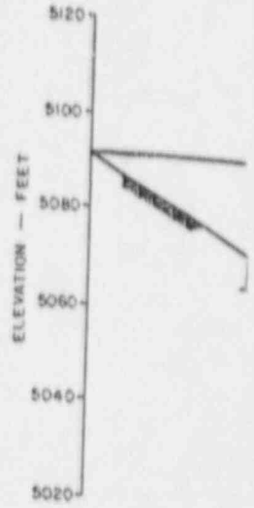
PROJECT NO. DE-AC04-83AL18796

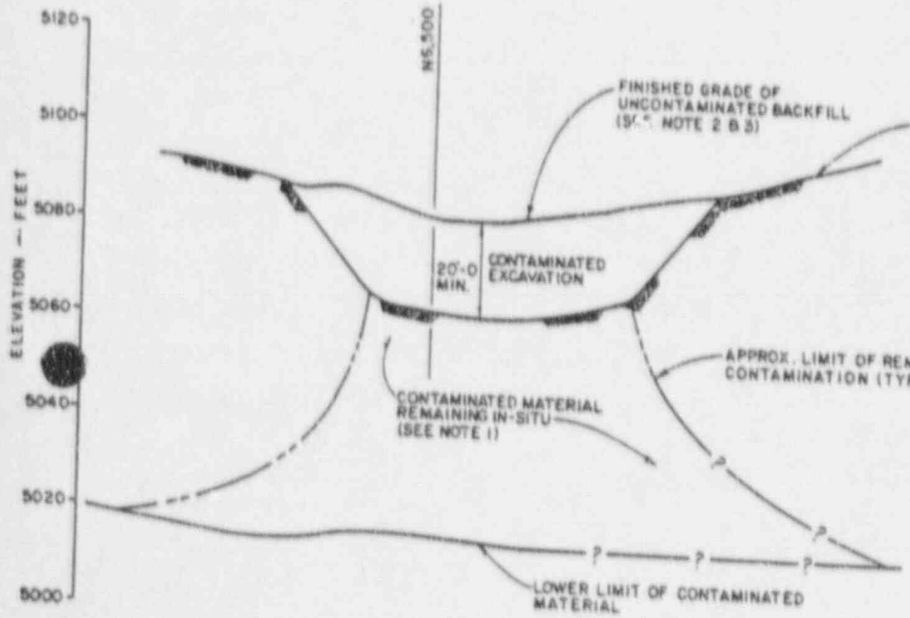
DRAWING NO. SPK-PS-10-0203 REV —

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	QA MGR.	DOE APP.
8-8-90	AS-BUILT						—
1/8/89	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

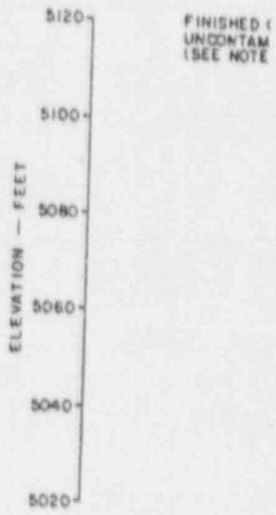


SECTION A 0202





SECTION B 0202



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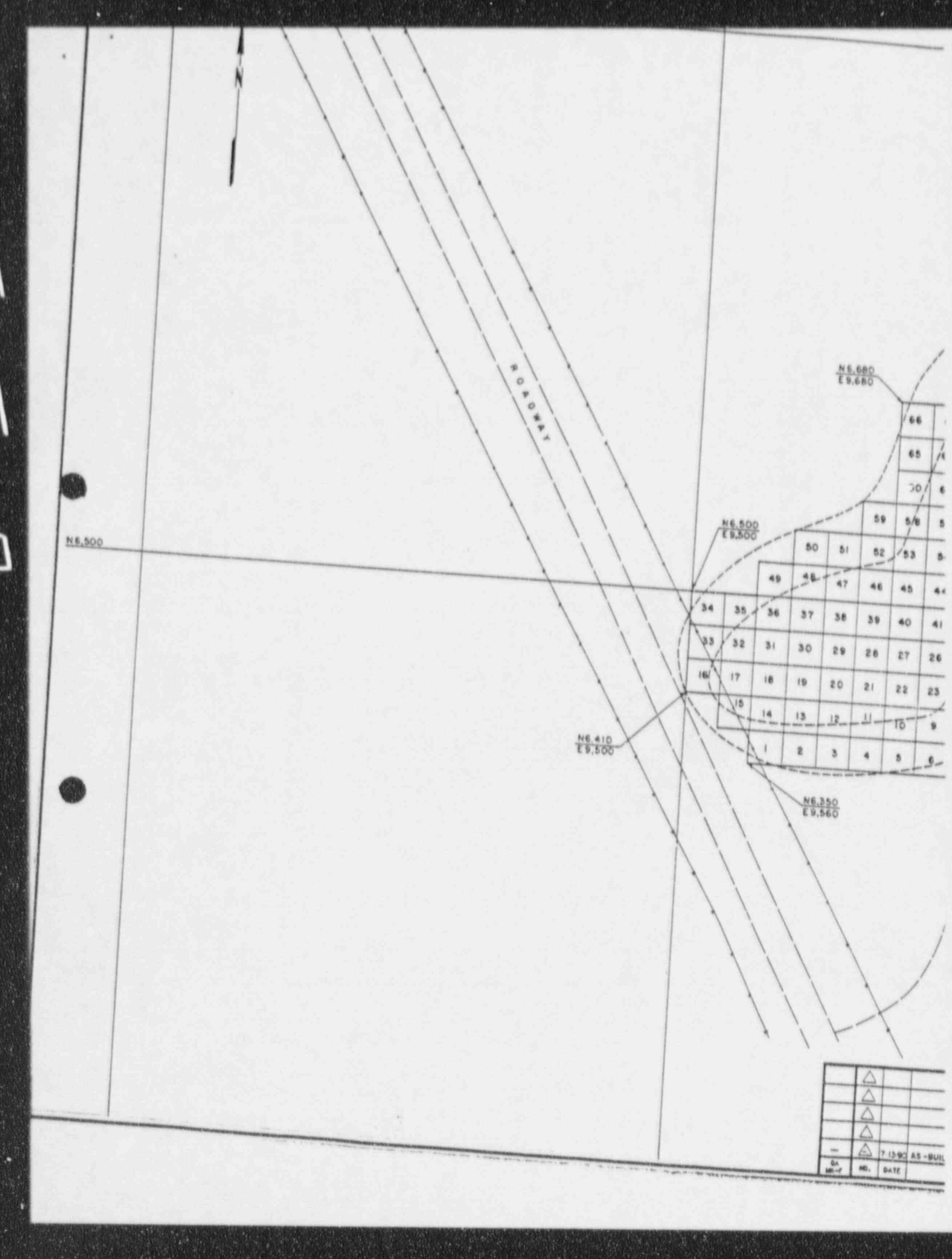
	1-8-89	ISSUED FOR (
NO.	DATE	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ROADWAY
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E9,680
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N6,410
E9,500
N6,350
E9,560
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7-13-90
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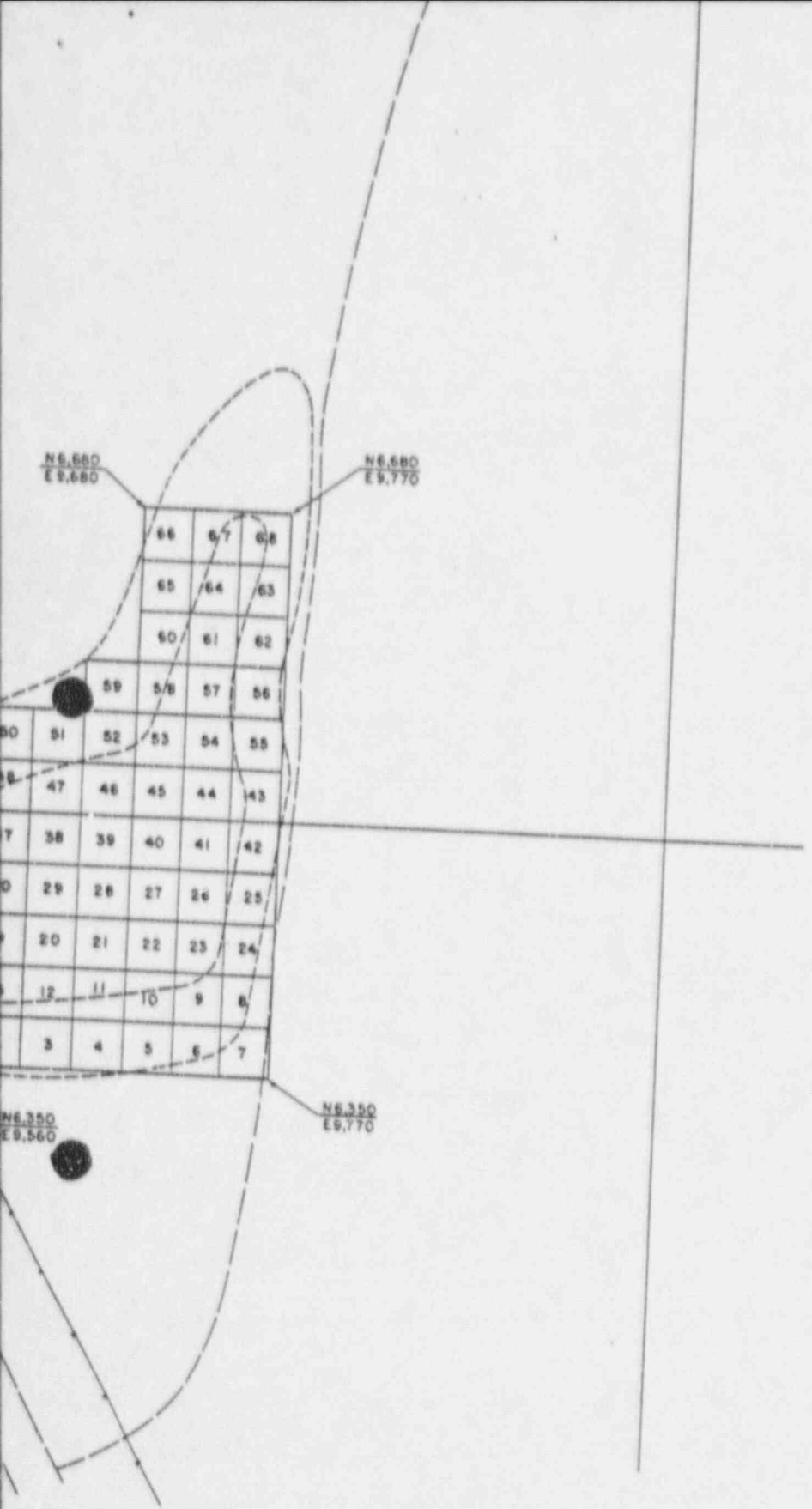
NO.
DATE



50 0 50 100
SCALE FEET

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED | DRAWN RBC
CHECKED
INSPECTED
RECOMMENDED
APPROVED | DATE

SPOOK SITE
SPOOK, WYOMING

SUPPLEMENTAL STANDAR
SOIL SAMPLE GRID LAYOU

DOE PROJECT ENGR.

MORRISON-KNUDSEN ENGINEERS, INC.
UMTRA PROJECT

PROJECT NO.
DE-AC04-83AL 1E

DRAWING NO.
SPK-PS-10-020

NO.	DATE	REVISIONS	BY	QA	ENG. MGR.	CHIEF ENG.	QA MGR.	DOE APP.
—	7-13-90	AS-BUILT						

APPENDIX A

RADIOLOGICAL SURVEY DATA

BARRINGER LABORATORIES INC.

15000 W 6TH AVE SUITE 300
GOLDEN COLORADO 80401
PHONE (303) 277 1687

1455 DEMING WAY SUITE 15
SPARKS NEVADA 89431
PHONE (702) 358 1158

30-Oct-89

Helene Langlois
MK-FERGUSON
P.O. Box 9136
Albuquerque, NM 87119

Page: 1
Copy: 1 of 3
Set : 1

Authority:
Project : Spook

Purchase order : 3050-511-9673 #050

Job: 891128E

Status: Final

Sample Type: Soil

Sample	Ra-226 Total pCi/g	Error 2σ*	Th-230 Total pCi/g	Error 2σ*	U Total µg/g
001-01	2.1	±0.7	5.3	±1.0	3.2
001-02	17	±2	24	±2	12.0
001-03	3.6	±0.9	6.9	±1.1	3.2
001-04	1.9	±0.7	4.9	±0.9	2.2
001-05	5.0	±1.1	11	±1	3.4
001-06	6.5	±1.2	9.2	±1.2	2.6
001-07	6.6	±1.3	6.4	±1.0	3.1
001-08	1.9	±0.7	4.1	±0.8	2.2
001-09	1.4	±0.6	15	±2	2.4
001-10	3.2	±0.9	115	±4	4.7
001-11	14	±2	30	±2	24
001-12	2.0	±0.7	27	±2	3.0
001-13	2.9	±0.8	19	±2	3.4
001-14	3.3	±0.9	49	±3	5.2
001-15	3.5	±0.9	55	±3	6.2
001-16	9.1	±1.5	115	±4	4.4
001-17	4.4	±1.0	98	±4	6.4
001-18	4.2	±1.0	190	±10	6.2
001-19	4.4	±1.0	160	±10	3.7
001-20	3.8	±1.0	102	±4	3.4
001-21	4.3	±1.0	94	±4	5.2
001-22	3.2	±0.9	112	±4	7.5
001-23	6.7	±1.3	63	±3	11
001-24	2.7	±0.8	31	±2	3.2
001-25	1.4	±0.6	5.1	±0.9	2.9
001-26	4.7	±1.0	170	±10	8.8
001-27	7.3	±1.3	190	±10	<0.3
001-28	5.1	±1.1	240	±10	5.0
001-29	12	±2	390	±10	3.2

BARRINGER LABORATORIES INC.

16000 W 6TH AVE SUITE 300
GOLDEN COLORADO 80401
PHONE (303) 277 1687

1455 DEMING WAY SUITE 15
SPARKS NEVADA 89431
PHONE (702) 358 1158

30-Oct-89

Helene Langlois
MK-FERGUSON
P.O. Box 9136
Albuquerque, NM 87119

Authority:
Project : Spook

Purchase order : 3050-511-9673 #050

Job: 891128E

Status: Final

Sample	Ra-226 Total pCi/g	Error 2σ*	Th-230 Total pCi/g	Error 2σ*	U Total µg/g
001-30	5.3	±1.1	230	±10	3.4
001-31	5.8	±1.2	330	±10	5.7
001-32	5.5	±1.1	106	±4	3.5
001-33	3.5	±0.9	29	±2	3.3
001-34	2.6	±0.8	26	±2	3.3
001-35	1.6	±0.6	10	±1	2.8
001-36	2.7	±0.8	72	±3	3.4
001-37	3.9	±0.9	300	±10	5.0
001-38	8.4	±1.4	660	±10	5.4
001-39	25	±2	530	±10	37
001-40	16	±2	310	±10	6.1
001-41	21	±2	750	±10	11
001-42	1.6	±0.6	21	±2	2.9
001-43	1.7	±0.7	33	±2	7.8
001-44	4.4	±1.0	49	±3	21
001-45	14	±2	450	±10	12
001-46	8.5	±1.4	340	±10	10
001-47	5.4	±1.1	330	±10	6.2
001-48	1.6	±0.7	74	±3	3.1
001-49	1.3	±0.6	3.7	±0.8	2.8
001-50	2.3	±0.7	5.8	±1.0	3.3
001-51	2.1	±0.7	4.6	±0.9	3.2
001-52	2.6	±0.8	35	±2	3.8
001-53	4.1	±1.0	160	±10	27
001-54	3.6	±0.9	61	±3	18
001-55	3.3	±0.9	71	±3	15
001-56	2.2	±0.7	44	±3	3.6
001-57	1.9	±0.7	25	±2	<0.3
001-58	1.9	±0.7	15	±2	3.3
001-59	2.4	±0.8	8.1	±1.2	3.2
001-60	1.8	±0.7	7.8	±1.1	3.2

BARRINGER LABORATORIES INC.

15000 W 6TH AVE SUITE 300
GOLDEN COLORADO 80401
PHONE (303) 277-1687

1455 DEMING WAY SUITE 15
SPARKS NEVADA 89431
PHONE (702) 358-1150

30-Oct-89

Helene Langlois
MK-FERGUSON
P.O. Box 9136
Albuquerque, NM 87119

Authority:
Project : Spook

Purchase order : 3050-511-9673 #050

Job: 891128E

Status: Final

Sample	Ra-226 Total pCi/g	Error 2σ*	Th-230 Total pCi/g	Error 2σ*	U Total µg/g
001-61	1.8	±0.7	4.9	±0.9	5.2
001-62	1.8	±0.7	15	±2	3.2
001-63	2.3	±0.7	4.8	±0.9	3.2
001-64	1.9	±0.7	8.5	±1.2	4.0
001-65	2.1	±0.7	2.6	±0.7	3.1
001-66	2.0	±0.7	1.9	±0.6	3.4
001-67	1.4	±0.6	20	±2	3.4
001-68	1.1	±0.6	2.6	±0.7	2.9

Vicinity Property No. SK-001
DOE Agreement No. DE-R004-89AL56562

APPENDIX C
OWNER ACCEPTANCE FORM

The undersigned Owner(s) of the Vicinity Property subject to DOE Vicinity Property Remedial Action Agreement No. DE-R004-89AL56562 acknowledge(s) that the remedial action described in the Vicinity Property Remedial Action Plan (Appendix B) of said Agreement has been satisfactorily performed and the DOE and the State have no further obligation under said Agreement except:

1. DOE must officially certify, in accordance with DOE policy implementing Public Law 95-604, that remedial actions on the Vicinity Property are in compliance with applicable radiation standards promulgated by the U.S. Environmental Protection Agency for the protection of the public health, safety and environment.

2. DOE, for the benefit of the Owner(s), shall use its best efforts to enforce any warranties or guarantees, express or implied, which the Government or its prime contractors are entitled to in connection with failure of remedial action work caused by omission of materials, defective materials or poor workmanship, or improper workmanship.

OWNER [illegible signature]　　　OWNER ____________________

DATE Oct 30, 1989　　　DATE ____________________

by [illegible signature]
General Manager

APPENDIX B

STATE OF WYOMING AND U.S. NRC CONCURRENCE OF SUPPLEMENTAL STANDARDS

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

INTER-OFFICE CORRESPONDENCE

DATE January 27, 1989

TO Rob Pommerening

FROM John Jones

LOCATION Albuquerque, NM

LOCATION Riverton, WY

SUBJECT Supplemental Standards
Acid Pond
Spook, Wyoming

Per my conversation of January 26, 1989 with Mr. Kirk Hornbuckle, Hornbuckle Ranch, Mr. Hornbuckle has no comments on supplemental standards being applied to the acid pond. He did request that no remedial action occur West of the North-South access road West of the pond.

ENCL:

THE STATE OF WYOMING

MIKE SULLIVAN
GOVERNOR

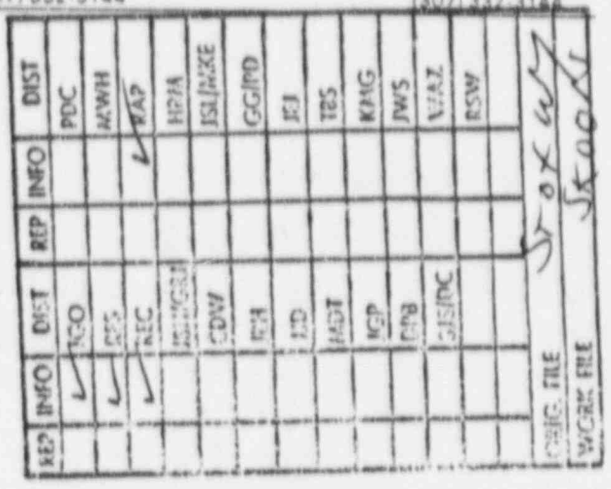
1890-1990 WYOMING CENTENNIAL A LASTING LEGACY

Department of Environmental Quality

210 Lincoln Street • Lander, Wyoming 82520

Air Quality Division (307) 332-3144	Land Quality Division (307) 332-3047	Solid Waste Management Program (307) 332-3144	Water Quality Division (307) 332-3144

March 21, 1989



Mr. Rob Pommerening
Vicinity Properties Manager
MK-Ferguson Company
P. O. Box 9136
Albuquerque, NM 87119

RE: REA Vicinity Property No. SK 001s

Dear Rob:

I have reviewed the Radiological and Engineering Assessment (REA) for Vicinity Property SK-001s. The State of Wyoming concurs with remedial action option No. Two (2) which states Supplemental Standards will be applied to the remaining contaminated material below the 20 foot excavation depth.

The State also recognizes that aquifer restoration will be addressed under a process separate from this phase of the UMTRA project and that the remedial action at the Spook site acid pond will not preclude or preempt future evaluation and implementation of groundwater cleanup or control activities by the U. S. Department of Energy.

During a March 20, 1989 telephone conversation, we discussed using slab on grade construction instead of an eight foot basement. This will change the RAECOM model and will allow for reduced excavation of the contaminated material. Should you have any questions, please call me.

Sincerely,

Charles L. Preston
UMTRA Program Manager

CLP:mm

xc: R. Shaffer - Cheyenne DEQ-LQD
J. Garcia - Dept. of Energy, Albuquerque, NM

3050-89-159

RADIOLOGICAL AND ENGINEERING ASSESSMENT (REA)
Review Form

UMTRA

DOE Location No. SK 00155 Rev. No. 0

RAC

PRIORITY: ☒ ROUTINE ☐ URGENT DATE 1-27-89

REQUESTED RESPONSE BY 2-13-89

COMMENTS: APPLICATION OF SUPPLEMENTAL STANDARDS ARE RECOMMENDED BY MK-FERGUSON

Robert A Pozning — VP MANAGER

1-27-89 — DATE

CONT. ON ATTACHED SHEET NO. ____

TAC

DATE RECEIVED 1/27/89

☐ RECOMMEND APPROVAL ☒ RECOMMEND APPROVAL AS NOTED BELOW ☐ DO NOT RECOMMEND APPROVAL AS NOTED BELOW

COMMENTS:

[illegible signature] — TAC

2/13/89 — DATE

CONT. ON ATTACHED SHEET NO. 1

STATE

DATE TRANSMITTED ____

☐ APPROVED ☐ APPROVED AS NOTED ☐ NOT APPROVED AS NOTED

RESPONSE DATE ____ ATTACHED RESPONSE ON SHEET NO. ____

NRC

DATE TRANSMITTED ____

☐ APPROVED ☐ APPROVED AS NOTED ☐ NOT APPROVED AS NOTED

RESPONSE DATE ____ ATTACHED RESPONSE ON SHEET NO. ____

TRIBE

DATE TRANSMITTED ____

☐ APPROVED ☐ APPROVED AS NOTED ☐ NOT APPROVED AS NOTED

RESPONSE DATE ____ ATTACHED RESPONSE ON SHEET NO. ____

DOE-UMTRA

DATE RECEIVED 1/27/89

☐ APPROVED ☒ APPROVED AS NOTED ☐ NOT APPROVED AS NOTED

COMMENTS: TAC RAD REVIEW – due 2-13-89

MK-FERGUSON CO.
ALBUQUERQUE
FEB 15 1989
RECEIVED

J. Garcia — DOE VP MANAGER

2-14-89 — DATE

SHEET NO. 1 OF 3

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Rob P.

3050-90-591

SK-001

FILE

APR - 5 1990

MK-FERGUSON CO.
ALBUQUERQUE

APR 18 1990

RECEIVED

Mr. Mark Matthews, Project Manager
Uranium Mill Tailings Project Office
Albuquerque Operations Office
U.S. Department of Energy
P.O. Box 5400
Albuquerque, NM 87115

Dear Mr. Matthews:

We have completed our review of the Radiological Engineering Assessment (REA) for vicinity property number SK-001s Revision 1, transmitted by your letter dated March 20, 1990. This revision of the REA has acceptably addressed the items identified in my letter to you dated February 23, 1990. However, as identified in the REA, DOE is deferring groundwater cleanup associated with this property to a separate phase of the project, and will conduct characterization and evaluation of the groundwater in conjunction with that of the Spook disposal site. This deferral is acceptable to the NRC staff, but groundwater cleanup will remain an open issue until fully addressed. Therefore, we hereby conditionally concur in the REA for vicinity property number SK-001s.

If you have any questions regarding this review, please do not hesitate to contact me or Dan Gillen of my staff (FTS 492-0517).

Sincerely

Paul H. Lohaus

Paul H. Lohaus, Chief
Operations Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS

cc: S. Mann, DOE Hq.
M. Abrams, DOE Alb.
P. Mann, DOE Alb.
J. Erickson, Wyoming DEQ

REP	INFO	DIST	REP	INFO	DIST
	✓	JGO			PDC
	✓	JBH			NMH
	✓	MAZ		✓	RAP
	✓	LJG			MFP
		CDW			FJF/AKE
		JDH			GJ FD
		JJO			JDJ
SRDG FILE		10-1			
WORK FILE		SK0015			

APPENDIX C

LEGAI DESCRIPTION

LEGAL DESCRIPTION

The property which is the subject of this Completion Report, the address of which is East Monroe Avenue, Riverton, Wyoming, is more particularly described in the Fremont County Recorder's Office, as follows:

The Acid Pond Vicinity Property is located in the southwest corner of the Spook, Wyoming UMTRA site. This site is located in the east-central Wyoming in Converse County, approximately 48 miles northeast of Casper, Wyoming, and 36 miles northwest of Douglas, Wyoming, The Spook, Wyoming site is located in section 27, Township 28N, Range 73W, of the 6th Principal Meridian.