WM-39

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-45271-VL
ADDRESS: 3012 C ROAD
GRAND JUNCTION, COLORADO

MARCH 1992

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

CHEM-NUCLEAR GEOTECH, INC.
P.O. Box 14000
Grand Junction, Colorado 81502-5504

APPROVED BY Joseph D Virgona
J. VIRGONA
DOE PROJECT ENGINEER

DATE 4/10/90

SUPPLEMENTAL STANDARDS

G45271RE.SS:CROAD

WM-39, 3

w/ltr 4/16/92
92-0424

owned by either the owner of GJ-45271-VL or the owner of GJ-07332-MR. Figure 1 and Figures 2 and 3 (attached) depict the area being considered and summarize the contamination data. Field Assessment radiological data are included in the Radiological Assessment, Appendix A. This data indicates that the depth of contamination varies from 6 inches to 51 inches.

The alternative actions being considered in Appendix B can be summarized as follows:

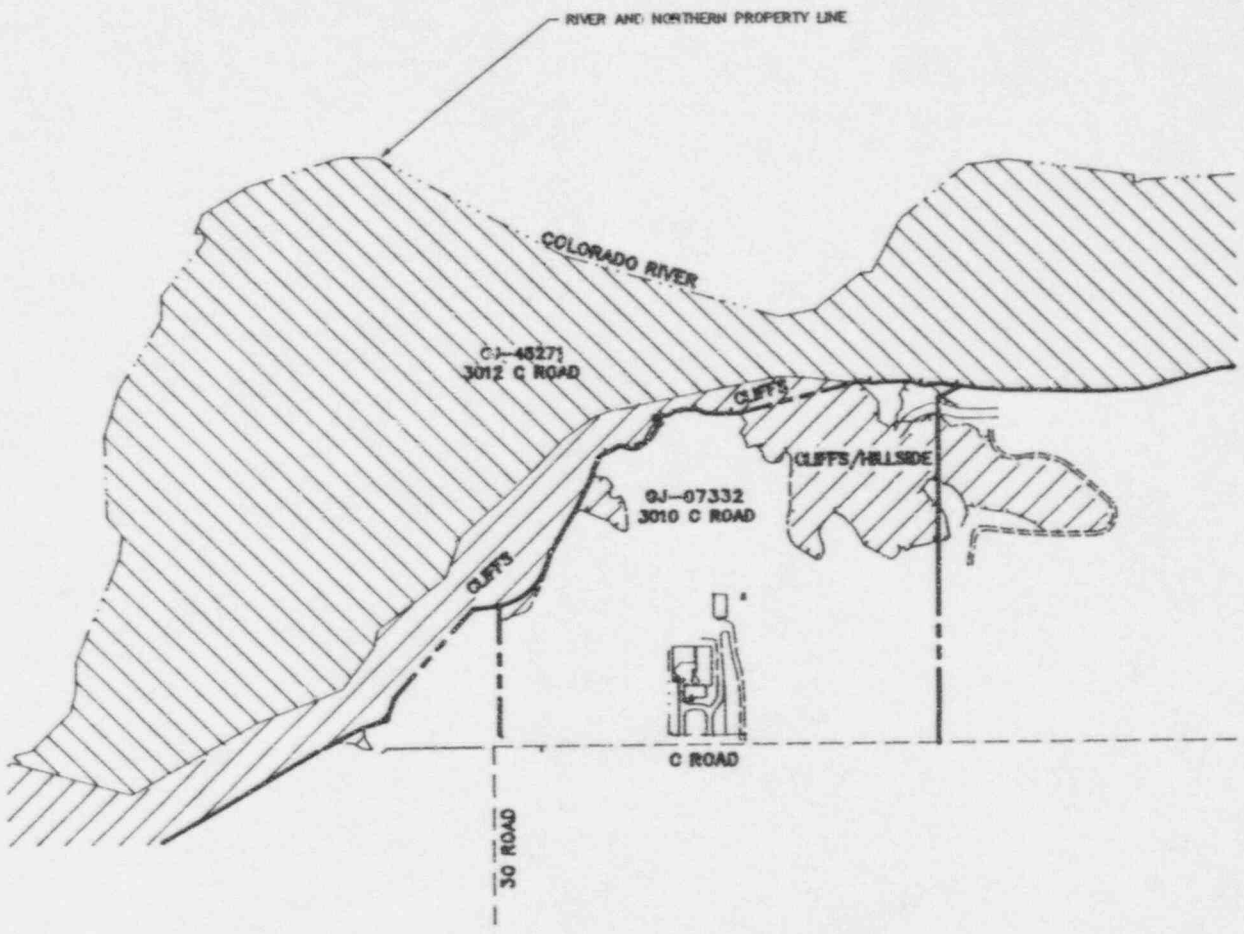
Alternative 1 - Complete Remediation
Health Risk - Reduced to within EPA standards
Estimated Construction Cost - $104,995
Approximate Volume of Contaminated Materials Removed - 1,915 cy
Approximate Volume of Contaminated Materials Remaining - 0

Alternative 2 - Partial Remediation (Remedial top 12 inches - Supplemental Standards)
Health Risk - Gamma exposure rates would be substantially reduced (possibly to background)
Estimated Construction Cost - $84,857
Approximate Volume of Contaminated Material Removed - 1,378 cy
Approximate Volume of Contaminated Materials Remaining - 537 cy

Alternative 3 - No Remediation (Supplemental Standards)
Health Risk - See Appendix B, Table B.T1
Estimated Construction Cost - $0
Approximate Volume of Contaminated Materials Removed - 0 cy
Approximate Volume of Contaminated Materials Remaining - 1,915 cy

3.0 CONCLUSIONS AND RECOMMENDATIONS

Examination of the health risk performed in the Appendix B suggest that there is no identifiable significant health risk if No Remediation (Alternative 3) is approved for Supplemental Standards. The cost and environmental harm of complete remediation (Alternative 1) is unreasonably high when compared to the insignificant health risks associated with no remediation. If Geotech's recommendation for No Remediation is not approved, Complete Remediation should be performed. Partial Remediation (Alternative 2) is not a viable alternative due to two major factors: the environmental harm that would be caused removing just the surface contamination, and the cost is nearly as great as total remediation.



LEGEND

PROPERTY LINE

APPROXIMATE AREA OF SUPPLEMENTAL STANDARDS FOR GJ-45271-VL (THIS APPLICATION)

APPROXIMATE AREA OF SUPPLEMENTAL STANDARDS FOR GJ-07332-MR (SEPARATE APPLICATION)

NORTH

LOCATION PLAN

SCALE: 1"=500'-0"

U.S. DEPARTMENT OF ENERGY

3012 C ROAD
GRAND JUNCTION, CO

DOE ID NO. GJ-45271-VL

FIGURE 1

APPENDIX A

SUPPLEMENTAL STANDARDS
RADIOLOGICAL ASSESSMENT

FOR

DOE ID NO. GJ-45271-VL
3012 C ROAD
GRAND JUNCTION, COLORADO

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TABLES

FIGURES (ATTACHED)

ATTACHMENT

Appendix A for GJ-45271-VL

1.0 INTRODUCTION

The Environmental Protection Agency (EPA) Standards for Remedial Actions at Inactive Uranium Processing Sites (40 CFR Part 192) defines two types of remedial action: control and cleanup. Control is the operation which places the tailings piles in a condition that will minimize the risk to man over a long period of time. Cleanup is the operation which reduces the potential health consequences of tailings that have been dispensed from tailings piles by natural forces or removed by man and used elsewhere in buildings or land. The purpose of the EPA Standards for cleanup is to provide the maximum reasonable protection of public health and the environment. The varied conditions at the designated sites and limited experience with remedial actions, which existed at the time the law was created, made it appropriate for the EPA to allow tailings to be left in place where circumstances make such action reasonable. Circumstances which make removal of tailings contamination unreasonable are accommodated by the EPA through provisions within 40 CFR Part 192 for Supplemental Standards. The Department of Energy (DOE) requested that Chem-Nuclear Geotech, Inc. (Geotech) consider Application for Supplemental Standards and alternatives for remedial action work for DOE ID No. GJ-45271-VL located at 3012 C Road.

This REA serves as an Executive Summary for the remainder of this document and contains a description of remediation alternatives, evaluation of health risks for the alternative action, estimated costs of the remedial action, approximate volumes of contaminated materials, and the recommended action. The Appendix A contains the Executive Summary for the Radiologic Assessment data and tables that summarize the available radiological data. The Appendix B is the Supplemental Standards Application and contains analysis of: land use, health risks, alternative actions, construction costs, and owner input.

2.0 EVALUATION

No structures exist on the property. Therefore, it does not meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

This REA is focused on the uranium mill tailings contamination located in soil of the vacant land located at 3012 C Road. This Supplemental Standards Application only addresses those deposits located in the floodplain of this property; a separate application was prepared to address hillside deposits on the cliffs and is presented in the GJ-07332-MR Supplemental Standards Application. The hillside deposits were included in a separate application because of a property line dispute that exists between the adjacent property owners. For the purposes of filing for Supplemental Standards in the cliff area, Geotech has determined that the cliff Supplemental Standards area is more appropriately referenced in GJ-07332-MR. It should be noted that the outcome of the property line dispute could result in the cliff area being

owned by either the owner of GJ-45271-VL or the owner of GJ-07332-MR. Figure 1 and Figures 2 and 3 (attached) depict the area being considered and summarize the contamination data. Field Assessment radiological data are included in the Radiological Assessment, Appendix A. This data indicates that the depth of contamination varies from 6 inches to 51 inches.

The alternative actions being considered in Appendix B can be summarized as follows:

Alternative 1 - Complete Remediation
Health Risk - Reduced to within EPA standards
Estimated Construction Cost - $104,995
Approximate Volume of Contaminated Materials Removed - 1,915 cy
Approximate Volume of Contaminated Materials Remaining - (

Alternative 2 - Partial Remediation (Remedial top 12 inches - Supplemental Standards)
Health Risk - Gamma exposure rates would be substantially reduced (possibly to background)
Estimated Construction Cost - $84,857
Approximate Volume of Contaminated Material Removed - 1,378 cy
Approximate Volume of Contaminated Materials Remaining - 537 cy

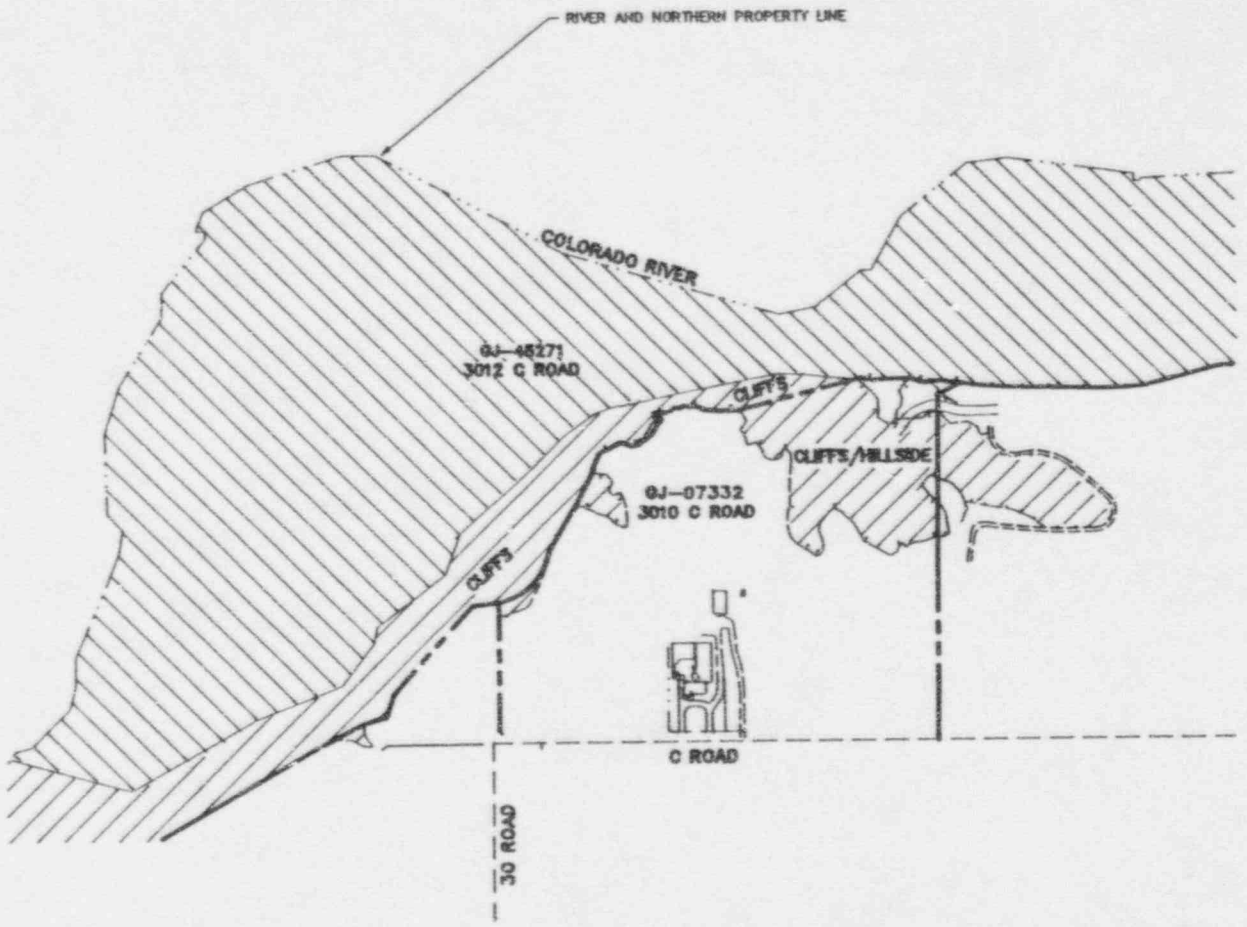
Alternative 3 - No Remediation (Supplemental Standards)
Health Risk - See Appendix B, Table B.T1
Estimated Construction Cost - $0
Approximate Volume of Contaminated Materials Removed - 0 cy
Approximate Volume of Contaminated Materials Remaining - 1,915 cy

3.0 CONCLUSIONS AND RECOMMENDATIONS

Examination of the health risk performed in the Appendix B suggest that there is no identifiable significant health risk if No Remediation (Alternative 3) is approved for Supplemental Standards. The cost and environmental harm of complete remediation (Alternative 1) is unreasonably high when compared to the insignificant health risks associated with no remediation. If Geotech's recommendation for No Remediation is not approved, Complete Remediation should be performed. Partial Remediation (Alternative 2) is not a viable alternative due to two major factors: the environmental harm that would be caused removing just the surface contamination, and the cost is nearly as great as total remediation.

Approval of the Supplemental Standards Application should be applied under 40 CFR 192.21 Criteria B and C (see Appendix B, Section B.1). A long-term tailings management, disposal, and migration control plan should be developed and implemented. The plan should address undiscovered deposits, deposits left in place through Application of Supplemental Standards, and deposits that are not within existing inclusion boundaries.

MP031292
G45271RE.SS:CROAD:DZ
REV032587



LEGEND

PROPERTY LINE

APPROXIMATE AREA OF SUPPLEMENTAL STANDARDS FOR GJ-45271-VL (THIS APPLICATION)

APPROXIMATE AREA OF SUPPLEMENTAL STANDARDS FOR GJ-07332-MR (SEPARATE APPLICATION)

NORTH

LOCATION PLAN

SCALE: 1"=500'-0"

U.S. DEPARTMENT OF ENERGY

3012 C ROAD
GRAND JUNCTION, CO

DOE ID NO. GJ-45271-VL

FIGURE 1

EXECUTIVE SUMMARY

1.0 INTRODUCTION

This appendix contains the applicable radiological information that was gathered during Engineering and Field Assessment of DOE ID No. GJ-45271-VL located at 3012 C Road.

Following the procedures described in the Field Assessment Operations Technical Data Procedures Manual, data was collected at the properties to assess the location and extent of contamination due to residual radioactive material in quantities in excess of the Environmental Protection Agency "Standards for Remedial Action at Inactive Uranium Processing Sites" (40 CFR 192).

2.0 GAMMA EXPOSURE RATE SURVEYS

2.1 Exterior

The low area background reading is 13 μR/h. The high exterior gamma level is 25 μR/h. Exterior gamma exposure rates in the area are shown on the radiological map, Figure 3. A summary of the gamma exposure rates is shown in Table A.T1.

2.2 Interior

Interior gamma exposure rates are not applicable. There are no structures located in the area being considered for Supplemental Standards.

3.0 RADON/RADON DECAY PRODUCT CONCENTRATION (RDC)

Radon decay product concentrations are not applicable. There are no structures located in the area being considered for Supplemental Standards.

4.0 EXTENT OF CONTAMINATION

4.1 Exterior

The extent of contamination is presented in the attached Figure 2.

4.2 Interior

Not applicable. There are no structures located in the area being considered for Supplemental Standards.

5.0 REMEDIAL ACTION RECOMMENDATIONS

5.1 Exterior

3012 C Road should be considered for Application of Supplemental Standards to the areas shown on the attached radiological maps, Figure 2 and Figure 3 (see Appendix B for further evaluation of the alternatives and recommendations).

5.2 Interior

Not applicable. No structures are located in the area being considered for Supplemental Standards.

APPENDIX A

SUPPLEMENTAL STANDARDS
RADIOLOGICAL ASSESSMENT

FOR

DOE ID NO. GJ-45271-VL
3012 C ROAD
GRAND JUNCTION, COLORADO

CONTENTS

TABLES

FIGURES (ATTACHED)

ATTACHMENT

Appendix A for GJ-45271-VL

6.0 COMMINGLED WASTE INVESTIGATION

A commingled waste investigations was not performed on this property.

MP030692
G45271EX.SUM:CROAD:DZ

TABLE A.T1

SUMMARY OF RADIOLOGICAL DATA

GJ – 45271 – VL
3012 C ROAD

SUPPLEMEMTAL STANDARDS APPLICATION

		GAMMA (uR/h)			RADIUM 226				
		SURFACE LEVEL			pCi/g			DEPTH OF CONTAMINATION	
AREA DESCRIPTION	BACKGROUND	MAX	MIN	AVE	BACKGROUND	MAX	MIN	MAX	MIN
3012 C Road (500 Year Floodplain)	13	25	16	21	2.4	22.1	2.5	51	6

Note: Areas outside the 500 Year Floodplain (i.e. Areas C and D) are not included in the scope of this application; because of this, radiological information for these areas is not listed.

ATTACHMENT

APPENDIX A FOR GJ-45271-VL

APPENDIX A

RADIOLOGICAL ASSESSMENT FOR

DOE ID NO. GJ-45271-VL

Revised: July 11, 1991

CONTENTS

Tables

Figures

EXECUTIVE SUMMARY

1.0 INTRODUCTION

This property is a vacant lot located at 3012 C Road (River Bluff).

Following procedures described in the *Field Assessments Procedures Manual*, data were collected on this property and assessed to estimate the location of residual radioactive material in excess of the Environmental Protection Agency (EPA) 'Standards for Remedial Action at Inactive Uranium Processing Sites' (40 CFR 192).

This property has been included for remedial action by the Department of Energy on the basis of Oak Ridge National Laboratory's identification of excess gamma exposure rates in the land area.

2.0 GAMMA EXPOSURE-RATE SURVEYS

2.1 Exterior

The area backgrounds are 13 μR/h and 2.4 pCi/g. The high exterior gamma exposure rate is 30 μR/h. Exterior gamma exposure rates are shown in Figure 1, and Figures 2a through 2l.

2.2 Interior

Not applicable - vacant lot.

3.0 RADON/RADON DECAY-PRODUCT CONCENTRATION (RDC)

Not applicable - vacant lot.

4.0 EXTENT OF CONTAMINATION

4.1 Exterior

Figures 2a through 2l show the locations and types of explorations and radium measurements made; the related radium data are listed in Tables 1a through 1l. The maximum radium concentration in the contaminated areas is 22.1 pCi/g.

Figures 3a through 3g show the estimated boundaries and depths of exterior contamination. The deposits containing identified residual radioactive materials are characterized as follows:

In the bare soil areas.

4.2 Interior

Not applicable - vacant lot.

5.0 REMEDIAL ACTION RECOMMENDATIONS

5.1 Exterior

Exterior Deposits A, B, and E through G (Figures 3a, 3b, and 3d through 3g) should be removed and the appropriate cover material replaced.

Exterior Deposits C and D (Figure 3c) should be considered for supplemental standards.

5.2 Interior

Not applicable - vacant lot.

6.0 COMMINGLED WASTE INVESTIGATION

A commingled waste investigation was not performed on this property.

:mm/pr

TEAM LEADER NOTES

DOE ID NUMBER: GJ-45271-VL

SURVEY DATE: March 21, 1991

TEAM LEADER: Ernie Colunga

Owners: Paul X. and Nancy B. McMenaman

Telephone Numbers: (303) 434-5355 (Home)
(303) 434-5146 (Work)

All deposits described in the historical data were located and investigated. Additional contamination was identified throughout the property.

The deposits mentioned in Oak Ridge National Laboratory's inclusion report have been partially cleaned up during the remediation performed at DOE ID number on GJ-07332-MR. The investigation of the remaining deposits are shown in Figure 2d and Table 1d. These deposits (Figure 3c) should be considered for supplemental standards, as they are located on the side of the cliffs of Orchard Mesa.

Figure 1 shows the locations and identifies the specific nature of each of the "No-Access" areas located on this property. Deposits C and D (Figure 3c) are adjacent to a "No-Access" area. It is undetermined if the deposits extend onto the "No-Access" area, as they are located on the side of the cliffs, which were determined to be too dangerous for personnel to attempt to assess.

There is no spillover to other adjacent properties, as determined by a scintillometer scan.

/pr

Table 1a
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
1	257270	00-06	OC	3.5				NAH-143
		00	DS	4.9				Soil
		03	TC	5.0	5.0			
		06	DS	6.6				DC = 0 inches
		06	TC	5.8	5.8			
		09	TC	6.6	9.1			
		12	TC	6.0	6.9			
		18	TC	4.9	4.7			
		24	TC	3.9	3.4			
		30	TC	3.2	3.2			
2	276265	00-06	OC	1.5				NAH-144
		00	DS	2.5				Soil
		03	TC	4.0	4.0			
		06	TC	4.8	5.2			DC = 0 inches
		09	TC	5.4	5.9			
		12	TC	5.7	5.3			
		18	TC	6.2	6.2			
		24	TC	6.7	8.3			
		30	TC	6.3	7.2			
		36	TC	5.4	5.2			
		42	TC	4.6	4.6			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

RADRPT V9.1 <900716>

Table 1b
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
3	640450	00-06	OC	3.5				NAH-155
		00	DS	2.6				Soil
		03	TC	3.9	3.9			
		06	TC	4.4	4.9			DC = 0 inches
		09	TC	4.6	5.5			
		12	TC	4.3	4.3			
		15	TC	4.0	3.3			
		18	TC	4.1	4.5			
		21	TC	4.0	4.0			
		24	TC	3.9	3.9			
		27	TC	3.8	3.6			
		30	TC	3.8	3.8			
		33	TC	3.8	4.0			
		36	TC	3.7	3.7			
4	640500	00	DS	2.3				Soil
		03	TC	4.1	4.1			Auger refusal
		06	TC	4.8	4.8			
		12	TC	5.5	7.6			DC = 0 inches
		18	TC	5.0	5.5			
		24	TC	4.2	4.2			
5	670370	00	DS	1.8				Soil
		03	TC	4.3	4.3			
		06	TC	4.8	5.9			DC = 0 inches
		09	TC	4.7	5.2			
		12	TC	4.3	4.1			
		15	TC	4.0	4.0			
		18	TC	3.7	3.2			
		21	TC	3.7	3.7			
		24	TC	3.7	3.9			
		27	TC	3.6	3.6			
		30	TC	3.5	3.5			
		33	TC	3.4	3.4			
6	670420	00	DS	1.9				Soil
		03	TC	4.6	4.6			
		06	TC	5.3	5.7			DC = 0 inches
		09	TC	5.8	6.3			
		12	TC	6.0	6.7			
		15	TC	5.8	6.5			
		18	TC	5.2	4.8			
		21	TC	4.8	4.6			
		24	TC	4.5	4.7			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
6	670420	27	TC	4.1	3.2			
		30	TC	4.2	4.9			
		33	TC	3.9	3.9			
7	670474	03	TC	4.4	4.4			Auger refusal
		06	TC	5.2	5.2			Soil
		09	TC	6.0	6.0			DC > 27 inches
		12	TC	6.8	6.6			
		15	TC	7.7	7.3			
		18	TC	8.8	8.8			
		21	TC	9.9	10.6			
		24	TC	10.6	11.8			
		27	TC	10.6	10.6			
8	670500	00	DS	1.8				Soil
		03	TC	3.8	3.8			Auger refusal
		06	TC	4.6	5.1			
		09	TC	5.1	4.6			DC > 39 inches
		12	TC	5.9	5.9			
		15	TC	6.7	6.3			
		18	TC	7.7	7.0			
		21	TC	9.1	9.8			
		24	TC	10.1	9.7			
		27	TC	11.3	10.1			
		30	TC	13.2	17.3			
		33	TC	12.8	14.8			
		36	TC	11.3	10.8			
		39	TC	10.1	10.1			
9	700450	00	DS	<1.0				Soil
		03	TC	3.5	3.5			
		06	TC	3.8	3.8			DC = 36 inches
		09	TC	4.1	3.4			
		12	TC	4.8	4.3			
		15	TC	5.8	5.3			
		18	TC	7.1	6.2			
		21	TC	8.9	8.9			
		24	TC	10.7	9.6			
		27	TC	13.1	16.7			
		30	TC	13.5	16.5			
		33	TC	12.2	14.9			
		36	TC	9.4	9.6			
		39	TC	6.5	3.8			
		42	TC	5.1	3.9			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
9	700450	45	TC	4.4	3.7			
		48	TC	4.1	4.1			
10	700500	00-06	OC	2.5				NAF-603
		00	DS	3.0				Soil
		03	TC	4.5	4.5			
		06	TC	5.2	6.3			DC = 0 inches
		09	TC	5.3	5.5			
		12	TC	5.3	6.4			
		18	TC	4.7	4.7			
		24	TC	4.1	3.4			
		30	TC	3.9	3.9			
11	720420	00	DS	1.3				Soil
		03	TC	2.9	2.9			Auger refusal
		06	TC	2.9	2.4			
		09	TC	3.2	3.4			DC = 0 inches
		12	TC	3.4	3.8			
		15	TC	3.4	3.4			
12	720470	00	DS	1.0				Soil
		03	TC	3.1	3.1			
		06	TC	3.5	3.7			DC = 0 inches
		09	TC	3.8	4.2			
		12	TC	3.9	4.1			
		15	TC	3.9	4.1			
		18	TC	3.8	3.4			
		21	TC	3.9	4.3			
		24	TC	3.8	4.0			
		27	TC	3.6	3.4			
		30	TC	3.5	3.5			
		33	TC	3.4	3.2			
		36	TC	3.4	3.2			
		39	TC	3.5	3.5			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

Table 1c
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
13	290500	00	DS	1.7				Soil
		03	TC	3.4	3.4			Auger refusal
		06	TC	3.9	4.8			
		09	TC	3.9	3.9			DC = 0 inches
		12	TC	3.9	3.9			
		15	TC	3.9	4.1			
		18	TC	3.8	3.8			
14	293405	00	DS	2.1				Soil
		03	TC	3.4	3.4			
		06	TC	3.5	3.5			DC = 0 inches
		09	TC	3.6	4.1			
		12	TC	3.4	3.2			
		18	TC	3.3	3.3			
		24	TC	3.2	3.2			
		30	TC	3.1	2.9			
		36	TC	3.1	3.1			
15	307456	00-06	OC	2.2				NAH-142
		00	DS	2.6				Soil
		03	TC	3.4	3.4			
		09	TC	4.0	5.8			DC = 0 inches
		15	TC	3.6	3.2			
		21	TC	3.4	3.4			
		27	TC	3.2	3.0			
		33	TC	3.1	3.1			
16	340460	00-06	OC	5.5				NAG-669
		00	DS	3.0				Soil
		03	TC	4.0	4.0			
		09	TC	4.7	6.7			DC = 6 inches
		15	TC	4.3	4.7			
		21	TC	3.7	3.3			
		27	TC	3.3	2.8			
		33	TC	3.2	3.2			
17	340502	00-06	OC	7.0				NAH-138
		00	DS	2.8				Soil
		03	TC	3.5	3.5			
		09	TC	4.3	6.1			DC = 6 inches
		15	TC	4.1	4.5			
		21	TC	3.7	3.3			
		27	TC	3.5	3.3			
		33	TC	3.4	3.4			

Table 1c
Radium Concentrations at Exterior Locations
3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
18	341416	00	DS	2.3				Soil
		03	TC	4.1	4.1			
		06	TC	4.0	3.8			DC = 0 inches
		09	TC	4.0	4.4			
		12	TC	3.8	3.4			
		18	TC	3.8	4.0			
		24	TC	3.7	3.7			
		30	TC	3.6	3.4			
		36	TC	3.6	3.6			
19	380462	00-06	OC	6.1				NAH-136
		00	DS	3.1				Soil
		03	TC	4.0	4.0			Auger refusal
		09	TC	4.2	5.6			
		15	TC	3.6	3.2			DC = 6 inches
		21	TC	3.2	2.3			
		27	TC	3.3	3.5			
		33	TC	3.3	3.3			
20	394368	00-06	OC	4.4				NAH-141
		00	DS	3.1				Soil
		03	TC	4.6	4.6			Auger refusal
		09	TC	5.6	7.9			
		15	TC	5.3	6.4			DC = 0 inches
		21	TC	4.4	4.4			
21	419424	00-06	OC	6.5				NAH-139
		00	DS	4.4				Soil
		03	TC	4.1	4.1			
		06	TC	4.4	4.9			
		06	DS	3.4				DC = 6 inches
		09	TC	4.4	4.6			
		12	TC	4.3	4.5			
		18	TC	4.1	3.9			
		24	TC	4.0	4.0			
		30	TC	3.9	4.1			
		36	TC	3.7	3.5			
		42	TC	3.6	3.6			
22	420280	00-06	OC	5.6				NAG-665
		00	DS	3.0				Soil
		03	TC	3.8	3.8			
		06	TC	4.0	4.2			DC = 6 inches
		09	TC	4.1	4.5			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
22	420280	12	TC	4.0	4.4			
		18	TC	3.7	3.3			
		24	TC	3.6	3.4			
		30	TC	3.6	3.6			
		36	TC	3.6	3.8			
		42	TC	3.5	3.5			
23	420500	00-06	OC	6.6				NAF-997
		00	DS	2.7				Soil
		03	TC	3.6	3.6			
		06	TC	3.8	4.5			DC = 6 inches
		09	TC	3.6	3.2			
		12	TC	3.6	3.6			
		21	TC	3.6	3.2			
		27	TC	3.8	4.3			
		33	TC	3.7	3.7			
24	425458	00	DS	<1.0				Soil
		03	TC	3.0	3.0			Auger refusal
		06	TC	3.4	3.6			
		09	TC	3.7	4.1			DC = 0 inches
		12	TC	3.8	4.0			
		15	TC	3.8	4.3			
		21	TC	3.5	3.1			
		27	TC	3.4	3.4			
25	429318	00-06	OC	6.6				NAH-140
		00	DS	2.5				Soil
		03	TC	3.6	3.6			
		09	TC	4.0	4.5			DC = 6 inches
		15	TC	4.1	4.3			
		21	TC	4.1	4.1			
		27	TC	4.1	4.5			
		33	TC	3.9	3.7			
		39	TC	3.8	3.8			
26	430350	00-06	OC	5.9				NAG-666
		00	DS	3.0				Soil
		03	TC	4.5	4.5			
		06	TC	4.5	4.7			DC = 6 inches
		09	TC	4.4	4.8			
		12	TC	4.1	3.7			
		15	TC	4.0	4.2			
		18	TC	3.8	3.4			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
26	430350	21	TC	3.8	3.3			
		24	TC	4.1	4.5			
		27	TC	4.2	4.9			
		30	TC	3.9	3.7			
		33	TC	3.7	3.3			
		36	TC	3.7	3.7			
		39	TC	3.7	3.7			
27	460370	00-06	OC	6.3				NAH-137
		00	DS	2.5				Soil
		03	TC	3.8	3.8			
		06	TC	4.6	5.5			DC = 6 inches
		09	TC	4.9	5.6			
		12	TC	4.8	5.5			
		18	TC	4.3	3.9			
		24	TC	4.0	3.3			
		30	TC	4.1	4.3			
		36	TC	4.1	4.1			
28	460410	00-06	OC	8.5				NAG-662
		00	DS	3.6				Soil
		03	TC	4.6	4.6			
		06	TC	4.8	5.9			DC = 6 inches
		09	TC	4.4	4.0			
		12	TC	4.2	4.4			
		18	TC	3.9	3.7			
		24	TC	3.7	3.5			
		30	TC	3.6	3.4			
		36	TC	3.6	3.6			
29	470320	00-06	OC	5.2				NAG-664
		00	DS	3.1				Soil
		03	TC	3.6	3.6			Auger refusal
		06	TC	3.7	3.7			
		09	TC	3.8	4.2			DC = 6 inches
		12	TC	3.7	3.7			
		15	TC	3.6	3.4			
		18	TC	3.6	3.6			
		21	TC	3.6	3.6			
30	470500	00-06	OC	5.2				NAF-998
		00	DS	3.1				Soil
		03	TC	4.7	4.7			
		09	TC	5.1	7.6			DC = 6 inches

Table 1c
Radium Concentrations at Exterior Locations
3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
30	470500	15	TC	4.1	2.5			
		21	TC	4.0	4.5			
		27	TC	3.6	3.6			
		33	TC	3.2	3.2			
31	475454	00-06	OC	5.9				NAH-135
		00	DS	3.2				Soil
		03	TC	4.5	4.5			
		06	TC	4.4	4.9			DC = 6 inches
		09	TC	4.0	3.5			
		12	TC	3.9	3.9			
		18	TC	3.8	3.8			
		24	TC	3.7	3.3			
		30	TC	3.8	4.2			
		36	TC	3.7	3.7			
32	500370	00-06	OC	4.6				NAG-663
		00	DS	3.1				Soil
		03	TC	3.8	3.8			
		06	TC	3.8	4.0			DC = 0 inches
		09	TC	3.7	3.5			
		12	TC	3.7	3.9			
		15	TC	3.6	3.4			
		18	TC	3.6	3.6			
		24	TC	3.6	3.8			
		30	TC	3.5	3.3			
		36	TC	3.5	3.5			
33	510330	00	DS	1.8				Soil
		03	TC	3.8	3.8			Water at 24"
		06	TC	4.0	4.5			
		09	TC	3.9	4.1			DC = 0 inches
		12	TC	3.7	3.3			
		15	TC	3.7	3.9			
		18	TC	3.6	3.4			
		21	TC	3.6	3.8			
		24	TC	3.5	3.5			
		27	TC	3.4	3.4			
		30	TC	3.3	3.1			
		33	TC	3.3	3.3			
34	510408	00	DS	2.0				Soil
		03	TC	3.1	3.1			DC = 0 inches
		09	TC	3.5	4.0			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
34	510408	15	TC	3.6	3.4			
		21	TC	3.8	3.6			
		27	TC	4.1	4.6			
		33	TC	4.1	4.5			
		39	TC	3.9	3.9			
35	523450	00	DS	2.1				Soil
		03	TC	3.5	3.5			
		06	TC	4.2	3.8			DC = 0 inches
		09	TC	5.1	5.8			
		12	TC	5.6	5.4			
		15	TC	6.2	7.6			
		18	TC	6.0	7.2			
		21	TC	5.1	5.3			
		24	TC	4.1	2.9			
		27	TC	3.8	3.3			
		30	TC	3.8	4.0			
		33	TC	3.7	3.7			
		36	TC	3.6	3.4			
		39	TC	3.6	3.6			
36	537484	00-06	OC	6.6				NAH-134
		00	DS	4.2				Soil
		03	TC	4.7	4.7			
		06	DS	5.2				DC = 6 inches
		06	TC	5.6	5.8			
		09	TC	6.4	7.1			
		12	TC	6.8	9.6			
		18	TC	5.6	5.8			
		24	TC	4.3	2.3			
		30	TC	4.1	4.1			
		36	TC	3.9	3.9			
37	560450	00-06	OC	4.6				NAG-667
		00	DS	3.1				Soil
		03	TC	3.7	3.7			
		06	TC	3.7	3.7			DC = 0 inches
		09	TC	3.7	3.9			
		12	TC	3.6	3.4			
		15	TC	3.6	3.6			
		18	TC	3.6	3.6			
		21	TC	3.6	3.8			
		24	TC	3.5	3.1			
		27	TC	3.6	3.8			

Table 1c
Radium Concentrations at Exterior Locations

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
37	560450	30	TC	3.6	3.6			
		33	TC	3.6	3.6			

Measurement Types:
- AS = Alpha Sample
- DH = Downhole Survey
- DS = Delta Scintillometer
- GB = GAD-6 Borehole
- GS = GAD-6 Surface
- OC = Soil Sample by Opp. Crys. Sys.
- RP = Radon Profile
- SS = Soil Sample by Laboratory Analysis
- TC = Total Count Borehole

Notes:
- DC = Depth of Contamination
- [n] = Reading Taken n-Inches Above Floor or Ground
- Date of Survey = 03-21-91
- Team Leader = EC

Table 1d
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
38	413507	00	DS	2.0				Soil
		03	TC	3.5	3.5			
		09	TC	4.2	5.8			DC = 0 inches
		15	TC	4.0	3.6			
		21	TC	4.0	4.9			
		27	TC	3.5	3.5			
		33	TC	3.0	2.6			
		39	TC	2.7	2.3			
		45	TC	2.6	2.6			
39	417325	00	DS	16.3				Soil
		06	DS	7.4				
40	440323	00	DS	1.2				Soil
41	459338	00	DS	8.5				Soil
		06	DS	1.5				
42	513402	00	DS	1.1				Soil
43	545413	00	DS	1.8				Soil
44	545423	00	DS	4.7				Soil
		06	DS	3.8				
45	580428	00	DS	6.1				Soil
		06	DS	2.0				
46	620422	00	DS	6.7				Soil
		06	DS	3.3				
47	654426	00-06	OC	15.5				NAF-945; soil
48	680412	00-06	OC	14.0				NAF-946; soil

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
49	118225	00	DS	1.4				Soil
		03	TC	3.5	3.5			Auger refusal, water at 39"
		06	TC	3.9	3.7			
		09	TC	4.4	4.6			DC = 0 inches
		12	TC	4.8	5.0			
		15	TC	5.1	5.1			
		18	TC	5.4	5.0			
		21	TC	5.9	5.9			
		24	TC	6.4	6.2			
		27	TC	7.0	7.2			
		30	TC	7.5	7.9			
		33	TC	7.8	7.8			
		36	TC	8.1	8.1			
		39	TC	8.4	8.4			
		42	TC	8.7	8.7			
50	126283	00	DS	1.4				Soil
		03	TC	3.4	3.4			Auger refusal
		06	TC	3.9	3.7			
		09	TC	4.5	5.2			DC = 0 inches
		12	TC	4.7	5.1			
		15	TC	4.7	4.2			
		18	TC	5.0	4.8			
		21	TC	5.4	5.8			
		24	TC	5.6	5.6			
		27	TC	5.8	6.3			
		30	TC	5.7	5.7			
51	340220	00-06	OC	5.7				NAG-668
		00	DS	2.9				Soil
		03	TC	3.8	3.8			
		09	TC	4.6	6.6			DC = 6 inches
		15	TC	4.3	4.7			
		21	TC	3.8	3.4			
		27	TC	3.5	3.1			
		33	TC	3.4	3.4			
52	470210	00-06	OC	6.1				NAF-999
		00	DS	3.0				Soil
		03	TC	3.8	3.8			
		06	TC	4.2	4.7			DC = 6 inches
		09	TC	4.3	4.8			
		12	TC	4.1	4.1			
		15	TC	3.9	4.3			

Table 1e
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
52	470210	21	TC	3.5	2.8			
		27	TC	3.5	3.7			
		33	TC	3.4	3.4			
53	500230	00	DS	2.4				Soil
		03	TC	3.1	3.1			Auger refusal
		06	TC	3.4	3.8			
		09	TC	3.5	3.7			DC = 0 inches
		12	TC	3.5	3.5			
		15	TC	3.5	3.5			
54	520196	00-06	OC	8.3				NAH-133
		00	DS	4.8				Soil
		03	TC	4.6	4.6			Auger refusal
		06	DS	4.6				
		09	TC	5.7	8.0			DC = 6 inches
		15	TC	5.5	7.6			
		21	TC	4.1	2.0			
		27	TC	3.9	3.9			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

Table 1f
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
55	558359	00	DS	2.0				Soil
		03	TC	3.4	3.4			Auger refusal
		06	TC	3.9	3.9			
		09	TC	4.4	4.4			DC = 0 inches
		12	TC	4.9	5.6			
		15	TC	5.0	4.8			
		18	TC	5.2	5.2			
56	576358	00	DS	5.4				Soil
		03	TC	5.0	5.0			Auger refusal
		06	TC	6.6	7.3			
		09	TC	7.8	9.0			DC = 18 inches
		12	TC	8.3	7.2			
		15	TC	9.4	15.4			
		18	TC	7.1	4.6			
		21	TC	6.2	5.0			
		24	TC	6.0	6.0			
57	580313	00-06	OC	6.9				NAG-598
		00	DS	3.6				Soil
		03	TC	3.9	3.9			Auger refusal
		06	TC	4.3	4.7			
		09	TC	4.5	4.7			DC = 6 inches
		12	TC	4.6	4.8			
		15	TC	4.6	4.6			
58	590410	00	DS	2.1				Soil
		03	TC	4.8	4.8			
		06	TC	5.3	6.2			DC = 0 inches
		09	TC	5.3	5.5			
		12	TC	5.2	5.9			
		15	TC	4.7	3.6			
		18	TC	4.8	5.0			
		21	TC	4.8	5.0			
		24	TC	4.7	4.3			
		27	TC	4.8	5.0			
		30	TC	4.8	4.8			
		33	TC	4.8	4.8			
		36	TC	4.8	4.8			
		39	TC	4.8	4.8			
59	594361	00-06	OC	8.8				NAG-658
		00	DS	3.4				Soil
		03	TC	3.9	3.9			Auger refusal

Table 1f
Radium Concentrations at Exterior Locations

3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
59	594361	06	TC	4.5	5.2			DC = 6 inches
		09	TC	4.7	5.1			
		12	TC	4.7	5.2			
		15	TC	4.4	4.0			
		18	TC	4.3	4.3			
60	595376	00-06	OC	5.0				NAG-597
		00	DS	3.5				Soil
		03	TC	4.6	4.6			
		06	TC	5.5	5.5			DC = 21 inches
		09	TC	6.4	6.4			
		12	TC	7.3	6.4			
		15	TC	8.7	9.2			
		18	TC	9.8	15.7			
		21	TC	7.6	6.0			
		24	TC	6.3	5.6			
		27	TC	5.4	5.0			
		30	TC	4.7	4.7			
61	603350	00-06	OC	7.6				NAG-596
		00	DS	3.7				Soil
		03	TC	4.6	4.6			Auger refusal
		06	TC	4.7	5.4			
		09	TC	4.4	4.2			DC = 6 inches
		12	TC	4.2	4.0			
		15	TC	4.1	4.3			
		18	TC	3.9	3.7			
		21	TC	3.8	3.8			
62	610401	00	DS	4.5				Soil
		03	TC	5.0	5.0			
		06	TC	6.5	6.7			DC = 36 inches
		09	TC	7.9	8.1			
		12	TC	9.2	9.4			
		15	TC	10.4	10.0			
		18	TC	11.8	12.2			
		21	TC	13.0	13.5			
		24	TC	13.9	14.3			
		27	TC	14.6	18.7			
		30	TC	13.0	15.3			
		33	TC	10.1	9.0			
		36	TC	7.8	5.8			
		39	TC	6.6	6.6			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
63	610450	00	DS	<1.0				Soil
		03	TC	3.2	3.2			DC = 0 inches
		06	TC	3.8	3.8			
		09	TC	4.4	4.8			
		12	TC	4.8	3.7			
		15	TC	5.8	6.7			
		18	TC	6.3	6.7			
		21	TC	6.6	7.8			
		24	TC	6.2	6.6			
		27	TC	5.6	5.2			
		30	TC	5.2	5.2			
64	620430	24-30	OC	22.1				NAG-660
		00-06	OC	3.6				NAG-659
		00	DS	3.5				Soil
		03	TC	5.8	5.8			
		06	TC	7.4	6.9			DC = 39 inches
		09	TC	9.3	9.8			
		12	TC	10.9	11.6			
		15	TC	12.1	12.5			
		18	TC	13.1	12.9			
		21	TC	14.2	14.4			
		24	TC	15.2	15.6			
		27	TC	16.0	17.8			
		30	TC	15.8	17.4			
		33	TC	14.7	17.7			
		36	TC	11.9	11.2			
		39	TC	9.5	6.5			
		42	TC	8.8	8.8			
65	623293	00-06	OC	5.4				NAG-599
		00	DS	3.7				Soil
		03	TC	4.4	4.4			Auger refusal
		06	TC	4.3	4.5			
		09	TC	4.1	4.3			DC = 6 inches
		12	TC	3.8	3.6			
		15	TC	3.6	3.2			
		18	TC	3.6	3.6			
66	630400	00-06	OC	5.4				NAG-671
		00	DS	3.4				Soil
		03	TC	4.6	4.6			Auger refusal
		09	TC	6.2	7.1			
		15	TC	7.3	7.3			DC = 27 inches

Table 1f
Radium Concentrations at Exterior Locations
3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
66	630400	21	TC	8.4	12.8			
		27	TC	7.0	7.0			
67	636441	00	DS	2.3				Soil
		03	TC	3.6	3.6			
		06	TC	4.1	3.9			DC = 30 inches
		09	TC	4.7	4.2			
		12	TC	5.6	5.8			
		15	TC	6.4	5.5			
		18	TC	7.7	8.1			
		21	TC	8.8	10.0			
		24	TC	9.2	9.7			
		27	TC	9.3	11.3			
		30	TC	8.3	7.6			
		33	TC	7.7	8.4			
		36	TC	6.7	6.0			
		39	TC	6.1	6.1			
68	638368	00-06	OC	1.9				NAH-148
		00	DS	4.1				Soil
		03	TC	4.5	4.5			
		06	TC	5.5	5.9			DC = 0 inches
		06	DS	6.5				
		09	TC	6.3	6.8			
		12	TC	6.8	7.0			
		15	TC	7.2	7.4			
		18	TC	7.5	7.7			
		21	TC	7.7	6.8			
		24	TC	8.4	9.3			
		27	TC	8.6	9.7			
		30	TC	8.2	8.2			
69	640230	00-06	OC	1.1				NAH-154
		00	DS	2.5				Soil
		03	TC	4.8	4.8			
		06	TC	5.2	6.1			DC = 0 inches
		09	TC	5.1	4.9			
		12	TC	5.1	5.1			
		15	TC	5.1	5.3			
		18	TC	5.0	5.0			
		21	TC	4.9	5.1			
		24	TC	4.7	4.3			
		27	TC	4.7	4.7			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
70	640350	00-06	OC	5.4				NAG-670
		00	DS	3.6				Soil
		03	TC	4.7	4.7			Auger refusal
		06	TC	5.2	5.6			
		09	TC	5.5	4.1			DC = 6 inches
		12	TC	6.6	8.4			
		15	TC	6.7	7.2			
		18	TC	6.5	6.5			
71	643423	00-06	OC	3.3				NAG-595
		00	DS	2.6				Soil
		03	TC	3.9	3.9			
		06	TC	5.1	5.5			DC = 27 inches
		09	TC	6.1	[illegible]			
		12	TC	6.8	7.0			
		15	TC	7.4	7.4			
		18	TC	8.0	7.8			
		21	TC	8.7	8.7			
		24	TC	9.4	12.8			
		27	TC	8.2	7.1			
		30	TC	7.6	7.8			
		33	TC	6.9	6.7			
		36	TC	6.3	6.3			
72	653322	00	DS	1.2				Soil
		03	TC	3.3	3.3			Auger refusal
		06	TC	4.1	4.3			
		09	TC	4.8	5.2			DC = 0 inches
		12	TC	5.3	5.1			
		18	TC	5.9	6.6			
		24	TC	6.1	6.1			
73	658260	00	DS	2.4				Soil
		03	TC	4.4	4.4			
		06	TC	4.9	5.4			DC = 0 inches
		09	TC	5.1	5.5			
		12	TC	5.1	4.9			
		15	TC	5.2	5.0			
		18	TC	5.4	5.0			
		21	TC	5.8	7.4			
		24	TC	5.3	4.9			
		27	TC	5.0	5.0			
74	670200	00	DS	1.8				Soil
		03	TC	4.0	4.0			Auger refusal

Table 1f
Radium Concentrations at Exterior Locations
3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
74	670200	06	TC	4.3	3.9			
		09	TC	4.8	4.6			DC > 39 inches
		12	TC	5.4	6.5			
		15	TC	5.4	5.4			
		18	TC	5.4	5.2			
		21	TC	5.5	4.6			
		24	TC	6.1	5.9			
		27	TC	6.8	6.1			
		30	TC	7.9	8.1			
		33	TC	8.9	9.1			
		36	TC	9.8	10.9			
		39	TC	10.1	10.1			
75	670230	00-06	OC	4.7				NAG-591
		00	DS	2.9				Soil
		03	TC	4.0	4.0			Auger refusal
		06	TC	4.8	5.0			
		09	TC	5.5	5.7			DC = 51 inches
		12	TC	6.1	6.3			
		15	TC	6.6	6.2			
		18	TC	7.3	7.5			
		21	TC	7.9	8.3			
		24	TC	8.3	8.7			
		27	TC	8.5	8.7			
		30	TC	8.6	8.6			
		33	TC	8.7	9.2			
		36	TC	8.5	8.0			
		39	TC	8.6	7.9			
		42	TC	9.1	8.6			
		45	TC	9.9	11.0			
		48	TC	10.1	10.8			
		51	TC	9.9	9.9			
76	673288	00-06	OC	5.8				NAG-592
		00	DS	3.2				Soil
		03	TC	4.4	4.4			
		06	TC	5.5	5.9			DC = 6 inches
		09	TC	6.4	6.8			
		12	TC	7.1	7.1			
		15	TC	7.8	8.2			
		18	TC	8.3	9.0			
		21	TC	8.4	9.1			
		24	TC	8.1	9.3			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
76	673288	27	TC	7.1	6.9			
		30	TC	6.2	6.2			
77	675382	00	DS	2.2				Soil
		03	TC	3.1	3.1			
		06	TC	3.8	3.6			DC = 0 inches
		09	TC	4.6	4.6			
		12	TC	5.4	5.9			
		15	TC	5.9	5.9			
		18	TC	6.4	7.1			
		21	TC	6.5	6.9			
		24	TC	6.4	6.4			
		27	TC	6.3	6.7			
		30	TC	6.0	6.0			
78	677342	00-06	OC	4.8				NAG-657
		00	DS	2.9				Soil
		03	TC	4.0	4.0			Auger refusal
		06	TC	5.0	5.0			
		09	TC	6.0	6.5			DC = 0 inches
		12	TC	6.7	6.9			
		15	TC	7.3	7.3			
		18	TC	7.9	7.2			
		21	TC	8.9	9.8			
		24	TC	9.4	9.4			
79	692325	00-06	OC	5.7				NAG-594
		00	DS	3.6				Soil
		03	TC	4.9	4.9			Auger refusal
		06	TC	6.0	6.2			
		09	TC	7.0	7.5			DC = 6 inches
		12	TC	7.7	8.2			
		15	TC	8.1	8.8			
		18	TC	8.1	9.7			
		21	TC	7.2	7.2			
80	700228	00	DS	4.6				Soil
		03	TC	4.4	4.4			
		06	TC	4.7	3.8			DC = 6 inches
		09	TC	5.5	5.7			
		12	TC	6.2	6.9			
		15	TC	6.5	7.9			
		18	TC	6.0	6.2			
		21	TC	5.4	5.4			
		24	TC	4.8	3.7			

Table 1f
Radium Concentrations at Exterior Locations
3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
80	700228	27	TC	4.8	5.0			
		30	TC	4.7	4.7			
		33	TC	4.6	5.0			
		36	TC	4.3	4.3			
81	700360	00	DS	1.7				Soil
		03	TC	3.1	3.1			Auger refusal
		06	TC	3.5	3.3			
		09	TC	4.0	4.4			DC = 0 inches
		12	TC	4.3	4.5			
		18	TC	4.5	4.3			
		24	TC	4.8	5.3			
		30	TC	4.8	5.0			
		36	TC	4.7	4.7			
82	709251	00-06	OC	7.5				NAG-672
		00	DS	3.1				Soil
		03	TC	4.0	4.0			Auger refusal
		06	TC	4.7	5.6			
		09	TC	4.9	5.8			DC = 6 inches
		12	TC	4.6	4.6			
		15	TC	4.3	4.3			
83	713308	00-06	OC	6.6				NAG-593
		00	DS	4.0				Soil
		03	TC	4.3	4.3			
		06	TC	5.4	6.5			DC = 6 inches
		09	TC	5.9	7.0			
		12	TC	5.8	6.3			
		15	TC	5.4	5.6			
		18	TC	4.9	5.6			
		24	TC	4.0	3.1			
		30	TC	3.6	3.1			
		36	TC	3.5	3.5			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-[illegible]-91
Team Leader = EC

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/ 100 cm^2	Comments
84	518460	00	DS	1.9				Soil
		03	TC	3.8	3.8			Auger refusal
		09	TC	4.9	5.4			
		15	TC	5.7	6.6			DC = 0 inches
		21	TC	6.0	8.1			
		27	TC	5.1	5.1			
85	518478	00-06	OC	2.8				NAH-147
		00	DS	3.0				Soil
		03	TC	4.6	4.6			
		06	TC	5.5	5.9			DC = 0 inches
		09	TC	6.2	6.2			
		12	TC	6.9	7.4			
		15	TC	7.3	7.1			
		18	TC	7.8	9.8			
		21	TC	7.2	7.6			
		24	TC	6.4	5.9			
		27	TC	5.9	5.5			
		30	TC	5.6	5.6			
86	518507	00	DS	2.1				Soil
		03	TC	3.8	3.8			
		09	TC	5.8	7.9			DC = 0 inches
		15	TC	6.6	8.0			
		21	TC	6.6	8.0			
		27	TC	5.8	5.4			
		33	TC	5.2	5.2			
87	615229	00-06	OC	2.4				NAH-145
		00	DS	3.7				Soil
		03	TC	3.5	3.5			
		06	TC	3.7	4.1			DC = 0 inches
		09	TC	3.7	3.9			
		12	TC	3.6	3.4			
		15	TC	3.6	3.8			
		18	TC	3.5	3.5			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

Table 1h
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
88	388183	00-06	OC	3.1				NAH-131
		00	DS	3.2				Soil
		03	TC	5.5	5.5			
		06	TC	5.6	6.0			DC = 0 inches
		09	TC	5.5	7.3			
		12	TC	4.4	2.6			
		18	TC	4.3	4.7			
		24	TC	4.0	3.8			
		30	TC	3.8	3.8			
		36	TC	3.6	3.4			
		42	TC	3.5	3.5			
89	437181	00-06	OC	3.9				NAH-132
		00	DS	4.0				Soil
		03	TC	4.3	4.3			Auger refusal
		06	TC	5.1	6.5			
		06	DS	5.3				DC = 0 inches
		09	TC	5.1	5.6			
		12	TC	4.8	5.5			
		18	TC	4.1	3.2			
		24	TC	3.9	3.7			
		30	TC	3.8	3.8			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
90	193262	00-06	OC	4.4				NAH-130
		00	DS	3.3				Soil
		03	TC	4.9	4.9			
		06	TC	5.1	5.1			DC = 0 inches
		09	TC	5.3	5.3			
		12	TC	5.5	5.1			
		15	TC	5.9	5.4			
		18	TC	6.6	6.4			
		21	TC	7.4	8.1			
		24	TC	7.8	7.6			
		27	TC	8.3	8.7			
		30	TC	8.6	9.7			
		33	TC	8.3	8.5			
		36	TC	7.9	8.1			
		39	TC	7.4	7.0			
		42	TC	7.1	7.1			
91	214253	00-06	OC	2.6				NAH-129
		00	DS	4.3				Soil
		03	TC	8.8	8.8			
		06	DS	17.0				DC = 33 inches
		06	TC	11.5	10.8			
		09	TC	14.6	15.5			
		12	TC	17.2	17.7			
		15	TC	19.5	22.0			
		18	TC	20.4	21.8			
		21	TC	20.5	24.9			
		24	TC	18.1	18.3			
		27	TC	15.6	16.5			
		30	TC	12.6	14.6			
		33	TC	8.5	2.3			
		36	TC	7.9	7.7			
		39	TC	7.4	7.4			
92	234270	00	DS	2.2				Soil
		03	TC	3.7	3.7			
		06	TC	4.6	5.8			DC = 0 inches
		09	TC	4.8	5.7			
		12	TC	4.5	4.1			
		15	TC	4.4	4.4			
		18	TC	4.3	4.5			
		21	TC	4.1	3.9			
		24	TC	4.0	3.8			
		27	TC	4.0	4.2			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha cpm/100 cm^2	Comments
92	234270	30	TC	3.9	4.1			
		33	TC	3.7	3.2			
		36	TC	3.8	3.8			
93	243255	00-06	OC	7.6				NAF-171
		00	DS	5.1				Soil
		03	TC	5.4	5.4			
		06	DS	3.9				DC = 6 inches
		06	TC	6.1	6.6			
		09	TC	6.5	9.0			
		12	TC	5.5	3.7			
		15	TC	5.5	5.9			
		18	TC	5.3	6.5			
		21	TC	4.4	3.2			
		24	TC	4.2	4.2			
		27	TC	4.0	4.0			
		30	TC	3.8	3.4			
		33	TC	3.8	4.0			
		36	TC	3.7	3.5			
		39	TC	3.7	3.7			
94	274254	00-06	OC	4.8				NAF-170
		00	DS	2.5				Soil
		03	TC	4.3	4.3			
		06	TC	4.0	2.6			DC = 0 inches
		09	TC	4.5	5.2			
		12	TC	4.6	4.6			
		15	TC	4.7	4.7			
		18	TC	4.8	4.6			
		21	TC	5.0	4.8			
		24	TC	5.3	6.2			
		27	TC	5.1	5.1			
		30	TC	4.9	4.7			
		33	TC	4.8	4.8			
		36	TC	4.7	4.7			
		39	TC	4.6	4.6			
95	552248	00-06	OC	5.0				NAF-169
		00	DS	2.8				Soil
		03	TC	4.0	4.0			
		06	TC	4.1	3.7			DC = 6 inches
		09	TC	4.4	4.8			
		12	TC	4.5	4.3			
		15	TC	4.7	4.7			

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/ 100 cm^2	Comments
95	552248	18	TC	4.9	4.2			
		21	TC	5.5	6.6			
		24	TC	5.5	6.0			
		27	TC	5.2	4.3			
		30	TC	5.4	5.9			
		33	TC	5.3	6.2			
		36	TC	4.7	4.0			
		39	TC	4.5	4.5			
96	591271	00	DS	1.2				Soil
		03	TC	3.4	3.4			
		06	TC	3.7	3.9			DC = 0 inches
		09	TC	3.9	3.9			
		12	TC	4.1	4.1			
		15	TC	4.3	4.3			
		18	TC	4.5	4.3			
		21	TC	4.8	5.2			
		24	TC	4.9	4.5			
		27	TC	5.2	6.1			
		30	TC	5.0	5.5			
		33	TC	4.5	4.0			
		36	TC	4.3	4.3			
97	595255	00-06	OC	6.8				NAF-168
		00	DS	4.8				Soil
		03	TC	5.5	5.5			
		06	TC	6.0	8.8			DC = 6 inches
		06	DS	4.6				
		09	TC	4.9	3.7			
		12	TC	4.5	4.0			
		15	TC	4.4	4.4			
		18	TC	4.3	4.3			
		21	TC	4.2	4.2			
		24	TC	4.1	4.1			
		27	TC	4.0	4.0			
		30	TC	3.9	3.7			
		33	TC	3.9	3.9			
98	646248	00-06	OC	7.2				NAF-167
		00	DS	2.7				Soil
		03	TC	3.8	3.8			Water at 36"
		06	TC	3.9	4.3			DC = 6 inches
		09	TC	3.8	3.6			
		15	TC	3.8	3.6			

Table 1i
Radium Concentrations at Exterior Locations
3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
98	646248	21	TC	3.9	3.2			
		27	TC	4.4	4.8			
		33	TC	4.7	5.8			
		39	TC	4.4	4.4			
99	647257	00	DS	1.2				Soil
		03	TC	2.9	2.9			Water at 27"
		09	TC	3.6	4.0			
		15	TC	4.1	4.5			DC = 0 inches
		21	TC	4.4	4.6			
		27	TC	4.6	4.8			
		33	TC	4.7	5.1			
		39	TC	4.6	4.6			

Measurement Types:
- AS = Alpha Sample
- DH = Downhole Survey
- DS = Delta Scintillometer
- GB = GAD-6 Borehole
- GS = GAD-6 Surface
- OC = Soil Sample by Opp. Crys. Sys.
- RP = Radon Profile
- SS = Soil Sample by Laboratory Analysis
- TC = Total Count Borehole

Notes:
- DC = Depth of Contamination
- [n] = Reading Taken n-Inches Above Floor or Ground
- Date of Survey = 03-21-91
- Team Leader = EC

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
100	111200	00-06	OC	3.3				NAH-149
		00	DS	4.4				Soil
		03	TC	5.5	5.5			Auger refusal
		06	DS	5.4				
		06	TC	6.3	6.8			DC = 0 inches
		09	TC	6.8	7.9			
		12	TC	6.7	8.1			
		18	TC	5.8	4.6			
		24	TC	5.6	5.6			
101	111239	00	DS	2.4				Soil
		03	TC	3.4	3.4			
		06	TC	4.3	4.7			DC = 0 inches
		09	TC	5.0	5.7			
		12	TC	5.3	5.8			
		15	TC	5.3	5.3			
		18	TC	5.3	5.7			
		21	TC	5.1	5.6			
		24	TC	4.6	4.8			
		27	TC	4.0	3.5			
		30	TC	3.7	3.7			
		33	TC	3.4	3.2			
		36	TC	3.2	3.2			
		39	TC	3.0	3.0			
102	127224	00-06	OC	6.5				NAH-150
		00	DS	3.6				Soil
		03	TC	5.4	5.4			
		06	TC	5.9	6.4			DC = 6 inches
		09	TC	6.1	6.8			
		12	TC	5.9	6.4			
		18	TC	5.4	5.6			
		24	TC	4.8	5.3			
		30	TC	3.9	3.0			
		36	TC	3.5	3.5			
103	137239	00-06	OC	5.0				NAG-002
		00	DS	3.2				Soil
		03	TC	4.0	4.0			
		09	TC	5.8	8.5			DC = 6 inches
		15	TC	6.1	7.7			
		21	TC	5.5	5.5			
		27	TC	4.9	5.8			
		33	TC	3.8	2.7			

Table 1j
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
103	137239	39	TC	3.3	3.3			
104	145218	00	DS	1.2				Soil
		03	TC	3.2	3.2			
		06	TC	3.3	2.9			DC = 30 inches
		09	TC	3.6	2.9			
		12	TC	4.3	3.4			
		15	TC	5.5	7.8			
		18	TC	5.4	3.4			
		21	TC	6.4	4.6			
		24	TC	8.4	11.2			
		27	TC	8.8	10.8			
		30	TC	8.1	9.3			
		33	TC	6.7	6.9			
		36	TC	5.2	3.1			
		39	TC	4.9	4.9			
105	148250	00-06	OC	4.9				NAG-661
		00	DS	3.2				Soil
		03	TC	4.3	4.3			
		06	TC	5.4	5.9			DC = 0 inches
		09	TC	6.2	7.1			
		12	TC	6.5	7.4			
		15	TC	6.3	6.3			
		18	TC	6.1	6.6			
		21	TC	5.6	5.1			
		24	TC	5.4	6.5			
		27	TC	4.6	4.1			
		30	TC	4.1	3.9			
		33	TC	3.7	4.1			
		36	TC	3.1	2.0			
		39	TC	3.1	3.1			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

Table 1k
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
106	700193	00-06	OC	2.4				NAG-001; background
		00	DS	1.0				
		03	TC	3.5	3.5			Water at 33"
		09	TC	4.5	6.3			
		15	TC	4.5	5.7			DC = 0 inches
		21	TC	3.8	3.6			
		27	TC	3.2	2.5			
		33	TC	3.0	3.0			
		39	TC	2.8	2.8			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

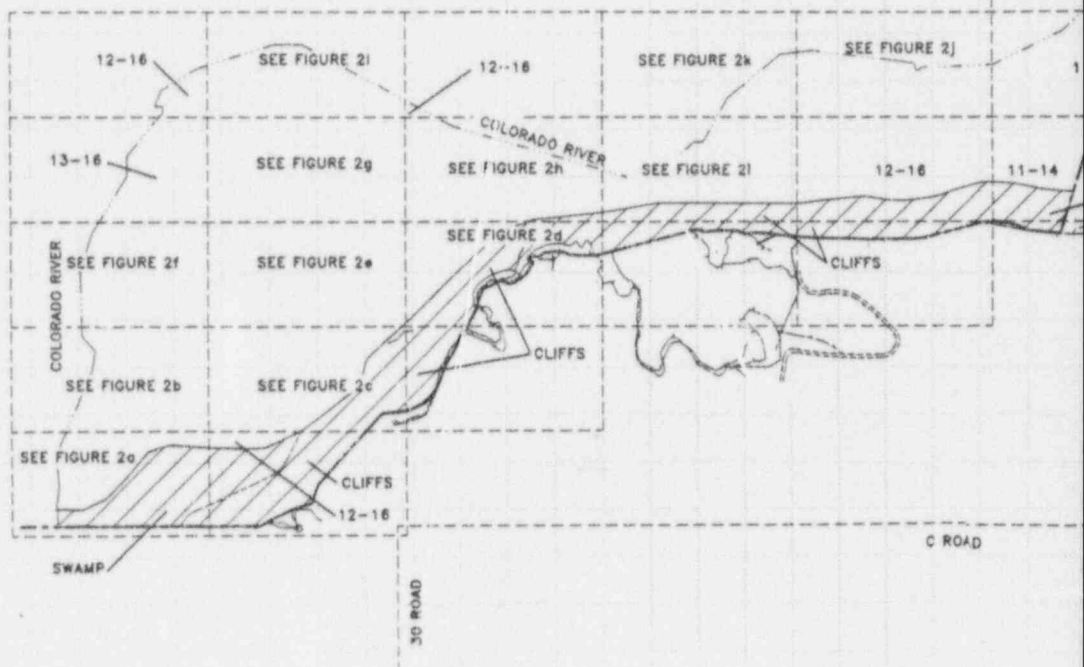
Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC

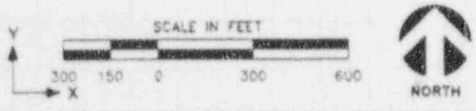
Table 11
Radium Concentrations at Exterior Locations
DOE ID #GJ-45271-VL 3012 C Road (River Bluff)

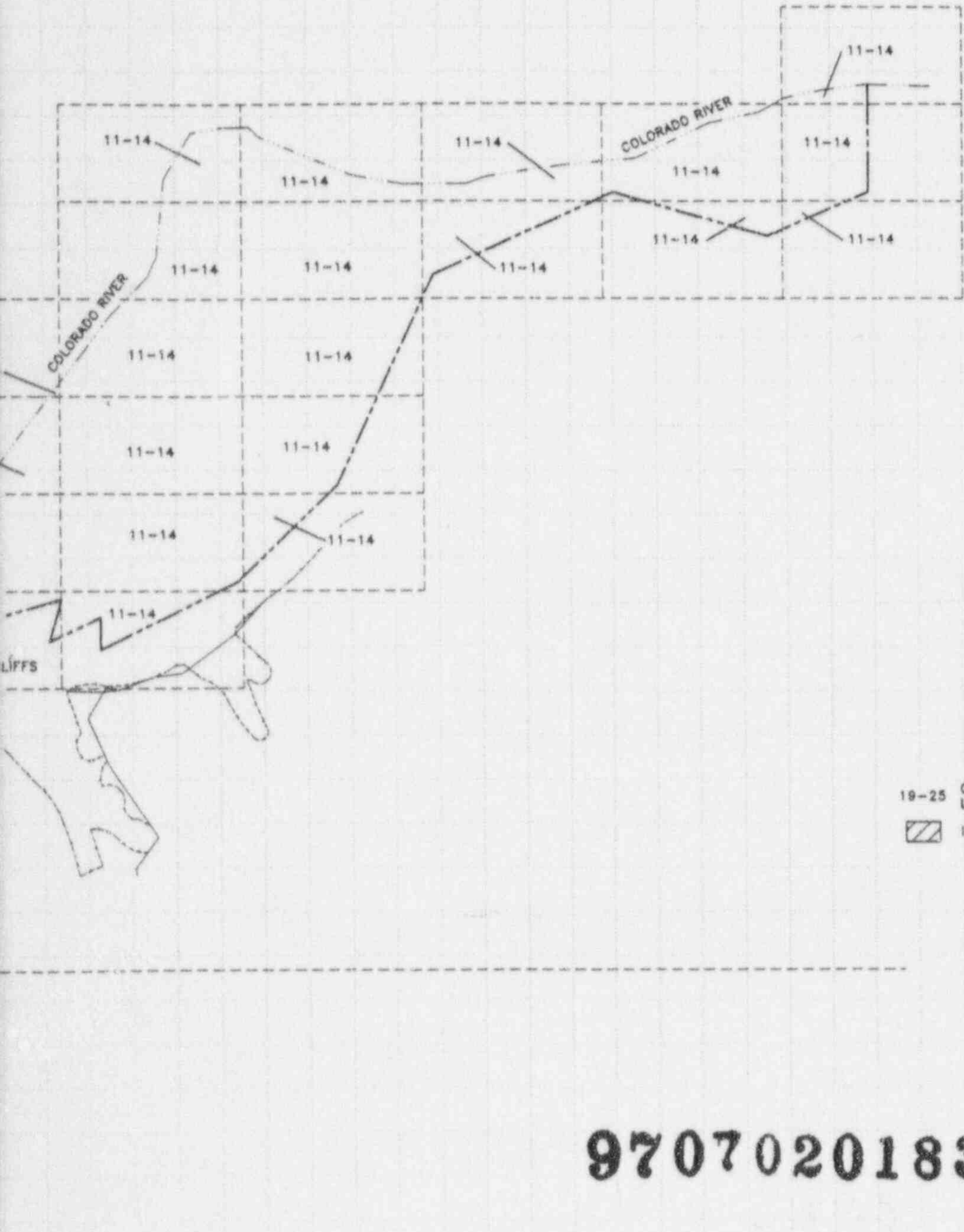
Loc #	Grid Location	Depth (in.)	Meas. Type	Ra-226 (pCi/g) Non-Deconv.	Ra-226 (pCi/g) Deconv.	RDC Working Level	Alpha dpm/100 cm^2	Comments
107	577190	00-06	OC	2.6				NAH-146
		00	DS	3.8				Soil
		03	TC	4.1	4.1			
		06	TC	5.0	5.7			DC = 0 inches
		09	TC	5.5	5.7			
		12	TC	5.9	6.1			
		15	TC	6.2	6.6			
		18	TC	6.3	6.3			
		21	TC	6.4	6.0			
		24	TC	6.7	7.1			
		27	TC	6.8	7.2			
		30	TC	6.7	6.7			
108	580210	00	DS	2.3				Soil
		03	TC	3.7	3.7			Auger refusal
		06	TC	4.4	6.4			
		09	TC	4.0	3.1			DC = 0 inches
		12	TC	4.1	3.9			
		15	TC	4.3	4.8			
		18	TC	4.2	4.2			
		21	TC	4.1	4.1			
		24	TC	4.0	4.0			
		27	TC	3.9	3.9			

Measurement Types:
AS = Alpha Sample
DH = Downhole Survey
DS = Delta Scintillometer
GB = GAD-6 Borehole
GS = GAD-6 Surface
OC = Soil Sample by Opp. Crys. Sys.
RP = Radon Profile
SS = Soil Sample by Laboratory Analysis
TC = Total Count Borehole

Notes:
DC = Depth of Contamination
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-21-91
Team Leader = EC


12-16
SEE FIGURE 2i
12--16
SEE FIGURE 2k
SEE FIGURE 2j
COLORADO RIVER
13-16
SEE FIGURE 2g
SEE FIGURE 2h
SEE FIGURE 2i
12-16
11-14
SEE FIGURE 2d
SEE FIGURE 2f
SEE FIGURE 2e
CLIFFS
COLORADO RIVER
CLIFFS
SEE FIGURE 2b
SEE FIGURE 2c
SEE FIGURE 2a
CLIFFS
12-16
SWAMP
C ROAD
30 ROAD


SCALE IN FEET
300 150 0 300 600
Y
X
NORTH



ANSTEC APERTURE CARD

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LEGEND

19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h

▨ INACCESSIBLE (SWAMP/CLIFFS)

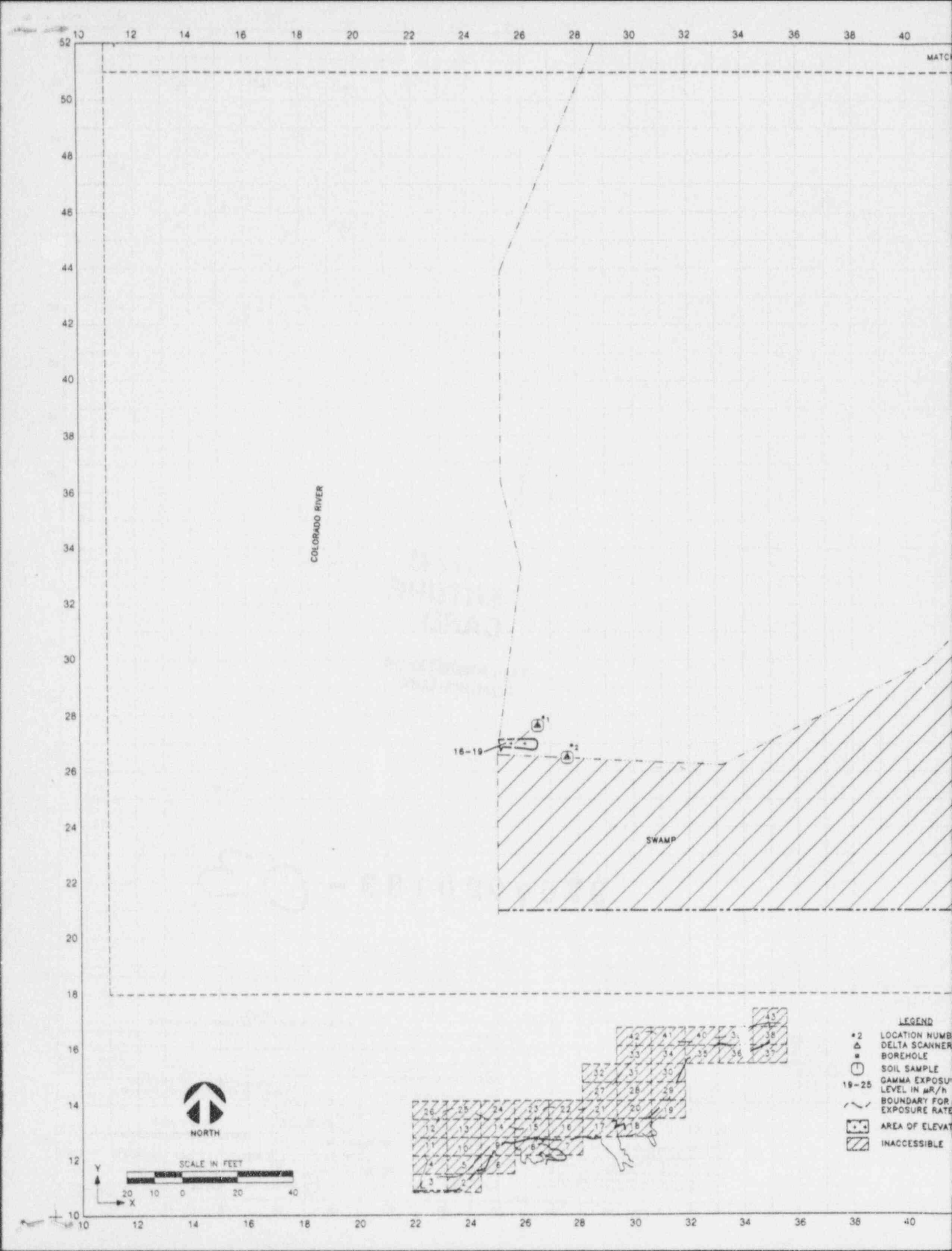
9707020183-01

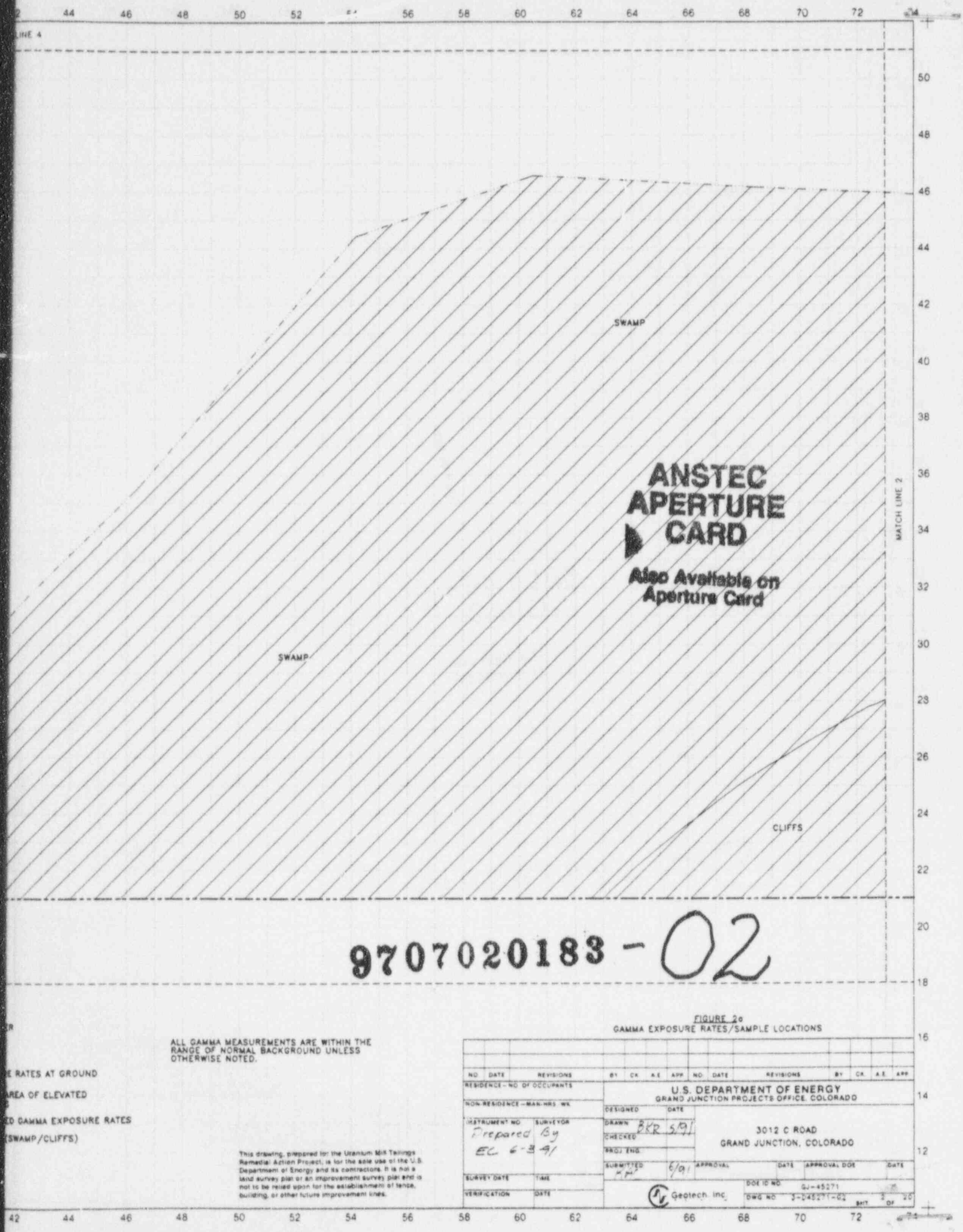
FIGURE 1
GAMMA EXPOSURE RATES

This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

NO.	DATE	REVISIONS	BY	CK	A.E.	APP	NO.	DATE	REVISIONS	BY	CK	A.E.	APP

RESIDENCE—NO. OF OCCUPANTS		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECTS OFFICE, COLORADO		
NON-RESIDENCE—MAN-HRS. WK.		DESIGNED	DATE	
INSTRUMENT NO.	SURVEYOR	DRAWN BKR	5/91	3012 C ROAD GRAND JUNCTION, COLORADO
Prepared By EC 6-3-91		CHECKED		
		PROJ. ENG.		
		SUBMITTED KKC	6-91	APPROVAL / DATE / APPROVAL DOE / DATE
SURVEY DATE	TIME	Geotech, Inc.		DOE ID NO. GJ-45271
VERIFICATION	DATE			DWG. NO. 3-045271-01 SHT 1 OF 20


MATCH
COLORADO RIVER
SWAMP
16-19
*1
*2
NORTH
SCALE IN FEET
20 10 0 20 40
Y
X
LEGEND
*2 LOCATION NUMB
DELTA SCANNER
BOREHOLE
SOIL SAMPLE
19-25 GAMMA EXPOSU LEVEL IN μR/h
BOUNDARY FOR EXPOSURE RATE
AREA OF ELEVAT
INACCESSIBLE



9707020183 - 02

FIGURE 20
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

E RATES AT GROUND
AREA OF ELEVATED
ED GAMMA EXPOSURE RATES
(SWAMP/CLIFFS)

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NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.	NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.

RESIDENCE – NO. OF OCCUPANTS
NON-RESIDENCE – MAN-HRS. WK.
INSTRUMENT NO. SURVEYOR
Prepared By
EC 6-3-91
SURVEY DATE TIME
VERIFICATION DATE

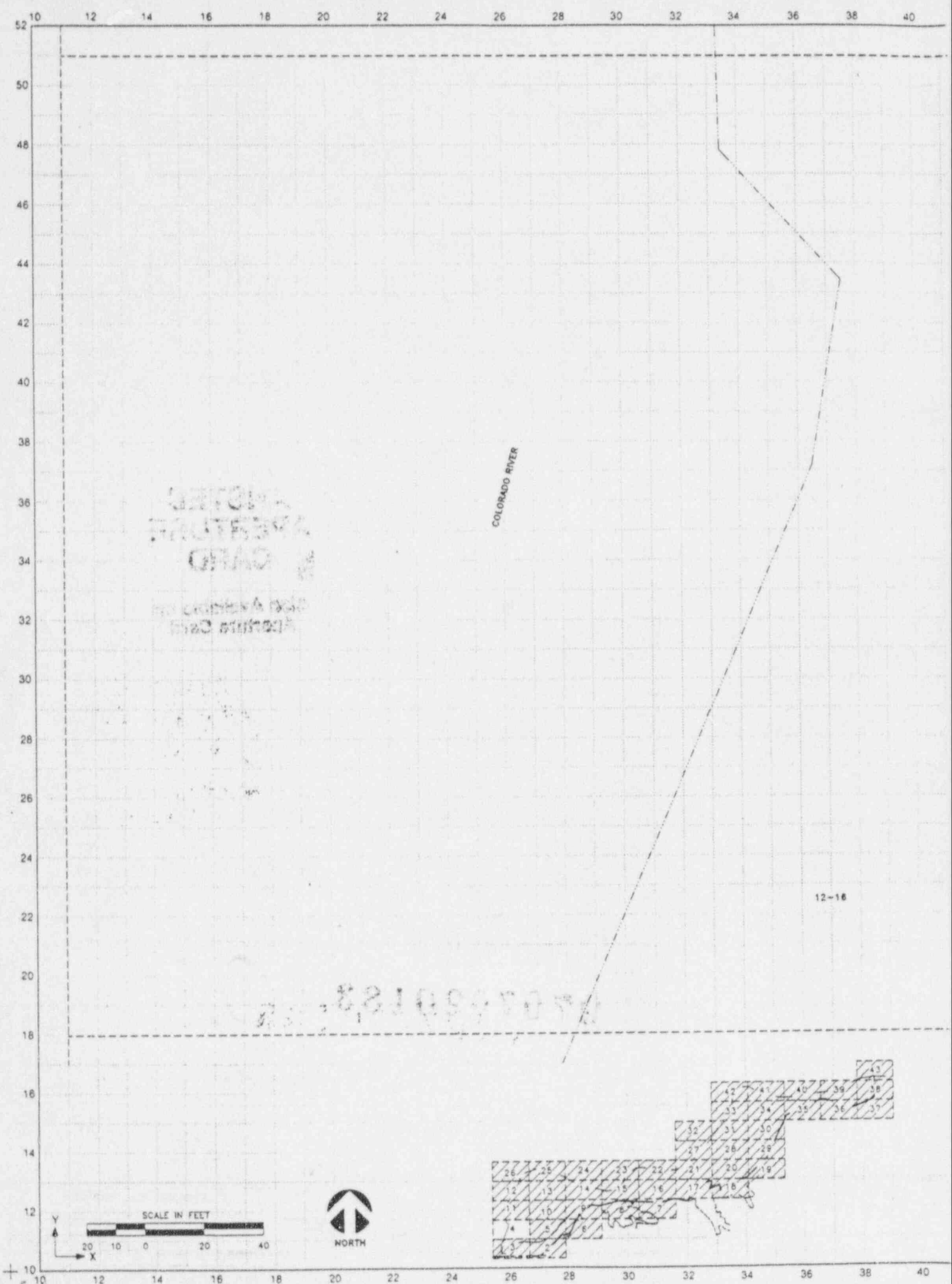
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

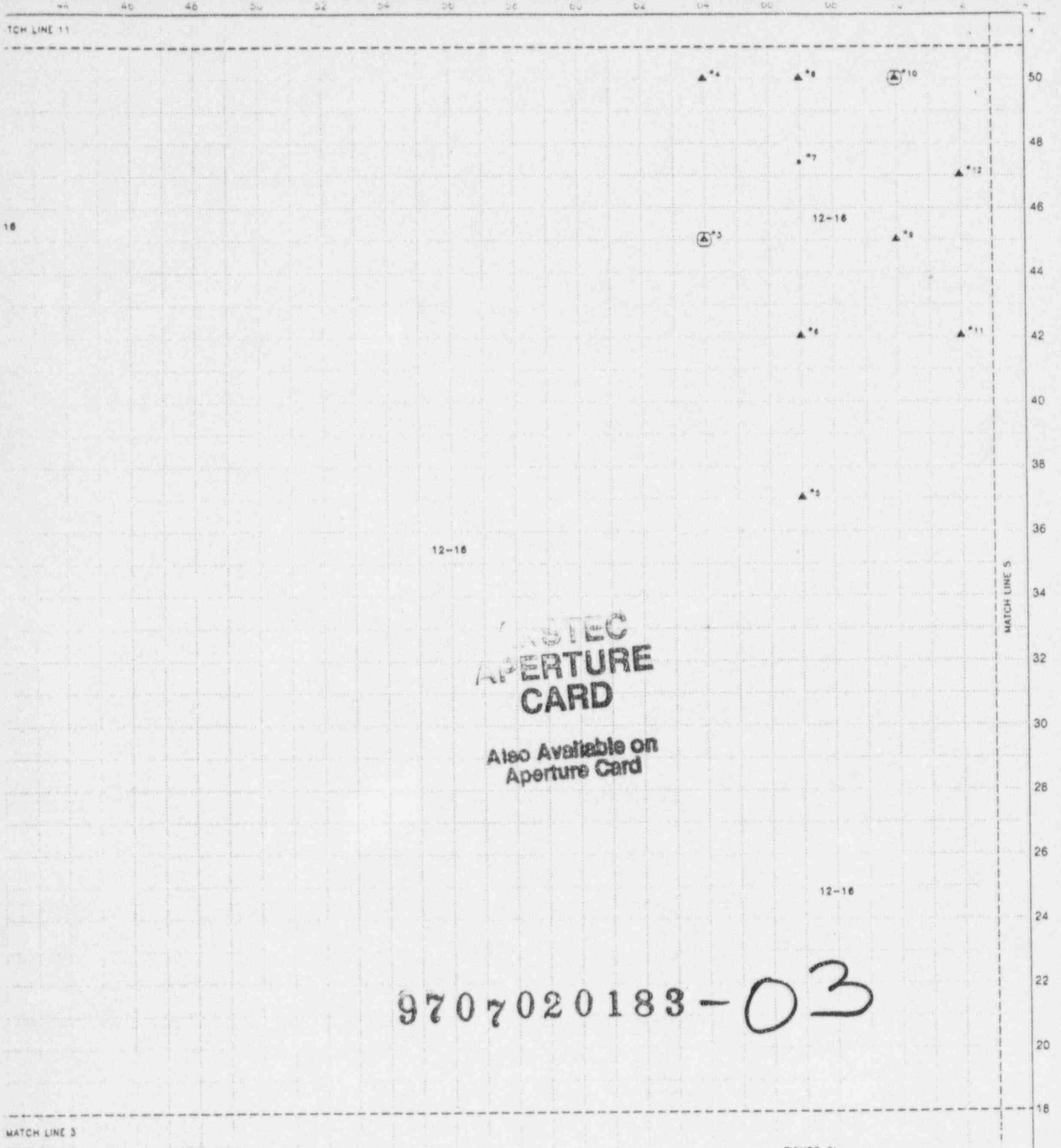
DESIGNED DATE
DRAWN BKR 5/91
CHECKED
PROJ. ENG.
SUBMITTED 6/91
APPROVAL DATE APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

DOE ID NO. GJ-45271
DWG NO. 3-045271-02 SHT. 3 OF 20

Geotech, Inc.


COLORADO RIVER
12-16
SCALE IN FEET
20 10 0 20 40
NORTH



9707020183-03

FIGURE 2b
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- * BOREHOLE
- (1) SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h

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NO	DATE	REVISIONS	BY	CK	A.E.	APP

RESIDENCE—NO. OF OCCUPANTS

NON-RESIDENCE—MAN-HRS. WK

INSTRUMENT NO. | SURVEYOR: Prepared By EC 6-3-91

SURVEY DATE | TIME

VERIFICATION | DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED | DATE

DRAWN BKR 5/91

CHECKED

PROJ. ENG.

SUBMITTED KAC 6/91 | APPROVAL | DATE

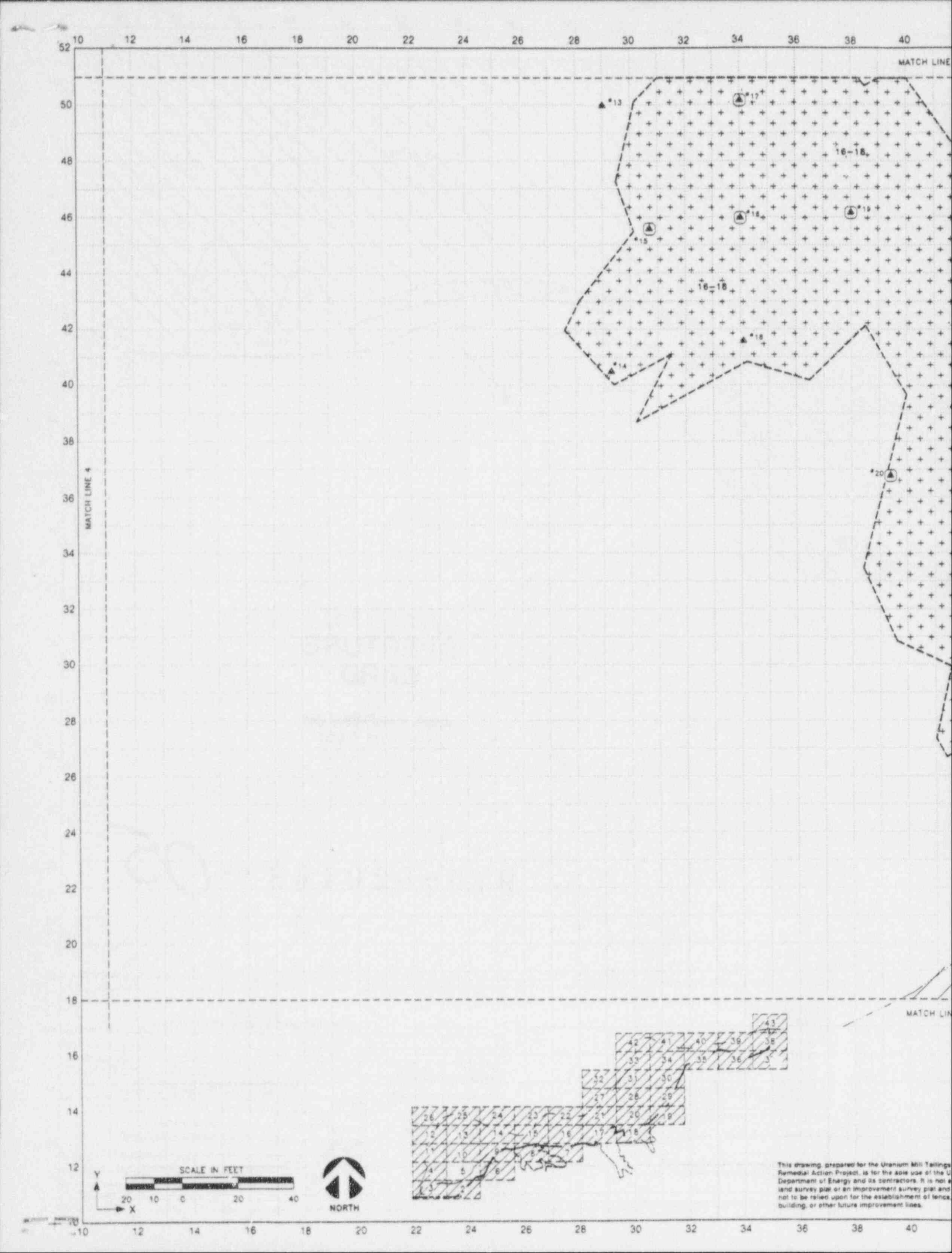
3012 C ROAD
GRAND JUNCTION, COLORADO

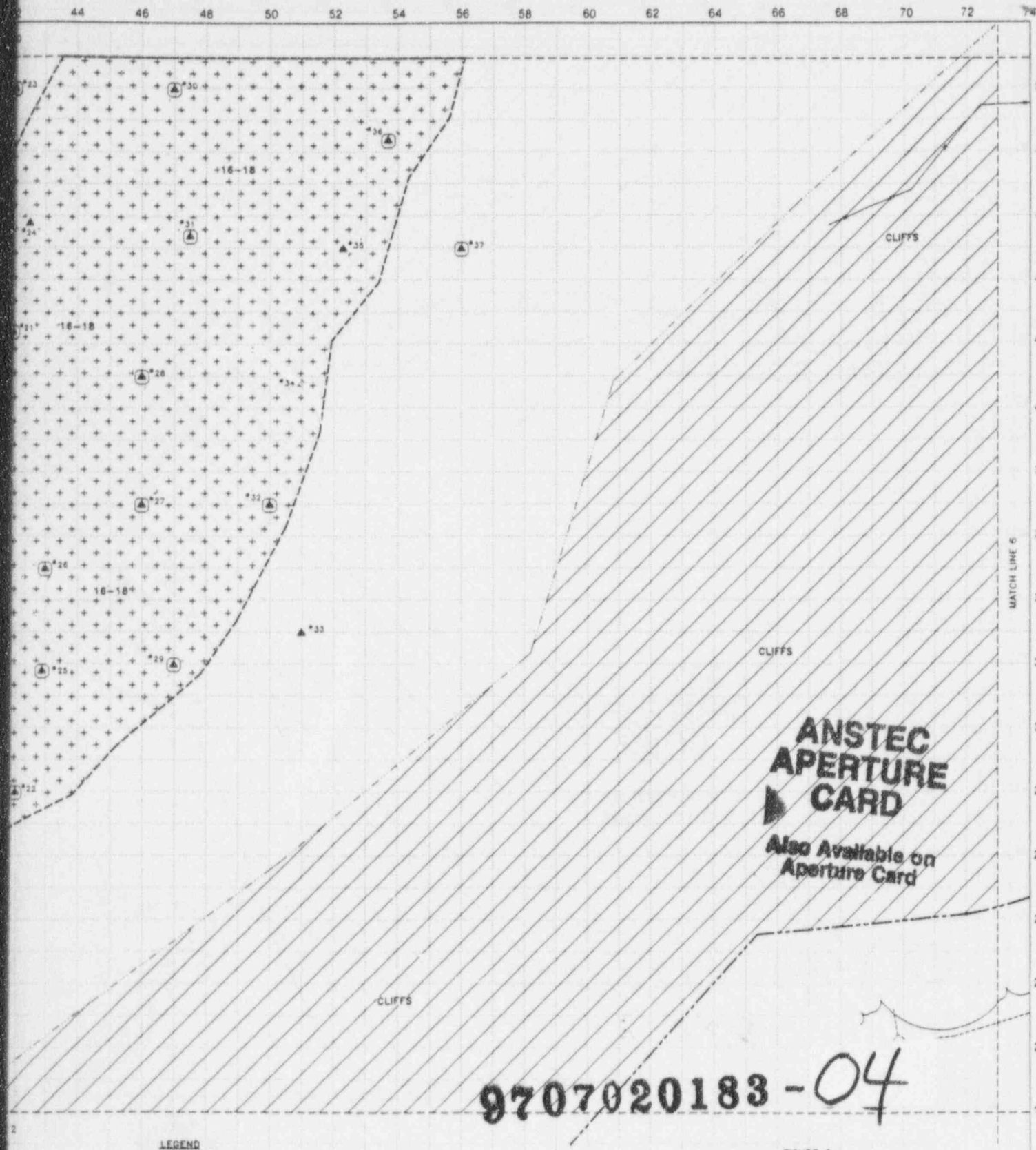
APPROVAL DOE | DATE

Geotech. Inc.

DOE ID NO GJ-45271

DWG NO 3-045271-03 SHT 3 OF 20


MATCH LINE
MATCH LINE 4
MATCH LIN
16-18
16-18
SCALE IN FEET
20 10 0 20 40
NORTH
This drawing, prepared for the Uranium Mill Tailings
Remedial Action Project, is for the sole use of the U
Department of Energy and its contractors. It is not a
land survey plat or an improvement survey plat and
not to be relied upon for the establishment of fence,
building, or other future improvement lines.



9707020183-04

LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- ▪ BOREHOLE
- SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES
- INACCESSIBLE (CLIFFS)

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 2c
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A.E.	APP.	NO.	DATE	REVISIONS	BY	CK	A.E.	APP.

RESIDENCE—NO. OF OCCUPANTS
NON-RESIDENCE—MAN HRS. WK

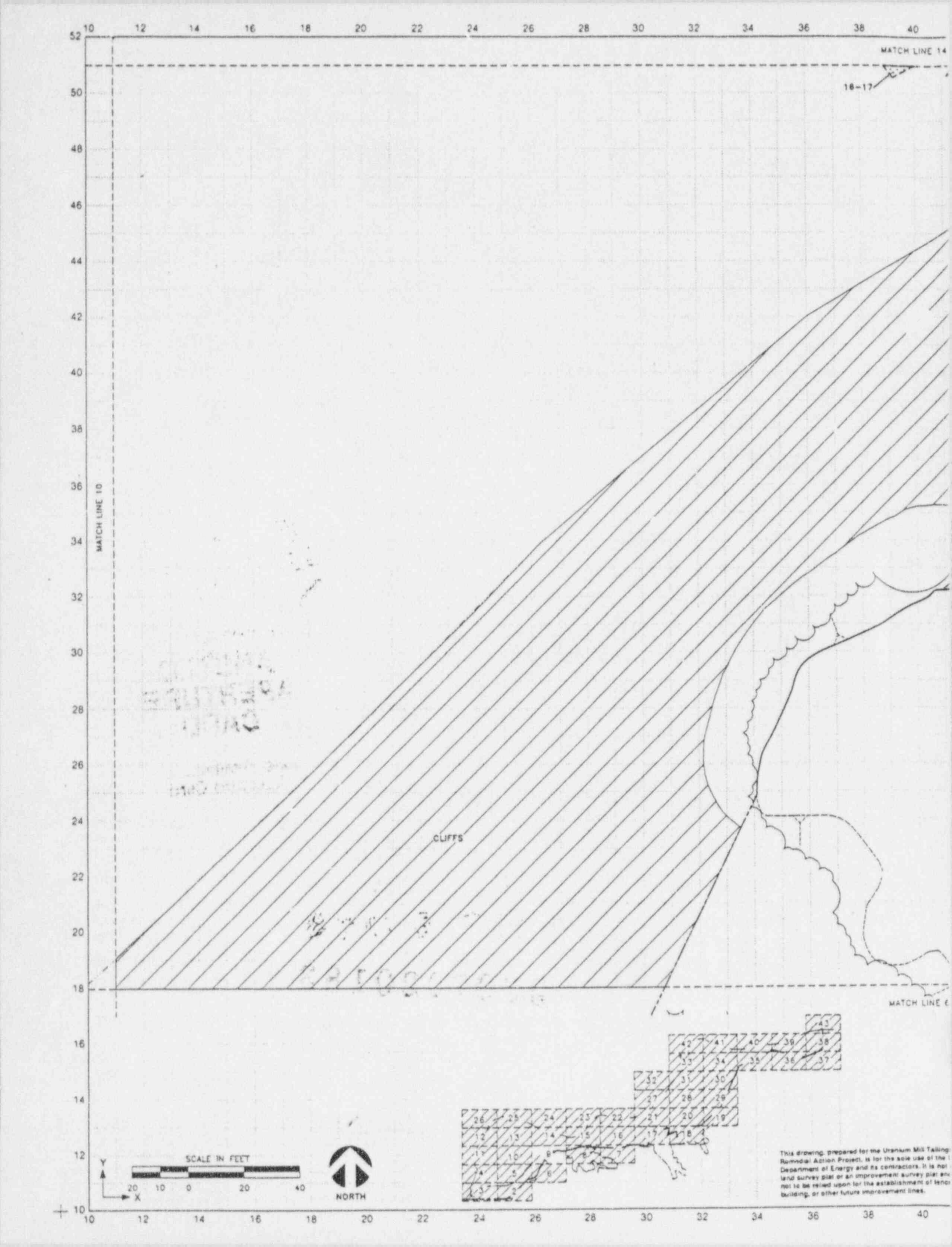
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

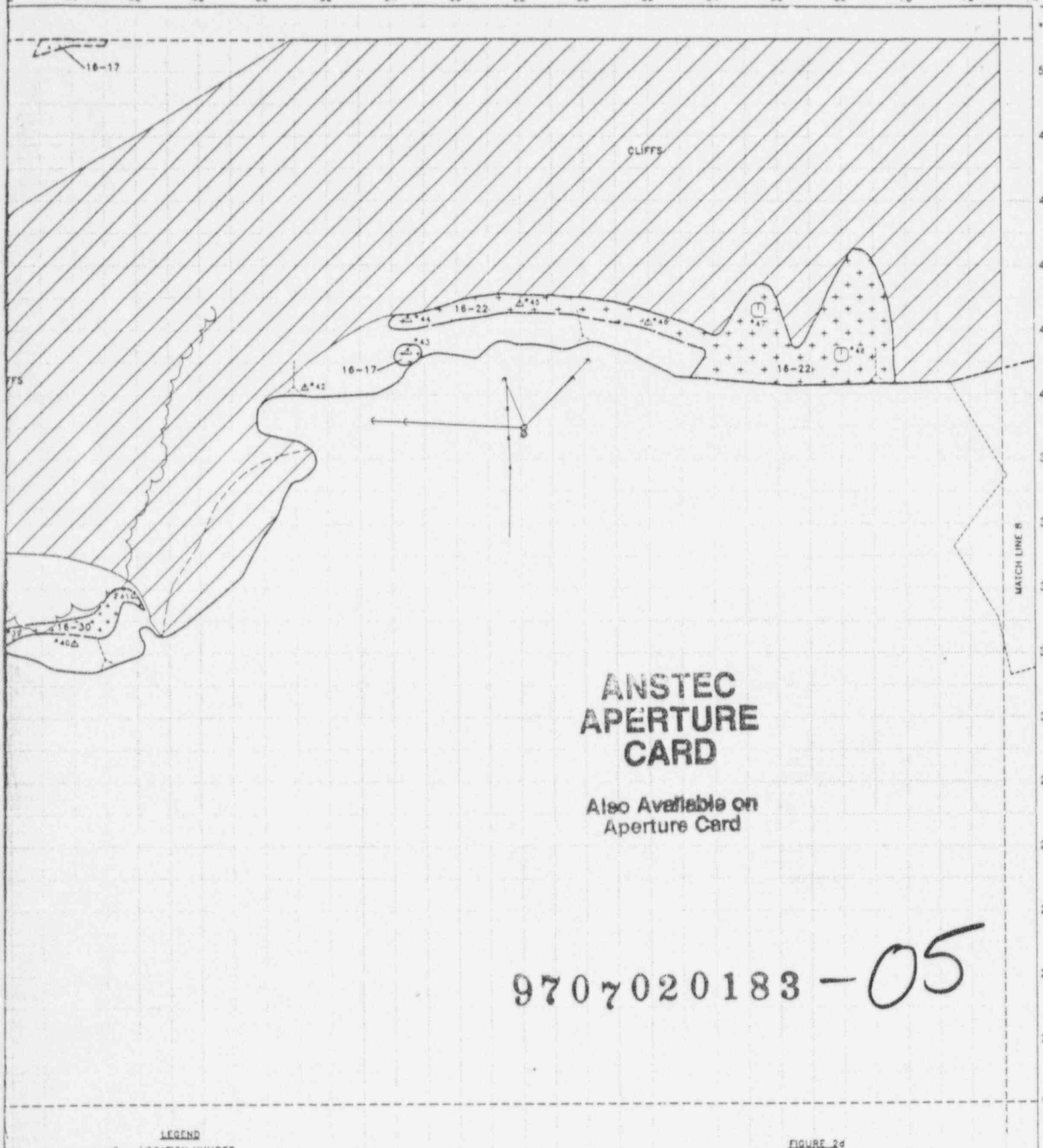
DESIGNED | DATE
DRAWN BKR 6/91
CHECKED
PROJ. ENG.
SUBMITTED KPH 6/91 | APPROVAL | DATE | APPROVAL DOE | DATE

INSTRUMENT NO. | SURVEYOR
Prepared By EC 6-12-91
SURVEY DATE | TIME
VERIFICATION | DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech Inc
DOE ID NO. GJ-45271
DWG NO. 3-045271-G4 SHT 4 OF 24


MATCH LINE 14
MATCH LINE 10
CLIFFS
MATCH LINE 6
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH
This drawing, prepared for the Uranium Mill Tailing
Remedial Action Project, is for the sole use of the
Department of Energy and its contractors. It is not
land survey plat or an improvement survey plat and
not to be relied upon for the establishment of fence
building, or other future improvement lines.



LEGEND

- *2 LOCATION NUMBER
- Δ DELTA SCANNER
- x BOREHOLE
- SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES
- INACCESSIBLE (CLIFFS)

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 2d
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO	DATE	REVISIONS	BY	CK	A E	APP

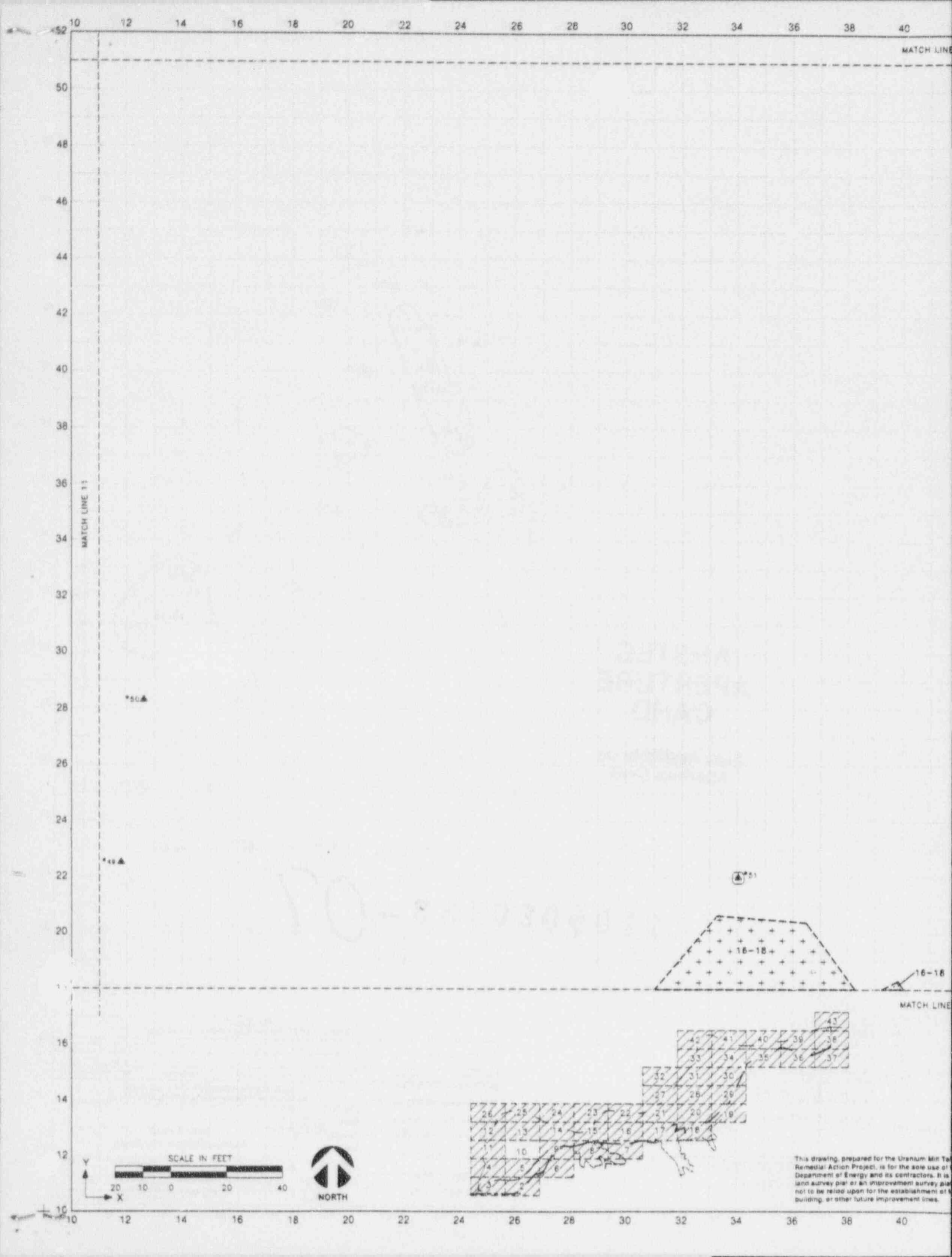
RESIDENCE – NO OF OCCUPANTS
NON RESIDENCE – MAN-HRS / WK
INSTRUMENT NO | SURVEYOR
Prepared By EC 6-3-91
SURVEY DATE | TIME
VERIFICATION | DATE

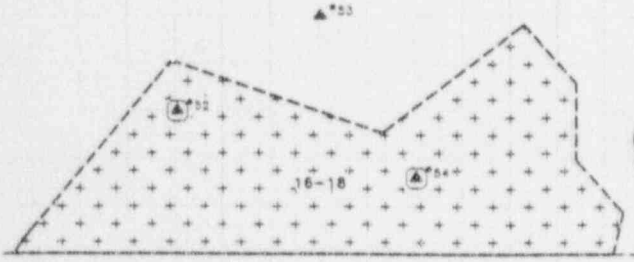
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED | DATE
DRAWN BKR 5/91
CHECKED
PROJ ENG
SUBMITTED KAL 6/9/91 | APPROVAL | DATE | APPROVAL DOE | DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc.
DOE ID NO GJ-45271
DWG NO 3-045271-05 SHT 5 OF 20


MATCH LINE
MATCH LINE 11
*50
*49
*51
16-18
16-18
MATCH LINE
SCALE IN FEET
20 10 0 20 40
X
Y
NORTH
This drawing, prepared for the Uranium Mill Tai
Remedial Action Project, is for the sole use of t
Department of Energy and its contractors. It is
land survey plat or an improvement survey plat
not to be relied upon for the establishment of f
building, or other future improvement lines.



MATCH LINE 9

LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- ⊕ BOREHOLE
- SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES
- INACCESSIBLE (CLIFFS)

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 7
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO	DATE	REVISIONS	BY	CK	A.E	APP

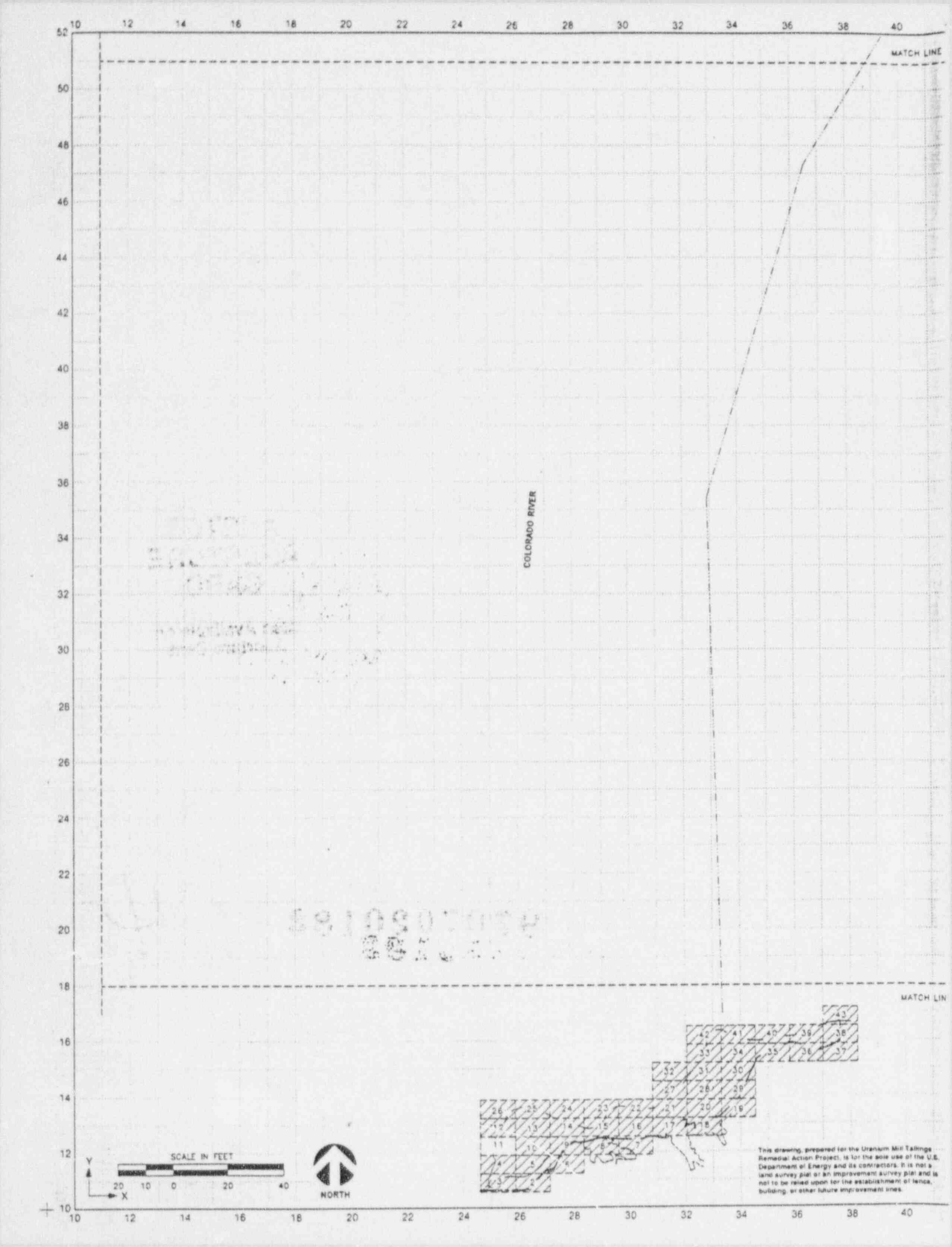
RESIDENCE—NO. OF OCCUPANTS
NON-RESIDENCE—MAN-HRS. WK.
INSTRUMENT NO. SURVEYOR: Prepared By EC 6-3-97
SURVEY DATE TIME
VERIFICATION DATE

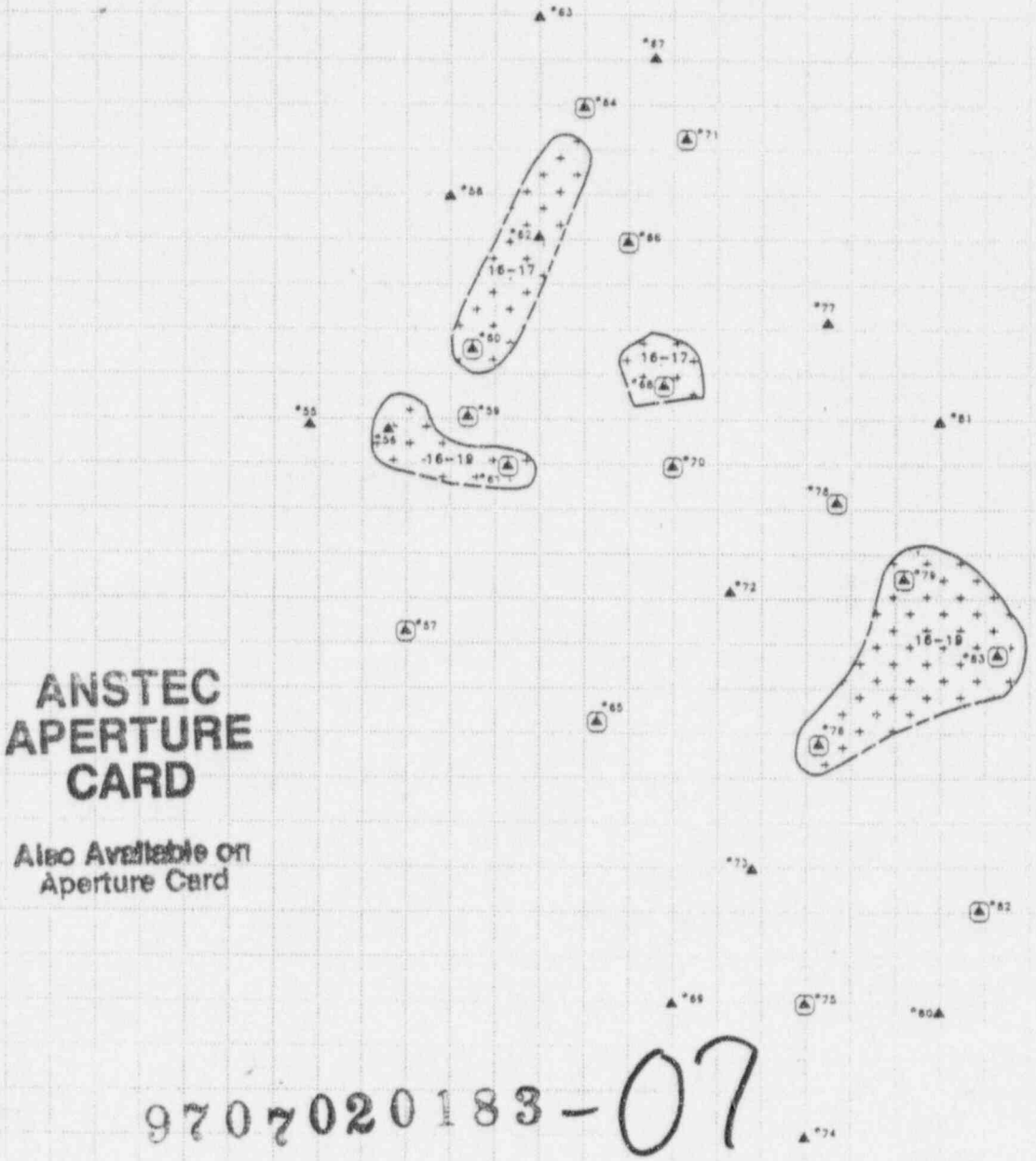
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 5/97
CHECKED
PROJ. ENG.
SUBMITTED KAC 6/97 APPROVAL DATE APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc.
DOE ID NO GJ-45271
DWG NO S-045271-06 SHT 8 OF 20


MATCH LINE
COLORADO RIVER
MATCH LIN
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.



9707020183-07

LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- * BOREHOLE
- (1) SOIL SAMPLE
- 16-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 21
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A E	APP

RESIDENCE – NO OF OCCUPANTS

NON-RESIDENCE – MAN HRS / WK

INSTRUMENT NO. | SURVEYOR

Prepared By EC 6-12-91

SURVEY DATE | TIME

VERIFICATION | DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED | DATE

DRAWN BKR 6/91

CHECKED

PROJ. ENG.

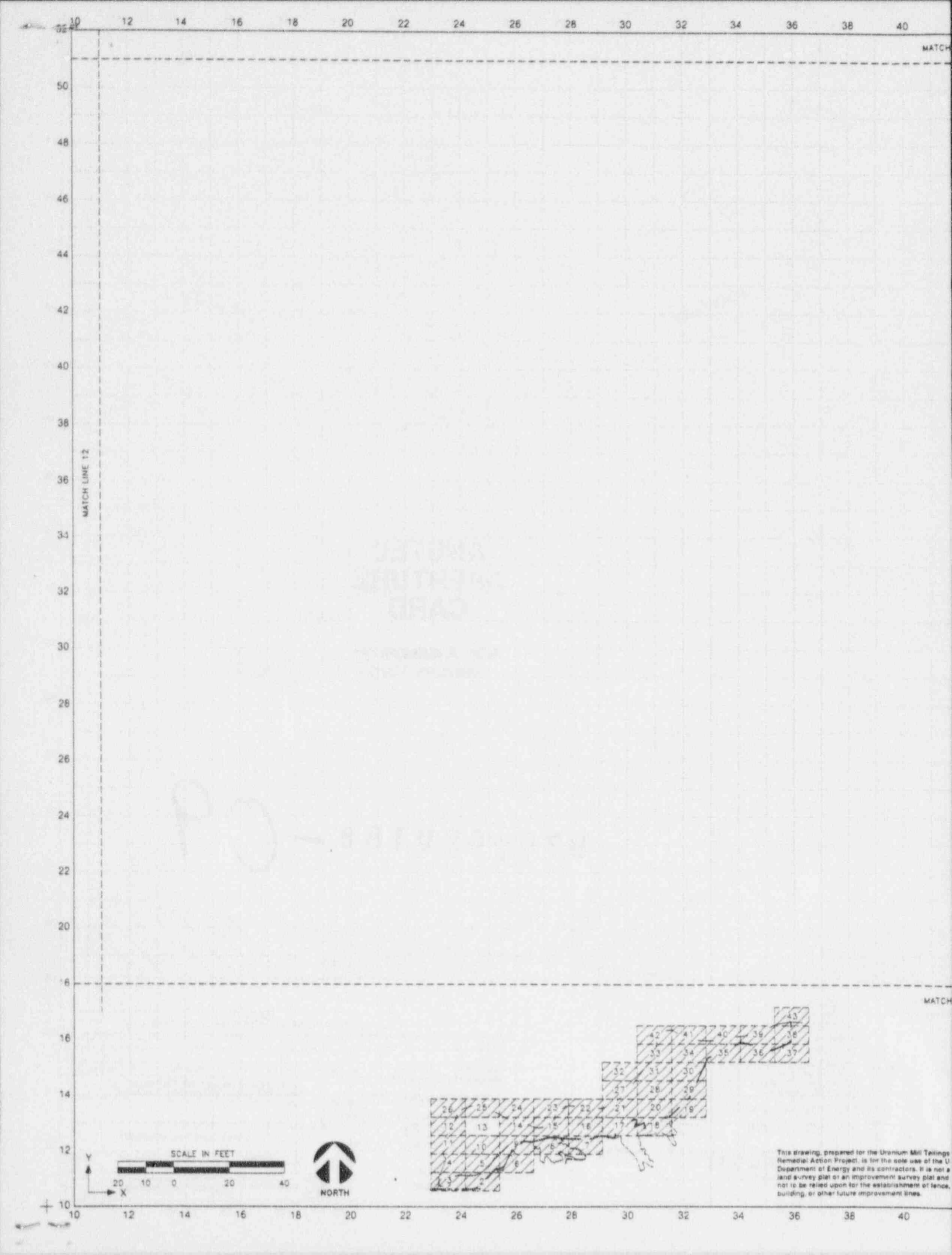
SUBMITTED EAC 6/91 | APPROVAL | DATE | APPROVAL DOE | DATE

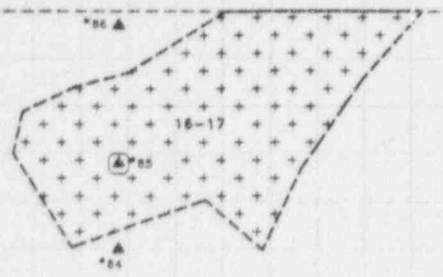
3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc.

DOE ID NO. GJ-45271

DWG NO. 3-D45271-G7 SHT 7 OF 20


MATCH LINE 12
MATCH
MATCH
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and not to be relied upon for the establishment of fence, building, or other future improvement lines.



LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- x BOREHOLE
- ⓘ SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 29
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A.E	APP

RESIDENCE—NO. OF OCCUPANTS

NON-RESIDENCE—MAN-HRS. WK

INSTRUMENT NO. SURVEYOR: Prepared By EC 6-8-91

SURVEY DATE TIME

VERIFICATION DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE

DRAWN BKR 5/91

CHECKED

PROJ. ENG.

SUBMITTED KAC 6/91 APPROVAL DATE

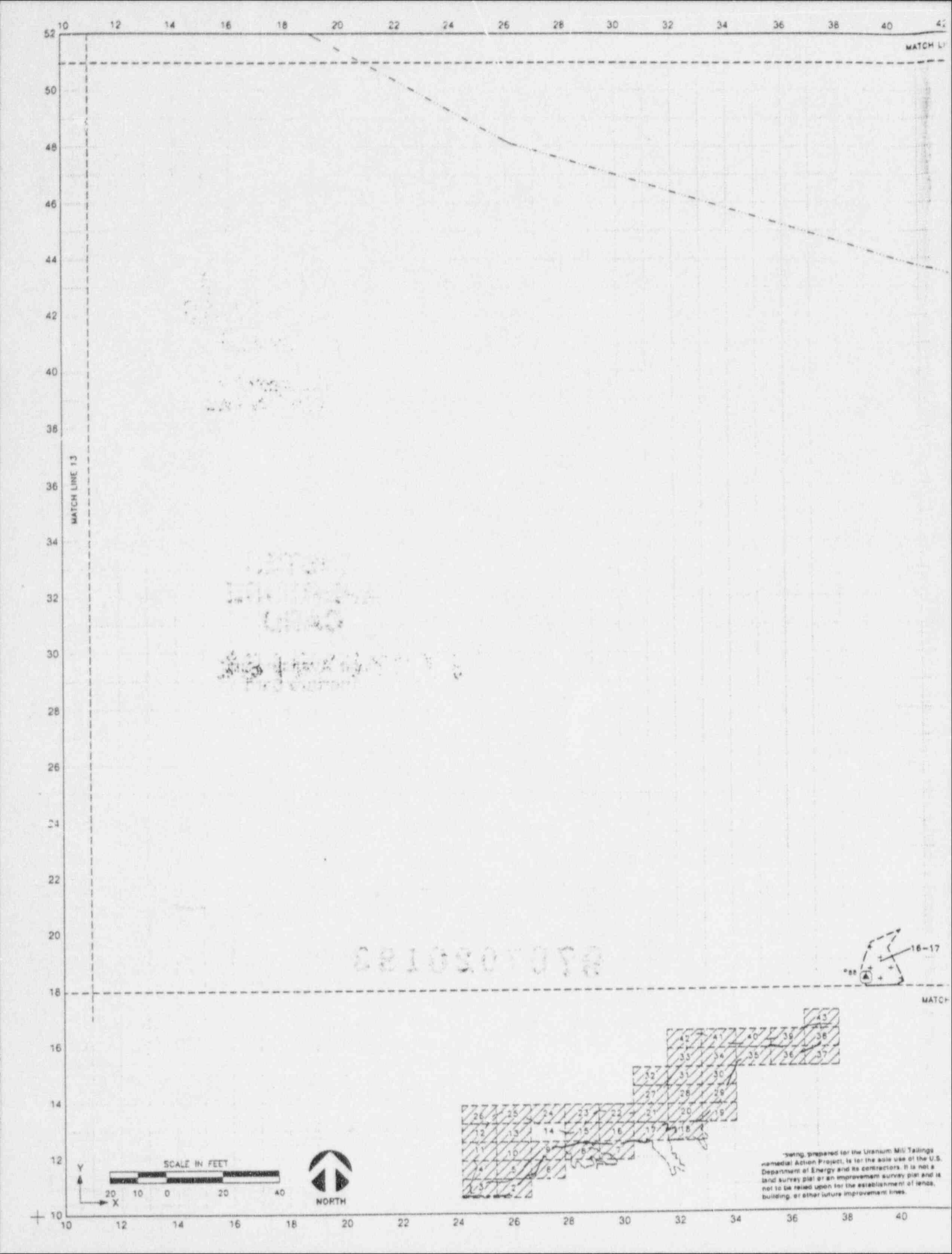
APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc

DOE ID NO. GJ-45271

DWG NO. S-04527I-08 SHT 8 OF 20



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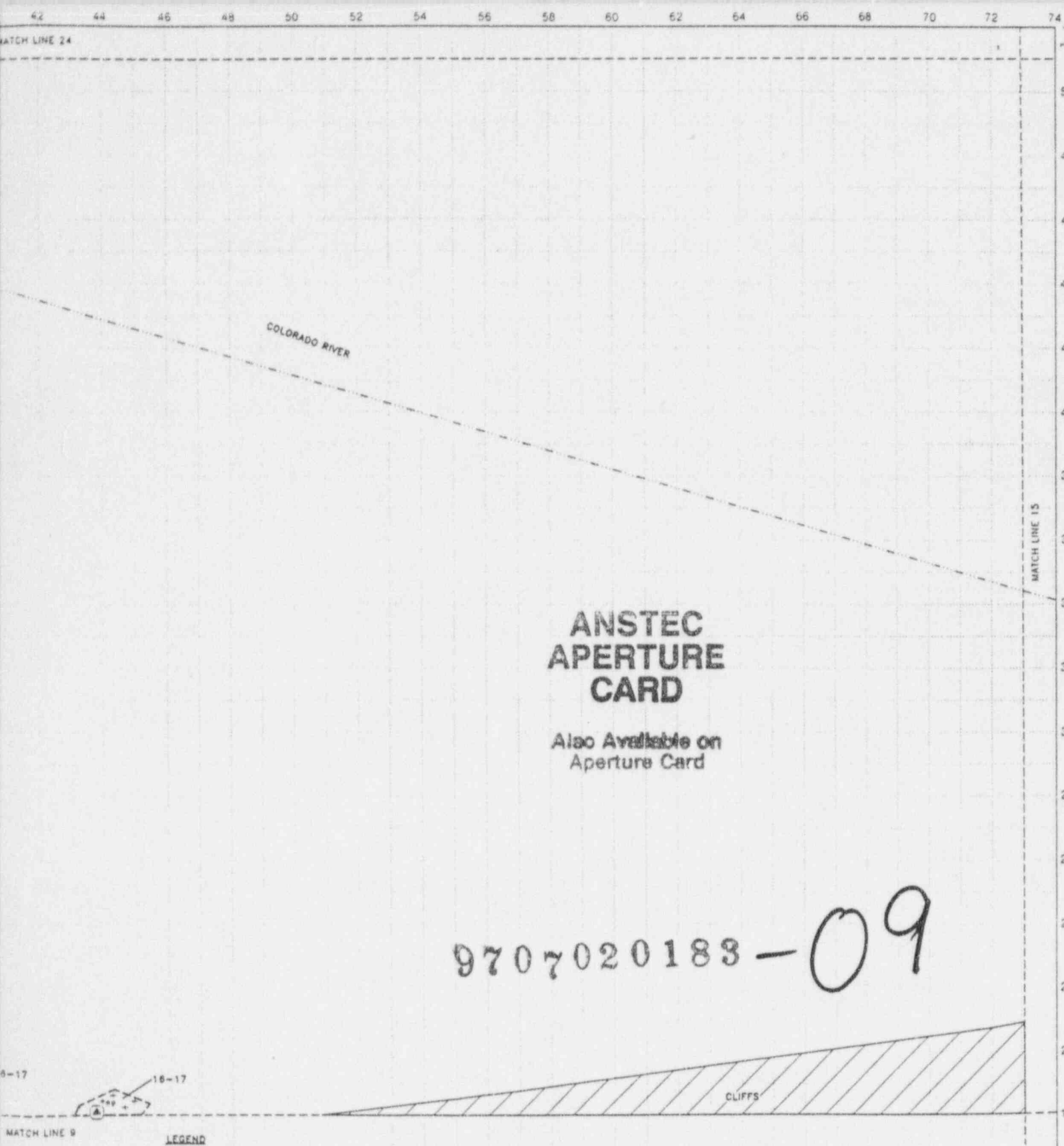


9707020183-09

LEGEND

- #2 LOCATION NUMBER
- △ DELTA SCANNER
- ⊕ BOREHOLE
- SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES
- INACCESSIBLE (CLIFFS)

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 2h
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A.E	APP

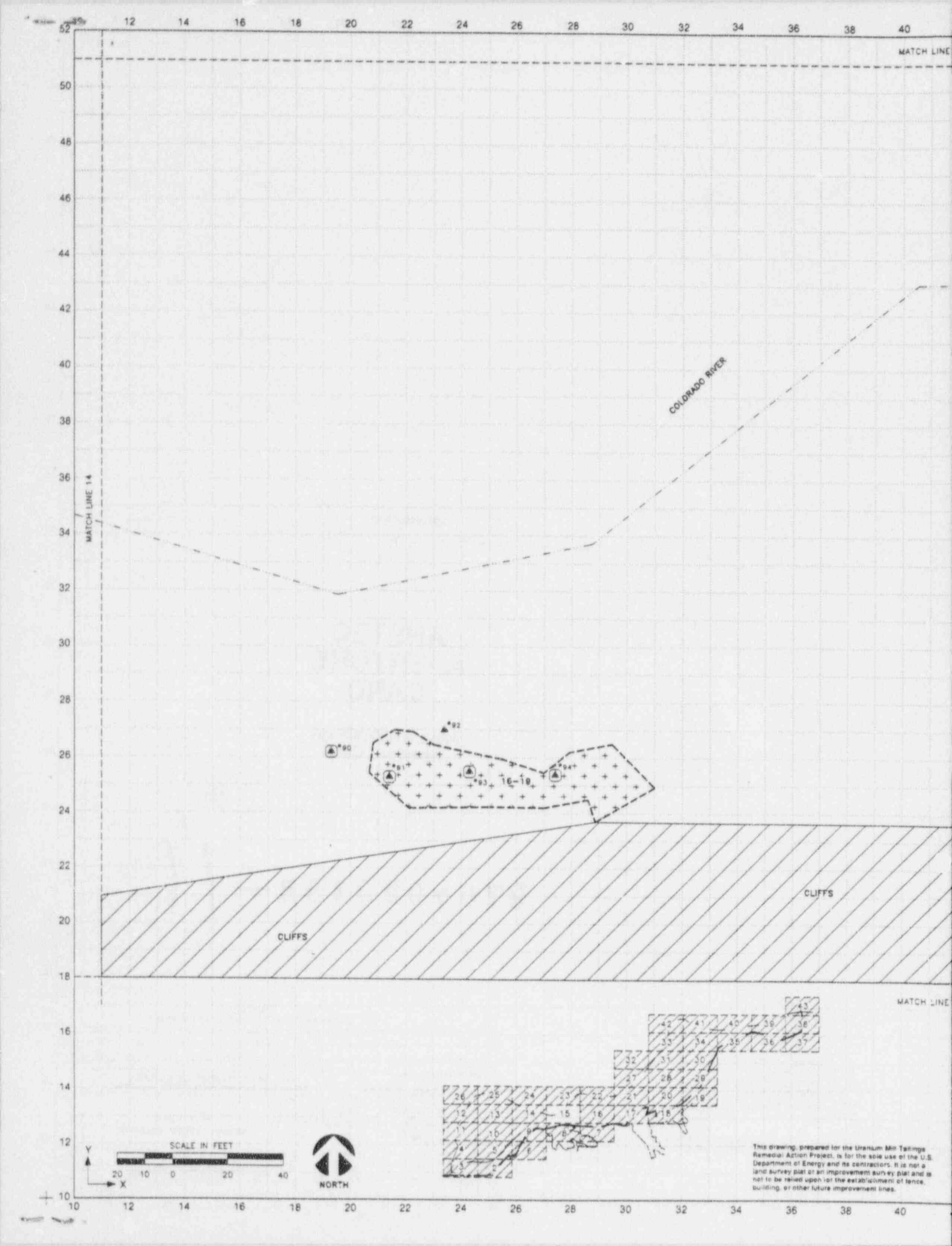
RESIDENCE—NO. OF OCCUPANTS
NON-RESIDENCE—MAN-HRS. WK
INSTRUMENT NO. SURVEYOR
Prepared By
EC 6-3-91
SURVEY DATE TIME
VERIFICATION DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKP 5/91
CHECKED
REQ. ENG.
SUBMITTED 6/91
APPROVAL DATE
APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech Inc
DOE ID NO GJ-45271
DWG NO 3-045271-08
SHT 8 OF 20


MATCH LINE
MATCH LINE 14
COLORADO RIVER
CLIFFS
CLIFFS
16-18
SCALE IN FEET
20 10 0 20 40
NORTH
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LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- ▪ BOREHOLE
- SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES
- INACCESSIBLE (CLIFFS)

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 21
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A.E.	APP.	NO.	DATE	REVISIONS	BY	CK	A.E.	APP.

RESIDENCE—NO. OF OCCUPANTS
NON-RESIDENCE—MAN-HRS. WK.
INSTRUMENT NO. SURVEYOR: Prepared By EC 6-12-91
SURVEY DATE TIME
VERIFICATION DATE

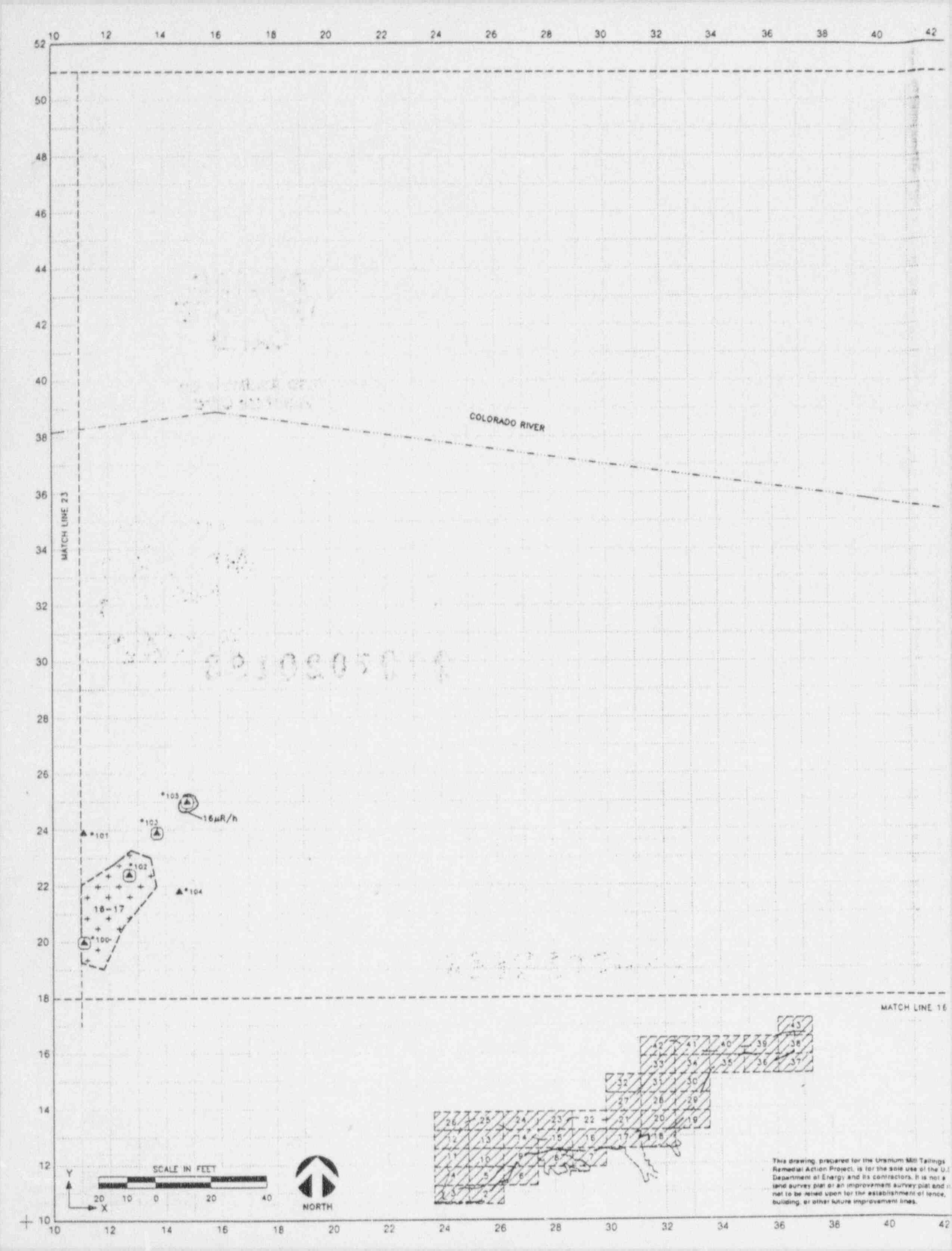
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 6/91
CHECKED
PROJ. ENG.
SUBMITTED KAR 6/91 APPROVAL DATE APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc.

DOE ID NO. GJ-45271
DWG NO. 3-045271-010 SHT 10 OF 20


COLORADO RIVER
MATCH LINE 23
MATCH LINE 16
*103
16μR/h
*101
*102
*104
*100
18-17
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH
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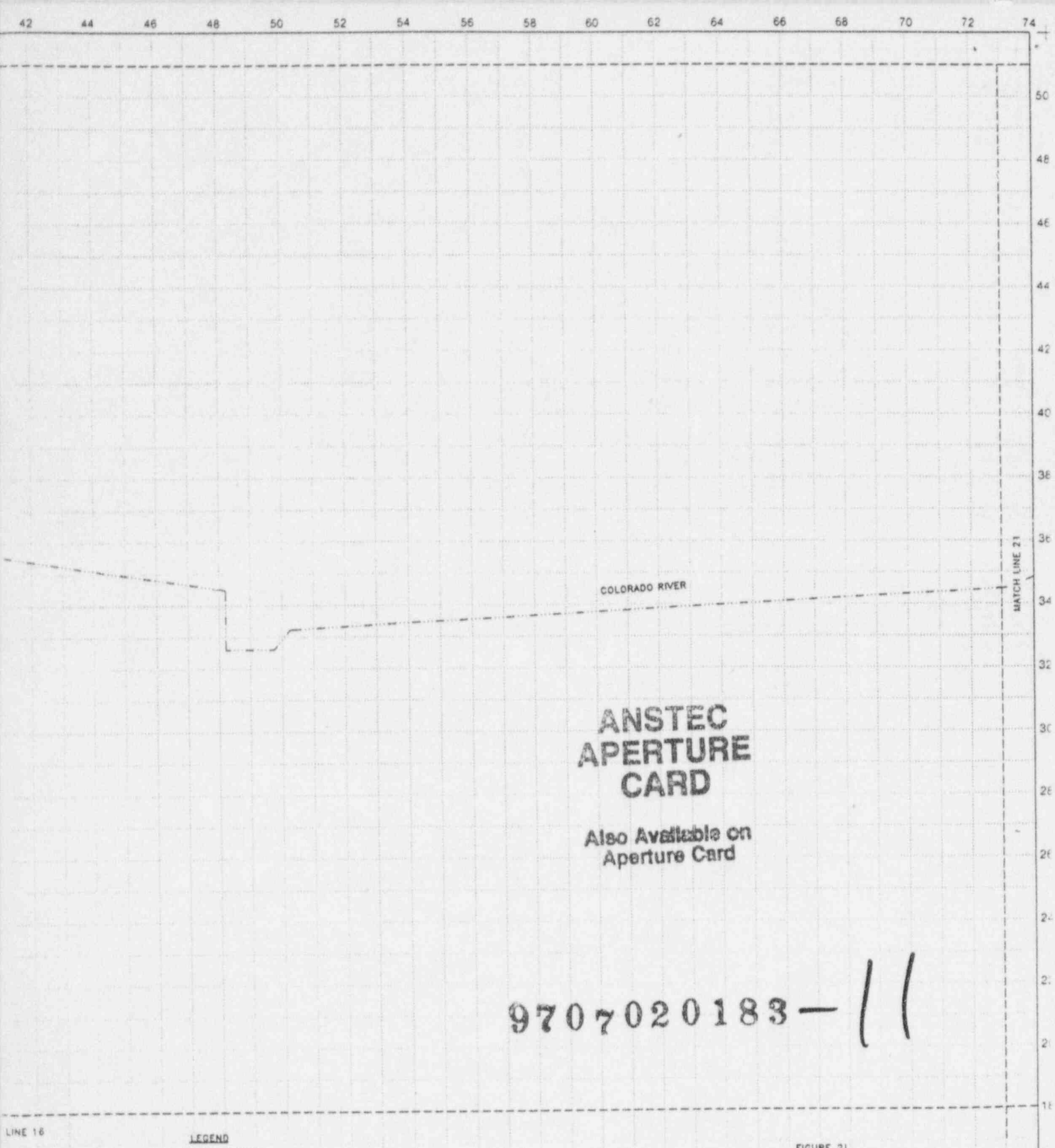


LINE 18

LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- ● BOREHOLE
- T SOIL SAMPLE
- 19–25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 21
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.
NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.

RESIDENCE—NO. OF OCCUPANTS
NON-RESIDENCE—MAN HRS. WK.
INSTRUMENT NO. SURVEYOR
Prepared By EC 6-3-91
SURVEY DATE TIME
VERIFICATION DATE

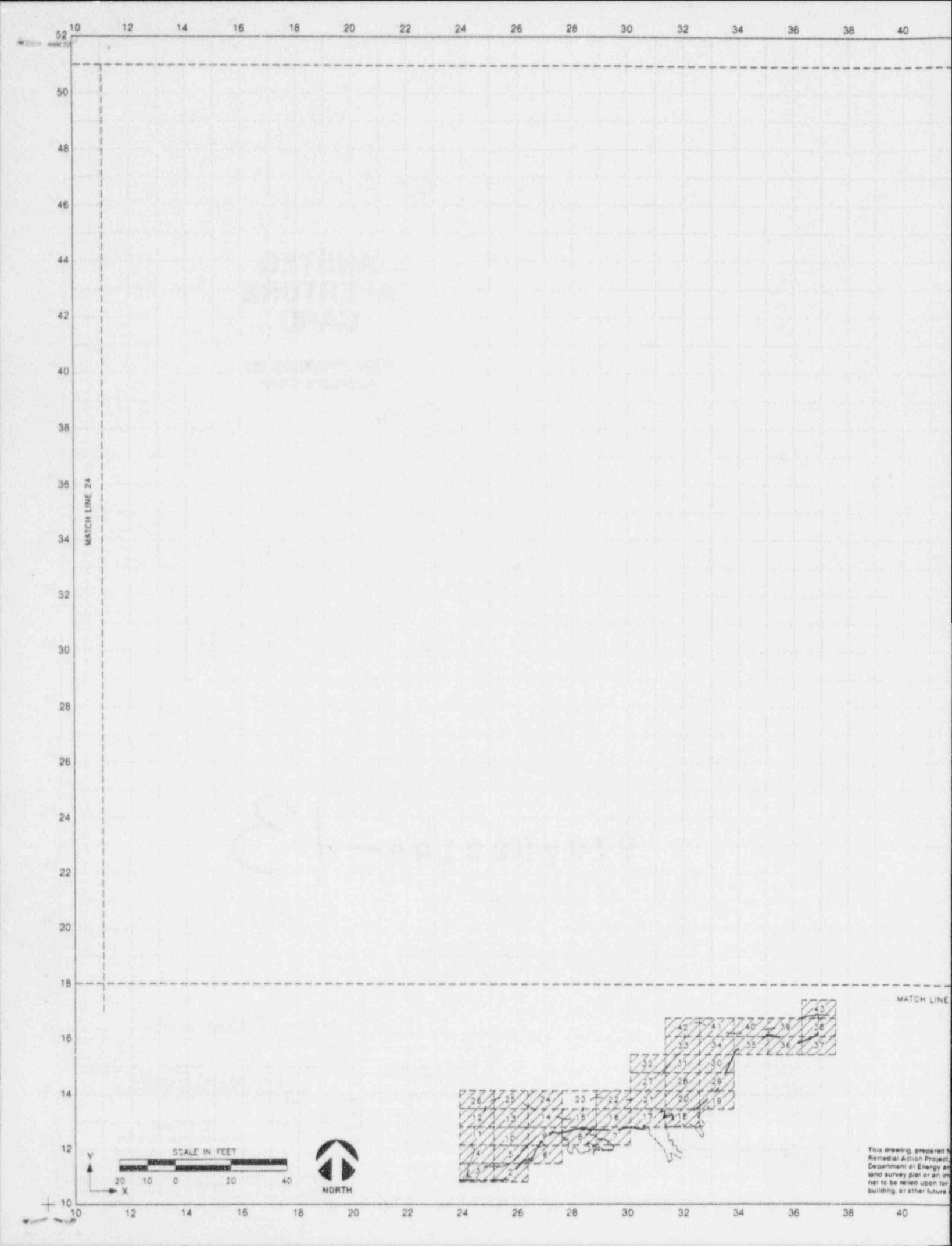
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 5/91
CHECKED
R&S ENG.
SUBMITTED KAC 6/91
APPROVAL DATE
APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

DOE ID NO GJ-45271
Geotech, Inc.
DWG NO 3-04527-011 SHT 11 OF 26

Tailings
of the U.S.
It is not a
part and is
of fence.


MATCH LINE 24
MATCH LINE
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH

9707020183 - 12

LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- * BOREHOLE
- SOIL SAMPLE
- 18 GAMMA EXPOSURE RATE AT GROUND LEVEL ALL READINGS IN μR/h
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 2k
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A.E	APP

RESIDENCE – NO. OF OCCUPANTS
NON-RESIDENCE – MAN HRS. WK.
INSTRUMENT NO. SURVEYOR: Prepared By EC 6-3-91
SURVEY DATE TIME
VERIFICATION DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 5/91
CHECKED
PROJ. ENG.
SUBMITTED KAK 6/91 APPROVAL DATE

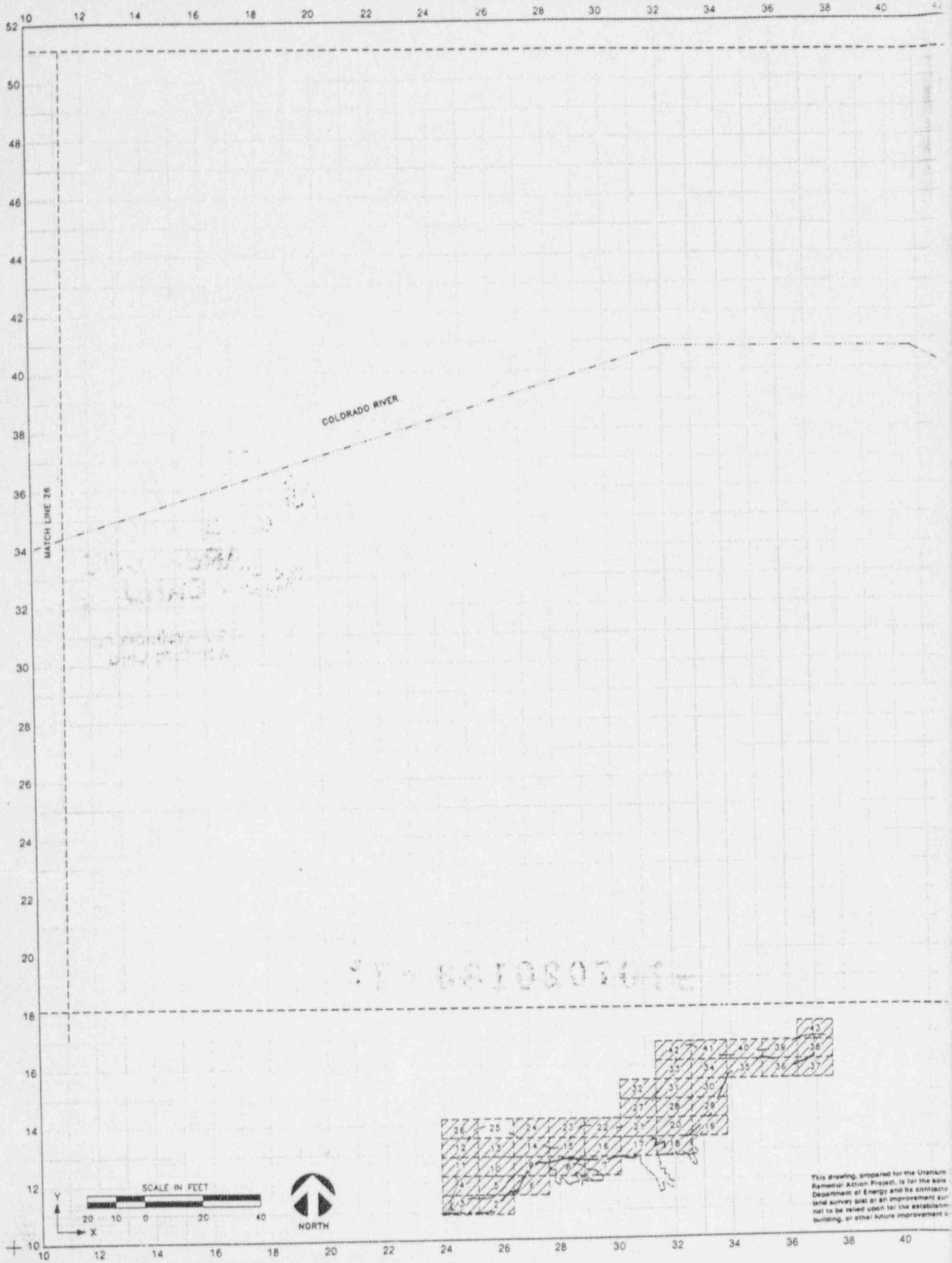
3012 C ROAD
GRAND JUNCTION, COLORADO

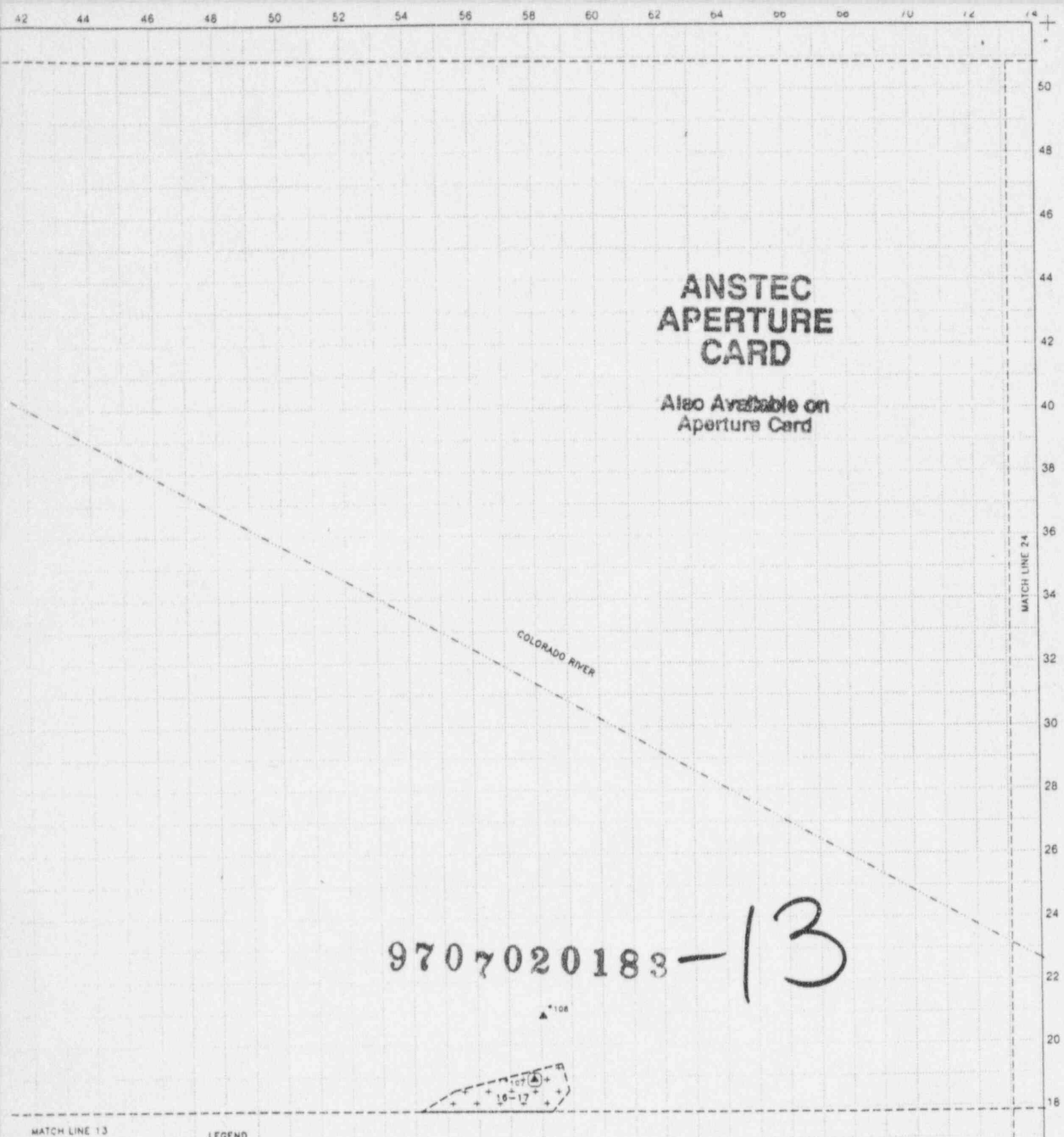
APPROVAL DOE DATE

Geotech. Inc.

DOE ID NO. GJ-45271
DWG NO. 3-045271-G12 SHT 12 OF 20

...e Uranium Mill Tailings ...r the sole use of the U.S. ... contractors. It is not a ...vement survey plat and is ...establishment of fence, ...rovement lines.


COLORADO RIVER
MATCH LINE 26
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH
This drawing, prepared for the Uranium
Remedial Action Project, is for the sole
Department of Energy and its contracto
land survey plat or an improvement sur
not to be relied upon for the establishm
building, or other future improvement l



LEGEND

- *2 LOCATION NUMBER
- △ DELTA SCANNER
- ⊗ BOREHOLE
- SOIL SAMPLE
- 19-25 GAMMA EXPOSURE RATES AT GROUND LEVEL IN μR/h
- BOUNDARY FOR AREA OF ELEVATED EXPOSURE RATES
- AREA OF ELEVATED GAMMA EXPOSURE RATES

ALL GAMMA MEASUREMENTS ARE WITHIN THE RANGE OF NORMAL BACKGROUND UNLESS OTHERWISE NOTED.

FIGURE 21
GAMMA EXPOSURE RATES/SAMPLE LOCATIONS

NO.	DATE	REVISIONS	BY	CK	A.E.	APP

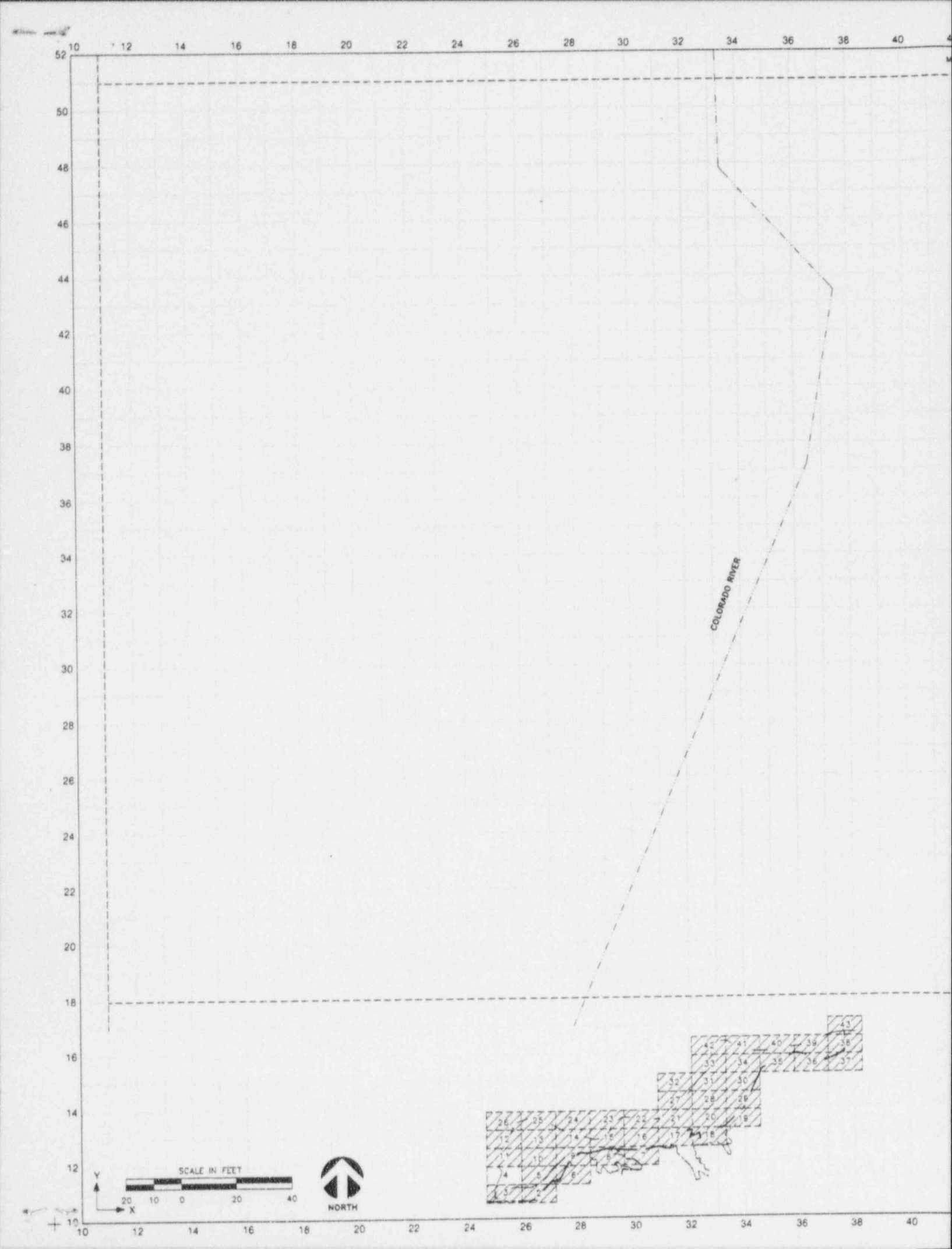
RESIDENCE – NO. OF OCCUPANTS
NON-RESIDENCE – MAN-HRS. WK
INSTRUMENT NO. SURVEYOR
Prepared By EC 6-3-91
SURVEY DATE TIME
VERIFICATION DATE

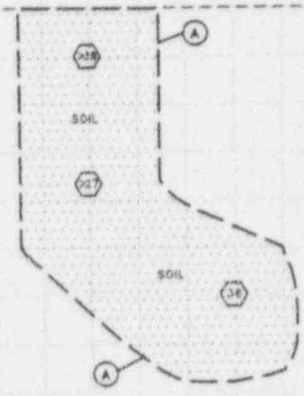
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 5/91
CHECKED
PROJ. ENG.
SUBMITTED 6/91 APPROVAL DATE APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc.
DOE ID NO.
DWG NO. 3-745271-013


COLORADO RIVER
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH



MATCH LINE 5

MATCH LINE 3

LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

FIGURE 3o
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.

RESIDENCE – NO. OF OCCUPANTS

NON-RESIDENCE – MAN-HRS. WK

INSTRUMENT NO. | SURVEYOR

Prepared By EC 6-10-91

SURVEY DATE | TIME

VERIFICATION | DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED | DATE

DRAWN BKR 5/91

CHECKED

PROJ. ENG.

SUBMITTED KMC 6/91 | APPROVAL | DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

APPROVAL DOE | DATE

DOE ID NO. GJ-45271

Geotech, inc.

DWG NO. 3-045271-014 SHT 14 OF 20

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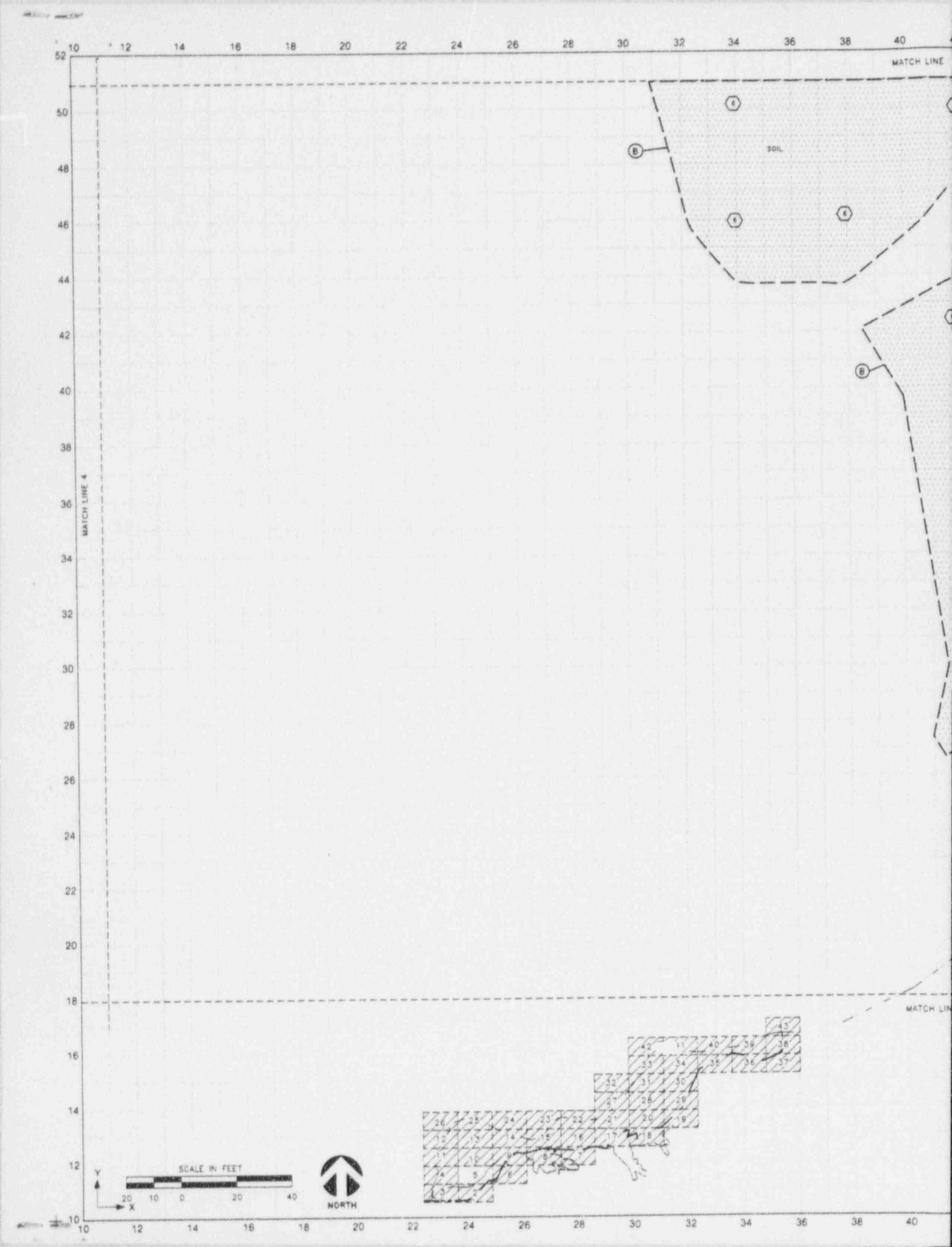
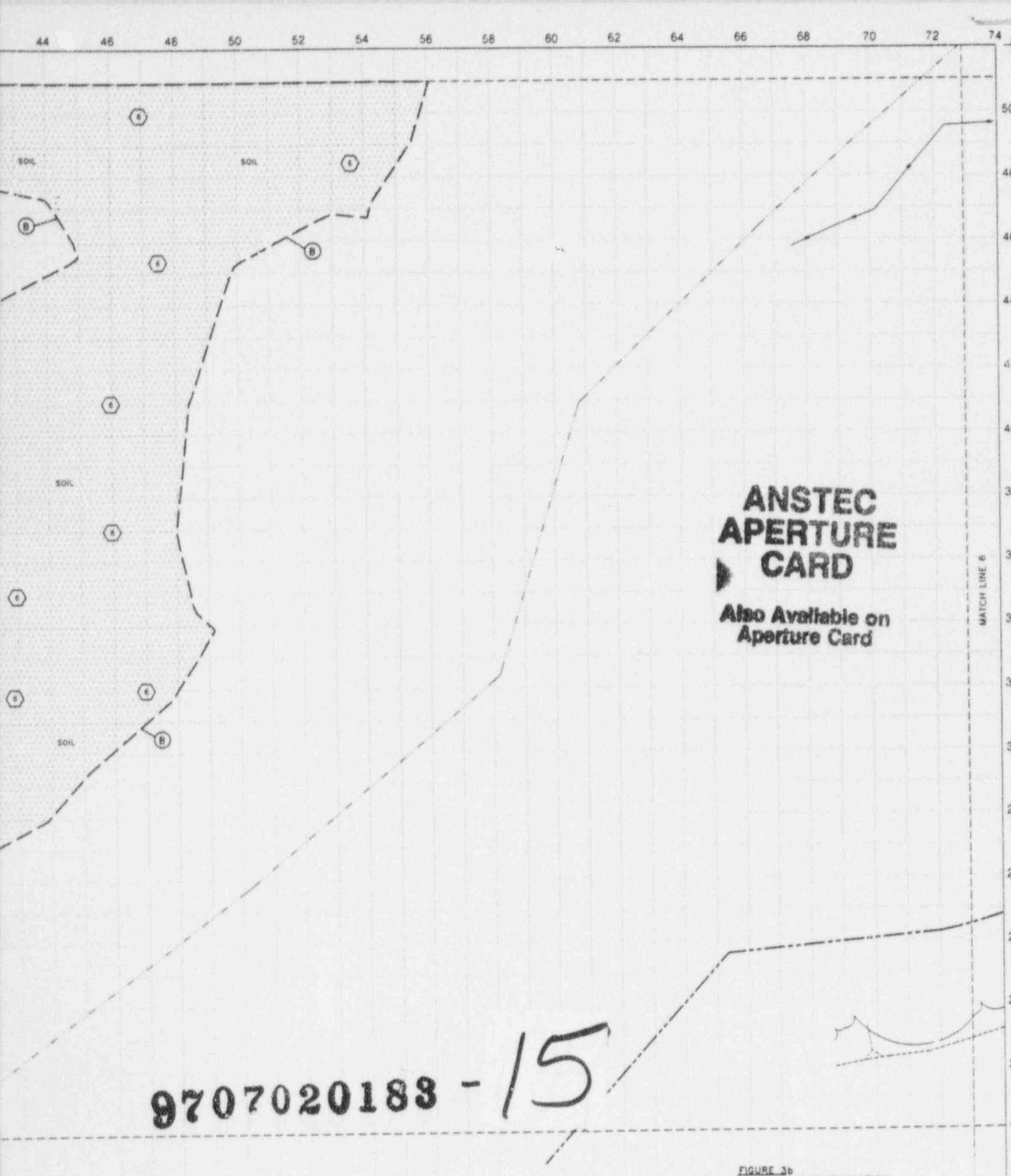

MATCH LINE
SOIL
MATCH LINE 4
MATCH LIN
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH



9707020183 - 15

FIGURE 3b
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

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NO.	DATE	REVISIONS	BY	CK	A.E	APP

RESIDENCE—NO. OF OCCUPANTS

NON-RESIDENCE—MAN-HRS. WK

INSTRUMENT NO. SURVEYOR: Prepared By EC 6-10-91

SURVEY DATE TIME

VERIFICATION DATE

NO.	DATE	REVISIONS	BY	CK	A.E	APP

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE

DRAWN RKR 5/91

CHECKED

PROJ. ENG

SUBMITTED XAC 6/91 APPROVAL DATE

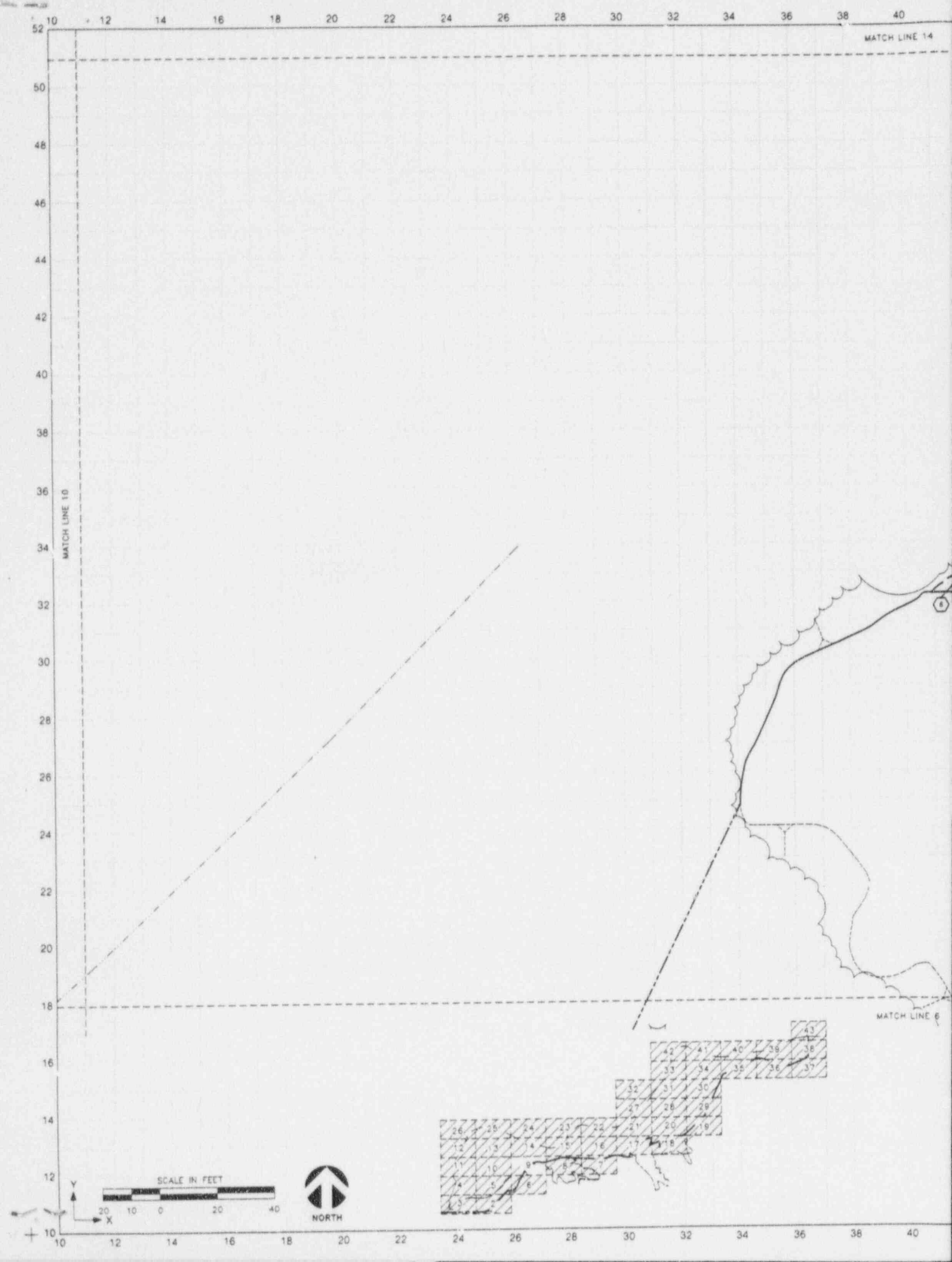
APPROVAL DOE DATE

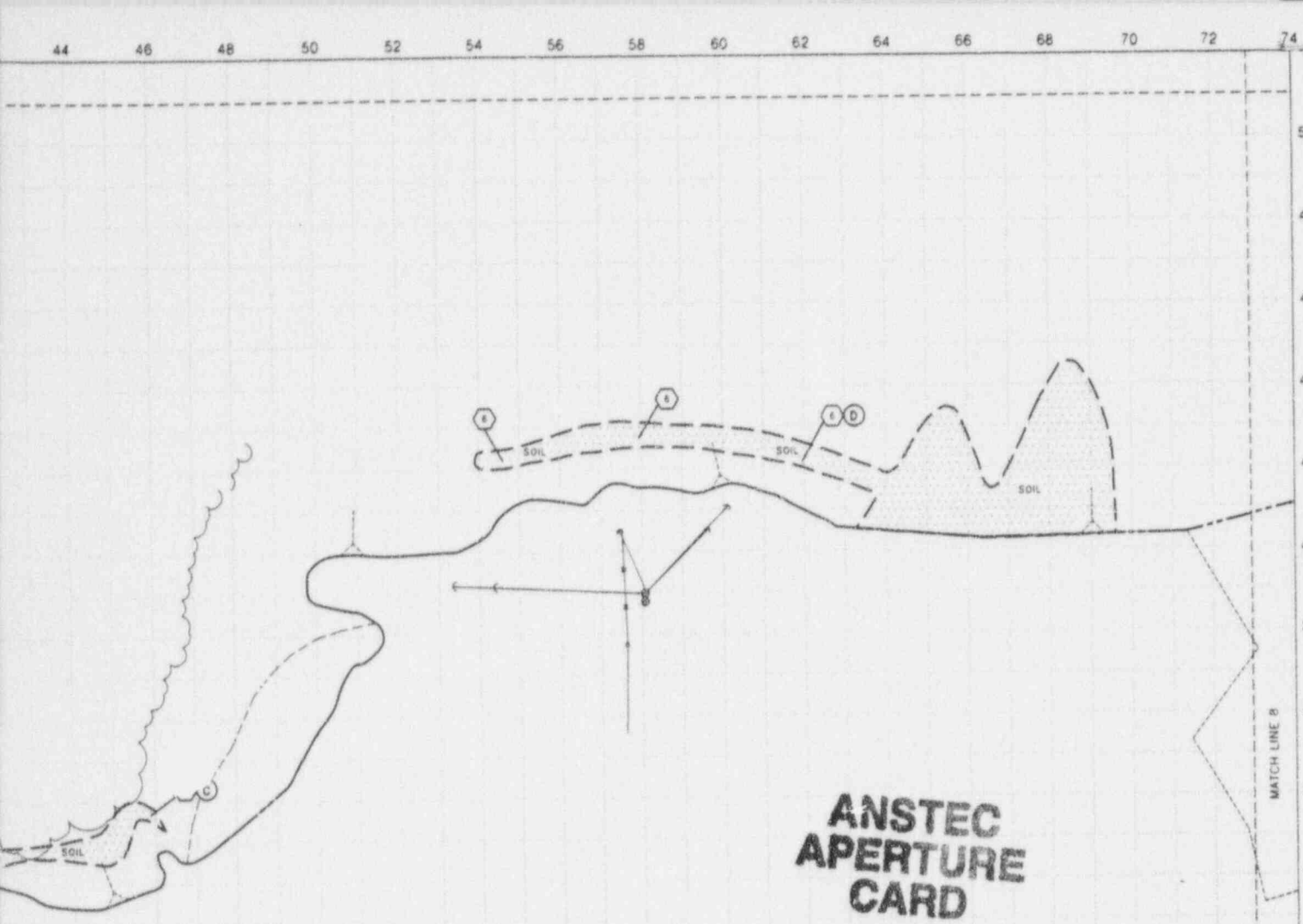
3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech. Inc.

DOE ID NO. GJ-45271

DWG NO. 3-045271-015 SHT 15 OF 20


MATCH LINE 14
MATCH LINE 10
MATCH LINE 6
SCALE IN FEET
20 10 0 20 40
NORTH
X
Y



LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

FIGURE 3c
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO.	DATE	REVISIONS	BY	CK	A.E	APP

NO.	DATE	REVISIONS	BY	CK	A.E	APP

RESIDENCE – NO. OF OCCUPANTS
NON-RESIDENCE – MAN-HRS. WK.
INSTRUMENT NO. SURVEYOR: Prepared By EC 6-10-91
SURVEY DATE: TIME:
VERIFICATION: DATE:

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED: DATE:
DRAWN: BKR 5/91
CHECKED:
PROJ. ENG.
SUBMITTED: RAC 5/91
APPROVAL: DATE:
APPROVAL DOE: DATE:

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech. Inc.
DOE ID NO. GJ-45271
DWG NO. 3-045271-018
SHT. 18 OF 20

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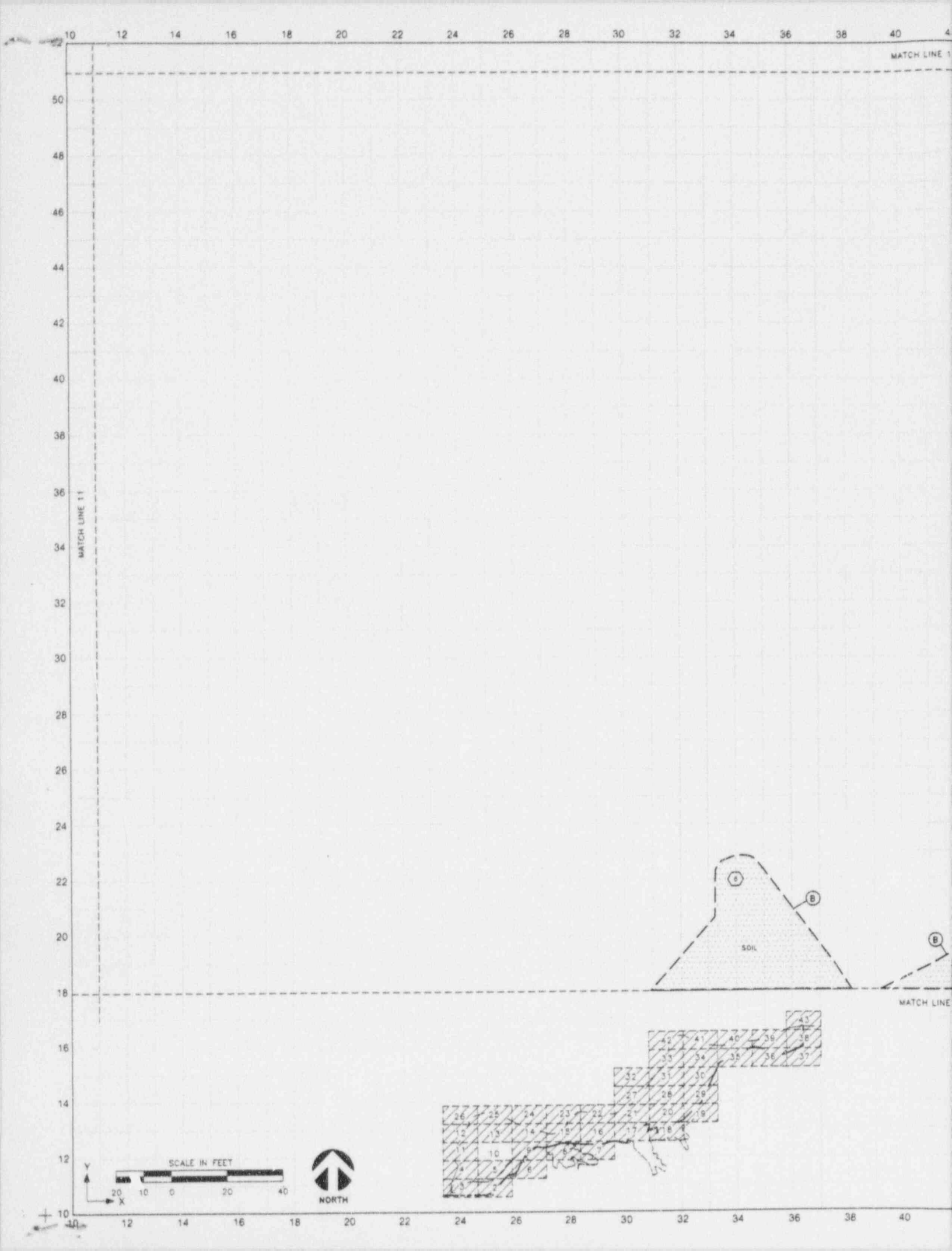
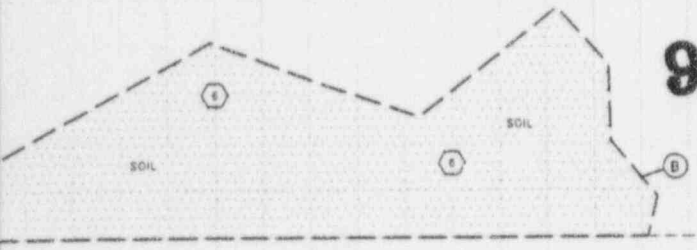

MATCH LINE 1
MATCH LINE 11
MATCH LINE
SOIL
SCALE IN FEET
NORTH



LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

FIGURE 3d
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO.	DATE	REVISIONS	BY	CK	A.E.	APP.	NO.	DATE	REVISIONS	BY	CK	A.E.	APP.

RESIDENCE – NO. OF OCCUPANTS
NON-RESIDENCE – MAN-HRS. WK

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 5/91
CHECKED
PROJ. ENG.
SUBMITTED KAC 5/91
APPROVAL DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

INSTRUMENT NO. SURVEYOR
Prepared By
EC 6-10-91
SURVEY DATE TIME
VERIFICATION DATE

APPROVAL DOE DATE
DOE ID NO GJ-45271
DWG NO 3-045271-017 SHT 17 OF 20

Geotech, Inc.

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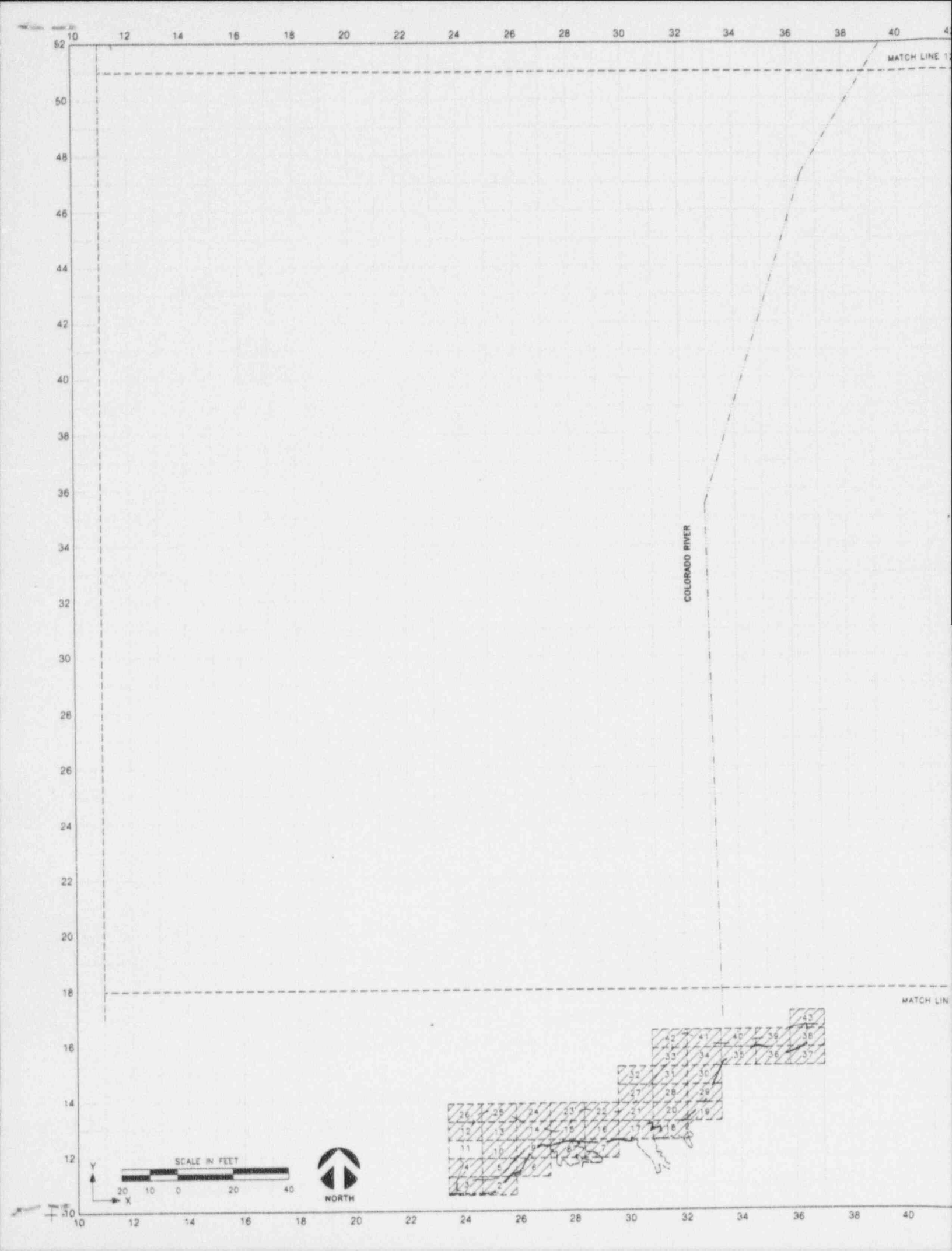
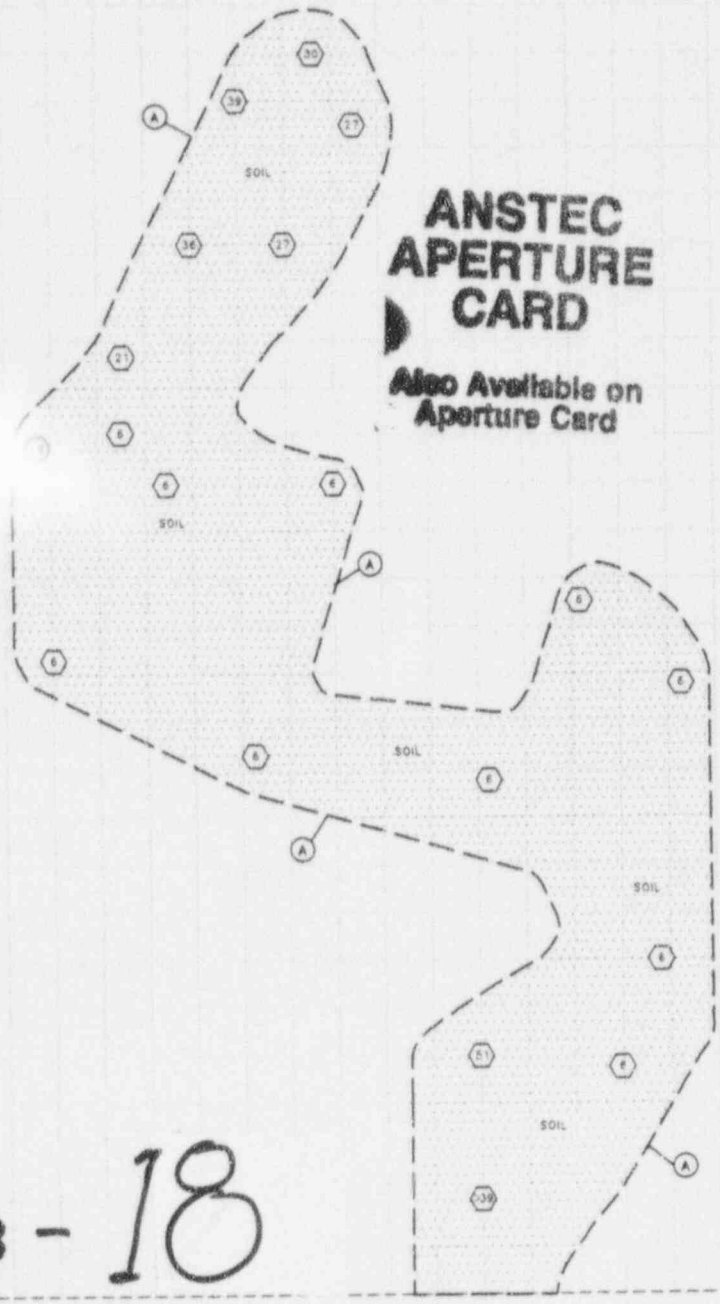
MATCH LINE 9


MATCH LINE 12
COLORADO RIVER
MATCH LIN
SCALE IN FEET
20 10 0 20 40
NORTH



LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

FIGURE 3e
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO	DATE	REVISIONS	BY	CK	A.E	APP

NO	DATE	REVISIONS	BY	CK	A.E	APP

RESIDENCE—NO. OF OCCUPANTS

NON-RESIDENCE—MAN-HRS. WK.

INSTRUMENT NO. SURVEYOR: Prepared By EC 6-10-91

SURVEY DATE TIME

VERIFICATION DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE

DRAWN BKR 5/91

CHECKED

PROJ. ENG.

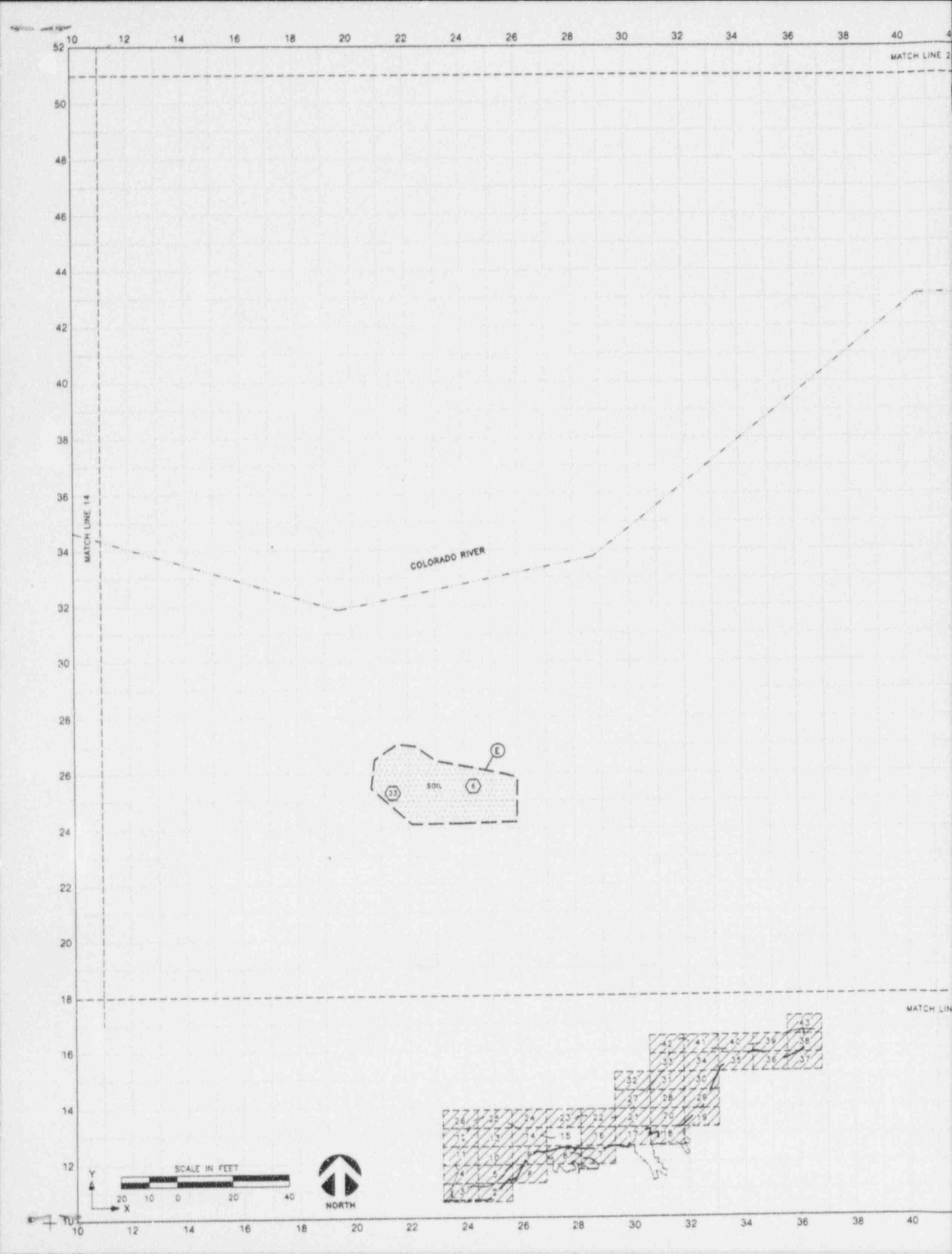
SUBMITTED KAC 6/91 APPROVAL DATE APPROVAL DOE DATE

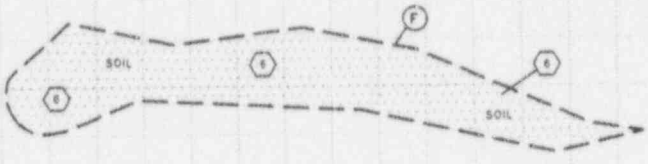
3012 C ROAD
GRAND JUNCTION, COLORADO

DOE ID NO. GJ-45271

Geotech, Inc.

DWG. NO. S-045271-018 SHT. 18 OF 20


MATCH LINE 2
MATCH LINE 1-4
COLORADO RIVER
E
33
SOIL
6
MATCH LIN
SCALE IN FEET
20 10 0 20 40
Y
X
NORTH



LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

FIGURE 3f
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.	NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.

RESIDENCE – NO. OF OCCUPANTS

NON-RESIDENCE – MAN-HRS./WK.

INSTRUMENT NO. SURVEYOR: Prepared By EC 6-10-91

SURVEY DATE: TIME:

VERIFICATION: DATE:

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED: DATE:

DRAWN: BKR 5/91

CHECKED:

PROJ. ENG.:

SUBMITTED: KAC 6/91

APPROVAL: DATE: APPROVAL DOE: DATE:

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech. Inc.

DOE ID NO. GJ-45271

DWG. NO. 3-042271-018 SHT. 19 OF 20

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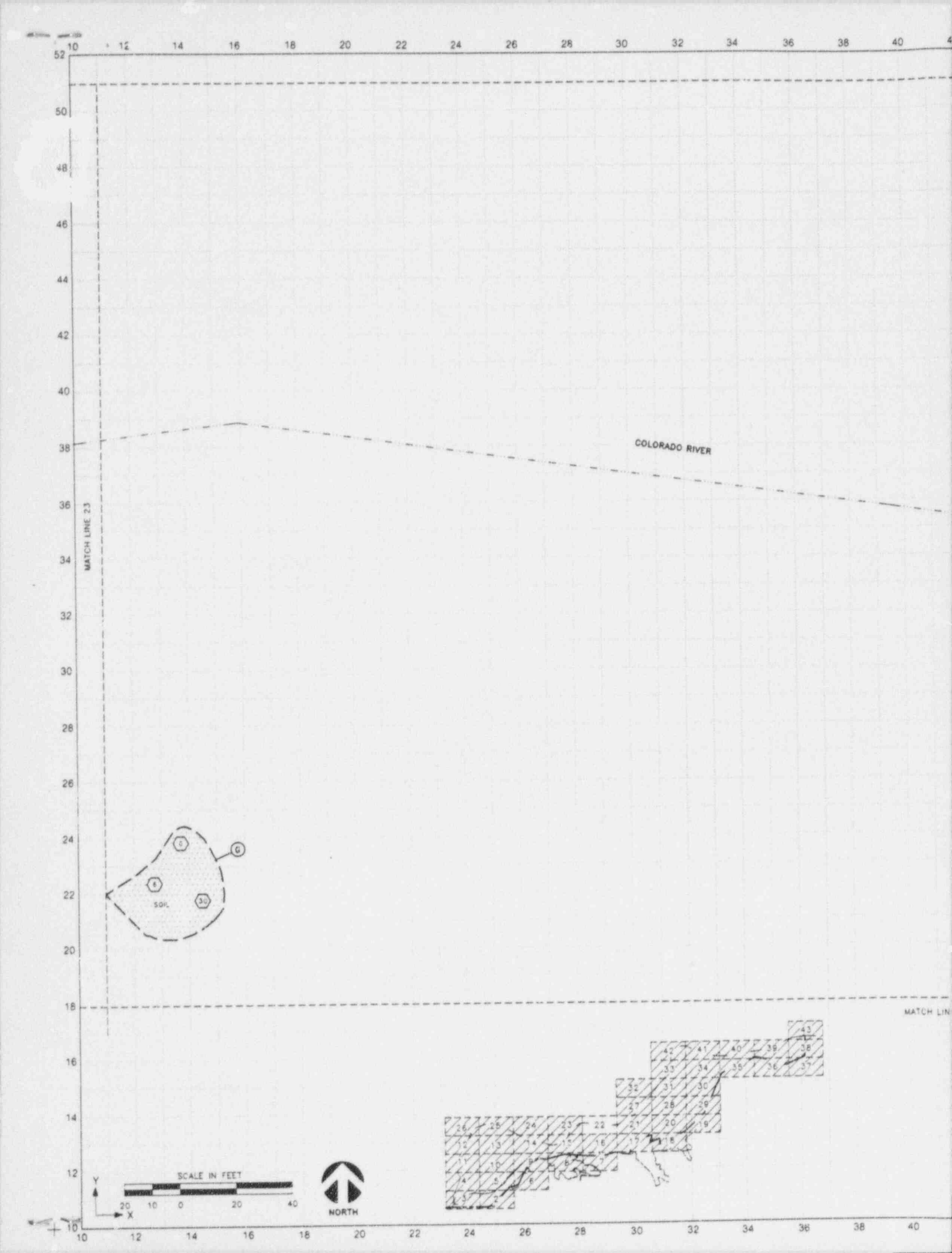
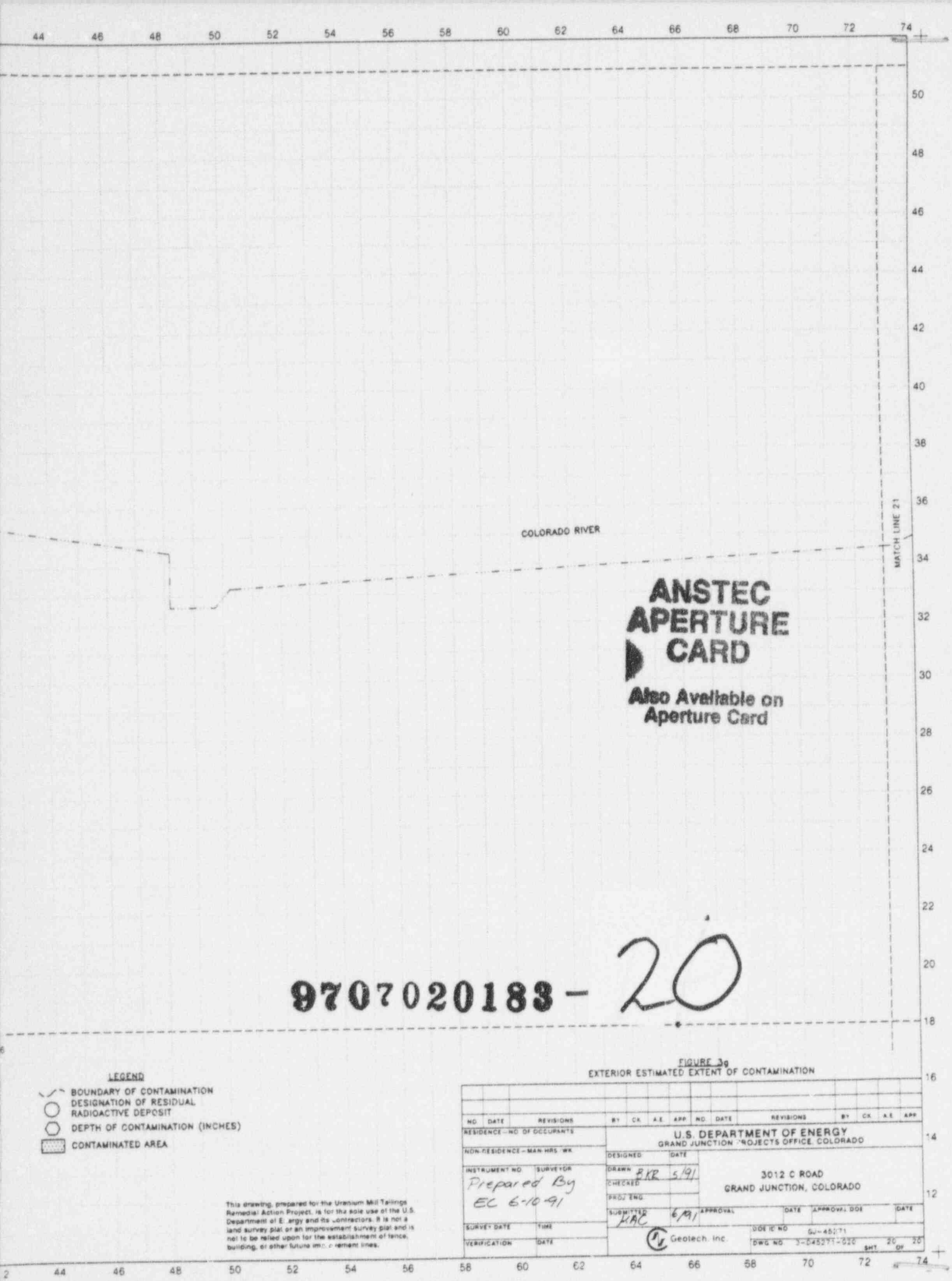
MATCH LINE 15


COLORADO RIVER
MATCH LINE 23
MATCH LIN
SOIL
SCALE IN FEET
20 10 0 20 40
X
Y
NORTH



LEGEND

- BOUNDARY OF CONTAMINATION
- DESIGNATION OF RESIDUAL RADIOACTIVE DEPOSIT
- DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

FIGURE 3g
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.
NO.	DATE	REVISIONS	BY	CK.	A.E.	APP.

RESIDENCE – NO. OF OCCUPANTS
NON-RESIDENCE – MAN-HRS./WK.
INSTRUMENT NO. SURVEYOR: Prepared By EC 6-10-91
SURVEY DATE TIME
VERIFICATION DATE

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION PROJECTS OFFICE, COLORADO

DESIGNED DATE
DRAWN BKR 5/91
CHECKED
PROJ. ENG.
SUBMITTED KAC 6/91 APPROVAL DATE APPROVAL DOE DATE

3012 C ROAD
GRAND JUNCTION, COLORADO

Geotech, Inc.

DOE I.C. NO. GJ-462171
DWG. NO. 3-045271-020 SHT. 20 OF 20

This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

APPENDIX B

APPLICATION FOR SUPPLEMENTAL STANDARDS
DOE ID NO. GJ-45271-VL

TABLE OF CONTENTS

B.1 Applicable EPA Criteria

Supplemental Standards Application is in accordance with the regulations set by the Environmental Protection Agency (EPA) in 40 CFR 192. The potential and applicable criteria as stated in 40 CFR 192.21 are as follows:

_____ a) Remedial action would pose a clear and present risk of injury to workers or to members of the public

__X__ b) Remedial action would directly cause excessive environmental harm

__X__ c) The cost of remedial action at the vicinity site is unreasonably high relative to long-term benefits

_____ d) The cost of remedial action for cleanup of a building is unreasonably high relative to benefits

_____ e) There is no known remedial action

_____ f) Radionuclides other than Radium-226 and its decay products are present

An "X" indicates the appropriate subsection(s) for this application.

B.2 Introduction

This Supplemental Standards Application pertains to uranium mill tailings contamination in the soil of the vacant land located at 3012 C Road. This application only pertains to the portions of this land which are located in the 500-year floodplain; additional tailings on the property located on the cliffs at the southern boundary of the property have been included in a separate Supplemental Standards Application GJ-07332-MR. The legal description of the property is listed below.

B.2.1 Common Location and Legal Description

The legal description of DOE ID No. GJ-45271-VL:

All the land between the Colorado River and the crest of the bluff in Lots 4, 5, and 6, Section 21, T.1S, R.1E, Ute Meridian, and Lot, Section 20, T.1S, R.1E, Ute Meridian, Mesa County, Colorado.

B.2.2 Major Physical Features

The area being considered for Supplemental Standards consists of vacant land adjacent to the Colorado River. All of this land exists within the 500-year floodplain of the Colorado River; a large part of this land is situated in the 100-year floodplain of the Colorado River. Floodplain determination is based upon information provided by the Mesa County Planning Department. The entire area is classified as Wetlands by the Corps of Engineers; this determination was made by the Corps of Engineers during a joint Corps/Geotech site visit.

B.2.3 General Assumptions and Parameters

The inclusion boundaries applied towards this Supplemental Standards Application will be: all areas of 3012 C Road located in the 500-year floodplain of the Colorado River. Deposits located above the floodplain (i.e. Areas C and D on the cliffs at the southern boundary of the property) are excluded from this application and have been included in a separate Supplemental Standards Application for GJ-07322-MR. Figure 1 is a location plan showing the approximate area for the proposed Supplemental Standards.

B.2.4 Land Use

The vacant land being considered for Supplemental Standards is currently being used for agricultural purposes. Mr. Griffith, the Owner, leases the land to others who use it as a grazing pasture. Future development of the land is severely limited due to two factors: its location in a floodplain and its designation as a Wetlands. A large part of the area is located within the 100-year floodplain; the county conducts a floodplain permit process so institutional controls would exist to control development of the land within the 100-year floodplain. The Corps of Engineers has designated the area a Wetlands; as such, disturbance of the existing vegetation is controlled by the Corps of Engineers and is only allowed under strict conditions.

B.2.5 Owner's Input

A meeting was conducted with Mr. L.O. Griffith, the owner of the property, to explain the data and evaluation of alternatives. Geotech submitted a request for formal comments and Mr. Griffith's reply has been received.

Mr. Griffith concurs with Geotech's decision to apply Supplemental Standards with one condition. Mr. Griffith made a stipulation that in the event the government of the U.S. should require removal of the tailings, that removal expense would be borne by the government of the U.S.A.

Geotech informed Mr. Griffith that we could provide no assurance what future regulations would be and what future obligation the Government would have to pay for complying with these regulations. Mr. Griffith understood this but wanted to ensure that his stipulation was included as part of the application.

Future management and control of mill tailings was raised as an issue during our verbal discussions with Mr. Griffith. It has also been raised as an issue by all previous owners confronted with Supplemental Standards. Geotech recognizes this concern and has recommended development of a long-term control plan. Resolution of this issue, however, is beyond the scope of the application.

B.3 Radiological Data

The Supplemental Standards Appendix A contains the radiological Supplemental Standards data that is relevant to this Supplemental Standards Application. The Supplemental Standards Appendix A consists of an Executive Summary, tables which summarize the radiological data, and the complete Appendix A for DOE ID Number GJ-45271-VL.

The radiological conditions within the Supplemental Standards Application area are summarized as follows:

a. Exposure rate range at ground level over contaminated area(s) = 16 to 25 uR/h

b. Average exposure rate at ground level over contaminated areas = 21 uR/h.

B.3.1 Health Risk Analysis

The analysis of current health risks is presented in Table B.T1. Exposure potentials are compared with two criteria as follows:

a. Long-term exposures are examined based on an allowable exposure rate of 100 mRem per year above background (hereinafter referred to as 100 mRem dose).

b. Short-term unusual exposures are examined based on an allowable exposure rate of 500 mRem per year above background (hereinafter referred to as 500 mRem dose).

The maximum gamma dose rate at waist level recommended by the International Commission on Radiological Protection (ICRP, 1977, 1978) in DOE ORDER 5400.5 (March 1990) is 100 mRem dose. This is the dose limit for an individual member of the general public. Doses which exceed 100 mRem dose are acceptable when the higher exposures do not persist for long periods and when the average annual dose over an individual's lifetime is expected to be less than 100 mRem dose. The ICRP and the DOE suggest that dose rates be "reduced as low as is reasonably achievable", but also state that no annual dose shall exceed 500 mRem dose. The health risk analysis presented in this Application for Supplemental Standards has compared the dose rates measured at ground level with the recommendations of the ICRP and DOE regarding waist level exposures. This procedure ensures a conservative evaluation.

The long-term exposure analysis considers three scenarios showing the following:

a. The required number of hours of continuous exposure to obtain the 100 mRem dose. This scenario is intended to model the exposure received by an individual residing on the site in the extreme case where no time away from the site is considered.

b. The hours per day of exposure during a continuous one year period required to receive the 100 mRem dose. This scenario is intended to represent a maximum allowable daily exposure by an individual who occupies the point where the high gamma reading occurs.

c. The hours per day of exposure during a one year period, utilizing week days only (260 days), required to receive the 100 mRem dose. This scenario models the potential exposure that could be received by an individual working in the area the indicated number of hours daily for one year.

The short-term unusual exposure analysis also considers three potential scenarios as follow:

TABLE B.T1

HEALTH RISK ANALYSIS

GJ – 45271 – VL
3012 C ROAD

B-47

AREA DESCRIPTION	GAMMA (uR/h) BACKGROUND	SURFACE MAX.	SURFACE MIN.	EXPOSURE RATE ABOVE BACKGROUND	LONG – TERM EXPOSURE ANALYSIS: REQUIRED NUMBER OF HOURS OF CONTINUOUS EXPOSURE TO RECEIVE 100 mRem DOSE	LONG – TERM EXPOSURE ANALYSIS: REQUIRED NUMBER OF HOURS PER DAY OVER ONE YEAR TO RECEIVE 100 mRem DOSE	LONG – TERM EXPOSURE ANALYSIS: REQUIRED NUMBER OF HOURS PER DAY OVER 260 DAYS TO RECEIVE 100 mRem DOSE	SHORT – TERM "OCCUPATIONAL" EXPOSURE ANALYSIS: REQUIRED NUMBER OF HOURS OF CONTINUOUS EXPOSURE TO RECEIVE 500 mRem DOSE	SHORT – TERM "OCCUPATIONAL" EXPOSURE ANALYSIS: REQUIRED NUMBER OF 48 – HOUR "REPAIR" SCENARIOS TO RECEIVE 500 mRem DOSE	SHORT – TERM "OCCUPATIONAL" EXPOSURE ANALYSIS: REQUIRED NUMBER OF 24 – HOUR "EMERGENCY" SCENARIOS TO RECEIVE 500 mRem DOSE
3012 C Road (Floodplain) (See Note 1)	13	25	16	12	8,333	23	32	41,667	868	1,736
Worst Case Scenario: (See Note 2)	13	25		12	8,333	23	32	41,667	868	1,736

Note 1: Radiological information for the areas outside the floodplain (i.e. Areas C and D) are not included in the scope of this application and are therefore not listed.

Note 2: The Worst Case Scenario is based on the lowest background and the highest surface gamma measurements, regardless of whether they were found in the same approximate location.

a. The required number of hours of continuous exposure to obtain the 500 mRem dose. The intent of this scenario is to allow examination of the estimated time of continuous exposure required to receive the allowable dose.

b. The number of 48-hour temporary occupancy periods, in one year, necessary to receive a 500 mRem dose. This scenario represents the case where an individual occupies the site for repair work or other short-term purposes.

c. The number of 24-hour periods of exposure, in one year, necessary to receive a 500 mRem dose. This scenario considers emergency operations to perform repair work at the site.

The worst case scenario is based on the minimum background and maximum surface gamma rates that were measured, without consideration of the relative physical location of each. In every case, the scenarios presented above can be described as unlikely but possible. The scenarios do not create a model of likely situations, but present data that can be used to evaluate the potential for a health hazard if this Supplemental Standards Application is approved.

Table B.T1 reflects the current gamma exposure rates that exist in the Supplemental Standards area. The maximum known existing gamma exposure rate, above background, occurring in the Supplemental Standards area is equal to the worst case scenario. The worst case scenario depicts occupation of a site for an average of 23 hours per day during a one year period to receive a 100 mRem dose. It is highly unlikely for this situation to occur considering the use and location of the vacant land.

B.4 Remediation Alternatives

Supplemental Standards is only one of the available alternatives for compliance with the EPA regulations. Evaluation of an alternative action in any area of tailings contamination logically includes consideration of the cost and health risk associated with the available choices. Two alternatives, complete remediation, and no remediation, are considered.

B.4.1 Alternative 1 - Complete Remediation

B.4.1.1 Work Description

The work for this alternative includes but is not limited to removing all tailings and replacing them with clean backfill, removing and replacing trees and other vegetation, and restoring Wetlands vegetation.

B.4.1.2 Health Risk Analysis

Health risks in the Supplemental Standards Application area, due to tailings contamination, would be reduced to within EPA standards.

B.4.1.3 Construction Parameters

Construction of this alternative consists of:

(1) Improve existing dirt road leading to the site. Existing dirt road requires maintenance work to allow heavy truck traffic to use it. This work may include, but is not limited to, installing drainage culverts over drainage areas and building up boggy portions of road.

(2) Removing approximately 2,000 cubic yards of contaminated material.

(3) Backfill with pit run and topsoil.

(4) Remove and replace trees and other vegetation.

(5) Restore Wetlands vegetation disturbed as a result of remediation.

B.4.1.4 Alternative Specific Issues

Total remediation of the area would result in over one acre of Wetlands being disturbed. Although the damage caused by remedial action would not be permanent, it could take from 5 to 10 years for the area to revegetate back to its present state. A 404 Permit from the Corps of Engineers will be required to do work in this Wetlands areas.

B.4.1.5 Engineering Data

No areas of contamination which exceed EPA standards will remain in place. The estimated construction cost of remedial action required for this alternative is $104,995. The cost estimate is presented in Table B.T2. The estimated volume of contaminated materials to be removed is 1,915 cubic yards. The per unit cost to remove the tailings is approximately $43.86 per cubic yard. This per unit cost was obtained by dividing the total estimated subcontracted construction cost (using no contingency) by the total estimated quantity of tailings to be removed (using no contingency).

B.4.2 Alternative 2 - Partial Remediation (Remediate Top 12 Inches - Supplemental Standards)

B.4.2.1 Work Description

The work for this alternative includes but is not limited to removing all tailings in the top 12 inches and replacing them with clean backfill, removing and replacing trees and other vegetation, and restoring Wetlands vegetation.

TABLE B.T2

GJ-45271-VL
3012 C ROAD

COST ESTIMATE FOR COMPLETE REMEDIATION – ALTERNATIVE 1

ITEM NO.	ITEM	QUANTITY	UNIT COST/UNITS	AMOUNT ($)
1.	REMOVE TAILINGS AND REPLACE WITH TOPSOIL	1,915	$30.00 CY	$57,450
2.	RESEED WITH GRASS (INCLUDING WATERING AND MAINTENANCE FOR 90 DAYS)	54,183	0.25 SF	13,546
3.	REMOVE EXISTING TREES	85	75 EA	6,375
4.	PLACE NEW RIPARIAN TREES	45	125 EA	5,625
5.	ACCESS ALLOWANCE DUE TO SITE	1	1,000 LS	1,000
6.	PLACE NEW RIPARIAN SHRUBS	87	30 EA	2,610
			SUBTOTAL:	$83,996
			CONTINGENCY(25%):	$20,999
			TOTAL COST:	$104,995

B.4.2.2 Health Risk Analysis

Health risks in the Supplemental Standards Application area resulting from gamma exposure would be substantially reduced by partial remediation. Some elevated exposure rates, which cannot be quantified at this time, might remain. Without the use of supplemental standards, EPA Standards for remedial action would not be met under this alternative.

B.4.2.3 Construction Parameters

Construction of this alternative consists of:

(1) Improve existing dirt road leading to the site. Existing dirt road requires some maintenance work to allow heavy truck traffic to use it. This work may include, but is not limited to installing drainage culverts over drainage areas and building up boggy portions of road.

(2) Removing approximately 1,400 cubic yards of contaminated material which exists in the top 12 inches.

(3) Backfill with topsoil.

(4) Remove and replace trees and other vegetation.

(5) Restore Wetlands vegetation disturbed as a result of remediation.

B.4.2.4 Alternative Specific Issues

Partial remediation of the area would result in over one acre of Wetlands being disturbed. Although the damage caused by remedial action would not be permanent, it could take from 5 to 10 years for the area to revegetate back to its present state. A 404 Permit from the Corps of Engineers will be required to do work in this Wetlands areas.

Although remediation of the surface 12 inches would provide some protection against tailings erosion, a major flood could erode the top 12 inches and cause tailings to migrate. The area in which the tailings are situated is subject to erosion from the Colorado River and would be especially vulnerable during the 5 to 10 years it might take for Wetlands vegetation to become reestablished to its present state. This erosion could occur from either flooding (the entire Supplemental Standards area is in the 500-year floodplain) or natural meandering of the Colorado River. Major flooding, with its accompanying high velocities, or meandering of the river itself, could disturb the surface and cause tailings to migrate from the site. If this should occur, the tailings would be swept down the Colorado River.

B.4.2.5 Engineering Data

Approximately 537 cubic yards of contamination which exceed EPA standards will remain in place. The estimated construction cost of remedial action required for this alternative is $84,857. The cost estimate is presented in Table B.T3. The estimated volume of contaminated materials to be removed is 1,378 cubic yards. The per unit cost to remove the tailings is approximately $49.26 per cubic yard. This per unit cost was obtained by dividing the total estimated subcontracted construction cost (using no contingency) by the total estimated quantity of tailings to be removed (using no contingency).

B.4.3 Alternative 3 - No Remediation (Supplemental Standards)

B.4.3.1 Work Description

No work is required for this alternative. Figure B.F1 depicts the extent of contamination that would remain under this alternative.

B.4.3.2 Health Risk Analysis

The health risks associated with this alternative are approximated in Table B.T1. It is highly unlikely that the allowable gamma dose rate will be exceeded. To do this, a person would have to occupy the site for an average of 23 hours per day; this would be nearly impossible considering the use and location of the vacant land.

B.4.3.3 Construction Parameters

Construction is not required for this alternative.

B.4.3.4 Alternative Specific Issues

The area in which the tailings are situated is subject to erosion from the Colorado River. This erosion could occur from either flooding (the entire Supplemental Standards area is in the 500-year floodplain) or natural meandering of the Colorado River. Since the area is well vegetated, it should be stable during low velocity flows of minor flooding. Major flooding, with its accompanying high velocities, or meandering of the river itself, could disturb the tailings and cause them to migrate from the site. If this should occur, the tailings would be swept down the Colorado River.

B.4.3.5 Engineering Data

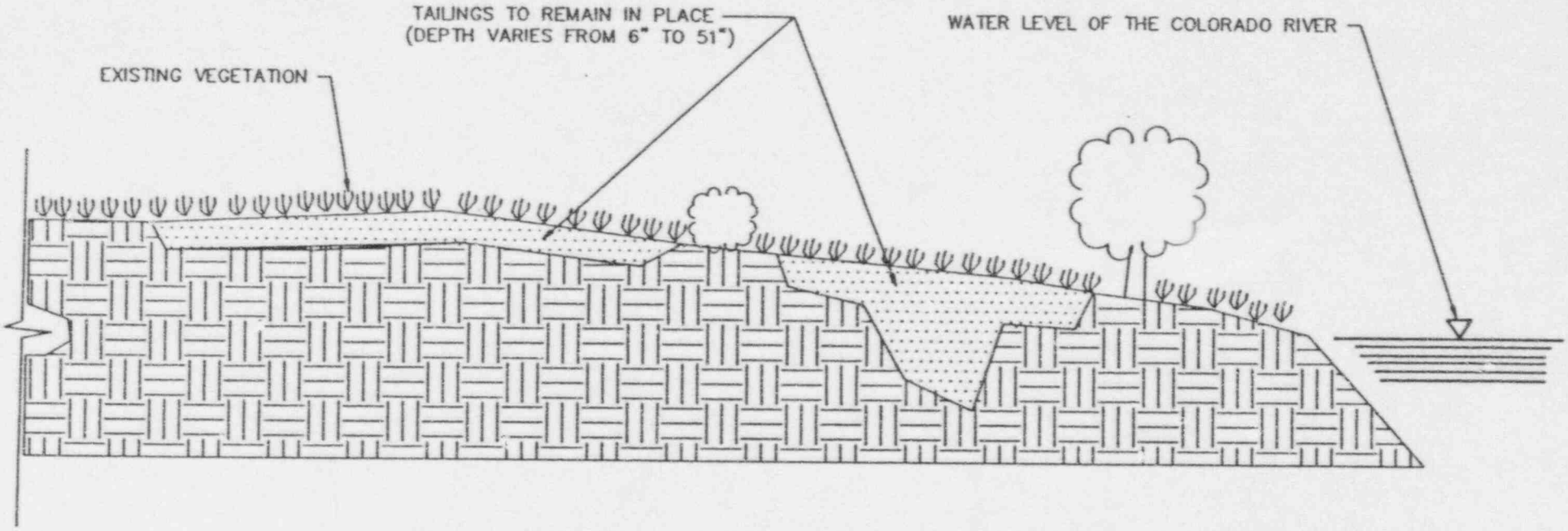
No cost is associated with this alternative. The approximate volume of contaminated materials that would be kept in place under this alternative is 1,915 cubic yards.

TABLE B.T3

GJ-45271-VL
3012 C ROAD

COST ESTIMATE FOR PARTIAL REMEDIATION – ALTERNATIVE 2

ITEM NO.	ITEM	QUANTITY	UNIT COST/UNITS	AMOUNT ($)
1.	REMOVE TAILINGS AND REPLACE WITH TOPSOIL	1,378	$30.00 CY	$41,340
2.	RESEED WITH GRASS (INCLUDING WATERING AND MAINTENANCE FOR 90 DAYS)	54,183	0.25 SF	13,546
3.	REMOVE EXISTING TREES	85	75 EA	6,375
4.	PLACE NEW RIPARIAN TREES	45	125 EA	5,625
5.	ACCESS ALLOWANCE DUE TO SITE	1	1,000 LS	1,000
6.	PLACE NEW RIPARIAN SHRUBS	87	30 EA	2,610
			SUBTOTAL:	$67,886
			CONTINGENCY (25%):	$16,971
			TOTAL COST:	$84,857



NO REMEDIATION ALTERNATIVE

NOT TO SCALE

U.S. DEPARTMENT OF ENERGY

3012 C ROAD
GRAND JUNCTION, CO

DOE ID NO. GJ--45271-VL

FIGURE B.F1

B.5 Summary

Geotech recommends that the No Remediation alternative presented in this Supplemental Standards Application be approved. The data in Table B.T1 suggests that there are no identifiable health risks if the No Remediation alternative of this Supplemental Standards Application is approved. In the worst case scenario, a person would have to occupy the point of high gamma exposure for 8,333 hours to receive a 100 mRem dose. It is highly unlikely that this situation will occur, due to both the length of time required and the physical location of the exposure rates. The potential for disturbance from man-made activity is limited; institutional control exists from both the Corps of Engineers 404 Permit (Wetlands) and the Mesa County Floodplain Permit processes.

Natural disturbance is more problematic. The constant meandering of the Colorado River creates the potential that, over time, erosion from the river could cause the tailings to migrate from the site and down the river. If this should occur, the low levels of radioactivity and the relatively small quantity of the tailings will not present a health risk to the public. Even with this possibility of tailings migration, Geotech does not recommend removal of the tailings. The cost of removal and resulting environmental harm, is unreasonably high when compared to the risk to the public of future tailings migration.

Each alternative examined by this Application can be summarized as follows:

Alternative 1 - Complete Remediation
- Health Risk - Reduced to within EPA standards
- Estimated Construction Cost - $104,995
- Approximate Volume of Contaminated Materials Removed - 1,915 cy
- Approximate Volume of Contaminated Materials Remaining - 0 cy

Alternative 2 - Partial Remediation (Remediate Top 12 Inches - Supplemental Standards)
- Health Risk - Gamma exposure rates would be substantially reduced (possibly to background)
- Estimated Construction Cost - $84,857
- Approximate Volume of Construction Materials Removed - 1,378 cy
- Approximate Volume of Construction Materials Remaining - 537 cy

Alternative 3 - No Remediation (Supplemental Standards)
- Health Risk - See Appendix B, Table B.T1
- Estimated Construction Cost - $0
- Approximate Volume of Contaminated Materials Removed - 0 cy
- Approximate Volume of Contaminated Materials Remaining - 1,915 cubic yards

B.6 Recommendations

Supplemental Standards (No Remediation) should be applied under 40 CFR 192.21 Criteria B and C (see Section B.1). A long-term tailings management, disposal, and migration control plan should be developed and implemented as required in the Romer-Twining UMTRA Management Agreement.

Daniel F Bremseke for Ptak — 3/13/92

Prepared by
Michael J. Ptak — Date

Paul D. James — 3/13/92

Reviewed by
Paul D. James — Date

MP031392
G45271SS.APB:CROAD:DZ
REV062888:01

Geotech, Inc.

February 5, 1992

Mr. L.O. Griffith
P.O. Box 3329
Grand Junction, Colorado 81502

SUBJECT: SUPPLEMENTAL STANDARDS APPLICATION FOR DOE ID NO. GJ-45271-VL

Dear Mr. Griffith:

This letter is to inform you that Chem-Nuclear Geotech, Inc. (Geotech) is proceeding with an Application for Supplemental Standards for the property you own at 3012 C Road. As part of the procedure for Application of Supplemental Standards, Geotech has the responsibility to explain this process and solicit comments from the property owner.

The Environmental Protection Agency supplemental standards allow uranium mill tailing deposits to remain in place when one or more of the following situations exits: a) clear and present risk to workers and/or the general public; b) excessive environmental harm; c) excessive cost of land cleanup relative to long-term benefits; d) excessive cost of building cleanup relative to benefits; e) there is no known remedial action; or f) radionuclides other than Ra-226 exist.

This Application for Supplemental Standards is to be applied to the portion of your property at 3012 C Road which has been designated as "Wetlands" by the U.S. Army Corps of Engineers. If this Supplemental Standards Application is approved, all tailings in the "Wetlands" areas will remain in place. Items "b" and "c" of the above mentioned list are used as justification for this Supplemental Standards Application. Information concerning the depths, concentrations, and locations where Geotech intends to use Supplemental Standards will be presented at our February 6, 1992 meeting. A "checklist" of all items to be discussed is included as an attachment to this letter.

This letter extends the opportunity for you to comment or express any concerns that you may have about this Supplemental Standards Application. It is requested that your response:

1. Acknowledge that this Supplemental Standards Application has been explained to you or your staff in accordance with the Owner Notification Checklist (Attachment 1);

2. Indicates any proposed construction or land use changes in this area in the foreseeable future; and

3. Includes any other questions or comments you may have regarding this Supplemental Standards Application.

Please send your written comments to Geotech by February 20, 1992. If you have any questions regarding this Supplemental Standards Application, please contact me at (303) 248-6469.

Sincerely,

Michael J. Ptak
Supplemental Standards Coordinator

1 attachment
Owner Notification "Checklist"

G45271LE:CROAD:DZ

OWNER NOTIFICATION "CHECKLIST"

1. Explanation of EPA 40 CFR 192.12 standards and why the deposit exceeds the standards.

2. Explanation of EPA 40 CFR 192.21, Application of Supplemental Standards.

3. Explanation of which criteria potentially applies to the deposit(s).

4. Maps showing areas considered for supplemertal standards.

5. Health risks associated with the gamma radiation and radon gas that is being emitted from the deposit(s). This should be in layman's language, presented scientifically correct and as simply as possible.

6. Include information that future health risks could be associated with building upon or disturbing the contaminated deposit(s).

7. Discuss alternate remedial actions or partial removals.

8. Reference must be made to the benefits of both removal and nonremoval of the deposit(s).

9. The application should indicate the use of the approved checklist, as listed above.

10. Discuss the long-term status of the disposal cell.

11. Address any additional questions or concerns of the property owner.

LOG Investments
P.O.BOX 3329
GRAND JUNCTION, COLO. 81502

(303) 243-5880

Feb. 7, 1992

Mike Ptak
UNC Geotech, Inc.
2597 B 3/4 Rd.
Grand Jct., Co. 81501

Re: S.S. Application

Dear Mike:

Thanks for the time you spent explaining the process to apply supplemental standards concerning some of our land at 3012 C Rd.

I hereby agree to the application for supplemental standards with the condition that in the event the government of the U.S should require these tailings to be removed, that removal expense would be borne by the Government of the U.S.A.

Sincerely,

L.O. Griffith