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FROM : William W. Easton and Eugene W. Oertell, Geologists
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SUBJECT: TECHNICAL MEMORANDUM NO. 116, EXPLORATORY DRILLING IN THE POSEY AND MARKEY LOCALITIES, RED CANYON AREA, SAN JUAN COUNTY, UTAH - CONTRACT NO. AT-(05-1)-236

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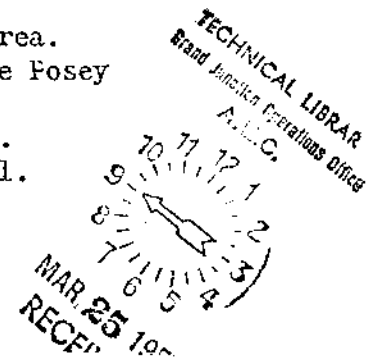
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EXPLORATORY DRILLING IN THE POSEY AND MARKEY LOCALITIES

RED CANYON AREA, SAN JUAN COUNTY, UTAH

ABSTRACT

The Posey and Markey localities are in Red Canyon approximately 70 miles west of Blanding, Utah. The area is on the west flank of the Monument upwarp and exposed sedimentary rocks range in age from Permian through Jurassic (?).

A program of exploratory drilling carried out in 1954 consisted of 33 diamond drill holes totaling 5,492.5 feet. Two holes penetrated ore and four encountered sub-ore grade material.

Uranium mineral concentrations occur in fluviatile sedimentary rocks of the Shinarump and Monitor Butte members of the Triassic Chinle formation.

The results of exploration in the favorable parts of the Posey and Markey localities indicate that they are less important than other uranium producing localities in the Red Canyon area.

INTRODUCTION

Location and Access

The Posey and Markey localities are on the southwest side of Red Canyon in the west-central part of San Juan County, Utah (figs. 1 and 2). The area is reached by traveling 48 miles west of Blanding, Utah, on Utah State Highway 95 to the Red Canyon access road AA-9. From this junction to the Skelly Oil Company road at Red House Cliffs is 12 miles via road AA-9; from there to the Posey claims is 10 miles and to the Markey claims, 12 miles.

Purpose and Scope of Investigation

Exploratory diamond drilling in the Posey and Markey localities was part of a program to investigate Shinarump paleostream channels in the Red Canyon area. Drilling was instituted to delineate paleostream channels, determine their lithologic and structural characteristics, and locate concealed uranium ore deposits.

Previous Work

Gregory (1938) describes the broad geologic and geographic features of Red Canyon in his reconnaissance of southeastern Utah. Recent geologic studies have been made in connection with exploration by the U. S. Atomic Energy Commission for uranium deposits (Mace, 1957a, 1957b).

GENERAL GEOLOGY

Sedimentary rocks exposed in the area range from the Permian Cedar Mesa sandstone member of the Cutler formation to the Jurassic Navajo sandstone (table 1). The nearest exposed igneous rocks are in the Henry Mountains about 20 miles northwest and in the Abajo Mountains about 45 miles northeast of the Posey and Markey localities.

Uranium deposits in the Red Canyon area occur in paleostream channels incised into beds of the Triassic Moenkopi formation and filled with fluvial sediments of the Shinarump member of the Triassic Chinle formation. The Shinarump is a gray, fine- to coarse-grained sandstone containing discontinuous lenses of conglomerate and mudstone. As reported by Mace (1957b) the Shinarump of southeast Red Canyon is divisible into two units, an upper zone of thinly laminated, micaceous sandstone commonly grading upward into overlying Chinle sandstone lenses, and a lower zone of massive, coarse-grained, poorly sorted, carbonaceous sandstone which rests on eroded Moenkopi clastics.

The Posey and Markey localities are on the gently dipping west flank of the Monument upwarp. The beds have a regional dip of $1\frac{1}{2}$ degrees to 2 degrees west and strike generally north-south. Joints are well defined in the sandstone strata and there are several faults, approximately one mile east and three miles west of the drilling localities, trending N. 30° E.

EXPLORATION PROGRAM

Under Contract No. AT(05-1)-236, the Mott Drilling Company of Huntington, West Virginia, began operations in the Posey and Markey localities on March 29, 1954, and terminated June 21, 1954. Thirty-three diamond-drilled holes were completed for a total of 5,492.5 feet (table 2). Ore-grade uranium was penetrated in two holes; in four others uranium minerals of sub-ore grade concentration were encountered (figs. 3 and 4).

The Posey channel was delineated for a distance of 2,800 feet southwestward from hole PO-28, by 18 holes involving a total of 3,797.0 feet drilled. Data (table 2) suggests that drilling was done on a Shinarump pinchout. The Markey channel was delineated for a distance of about 1,000 feet in a direction southwest from the channel outcrop, with 15 holes in which a total of 1,695.5 feet was drilled.

Method of Investigation

Data from diamond drilling conducted in the Red Canyon area by the U. S. Atomic Energy Commission in 1953 (Mace, 1957b) were utilized in this work. In the present project, as each hole was completed, the core was checked for radioactivity, the hole was probed either by Geiger counter or a recording, truck-mounted gamma ray logger when the latter was available, lithology of the core was recorded, and

the bottom foot of Shinarump was sampled for radiometric and chemical assay of U_3O_8 and for chemical assay of Cu and $CaCO_3$. Analyses were made of any part of the core that was radioactive or contained visible copper minerals.

Core recovery averaged 98 percent. Customary diamond core drilling practices, satisfactory when coring in well-cemented sandstone, are not as satisfactory in friable sandstone, or in clay or mudstone. Most of the non-core drilling was done with air rotary equipment, and this method proved very satisfactory in the type of overburden present in Red Canyon.

URANIUM DEPOSITS

No uranium ore deposits in the Shinarump were found in the Posey channel. There was a loss of core in the Shinarump ore zone of hole MA-9, where 8.5 feet were recovered from a 10-foot run. The gamma-ray log of the hole indicated ore. However, previously noted guides to ore in the Red Canyon area such as cross-bedding, coarse, poorly sorted sandstone and conglomerate, presence of sulfides, carbon, clay galls, and jarosite were observed in many of the holes. The only ore hole, MA-9, and the weakly mineralized holes, MA-12, MA-15, MA-16, and MA-18, have many of these characteristics. Ore-grade uranium mineralization occurs in hole PO-34 above the top of the Shinarump in basal carbonaceous shale beds of the Monitor Butte member of the Chinle formation. Holes MA-12 and MA-18 also show mineralization in the Moenkopi formation immediately below the Shinarump-Moenkopi contact.

CONCLUSIONS

Exploratory drilling in the Posey locality indicates that the Posey Channel becomes a shallower and less sharply defined structural feature southeast of the area delimited by the previous investigative drilling program. Drilling in the Markey locality suggests that a continuous, well-defined channel trends in a southwesterly direction, but exploration for concealed uranium deposits would be relatively expensive because Shinarump rocks are more deeply covered by the upper Chinle and Wingate formations in that direction. Drilling depths increase rapidly to a maximum of over 1,000 feet about $\frac{1}{2}$ mile south of the drilled area.

Negative results realized from the physical exploration conducted in the more favorable areas place the Posey and Markey localities in a less important position than other uranium-producing localities in the Red Canyon area.

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Table 1. Sedimentary rocks exposed in the Red Canyon area.

SYSTEM	FORMATION	THICK- NESS (feet)	DESCRIPTION
Jurassic	Navajo sandstone	300 /	Massive, cross-bedded, buff to white sandstone.
Jurassic (?)	Kayenta formation	200 /	Interbedded dark red thin-bedded medium-grained sandstones and thin beds of reddish-brown siltstone and mudstone.
Triassic	Wingate sandstone	300	Massive, orange to reddish-brown, fine-grained eolian sandstone.
	Middle and Upper	380 to 550	Reddish-brown, thin-bedded, calcareous mudstones, siltstones and sandstones overlying gray to green bentonitic clays and purple or chocolate brown mudstones and numerous sandstone lenses.
	Chinle formation Moss Back member	0-50	White to light gray, medium-grained to conglomeratic quartzose sandstone.
	Chinle formation Monitor Butte member	140 to 250	Variegated bentonitic clays and mudstones with numerous sandstone lenses.
	Chinle formation Shinarump member	0-40	Light gray lenticular sandstone with interbedded mudstone
	Chinle formation Moenkopi formation	176 to 220	Interbedded chocolate brown siltstone and light brown fine-grained sandstone.
Permian	White Rim member	0-20	Massive, white sandstone.
	Hoskinnini tongue	120	Reddish-brown, fine-grained massive sandstone.
	Organ Rock tongue	200 to 300	Reddish-brown siltstone and fine-grained sandstone.
	Cutler formation Cedar Mesa member	1000 /	Buff to white, cross-bedded, fine-grained eolian sandstone with thin beds of reddish-brown siltstone in the upper part.

Table 2. Diamond Drill Hole Data, Posey and Markey Localities, Red Canyon Area, Utah

Hole No.	Collar Elev.	Coordinates		Footage Drilled	Footage Cored	Depth Trs-Trm Contact	Shinarump Thickness	Uranium Occurrence			Sample Assay Data				
		North	East					Sample No.	Interval	Grade	Formation	U ₂ O ₈ %	U ₃ O ₈ %	Cu%	CaO%
PO-29	5048.6	98,485.3	103,086.9	128	48	118.9	18.9	30451	117.9 - 118.9	Barren	Shinarump	Nil	-	0.00	1.3
PO-30	5036.7	98,317.0	103,171.9	108	31	100.9	20	30452	99.9 - 100.9	Barren	Shinarump	Tr	-	0.05	8.2
PO-31	5041.6	98,178.9	103,103.4	118	38	112.0	32	30454	111.0 - 112.0	Barren	Shinarump	Nil	-	0.00	14.5
PO-32	5082.4	97,965.2	103,286.6	152.5	57.5	147.3	36.3	30453	146.3 - 147.3	Barren	Shinarump	Tr	-	0.06	8.5
PO-33	5039.7	99,031.7	102,571.5	139.5	31.5	129.5	21.5	30455	128.5 - 129.5	Barren	Shinarump	Nil	-	0.15	11.2
PO-34	5050.1	98,837.8	102,716.1	140	40	135.9	15.4	30456	120.0 - 121.0	Ore	Monitor Butte	0.07	0.10	0.00	0.3
								30457	134.9 - 135.9	Barren	Shinarump	Nil	-	0.11	11.0
PO-35	5071.2	98,554.5	102,652.7	157	26	152.2	4.4	30458	151.2 - 152.2	Barren	Shinarump	Tr	-	0.15	8.7
PO-36	5072.7	98,626.1	102,926.6	160	20	150.8	10.8	30459	149.8 - 150.8	Barren	Shinarump	Nil	-	0.06	6.2
PO-37	5105.7	98,360.9	102,842.2	186	21	179.6	4.2	30460	178.6 - 179.6	Barren	Shinarump	Nil	-	0.05	5.7
PO-38	5125.6	97,936.2	103,046.5	203	38	197.1	32.1	30461	196.1 - 197.1	Barren	Shinarump	Tr	-	0.05	10.7
PO-39	5128.7	97,677.1	103,370.7	202	45	195.7	38.7	30462	194.7 - 195.7	Barren	Shinarump	Tr	-	0.02	5.6
PO-40	5217.8	97,489.3	103,736.8	283.5	19.9	276.1	12.5	30463	275.1 - 276.1	Barren	Shinarump	0.02	-	0.03	7.5
PO-41	5212.6	97,521.8	103,455.4	282	10	277.5	5.5	30464	276.5 - 277.5	Barren	Shinarump	0.01	-	0.11	14.7
PO-42	5197.2	97,404.7	103,270.4	273.5	35.5	267.2	29.2	30465	266.2 - 267.2	Barren	Shinarump	0.01	-	0.00	2.0
PO-43	5234.0	97,440.2	104,012.9	280.5	18.5	273.7	11.7	30466	272.7 - 273.7	Barren	Shinarump	0.01	-	0.16	20.6
PO-44	5220.9	97,609.6	104,324.6	260	20	258.7	18.7	30467	257.7 - 258.7	Barren	Shinarump	0.01	-	0.11	19.0
PO-45	5237.8	97,404.5	104,311.4	286	20	277.7	11.7	30468	276.7 - 277.7	Barren	Shinarump	0.01	-	0.12	22.1
PO-46	5377.8	97,010.0	103,872.0	437.5	17.5	427.5	7.5	30473	426.5 - 427.5	Barren	Shinarump	Tr	-	0.05	11.5

Hole No.	Collar Elev.	Coordinates		Footage Drilled	Footage Cored	Depth Trs-Trm Contact	Shinarump Thickness	Uranium Occurrence			Sample Assay Data				
		North	East					Sample No.	Interval	Grade	Formation	U3O8e%	U3O8%	Cu%	CaCO3
MA-8	4746.7	103,783.2	96,145.4	50	30	44.3	24.3	30469	43.3 - 44.3	Barren	Shinarump	0.01	0.00	0.09	23.1
MA-9*	4757.5	103,701.5	96,232.8	63.5	43.5	58.4	38.4	30470	48.0 - 49.0	Barren	Shinarump	0.02	0.00	0.00	0.
								30471	51.0 - 52.0	Barren	Shinarump	0.02	0.00	0.00	0.
								30472	57.4 - 58.4	Weakly Mineralized	Shinarump	0.05	0.03	2.94	18.
MA-10	4776.1	103,741.4	95,970.6	78	18	73.7	13.7	30474	72.7 - 73.7	Barren	Shinarump	0.01	-	0.00	0.
MA-11	4785.0	103,708.2	95,838.8	90	20	81.9	11.9	30475	80.9 - 81.9	Barren	Shinarump	0.01	-	0.03	13.1
MA-12	4824.4	103,595.7	95,988.4	134	47	129.9	39.9	34276	127.9 - 128.9	Weakly Mineralized	Shinarump	0.05	0.03	0.00	2.
								34277	128.9 - 129.9	Weakly Mineralized	Moenkopi	0.01	-	0.07	16.2
MA-13	4812.3	103,598.4	96,154.6	130	39	123.7	32.7	34278	122.7 - 123.7	Barren	Shinarump	0.01	-	0.22	25.0
MA-14	4840.0	103,440.5	96,163.3	156.5	36.5	151.0	31	34279	150.0 - 151.0	Barren	Shinarump	0.01	-	1.25	22.3
MA-15	4876.4	103,269.7	96,116.9	183.5	47.5	181.0	37.5	34280	168.0 - 169.0	Weakly Mineralized	Shinarump	0.02	-	0.00	0.7
								34281	178.0 - 179.0	as indicated by	Shinarump	0.02	-	0.00	4.4
								34282	180.0 - 181.0	gamma-ray log		Tr.	-	0.31	21.3
MA-16	4813.6	102,948.1	96,046.9	123	37	116.0	30	34288	89.0 - 90.0	Weakly mineralized	Shinarump	0.03	-	0.00	0.9
								34289	107.0 - 108.0	as indicated by		0.02	-	0.00	0.4
								34290	115.0 - 116.0	gamma-ray log		0.02	-	0.82	9.5
MA-17	4784.4	103,634.3	96,428.9	74	20	71.1	17.1	34291	70.1 - 71.1	Barren	Shinarump	Nil.	-	0.20	23.2
MA-18	4795.8	104,129.8	96,402.4	103	43	92.0	30.5	34292	91.0 - 92.0	Weakly mineralized	Shinarump	0.01	-	0.32	12.3
								34293	92.0 - 93.0	as indicated by gamma-ray log	Moenkopi	0.03	-	0.18	4.2
MA-19	4811.2	104,143.6	96,319.7	110	40	107.0	31.5	34295	106.0 - 107.0	Barren	Shinarump	Tr.	-	0.06	3.7

* 8.5 feet of core recovered in 10 feet run. Gamma log of this interval indicated ore.

Hole No.	Collar Elev.	Coordinates		Footage Drilled	Footage Cored	Depth Trs-Trm Contact	Shinarump Thickness	Uranium Occurrence			Formation	Sample Assay Data			
		North	East					Sample No.	Interval	Grade		U308e%	U308%	Cu%	CaCO
MA-20	4841.0	103,541.7	96,635.7	120	20	115.1	15.1	34294	114.1 - 115.1	Barren	Shinarump	Tr.	-	0.10	20
MA-21	4842.9	103,451.7	96,833.3	115	29	111.5	25.5	34296	111.4 - 111.5	Barren	Shinarump	0.01	-	0.19	17
MA-22	4884.7	103,237.9	96,672.1	165	20	158.9	13.9	34297	157.9 - 158.9	Barren	Shinarump	0.01	-	0.19	14

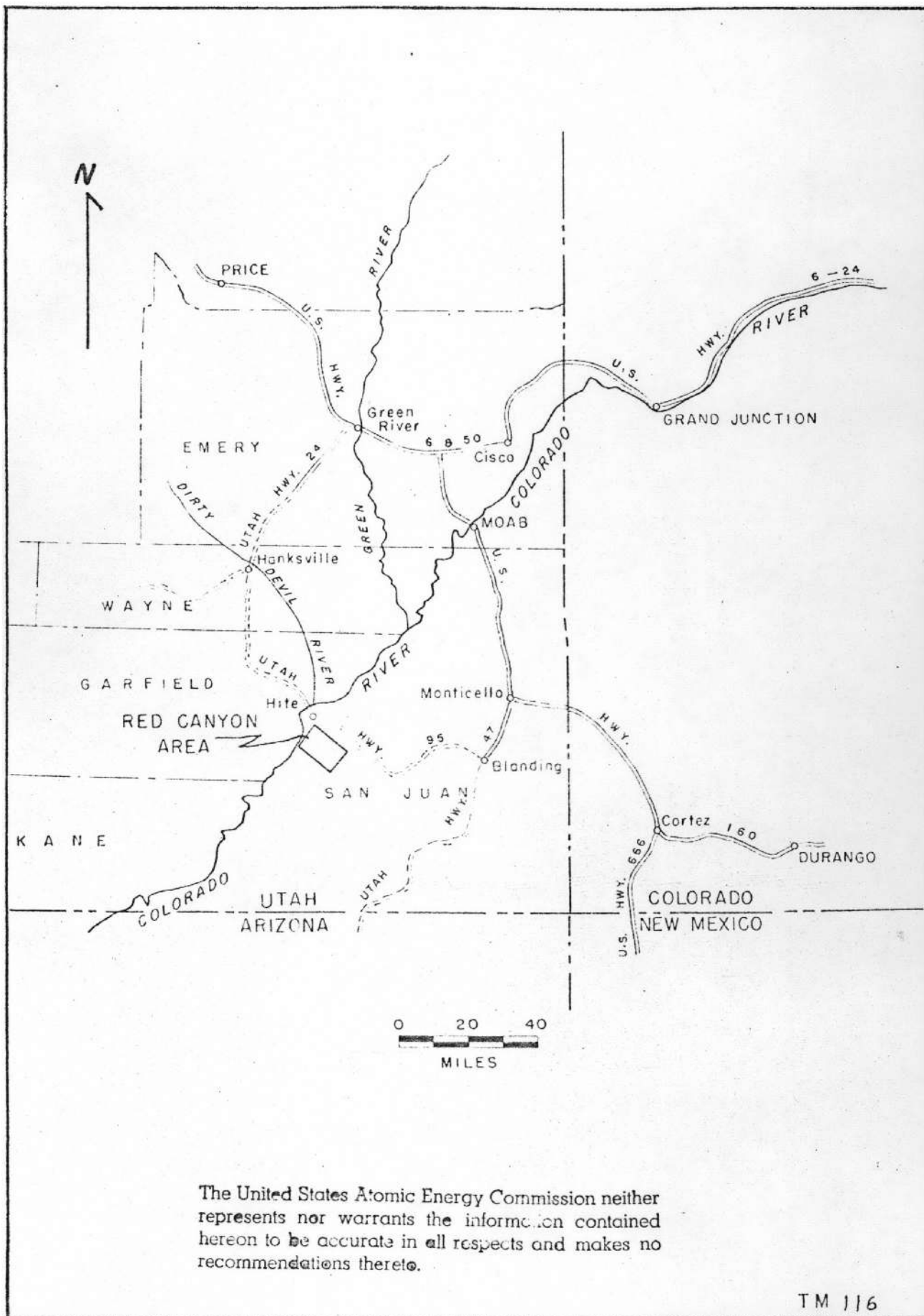


Figure 1 Index map showing location of Red Canyon area, San Juan County, Utah

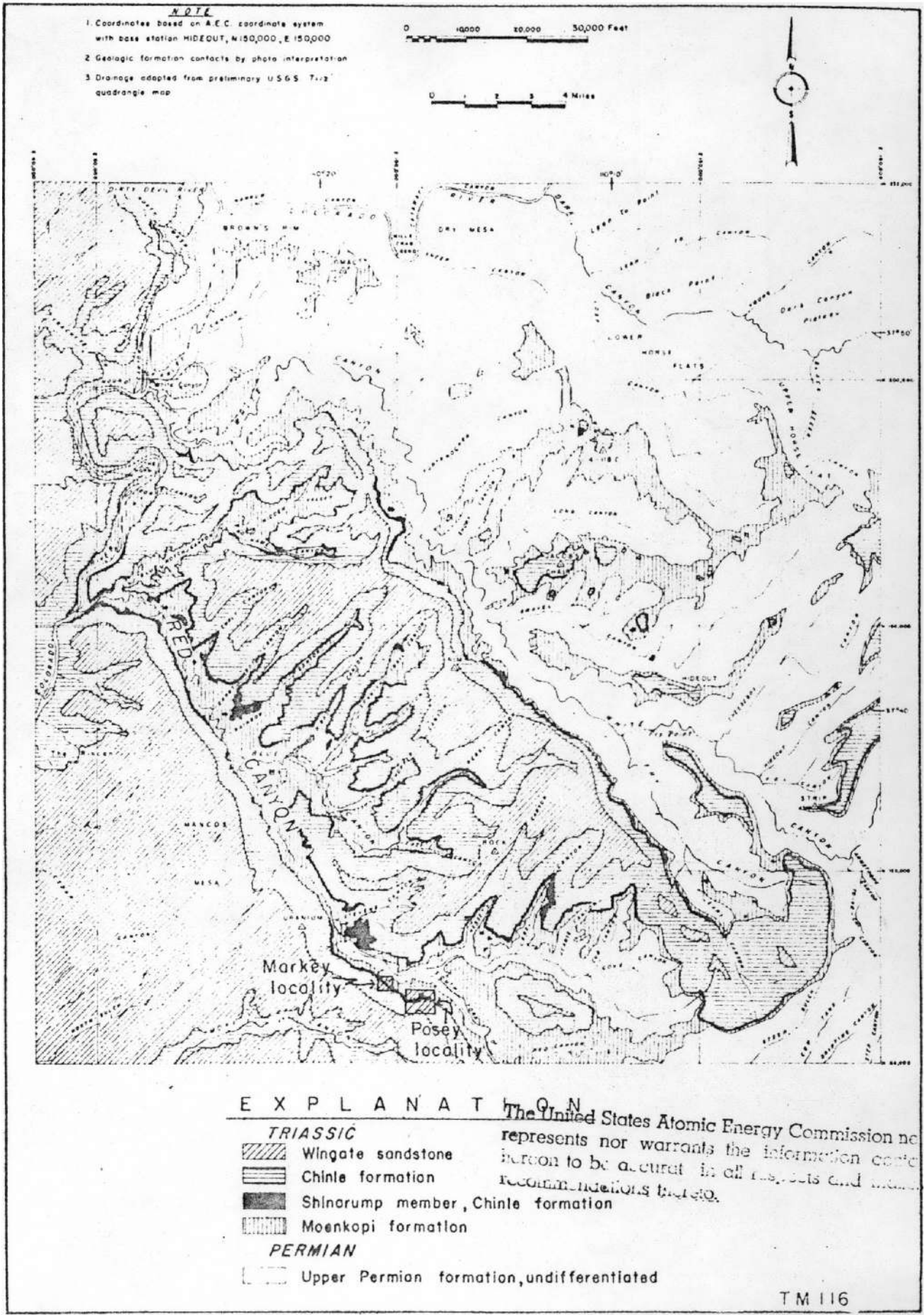


Figure 2. Geologic map of the Red Canyon area showing the Posey and Markey locations.



Figure 3. Map showing the structure of the Posey channel, Red Canyon area, San Juan County, Utah

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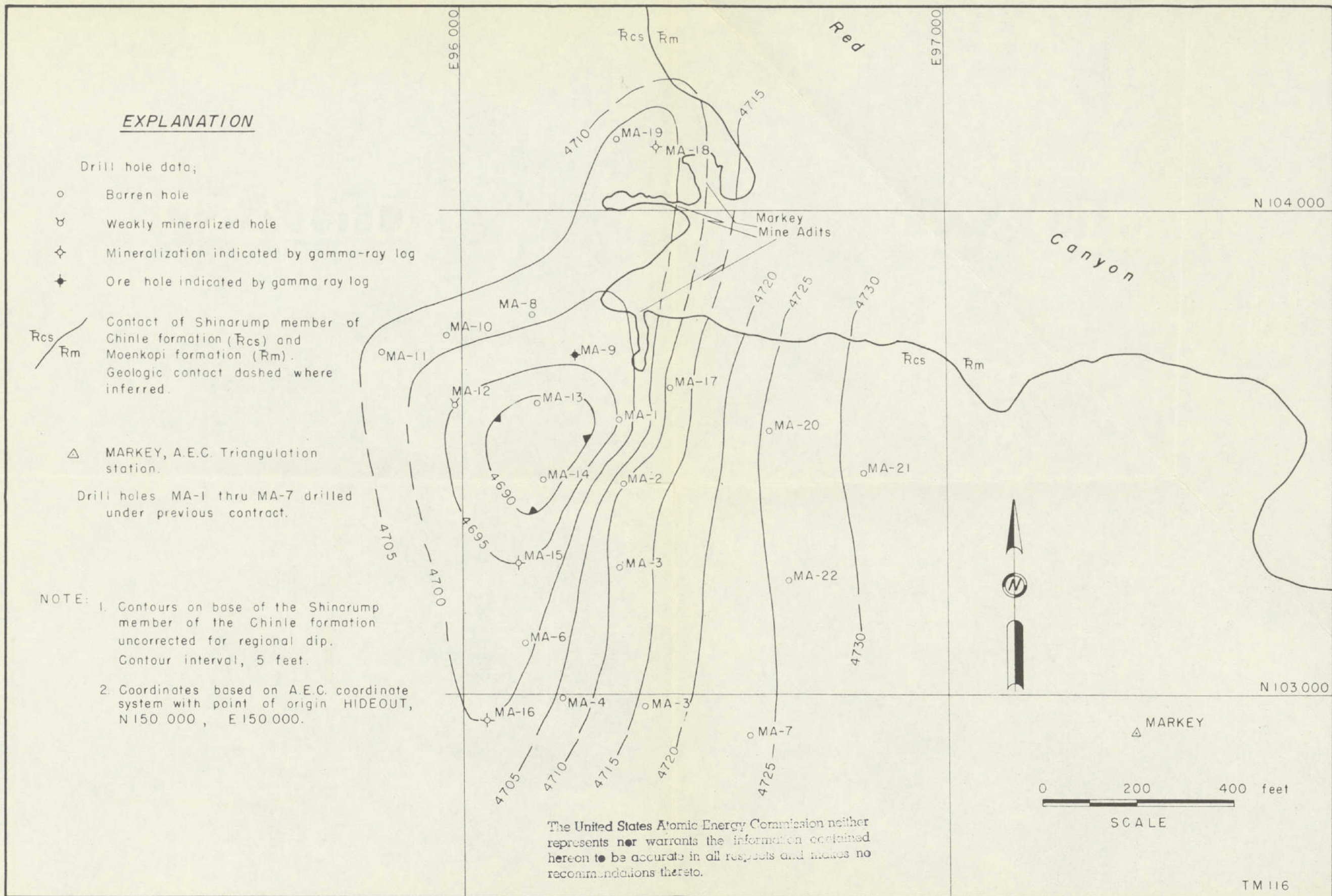


Figure 4 Map showing the structure of the Markey channel, Red Canyon area, San Juan County, Utah.