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Reconnaissance for Uranium in New Mexico in 1953

By R. L. Griggs, 1914-

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Trace Elements Investigations Report 419

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Geology and Mineralogy

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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

RECONNAISSANCE FOR URANIUM IN NEW MEXICO IN 1953*

By

Roy L. Griggs

January 1954

Trace Elements Investigations Report 419

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*This report concerns work done on behalf of the Division of Raw Materials of the U.S. Atomic Energy Commission.

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By Roy L. Griggs

ABSTRACT

In the fall of 1953 a reconnaissance search for uranium was made in the Datil area, west-central New Mexico, and in the Cerrillos, Glorieta, and Tecolote districts and the Las Vegas and Colfax Sill areas in north-central to northeastern New Mexico. Traces of radioactive materials were detected at many places and occurrences of uranium minerals that may be of possible economic significance were found in the Datil area, near the village of Datil. Small amounts of uranium are widespread in sandstone beds in the Mesaverde formation. The highest-grade sample contained 0.056 percent uranium.

INTRODUCTION

During the fall of 1953 the writer made a reconnaissance examination of several areas in New Mexico in search of uranium. The work was undertaken on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission and was a continuation of reconnaissance investigations begun in the state in 1951 (Bachman and Read, 1952). Some of the areas selected for investigation in 1953 were suggested by the results of the work of the two preceding field seasons.

The several areas examined are in west-central and north-central to northeastern New Mexico (fig. 1). Most of these areas showed evidence

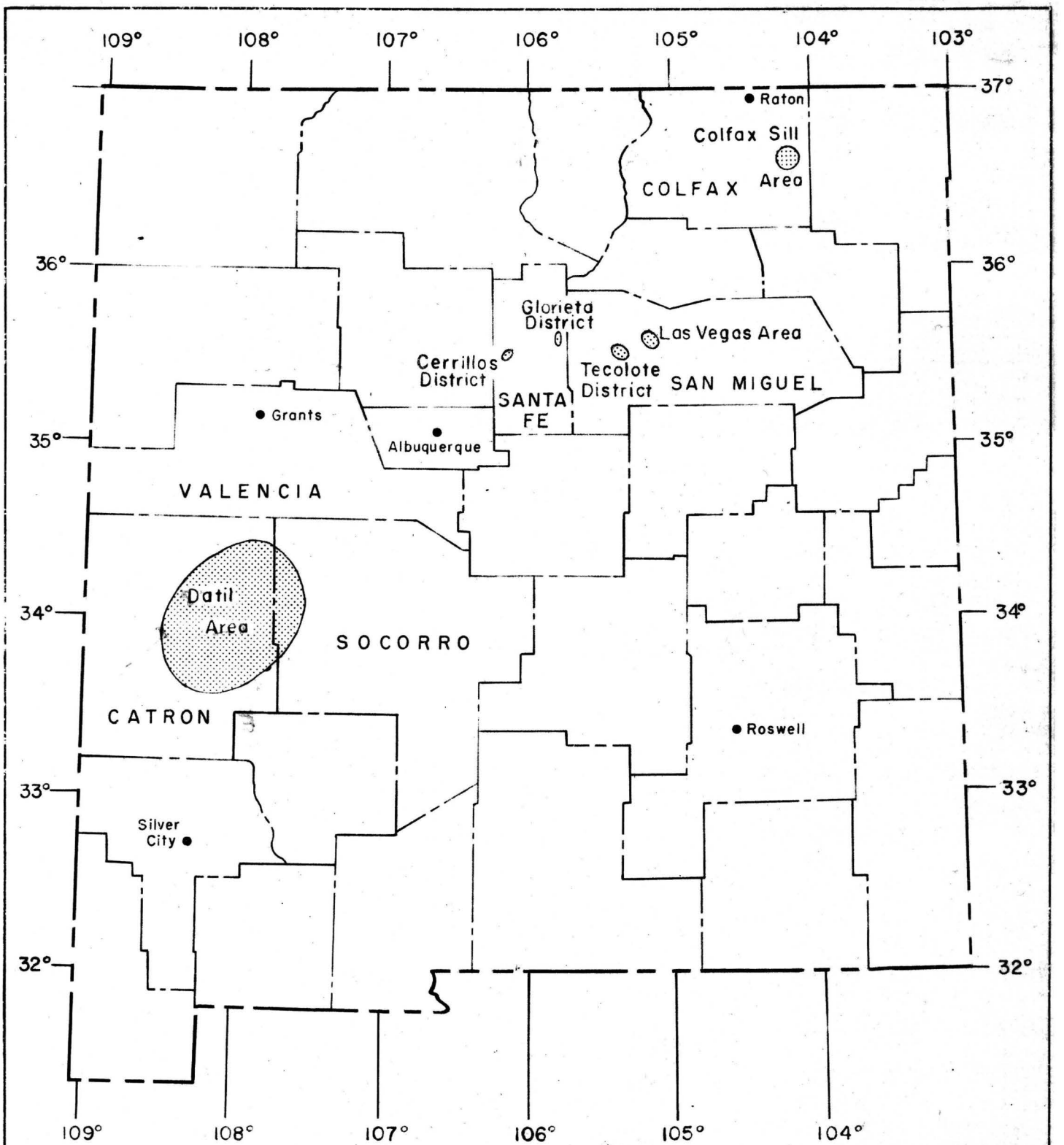

FIGURE 1.--INDEX MAP OF NEW MEXICO SHOWING AREAS EXAMINED

0 10 30 50 miles

of the occurrence of uranium, and the one in southwestern New Mexico, near the village of Datil, may contain occurrences of economic significance.

Each area was traversed by automobile and on foot using portable scintillation and Geiger counters as detection equipment. Possible source and receptor rocks were examined and sampled, and the samples were analyzed by the Denver laboratory of the U. S. Geological Survey.

DATIL AREA

Geography

The Datil area is in eastern Catron and western Socorro Counties, in the west-central part of the state; the village of Datil is a short distance northeast of the geographic center of the area. The area is a highland encompassing a large depression, the Plains of San Augustin, that trends northeastward and lies just inside the southwestern margin of the Colorado Plateau. The highland is in various stages of dissection. In places it is mountainous and in places it is a gently sloping plateau. The Plains of San Augustin is a closed depression covered by Quaternary deposits.

Most parts of the area are accessible from U. S. Highway 60, State Highway 12, and several secondary roads.

Geologic setting

Relatively little is yet known of the regional geology. The rocks

of the area are in large part of volcanic origin and are of late Tertiary age, but late Cretaceous and early Tertiary sediments are present at the northern tip of the area, and Quaternary alluvium is widespread within the Plains of San Augustin. Some Quaternary basalt also is present locally.

Stratigraphy

The late Cretaceous and early Tertiary rocks at the northern tip of the area belong to the Mesaverde and Baca formations (fig. 2). The Mesaverde is by far the more extensive of these two units, and where examined it consists of two general types of lithology. A lower undifferentiated portion is at least 250 feet thick and is composed mainly of dark-colored carbonaceous shale and grayish sandstone. The shale commonly weathers greenish-gray. The upper part of the formation also is a distinct unit about 300 feet thick composed mainly of light-gray to gray sandstone which weathers greenish-buff and forms prominent cuestas. Carbonaceous shale, interbedded in the sandstone, generally occurs in relatively thin lentils.

The Baca formation of early Tertiary age is exposed locally between outcrop bands of the Mesaverde formation and the Datil formation. It lies disconformably on the upper member of the Mesaverde and is composed of an alternating sequence of gray sandstone and maroon shale beds. The unit has a maximum thickness of approximately 300 feet.

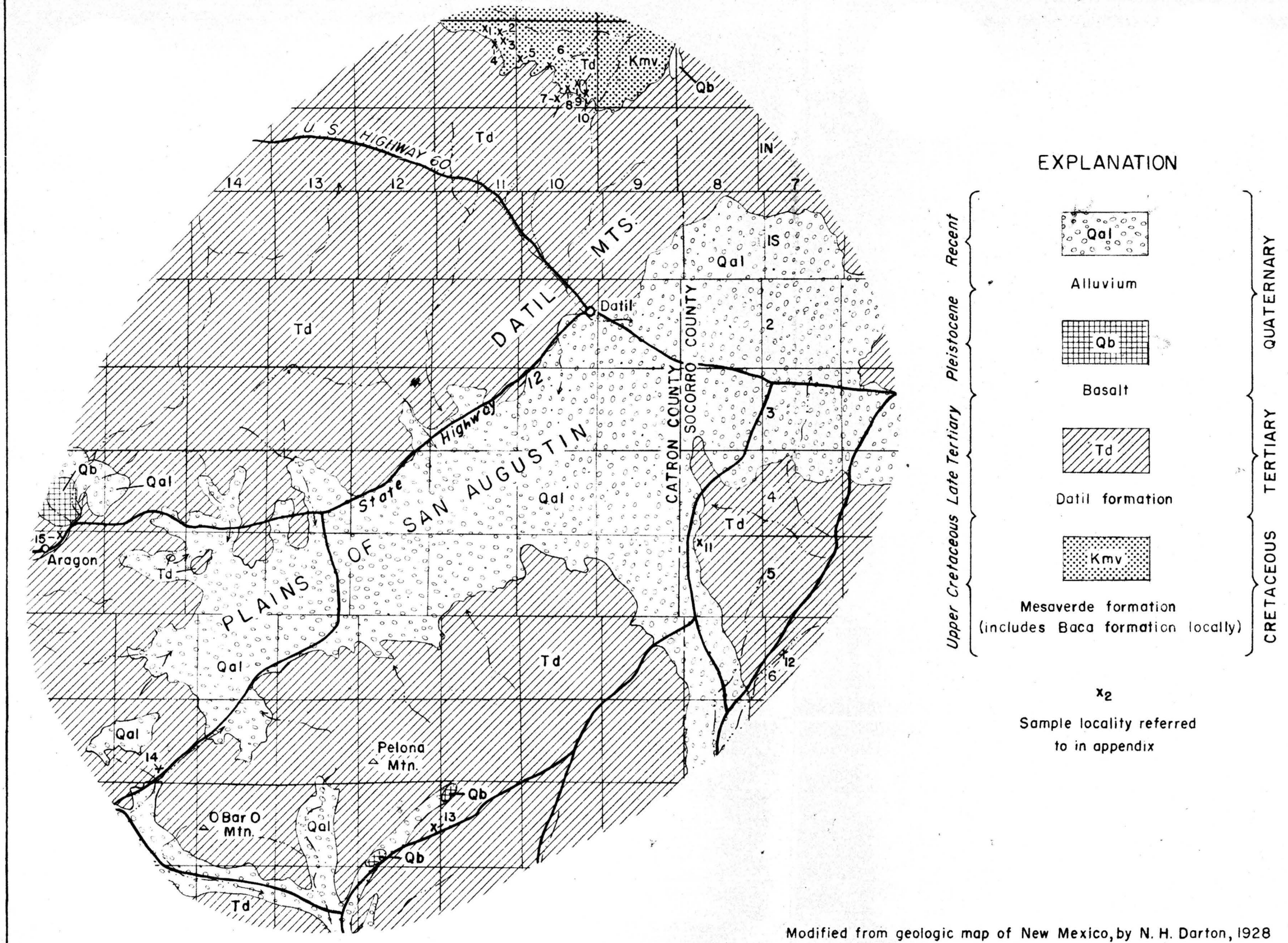

FIGURE 2.--GEOLOGIC MAP OF DATIL AREA, CATRON AND SOCORRO COUNTIES, NEW MEXICO

The Datil formation of late Tertiary age is separated by an angular unconformity from the underlying Mesaverde and Baca formations. The Datil is composed dominantly of rhyolitic materials. The lower part is mainly water-washed and water-laid silt, sand, and gravel with more or less admixed tuffaceous debris. The upper part is mainly welded tuff with some associated rhyolite extrusives.

Quaternary deposits cover much of the Plains of San Augustin, and Quaternary basalt flows form local patches.

Structure

The structure of the area is generally simple. The Mesaverde and Baca formations at the north end of the area generally dip 2 to 10 degrees to the south and southwest. The volcanics of the Datil formation are nearly flat-lying above the angular unconformity which truncates the underlying formation. North of the Plains of San Augustin, however, the volcanics dip 2 to 5 degrees northward, and south of the Plains of San Augustin they dip about the same to the south. Normal faults are present along the margins of the Plains of San Augustin although the faults are largely concealed by alluvium. Beds of welded tuff that are downfaulted to low elevations in the interior of the Plains, and rhyolite domes in the interior and at the margins of the Plains suggest that this prominent closed depression is a collapsed volcanic trough.

Uranium occurrences

Uranium minerals in the Datil area were noted first by Mr.

Jeff Tietjen, a local rancher, who found several radioactive localities in the winter of 1951-1952.

Uranium is present in traces in some of the rocks of the Datil formation, but the best occurrences are in the cuesta-forming upper member of the Mesaverde. Uranium was detected in this sandstone unit at several localities in a narrow belt north of and parallel to the contact of the Mesaverde and the overlying Datil formation. Known localities are in T. 2 N., Rs. 10 and 11 W. (fig. 2). The localities are distributed along the strike of the sandstone member for a distance of about 10 miles. Uranium may occur at other localities in this same belt of outcrop which extends both to the southeast and the northwest of the known uranium-bearing areas. The total length of the belt in the sandstone member may be about 15 miles. Uranium may also be present in the sandstone up dip to the north and down dip to the south, beneath the Datil formation (fig. 3). Still another possibility is the Baca formation. This early Tertiary unit, overlain with angular unconformity by the Datil formation, may have transmitted uraniferous solutions, and uranium may have been precipitated in places where conditions were favorable.

Uranium is generally localized at the contact of sandstone and shale beds, and the highest grade material lies in the basal portion of sandstone beds directly above shale beds. Less intense radioactivity commonly extends downward for a few inches into the underlying shale. The zone of the most intense mineralization generally ranges in thickness from a feather edge to about three inches. The best locality found thus far is not of ore grade. The two best samples (Nos. 2 and 3a)

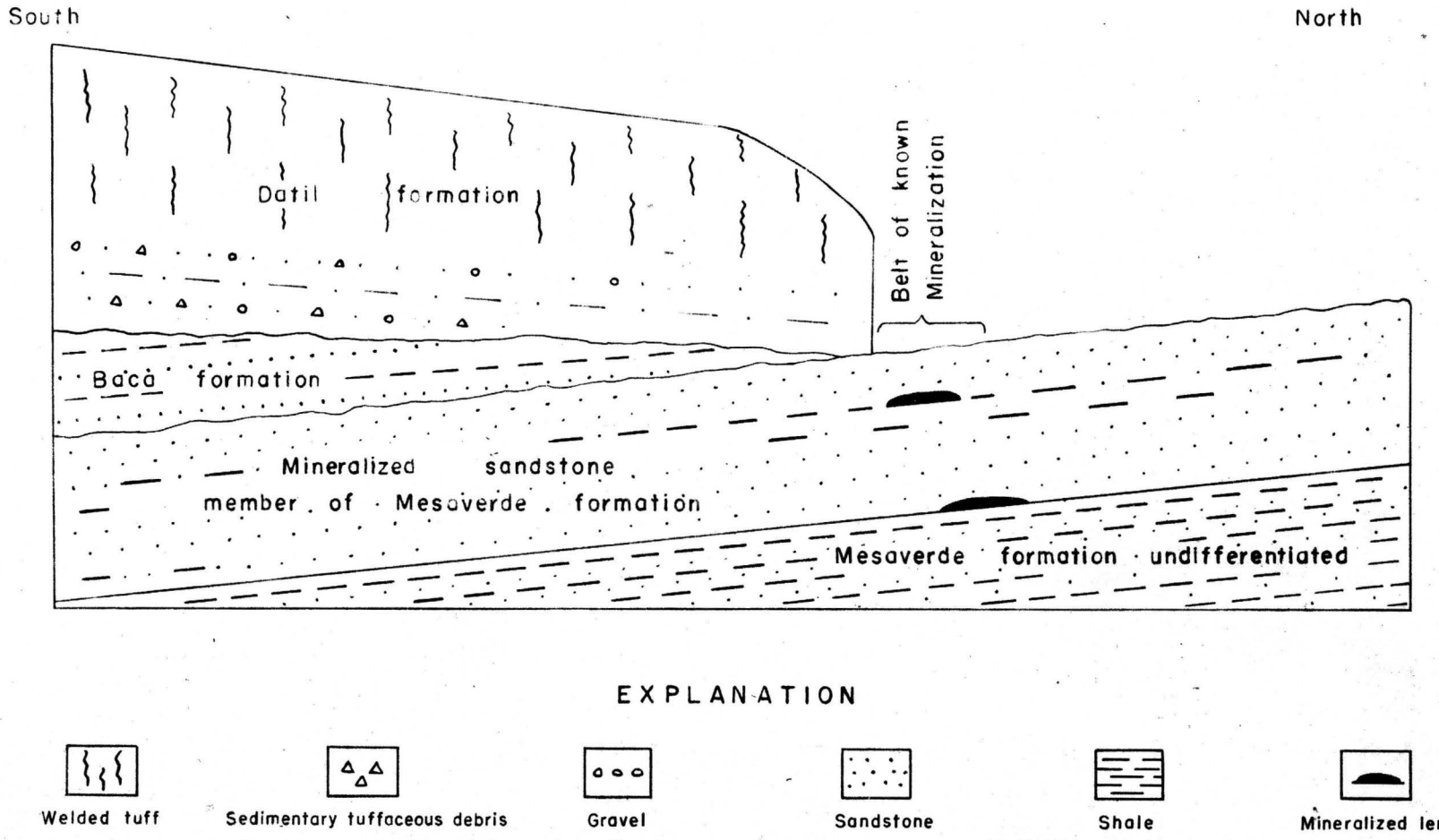

FIGURE 3.--DIAGRAMMATIC CROSS SECTION OF THE NORTHERN PART OF THE DATIL AREA SHOWING STRATIGRAPHY, STRUCTURE, AND MINERALIZED LENSES

contain 0.056 and 0.042 percent uranium respectively. However, little is known of the lateral extent of mineralization at any given locality because of the reconnaissance nature of the survey and because the mineralized zones are largely covered by talus.

The uranium minerals appear to be of the carnotite type associated with organic material and limonite. At most localities the organic material consists of carbonized leaves and twigs, or disseminated plant remains. Some beds of sandstone appear to be oil stained. The limonite consists of thin films or layers deposited along the bedding plane between the mineralized sandstone and the underlying shale. At several localities the limonite contains radioactive material, and at two localities it is associated with a yellow uranium mineral.

Field-counter measurements indicate that the oldest parts of the Datil formation, the water-washed and water-laid silts, sands, and gravels and the older welded tuffs, are essentially nonradioactive. The youngest rocks of the Datil formation, however, such as the welded tuffs and rhyolite domes, are radioactive and contain traces of uranium. A sample from locality No. 13 (fig. 2; also appendix) is considered representative of the younger welded tuffs. This sample (No. 13) contains 0.003 percent equivalent uranium and 0.0006 percent uranium. Samples from the rhyolite domes at localities Nos. 11, 14, and 15 all contain 0.003 percent equivalent uranium, and 0.0005, 0.0006, and 0.0011 percent uranium, respectively.

Origin

The uranium in the sandstone member of the Mesaverde formation is believed to have been deposited by ground water after the consolidation of the sandstone and associated shale. Deposition by ground water is indicated by (1) the occurrence of mineralized zones in sandstone directly above beds of impervious shale, and (2) the apparent lack of a relation of the mineralization to a fracture system. The characteristic occurrence of a thin crust of limonite along bedding planes between mineralized sandstone and underlying shale beds indicates that the rocks were consolidated prior to formation of the limonite although the limonite may be pseudomorphous after a parent iron-bearing mineral. Field counter measurements show that the limonite invariably contains some uranium, and at two localities the limonite is closely associated with a yellow uranium mineral. At one of these localities the uranium mineral impregnates the basal portion of a sandstone bed directly above a limonitic crust. At the other locality the uranium mineral occurs as irregular stains within the limonite. The uranium mineral may have been deposited at the same time as the limonite or later.

Descending meteoric waters may have leached radioactive material from tuffaceous rocks of the Datil formation and carried and deposited it at its present locations in the Mesaverde formation. The mineralization is closely associated with the tuffaceous rocks of the Datil formation which rest with angular unconformity on the mineralized sandstone of the Mesaverde.

CERRILLOS MINING DISTRICT

The Cerrillos mining district is in the Cerrillos Hills in west-central Santa Fe County, about 15 miles southwest of the town of Santa Fe. The district has been a relatively unimportant metal producer but has been intermittently active for a long time. Silver, lead, zinc, and a little copper have been produced since 1879, and turquoise was mined by the Indians in pre-Spanish times. The value of production from 1904 to 1928 amounted to about $175,000 (Lasky and Wootton, 1933, p. 95).

The mineralized parts of the district are associated with a group of small intrusives of monzonitic composition which have invaded sedimentary rocks of late Cretaceous and early Tertiary age. Most of the mineralized localities are in steeply dipping shear zones that cut the intrusives (Lindgren, et al., 1910, p. 167). Silver-bearing galena, sphalerite, and chalcopyrite are the chief ore minerals.

The reconnaissance survey of the district found little radioactive material associated with the lead-zinc minerals. Low-level radioactivity in the district, however, was found invariably to accompany a type of alteration that is best developed in association with the turquoise deposits of the area. Rocks affected by this type of alteration are readily recognizable by their white to light-gray color, and by the presence of kaolinite (?) and fine-grained silica. They occur along shear zones that cut some of the intrusives and in highly fractured ground adjacent to the shear zones. The reconnaissance examination suggests that the altered zones may be found only in a fine-grained gray latite.

The most prominent observed areas of alteration are at abandoned turquoise mines, of which there are two in the district. One is in the southeastern part of the district in sec. 5, T. 14 N., R. 8 E., and the other is in a low hill to the northeast of the main part of the district in sec. 21, T. 15 N., R. 8 E. A sample (No. 16) of altered material taken at the former locality contains 0.003 percent equivalent uranium and 0.0009 percent uranium. Turquoise, hand separated from the sample (No. 16a), contains 0.002 percent equivalent uranium and 0.0007 percent uranium. Two samples were collected at the locality in the northeastern part of the district. Both contain small amounts of turquoise. One of them (No. 18) contains 0.009 percent equivalent uranium and 0.0085 percent uranium, and the other (No. 19) contains 0.007 percent equivalent uranium and 0.001 percent uranium. A sample of relatively unaltered intrusive rock from this locality contains 0.003 percent equivalent uranium and 0.0005 percent uranium (No. 20). Other localities are less altered, as for example the old Evelyn mine in sec. 19, T. 15 N., R. 8 E. where the alteration is associated with oxidized copper minerals. A sample (No. 21) from this locality contains 0.005 percent equivalent uranium and 0.0007 percent uranium. (See appendix.)

Two other samples were collected in the district. Sample No. 17 is a relatively fresh, medium-grained monzonite collected from the dump of the Cash Entry mine in sec. 5, T. 14 N., R. 8 E. It contains 0.002 percent equivalent uranium and 0.001 percent uranium. Sample No. 22 was taken in sec. 8, T. 14 N., R. 8 E. where Mancos shale is in contact

with one of the intrusive bodies. The slightly altered shale contains 0.002 percent equivalent uranium and 0.0004 percent uranium. (See appendix.)

GLORIETA DISTRICT

The Glorieta district lies near the village of Glorieta in east-central Santa Fe County about 15 miles southeast of the town of Santa Fe. The northern part of the district is in rugged terrain at the south end of the Rocky Mountains, and the southern part extends on to the top of Glorieta Mesa, a prominent plateau immediately south of the mountains. The surface rocks are sediments of Pennsylvanian and Permian age which are folded into a broad, southerly plunging syncline the limbs of which dip about 10 degrees in the northern and about five degrees in the southern part of the area (Read and others, 1944).

Iron and copper ores were mined in the district about 50 years ago. About 3,500 tons of iron ore was shipped from the Kennedy mine in the southern part of the area (Kelley, 1949, p. 197), and perhaps a few hundred tons of copper ore was shipped from prospects in the northern part of the area. At the Kennedy mine in sec. 23 (?), T. 15 N., R. 11 E. on Glorieta Mesa, the ore is limonite and hematite which occur as a replacement body in sandstone in the San Andres formation. The ore body is tabular and dips about five degrees to the west, and where mined it averaged about three feet in thickness. The abandoned workings consist of a small open cut and several hundred feet of underground tunnels and rooms.

The copper ore was mined from red-bed copper deposits in the Sangre de Cristo formation that is present mainly along La Cueva Creek in the northern part of the district. Chalcocite, malachite, and azurite are disseminated in arkose beds in the lower part of the Sangre de Cristo formation which dips about 10 degrees to the west.

Samples were collected at two localities in the Glorieta district. A grab sample (No. 24) of hematite ore from the Kennedy mine contains 0.001 percent equivalent uranium and 0.0005 percent uranium. A grab sample (No. 23) of copper ore from a three-foot bed of arkose in sec. 14, T. 16 N., R. 11 E. contains 0.002 percent equivalent uranium and 0.0004 percent uranium. (See appendix.) Copper prospects in Glorieta Canyon are not radioactive and were not sampled.

TECOLOTE DISTRICT

The Tecolote district lies in western San Miguel County about 10 miles southwest of Las Vegas. The exposed rocks are, in ascending order, the Magdalena group of Pennsylvanian age, the Sangre de Cristo formation of Pennsylvanian and Permian age, and the Yeso and San Andres formations of Permian age. Along the western margin of the area these rocks form a steep, easterly dipping monocline, but over the greater part of the area they are nearly flat-lying (Read and others, 1945; Northrop and others, 1946).

The district consists of several abandoned prospects and two abandoned mines which were worked for copper around the turn of the century and again during the first World War. The deposits occur in

arkose beds in the Sangre de Cristo formation. The ore minerals are chalcocite, bornite, malachite, and azurite (Lindgren, and others, 1910, pp. 116-123).

Several of the abandoned prospects were examined for uranium in 1953. All of the prospects examined are within the bounds of the Tecolote Grant; most of them are on a hill about one mile north of the village of Santana. Other prospects that were visited are about half a mile east of Santana, about one mile west of Tecolote, and about two miles northwest of Tecolote. No samples were taken from the prospects as very little radioactivity was noted.

One of the abandoned mines was examined. It is in sec. 8, T. 14 N., R. 15 E., along the monocline in the western part of the district. Here an arkose bed about 10 feet thick has been mined for a distance of about 250 feet along the strike and for a distance of about 25 feet down dip. A sample of copper-bearing rock (No. 26) collected from the dump contains 0.003 percent equivalent uranium and 0.0004 percent uranium. (See appendix.)

Two other samples were collected in the district. One was from an area of greenish-colored rock in an arkose bed at a place a quarter of a mile west of Tecolote. Although no copper minerals were observed at this place, a field-counter measurement was higher than at any copper prospects in the district. This sample contains 0.002 percent equivalent uranium and 0.0003 percent uranium (No. 25). Another sample was taken from a two-foot coal in the Madera limestone in sec. 8, T. 14 N., R. 15 E. A channel sample (No. 24) of this coal contains 0.001 percent

equivalent uranium and 0.0004 percent uranium. (See appendix.)

LAS VEGAS AREA

Triassic, Jurassic, and Cretaceous sediments are well-exposed in the vicinity of Las Vegas in western San Miguel County (Northrop, and others, 1946). These sediments were tested for radioactivity at several localities. At Kearny and Romeroville Gaps, two and five miles, respectively, southwest of Las Vegas, and at a point on State Highway 20 ten miles southeast of Las Vegas, traces of radioactivity are present in the Morrison and Purgatoire formations. Several beds as thick as three feet in the Morrison formation show traces of radioactivity. A three-foot shale bed at Romeroville Gap was selected as representative of this radioactivity in the Morrison and sampled. The sample (No. 28) contains 0.005 percent equivalent uranium and 0.002 percent uranium. (See appendix.)

The Purgatoire formation contains a black shale bed about 20 feet thick at its top at the three localities. A representative sample (No. 29) from this shale at Romeroville Gap contains 0.002 percent equivalent uranium and 0.0009 percent uranium. Bentonitic rocks in the Graneros shale show traces of radioactivity at a locality a quarter of a mile east of Las Vegas on State Highway 65. Ten beds of bentonite ranging from one-eighth inch to nearly one foot in thickness are present in a stratigraphic interval of about 50 feet. A representative sample (No. 30) collected from one of the beds contains 0.003 percent equivalent uranium and 0.0012 percent uranium. (See appendix.)

COLFAX SILL AREA

In eastern Colfax County an area of about 100 square miles contains abundant monzonite and syenitic sills. Most of these sills are emplaced in Graneros and Carlisle shale of late Cretaceous age although a few sills occur in Jurassic sediments. A rapid survey showed that many, perhaps most, of these intrusive rocks contain traces of radioactive materials, and one type of porphyry, a distinctive grayish-green rock with large feldspar phenocrysts, appears to be slightly more radioactive than other types. A sample (No. 31) of this rock from sec. 6, T. 27 N., R. 26 E. contains 0.008 percent equivalent uranium and 0.0041 percent uranium. A dike about 10 feet wide that leads to the overlying sill at a nearby locality cuts the Carlisle shale, and the shale is conspicuously altered for a distance of 5 to 10 feet on either side of the dike. A sample (No. 32) of the altered shale contains 0.002 percent equivalent uranium and 0.0004 percent uranium. (See appendix.)

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APPENDIX

Radioactivity and chemical analyses of samples collected

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM DATIL AREA	
1	201449	0.074	0.004	A channel sample of a lens of sandstone in the cuesta-forming member of the Mesaverde formation at a point where the lens is one foot thick. The sandstone contains carbonized leaves and twigs. Sec. 10 or 11, T. 2 N., R. 11 W.
2	201454	.062	.056	A selected sample of the lower three inches of a sandstone bed in the cuesta-forming member of the Mesaverde formation. The zone contains carbonized leaves. Sec. 11 or 14, T. 2 N., R. 11 W.
3a	201447	.056	.042	A selected sample of the lower one inch of a sandstone bed in the cuesta-forming member of the Mesaverde formation. The sample contains a yellow uranium mineral. Sec. 14, T. 2 N., R. 11 W.

Radioactivity and chemical analyses of samples collected --Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
		SAMPLES FROM DATIL AREA (cont.)		
3b	201448	0.003	0.0017	A grab sample of the upper two feet of black shale immediately below sample 3a.
4	201450		.022 ppm	A water sample from the well at the Mc Phaul Ranch house (sec. 14, T. 2 N., R. 11 W.). The well obtains water from the cuesta-forming member of the Mesaverde formation.
5a	201440	.016 (?)	.022	A grab sample of the lower eight inches of a sandstone bed in the cuesta-forming member of the Mesaverde formation. The sandstone contains shale pellets. Sec. 18 or 19, T. 2 N., R. 10 W.
5b	201441	.051	.019	A selected sample of the lower two inches of a sandstone bed in the cuesta-forming member of the Mesaverde formation. Sec. 18 or 19, T. 2 N., R. 10 W.
5c	201442	.025	.004	Limonite deposited along bedding plane immediately below sample 5b.

Radioactivity and chemical analyses of samples collected--Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM DATIL AREA (cont.)	
5d	201443	0.005	0.002	A grab sample of the upper one foot of black shale immediately below sample 5c. This shale also is immediately below the cuesta-forming member of the Mesaverde.
6	201444	.004	.002	A grab sample of sandstone from the cuesta-forming member of the Mesaverde formation. The sample contains pieces of carbonized wood. Sec. 21, T. 2 N., R. 10 W.
7	201451		.036 ppm	A water sample from the well at the Webster ranch (sec. 34, T. 2 N., R. 10 W.). The well obtains water from the cuesta-forming member of the Mesaverde formation.
8	201439	.013	.011	A grab sample of the lower six inches of a sandstone bed in the cuesta-forming member of the Mesaverde formation. Sec. 27, T. 2 N., R. 10 W.
9	201446	.095	.017	A selected sample of the lower one inch of a sandstone bed in the cuesta-forming member of the Mesaverde formation. The sample includes a thin

Radioactivity and chemical analyses of samples collected—Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM DATIL AREA (cont.)	
9 (cont.)				crust of limonite which occurs along the bedding plane beneath the sandstone. A yellow uranium mineral occurs in this limonite. Sec.26 (?), T. 2 N., R. 10 W.
10	201445	0.023	0.026	A grab sample of the lower four inches of a sandstone bed in the cuesta-forming member of the Mesaverde formation. Sec. 26, T. 2 N., R. 10 W.
11	201437	.003	.0005	A grab sample of a rhyolite dome. Sec. 5 (?), T. 5 S., R. 8 W.
12	201452		<.001 ppm	A water sample from a spring that emerges from rhyolite tuff. Sec. 20 (?), T. 6 S., R. 7 W.
13	201436	.003	.0006	A grab sample of welded tuff. Sec. 24 (?), T. 8 S., R. 12 W.
14	201438	.003	.0006	A grab sample of a rhyolite dome. Sec. 34 (?), T. 7 S., R. 15 W.
15	201434	.003	.0011	A grab sample of a rhyolite dome. Sec. 3, T. 5 S., R. 16 W.

Radioactivity and chemical analyses of samples collected—Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM DATIL AREA (cont.)	
16	201419	0.003	0.0009	A grab sample of kaolinized (?) and silicified latite from a turquoise mine in sec. 5, T. 14 N., R. 8 E.
16a	201420	.002	.0007	A selected sample of turquoise separated from sample 16.
17	201421	.002	.0010	A grab sample of a medium-grained monzonite from the dump of the Cash Entry mine. Sec. 5, T. 14 N., R. 8 E.
18	201424	.009	.0085	A grab sample of kaolinized (?) and silicified latite from a turquoise mine in sec. 21, T. 15 N., R. 8 E. Clay is predominant in this sample.
19	201425	.007	.0010	A grab sample of kaolinized (?) and silicified latite from a turquoise mine in sec. 21, T. 15 N., R. 8 E.
20	201423	.003	.0005	A grab sample of relatively unaltered latite from the same locality as samples 18 and 19.

Radioactivity and chemical analyses of samples collected--Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM DATIL AREA (cont.)	
21	201426	0.005	0.0007	A grab sample of kaolinized (?) and silicified latite from the Evelyn copper mine. Sec. 19, T. 15 N., R. 8 E.
22	201422	.002	.0004	A grab sample of slightly altered Mancos shale adjacent to the contact with a monzonitic intrusive. Sec. 8, T. 14 N., R. 8 E.
23	201427	.002	.0004	A grab sample of copper ore from a three-foot bed of arkose in the Sangre de Cristo formation. Sec. 14 (?), T. 16 N., R. 11 E.
24	201428	.001	.0005	A grab sample of iron ore from the San Andres formation at the old Kennedy mine. Sec. 23 (?), T. 15 N., R. 11 E.
			SAMPLES FROM THE TECOLOTE DISTRICT	
25	201431	.002	.0003	A grab sample of a green area in an arkose bed in the Sangre de Cristo formation. The locality is one-quarter mile west of the village of Tecolote.

Radioactivity and chemical analyses of samples collected—Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM THE TECOLITE DISTRICT (cont.)	
26	201430	0.003	0.0004	A grab sample of copper ore collected from the dump of the old Blake mine in sec. 8, T. 14 N., R. 15 E.
27	201429	.001	.0004	A channel sample of a bed of coal two feet thick in the Madera limestone. Sec. 8, T. 14 N., R. 15 E.
			SAMPLES FROM THE LAS VEGAS AREA	
28	201432	.005	.0020	A channel sample of a bed of shale three feet thick in the Morrison formation. The locality is Romeroville Gap, five miles south of Las Vegas, N. Mex.
29	201433	.002	.0009	A channel sample of a bed of bony shale one foot thick present in a carbonaceous shale unit in the Purgatoire formation. The locality is Romeroville Gap, five miles south of Las Vegas, N. Mex.
30	201434	.003	.0012	A channel sample of a 10-inch bentonite bed in the Graneros shale. The locality is one-quarter mile east of Las Vegas, N. Mex.

Radioactivity and chemical analyses of samples collected—Continued

Sample and locality number	Laboratory serial number	Equivalent uranium (percent)	Uranium (percent)	Description
			SAMPLES FROM THE COLFAX SILL AREA	
31	201455	0.008	0.0041	A grab sample of a grayish-green sill emplaced in the Carlisle shale in sec. 6, T. 27 N., R. 26 E.
32	201456	.002	.0004	A grab sample of altered Carlisle shale adjacent to a dike. Sec. 6, T. 27 N., R. 26 E.

USGS TEI-419, PART II

PLANS

Additional reconnaissance is planned of the Mesaverde formation, and other Cretaceous rocks, and the Baca formation in areas where these formations are overlain by the Datil formation. These areas lie in northwestern Socorro County and northeastern and northwestern Catron County. The reconnaissance will include sketch mapping on photo mosaics of the distribution of the Datil formation and the underlying non-tuffaceous units. Some detailed mapping may be done if uranium occurrences are found in the reconnaissance.