# ROSAMOND PROSPECT,

# KERN COUNTY, CALIFORNIA

By George W. Walker

Trace Elements Memorandum Report 514

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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GEOLOGICAL SURVEY

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George W. Walker



February 1953

Trace Elements Memorandum Report 514

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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 George W. Walker

## ABSTRACT

Small quantities of autunite and gummite (?) occur in tuffaceous sedimentary rocks of the Rosamond formation of Miocene age at the Rosamond prospect. The property is about 10 miles southeast of Mojave, Kern County, California, in the western Mojave Desert.

Examination of the property in January 1952, by George W. Walker and Luther H. Baumgardner of the U. S. Geological Survey, indicates that the autunite occurs principally as coatings on fracture and joint surfaces and, to a less extent, as disseminations in the tuffaceous rocks adjacent to faults. A waxy, reddish-brown, radioactive mineral, here called gummite (?), is found in small quantities on slickensided fault surfaces associated with iron oxides and chlorite (?). The uranium minerals are erratically distributed over an area of about 15 acres. Assays of 12 samples indicate a uranium content ranging from 0.002 to 0.59 percent and an average content of slightly less than 0.08 percent uranium.

# INTRODUCTION

Secondary uranium minerals occur both as fracture coatings and as disseminations in tuffaceous sedimentary rocks at the Rosamond prospect. The prospect, which is in a group of low hills at an elevation of 2,700 feet, is in the western Mojave Desert, about 10 miles southwest of the town of Mojave, Kern County, Calif., in the S1/2 sec. 25, T. 10 N., R. 13 W., San Bernardino base and meridian (fig. 1). The area in which the mine is located--locally referred to as the Soledad, Rosamond, or Mojave mining district though probably not in an organized mining district--is best known for the production of gold and silver which occur with base-metal sulfides in a series of quartz veins that cut dacite flows and plugs. All of the larger gold and silver properties are 2 miles or more from the Rosamond prospect.

The Rosamond prospect may be reached by hard surfaced roads from Rosamond, Calif., by driving west 3.8 miles toward Willow Springs and then north on the Tropico-Mojave road a distance of 4.4 miles. The property lies about 200 feet west of the Tropico-Mojave road. Rosamond is on U. S. Highway No. 6 and on the Southern Pacific Railroad.

Mr. Clifford Gillespie, 5330 Russell Avenue, Hollywood 27, Calif., has a Master Lease covering the south half of section 25, and is the present operator of the Rosamond prospect.

The mine workings at the property, driven exclusively in prospecting for uranium, consist of a short adit, a 20-foot shaft, and numerous shallow pits. The present lessees of the property have drilled a total of 15 test holes, which range from 1.5 feet up to 19 feet in depth; only 11 of the drill holes were found when the property was examined in January 1952.

An examination of the Rosamond mine was made, at the request of the U. S. Atomic Energy Commission, by George W. Walker and Luther H. Baumgardner of the U. S. Geological Survey in January 1952. The results of a brief examination of the property in August 1950, by F. M. Chace of the U. S. Geological Survey, are contained in Trace Elements Memorandum Report 136. The examination in 1952 consisted of plane-table mapping on a scale of 100 feet equals one inch of an area approximately 900 feet by 600 feet, and of mapping the adit at a scale of 20 feet equals one inch with tape and Brunton compass (see fig. 2). The mapped area and the underground workings were tested radiometrically with a Geiger-Mueller counter (Victoreen, Model 263B), and 12 samples were taken for analysis.

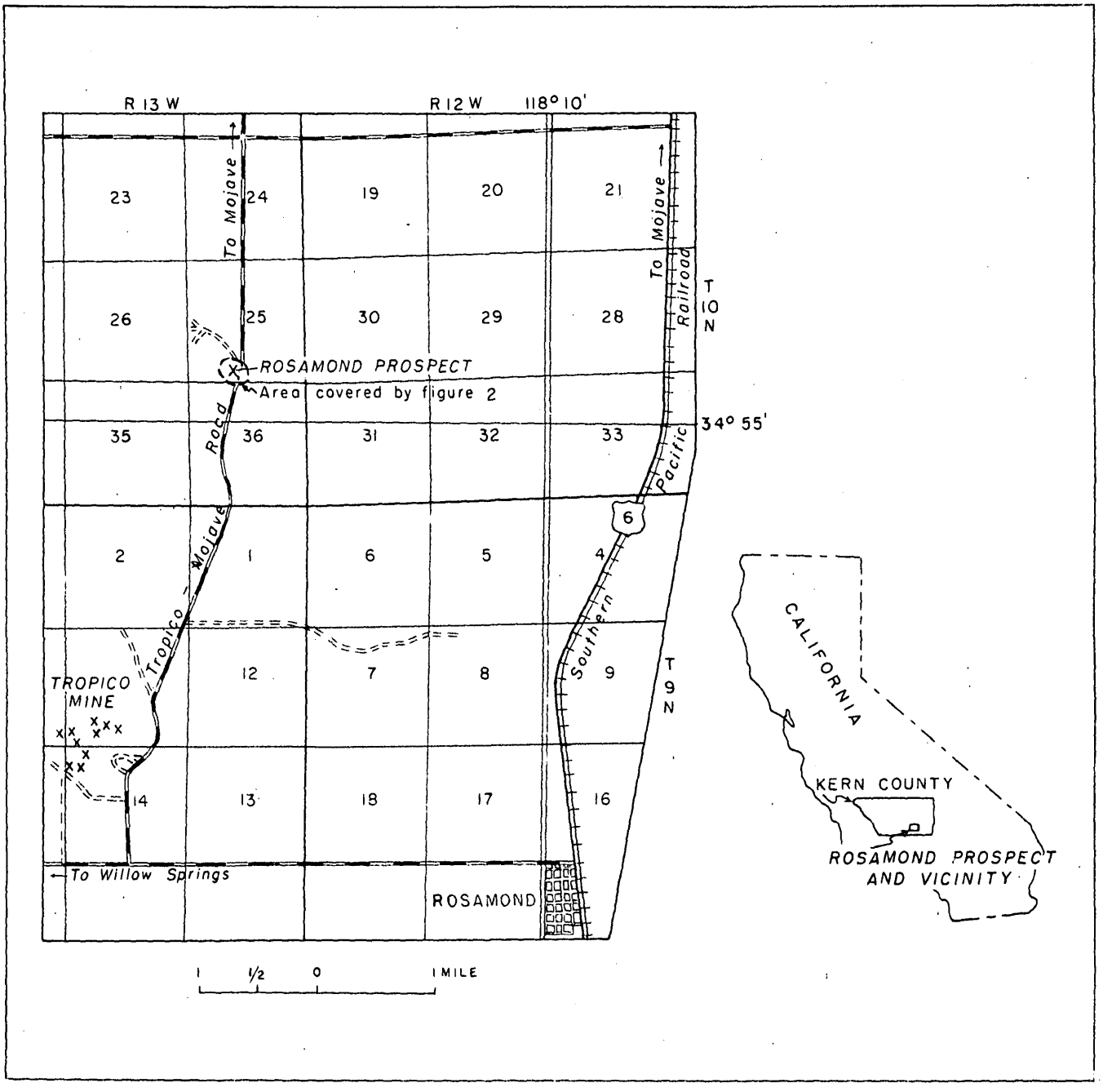


FIGURE 1.—INDEX MAP SHOWING LOCATION OF ROSAMOND PROSPECT, KERN COUNTY, CALIFORNIA

# GEOLOGY

Rocks exposed in the vicinity of the Rosamond prospect have been mapped by Simpson _/, as part of the Rosamond formation of Miocene age. The formation, as exposed near the mine, consists of a sequence of layered tuffaceous sedimentary rocks, pyroclastic breccias, and amygdaloidal flow rocks. Exposures at the base of the Rosamond formation--as found elsewhere in the region--indicate that this sequence of volcanic and layered tuffaceous rocks rests on eroded quartz monzonite, associated aplite, and pegmatite of late (?) Mesozoic age.

The basal stratum exposed near the mine is a dark, highly brecciated, amygdaloidal flow rock of andesitic or basaltic composition. Stratigraphically above and apparently conformable with the amygdaloidal flow is a sequence of layered tuffaceous sedimentary rocks that grade upward into coarse lithic tuffs and breccias of rhyolitic and dacitic composition. Excellent exposures of about 30 feet of this section, including the upper 5 feet of the amygdaloidal flow, are found on the east-facing bluff immediately above the adit portal. For 8 feet above the flow the tuffaceous rocks are thinly layered (1/4 to 8 inches), fine grained, and alternating gray and buff to white in color. A few 1- to 2-inch discontinuous beds of chert are interlayered with the tuffs. Above this 8-foot section individual beds are commonly thicker--up to 5 feet--coarser in grain size, and locally, poorly sorted. They are white, light gray, or buff in color. The poorly sorted material consists of angular chunks and blocks of flow-banded dacite suspended in the coarse lithic tuff. These blocks are mostly 2 to 6 inches, but some are as much as 3 feet in diameter. A few layers consist predominantly of poorly sorted, angular flow rock fragments with virtually no tuffaceous matrix.

Beds in the tuffaceous rocks strike northwest and dip at low angles to the southwest. The beds show a few small local flextures adjacent to the numerous northwest- and west-trending faults of which only the larger have been shown on figure 2. The faults dip at steep angles both to the north and south; some faults have displaced the tuff beds and the contact beneath the tuffs only a few inches, whereas others show a displacement of as much as 10 feet. Locally, slickensides and mullions on the fault surfaces indicate both

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_/Simpson, E. C., 1934, Geology and mineral deposits of the Elizabeth Lake Quad., California: California Jour. Mines and Geology, vol. 30, no. 4, pp. 371-415.

strike-slip and dip-slip components of movement. Commonly, on the faults, there is a 6- to 12-inch zone in which the tuffaceous beds are stained with hydrated iron oxides.

## ORE DEPOSITS

Uranium-bearing minerals are erratically distributed over an area of nearly 15 acres at and near the Rosamond prospect. In January 1952, at the time of the field examination, only limited surface and near-surface exploration had been completed on the property, so that a complete evaluation of the reserves could not be made.

A lemon yellow, commonly micaceous, fluorescent mineral, tentatively identified as autunite, occurs on joint and fracture surfaces, in iron-stained material along faults, and as sparse disseminated crystals in the tuffaceous beds adjacent to faults. Very small quantities of a brittle and waxy, dark reddish-brown to black mineral are found on slickensided fault surfaces; associated with this mineral are autunite, hydrated iron oxides, chlorite (?), and an unidentified dark green waxy mineral. Small specimens containing this assemblage are more highly radioactive than normally would be expected from the small amount of autunite that is present. The origin of the waxy minerals is unknown; primary uranium minerals were not observed on the property nor have any been identified from the surrounding area. Conceivably, the anomalous radioactivity of the material could be due to abundant submicroscopic particles of autunite either sheared or disseminated through an unidentified mineral. On the other hand, the minerals could be an alteration product of a primary uranium-bearing mineral. In this report, the waxy minerals are called gummite (?), as the physical properties are similar to those for gummite

described in Dana, 7th Ed., vol. 1, pp. 622-623.

Virtually all of the autunite occurs in the tuffs; the amygdaloidal flows underlying the tuffs were checked with Geiger-Mueller counters but very little abnormal radioactivity was found. The autunite was apparently introduced by solutions that ascended along the fault zones; the tuffs, and particularly those near the base of the tuffaceous section, were apparently the first rocks susceptible to autunite deposition encountered by the ascending solutions. Exposures on the east-facing bluff indicate that the autunite is distributed in the basal 8 or 10 feet of the tuff section for distances up to 10 feet away from the faults. The mineralized zones along faults narrow upward and, commonly, where exposed higher in the tuff section, they are only 4- to 12-inches thick.

Geiger-Mueller counter readings were taken at numerous places on the surface as well as in the underground workings. A background count of 3 divisions on the 0.2 scale was established for the tuffs exposed approximately 1,000 feet northeast of the Rosamond prospect, and a comparable background count was also established for those areas underlain by the amygdaloidal flow rocks. Abnormal radioactivity was found in numerous spots throughout the area covered by figure 2; virtually all of these spots were in the tuffaceous rocks close to the faults. Readings varied erratically from 3 divisions on the 0.2 scale to a maximum of 16 divisions on the 20 scale. The highest radioactivity found on the property occurred in the iron-stained material along the fault exposed in the adit. Very select grab samples of this material assayed 0.59 percent uranium, whereas most samples taken on the property contained appreciably less uranium. A total of 12 samples were taken in those spots where counter readings were the highest. Assays of these samples indicate a uranium content ranging from 0.002 percent to 0.59 percent and an average

content of slightly less than 0.08 percent. (table 1)

## SUGGESTIONS FOR PROSPECTING

In view of the low uranium content and the erratic distribution of uranium minerals in the tuffaceous rocks at the Rosamond prospect, it seems unlikely that an economic source of uranium can be developed; however, limited exploration of one area on the property may be justified. This work should consist of exploration of the basal 8 or 10 feet of the tuffaceous beds where they are covered by a substantial thickness of tuffs and breccias, and where they are cut by the northwest- or west-trending faults. The place that appears most feasible for such exploration is in the southwest part of the map area (fig. 2). Here, the tuffaceous section is approximately 80 feet thick and three large, steep faults are closely spaced. Adequate preliminary testing of this area could be accomplished by one--or possibly two--vertical drill holes put down to the tuff-amygdaloidal flow contact.

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Table 1. Analyses of samples, Rosamond prospect, Kern County, California

| No. 1/ | Sample description | Equivalent uranium (percent) | Uranium (percent) |
|---|---|---|---|
| 1 | Grab sample. Bedded tuffs from south wall of adit | 0.003 | 0.002 |
| 2 | Grab sample. Sandy tuff 10 feet above portal of adit | .034 | .043 |
| 3 | Select grab sample. Altered tuff along fault in adit | .110 | .130 |
| 4 | Select chip. Altered tuff along fault in adit | .360 | .590 |
| 5 | Channel sample (1.5 feet long across oxidized zone on fault above adit) | .037 | .030 |
| 6 | Channel sample (5.0 feet long across face of adit) | .006 | .004 |
| 7 | Channel sample (5.0 feet long of fines across adit floor) | .009 | .004 |
| 8 | Channel sample (11 feet long across (vert.) section of tuff beds) | .033 | .024 |
| 9 | Select continuous chip. Oxidized material from fault zone | .057 | .042 |
| 10 | Channel sample (7.0 feet long) across (vert.) section of tuff beds | .013 | .009 |
| 11 | Select grab from 3-foot bed of chert | .064 | .050 |
| 12 | Channel sample (4.0 feet long) across "chert" pit on fault | .009 | .005 |

1/ Location of samples are shown on figure 2.