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12/10/90

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: SHADOW MTN COLLAPSE

ALTERNATE NAMES:
NAVAJO COLLAPSE PIPES

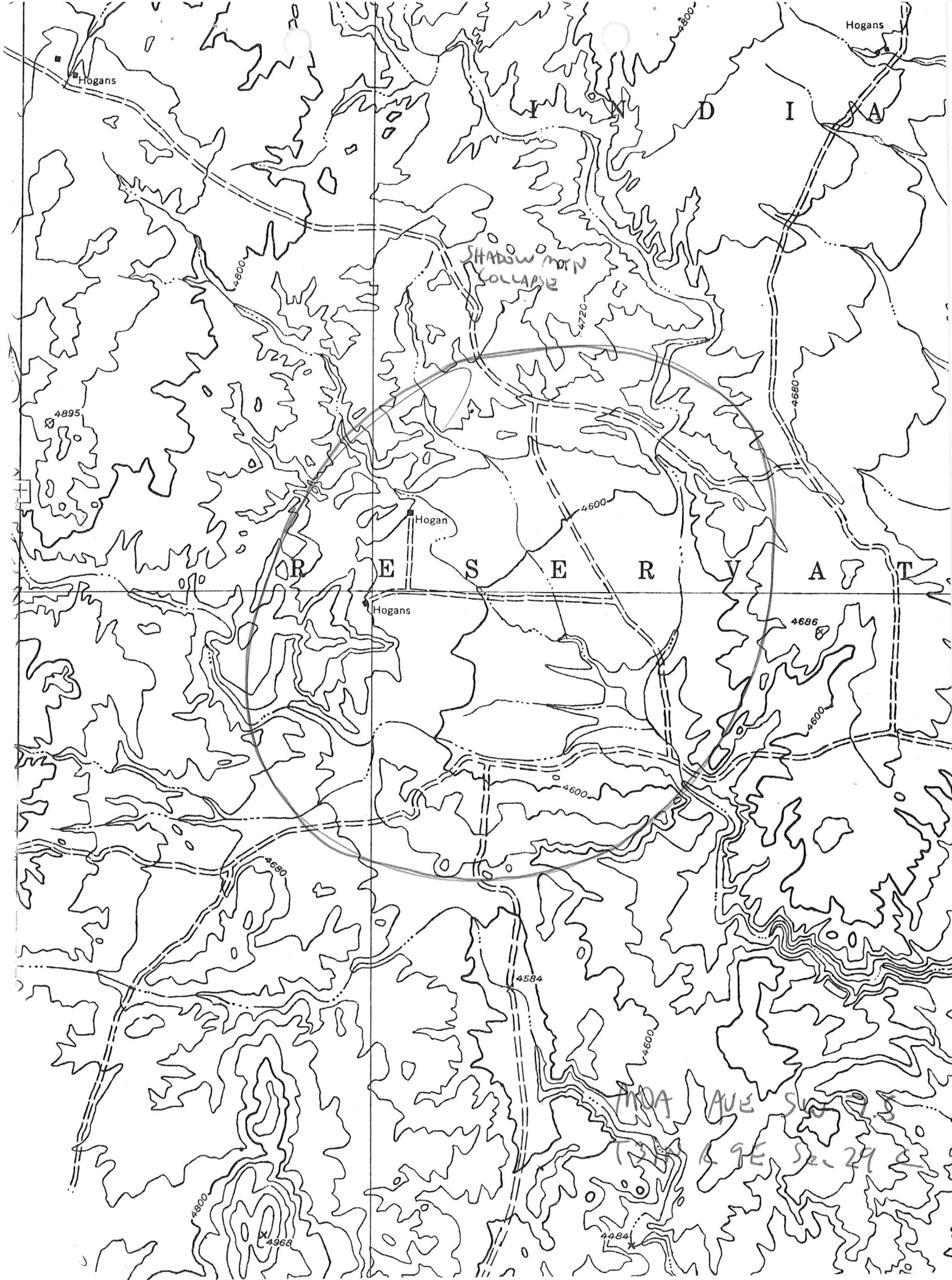
COCONINO COUNTY MILS NUMBER: 526

LOCATION: TOWNSHIP 31 N RANGE 9 E SECTION 29 QUARTER P
LATITUDE: N 36DEG 02MIN 30SEC LONGITUDE: W 111DEG 27MIN 30SEC
TOPO MAP NAME: SHADOW MTN WELL - 7.5 MIN

CURRENT STATUS: EXP PROSPECT

COMMODITY:
URANIUM

BIBLIOGRAPHY:
ADMMR SHADOW MTN COLLAPSE FILE
USGS BULL 1622, P. 201
GSA FIELD TRIP GUIDE BK, 1986, P. 43
AGS, VOL. 16, P. 179


Hogans
Hogans
I N D I A
SHADOW MTN COLLAPSE
4800
4720
4680
4895
4600
Hogan
R E S E R V A T
Hogans
4686
4600
4600
4680
4584
4600
4800
4968
4484

GEOLOGY OF CENTRAL AND NORTHERN ARIZONA
GEOLOGICAL SOCIETY OF AMERICA
ROCKY MOUNTAIN SECTION GUIDEBOOK
D. NATIONS, C.M. CONWAY, and G.A. SWANN, EDITORS
FLAGSTAFF, ARIZONA, 1986

PARTIAL COPY NJN

FIELD TRIP LOG — BRECCIA PIPES IN NORTHERN ARIZONA

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INTRODUCTION

Thousands of solution-collapsed breccia pipes outcrop in the canyons and on the plateaus of the Grand Canyon region. The pipes originated by dissolution of the Mississippian Redwall Limestone and collapse of the overlying 3000+ feet of strata. Triassic, or older, mineralizing fluids deposited U, Cu, Ag, Co, Ni and Fe-bearing minerals into the matrix of the brecciated Triassic and Paleozoic rock.

Uraninite mineralization was sufficient to produce ore bodies with an average grade commonly over 0.5% U_3O_8. Seven known ore bodies, the Orphan, Hack I, Hack II, Hack III, Pigeon, Kanab North, and Canyon Mine have been or will be active mines. Such high-grade deposits are of great economic interest even during periods of low uranium prices; this is particularly true if the strategic metals, Ag, Co, and Ni can be recovered as by products.

Most stops on this field trip are located at breccia pipes on the Marble Plateau. This area is ideal for the trip because: (1) Rock exposure is excellent due to sparse vegetation. (2) The breccia pipe density is high. (3) Several breccia pipe morphologies outcrop; including vertical exposures along the Little Colorado Gorge and planar views on the Kaibab, Moenkopi and Chinle surfaces, and (4) the area has been mapped in detail (Sutphin and Wenrich, 1983).

0.0 mi. Leave Little America. Head east on Interstate 40.

0.7 mi. Kaibab Limestone in roadcut.

2.7 mi. Take exit 201, to Highway 89, to Page.

3.1 mi. Straight ahead is Mt. Elden (Fig. 1a), which is a dacite dome, believed by Robinson (1913) to be a laccolith which ruptured its sedimentary cover. It is one of several silicic volcanic centers in the San Francisco volcanic field. These centers range in composition from dacite to rhyolite. Well-developed flows radiate from sub-linear vents to form the southern slope (Kluth and Kluth, 1974) that is visible from here. Paleozoic strata, from the Devonian Martin Formation to the Permian Kaibab Limestone (see stratigraphic column--Fig. 2) are exposed on the northeast and northwest slopes, and have been uplifted by the dacite intrusion to as high as 8500 feet.

3.5 mi. Turn north on Highway 89.

6.5 mi. Mt. Elden is on the left. The low hills in the foreground are the uplifted Kaibab Limestone. Devonian rocks are located near the top ridge.

9.5 mi. Sunset Crater is at 2 o'clock. Sunset Crater is the youngest volcanic feature in the San Francisco volcanic field. It erupted between the growing seasons of 1064 and 1065 A.D. (Smiley, 1958, p. 190). Flows and cinders from Sunset Crater are alkali-olivine basalts. At 12:30 is O'Leary Peak, comprised of two extrusive rhyodacite porphyry domes surrounded by several silicic flows, similar to Mt. Elden. In contrast to Mt. Elden, there are no coherent uplifted strata of Paleozoic rocks, although two hills of chaotic rock debris contain abundant fragments of Redwall Limestone, Supai Group, Coconino Sandstone, and Kaibab Limestone. The rhyodacite intrusives of O'Leary Peak have abundant phenocrysts of sanidine with a texture similar to that of rapakivi granite (Bladh, 1972).

12.2 mi. Humphrey's Peak is at 10:30. This is the highest peak in Arizona, with an elevation of 12,633 feet. The Franciscans, who established a mission at Oraibi early in the 17th century, named these peaks in honor of St. Francis of Assisi, the founder of their order. The highest peak was named in honor of Andrew Atkinson Humphreys (1810-83), who surveyed for a railroad to the Pacific (Vandersluis and Hauf, 1969). San Francisco Mountain, which includes Humphreys, Agassiz, and Fremont Peaks, is a stratovolcano composed of andesite, dacite, rhyodacite, rhyolite flows and pyroclastic deposits. It is surrounded by approximately 400 basaltic cinder cones, associated flows, and scattered silicic domes and dome complexes. According to Moore and others (1976) the flows and cones are predominantly alkali-olivine basalts accompanied by lesser amounts of alkali-rich, high aluminum basalt and basaltic andesite. The San Francisco Mountain lavas that are