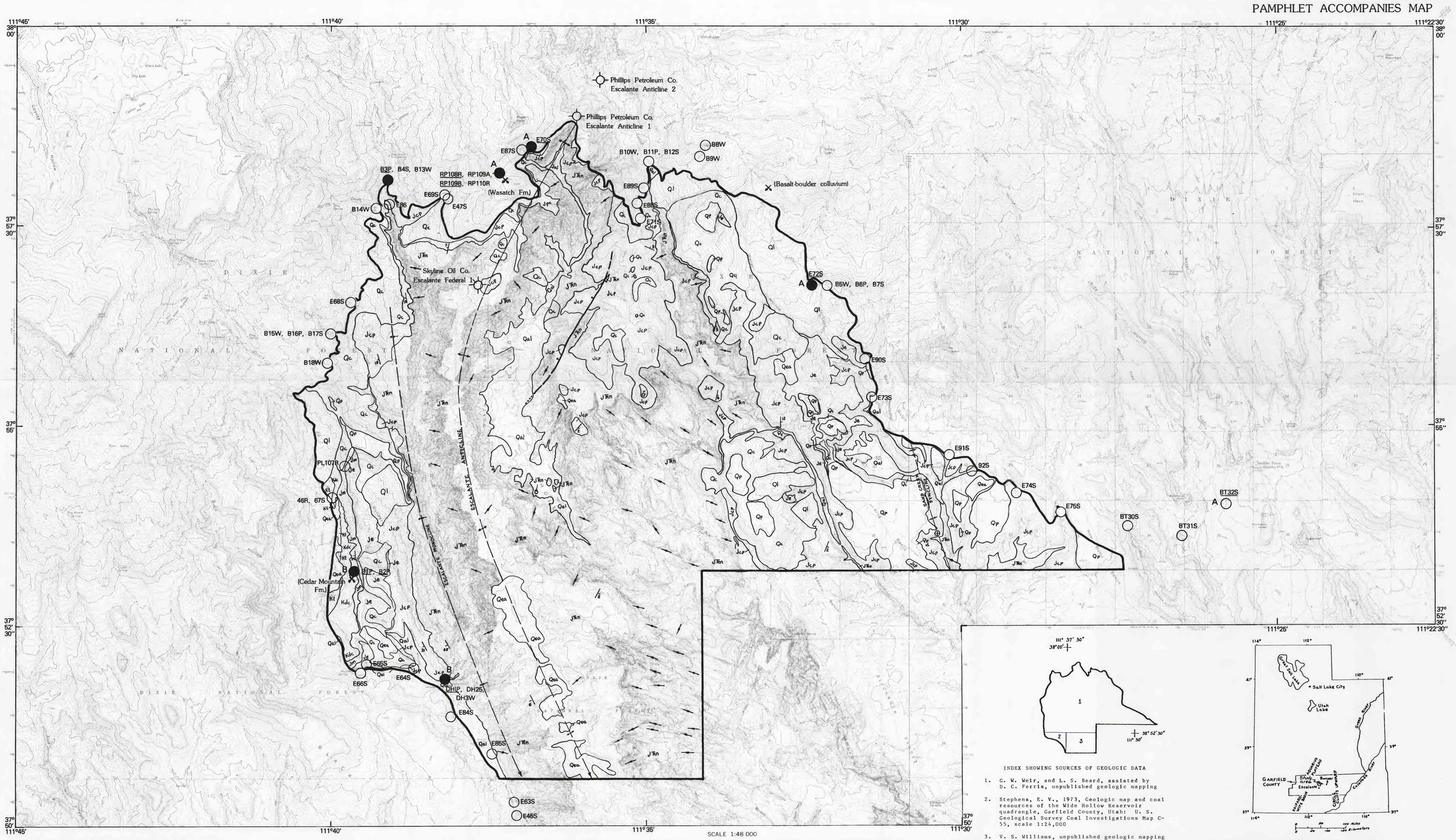
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1319-B
PAMPHLET ACCOMPANIES MAP



Base from U.S. Geological Survey 1:24,000, 1964;
Escalante; Wide Hollow Reservoir, and Posy Lake

SCALE 1:48 000

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETERS

INDEX SHOWING SOURCES OF GEOLOGIC DATA

1. G. W. Weir, and L. S. Beard, assisted by D. C. Ferris, unpublished geologic mapping
2. Stephens, E. V., 1973, Geologic map and coal resources of the Wide Hollow Reservoir quadrangle, Garfield County, Utah: U. S. Geological Survey Coal Investigations Map C-55, scale 1:24,000
3. V. S. Williams, unpublished geologic mapping of the Escalante 7.5' quadrangle

INDEX MAP OF UTAH SHOWING LOCATION OF THE BOX-DEATH HOLLOW ROADLESS AREA

CORRELATION OF MAP UNITS

Qal, Qea	Holocene	QUATERNARY
Qc, Ql	Pleistocene(?)	
Qp	Pleistocene	
UNCONFORMITY		
Kt	Upper Cretaceous	CRETACEOUS
UNCONFORMITY		
Kdc	Upper and Lower Cretaceous	
UNCONFORMITY		
Jm	Upper Jurassic	JURASSIC
Je, Jcp	Middle Jurassic	
UNCONFORMITY		
JTrn		JURASSIC AND TRIASSIC(?)

LIST OF MAP UNITS

Qal	ALLUVIUM (HOLOCENE)
Qea	EOLIAN AND ALLUVIAL DEPOSITS (HOLOCENE)
Qc	COLLUVIUM (HOLOCENE AND PLEISTOCENE?)
Ql	LANDSLIDE DEPOSITS (HOLOCENE AND PLEISTOCENE?)
Qp	PEDIMENT GRAVELS (PLEISTOCENE)
Kt	TROPIC SHALE (UPPER CRETACEOUS)
Kdc	DAKOTA FORMATION (UPPER CRETACEOUS) AND CEDAR MOUNTAIN FORMATION (LOWER CRETACEOUS)
Jm	MORRISON FORMATION (UPPER JURASSIC)
Je	ENTRADA SANDSTONE (MIDDLE JURASSIC)
Jcp	CARMEL FORMATION AND PAGE SANDSTONE (MIDDLE JURASSIC)
JTrn	NAVAJO SANDSTONE (JURASSIC AND TRIASSIC?)

CONTACT

FAULT--Dashed where inferred; dotted where concealed; bar and ball on downthrown side

ANTICLINE--Showing trace of axial plane and plunge of axis; dashed where approximately located

SYNCLINE--Showing trace of axial plane and plunge of axis; dashed where approximately located

MONOCLINE--Showing trace of axial plane and plunge of axis; dashed where approximately located

STRIKE AND DIP OF BEDS

Inclined

Horizontal

Approximate

STRIKE OF VERTICAL JOINTS

(Wasatch Fm) GRAVEL PIT--Quarried unit named in parentheses

DRY HOLE--Abandoned (see table C)

E72 SAMPLE LOCALITY AND SAMPLE NUMBER--Without anomalous value

E70S A SAMPLE LOCALITY AND SAMPLE NUMBER--Having anomalous value. Underline indicates that sample is listed in table. Large capital letter denotes table listing anomalous value

APPROXIMATE BOUNDARY OF ROADLESS AREA

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to assess their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This map presents the results of a mineral survey of The Box-Death Hollow Roadless Area, in the Dixie National Forest, Garfield County, Utah. The Box-Death Hollow Roadless Area (06259) was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

A geologic and geochemical investigation and a search for prospects and mineralized areas have been conducted to determine the mineral resource potential of The Box-Death Hollow Roadless Area, Garfield County, Utah. The study area includes about 31,000 acres of mesas and canyons in the Dixie National Forest. Paleozoic and Mesozoic sedimentary rocks crop out in an area of gently dipping homoclines associated with broad upwarps and basins.

The mineral resource potential of The Box-Death Hollow Roadless Area is very low. No mineralized rock is known in the study area. The only mining activity in or near The Box-Death Hollow Roadless Area has been the intermittent quarrying of rock for local road metal. Exploration for oil and gas has been limited to a single well. In this well no hydrocarbons were found, and the well was plugged and abandoned. Analyses of samples of stream sediments, rocks, and water in and near the study area do not suggest derivation from mineralized terranes. Triassic rocks underlying The Box-Death Hollow Roadless Area may contain uranium-copper deposits, but no evidence suggests that they may be minable at depths of several thousand feet. A discontinuous seam of clayey coal less than 12 in. thick is found in the western part of the study area, but thicker seams of better quality coal crop out a few miles outside the study area.

INTRODUCTION

During 1979 and 1980 the U.S. Geological Survey and the U.S. Bureau of Mines conducted field studies to evaluate the mineral resource potential of The Box-Death Hollow Roadless Area, Garfield County, Utah. Field studies included geological mapping (Weir and Beard, 1981), geochemical sampling, and a search for prospects and mineralized areas. Based on these studies the mineral resource potential of The Box-Death Hollow Roadless Area was judged to be low.

The Box-Death Hollow Roadless Area includes about 31,000 acres of mesas and canyons in the Dixie National Forest in central Garfield County, Utah. The area lies within the western part of the Canyonlands section of the Colorado Plateau physiographic province (Thornbury, 1965, p. 426-434). No mineralized rock is known within The Box-Death Hollow area. Exploration within the study area has been limited to a single well drilled for oil and gas in 1969. No hydrocarbons were found and the well was plugged and abandoned.

GEOLOGY

Rocks of Mesozoic age totaling about 2,000 ft in thickness and thin deposits of Quaternary age crop out in the area (Weir and Beard, 1981). Buried Mesozoic and Paleozoic rocks are known to be more than 4,000 ft thick.

Navajo Sandstone (grayish-orange, crossbedded sandstone) forms the most extensive outcrops in the study area. Formations of Jurassic age are exposed along the western, northern, and eastern fringes of the study area. Cretaceous rocks crop out in a narrow band near the western border of the study area.

In most of the study area the rocks dip gently to the southeast. The major folds are the Sand Creek syncline and the Escalante anticline, whose southwestern flank is the steeply dipping Escalante monocline (Weir and Beard, 1981). A high-angle normal fault, having a maximum displacement of about 200 ft, cuts the eastern flank of the Escalante anticline.

GEOCHEMISTRY

Sampling and Analytical Techniques

A total of 54 samples from within and near The Box-Death Hollow Roadless Area was collected in 1980 by J. C. Antweiler, L. S. Beard, and G. W. Weir; assisted by Eileen Simmons, M. K. Weisman, and C. A. Worrell. Thirty-two stream-sediment samples were collected along generally south-flowing streams that empty into the Escalante River a few miles south of the study area. Six rock samples were taken as representative of major formations. Panned concentrates of five samples of stream sediments and two of sedimentary rocks were made by J. C. Antweiler. In addition, Antweiler collected nine water samples from streams and springs. Geochemical surveys of adjoining areas on the south and southeast have also been completed (Weir and Lane, 1981a, b).

Semiquantitative spectrographic analyses of the silt fraction (less than 80 mesh) of the stream sediments and rocks were made by D. E. Detra and R. T. Hopkins using the six-step method for 30 elements (Au, Ag, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, La, Mg, Mn, Mo, Nb, Ni, Pb, Sb, Sc, Sn, Sr, Ti, V, W, Y, Zn, and Zr). The spectrographic data are reported to the nearest number in the series 1, 0.7, 0.5, 0.3, 0.2, 0.15, or multiples of 10 of those numbers, which represent approximate midpoints of grouped data on a geometric scale. The panned concentrates of heavy minerals were analyzed for gold by W. L. Campbell using atomic-absorption techniques. The water samples were analyzed for uranium by J. B. McHugh and W. L. Campbell using atomic-absorption and liquid-chromatograph techniques. The data for all samples are stored in the RASS (Rock Analysis and Storage System) files. Only those samples containing anomalous values are shown in tables A and B.

Evaluation of Analytical Data

The spectrographic analyses of sediments and rocks from in and near The Box-Death Hollow Roadless Area do not suggest derivation from mineralized terranes. They appear characteristic of the country rock, mostly sandstone and shale of Jurassic and Triassic age (Weir and Beard, 1981). Similar conclusions were reached in the geochemical surveys of adjoining areas on the south and southeast (Weir and Lane, 1981a, b).

A few spectrographically determined values appear anomalous because they are high relative to the whole set of analyses (table A). Most relatively high values in stream sediments are probably caused by contamination by debris from volcanic rocks that crop out north of the study area. Anomalous values in samples from the Wasatch Formation (which occurs north of the study area) are probably related to volcanic material in the matrix of the sedimentary rocks. None of the anomalies are more than an order of magnitude higher than the lower limit of spectrographic detection, and they do not form a pattern suggesting the need for more sampling.

Gold values detected in a few panned concentrates (table B) are very low. None of the water samples showed a uranium content of more than 1.5 parts per billion.

MINING DISTRICTS AND MINERALIZED AREAS

The Box-Death Hollow Roadless Area does not lie within an organized mining district. Mining claim records were examined at the office of the Garfield County Recorder in Panguitch, Utah. No claims are known to have been located within the area.

Development of mineral resources in and near The Box-Death Hollow Roadless Area has been limited to the quarrying of road material from Tertiary and Cretaceous conglomerate and from Tertiary volcanic rocks. None of the quarried material has been trucked more than a few miles. No mineralized rock is known within the area.

MINERAL RESOURCE POTENTIAL

The mineral resource potential of The Box-Death Hollow Roadless Area is very low. No metallic mineral deposits are known in the area. Analyses of samples of stream sediments, rocks, and water from springs and streams in and near the study area do not suggest derivation from mineralized terranes. Gold values detected in a few samples are too low to encourage prospecting.

Uranium-copper deposits are in Triassic rocks in the Circle Cliffs about 15 mi east of the study area. These deposits are generally small and weakly mineralized; only a few have been mined (Davidson, 1967, p. 65-91; Doelling, 1975, p. 107-109, 131-135). In 1979 and 1980 all mines and prospects in the Circle Cliffs area appeared inactive. The Triassic rocks underlying The Box-Death Hollow area may contain similar uranium-copper deposits, but no evidence suggests that they might be of sufficient size and grade to be minable at depths of several thousand feet. Uranium-vanadium deposits are in the Morrison Formation in eastern Garfield County about 50 mi east of the study area (Doelling, 1975, p. 102-107), but similar deposits are not known in the Morrison of central Garfield County.

The oil and gas potential of The Box-Death Hollow Roadless Area appears low. One well in the study area and two wells within a mile north of the study area have been drilled on the Escalante anticline without commercial success (table C). A fourth well on this structure, about 6 mi south of the study area, was also dry.

A discontinuous seam of clayey coal, averaging less than 12 in. thick, is in the upper part of the Dakota Formation in the western part of the area. This seam has not been developed, because thick seams of good-quality coal crop out in younger formations a few miles outside the study area.

Potential construction materials within the area include stone for road metal in Cretaceous conglomerate and Tertiary basalt, gravel in alluvial and colluvial deposits, and gypsum and limestone in the Carmel Formation. However, ample supplies of these materials are readily available at nearby localities outside the study area.

REFERENCES

Davidson, E. S., 1967, Geology of the Circle Cliffs area, Garfield and Kane Counties, Utah: U.S. Geological Survey Bulletin 1229, 140 p.

Doelling, H. H., 1975, Geology and mineral resources of Garfield County, Utah: Utah Geological and Mineral Survey Bulletin 107, 175 p.

Heylmun, E. B., Cohenour, R. E., and Kayser, R. B., 1965, Drilling records for oil and gas in Utah, January 1, 1954-December 31, 1963: Utah Geological and Mineralogical Survey Bulletin 74, 518 p.

McFall, C. C., and Peterson, P. R., 1971, Structure map of the Escalante-Boulder Area, Garfield County, Utah: Utah Geological and Mineralogical Survey Map 30, scale 1:62,500.

Thornbury, W. D., 1965, Regional geomorphology of the United States: New York, John Wiley and Sons, Inc., 609 p.

Weir, G. W., and Beard, L. S., 1981, Geologic map of The Box-Death Hollow Further Planning Area (RARE II), Garfield County, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1319-A, scale 1:48,000.

Weir, G. W., and Lane, M. E., 1981a, Mineral resources of the Escalante Canyon Instant Study Area, Garfield County, Utah: U.S. Geological Survey Open-File Report 81-559, 20 p.

_____1981b, Mineral resource potential of the Phipps-Death Hollow Instant Study Area, Utah: U.S. Geological Survey Open-File Report 81-558, 18 p.

Table A.--Anomalous values shown by semiquantitative spectrographic analyses of stream sediments and rocks from in and near The Box-Death Hollow Roadless Area, Utah

[Samples analyzed by D. E. Detra and R. T. Hopkins using the six-step method for 30 elements. Values reported in parts per million (ppm)]

Element (Lower limit of detection)	Ag (0.5)	Cr (10)	Cu (5)	Sr (100)	V (100)	Remarks
Anomaly minimum	.5	100	100	500	200	
Sample No.						
BT32S	---	100	---	500	300	Stream sediment, tributary to Boulder Creek.
E70S	.5	---	---	500	---	Stream sediment, tributary to Death Hollow.
E72S	---	---	---	---	200	Stream sediment, tributary to Lake Creek.
RP108R	---	---	150	1,000	100	Tuffaceous sandstone, Wasatch Formation.
RP109B	.7	---	---	---	---	Matrix of weathered conglomerate, Wasatch Formation.

Table B.--Anomalous values of gold shown by chemical analyses of panned concentrates of heavy minerals from stream sediments and sedimentary rocks in and near The Box-Death Hollow Roadless Area, Utah

[Samples analyzed by W. L. Campbell using atomic-absorption techniques. Values reported in parts per million (ppm). L, indicates detected, but below limit of determination (in parentheses)]

Sample No.	Au	Remarks
B1P	0.09	Conglomerate, base of Cedar Mountain Formation (Lower Cretaceous).
B2P	.05	Do.
B3P	L(.02)	Stream sediment, Pine Creek, about 50 ft north of Hells Backbone Road.
DH1P	.25	Stream sediment, Pine Creek, mouth of The Box.

Table C.--Record of exploratory wells drilled in and near The Box-Death Hollow Roadless Area, Utah

[Wells drilled are as of 1979. All wells are abandoned. Sources of data: Heylmun and others (1965), McFall and Peterson (1971), drill-pipe inscriptions, and records of the U.S. Geological Survey]

Section	Operator	Well	Total depth (feet)	Year completed	Oldest formation (or age of rocks) penetrated	Remarks
T. 32 S., R. 3 E.						
29	Phillips Petroleum	2 Escalante Anticline	6,062	1961; re-entered 1980	Ouray Limestone (Devonian-Mississippian)	Yielded more than 8 MMCFG/D of non-flammable gas (probably mostly CO_2) from Triassic and Permian rocks
32	Phillips Petroleum	1 Escalante Anticline	3,384	1961	Kaibab Limestone (Permian)	Dry hole
T. 33 S., R. 2 E.						
12	Skyline Oil Co.	Escalante Federal 1	4,166	1969	Toroweap Formation (Permian)	Yielded more than 10 MMCFG/D of non-flammable gas (more than 98% CO_2)

MINERAL RESOURCE POTENTIAL MAP OF THE BOX-DEATH HOLLOW ROADLESS AREA, GARFIELD COUNTY, UTAH

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1983

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