

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ORIGINAL

FIELD NOTES

OF

THE RETRACEMENT OF

A PORTION OF THE UTAH-ARIZONA STATE BOUNDARY LINE
FROM MILE POST 171 TO MILE POST 178
(SOUTH BOUNDARY),

AND

THE SURVEY OF THE EAST, WEST, AND NORTH BOUNDARIES

OF

TOWNSHIP 43 SOUTH, RANGE 9 EAST,

OF THE SALT LAKE MERIDIAN
IN THE STATE OF UTAH

EXECUTED BY

Scott A. Burkhardt
Cadastral Surveyor

Under Special Instructions dated and approved **October 1, 2014**, which provided for the surveys included under Group Number **1286**, and Assignment Instructions dated **October 1, 2014**.

Survey Commenced, **October 6, 2014**
Survey Completed, **October 23, 2014**

INDEX DIAGRAM

Township 43 South, Range 9 East, Salt Lake Meridian, Utah.

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ARIZONA

TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH

The following field notes are those of the retracement of a portion of the Utah-Arizona state boundary line from Mile Post 171 to Mile Post 178, and the survey of the east, west, and north boundaries of T. 43 S., R. 9 E., Salt Lake Meridian, Utah.

HISTORY OF SURVEYS

	Surveyed by	Retr. or Resurveyed by
SOUTH BOUNDARY (Utah-Arizona State Boundary Line)		
All	H.B. Carpenter	1901
EAST BOUNDARY		
All	Unsurveyed	
WEST BOUNDARY		
All	Unsurveyed	
NORTH BOUNDARY		
All	Unsurveyed	
SUBDIVISION		
All	Unsurveyed	

Protraction Diagram No. 48, dated March 7, 1961

TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH

The survey was executed in accordance with the specifications set forth in the Manual of Surveying Instructions, 2009, and the Special Instructions for Group No. 1286, dated October 1, 2014.

The direction of the lines was determined by references to true meridian, established by Global Positioning System (GPS) utilizing Real-Time Kinematic (RTK) techniques throughout the survey. The positional accuracy of this survey complies with the *Standards for the Positional Accuracy of Cadastral Surveys When Using Global Navigation Satellite Systems (GNSS)*, dated February 23, 2009. Trimble model R8 GPS receivers were used for field collection. Cadastral Automated Plat Drafting (CAPD) software was the primary software utilized for project calculations.

Preliminary to the resurvey, the lines of the prior surveys were retraced and a search was made for all corners and other calls of record. Identified corners were remonumented in their original positions. Lost corners were reestablished at proportionate positions based on the official record. The retracement data were thoroughly verified and only the true line field notes are given herein.

Geodetic control was derived from GPS static observations, post processed by National Geodetic Survey, Online Positioning User Service (OPUS), utilizing Continuously Operating Reference Stations (CORS): DI2245 P011 SPIDERROCKAZ2005 CORS ARP, AI8805 FRED FREDONIA CORS ARP, and DI2242 P009 MARYSVILLE_UT2006 CORS ARP.

The geographic position of the closing corner of T. 43 S., Rs. 8 and 9 E., on the Utah - Arizona state boundary line, calculated as determined by direct RTK methods from the National Geodetic Survey OPUS solution, is as follows:

Latitude: **37°00'08.888" N.**,
 Longitude: **110°57'19.575" W.**, N.A.D. 83 (2011), EPOCH: 2010.00
 Network Accuracy = 0.200 meter at 95% confidence

The geographic position of the United States Coast & Geodetic Survey Triangulation Station (designation: NAVAJO MTN (1934), PID: HNO911) as determined by direct RTK methods from the National Geodetic Survey OPUS solution, as follows:

Latitude: **37°02'03.314" N.**,
 Longitude: **110°52'10.476" W.**, N.A.D. 83 (2011), EPOCH: 2010.00
 Network Accuracy = 0.200 meter at 95% confidence

The geographic position of the Witness Corner to the True Point for the closing corner of T. 43 S., Rs. 9 and 10 E., on the Utah - Arizona state boundary line, as determined by direct RTK methods from the National Geodetic Survey OPUS solution, is as follows:

Latitude: **37°00'08.697" N.**,
 Longitude: **110°50'49.588" W.**, N.A.D. 83 (2011), EPOCH: 2010.00
 Network Accuracy = 0.200 meter at 95% confidence

The geographic position of the corner of Tps. 42 and 43 S., Rs. 9 and 10 E., calculated as per directed by Protraction Diagram No. 48 dated March 7, 1961 and as determined by direct RTK methods from the National Geodetic Survey OPUS solution, is as follows:

TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH

Latitude: **37°05'06.291" N.**,
Longitude: **110°50'49.574" W.**, N.A.D. 83 (2011), EPOCH: 2010.00
Network Accuracy = 0.200 meter at 95% confidence

The geographic position of CP CEDAR, as determined by direct RTK methods from the National Geodetic Survey OPUS solution, is as follows:

Latitude: **37°04'58.719" N.**,
Longitude: **110°56'23.333" W.**, N.A.D. 83 (2011), EPOCH: 2010.00
Network Accuracy = 0.200 meter at 95% confidence

All stainless steel monuments and brass tablets set in this survey bear the Navajo Nation Seal.

RETACEMENT OF A PORTION OF THE UTAH-ARIZONA STATE BOUNDARY LINE,
 FROM MILE POST 171 TO MILE POST 178, (SOUTH BOUNDARY),
 TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH
 CHAINS

Retracement of a Portion of the Utah-Arizona State boundary line,
 from Mile Post 171 to Mile Post 178, (South Boundary),
 Township 43 South, Range 9 East, Salt Lake Meridian, Utah

Restoring the Survey Executed by H.B. Carpenter in 1901

Beginning at Mile Post 171 on the Utah - Arizona state boundary line, monumented with a sandstone, 34 x 24 x 5 inches, loosely set in a mound of stone, 3 feet diameter, 1 foot high, marked ARIZ on the south face, 37NL on the east face, 171 M on the west face, with north face heavily weathered and no marks discernible (record: 40 x 20 x 6 inches, set in a mound of stone, 5 feet diameter, 2 feet high, marked ARIZ on south face, 37NL on the east face, 171 M on the west face, and UTAH on north face).

At the corner point

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, set on exposed sandstone bedrock, magnet at base, in a mound of stone, 3 feet diameter, to cap, with brass cap marked

UTAH
 — 171M —
 ARIZ
 2014

Incorporate the original stone into the mound of stone.

Corner is located on a moderately-steep east-facing slope of sandstone bedrock, approximately 50 feet west of the west edge of a canyon, 100 feet deep, course southerly.

S. 89°39.8' E., on the 172nd mile.

8.360 Point for the closing corner of T. 43 S., Rs. 8 and 9 E., on the Utah - Arizona state boundary line.

Set a brass tablet, 3 1/4 inch diameter, with 3 1/2 inch stem, flush with sandstone, in epoxy bond, with magnet at base, into a drill hole on solid rock, marked

T43S
 R8E R9E
 S36 | S31
 — c | c —
 2014

Raise a mound of stone, 2 feet diameter, 2 feet high, southeast of the corner at top of slope.

RETRACEMENT OF A PORTION OF THE UTAH-ARIZONA STATE BOUNDARY LINE,
 FROM MILE POST 171 TO MILE POST 178, (SOUTH BOUNDARY),
 TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH
 CHAINS

Corner is located on a steep northwest-facing slope of sandstone bedrock.

- 76.473** Mile Post 171.95 on the Utah-Arizona state boundary line, monumented with a sandstone, 32 x 17 x 9 ins., firmly set, projecting 20 inches above a mound of stone, 3 feet diameter, 2 feet high, marked ARIZ on the south face, UTAH on the north face, 171.95 M on the west face, with no discernible marks on the east face (record: 33 x 16 x 10 inches, marked ARIZ on south face, 37NL on the east face, 171.95 M on the west face, and UTAH on north face).

At the corner point

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, 6 inches in the ground to bedrock, magnet at base, in a mound of stone, 5 feet diameter, to cap, with brass cap marked

UTAH
 — 171.95M —
 ARIZ
 2014

Incorporate the original stone into the mound of stone.

Corner is located on a mesa top, with loose rocks and black brush.

N. 89°45.0' E., beginning new measurement.

- 3.845** Point for the 172nd mile post on the Utah-Arizona state boundary line, at proportionate distance. Not monumented.

N. 89°45.0' E., on the 173rd mile.

- 76.896** Mile Post 173 on the Utah-Arizona state boundary line, monumented with a sandstone, 36 x 26 x 8 ins., firmly set in a mound of stone, 3 feet diameter, 1 foot high, marked ARIZ on the south face, UTAH on the north face, with no other discernible marks, with a mound of stone, 2 1/2 ft. diameter, 2 ft. high, to the southeast. (Record: 48 x 30 x 10 inches, set in the ground, marked ARIZ on south face, 37NL on the east face, 173 M on the west face, and UTAH on north face).

At the corner point

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, 8 inches in the ground to bedrock, magnet at base, in a mound of stone, 4 feet diameter, to cap, with brass cap marked

RETRACEMENT OF A PORTION OF THE UTAH-ARIZONA STATE BOUNDARY LINE,
 FROM MILE POST 171 TO MILE POST 178, (SOUTH BOUNDARY),
 TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH
 CHAINS

UTAH
 — 173M —
 ARIZ
 2014

Incorporate the original stone into the mound of stone.

Corner is located on a rocky spur, sloping southwest.

S. 89°42.1' E., on the 174th mile.

- 80.313** Mile Post 174 on the Utah-Arizona state boundary line, monumented with a sandstone, 31 x 24 x 8 inches, firmly set, projecting 24 inches above the ground, marked ARIZ on the south face, UTAH on the north face, and 174 M on the west face, with no discernible marks on the east face, with a mound of stone 3 ft. diameter, 3 ft. high, to the north. (Record: 36 x 30 x 7 inches, marked ARIZ on south face, 37NL on the east face, 174 M on the west face, and UTAH on north face).

At the corner point

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, on exposed sandstone bedrock, magnet at base, in a mound of stone, 4 feet diameter, to cap, with brass cap marked

UTAH
 — 174M —
 ARIZ
 2014

Incorporate the original stone into the mound of stone.

From which the 1901 bearing object

A +BO marked on a sandstone boulder, 15 x 12 x 12 feet, bears N. 38°30' W., 37.6 links distance (Record: bears N. 37°05' W., 34 links distance, marked UTAH above the cross, BO below the cross, and 174M west of the cross).

Remove 1901 accessory mound of stone to north to build mound of stone at corner.

Corner is located on a rocky spur, sloping southwest.

Note: At a point 10 chains east of Mile Post 174, the line of the 1901 survey by Carpenter was offset 50 chains to the south to avoid the steep terrain of Navajo Mountain. This offset line continued east for 246.25 chains, along which Carpenter set witness corners to Mile Posts 175 and 176, then north for 30

RETRACEMENT OF A PORTION OF THE UTAH-ARIZONA STATE BOUNDARY LINE,
FROM MILE POST 171 TO MILE POST 178, (SOUTH BOUNDARY),
TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH

CHAINS

chains, where Carpenter set his witness corner to Mile post 177.203. The offset survey line then continued east for 63.75 chains, then due north again for 20 chains to return to the Utah-Arizona state boundary line for Mile Post 178 (37° N. latitude intended). In the course of this 2014 retracement, no evidence of the 1901 witness corners set on this offset line were found, despite extensive searches. Therefore, the positions of mile posts 175, 176, and 177 are calculated by single proportionment between Mile Posts 174 and 178, on the geodetic line between those two mile posts.

N. 89°57.9' E., on the 175th mile.

- 79.522 Point for Mile Post 175 on the Utah-Arizona state boundary line, at proportionate distance. Not monumented.

N. 89°57.9' E., on the 176th mile.

- 79.522 Point for Mile Post 176 on the Utah-Arizona state boundary line, at proportionate distance. Not monumented.

N. 89°57.9' E., on the 177th mile.

- 79.522 Point for Mile Post 177 on the Utah-Arizona state boundary line, at proportionate distance. Not monumented.

N. 89°57.9' E., on the 178th mile.

- 11.739 True point for the closing corner of T. 43 S., Rs. 9 and 10 E., on the Utah - Arizona State boundary line. Point falls on a sandstone boulder (8 ft. x 8 ft. x 4 ft.), where it is impracticable to establish a permanent monument.

Point chosen for an off-line witness corner, bears N. 46°13.0' W., 2.5 links distance.

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, 28 inches in the ground, with magnet at base, with brass cap marked

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WC
T43S
R9E | R10E
S36 | S31
  CC
  2014
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Raise a mound of stone, 3 feet diameter, 2 feet high, to the south.

Corner is located immediately west of a sandstone boulder 8 x 8 x 4 feet, on a gentle south slope with rocks and juniper trees.

- 79.522 Mile Post 178 on the Utah-Arizona state boundary line, monumented

RETRACEMENT OF A PORTION OF THE UTAH-ARIZONA STATE BOUNDARY LINE,
 FROM MILE POST 171 TO MILE POST 178, (SOUTH BOUNDARY),
 TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH

CHAINS

with a sandstone, 34 x 12 x 10 inches (record: 30 x 15 x 10 inches), firmly set, projecting 18 inches above the ground, marked ARIZ on the south face, UTAH on the north face, 37NL on the east face, and 174 M on the west face, in a collar of stone, 2 1/2 feet diameter, with a mound of stone, 5 feet diameter, 2 feet high, to the east.

From which the remaining 1901 bearing trees

A juniper, 5 inches diameter, bears S. 18°52' W., 50.9 links distance, with illegible markings (record: S. 19°30' W., 49 links distance, marked ARIZ 178M BT).

A juniper, 7 inches diameter, bears N. 64°40' W., 66.7 links distance, marked UTAH 178 (record: N. 61°20' W., 66 links distance).

At the corner point (marked sandstone)

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, 20 inches in the ground, magnet at base, in a mound of stone, 3 feet diameter, to cap, with brass cap marked

UTAH
 — 178M —
 ARIZ
 2014

Bury original stone alongside the corner.

Corner is located on a gentle southeast-facing slope, with juniper trees.

The Survey of the East Boundary,
 Township 43 South, Range 9 East, Salt Lake Meridian, Utah

The point for the corner of Tps. 42 and 43 S., Rs. 9 and 10 E., established at the bearing and distance as shown on the protraction diagram No. 48; West, 158.95 chains distance from the northwest corner of section 4, T. 43 S., R. 10 E.

Set a brass tablet, 3 1/4 inch diameter, with 3 1/2 inch stem, flush with sandstone, in epoxy bond, into a drill hole on solid rock, marked

THE SURVEY OF THE EAST BOUNDARY,
TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH
CHAINS

T42S	
R9E, R10E	
S36	S31
S1	S6
T43S	
2014	

Raise a mound of stone, 3 feet diameter, 3 feet high, to the south.

Corner is located on a sandstone ledge at the top of a steep, northeast sloping hill, on the edge of a fairly level sandstone bench.

SOUTH, on the east boundary of the township.

456.185 The true point for the closing township corner of T. 43 S., Rs. 9 and 10 E., on the Utah - Arizona state boundary line, hereinbefore described.

From the true point the triangulation station "NAVAJO MT" bears N. 29°30.5' W., 201.896 chains distance, monumented with a brass cap, 2 1/2 inches diameter, set flush in bedrock outcrop, marked

U.S. COAST & GEODETIC SURVEY
TRIANGULATION STATION

"NAVAJO MT"
1934

From which the reference monuments

A brass cap, 2 1/2 inches diameter, set flush in bedrock outcrop, marked U.S. COAST & GEODETIC SURVEY REFERENCE MARK NAVAJO MT NO1 1934, with an arrow pointing to the station, bears N.19°54.0' W., 33.5 links distance.

A brass cap, 2 1/2 inches diameter, set flush in bedrock outcrop, marked U.S. COAST & GEODETIC SURVEY REFERENCE MARK NAVAJO MT NO2 1934, with an arrow pointing to the station, bears S.63°03.1' E., 33.4 links distance.

The monument is located near the highest point on Navajo Mountain, on a low bedrock outcrop, southeast of the metal buildings near a communication site. Access to the location is via helicopter or difficult four wheel drive road.

The Survey of the West Boundary,
Township 43 South, Range 9 East, Salt Lake Meridian, Utah

From the point for the corner of Tps. 42 and 43 S., Rs. 8 and 9 E., established at the bearing and distance as shown on

THE SURVEY OF THE EAST BOUNDARY,
TOWNSHIP 43 SOUTH, RANGE 9 EAST, SALT LAKE MERIDIAN, UTAH
CHAINS

Protraction Diagram No. 48; West, 478.950 chains distance from the corner of Tps. 42 and 43 S., Rs. 9 and 10 E. Not monumented due to difficult access.

Point chosen for control point "CP CEDAR", bears S. 80°27.7' E., 70.039 chains distance.

Set a stainless steel post, 30 inches long, 2 1/2 inches diameter, 6 inches in the ground, to bedrock, magnet at base, in a mound of stone, 4 feet diameter, to cap, with brass cap marked

T43S R9E
+
CP CEDAR
2014

Corner is located on gently-rolling, west-sloping ground, in black brush, in an open valley.

South, on the west boundary of the township.

455.874 The closing corner of T. 43 S., Rs. 8 and 9 E., hereinbefore described.

The Survey of the North Boundary,
Township 43 South, Range 9 East, Salt Lake Meridian, Utah

From the corner of Tps. 42 and 43 S., Rs. 9 and 10 E.

West, on the north boundary of the township.

478.950 The point for the corner of Tps. 42 and 43 S., Rs. 8 and 9 E. Bearing and distance as shown on Protraction Diagram No. 48.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FIELD ASSISTANTS

Name	Capacity
Phil Freiberg	Survey Technician
Mike Chapman	Boat operator-US Coast Guard Auxiliary
Karen Chapman	Boat operator-US Coast Guard Auxiliary
Daniel Webb	Chief Cadastral Surveyor

CERTIFICATE OF SURVEY

I, **Scott A. Burkhardt, Cadastral Surveyor**, HEREBY CERTIFY upon honor, that in pursuance of Special Instructions bearing the date of the 1st day of October, 2014, have retraced a portion of the Utah-Arizona State Boundary, from Mile Post 171 to Mile Post 178 (a portion of the south boundary), and surveyed the east, west, and north boundaries, in Township 43 South, Range 9 East, of the Salt Lake Meridian, in the State of Utah, which are represented in the foregoing field notes as having been executed by me and under my direction; and that said survey has been made in strict conformity with said special instructions, the Manual of Instructions of the Survey of the Public Lands of the United States, and in specific manner described in the foregoing field notes.

January 6, 2015
Date

Scott A. Burkhardt
Cadastral Surveyor

CERTIFICATE OF APPROVAL

BUREAU OF LAND MANAGEMENT
Salt Lake City, Utah

The following field notes of the *retracement of a portion of the Utah-Arizona State Boundary, from Mile Post 171 to Mile Post 178 (a portion of the south boundary), and the survey of the east, west, and north boundaries, in Township 43 South, Range 9 East, Salt Lake Meridian, Utah*, executed by **Scott A. Burkhardt, Cadastral Surveyor**, having been critically examined and found correct, are hereby approved.

August 14, 2015
Date

Daniel W. Wells
Chief Cadastral Surveyor for Utah