

(July 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MINERAL REPORT

Serial Number

UTU-90091

MINERAL LAND REPORT
FOR THE
STATE OF UTAH,
SCHOOL & INSTITUTIONAL TRUST LANDS ADMINISTRATION
INDEMNITY (IN-LIEU) SELECTION

LANDS INVOLVED

SW $\frac{1}{4}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ SW $\frac{1}{4}$, Section 5SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 6W $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ Section 8

T. 11 S., R. 25 E.,

Salt Lake Meridian

Uinta County, Utah

Containing 440 Acres More or Less

Prepared By:


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(Title)1 MARCH 2018
(Date)

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1.0 MANAGEMENT SUMMARY

This parcel of land that is being considered is in response to a petition for classification and an application for indemnity selection, serial number UTU-90091. This mineral land report reviews all the major mineral types in the Uinta Basin including saleable, locatable and leasable minerals and it has been determined there is a high level of potential for oil and gas and oil shale resources. The potential for occurrence in this report does not look at the economics of the minerals reviewed.

For State indemnity selections, a “Mineral Land Report” (Mineral in Character) is required for lands that have been determined to have a mineral potential of “High” (H) or “Moderate” (M) on the parcel, per the United States Department of the Interior, Bureau of Land Management (BLM), 3060 and 3031 manuals. The “Mineral in Character” determination is made in order to satisfy the requirements of 43 USC 851 and 852 and looks at if the resource(s) can return a profit for all mineral types receiving “H” or “M” classification(s). Different levels of economics valuations can be considered. For the oil shale valuation, current oil shale production status in the United States and current market demand with literature search including the most recent available valuations was reviewed. For oil and gas, the wells surrounding the parcel were reviewed. The closest wells currently producing are about 5 miles away, while there has never been any wells drilled on the parcel, there have been a number of wells drilled within the same township and range that had been plugged and abandoned for various reasons including dry holes. It was my conclusion that the probability for production in commercial quantities (economic) of oil and gas was low. Because at this level of valuation there was no need to go into a further depth of analysis for both minerals with “H” as their classifications. This led me to a conclusion that the lands are not “Mineral in Character”.

2.0 INTRODUCTION

This mineral land report assesses the potential for mineral occurrence and possible profitability on a parcel of land administered by the BLM. The nexus for requiring this report is the application for indemnity selection, serial number UTU-90091, with the BLM Utah State Office and Vernal Field Office. This is pursuant to sections 6 and 13 of the Utah Enabling Act of July 18, 1894 and in accordance with regulations under Title 43 of the Code of Federal Regulations (CFR) Part 2621. Private lands were patented under the mining law in the early 1900’s that surround the parcel in question. The parcel is located in Uintah County, Utah approximately 44 miles southeast of Vernal Utah. The surface and the minerals are part of the proposed land exchange.

The Record of Decision (ROD) for the Programmatic Environmental Impact Statement (Oil Shale and Tar Sands) states that one of the decisions from the ROD is to “Require the BLM to consider and give priority to the use of land exchanges, where appropriate and feasible, to consolidate land ownership and mineral interests within the oil shale basins.” (BLM, 2013).

The parcel boundary and the surrounding area presented on Figure 1 is described as:

Township 11 South, Range 25 East, Salt Lake Meridian

Section 5: SW $\frac{1}{4}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ SW;

Section 6: SE $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$;

Section 8: NW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{4}$.

Containing 440 acres.

Historically the Uinta Basin has had many mineral actions which have taken place over the years. Following is a short list of these actions:

History:

- On May 23, 1916, the United States Geological Survey (USGS) classified the lands in this parcel (T. 11 S., R. 25 E.) in a letter to the commissioner of the General Land Office as mineral lands, having a "high prospective mineral value" and valuable as a source for petroleum and nitrogen (oil shales). (The word valuable does not indicate a Valuable Mineral Deposit as defined 43 CFR 3501.10)
- April 15, 1930, Executive Order (EO) No. 5327, withdrew lands from lease or other disposal and reserved for the purposes of investigation, examination and classification.
- May 13, 1935, Executive Order 7038, allowed issuance of sodium permits and leases.
- February 6, 1933, Executive Order 6016, modified EO 5327 to allow oil and gas leasing.
- May 26, 1952, Executive Order No.10355, lands were withdrawn from appropriation under the United States mining laws relating to metalliferous minerals and from sodium leasing except for trona in Wyoming or where leasing would not interfere with the oil shale values.
- October 19, 1962, Public Land Order 2795, Modified EO 5327 and allowed native asphalt, solid and semisolid bitumen and bituminous rock (gilsonite) leases to be issued.
- November 2, 1981, Oil Shale Leasing Area established by Minutes of the Mineral Land Evaluation Committee (MMS 1981a).

The conclusions and recommendations of this report are limited to the actions prompting the report and should not be used for any other purposes.

3.0 DESCRIPTION OF GEOLOGY

The following section describes the physiographic, lithologic, stratigraphic, and structural geologic features of the parcel and surrounding area.

3.1 PHYSIOGRAPHY

The parcel is located near the eastern margin of the Uinta Basin section and partially within the Book Cliffs-Roan Plateau section of the Colorado Plateau physiographic province (Stokes, 1986). The plateaus are vegetated and highly dissected by intermittent drainages such as Evacuation Creek, which lies just to the west of the parcel. These drainages flow generally north and northwestward, eventually emptying into the White River. This river forms a major drainage that flows east to west and eventually flows into the Green River, approximately 30 miles west-northwest of the parcel.

3.2 GEOLOGIC SETTING

The parcel is located in the Uinta Basin which is a sharply asymmetric feature produced by Laramide orogeny. The basin axis lies near the Uinta Mountains. During Eocene time (~56–34 million years ago), the southern sediments were deposited in lacustrine and fluvial environments. These sediments form the Tertiary deposits of the Wasatch, Green River (Tgp) and Uinta A and Uinta B formations (Tua and Tub) as shown in Figures 2 and 3 (Cashion 1967). The Green River formation members are Evacuation Creek, Parachute Creek Garden Gulch and Douglas Creek (in descending order). Oil and gas are found in deeper formations.

3.3 SITE GEOLOGY

The geologic formation exposed at the parcel is the Uinta A Sandstone and the Parachute Creek member of the Green River formation. The Uinta Formation is the highest stratigraphic unit found on the parcel, which is composed of hard brown sandstone and greenish-gray claystone in the Uinta A sequence. The sediments found in the Uinta Formation were deposited in streams and on flood plains that were formed during the waning phases of a lake south of the Uinta Mountains (Cashion, 1967).

The Green River formation was formed by lacustrine sediments of the Green River lakes during Eocene time. Fluctuations in the amount of inflowing stream waters caused large expansions and contractions of the lakes as evidenced by widespread intertonguing of marly lacustrine strata with beds of land-derived sandstone and siltstone (Dyni 2005). The warm alkaline lake waters of the Eocene Green River lakes provided excellent conditions for the abundant growth of blue-green algae (cyanobacteria) that are thought to be the precursor of the organic matter in the oil shale. Oil shale is neither shale nor does it contain conventional oil. It is marlstone (dirty limestone) and kerogen which is decomposed organic matter.

Oil and gas source rock capable of generating oil and gas resources occur in the parcel area. Source rocks occur in the Mancos and Mesaverde Groups, and Green River Formation (Lillis, Warden, and King, 2003). Source rocks in the Mancos provide the reservoir rocks in the Jurassic Morrison, Cretaceous, Cedar Mountain and Dakota Sandstones. Mesaverde source rocks provide oil and gas to the Upper Mesaverde Group sandstones. The Mesaverde petroleum system is predominantly a gas system and the source rock are coals or sedimentary rocks with coaly organic matter (Lillis, Warden, and King, 2003). Coal and carbonaceous shales accumulated in swamps of deltaic and coastal plain environments

(Johnson and Roberts, 2003). The coal bearing intervals are the Nelsen Formation and the Blackhawk formation and contain most of the Mesaverde coal in the Uinta Basin (Johnson and Roberts, 2003). Green River oil types are widely distributed in the Uinta Basin. Oils are found in the Wasatch and Green River Formation. These oils are found predominantly in the Natural Buttes field.

4.0 DESCRIPTION OF MINERAL RESOURCES

Mineral resources are defined by the USGS as “A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth’s crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible. Reserves are defined as “The part of the reserve base which could be economically extracted or produced at the time of determination. The term reserves need not signify that extraction facilities are in place and operative. Reserves include only recoverable materials; thus, terms such as ‘extractable reserves’ and recoverable reserves’ are redundant and are not a part of this classification system” (USGS, 1980). A resource that is demonstrated (of such quality and quantity) and economic is classified as a reserve. Due to market conditions, the reserve determination is only good for the date of the determination and could change over time. This is why deposits are mined or produced in areas that previously were not considered.

There are 3 mineral resources that lie within this parcel.

- Oil and gas
- Oil shale
- Building stone

4.1 “KNOWN” AND “MINERAL IN CHARACTER” OF THE DEPOSITS AT THE PARCEL

A “known mineral value” is a broader term that means mineral rights in lands containing geologic formations that have monetary value as defined in 43 CFR 2720.5(b) for exploring, developing or producing mineral deposits. There are currently no “known” mineral deposits on this parcel.

Since this is a State indemnity selection, a “Mineral in Character” determination is required under 43 U.S.C. 851 and 852 if the level of mineral potentials for any mineral commodity are either H or M.

4.2 MINING CLAIMS, LEASES, AND MINERAL MATERIAL SITES

The BLM uses a database called LR2000 (Legacy Rehost System) to store land and mineral authorizations for mineral development on public lands. A report was conducted on February 12, 2018, and no mineral leases, claims, or mineral material sale sites were identified on the parcel (BLM 2018).

5.0 MINERAL POTENTIAL

The occurrence of a mineral resource does not imply that the mineral is in a form or quantity that can be economically extracted or will likely be in the future. For the purposes of this section, mineral

occurrence potential refers to exploitable and potentially exploitable occurrences. In 2008 as part of the Vernal Resource Management Plan, the Utah Geological Survey (UGS, 2002) did a mineral potential report covering the Vernal Field Office boundaries. The mineral potentials used in that report will be used as a basis for this report. The BLM Manual 3031, Energy and mineral Resource Assessment will be utilized (BLM, 1985) for determination/classification of the mineral potential.

5.1 COAL

Coal may occur as part of the Main coal unit as part of the Mesaverde Group which was formed during the Cretaceous time. It is mapped further north near the city of Vernal Utah. There is no direct evidence on the property.

The parcel has a low potential for coal with indirect evidence (ND).

5.2 OIL AND GAS

The proposed parcel is surrounded by private lands. It is accessible via Uintah County Class B & D Roads and RS 2477 road #140201. Disposal of these lands would be in conformance with the VFO RMP/ROD approved on October 2008. There was an oil and gas lease UTU-81023 that has since expired and there are no other leases on the parcel at this time.

Oil and Gas Wells: Existing oil and gas wells are shown in Figure-4 and listed in Table-1 (well data-UDOGM, 2018)

Sixteen wells have been drilled in T.11S., R.25E., with only one well currently producing gas in the Hells Hole Field approximately 5 miles away. The others are one Shut-In Gas well (SIGW) in the Evacuation Creek Field that showed gas production and 14 wells that have been plugged and abandoned (9 dry, 5 wells in the Kicker Field produced gas). These wells have been drilled to depths ranging from 2,385 feet (Kicker Field) to deeper wells (11,700 feet-Kicker Field and 8,502-Evacuation Creek). The shallowest well drilled was the Robertson 1 (sec 5, T.11S., R.25E.) and it was only drilled to a depth of 839 ft. This well, closest to the parcel, did not test the oil and gas potential because it did not penetrate deeper source rock or reservoir rock of the Mesaverde Group.

The source rocks that provides gas to the oil and gas fields of the area of the parcel are predominantly Mesaverde source rocks (Nelsen and Blackhawk Formations) and therefore the hydrocarbon generated from the coaly intervals is mainly gas.

Oil and Gas Fields: Existing oil and gas fields are shown in Figure 5, and listed in Table 2:

Seven oil and gas fields have been identified to occur in the surrounding area of the parcel (see Fig- 5, Table-2). The reservoir units that have been identified in the seven fields include the following formations: Tertiary Green River Fm, Tertiary Wasatch Fm, Cretaceous Mesaverde, Cretaceous Dakota Ss, Cretaceous Cedar Mountain Fm and Jurassic Morrison Fm. The oldest field discovered in the area is the Oil Springs discovered in 1963, while the youngest field in the area is the Kicker Field, discovered in

2001, but now abandoned. Although abandoned, the Kicker Field produced significant quantities gas resources. The parcel is not located in an existing oil or gas field, but is surrounded by them (Figure-5).

Oil and Gas Leases: Existing and Historic Federal and State Leases are shown in Figure 6.

Much of the surface and subsurface is held by State and Federal Oil and Gas Leases (See Figure-6 for current oil and gas leases). The parcel is not covered by any active oil and gas leases. However, historical oil and gas leases covered the portion of the parcel in Section 5 and Section 6, T.11S., R.25E. (Figure-6). No oil or gas wells were drilled on those historical leases which covered the proposed parcel in Section 5 or Section 6 so any existing oil and gas resources were not tested.

Oil and Gas Units and Participating Areas (PAs): Existing Federal Units are shown in Figure 7, and listed in Table 2.

Approximately eight Federal oil and gas Units occur, mainly to the west of the parcel (see Figure-7, Table-2) They include the following eight units:

- 1) Displacement Point (T.12S., R.25E.),
- 2) Black Dragon (T.12S., R.25E.),
- 3) Hanging Rock (T.12S., R.24E.),
- 4) Oil Springs (T.11S., R.24E.),
- 5) Asphalt (T.11S., R.24E.),
- 6) Rockhouse (T.11S., R.23E.),
- 7) Marble Mansion II (T.11S., R.23E.), and
- 8) Rainbow (T.11S., R.23E.). The parcel does not occur in current active oil and gas units or participating areas (PA).

Reservoir, Source Rock, and Trap:

Reservoir, Trap, and Source Rock are physical conditions needed for oil and gas accumulations to occur in the parcel area (AAPG Wiki, 2018).

- Reservoir rock that are capable of sufficient porosity and permeability to contain oil and gas resources occur in the parcel area. Producing and potentially producing reservoir rocks are primarily fluvial channel sandstone beds in the Upper Cretaceous Mesaverde Group and overlying Wasatch formation in the eastern part of the of the Uinta Basin described as the Mesaverde Total Petroleum System (Johnson and Roberts, 2003). Gas is interpreted to have migrated vertically or updip from the source rocks into the fluvial, deltaic, marginal marine sandstone reservoir rocks (Johnson and Roberts, 2003). Mesaverde Group reservoirs range from

20 to 60 ft thick and have porosities varying from less than 5 percent to greater than 8 percent (Spencer, 1996) (See Figures-8, 9).

The Mesaverde Total Petroleum System consists of seven gas assessment units: two continuous gas assessment units (50200261 and 50200263), two transitional gas assessment units (50200262 and 50200264), two coalbed methane assessment units (50200281 and 50200282), and one conventional gas assessment unit (50200201).

- Trap- The conditions necessary to trap hydrocarbons through stratigraphic facies changes in the Mesaverde Group and possibly occurs throughout the parcel.

- General Discussion:

Gas was generated from coals and carbonaceous shales and migrated updip or along vertical fractures into low-permeability Mesaverde Group sandstones. Vertical migration of gas from Mesaverde Group source rocks via faults/major fractures into rocks less organically rich may be displayed by association with Greater Natural Buttes field production. Many of the vertical faults/fractures are filled with the mineral gilsonite, a solid hydrocarbon derived from Green River oil shale. Depths of sandstone reservoirs with gas deposits range from 4,000-10,000' (see Figure-9) (Johnson and Roberts, 2003).

Vernal Field Office Approved Resource Management Plan (2008)

The Vernal RMPs' Reasonable Foreseeable Development (RFD) area for the parcel lies within the "East Taviputs Plateau RFD area" (BLM, 2008) (Figure 10). It was projected for the entire East Taviputs Plateau area that a total of 75 new oil wells, 600 new gas, and 80 new coalbed methane wells could be drilled over a 15 year period beginning in 2008.

It was stated in the RFD that it was believed that increased development particularly concerning gas deposits will occur in the area over the next 15 years.

Since the 2008, RMP, RFD, 5 wells have been drilled in T.11S., R.25E., (2008-2018). If the drilling rate is consistent, from 2018-2023, you would see an additional 2.5 wells drilled in the township and range that the parcel is located.

5.3 TAR SANDS

Tar Sands also called oil-impregnated or bituminous sandstones, was mapped in the township to the south of the parcel in T.12S., R.25E., as the PR Springs Special Tar Sand Area (STSA). This STSA is found in the Douglas Creek member of the Green River Formation and the upper sandstone beds and have appreciable amount of bituminous material. (Cashion 1967). This unit if it exists lies below the surface of the parcel.

The parcel has not enough information to make a mineral potential determination so it is classified as (ND).

5.4 NON-ENERGY LEASEABLE MINERAL (SODIUM, POTASSIUM, PHOSPHATE AND GILSONITE)

Sodium in minute quantities is found in the Birds Nest aquifer that lies in the Parachute Member of the Green River Formation. This aquifer out crops in the northern portion of Evacuation Creek near the White River and was associated with the formation of nocholite which has been dissolved creating voids in the aquifer. The sodium has essentially been dissolved and it is not available to be extracted.

Potassium deposits in Eastern Utah occur in the Pennsylvanian Paradox Formation, which are not located in the Uinta Basin. Phosphate deposits occur in the Permian Meade Peak Member of the Phosphoria (Park City) Formation. It is located on the flanks of the Uinta Mountains, north of Vernal, Utah (USGS, 2015). The BLM has established a Known Phosphate Leasing Area on the south flank of the Uinta Mountains.

Gilsonite or uintahite forms in vertical veins through the Uinta and Green River Formations. The source for the gilsonite is found in the Mahogany oil shale zone of the Green River Formation (UGS 2012). At the time of formation, the gilsonite in liquid form rose through hydro fractures in the country rock to form the veins or dykes. There are no veins mapped on the property. (UGS 2012).

The parcel has not enough information to make a mineral potential determination so it is classified as (ND).

5.5 OIL SHALE

Oil shale is found in the Green River Formation in the Uinta Basin and this formation lies in this parcel. The shale in this parcel contains 30-40 feet thick of 35 gallons per ton of shale oil (UGS, 2008). The overburden is about 300-500 feet (see Figure 12). The gallons per ton thickness will increase or decrease depending upon the value chosen. For example if 15 gallons per ton was desired then the thickness of the oil shale containing that grade would increase. Currently Enefit Oil Shale Lease hold a Federal Research Development and Demonstration (RD,D) Oil Shale Lease in T. 10 S., R. 24 E. Sections 21 and 26. This is where the White River Oil Shale mine was constructed under Federal Oil Shale lease Tracts Ua and Ub.

The parcel has a high potential for oil shale with a high degree of confidence (H/D)

5.6 METALLIC MINERALS

There are no metallic mineral deposits on the entire Township of Township 11 South, Range 25 East. The parcel has not enough information to make a mineral potential determination so it is classified as (ND).

5.7 URANIUM AND VANADIUM

Trace concentrations of uranium occur in rocks of most all ages. Accumulations of uranium and vanadium have not occurred and are not found in any appreciable amount in the rocks of these formations in this parcel.

The parcel has not enough information to make a mineral potential determination so it is classified as (ND).

5.8 NONMETALLIC MINERALS/INDUSTRIAL MINERALS

No other nonmetallic minerals/industrial minerals exist on the property except for common variety building stone (see below). No Quaternary deposits of sand and gravel are located on the parcel.

The parcel has not enough information to make a mineral potential determination so it is classified as (ND).

5.9 COMMON VARIETY MINERALS

The formation that contains the building stone has been identified in the western most part of the parcel. The Uinta A formation is the primary formation and the cliffs that form the contact to the Parachute Member of the Green River Formation are where the building stone lies. The formations do exist but there have been no sales on the parcel so it is unknown if the building stone exists as would be required by commercial dealers. Areas for collecting building stone are numerous in this area. The Mineral Potential report for the Vernal RMP lists the potential as (H/C). After further review, this potential is for the formation and not for the building stone (workable size and quantities) that would be needed for a conclusion on the stone itself.

Therefore, I believe the parcel has a low potential for common variety minerals with evidence (L/C).

6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Oil Shale Summary:

Oil shale is found abundantly on the property 30-40 feet thick at a grade of 35 gallons per ton. The overburden in the parcel ranges from approximately 300-500 feet in thickness.

- This has a mineral potential classification of (H/D)
- The area was classified by the USGS as mineral lands in 1916 under the USGS Organic Act (March 3, 1879 (20 Stat. 394; 43 U.S.C. 31), et seq.).
- The area was classified as prospectively valuable on November 2, 1981 (MMS 1981).
- The area was classified as part of the Southeastern Uinta Basin Oil Shale Leasing Area on November 2, 1981(MMS 1981a)¹

¹ The function of classification under the USGS Organic Act resided with USGS until 1982 then it became the function of the Minerals Management Service (MMS). In 1983, the function moved from MMS to the Bureau of Land Management where it resides today. BLM currently has the authority to classify or evaluate lands for leasable minerals under the 43 U.S.C. 31 (Departmental Manual, part 235 1.1 L.)

Oil Shale Conclusion:

The mineral potentials for the above minerals show a potential area for development. The lands have been classified as mineral lands for oil shale by the USGS but there is no finding of “Mineral in Character” or there is no “Known Oil Shale Leasing Area” established, therefore we are not accepting the 1916 mineral land classification.

It is my opinion that currently oil cannot be commercially produced from this parcel containing oil shale for the following reasons:

- There is no commercial production of oil from oil shale currently in the United States including Utah, Colorado and Wyoming.
- The Rand Corporation, under contract with the U.S. Department of Energy, estimated surface retorting plants (including mining and processing) would unlikely be profitable unless crude oil prices were \$70 to \$95 per barrel (Rand, 2005). The BLM used the inflator calculator from the Bureau of Labor and Statistics to inflate these 2005 dollars to \$91 to \$123 (BLS, 2018). Today the price of oil is about \$62.82 (2018) per barrel per the Nasdaq on February 22, 2018 (Nasdaq, 2018).
- The size of the parcel would not:
 - Allow independent development because of the lack of reserves to offset necessary financial investment. At a moderate size facility (25,000 barrels per day) there is only about 4 years’ worth of shale oil resource in the ground. Even 4 years does not allow for mining and processing losses, and with an overburden of 300 feet there would need to be a ramp and a box cut that would substantially reduce the amount of oil shale that could be extracted. Further, this is assuming that processing would happen offsite to avoid a large capital investment.
 - Justify expenditures of funds for a primary and secondary treatment facility to upgrade the small amount of shale oil to remove the nitrogen to reach the specifications for conventional oil.

Based on these factors I find that the lands in the parcel are not “Mineral in Character” for oil shale.

Oil and Gas Summary

The mineral potential for oil and gas resources in the parcel is high (H). This conclusion is based upon the geotechnical work of the USGS, which describes the subsurface existence of oil and gas reservoir rocks, source rock, and trap conditions. Oil and gas wells that have been drilled in the area surrounding the parcel have defined oil and gas production/oil and gas shows, oil and gas plays, and oil and gas fields. This has led to an interest by companies to lease both Federal and State lands. It has also led operators to form oil and gas exploratory units and Participating Areas. Operators continue to have

interest in oil and gas exploration and production in the area, as is shown by the large number of oil and gas leases currently held, as well as, historic leases on the parcel.

The level of mineral potential is high (H). The level of certainty shows that the available data is abundant, direct, and indirect to support the possible existence of fluid mineral resources (D) (H/D)

Oil and Gas Conclusions:

- Federal lands around the parcel are either leased for oil and gas or have been nominated for oil and gas leasing by private parties. The northern portion of the parcel was also nominated for lease.
- There was one hole drilled in 1961, in T.11 S., R. 25 E., Section 5, about one-half mile east of the parcel. The operator was planning on drilling to a depth of 2500 feet, to reach the Wasatch Formation, but the hole was plugged and abandoned at 839 feet in the Green River Formation because they ran into brackish water zones.
- The well in T.10 S., R. 25 E., Section 32 (about 2 miles away) was drilled to a depth of 4900 feet and it was dry and was plugged and abandoned. There were a number of holes with applications, which were rescinded.
- The Application Permit to Drill (APD) for a hole located in T. 11 S., R. 25 E., Section 10 (about 3 miles away), was rescinded by the company.
- The hole in T. 10 S., R., 24 E., Section 34 (about 4 miles away) was a dry hole, plugged and abandoned. Drilled to just over 2000 feet. One hole drilled and other applications were rescinded by the company
- The hole in T. 10 S., R. 24 E., Section 28 (about 5 miles away), was drilled to a depth of 7050 feet, hit coal partings and was plugged and abandoned.
- T. 11 S., R. 24 E., Section 23, (about 4 miles away), proposed depth 5500 feet, well shut in.
- The closest producing gas well is (about 5 miles away) in T. 11 S., R. 25 E., Section 12 and was drilled 7460 feet deep in the Dakota Sand Stone.
- The Kicker Field in T.11 S., R. 25 E., Sections 21, 22, 26 and 27 (about 3 miles away). First production was in 2001. In Section 22 there were three holes drilled with the following production. Well depths were 2385 to 11,700 feet.
 - One dry hole,
 - 106,745 mcf of gas
 - 207,541 mcf, of gas

- 13,541 mcf of gas

The closest well that is currently producing is about 5 miles away in three different directions. There are a number of wells drilled surrounding the parcel that were dry holes. Based on the information above I believe that the lands have a low probability of producing oil or gas in economic quantities and thus lands are not “Mineral in Character” for oil and gas.

Recommendation:

The lands have been found **not** to be “Mineral in Character”.

Based upon the evaluation, mineral potential and conclusions reached in this report, it is the opinion of this author that the parcel is suitable for disposal. The recommendation is to allow disposal of the parcel provided all other criteria for this disposal are met including a mineral valuation to determine the “Fair Market Value” of the parcel.

7.0 REFERENCES

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FIGURES

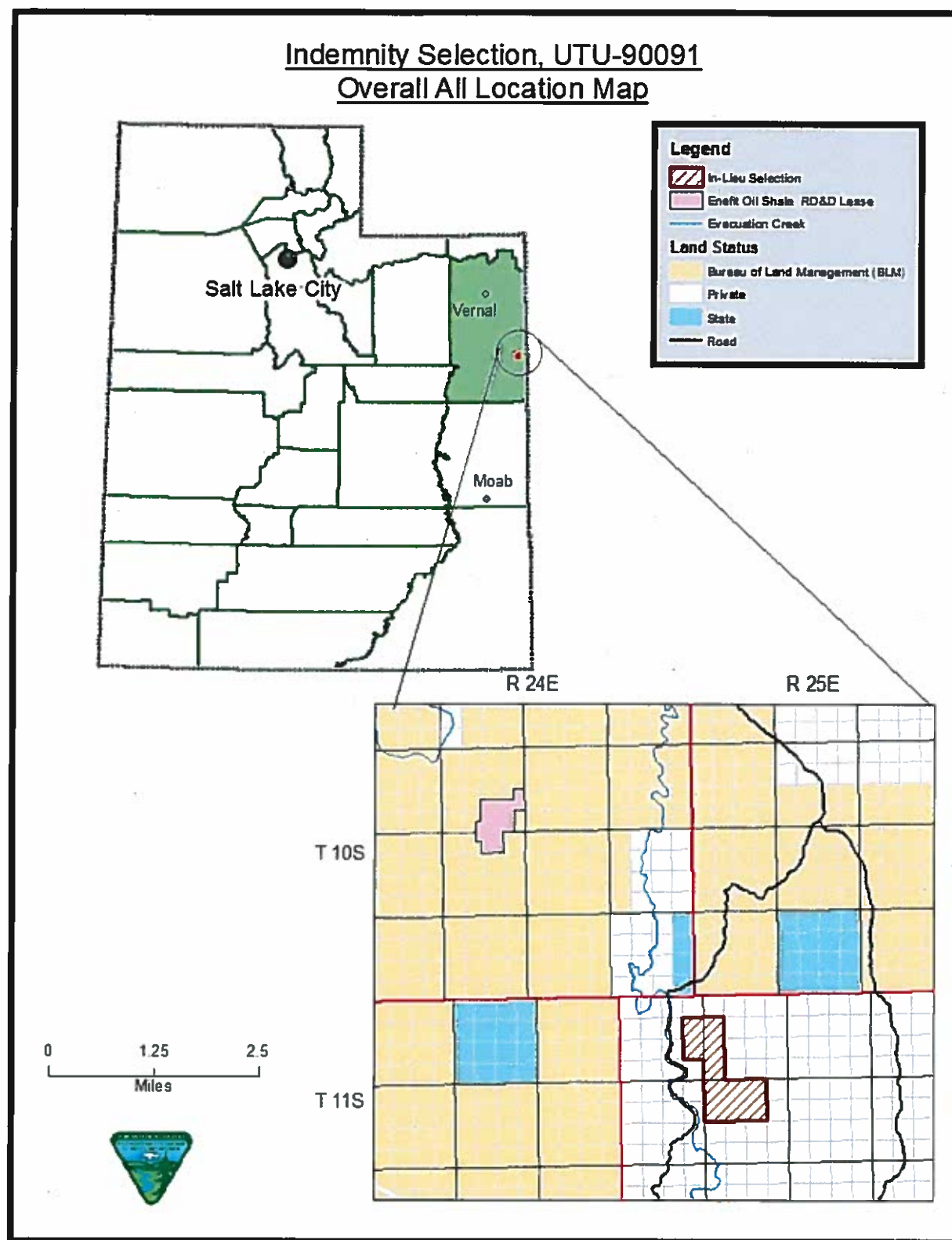


Figure 1 Overall Location

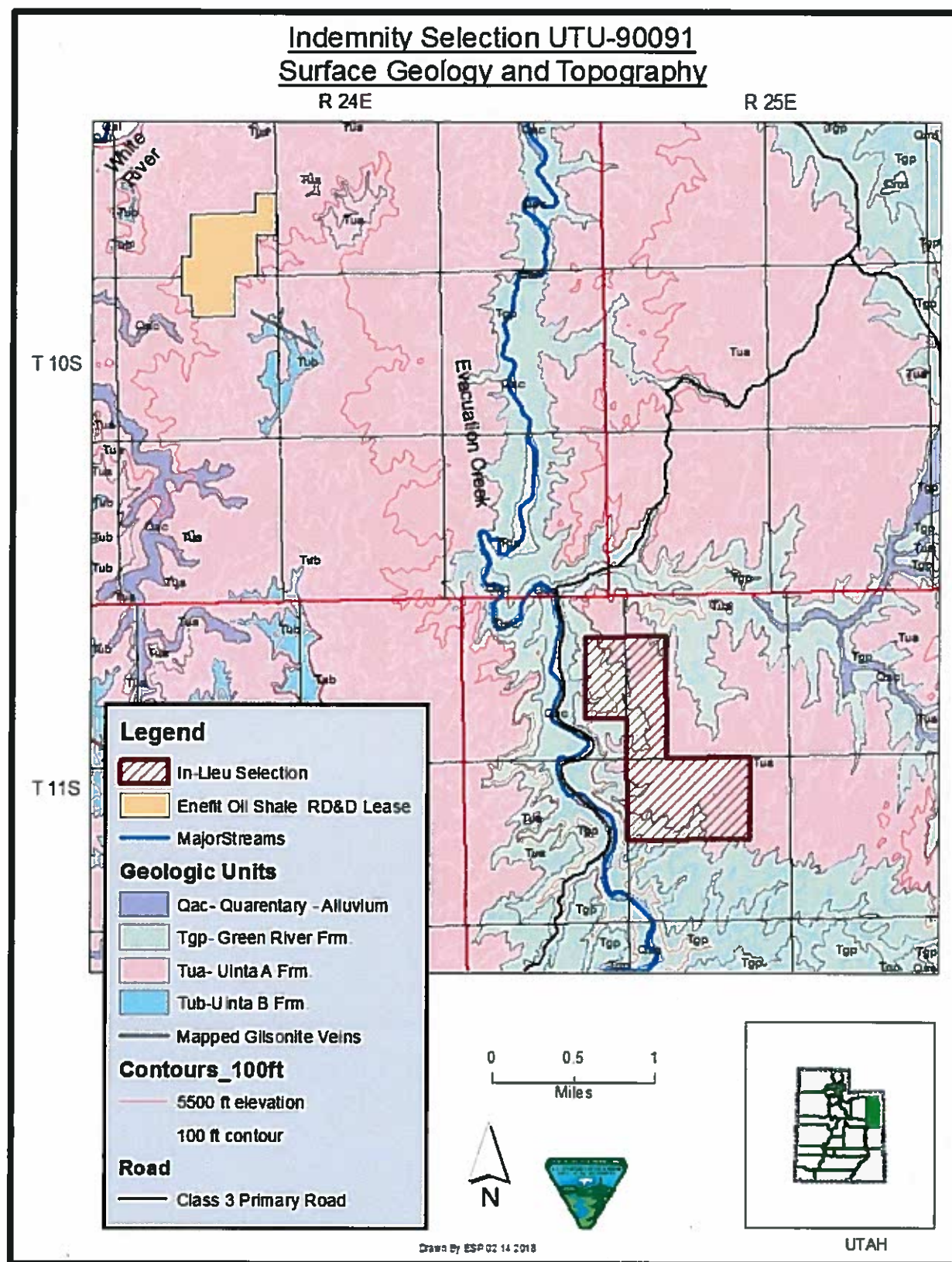
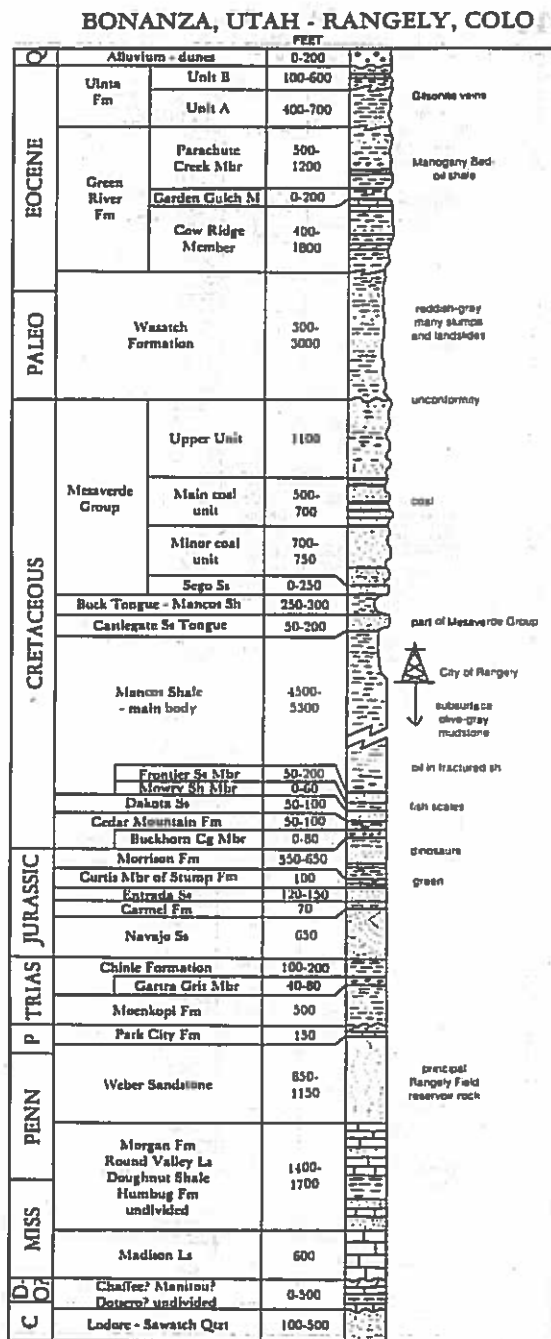


Figure 2 Surface Geology and Topography



Geologic History of Utah
Lela F. Hietze

Figure 3 Geologic Stratigraphic Column

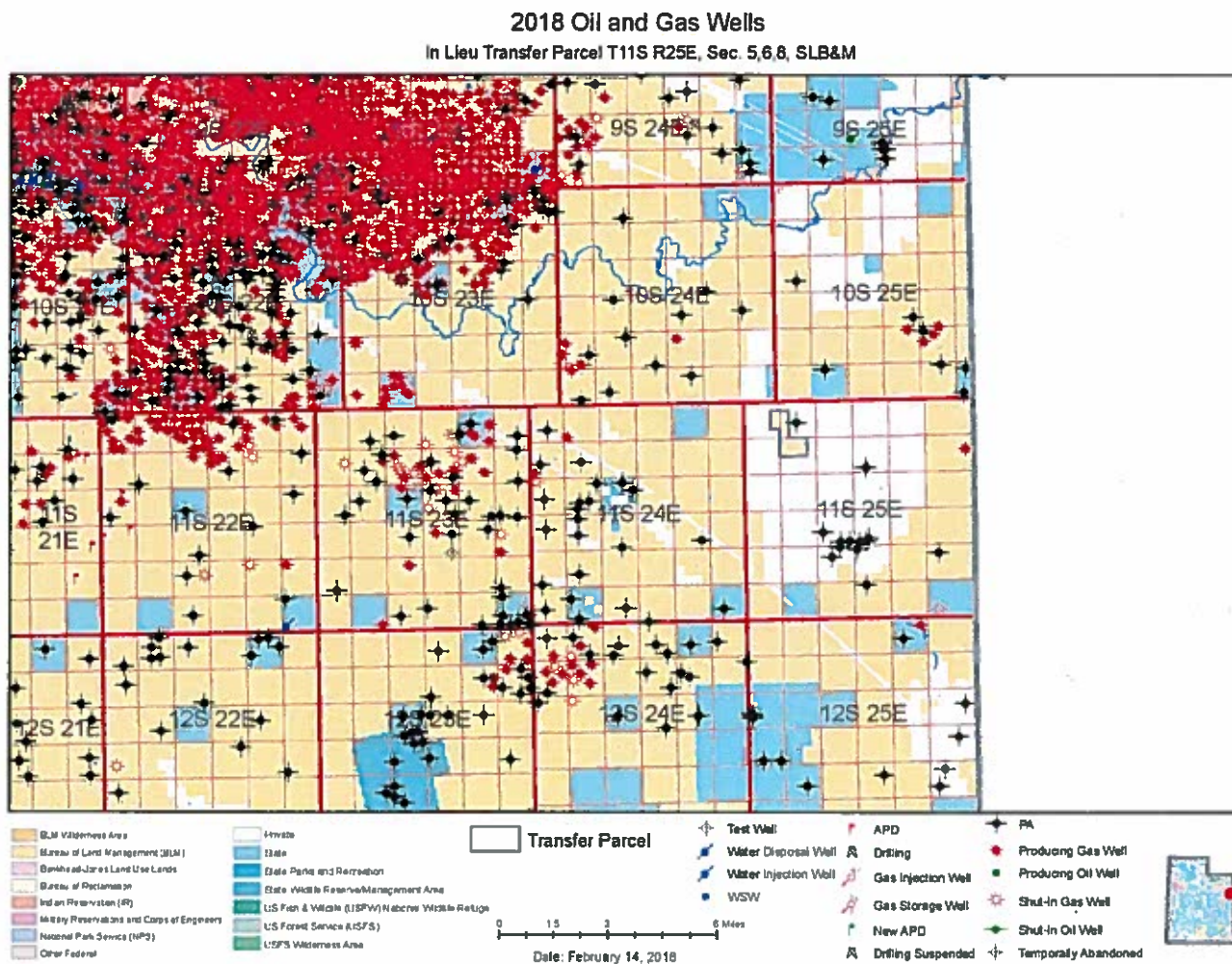


Figure 4 2018 Oil and Gas Wells and Fields

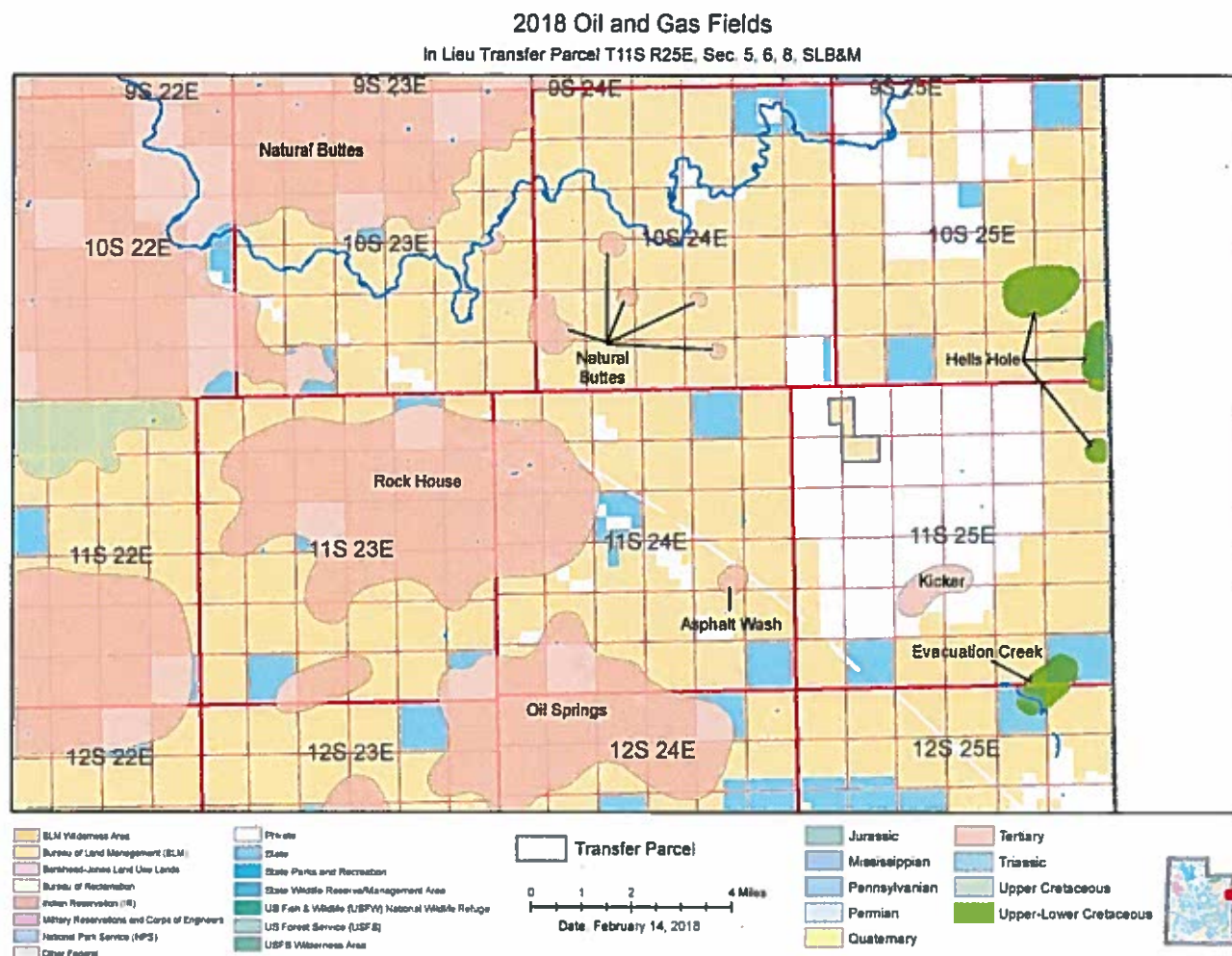


Figure 5 2018 Oil and Gas Fields

2018 Federal and State Oil and Gas Leases
In Lieu Transfer Parcel T11S R25E, Sec. 5,6,8, SLB&M

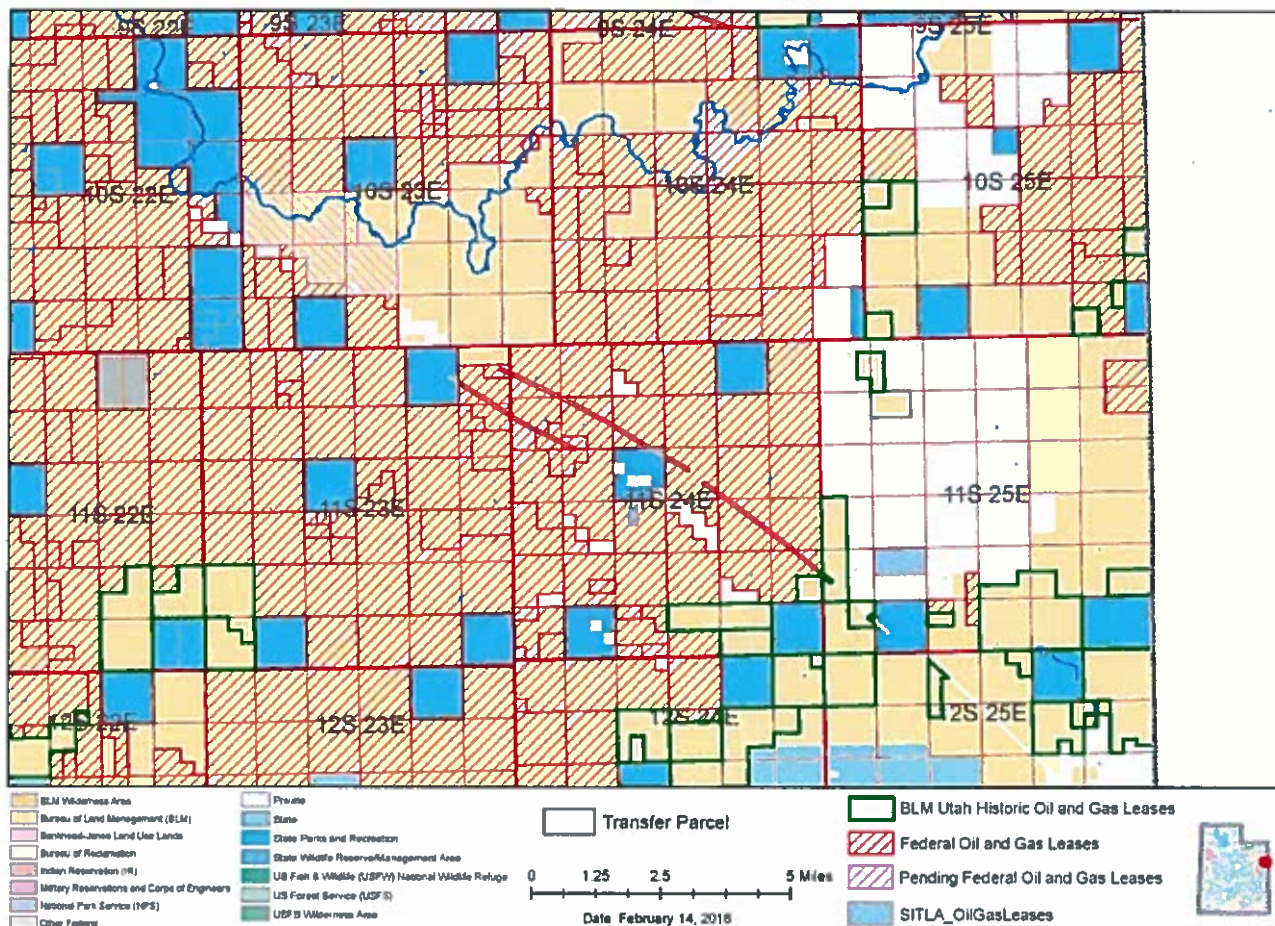


Figure 6 Federal and State Oil and Gas Leases

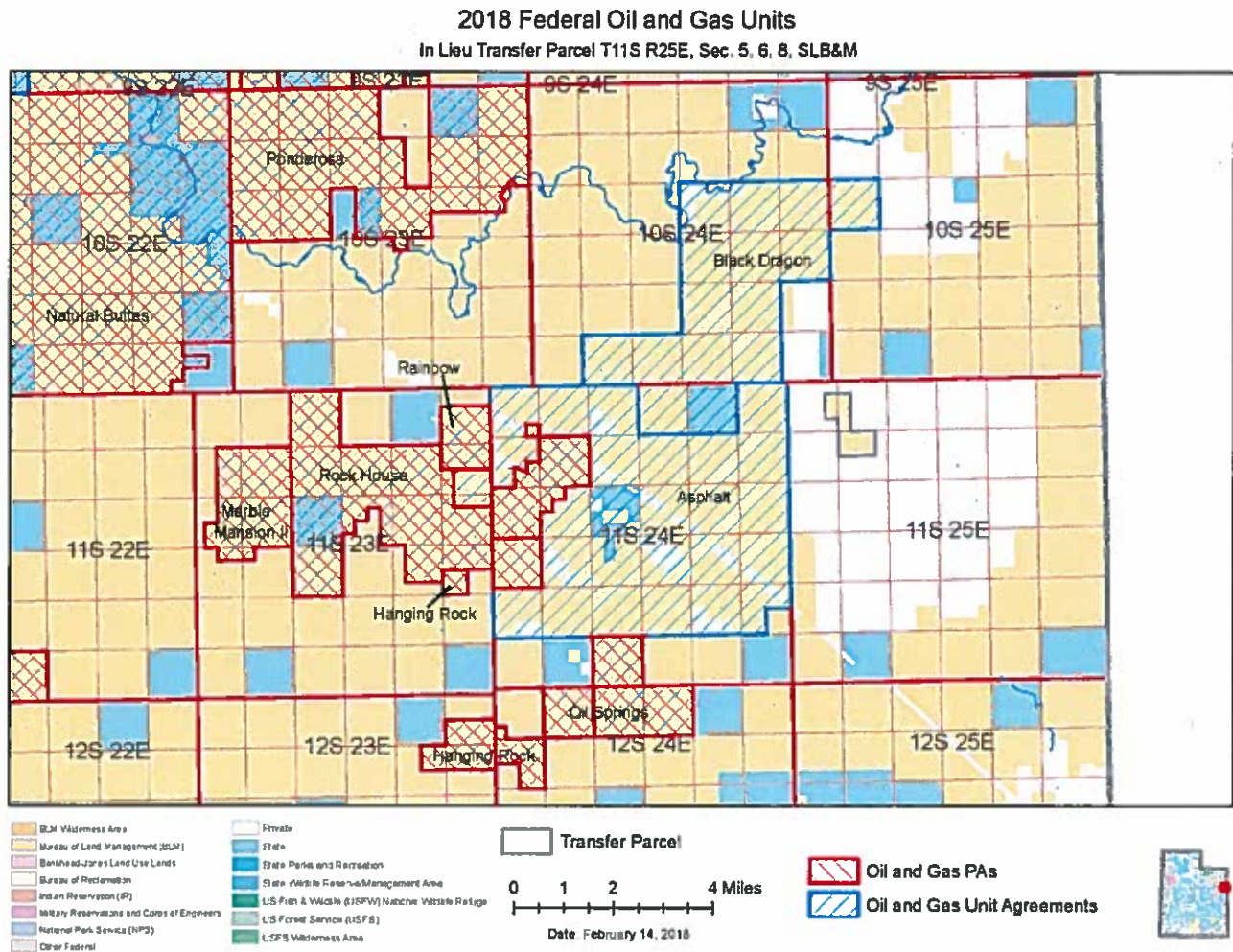


Figure 7 2018 Federal Oil and Gas Units

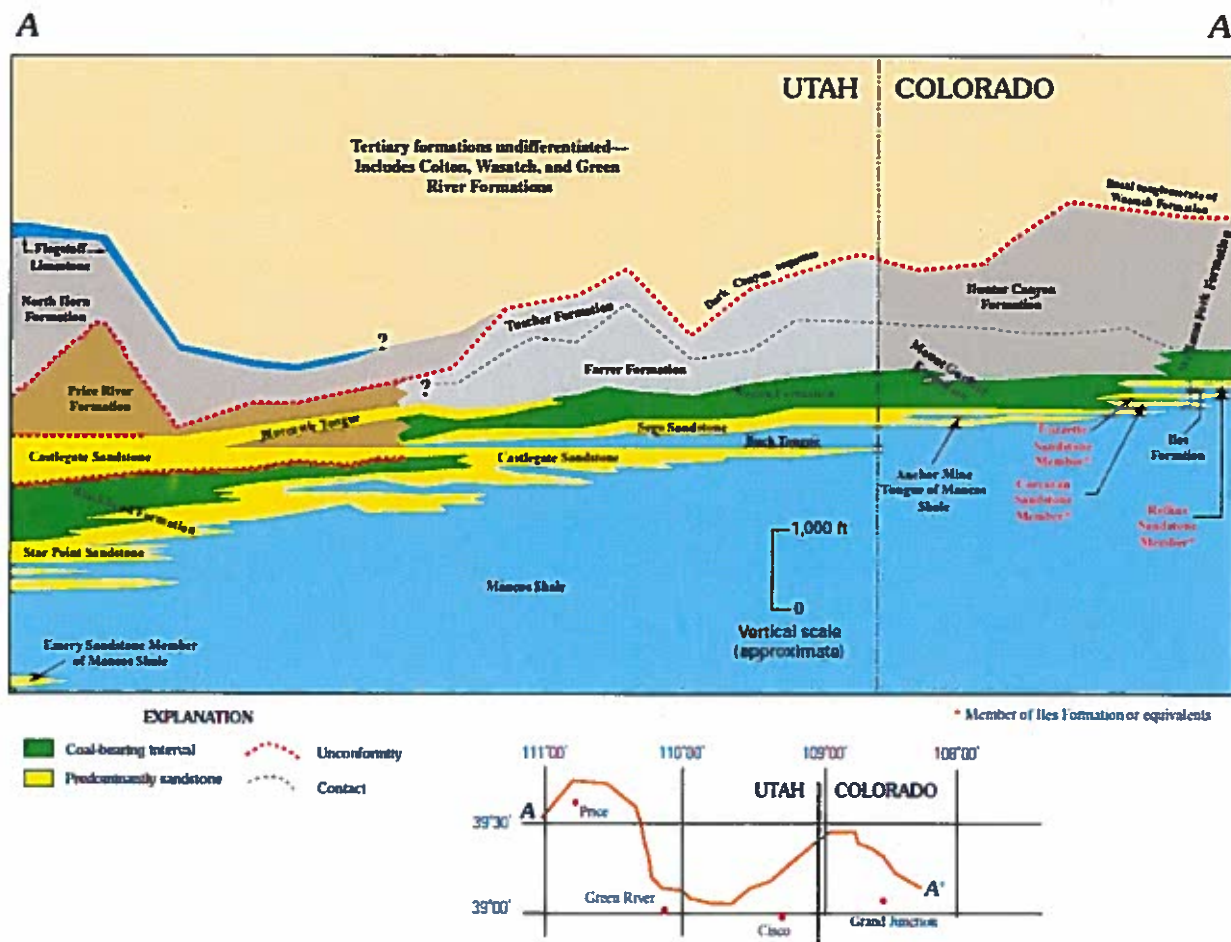


Figure 8. Generalized west-east cross section showing Upper Cretaceous and lower Tertiary stratigraphic units in Uinta Basin and western Piceance Basin, Utah and Colorado. Modified from Fisher and others (1960).

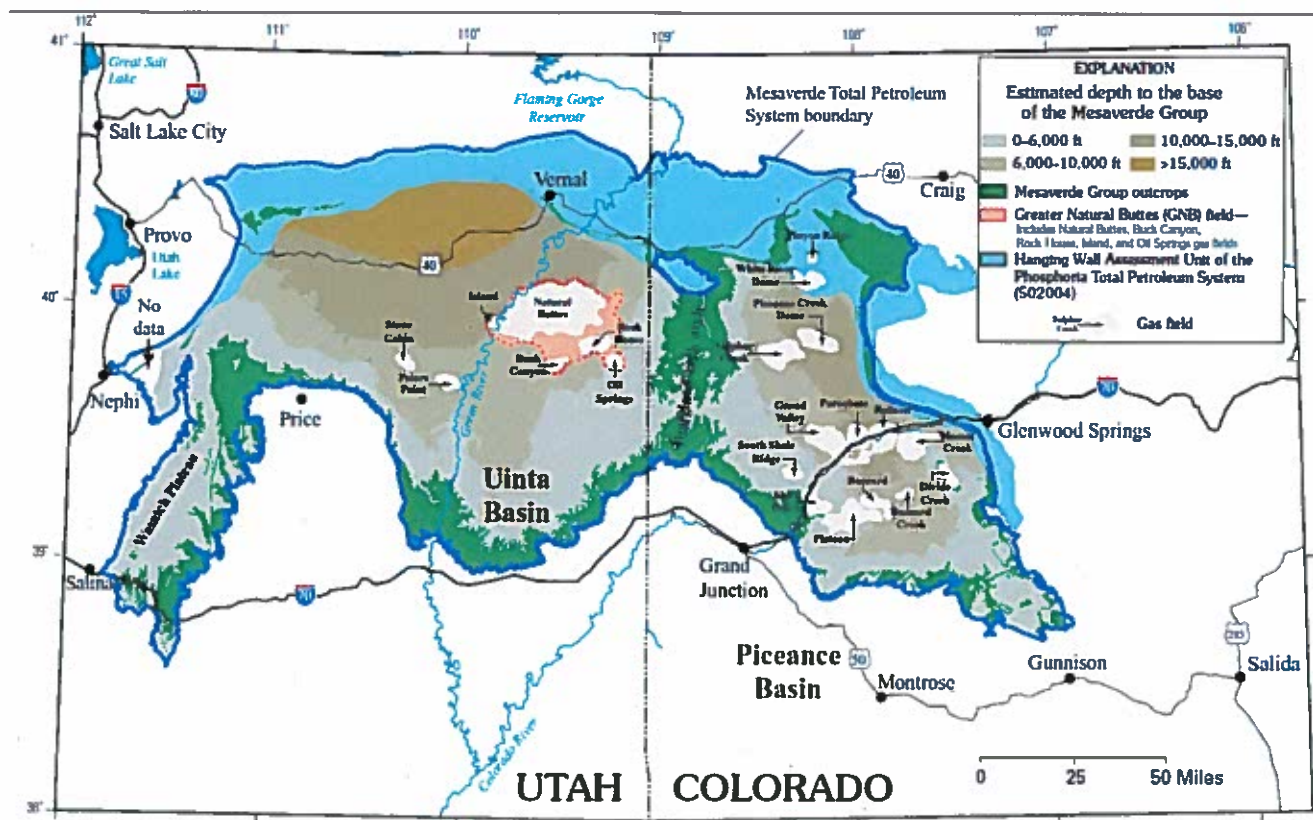


Figure 9 Estimated depth to the base of the Mesaverde in the in-lieu transfer parcel (approximately 4,000-10,000'). Note the Oil Springs and Rock House fields slightly west of the in-lieu transfer parcel are interpreted as part of the Greater Natural Buttes Field (Johnson and Roberts, 2003). Gas resources that may occur in the in-lieu transfer parcel may also be considered as part of the Greater Natural Buttes Field.

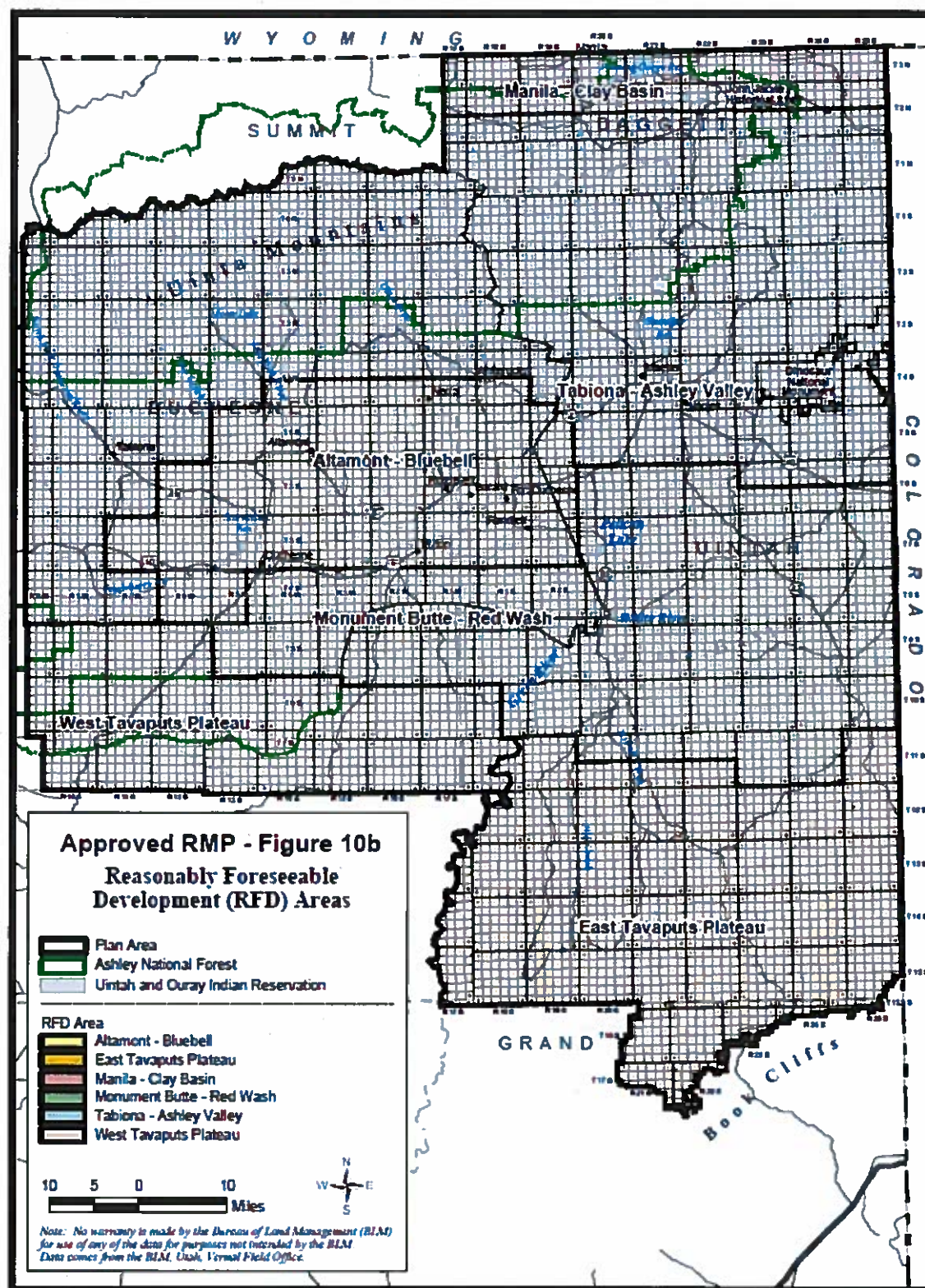


Figure 10 Approved RMP

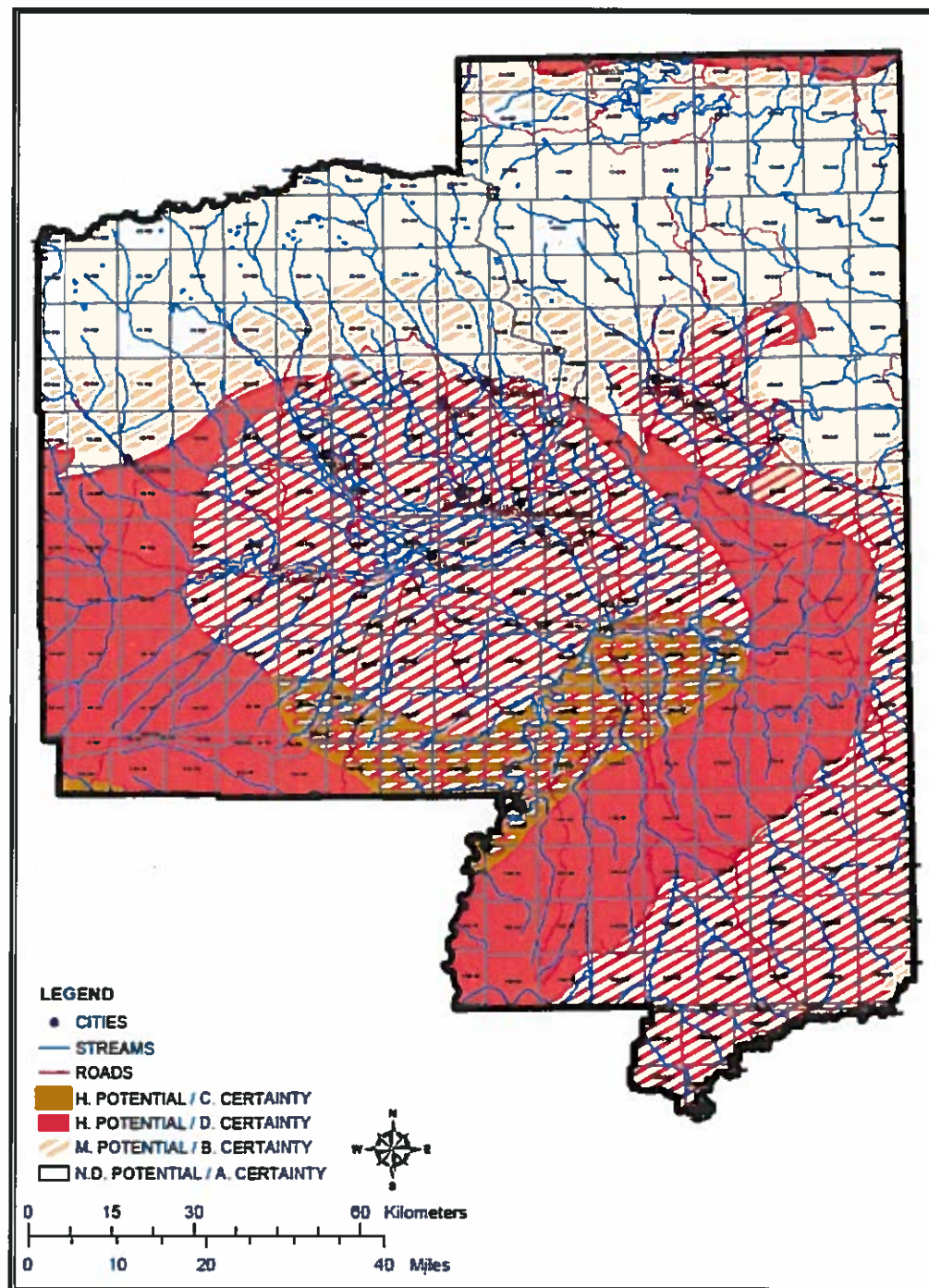


FIGURE A4. OIL AND GAS OCCURRENCE POTENTIAL

Figure 11 Oil and Gas Occurrence Potential

Taken from the Vernal RMP, 2008 Mineral Potential Report

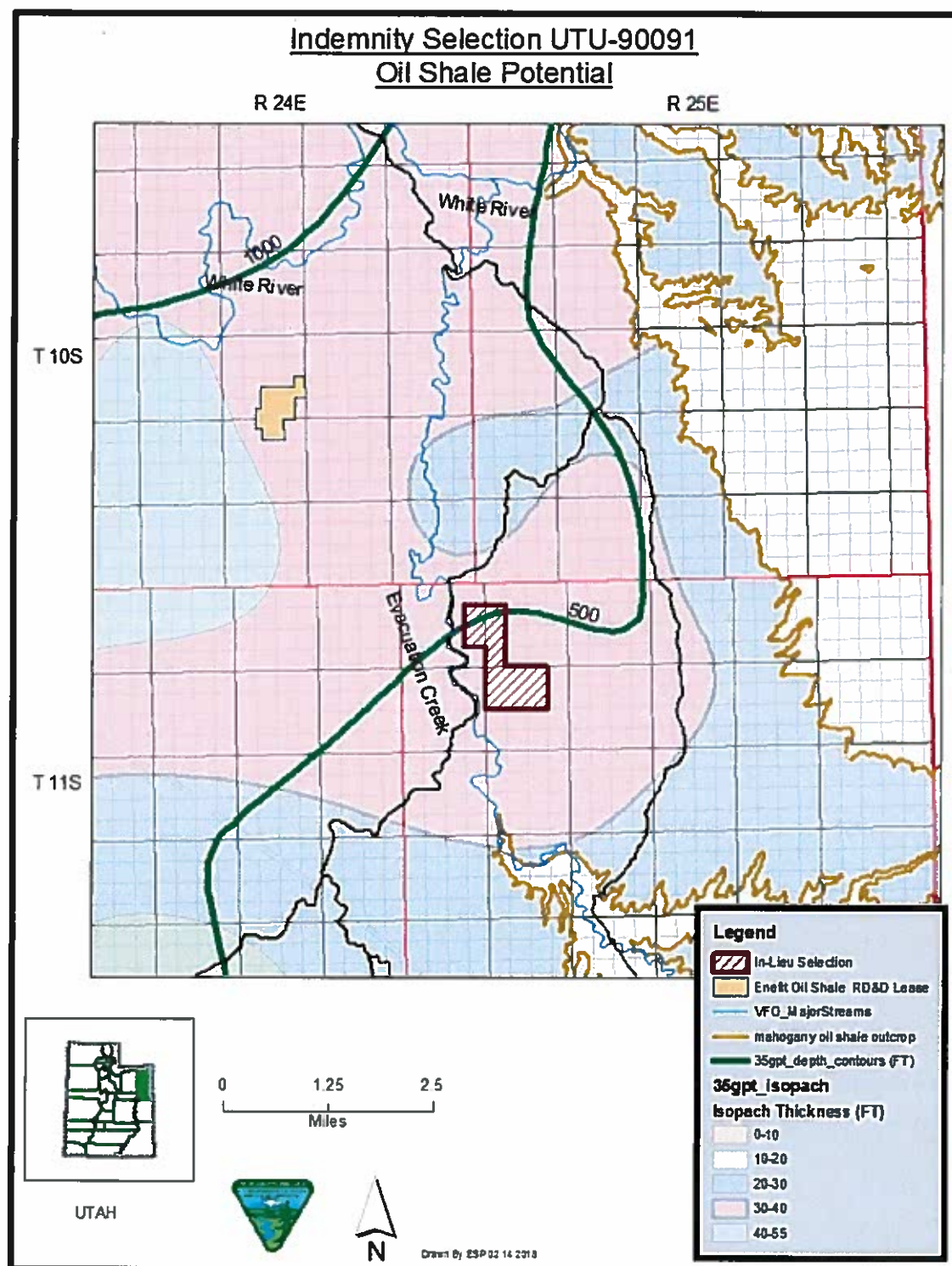


Figure 12 Oil Shale Resources

Taken from „ Basin-wide Evaluation of the Uppermost Green River Formation’s Oil-Shale Resource, Uinta Basin, Utah and Colorado, UGS Special Study 128.

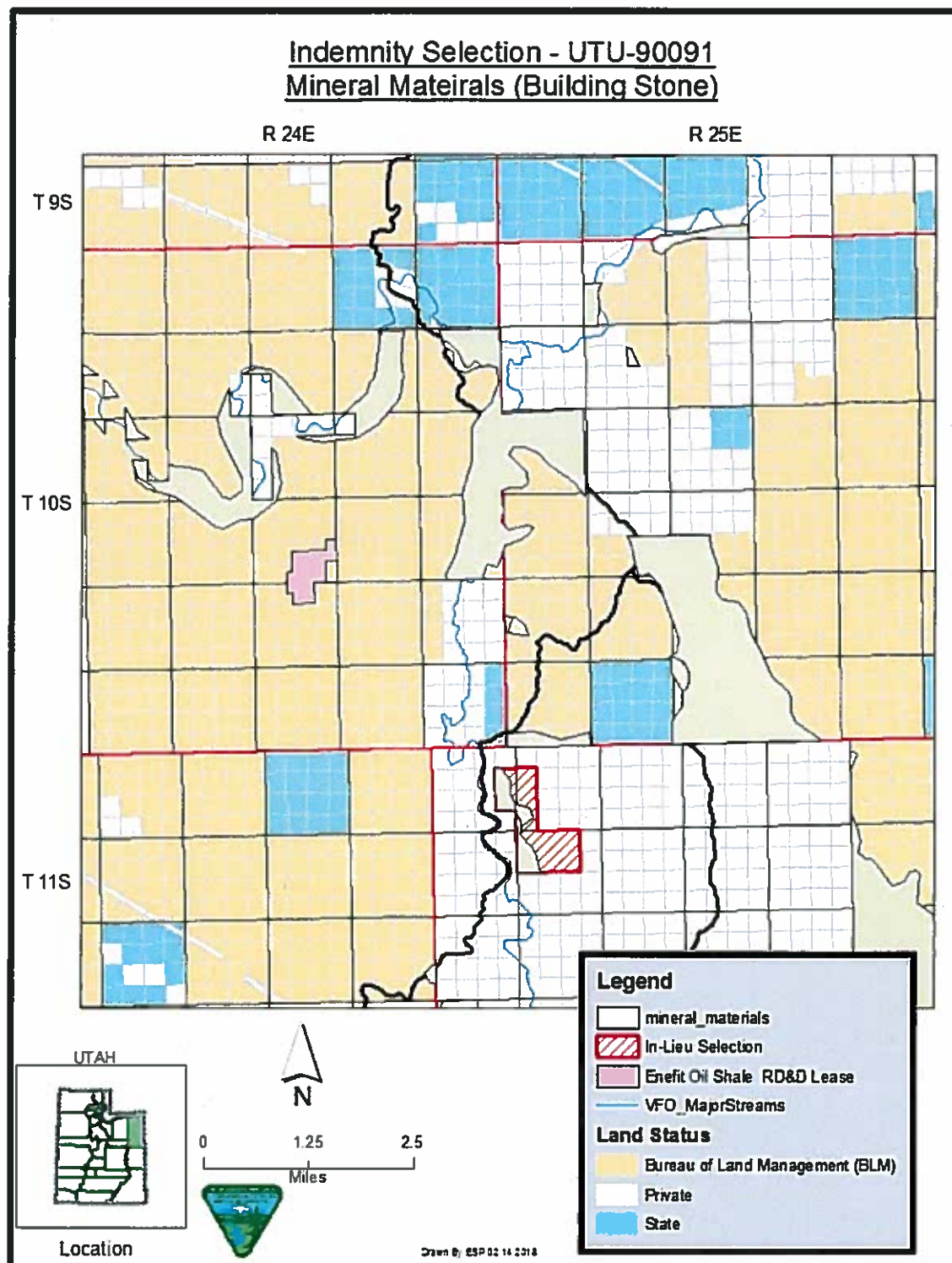


Figure 13 Building Stone Resource

Taken from Vernal Field Office Record of Decision and Approved Resource Management Plan (2008) and Resource Management Plan

TABLES

Mineral Land Report

Indemnity Selection, UTU-90091

Table 1: Oil and Gas Wells Drilled in T11S, R25E near the in-lieu transfer parcel.

OIL AND GAS WELLS DRILLED IN T11S, R25E.																	
API Number	Operator	Well Name	Well Stat	Well Type	Cum Oil (bbls)	Cum Gas (MCF)	Cum Wat (Bbls)	Field Name	Surface	Mineral Lease	County	Qtr/Qtr	Sec	Twn-Rge	TD	P8TD	CompDate
4304710251	CONTINENTAL OIL	EVACUATION CRK FEE 1	P&A	Dry Hole	0	0	0	KICKER	Private	Private	UINTAH	SESW	22	11S-25E	6300		8/1/1961
4304710988	ROBERTSON,	ROBERTSON 1	P&A	Dry Hole	0	0	0	WILDCAT	Private	Private	UINTAH	NESW	5	11S-25E	839		7/6/1960
4304731307	ROSEWOOD RES	EVACUATION CREEK 1	SI	Gas Well	3226	520306	2020	EVACUATION CREEK	State	State	UINTAH	SESW	36	11S-25E	8502		6/4/1983
4304731386	TXO PROD	EVACUATION CREEK ST 4	Loc Abd	Gas Well	0	0	0	EVACUATION CREEK	State	State	UINTAH	SWNW	36	11S-25E			
4304731387	TXO PROD	EVACUATION CREEK ST 2	Loc Abd	Gas Well	0	0	0	EVACUATION CREEK	State	State	UINTAH	NWNE	36	11S-25E			
4304731388	TXO PROD	EVACUATION CREEK ST 5	Loc Abd	Gas Well	0	0	0	EVACUATION CREEK	State	State	UINTAH	NWSE	36	11S-25E			
4304731389	TXO PROD	EVACUATION CREEK ST 3	Loc Abd	Gas Well	0	0	0	EVACUATION CREEK	State	State	UINTAH	SWNE	36	11S-25E			
4304731610	MITCHELL ENERGY	DRAGON WATSON 1-22-11-25	Loc Abd	Gas Well	0	0	0	KICKER	Private	Private	UINTAH	NWSE	22	11S-25E			
4304731677	TXO PROD	EVACUATION CREEK ST 2	Loc Abd	Gas Well	0	0	0	EVACUATION CREEK	State	State	UINTAH	SESW	36	11S-25E	7460		12/9/1987
4304731803	SWECO-SABW	HELLS HOLE 9110	Prod	Gas Well	909	406017	924	HELL'S HOLE	Federal	Federal	UINTAH	SENE	1	11S-25E	8543		9/11/1990
4304731858	MITCHELL ENERGY	DRAGON FED 1-1-11-25	Loc Abd	Gas Well	0	0	0	WILDCAT	Federal	Federal	UINTAH	NESW	25	11S-25E	11700		12/14/1995
4304731896	TXO PROD	EVACUATION CREEK UNIT 1	P&A	Dry Hole	0	0	0	WILDCAT	Private	Private	UINTAH	SESW	22	11S-25E	4250	2205	3/20/2001
4304732693	ANSCHUTZ EXPL	TEXAS CREEK 14-22	P&A	Gas Well	175	106745	0	KICKER	Private	Private	UINTAH	SESW	22	11S-25E			
4304733693	ENDURING RES	QUEST 11-25-24-22	P&A	Gas Well	0	207541	291	KICKER	Private	Private	UINTAH	SESW	22	11S-25E			
4304733801	ENDURING RES	QUEST 4-28	Loc Abd	Gas Well	0	0	0	KICKER	Private	Private	UINTAH	NWNW	28	11S-25E			
4304733803	ENDURING RES	QUEST 11-25-22-28	P&A	Gas Well	0	30900	878	KICKER	Private	Private	UINTAH	SESW	28	11S-25E	3078	2240	5/2/2001
4304733805	ENDURING RES	QUEST 11-25-44-21	P&A	Gas Well	0	306845	391	KICKER	Private	Private	UINTAH	SESE	21	11S-25E	3000	2954	3/7/2001
4304733935	ENDURING RES	QUEST 11-25-13-21	P&A	Dry Hole	0	0	0	KICKER	Private	Private	UINTAH	NWSW	21	11S-25E	3911	1540	3/24/2001
4304734012	XTO ENERGY	CLIFFS 15-21L	Loc Abd	Gas Well	0	0	0	KICKER	Private	Private	UINTAH	SWSE	21	11S-25E			
4304734116	TCC ROYALTY	QUEST 6-15	Loc Abd	Gas Well	0	0	0	WILDCAT	Private	Private	UINTAH	SESW	15	11S-25E			
4304734117	TCC ROYALTY	QUEST 8-15	Loc Abd	Gas Well	0	0	0	WILDCAT	Private	Private	UINTAH	SENE	15	11S-25E			
4304734118	ENDURING RES	QUEST 11-25-24-10	P&A	Dry Hole	0	0	0	WILDCAT	Private	Private	UINTAH	SESW	10	11S-25E	4538	2950	7/8/2009
4304734119	TCC ROYALTY	QUEST 16-10	Loc Abd	Gas Well	0	0	0	WILDCAT	Private	Private	UINTAH	SESE	10	11S-25E			
4304735297	ENDURING RES	QUEST 11-25-34-21	P&A	Dry Hole	0	0	0	KICKER	Private	Private	UINTAH	SWSE	21	11S-25E	2555	2535	11/18/2010
4304735298	ENDURING RES	QUEST 11-25-11-27	P&A	Dry Hole	0	0	0	KICKER	Private	Private	UINTAH	NWNW	27	11S-25E	2400	2354	9/11/2011
4304735299	ENDURING RES	QUEST 11-25-14-22	P&A	Gas Well	0	13541	170	KICKER	Private	Private	UINTAH	SWSW	22	11S-25E	2438		4/18/2004
4304735310	ENDURING RES	QUEST 11-25-31-28	P&A	Gas Well	0	0	0	KICKER	Private	Private	UINTAH	SWNE	28	11S-25E	2485	2440	12/18/2008
4304738453	MEDALLION EXP	ATCHEE FED 14-34-11-25	Loc Abd	Gas Well	0	0	0	UNDESIGNATED	Federal	Federal	UINTAH	SWSW	34	11S-25E			
4304738454	MEDALLION EXP	ATCHEE FED 13-34-11-25	Loc Abd	Gas Well	0	0	0	UNDESIGNATED	Federal	Federal	UINTAH	NWSW	34	11S-25E			
4304738559	ENDURING RES	PARK CYN 11-25-34-16	Loc Abd	Gas Well	0	0	0	UNDESIGNATED	Private	Private	UINTAH	SWSE	16	11S-25E			
4304738572	ENDURING RES	PARK CYN 11-25-22-9	Loc Abd	Gas Well	0	0	0	WILDCAT	Private	Private	UINTAH	SESW	9	11S-25E			
4304738769	MEDALLION EXP	ATCHEE FED 21-34-11-25	P&A	Dry Hole	0	0	0	UNDESIGNATED	Federal	Federal	UINTAH	NWNW	34	11S-25E	500		4/6/2012
4304738770	MEDALLION EXP	ATCHEE FED 12-34-11-25	Loc Abd	Gas Well	0	0	0	UNDESIGNATED	Federal	Federal	UINTAH	SWNW	34	11S-25E			

Table-2: Oil and Gas Units and Fields Surrounding BLM to State in-lieu transfer parcel (T11S, R25E).

OIL AND GAS UNITS SURROUNDING BLM TO TO STATE TRANSFER PARCEL (T11S, R25E)						
Range	Unit	Location	Operator	Serial Register	Status	
R25E	Displacement Point	T12S, R25E	Foundation Energy	UTU 089378X	Exploratory	
	Black Dragon	T12S, R25E	Enduring Resources	UTU 076780X	Exploratory	
R24E	Hanging Rock	T12S, R24E	Onshore Royalties	UTU 073518X	PP GAS	
	Oil Springs	T12S, R24E	Rosewood Resources	UTU 063031X	PP GAS	
	Asphalt	T11S, R24E	Enduring Resources	UTU 084718X	PP GAS	
	Black Dragon	T10S, R24E	Enduring Resources	UTU 076780X	Exploratory	
R23E	Hanging Rock	T12S, R23E	Onshore Resources	UTU 073518X	PP GAS	
	Rockhouse	T11S, R23E	Rosewood Resources	UTU 063030X	PP GAS	
	Marble Mansion II	T11S, R23E	Rosewood Resources	UTU 073813X	PP GAS	
	Rainbow	T11S, R23E	Rosewood Resources	UTU 063035X	PP GAS	
	Asphalt	T11S, R23E	Enduring Resources	UTU 084718X	PP GAS	
OIL AND GAS FIELDS SURROUNDING BLM-STATE TRANSFER PARCEL T11S, R25E (Cumulative production statistics until 2017, UDOGM)						
Range	Field	Location	Operator	Discovery Date	Reservoir	Type
R25E	Hells Hole	T10S/11S, R25E	Bayless, Encana	1989	Km, Kd, Jm	Gas
	Kicker	T11S, R25E	Enduring, Anschutz,	2001	Tw	Gas
	Evacuation Creek	T11S, R255	Rosewood Resources	1964	Kd, Km	Gas
R24E	Natural Buttes	T10S, R24E	Summit, Enduring	1972	Tgr, Tw, Kmv, Kd, Kf	Gas
	Rock House	T11S, R24E	Rosewood Resources	1960	Tw, Kmv	Gas
	Asphalt Wash	T11S, R24E	Enduring	1998	Tw, Kmv	Gas
	Rock House	T12S, R24E	Rosewood Resources	1960	Tw, Kmv	Gas
R23E	Natural Buttes	T10S, R23E	Kerr McGee	1972	Tgr, Tw, Kmv, Kd, Kf	Gas
	Rock House	T11S, R23E	Rosewood Resources	1960	Tw, Kmv	Gas
	Oil Springs	T11S, R23E	Rosewood Resources	1963	Tw, Kmv	Gas
						Cum Gas (MCF)
						2,065,789
						665,572
						3,392,072
						3,857,588,031
						50,156,758
						236,802
						50,156,758
						3,857,588,031
						50,156,758
						17,435,690