# COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

**TITLE OF REPORT:** **Fording River Operations Assessment Report**
**2015 Turnbull Exploration Project**

**TOTAL COST: $ 1,574,550.00**

AUTHOR: **Barry F. Musil**
SIGNATURE: **Originals Signed and Sealed by Author**

NOTICE OF WORK PERMIT NUMBER/DATE: **CX-5-012 / May 15 2014 – May 14 2019**

YEAR OF WORK: **2015**

PROPERTY NAME: **Turnbull Mountain Exploration (FRO)**

COAL LICENSE(S) AND/OR LEASES ON WHICH PHYSICAL WORK WAS DONE:
**COAL LEASES: 389275, 389290, 389311**

MINERAL INVENTORY MINFILE NUMBER**:**
**File: 14675-20/1630586**

MINING DIVISION: **Fort Steele**
NTS / BCGS: **082J0262**
LATITUDE: **50° 13' 01"**
LONGITUDE: -**114° 50' 28"** (at centre of work)
UTM Zone: **11** EASTING: **654000** NORTHING: **5565000**

OWNER: **Teck Coal Limited**

MAILING ADDRESS: **PO BOX 100, Elkford, BC, V0B 1H0**

OPERATOR: **Teck Coal Limited**

MAILING ADDRESS: **PO BOX 100, Elkford, BC, V0B 1H0**

REPORT KEYWORDS:

**Interbedded sequence of sandstones, siltstones, silty shales, mudstones, and medium to high volatile bituminous coal from the Jurassic–Cretaceous Mist Mountain Formation. The region is structurally complex, containing extensive thrust faulting and folding.**

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:

**Annual Assessment Reports Since 1970**

| SUMMARY OF TYPES OF WORK IN THIS REPORT | | EXTENT OF WORK (in metric units) | ON WHICH TENURES |
|---|---|---|---|
| GEOLOGICAL (scale, area) | | | |
| | Ground, mapping | | |
| | Photo interpretation | | |
| GEOPHYSICAL (line-kilometres) | | | |
| | Ground (Specify types) | | |
| | | | |
| | Airborne (Specify types) | | |
| | | | |
| | Borehole | | |
| | **Gamma, Neutron** | **7,004.2 m** | **Coal Lease: 389275, 389290, 389311** |
| | **Density** | **6,762.6 m** | **Coal Lease: 389275, 389290, 389311** |
| | **Caliper** | **6,762.6 m** | **Coal Lease: 389275, 389290, 389311** |
| | **Deviation** | **6,979.4 m** | **Coal Lease: 389275, 389290, 389311** |
| | Dip | | |
| | Others (specify): | | |
| | Core | | |
| | Non-core | | |
| SAMPLING AND ANALYSES | | | |
| Total # of Samples | | | |
| **135** | **Proximate** | | **Coal Lease: 389275, 389290, 389311** |
| | Ultimate | | |
| **135** | **Petrographic** | | **Coal Lease: 389275, 389290, 389311** |
| | Vitrinite reflectance | | |
| | Coking | | |
| **135** | **Wash tests** | | **Coal Lease: 389275, 389290, 389311** |
| PROSPECTING (scale/area) | | | |
| PREPARATORY/PHYSICAL | | | |
| Line/grid (km) | | | |
| Trench (number, metres) | | | |
| Bulk sample(s) | | | |

# Fording River Operations

## Assessment Report

## 2015 Turnbull Exploration Project

Teck

Table 5, Appendix 3, and Appendix 4 remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

http://www.bclaws.ca/civix/document/id/complete/statreg/251_2004

## Fording River Operations Assessment Report

### 2015 Turnbull Exploration Project

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# Fording River Operations Assessment Report

## 2015 Turnbull Exploration Project

### 1. INTRODUCTION

This report presents results of coal exploration activities conducted during the summer of 2015 on the Turnbull Mountain Exploration project, located in the Elk Valley Coalfield, Teck Coal Limited, Fording River Operation, in southeastern British Columbia. The exploration work was completed by Fording River site personnel.

#### *i. Property Description and Access*

The Turnbull Mountain Exploration project is located in the Fording River property and Upper Fording River Valley, approximately 26 kilometers north, and east of Elkford, BC. Figure 1 shows the property location.

Access to the Fording River property is by paved road northeast from Elkford along the Fording River Valley, or north along the Elk River Valley via the Forestry Service gravel road or the Kan-Elk Powerline road.

#### *ii. Property History*

The Elk River portion of the property was actively explored by the Canadian Pacific Railway Company in the period between 1902 and 1908. Until 1947, the property was comprised of 10,276 hectares in 40 Crown Granted Lots. In that year, the holdings were reduced to 2,979 hectares in 15 Crown Granted Lots. In 1967 and 1968, Canadian Pacific Oil and Gas reacquired part of the coal lands which had been abandoned in 1947. An additional nine Coal Licenses located at the south end of the property were acquired in 2001. At the present time, the Fording River Property consists of 22, 635 hectares, held on seven Coal Leases, 9 Coal Licenses, and 15 Crown Granted Lots.

Mining operations, which commenced in 1971, have produced more than 257 million tonnes of clean metallurgical and thermal coal for markets in North and South America, Africa, Europe, and Asia.

#### *iii. Coal Licenses and Tenure*

Currently, 28 coal licenses for Fording River Operations, BC are held by Teck Coal Limited. The tenure number, name, owner, grant and expiry dates, and area are summarized in Table 1. All licenses are located in British Columbia in the Fort Steel Mining Division. The location and distribution of coal licenses are shown on Figure 2.

**Table 1**
**FRO Coal Licenses**

| Tenure Number | Name | Owner | Grant Date | Expiry Date | Area (ha) | Tenure Type | Project |
|---|---|---|---|---|---|---|---|
| 389275 | COAL LEASE No. 01 | TECK COAL LIMITED | 1/1/1974 | 1/1/2025 | 1,009 | Coal Lease No. 1 (389275) | Fording River Operations, BC |
| 389282 | COAL LEASE No. 02 | TECK COAL LIMITED | 5/19/1977 | 5/19/2028 | 2,250 | Coal Lease No. 2 (389282) | Fording River Operations, BC |
| 389285 | COAL LEASE No. 05 | TECK COAL LIMITED | 3/17/1982 | 3/17/2018 | 644 | Coal Lease No. 5 (389285) | Fording River Operations, BC |
| 389290 | COAL LEASE No. 09 | TECK COAL LIMITED | 10/1/1991 | 10/1/2021 | 1,096 | Coal Lease No. 9 (389290) | Fording River Operations, BC |
| 389310 | COAL LEASE No. 16 | TECK COAL LIMITED | 5/9/1998 | 5/9/2028 | 2,859 | Coal Lease No. 16 (389310) | Fording River Operations, BC |
| 389311 | COAL LEASE No. 17 | TECK COAL LIMITED | 5/9/1999 | 5/9/2029 | 8,180 | Coal Lease No. 17 (389311) | Fording River Operations, BC |
| 389312 | COAL LEASE No. 18 | TECK COAL LIMITED | 1/30/2000 | 1/30/2030 | 1,298 | Coal Lease No. 18 (389312), includes Crown Grants | Fording River Operations, BC |
| 402047 | CLIC-402047 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 259 | Coal License | Fording River Operations, BC |
| 402048 | CLIC-402048 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 129 | Coal License | Fording River Operations, BC |
| 402049 | CLIC-402049 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 258 | Coal License | Fording River Operations, BC |
| 402050 | CLIC-402050 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 259 | Coal License | Fording River Operations, BC |
| 402051 | CLIC-402051 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 261 | Coal License | Fording River Operations, BC |
| 402052 | CLIC-402052 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 258 | Coal License | Fording River Operations, BC |
| 402053 | CLIC-402053 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 129 | Coal License | Fording River Operations, BC |
| 402054 | CLIC-402054 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 129 | Coal License | Fording River Operations, BC |
| 402055 | CLIC-402055 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 259 | Coal License | Fording River Operations, BC |
| 402056 | CLIC-402056 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 259 | Coal License | Fording River Operations, BC |
| 402057 | CLIC-402057 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 130 | Coal License | Fording River Operations, BC |
| 402058 | CLIC-402058 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 240 | Coal License | Fording River Operations, BC |
| 402105 | CLIC-402105 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 259 | Coal License | Fording River Operations, BC |
| 402106 | CLIC-402106 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 325 | Coal License | Fording River Operations, BC |
| 402110 | CLIC-402110 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 258 | Coal License | Fording River Operations, BC |
| 402111 | CLIC-402111 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 255 | Coal License | Fording River Operations, BC |
| 402112 | CLIC-402112 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 228 | Coal License | Fording River Operations, BC |
| 402113 | CLIC-402113 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 95 | Coal License | Fording River Operations, BC |
| 402115 | CLIC-402115 | TECK COAL LIMITED | 5/8/2003 | 5/8/2016 | 284 | Coal License | Fording River Operations, BC |
| 417067 | CLIC-417067 | TECK COAL LIMITED | 10/14/2005 | 10/14/2016 | 259 | District Lot 6704 | Fording River Operations, BC |
| 417068 | CLIC-417068 | TECK COAL LIMITED | 10/14/2005 | 10/14/2016 | 259 | District Lot 6705 | Fording River Operations, BC |

## 2. GEOLOGY

### *i. Stratigraphy*

The general stratigraphic succession on the Fording River Property is summarized in the following table:

**Table 2**
**Fording River Stratigraphy**

| Period | Litho-Stratigraphic Units | | | Principle Rock Types |
|---|---|---|---|---|
| Recent | | | | Colluvium |
| Quaternary | | | | Clay, silt, sand, gravel, cobbles |
| Lower Cretaceous | Blairmore Group | | | Massive bedded sandstones and conglomerates |
| Lower Cretaceous to Upper Jurassic | KOOTENAY GROUP | Elk Formation | | Sandstone, siltstone, shale, mudstones, chert pebble conglomerate, minor coal |
| | | Mist Mountain Formation | | Sandstone, siltstone, shale, mudstones, thick coal seams |
| | | MORRISSEY FORMATION | Moose Mountain Member | Medium to coarse-grained quartz- chert sandstone |
| | | | Weary Ridge Member | Fine to coarse-grained, slight ferruginous quartz-chert sandstone |
| Jurassic | Fernie Formation | | | Shale, siltstone, fine-grained sandstone |
| Triassic | Spray River Formation | | | Sandy shale, shale quartzite |
| | Rocky Mountain | | | Quartzite |
| Mississippian | Rundle Group | | | Limestone |

The oldest rocks present on the Fording River property are the Rundle Group limestone, located on the west bank of the Fording River, near the southern property boundary.

These rocks are in faulted contact with the Kootenay Group to the west, and unconformable contact with Rocky Mountain Formation quartzites to the north. The latter are best exposed on the eastern slope of the Brownie Creek valley.

The Fernie Formation shales occur throughout the area, generally along the sides of the valleys on the lower flanks of the mountains. The shales are recessive and, generally poorly exposed. However there are some good exposures of Fernie Formation strata on the lower western slopes of Eagle Mountain in some creek drainages. The Fernie Formation is in conformable contact with the Morrissey through the "Passage Beds," which are a transitional zone from marine to non-marine sedimentation.

The Morrissey Formation, which is the "basal sandstone" of the Kootenay Group, is a prominent cliff-forming marker horizon in many locations. On the Fording River property, the top of the Moose Mountain member (Morrissey Formation) is in sharp contact with 010 seam, the lowermost bed of the

Mist Mountain Formation.

The Mist Mountain Formation contains all of the economic coal seams, and is the most widely occurring formation on the Fording River property. This economically important formation is an interbedded sequence of sandstones, siltstones, silty shales, mudstones, and medium to high volatile bituminous coal seams. The volatile content of the coal increases up section, with decreasing rank. Lenticular sandstones comprise about 1/3 of the Mist Mountain sediments at Fording River, but very few laterally extensive sandstone beds exist.

The sandstone immediately above and below seam 040 and above 090, are the most persistent units, and are often cliff-forming marker horizons.

The Mist Mountain Formation is generally overlain conformably by strata of the Elk Formation. On the Fording property, this formation is commonly a succession of sandstones, siltstones, shales, mudstones, chert pebble conglomerates, and sporadic, thin, high volatile bituminous coal seams. The coal seams are characterized by high alginate content and referred to as "Needle" coal. The Elk Formation is observed near the tops of the mountains, mainly on the east side of the Elk Valley on the Greenhills Range, and northward to the Mount Tuxford areas.

The top of the Elk Formation marks the upper boundary of the Kootenay Group, which is unconformably overlain by the basal member of the Blairmore Group. This thick bedded, cliff-forming sandstone and conglomerate unit is observed on the upper slopes of Mount Tuxford.

*ii. Structure*

Subsequent to deposition, the sediments were involved in the mountain building movements of the late Cretaceous to early Tertiary Laramide orogeny. The major structural features of the Fording River property are the North-South trending synclines with near horizontal to steep westerly dipping thrust faults, and a few high angle normal faults. Some of the thrust faults were probably folded late in the tectonic cycle.

The formation of the major fold structures began early in the tectonic cycle. In the current mining area, two asymmetric synclines are evident: the Greenhills Syncline to the west, and the Alexander Creek Syncline to the east of the Fording River.

The thrust faulting (i.e.: the Ewin Pass and Brownie Ridge Thrusts), was probably contemporaneous with the later stages of folding. The intervening anticline was subsequently faulted (Erickson Fault), then eroded.

The Alexander Creek Syncline can be traced from the southern property boundary on Castle Mountain to the northern end of the property on Weary Ridge. The strata of the west limb, on the west face of Eagle Mountain, dip easterly at 20 to 25$^{o}$, decreasing gradually to zero as the axis is approached. The east limb, however, attains a 20$^{o}$ westerly dip within a much shorter (500m) distance of the axis.

This asymmetry is possibly due, at least in part, to the influence of the Ewin Pass Thrust which subcrops 600 to 800 meters east of the synclinal axis.

Further to the east, on Brownie Ridge, the strata dip westerly at a mean dip of 42$^{o}$. The Brownie Ridge Thrust, which subcrops near the crest of the ridge, probably contributes to this steepening.

Within the mining area, the axis of the Alexander Creek Syncline plunges to the north at an average of 4°. Turnbull Mountain exhibits a localized series of en echelon fold structure, plunging both to the north and to the south. These subsidiary folds may be related to thrust faulting. From the south end of Mount Tuxford, the synclinal axis continues north- northwest along the base of Mount Veits and into the Elk River Valley near Aldridge Creek.

On Mount Tuxford, the beds exposed are those of the Elk Formation and the overlying (non-coal bearing) Cadomin Formation. The area has not been extensively explored. The stratigraphic sequence of the east limb, in the more extensively explored Mist Mountain strata near Aldridge Creek (Elco property), closely resembles the east limb strata found on Henretta Ridge, ten kilometers to the south.

On the northwest corner of Eagle Mountain, the lower Kootenay-upper Fernie section is the locus for a zone of near horizontal thrust faulting. The effect is to cause a double repetition of the lower coal seams and basal sandstone on the west synclinal limb. This fault zone is synclinal in form and continuous with the Ewin Pass Thrust zone found in the east limb.

The Greenhills Syncline in the mining area is essentially a "mirror-image" of the Alexander Creek structure. The east limb of the asymmetric syncline dips westerly at 15 to 25°, except in areas near the Erickson Fault, where 45 to 55° dips are common. The west limb exhibits much steeper dips, commonly in the 35 to 45° range. The Greenhills Syncline plunges northward (340 to 350°), at less than 5°, and then appears to die out to the north in the area of the Osborne Creek Depression.

The Erickson Fault, which locally runs along the base of the Greenhills Range, west of the Fording River, is one of the major regional faults. From south to north, this westerly dipping (40 to 70°) normal fault, brings Mist Mountain strata progressively into contact with Rundle, Rocky Mountain, Spray River, Fernie, and Morrissey strata. The downthrown block is to the west. Near the south end of Lake Mountain, the Erickson Fault begins to "splay" into two zones.

The main fault runs along the eastern margin of Lake Mountain, and the subsidiary fault runs to the west and appears to "die out" northward. The steep northward dip exhibited in the Lake Mountain strata could be due to influence from these flanking "splays" of the fault. The flat lying region to the north of Lake Mountain (Osborne Creek Depression area) is completely void of outcrop, and the Erickson Fault has not been traced either through or to the north of this area.

## 3. 2015 SUMMARY OF EXPLORATION WORK

### *i. 2015 Turnbull Exploration Project Objectives*

In 2015 Fording River conducted an exploration drilling and coal sampling program on the Turnbull Mountain property.

Eleven reverse circulation holes were drilled for geological and coal quality purposes. Two diamond drill holes and three reverse circulation holes were drilled on the south flank of Turnbull Mountain to obtain geotechnical data. In total sixteen drill holes were completed for a cumulative drilled length of 7,004 m, and geophysical logs were completed at each hole.

The overall objective for the 2015 Turnbull Exploration drilling program was to improve resource confidence and increase coal location and quality knowledge using tighter spaced drilling, focused

sampling and additional coal quality analyses.

These objectives were accomplished by

- Developing and implementing an exploration program that included drilling and logging of 11 new reverse-circulation (RC) coal exploration holes, as well as five geotechnical holes;
- Revising geological interpretation that was based on historic mapping and drilling in the Turnbull Mountain area;
- Integrating the new exploration and geotech drilling results with previous historic programs;
- Updating the geological interpretation based on new drilling;
- Determine the coal quality of the represented coal seams from cuttings samples;
- Updating the coal resources in the exploration area using a computer geologic model; and
- Improve resource model and support an economic assessment of Turnbull Mountain.

Prior to drilling, deteriorated pre-existing exploration roads and trails were improved to allow drilling equipment access. Timber harvesting, new excavated trail, and drill pad construction was completed by local contractors to provide access to new drill holes.

Each hole was geophysically logged and representative coal samples were collected from the drillholes.

Each drilling location was surveyed to obtain exact coordinates and elevations. The exploration project was completed under the direction and supervision of Fording River Operations' site geology team.

The following table shows the drillhole locations with respect to Coal Leases.

**Table 3**
**Turnbull Drillhole Locations Relative to Coal License**

| Coal License | Drillholes |
|---|---|
| 389290 | 3388, 3389, 3391, 3393, 3394, 3395, 3397 |
| 389275 | 3387, 3392 |
| 389311 | 3396, 3390, 3405, 3408, 2831B, BH15-02, BH15-01 |

*ii Summary of Completed Work*

The total cost for the 2015 Turnbull Exploration Project was $1,574,550 See Appendix 1 for the cost statement.

The exploration project planning, execution, and geological interpretation and modeling were completed by the Fording River geology team.

Prior to drill site preparation, the excavated trails and exploration drill sites were located by the Fording River environmental team. Excavated trail and drill site construction for the 2015 program began in May, 2015. The new roads and drill pads were completed by the Nohels Group, Sparwood, BC and timber harvesting services was conducted by Trucut Logging Ltd., Sparwood, BC.

Reverse circulation drilling services were performed by Foraco Canada Ltd., Calgary, AB using a Schramm T685WS-D drill rig. The reverse circulation drilling method was chosen as the preferred method for collecting uncontaminated, representative and accurately located coal samples.

As sampling accuracy is critical to develop an accurate understanding of coal seam thickness and quality, Fording River utilized a rigorous Quality Assurance/Quality Control procedure to assure accurate collection of coal samples.

A total of fourteen reverse circulation and two diamond drill holes were completed by Foraco for a cumulative drilling length of 7,004 m. Drillhole depths ranged between 232 and 600 m, averaging 437m. Drillhole information is given in Table 2, and the exploration area with drillhole locations are shown in Figure 4.

**Table 4**
**2015 Drill Hole Collar Locations**

| Drillhole Name | Purpose | UTM COORDINATES | | Elevation | Azimuth | Dip | Hole Depth (m) |
|---|---|---|---|---|---|---|---|
| | | Easting | Northing | | | | |
| 3408 | geological | 655,265.69 | 5,564,488.66 | 2,378.06 | 0 | -90 | 384 |
| 3387 | geological | 652,865.34 | 5,564,496.87 | 1,949.07 | 0 | -90 | 568 |
| 3388 | geological | 653,582.52 | 5,565,462.42 | 2,217.72 | 0 | -90 | 600 |
| 3389 | geological | 654,031.75 | 5,565,448.17 | 2,220.95 | 0 | -90 | 540 |
| 3390 | geological | 654,517.78 | 5,565,087.23 | 2,261.08 | 0 | -90 | 564 |
| 3391 | geological | 653,717.86 | 5,565,748.31 | 2,104.44 | 0 | -90 | 470 |
| 3392 | geological | 653,478.65 | 5,564,722.19 | 2,195.47 | 0 | -90 | 575 |
| 3393 | geological | 654,202.61 | 5,566,050.27 | 2,090.58 | 0 | -90 | 396 |
| 3394 | geological | 654,600.20 | 5,565,799.81 | 2,116.82 | 0 | -90 | 232 |
| 3395 | geological | 654,038.88 | 5,566,429.44 | 1,921.16 | 0 | -90 | 499 |
| 3396 | geotechnical | 654,024.36 | 5,564,337.29 | 2157.526 | 0 | -90 | 458 |
| 3397 | geological | 654,092.63 | 5,565,784.16 | 2109.533 | 0 | -90 | 482 |
| 3405 | geotechnical | 654,484.87 | 5,564,328.58 | 2252.987 | 0 | -90 | 400 |
| 2831B | geotechnical | 654,848.21 | 5,564,337.68 | 2267.866 | 0 | -90 | 305 |
| BH15-01 | geotechnical | 654514.53 | 5564102.788 | 2130.487 | 56.7 | -60 | 400 |
| BH15-02 | geotechnical | 653994.59 | 5564106.561 | 2019.2 | 170 | -80 | 305 |

Downhole geophysical logs were completed by Century Wireline Services, Penhold AB. Each hole was logged through the drill pipe for gamma-neutron. Open holes were logged for downhole deviation and gamma density. The geophysical logs are in Appendix 2.

Coal seams intersected by reverse circulation drilling were sampled in 0.5 meter intervals. Representative composite samples for each coal seam were prepared at Fording River Operation's on-site process plant laboratory. Raw composite samples received in-house raw proximate, sulphur, and FSI analysis.

Composites were forwarded to GWIL Industries, Calgary, AB, for single gravity wash and fluorine analysis. Clean coal samples were returned to the Fording River laboratory where Fording River

Operation's staff completed in-house clean proximate analysis: ash, volatile matter, raw moisture, fixed carbon, sulfur, P2O5, and FSI. Pearson Coal Petrography, Victoria BC, completed Petrographic analysis.

## 4. RESULTS

The primary goal of the 2015 drilling program on Turnbull Mountain was to improve resource confidence through tighter spaced drilling, and increase coal location and quality knowledge. Holes were drilled to infill to an approximate 400 meter density between the 2014, and prior Turnbull exploration holes with favorable results. The project consisted of fourteen reverse circulation and two diamond drill holes an average depth of 437 meters. The holes intersected much of the stratigraphic section, from the Elk formation to the Mist Mountain. Down hole geophysical data was collected from the geotech holes, and used in the geological model as well. To-date, geotechnical analysis has not been fully completed.

The Mist Mountain Formation in the Turnbull mountain area is structurally dominated by the Ewin Pass (TB_Major thrust 210-220) and Brownie Ridge (220-230 Fault) thrust faults, with displacement of over 250 and 100 meters respectively. The three major fault blocks in Turnbull mountain are known as the 210 (west of Ewin Pass fault), the 220 (east of Ewin Pass and west of Brownie Ridge fault), and the 230 (east of Brownie Ridge fault) The Turnbull mountain area contains five dominant coal seams (40, 50, 70, 110 and 130 packages) which are consistently greater than four meters in thickness, and often significantly thicker. Previous thick intersections of the 110 seam in the 220 fault block were confirmed, and potential spoiling areas east of lowermost 040 seam in the 220 fault block were defined. The remaining seam packages were intersected but are generally less than three meters and can lack continuity. Cross sections which illustrate the faults blocks and major coal seams are shown in Figure 5, 5-1, and 5-2.

In house clean coal assay results from the composite samples were added to the seam's qualities in the geological data base and interpolated in the geological model. Seam qualities support the coal's marketability and assist the long term mine plan for the region. Fording River in-house clean and raw analyses are provided in Appendix 3. Fluorine data compilation and data verification is not complete so results are not published in this report. To-date, coal petrography reports have not been processed.

The 2015 drilling program results were incorporated into the Fording River East 3D Block Model. The geological model will be used for detailed mine planning and economic analysis. For modeling methods and parameters please refer to Appendix 4.

There are no reserves published for Turnbull Mountain as detailed engineering work has not been completed. Turnbull Mountain resources are incorporated with Eagle (area to south) and Henretta (area to the north) resources, and are collectively called FRO East. Resources for FRO East are explained in Table 5.

## 5. CONCLUSION

The 2015 exploration drilling program has successfully increased drillhole density and resource confidence in Turnbull Mountain. The program confirmed the location and continuity of all coal seams in the Turnbull Mountain area allowing improved geological and structural interpretation. The assay results confirmed favorable coal quality data that have been incorporated into the geological model. Fording River Operations has now updated its current model, and a mine engineering economic assessment of Turnbull Mountain is under evaluation.

Further RC drilling to improve resource confidence and to increase the amount and density of coal quality data including ash, volatile matter, $P_2O_5$, FSI, fluorine, and fluidity is recommended prior to detailed planning for Turnbull mining. In addition, bulk sampling using large diameter drilling methods is recommended for pilot plant washability analysis and carbonization testing.

## 6. AUTHOR'S QUALIFICATIONS

**Statements of Author's Academic and Professional Qualifications**

CERTIFICATE OF QUALIFIED PERSON

Name: Barry F. Musil, P.Geo.

Company: Teck Coal Limited

Address: Fording River Operations
P.O. Box 100
Elkford, BC
VOB IHO
Phone: (250) 865-5169

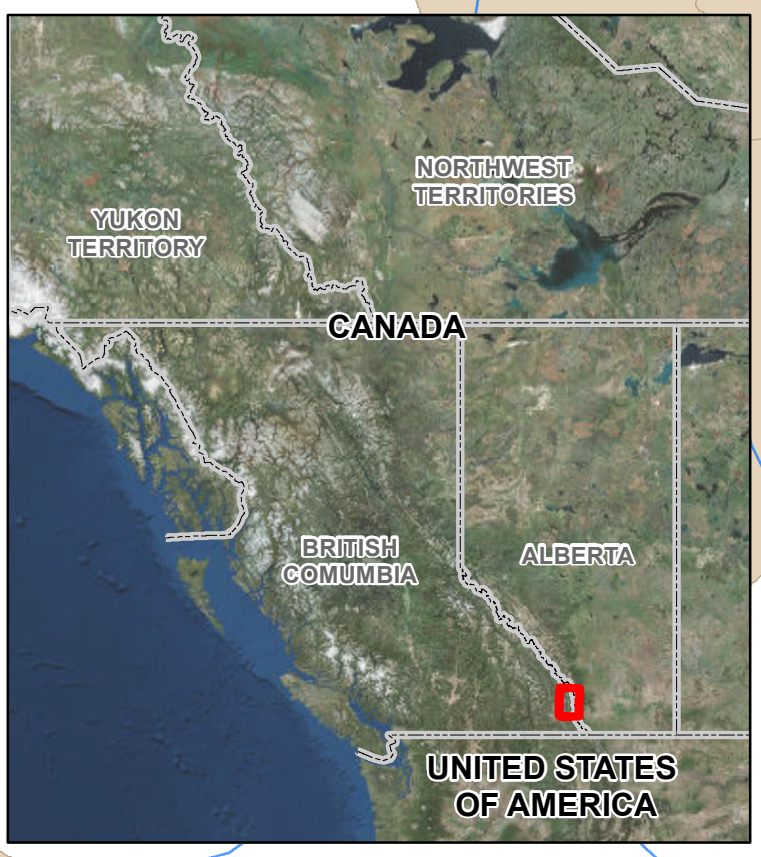
I, Barry F. Musil, P.Geo, am employed as a Senior Geologist, Supervisor at Fording River Operations. This certificate applies to the report titled "Fording River Operations, Assessment Report, 2015 Turnbull Exploration Program". I graduated from the University of British Columbia with a Bachelor of Science Degree in Geology, 1984. I am a member of the Association of Professional Engineers and Geoscientists of British Columbia (# 19361). Since 1986 I have been involved with coal mining projects at Fording River, and other Teck Coal Operations. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

**"Signed and Stamped"**

Barry F. Musil, P.Geo.

620,000 630,000 640,000 650,000 660,000 670,000

5,580,000 5,570,000 5,560,000 5,550,000 5,540,000 5,530,000 5,520,000 5,510,000 5,500,000




Fording River Operations

Greenhills Operations

Line Creek Operations

Elkview Operations

Elkford

Sparwood

Hosmer

FORDING RIVER

BULL RIVER

BRITISH COLUMBIA

ALBERTA

43

3

620,000 630,000 640,000 650,000 660,000 670,000

# Figure 1 - Location Map

- Communities
- Canadian Pacific Railway
- Primary Highway
- Secondary Highway
- Watercourse
- British Columbia - Alberta Border
- Mine Permit Boundaries
- FRO Mine Permit Boundary
- First Nations Reserve
- Provincial Park/Protected Area
- Waterbody

N

0 2.5 5 Kilometers

| DATE: | MINE OPERATION: |
|---|---|
| 4/13/2016 | Elk Valley |
| SCALE: | COORDINATE SYSTEM: |
| 1:250,000 | NAD 1983 UTM Zone 11N |

Teck



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649000 652000 655000 658000 661000

5572000 5568000 5564000 5560000 5556000 5552000

328050
389312
389311
389312
389290
389285
389275
417068
417067
389275
389312
389282
389285
389312
389310
327991
327990
327978
327992
327993
328674
327997
327996
327995
327998
327999
328000
328001
327806
327805

649000 652000 655000 658000 661000

# Figure 2 - Coal License Map

Roads
Railway
Major Streams
Provincial Boundaries
Mineral Coal Tenure
Coal Licenses
Teck Fee Simple Land

Elkford

N

0 0.5 1 2 Kilometers

| DATE: | MINE OPERATION: |
|---|---|
| 4/13/2016 | Coal Mountain |
| SCALE: | COORDINATE SYSTEM: |
| 1:65,000 | NAD 1983 UTM Zone 11N |

**Teck**



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651,000 652,000 653,000 654,000 655,000 656,000 657,000

5,567,000 5,566,000 5,565,000 5,564,000 5,563,000

JF JMo JKMM KE CPRM TS

3395 3393 3394 3391 3397 3388 3389 3390 3392 3387 3408 3396 3405 2831B BH15-02 BH15-01

Mount Turnbull

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# Teck

## Figure 3
## Property Geology Map

**Legend**

- 2015 Turnbull Geotech Holes on pre-exisiting drill sites
- 2015 Turnbull Geotech Holes
- 2015 Turnbull Drill Holes
- MYAB Boundary
- Anticline and syncline
- Bedding, tops known (inclined, vertical, overturned)

LOWER CRETACEOUS

- KC — *CROWSNEST FORMATION*
- KBl — *BLAIRMORE GROUP*
- KE — *KOOTENAY GROUP ELK FORMATION*

UPPER JURASSIC AND LOWER CRETACEOUS

- JKMM — *MIST MOUNTAIN FORMATION*
- JMo — *MORRISEY FORMATION*
- JF — *FERNIE FORMATION*

TRIASSIC

- TWh — *SPRAY RIVER GROUP WHITEHORSE FORMATION*
- TSM — *SULPHUR MOUNTAIN FORMATION*

UPPER CARBONIFEROUS AND PERMIAN

- CPRM — *ROCKY MOUNTAIN SUPERGROUP*

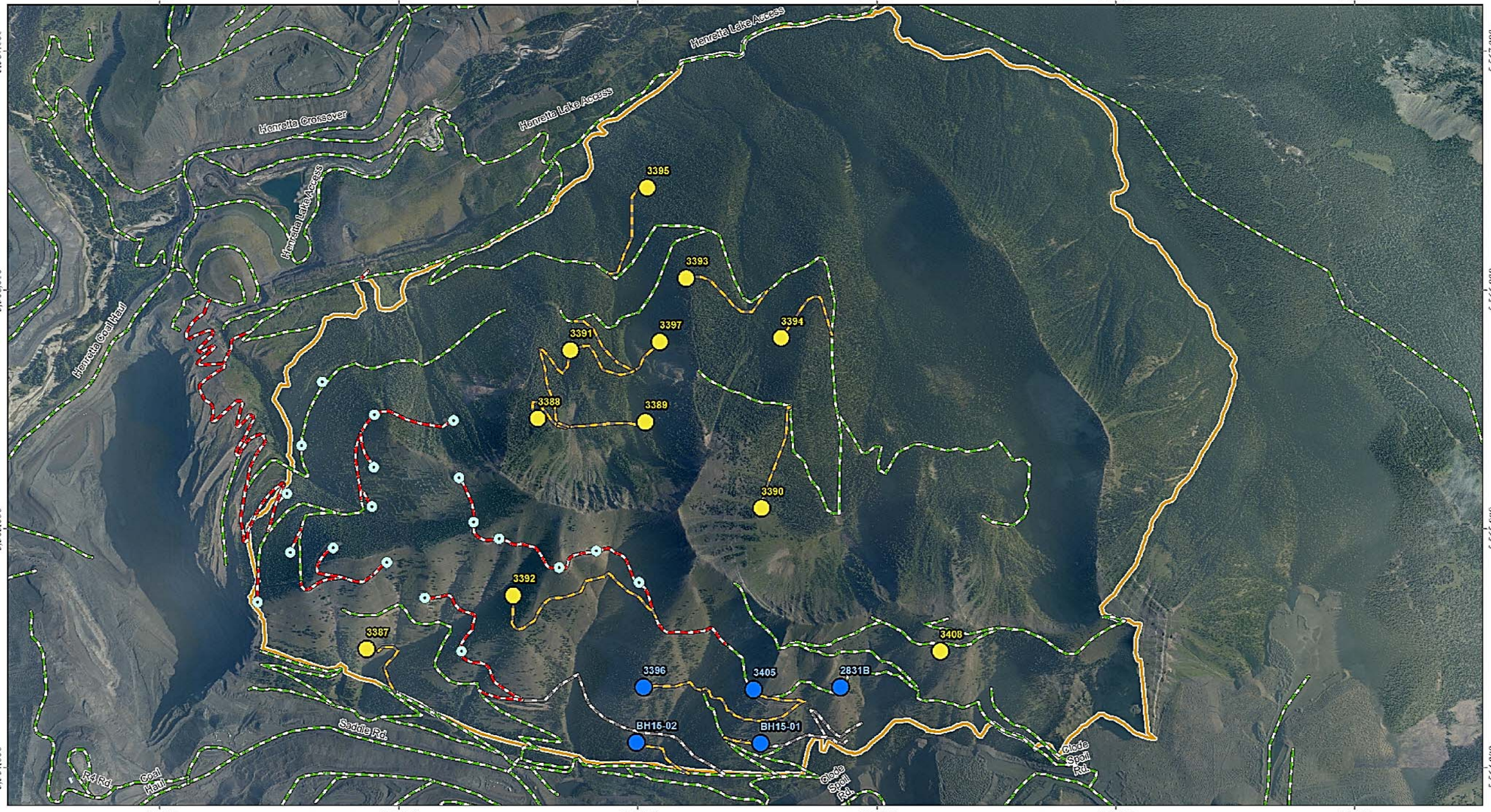
LOWER CARBONIFEROUS

- TS — *SPRAY RIVER GROUP*


N

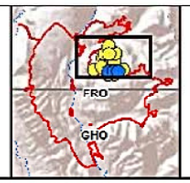
0 100 200 400 600 Meters

| DATE: | MINE OPERATION: |
|---|---|
| 4/14/2016 | Fording River |
| SCALE: 1:20,000 | COORDINATE SYSTEM: NAD 1983 UTM Zone 11N |




**Teck**






# Figure 4 - Drill hole Location Map

- 2015 Turnbull Drill Holes
- 2015 Turnbull Geotech Holes
- 2014 Drill Holes
- 2015 Excavated MYAB Trail: 6.36km
- 2014 Excavated MYAB Trail: 4.57km
- Previously Reclaimed Access: 2.20km
- Pre-Existing Road: 26.99km
- MYAB Boundary

N

0 75 150 300 450 Meters

| DATE: 2/17/2018 | MINE OPERATION: Fording River |
|---|---|
| SCALE: 1:15,000 | COORDINATE SYSTEM: NAD 1983 UTM Zone 11N |

652,000 653,000 654,000 655,000 656,000 657,000

5,567,000 5,566,000 5,565,000 5,564,000

Henretta Lake Access
Moore Creek
McQuarrie Creek
Henretta Crossover
Henretta Creek
Henretta Lake Access
Fording River
Henretta Creek Side Channel
Fording River Side Channel
Henretta Lake Access
Henretta Coal Haul
3395
A'
3393
3391
3397
3394
A
3388
3389
3390
B'
3392
3387
3408
3396
3405
2831B
BH15-02
B
BH15-01
Saddle Rd.
R4 Rd.
Coal Haul
Clode Creek
Clode Spoil Rd.
Clode Spoil Rd.

652,000 653,000 654,000 655,000 656,000 657,000

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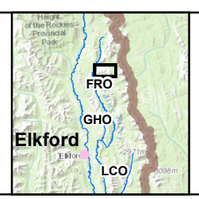


## Figure 5 - Cross Section Location Map

- 2015 Turnbull Drill Holes
- 2015 Turnbull Geotech Holes
- 2015 Turnbull Geotech Holes on pre-existing drill sites
- 2014 Drill Holes
- 2015 Excavated MYAB Trail: 6.36km
- 2014 Excavated MYAB Trail: 4.57km
- Previously Reclaimed Access: 2.20km
- Pre-Existing Road: 26.99km
- Cross Section Line
- Streams
- Water Body
- MYAB Boundary

N

0 62.5 125 250 375 500 Meters

| DATE: | MINE OPERATION: |
|---|---|
| 4/14/2016 | Fording River |
| SCALE: | COORDINATE SYSTEM: |
| 1:15,000 | NAD 1983 UTM Zone 11N |

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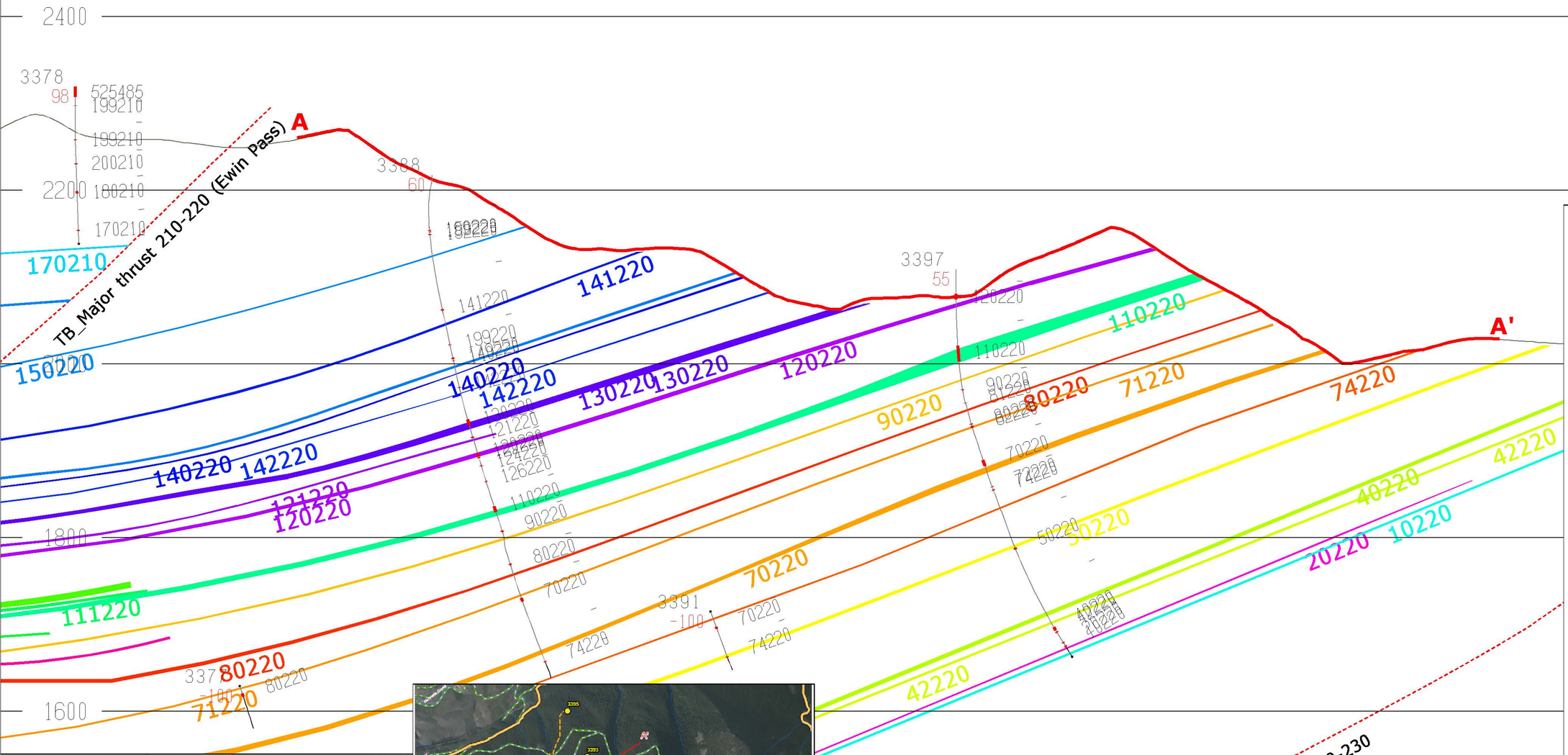
# Figure 5-1
# Cross Section A-A'




## Legend

- Cross Section Line
- Topography
- Fault
- 171 210 (Fault block)
- Seam Name
- 170 210
- 150 220
- 141 220
- 149 220
- 140 220
- 142 220
- 130 220
- 121 220
- 120 220
- 110 220
- 111 220
- 110 220
- 112 220
- 90 220
- 92 220
- 80 220
- 71 220
- 70 220
- 74 220
- 50 220
- 40 220
- 42 220
- 20 220
- 10 220

| | |
|---|---|
| PROJECT: | Turnbull Mountain Exploration (FRO) |
| SECTION: | A- A' |
| FRO SECTION #: | 0764 |
| DATE: | 2016/04/26 |
| SCALE: | X = 1mm : 6000mm |
| | Y = 1mm : 6000mm |

1 : 6000

0 100 200 300 400

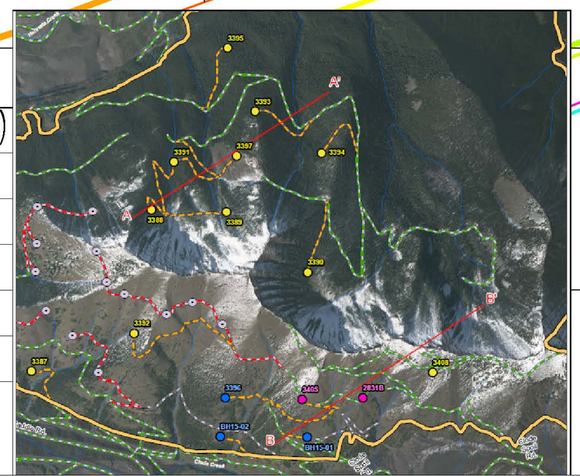
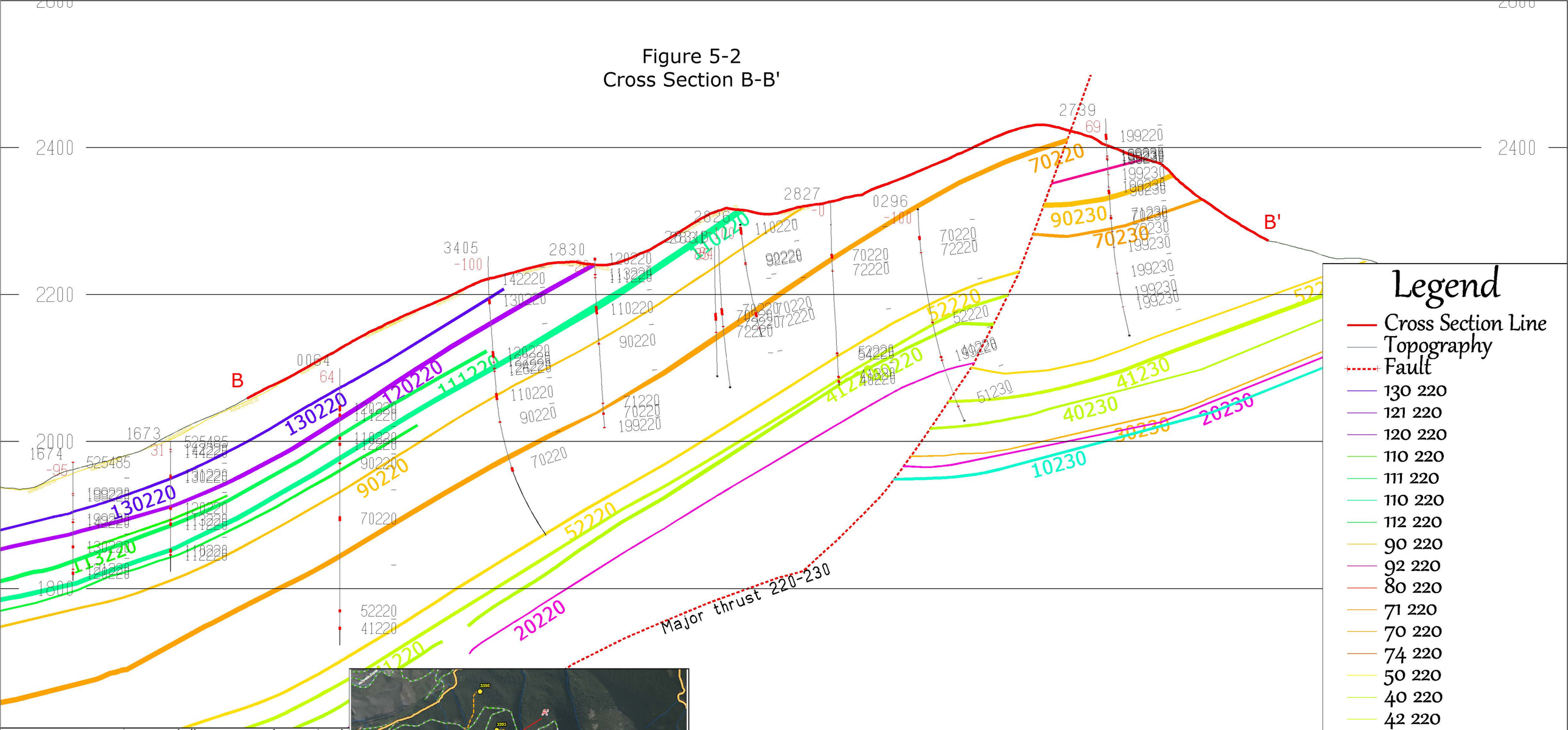
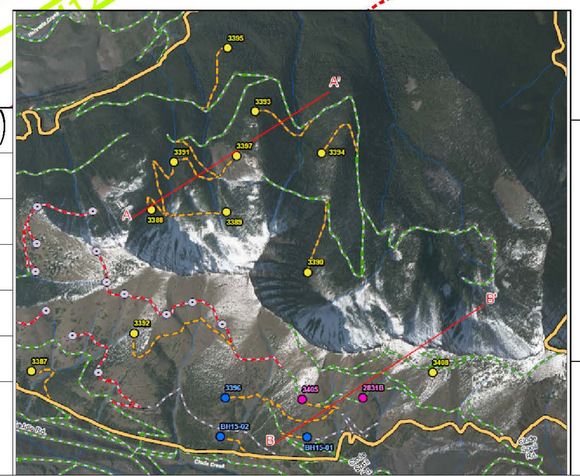


Figure 5-2
Cross Section B-B'




| | |
|---|---|
| PROJECT: | Turnbull Mountain Exploration (FRO) |
| SECTION: | B- B' |
| FRO SECTION #: | 0684 |
| DATE: | 2016/04/26 |
| SCALE: | X = 1mm : 6000mm |
| | Y = 1mm : 6000mm |

1 : 6000

0 100 200 300 400

## Appendix 1 - Cost Statement

| Exploration Work type | Comment | Days | | | Totals |
|---|---|---|---|---|---|
| | | | | | |
| **Personnel (Name)* / Position** | **Field Days (list actual days)** | **Days** | **Rate** | **Subtotal*** | |
| | | | $0.00 | $0.00 | |
| | | | | $0.00 | **$0.00** |
| **Office Studies** | **List Personnel (note - Office only, do not include field days** | | | | |
| Literature search | | | $0.00 | $0.00 | |
| Database compilation | | | $0.00 | $0.00 | |
| Computer modelling | | | $0.00 | $0.00 | |
| Reprocessing of data | | | $0.00 | $0.00 | |
| General research | | | $0.00 | $0.00 | |
| Report preparation | | | $0.00 | $0.00 | |
| Other (specify) | | | | $0.00 | |
| | | | | $0.00 | **$0.00** |
| **Airborne Exploration Surveys** | **Line Kilometres / Enter total invoiced amount** | | | | |
| Aeromagnetics | | | $0.00 | $0.00 | |
| Radiometrics | | | $0.00 | $0.00 | |
| Electromagnetics | | | $0.00 | $0.00 | |
| Gravity | | | $0.00 | $0.00 | |
| Digital terrain modelling | | | $0.00 | $0.00 | |
| Other (specify) | | | $0.00 | $0.00 | |
| | | | | $0.00 | **$0.00** |
| **Remote Sensing** | **Area in Hectares / Enter total invoiced amount or list personnel** | | | | |
| Aerial photography | | | $0.00 | $0.00 | |
| LANDSAT | | | $0.00 | $0.00 | |
| Other (specify) | | | $0.00 | $0.00 | |
| | | | | $0.00 | **$0.00** |
| **Ground Exploration Surveys** | **Area in Hectares/List Personnel** | | | | |
| Geological mapping | | | | | |
| Regional | | *note: expenditures here* | | | |
| Reconnaissance | | *should be captured in Personnel* | | | |
| Prospect | | *field expenditures above* | | | |
| Underground | Define by length and width | | | | |
| Trenches | Define by length and width | | | $0.00 | **$0.00** |
| | | | | | |
| **Ground geophysics** | **Line Kilometres / Enter total amount invoiced list personnel** | | | | |
| Radiometrics | | | | | |
| Magnetics | | | | | |
| Gravity | | | | | |
| Digital terrain modelling | | | | | |
| Electromagnetics | *note: expenditures for your crew in the field* | | | | |
| SP/AP/EP | *should be captured above in Personnel* | | | | |
| IP | *field expenditures above* | | | | |
| AMT/CSAMT | | | | | |
| Resistivity | | | | | |
| Complex resistivity | | | | | |
| Seismic reflection | | | | | |
| Seismic refraction | | | | | |
| Well logging | 7,023 Meters | | | $178,880.00 | |
| Geophysical interpretation | | | | | |
| Petrophysics | | | | | |
| Other (specify) | | | | | |
| | | | | $178,880.00 | **$178,880.00** |
| **Geochemical Surveying** | **Number of Samples** | **No.** | **Rate** | **Subtotal** | |
| | | | | | |
| Drill (cuttings, core, etc.) | 135 Single gravity wash and 103 Fluorine | | $446.96 | $60,339.00 | |
| Stream sediment | | | $0.00 | $0.00 | |

| | | | | | |
|---|---|---|---|---|---|
| Soil | *note: This is for assays or* | | $0.00 | $0.00 | |
| Rock | *laboratory costs* | | $0.00 | $0.00 | |
| Water | | | $0.00 | $0.00 | |
| Biogeochemistry | | | $0.00 | $0.00 | |
| Whole rock | | | $0.00 | $0.00 | |
| Petrology | | | $0.00 | $0.00 | |
| Other (specify) | | | $0.00 | $0.00 | |
| | | | | $60,339.00 | **$60,339.00** |
| **Drilling** | **No. of Holes, Size of Core and Metres** | **No.** | **Rate** | **Subtotal** | |
| Diamond | 2 hole, HQ, 551 meters | | $337.26 | $185,828.00 | |
| Reverse circulation (RC) | 14 holes, 6472 meters | | $140.54 | $909,600.00 | |
| Rotary air blast (RAB) | | | $0.00 | $0.00 | |
| Other (specify) | | | $0.00 | $0.00 | |
| | | | | $1,095,428.00 | **$1,095,428.00** |
| **Other Operations** | **Clarify** | **No.** | **Rate** | **Subtotal** | |
| Trenching | | | $0.00 | $0.00 | |
| Bulk sampling | | | $0.00 | $0.00 | |
| Underground development | | | $0.00 | $0.00 | |
| Other (specify) | Road and Pad Construction | | | $215,903.00 | |
| | | | | $215,903.00 | **$215,903.00** |
| **Reclamation** | **Clarify** | **No.** | **Rate** | **Subtotal** | |
| After drilling | | | $0.00 | $0.00 | |
| Monitoring | | | $0.00 | $0.00 | |
| Other (specify) | | | $0.00 | $0.00 | |
| | | | | | |
| **Transportation** | | **No.** | **Rate** | **Subtotal** | |
| | | | | | |
| Airfare | | | $0.00 | $0.00 | |
| Taxi | | | $0.00 | $0.00 | |
| truck rental | | | $0.00 | $0.00 | |
| kilometers | | | $0.00 | $0.00 | |
| ATV | | | $0.00 | $0.00 | |
| fuel | | | $0.00 | $0.00 | |
| Helicopter (hours) | | | $0.00 | $0.00 | |
| Fuel (litres/hour) | | | $0.00 | $0.00 | |
| Other | | | | | |
| | | | | $0.00 | **$0.00** |
| **Accommodation & Food** | **Rates per day** | | | | |
| Hotel | | | $0.00 | $0.00 | |
| Camp | | | $0.00 | $0.00 | |
| Meals | day rate or actual costs-specify | | $0.00 | $0.00 | |
| | | | | $0.00 | **$0.00** |
| **Miscellaneous** | | | | | |
| Telephone | | | $0.00 | $0.00 | |
| Other (Specify) | Supplies - drill casing, sample bags, sample tags | | | $24,000.00 | |
| | | | | $24,000.00 | **$24,000.00** |
| **Equipment Rentals** | | | | | |
| Field Gear (Specify) | | | $0.00 | $0.00 | |
| Other (Specify) | | | | | |
| | | | | $0.00 | **$0.00** |
| **Freight, rock samples** | | | | | |
| | | | $0.00 | $0.00 | |
| | | | $0.00 | $0.00 | |
| | | | | $0.00 | **$0.00** |
| | | | | | |
| *TOTAL Expenditures* | | | | | **$1,574,550.00** |