Technical Report Summary
On the Bear Lodge REE Project

Located in Crook County, Wyoming.

Prepared For

Rare Element Resources

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29 February 2024

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DATE AND SIGNATURE PAGE

The effective date of the Mineral Resource estimate is 31 December 2023.

The effective date of this Technical Report Summary (TRS) is 29 February 2024

This TRS has been prepared on behalf of Rare Element Resources Inc. in accordance with Regulation S-K (CFR Title 17 §§229.1300-1305 and §§229.601(b)(96)) promulgated by the Securities and Exchange Commission (SEC).

The table below provides a list of the Qualified Persons and sections for which they are responsible for authoring:

Qualified Person	Section (s) Author	Section (s) Review	Signature
Alan C. Noble	1, 2, 11, 22, 23	3, 4, 5, 6, 7, 8, 9, 11	“Digitally Signed”
Monica Barrero Bouza	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 22, 23		“Digitally Signed”
Jaye Pickarts	1, 2, 8, 10, 14, 17, 21, 22, 23		“Digitally Signed"

The Qualified Persons’ qualifications and relevant experience are summarized below:

Mr. Noble (Ore Reserves Engineering) is a Qualified Person, as described in Subpart §229.1300 of Regulation S-K, for resource estimation based on having received a B.S. Degree in Mining Engineering from the Colorado School of Mines, registration as a Professional Engineer in the State of Colorado USA, and over 50 years of experience with resource estimation on over 156 mineral deposits throughout the world. Mr. Noble is independent of Rare Element Resource Inc. and Bear Lodge REE Project.

Ms. Barrero Bouza is a Qualified Person, as described in Subpart §229.1300 of Regulation S-K, for resource estimation based on having received a BS Degree in Geology from the University of Oviedo (Spain), a registered member of the Official Association of Professional Geologists of Spain (ICOG), a registered Eurogeologist, and over 25 years of diverse experience in geology and resource estimation of precious and base metal projects. Ms. Barrero Bouza is independent of Rare Element Resource Inc. and Bear Lodge REE Project.

Mr. Pickarts is a Qualified Person, as described in Subpart §229.1300 of Regulation S-K, for metallurgical and process engineering as well as environmental management. Mr. Pickarts has a B.S Degree in Mineral Processing Engineering from Montana College of Mineral Science and Technology (Montana Tech) and is a Qualified Professional (QP) certified by the Mining and Metallurgical Society of America (MMSA) and a registered member of the Society of Mining, Metallurgy, and Exploration (SME). Mr. Pickarts is a Professional Engineer (P.E.) registered in the State of Colorado, Nevada, and Wyoming. Mr. Pickarts is an independent consultant and former Chief Operating Officer for Rare Element Resources, Inc.

1 EXECUTIVE SUMMARY

Rare Element Resources Inc. (RER) engaged the authors of this report to prepare an initial assessment to support the disclosure of Mineral Resources of the Bear Lodge REE Project in a Technical Report Summary (TRS) in compliance with the United States Securities and Exchange Commission's (SEC) Regulation S-K, CFR Title 17 §§229.1300-1305, Disclosure by Registrants Engaged in Mining Operations, and Subpart §§229.601(b)(96) Technical Report Summary.

The Bear Lodge REE Project is a rare-earth project located in Crook County, Wyoming, consisting of the Bull Hill and other rare-earths (REE) deposits. The Bear Lodge REE Project is a greenfield project with no existing infrastructure or equipment on the property.

The Mineral Resource estimate of the oxide zones of the Bull Hill rare-earth deposit ("the Bull Hill deposit") is supported by this TRS, which has an effective date of 31 December 2023.

1.1 Property Description and Ownership

The Bear Lodge REE Project is located in Central Crook County, northeastern Wyoming, within parts of Sections 5, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 in Township 52 North and Range 63 West, Sixth Principal Meridian.

The property comprises 499 unpatented lode mining claims located on land administered by the U.S. Forest Service (USFS), approximately 9,223 acres (3,732 hectares), and a 640-acre parcel (259 hectares) located in Section 16 for a total of roughly 9,863 acres (3,991 hectares). RER holds a 100% interest in the 499 unpatented mineral claims that constitute the bulk of the Bear Lodge REE Project area. Section 16 is owned by Whitelaw Creek LLC.; RER has a re-purchase agreement in place with them once RER has determined the development plans for the project (Rare Element Resources Inc., 2021).

1.2 Geology and Mineralization

The Bear Lodge REE Project is in the Bear Lodge alkaline-igneous complex, near the western end of the northern Black Hills intrusive belt. The Bear Lodge alkaline-igneous complex consists predominantly of silica-undersaturated alkaline-igneous intrusive rocks, and it is the only intrusive series in the alkaline belt where associated carbonatitic intrusions are found.

REE mineralization is associated with carbonatite and silicocarbonatite dikes, veins, and stockwork that intrude diatreme, heterolithic breccias, and their host trachyte and phonolite intrusions. The northwest alignment of the three diatreme pipes (Bull Hill, Whitetail Ridge, and Carbon Hill) coincides with numerous north- to northwest-striking alkaline igneous dikes and mineralized zones.

Most rock units within the project area are affected by widespread potassic alteration and have a thick near-surface oxidized zone. Carbonate is leached from many surface exposures during the supergene oxidation of pyrite. Near-surface carbonatite is strongly weathered and depleted in calcite; the RER team has termed this material as FMR, a mix of iron oxides, manganese oxides, and rare earth minerals. FMR dikes and veins are interpreted to represent primary carbonatites that were subjected to heavy supergene oxidation and weathering.

REE mineralization exhibits a generalized vertical zonation related to the degree of supergene oxidation, weathering, and hydrothermal alteration of the carbonatite, which generally decreases with increasing depth. The generalized vertical distribution of REE mineralization zones (from top to bottom) and the REE mineralogy is summarized in *Table 1-1*.

Table 1-1. Zonal REE Mineralogy in the Bear Lodge Carbonatite and Derivative Dikes and Veins from the Surface to Depth (Roche-Engineering, 2014).

Zones	Mineralized Body	REE Mineralogy
Oxide (Ox)	FMR dikes and veins; oxidized and leached carbonatite (surface to appx. 5,600 feet/ 1,707 meters) elevation ±300-500 feet (91-152 meters) thickness) FeOx-MnOx-REEs ± Ksp, ap, Q, bi	Bastnäsite group minerals (bastnäsite-dominant), monazite, ± variable, but generally subordinate cerianite
Oxide-Carbonate (OxCa)	Variably oxidized and partially leached carbonatite (variable thickness, surface to appx 5,600 feet/1,707 meters elevation) FeOx-MnOx-REEs-calc ± Ksp, ap, Q, bi	Bastnäsite group minerals (bastnäsite-dominant), ancylite, monazite, ± variable, but generally subordinate cerianite
Transitional (Tran)	Partly oxidized carbonatite (appx. 5,600 feet/1,707 meters elevation) Calc-REE-sulfides-FeOx-REE ± Ksp, ap, aeg, bi	Predominantly ancylite; minor to significant bastnäsite group minerals, ± monazite
Unoxidized/ Sulfide (Sulf)	Unoxidized carbonatite and silicocarbonatite (< 5,600 feet/1,707 meters elevation) Calc-REE-sulfides (py-po±cp,sl,gn,mb)-bi ± Ksp, ap, aeg	Predominantly ancylite; minor to significant bastnäsite group minerals; ± minor monazite, carbocernaite, and burbankite

The main ore phases in the unoxidized dikes are ancylite-(Ce) plus lesser carbocernaite. REE minerals calcioancylite, bastnäsite, parisite, synchisite, monazite, cheralite, burbankite, and cerianite occur in the oxidized and unoxidized carbonatites.

The greatest concentration of REE-mineralized bodies occurs in NW-trending dike swarms and stockworks in the Bull Hill deposit, where Individual dikes can reach 80 feet in width (24.4m). Generally, it exhibits light REE enrichment (generally including cerium/Ce, lanthanum/La, neodymium/Nd, praseodymium/Pr, and samarium/Sm). The mineralized zone extends approximately 1,700 feet (518 meters) in a north-westerly direction, by 300 feet (91 meters) to more than 700 feet (213 meters) in a north-easterly direction, reflecting the overall orientation of a relatively persistent swarm of steeply dipping, northwest-striking dikes and veins of FMR and carbonatite.

1.3 Status of exploration, development, and operations

There are no current exploration or development activities on the property.

1.4 Mineral Resource Estimate

This Mineral Resource estimate is reported in accordance with Regulation S-K (CFR Title 17 Part 229 Items 601(b)(96) and 1300-1305).

Bull Hill deposit estimated measured, indicated, and inferred mineral resources contained in the preliminary open pit design, using a base-case cutoff grade for resource reporting of 2.18% Total Rare earth Oxide (TREO), are summarized in *Table 1-2*. The effective date of the Mineral Resource estimate is 31 December 2023.

Table 1-2. Bull Hill TREO Mineral Resource Summary for the Total Oxide (Ox & OxCa)-31 December 2023 (Noble & Barrero, 2023)

Resource Class	Cutoff %TREO	Short Tons	Metric Tonnes	%TREO	Contained TREO Metric Tonnes	Recovered TREO Metric Tonnes	Recovered NdPr Metric Tonnes
		(millions)	(millions)		(1000's)	(1000's)	(1000's)
Measured	2.18	2.25	2.04	4.53	92.4	60.6	18.4
Indicated	2.18	4.38	3.98	3.85	153.1	99.9	31.3
Measured & Indicated (MI)	2.18	6.63	6.02	4.08	245.5	160.5	49.7
Inferred	2.18	2.09	1.90	3.61	68.5	44.9	14.4
Mineral Resources do not have demonstrated economic viability. There is no guarantee that any part of the mineral resource will be converted to mineral reserves in the future. All figures are rounded to reflect the accuracy of the grade and tonnage estimates.							

The metallurgical recoveries, pay factors, and selected commodity price assumptions are shown in *Table 1-3*. Additional information about these assumptions is provided in *Chapter 11*.

Table 1-3. Pay Factors, Hydromet Plant Recoveries, and Rare-Earth Elements Prices (provided by RER, 2023)

Element	Pay Factor	Hydromet Plant Recoveries	Prices (US $ /Kg)
La (Lanthanun)	1	0.907	0.93
Nd (Neodymium)	1	0.898	77.25
Pr (Praseodymium)	1	0.902	76.48
Dy (Dysprosium)	0.75	0.835	320
*HREE (Yb+Tm+Tb+Er+Ho+Lu)	0.5	0.816	1200
Ce (Cerium)	0	0.336	0
Sm (Samarium)	0	0.912	0
Eu (Europium)	0	0.913	0
Gd (Gadolinium)	0	0.924	0
Y (Ytrrium)	0	0.788	0

**HREE (Heavy Rare Earth Elements) = Ytterbium (Yb)+Thulium (Tm)+ Terbium (Tb)+ Erbium (Er)+Holmium (Ho)+Lutetium (Lu)*

1.5 Summary of Capital and Operating Cost Estimates

Capital costs for the Bear Lodge REE Project have not been estimated.

Operating mining and processing cost estimates have been provided by RER and are factored from 2019 cost data, and contractor estimated costs. These operating costs have been used as input parameters to analyze the economic pit limits to estimate the mineral resources. In the Qualified Persons' opinion, these costs are considered reasonable for establishing the prospects of economic extraction for mineral resources at the time of reporting.

1.6 Processing and Recovery Methods

RER is proceeding with the construction of a rare earth processing and separation demonstration plant. The demonstration plant is scheduled to be in operation in 3rd Quarter of 2024. It is expected to advance RER's proprietary processing and separation technology and generate the operational and economic data necessary for the design of a commercial-scale facility.

1.7 Permitting Requirements

RER will be required to obtain permits and licenses to further develop the Bear Lodge REE Project from the United States Forest Service (USFS), the Wyoming Department of Environmental Quality Land Quality Division (WDEQ-LQD), and the US Nuclear Regulatory Commission (NRC). In accordance with RER's Environmental, Health, and Safety Policy. RER will comply with applicable federal, state, and local environmental statutes, standards, regulations, and guidelines under the National Environmental Policy Act (NEPA) for permitting and licensing of the Bear Lodge REE Project.

1.8 Qualified Persons' Conclusions and Recommendations

The present Mineral Resource estimate includes an update of the Bull Hill deposit oxide zones (Ox and OxCa) for more selective mining and a more conservative resource classification criteria.

Based on the available data and the analysis presented in this TRS, the resource block model has been validated using accepted industry methods. At the time of reporting, the Mineral Resource summarized within the resulting preliminary pit design is considered to have reasonable prospects for eventual economic extraction by open pit methods. Mineral resources are estimated from the current topography and are dated 31 December 2023.

The Mineral Resource estimates are sensitive to commodity prices, operating and processing costs, and metallurgical recoveries, which directly affect the cutoff grade. Additionally, the Lerchs-Grossmann (LG) analysis of economic pit limits and the subsequent pit design summarizing the mineral resource are sensitive to the slope pit design parameters used.

Additional opportunities exist, such as the potential to convert current inferred mineral resources into indicated and measured resources within the present pit limits.

Furthermore, the limits of the REE-mineralized system on the Bear Lodge property have yet to be determined; there is significant REE mineralization at Whitetail, and important REE mineralization has been identified in the sulfide zone, both of which may be economical but are not examined in this TRS.

A Demonstration Plant, which is expected to be operational in the 3rd Quarter of 2024, will provide the necessary design criteria for a larger commercial-scale facility and has the potential to reduce costs and improve metallurgical performance and product quality, positively affecting the project economics. On the other hand, if the operation of the plant is unsuccessful or experiences technical problems, this would have a material adverse effect on RER economics, funding, and future development plans.

2 INTRODUCTION

2.1 Details of the Registrant

This Technical Report Summary (TRS) was prepared in accordance with Regulation S-K (CFR Title 17 Part 229 Items 601(b)(96) and 1300-1305) promulgated by the Securities and Exchange Commission (SEC). This TRS was prepared for Rare Element Resources, Inc. (RER).

2.2 Purpose and Terms of Reference

The purpose of this TRS is to report Mineral Resource estimates for the oxide portion of the Bull Hill deposit, Bear Lodge REE Project. Several Qualified Persons, as noted on the signature page, are responsible for authoring this TRS on behalf of RER; they are:

- Mr. Alan C. Noble, P.E.
- Ms. Monica Barrero Bouza, EurGeol.
- Mr. Jaye Pickarts, P. E., Q.P.

The effective date of this TRS is 29 February 2024, while the effective date of the Mineral Resource estimate was 31 December 2023. In the Qualified Persons' opinion, no known material changes could materially affect the Mineral Resource estimates from 31 December 2023 and the time of reporting.

Mr. Alan C. Noble, P.E. of Ore Reserves Engineering, and Ms. Monica Barrero Bouza EurGeol visited the Bear Lodge REE Project on November 9-10, 2023. During the visit, they both toured the property area, core logging, and core storage facilities, reviewed site conditions and inspected representative drill cores from the Bull Hill deposit.

Mr. Jaye T. Pickarts, P.E., Q.P. is an independent consultant and former Chief Operating Officer for Rare Element Resources, Inc. Mr. Pickarts visited the site with Mr. Noble and Ms. Barrero Bouza on November 9-10, 2023.

Mr. Alan C. Noble, P.E., and Ms. Monica Barrero Bouza, EurGeol, are responsible for the preparation of the Mineral Resource estimate provided in this TRS. Mr. Jaye Pickarts, P.E., Q.P., is responsible for the review and preparation of the metallurgical, processing, recovery, and environmental sections of this report. They are independent Qualified Persons as described in Subpart §229.1300 of Regulation S-K, have extensive experience in the mining industry, and have conducted this work as independent consulting engineers and geologists.

2.3 Sources of Information

Much of the information and data used in the development of this report was provided by RER (electronic data files containing geologic interpretations, drill hole data, and surface topography) and existing previous Technical Reports completed from 2009 to 2014 and prepared on behalf of RER in accordance with Form 43-101F1 and CIM Definition Standards for Mineral Resources and Mineral Reserves. A detailed list of the technical reports mentioned is included in *Section 24* of this TRS.

According to SEC's Regulation S-K, this is the first TRS filed for the Bear Lodge REE Project.

2.4 Units of Measure, Abbreviations, Acronyms, and Symbols

This TRS uses a combination of the System International (SI or metric) and US Customary Units of measure. Ore grades are presented in weight percent (wt.%) or part per million (ppm), while tonnages are stated in US Short Tons (or Tons), and product quantities are stated in Metric Tonnes (or Tonnes). Unless otherwise noted, the primary linear distance units are feet (ft) or miles.

Currency units are in U.S. dollars (US $), and rare earth element prices are in US $ per Kilogram (US $/Kg). All costs are presented in U.S. dollars (US $).

Geographic coordinates in this TRS are projected in the Universal Transverse Mercator (UTM) system relative to Zone 13 North (13N) of the geometric horizontal North American Datum of 1983 (NAD83) and North American Vertical Datum of 1988 (NAVD88), in U.S. Survey feet or in metric units of measure (meters).

TREO means Total Rare Earth Oxide (expressed in wt.%) and represents the total of fourteen (14) individually assayed rare earth element oxides plus yttrium oxide: La_2O_3, Ce_2O_3, Pr_2O_3, Nd_2O_3, Sm_2O_3, Eu_2O_3, Gd_2O_3, Tb_2O_3, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Lu_2O_3, and Y_2O_3. The list of REE elements is included in *Table 2-1*; all of them are incorporated in the 2023 Final Critical Materials List determined by the U.S. Department of Energy (U. S. Department of Energy (DOE), 2023).

Table 2-1. List of fourteen (14) Rare Earth elements and Yttrium. Light Rare Earth Elements (LREE) include La, Ce, Pr, Nd, and Sm, the others are Heavy Rare Earth Elements (HREE)

Element	Symbol REE	Molecular Wt	Oxide	Molecular Wt	Ratio REE/TREO
Lanthanum	La	138.905	La_2O_3	325.8082	0.8527
Cerium	Ce	140.116	Ce_2O_3	328.2302	0.8538
Cerium	Ce	140.116	CeO_2	172.1148	0.8141
Praseodymium*	Pr	140.908	Pr_2O_3	329.8142	0.8545
Neodymium	Nd	144.242	Nd_2O_3	336.4822	0.8574
Samarium	Sm	150.36	Sm_2O_3	348.7182	0.8624
Europium	Eu	151.964	Eu_2O_3	351.9262	0.8636
Gadolinium	Gd	157.25	Gd_2O_3	362.4982	0.8676
Terbium	Tb	158.925	Tb_2O_3	365.8482	0.8688
Dysprosium	Dy	162.5	Dy_2O_3	372.9982	0.8713
Holmium	Ho	164.93	Ho_2O_3	377.8582	0.873
Erbium	Er	167.259	Er_2O_3	382.5162	0.8745
Thulium	Tm	168.934	Tm_2O_3	385.8662	0.8756
Ytterbium	Yb	173.054	Yb_2O_3	394.1062	0.8782
Lutetium	Lu	174.967	Lu_2O_3	397.9322	0.8794
Yttrium	Y	88.906	Y_2O_3	225.8102	0.7874

The acronyms and abbreviations used in this TRS are listed in *Table 2-2* and in *Table 2-3*.

Table 2-2. Acronyms used in this TRS

ACRONYM	**Definition**
BLM	Bureau of Land Management
CRS	Coordinate Reference System
CSAMT	Controlled-Source Audio-Magnetotelluric Technique
DDH	Diamond Drill Hole
DEM	Digital Elevation Model
DH	Drill Hole
EPSG	European Petroleum Survey Group
FMR	FeOx (Iron Oxides)-MnOx (Manganese Oxides)-REE (Rare earths)
HREE or HREE	Heavy Rare Earth Elements
ICP-OES	Inductively Coupled Plasma-Optical Emission Spectroscopy
IP	Induced Polarization; geophysical method
LREE or LREEs	Light Rare Earth Elements
NAD	North American Datum
NAVD	North American Vertical Datum
NRC	US Nuclear Regulatory Commission
NURE	Natural Uranium Resource Evaluation Aeromagnetic Data
RC	Reverse Circulation Holes
REE or REEs	Rare Earth Elements/Metals
RSD	Relative Standard Deviation
TEM	Time Domain/Transient Electromagnetic; geophysical method
TREO	Average percent total rare earth oxide
USBM	US Bureau of Mines
USFS	US Forest Service
USGS	US Geological Survey
UTM	Universal Transverse Mercator geographic coordinate system

Table 2-3. Abbreviations and Symbols used in the TRS.

Abbreviation/Symbol	Definition
$	U.S. dollars
US $/Kg	U.S. dollars/Kilogram
$/kg	U.S. dollars/Kilogram
%	Percent
°	Degrees
°C	Degrees Celsius
°F	Degrees Fahrenheit
µm	Microns
Ca	Calcium (chemical element)
cm	Centimeter
Fe	Iron (chemical element)
ft	Feet (‘)
ft^2	Square feet
ft^3	Cubic foot
g	Gram
g/cc	Gram per cubic centimeter
h	Hour
kg	Kilogram
km	Kilometer
lb/ft^3	Pounds per cubic foot
m	Meter
m^2	Square meter
Ma	Mega-annum (million years)
Mg	Magnesium (chemical element)
mil	thousandth of an inch
mL	Milliliter
Mn	Manganese (chemical element)
mm	Millimeter
oz	Ounce
ppm	Parts per million
Ra	Radium (radioactive chemical element)
Th	Thorium (radioactive chemical element)
ton	U.S. short ton
tonne	Metric tonne
USD	U. S. dollars
wt. %	Weight percent
U	Uranium (radioactive chemical element)
1000's	Thousands

3 PROPERTY DESCRIPTION

3.1 Property Location

3.1.1 Bear Lodge REE Project

The Bear Lodge REE Project is located in Central Crook County, northeastern Wyoming, in the northwestern portion of the Black Hills uplift. The property is situated in the central Bear Lodge Mountains, a relatively small northwesterly trending range. The project is flanked to the west by the Powder River Basin, famous for its extensive coal mining, and is adjoined by the Great Plains to the southeast (*Figure 3-1*).

The Bear Lodge REE Project lies about 7 air miles (11 kilometers) or 12 road miles (19 kilometers) northwest of the town of Sundance (Wyoming), approximately 22 air miles (35 kilometers) west of the South Dakota state line, 55 air miles (89 kilometers) east of Gillette (Wyoming), and 230 miles (370 kilometers) north of Cheyenne, the Wyoming state capitol. Gillette is the headquarters for much of the Wyoming coal mining industry.

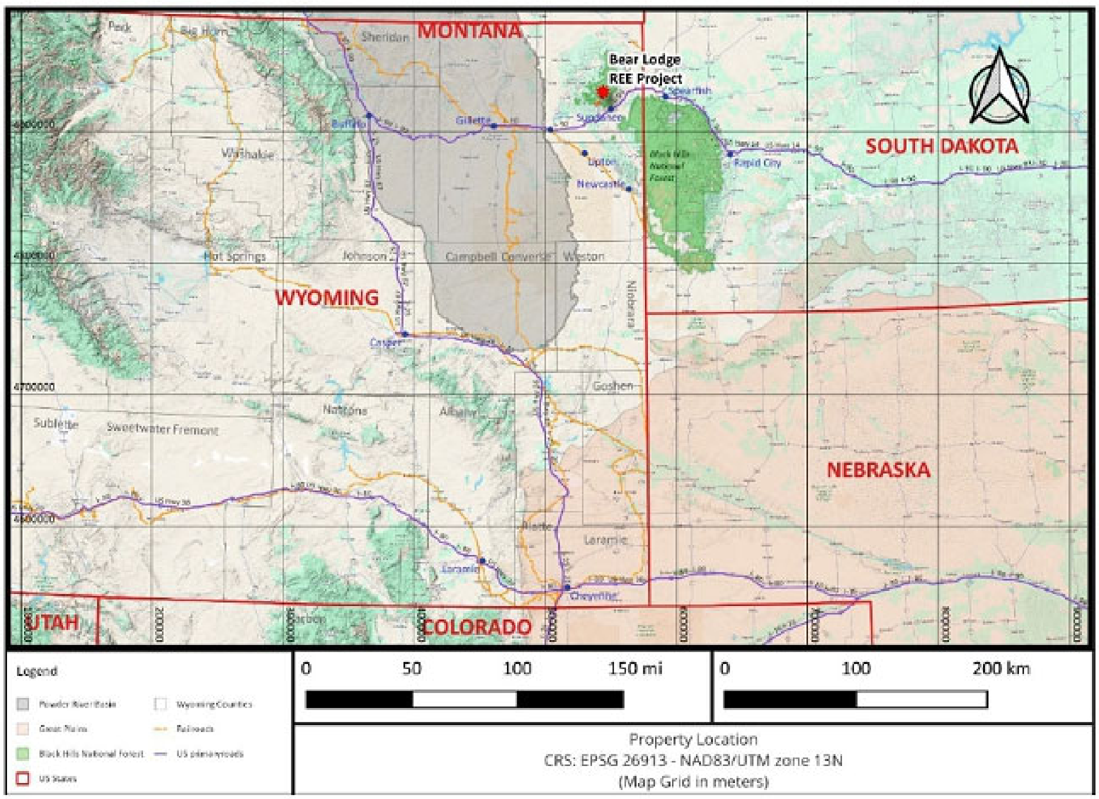


Figure 3-1. General Property Location Map (Noble & Barrero, 2024).

The approximate center of the project area is at a longitude of 104 degrees 27 minutes West and a latitude of 44 degrees 30 minutes North (4,927,000N and 544,000E coordinates in meters, NAD83 UTM zone 13N).

3.2 Property Description and Ownership

3.2.1 Land Ownership

The property is located within parts of Sections 5, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 in Township 52 North and Range 63 West, Sixth Principal Meridian (*Figure 3-2*).

The property comprises 499 unpatented lode mining claims located on land administered by the USFS, approximately 9,223 acres (3,732 hectares), and a 640-acre parcel (259 hectares) located in Section 16 for a total of roughly 9,863 acres (3,991 hectares).

Section 16 is owned by Whitelaw Creek LLC.; RER has a re-purchase agreement in place with them once RER has determined the development plans for the project (Rare Element Resources Inc., 2021). The Bull Hill deposit is located within Section 17 (*Figure 3-2*).

3.2.2 Mining Claims

Rare Element Resources, Inc. (formerly known as Paso Rico (USA), Inc.), holds a 100% interest in the 499 unpatented mineral claims that constitute the bulk of the Bear Lodge REE Project area. These claims were, in part, acquired from Phelps Dodge Exploration Company (Phelps Dodge) by way of a “Mineral Lease and Option for Deed” in 2000, and an additional 327 claims were transferred from Newmont in 2010. Additional claims were added in 2011. Some of the claims and a portion of a defined area of influence surrounding the claims were subject to a production royalty of 2% of Net Smelter Returns (NSR) payable to Phelps Dodge (now Freeport McMoRan Corporation), but the royalty was purchased subsequently by Rare Element Resources, Ltd. in March 2009. In July 2009, Rare Element Resources, Ltd. assigned the Phelps Dodge royalty to RER and retained the royalty as it applies to the production of rare earth minerals.

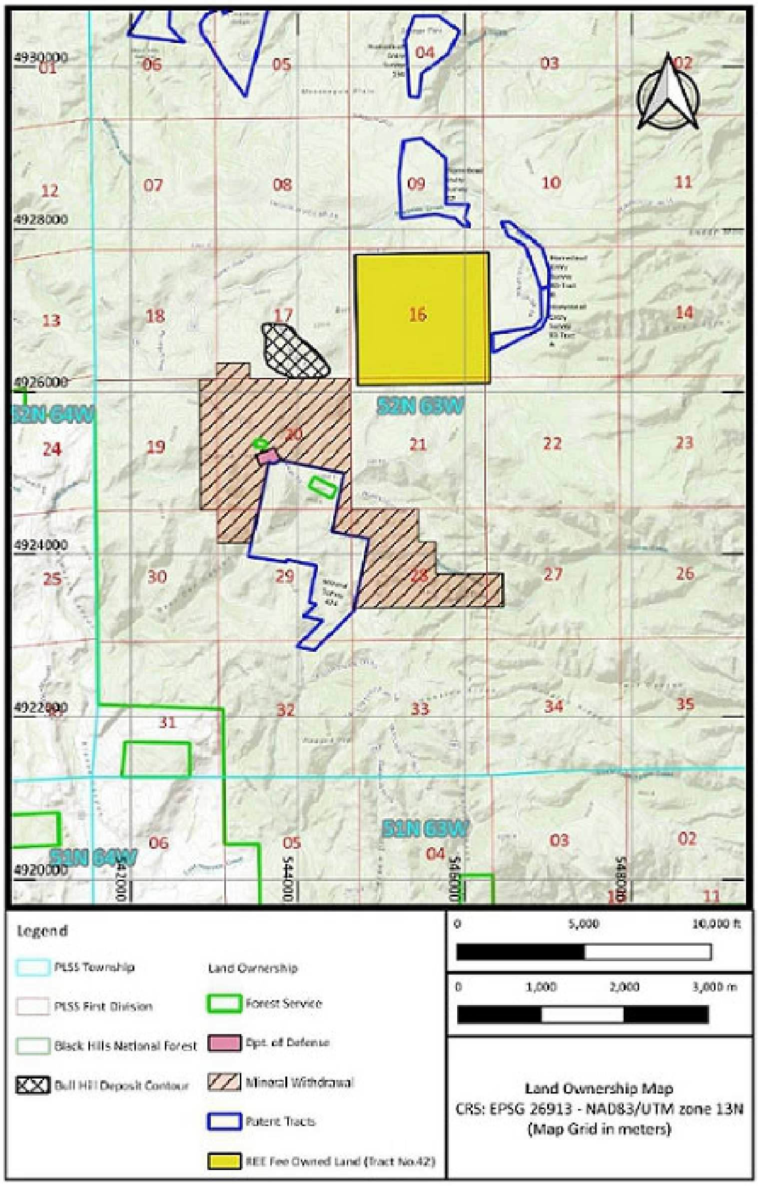


Figure 3-2. Detailed Project Land Property Map (Noble & Barrero, 2024).

The Mineral & Records System of the Bureau of Land Management Website (U.S. Department of Interior) has been consulted, and the information on the 499 mining claims has been downloaded and reviewed. A listing of the RER active mining claims is included in *Table 3-1* and shown graphically in *Figure 3-3*.

All the mining claims are unpatented, such that the United States of America holds the paramount ownership and title of the land. All 499 unpatented claims in the project are located on federal lands and are subject to annual maintenance fees payable to the United States Bureau of Land Management. Claim maintenance payments and related documents must be filed annually with the Wyoming State Office of the Bureau of Land Management (BLM) and recorded with the Crook County, Wyoming Clerk, and Recorder to keep the claims from terminating by operation of law. The claims can be maintained in good standing so long as those requirements are met. Surface usage and access to the claims are part of the rights held by the owners of mining claims.

To maintain all claims in good standing, RER is responsible for paying annual federal claim maintenance fees (currently $165/claim) and recording the annual claim maintenance and intent to hold notice with Crook County (Wyoming). Mineral and surface rights on the mining claims and the 640-acre private parcel allow RER to explore the Bear Lodge property, subject to the prior procurement of required permits and approvals and compliance with applicable federal, state, and local laws, regulations and ordinances.

RER believes that all its mining claims are in good standing, and the authors of this report have no reason to believe otherwise and have accepted the land ownership and control to be as represented.

RER will comply with all federal, state, and local permit and licensing requirements once the project parameters are better defined.

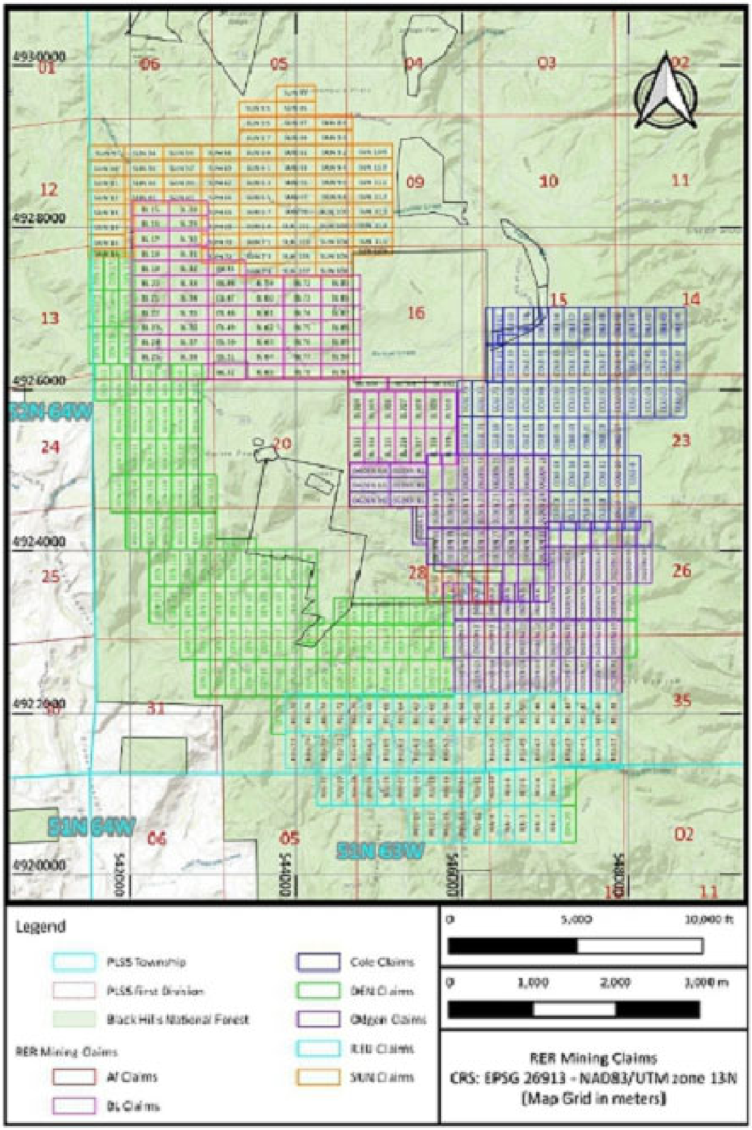


Figure 3-3. Rare Element Resources Mining Claims Map (Noble & Barrero, 2024).

Table 3-1. Listing of RER Mining Claims (Mineral & Records System of the Bureau of Land Management).

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
1	WY101319970	WMC275726	WMC275664	SUN 63	CROOK	LODE CLAIM	6	0520N	0630W	8
2	WY101319971	WMC275727	WMC275664	SUN 64	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
3	WY101319972	WMC275728	WMC275664	SUN 65	CROOK	LODE CLAIM	6	0520N	0630W	8
4	WY101319973	WMC275729	WMC275664	SUN 66	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
5	WY101319974	WMC275730	WMC275664	SUN 67	CROOK	LODE CLAIM	6	0520N	0630W	8
6	WY101319975	WMC275731	WMC275664	SUN 68	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
7	WY101319976	WMC275732	WMC275664	SUN 69	CROOK	LODE CLAIM	6	0520N	0630W	8
8	WY101319977	WMC275733	WMC275664	SUN 70	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
9	WY101319978	WMC275734	WMC275664	SUN 71	CROOK	LODE CLAIM	6	0520N	0630W	8
10	WY101319979	WMC275735	WMC275664	SUN 72	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
							6	0520N	0630W	17
							6	0520N	0630W	18
11	WY101319980	WMC275736	WMC275664	SUN 73	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	17
12	WY101319981	WMC275737	WMC275664	SUN 74	CROOK	LODE CLAIM	6	0520N	0630W	17
13	WY101319982	WMC275746	WMC275664	SUN 83	CROOK	LODE CLAIM	6	0520N	0630W	5
14	WY101319983	WMC275748	WMC275664	SUN 85	CROOK	LODE CLAIM	6	0520N	0630W	5
15	WY101319984	WMC275750	WMC275664	SUN 87	CROOK	LODE CLAIM	6	0520N	0630W	5
							6	0520N	0630W	8
16	WY101319985	WMC275751	WMC275664	SUN 88	CROOK	LODE CLAIM	6	0520N	0630W	4
							6	0520N	0630W	5
							6	0520N	0630W	8
							6	0520N	0630W	9
17	WY101319986	WMC275752	WMC275664	SUN 89	CROOK	LODE CLAIM	6	0520N	0630W	8
18	WY101319987	WMC275753	WMC275664	SUN 90	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
19	WY101319988	WMC275754	WMC275664	SUN 91	CROOK	LODE CLAIM	6	0520N	0630W	8
20	WY101319989	WMC275755	WMC275664	SUN 92	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
21	WY101319990	WMC275756	WMC275664	SUN 93	CROOK	LODE CLAIM	6	0520N	0630W	8
22	WY101340373	WMC247989	WMC247925	BL #65	CROOK	LODE CLAIM	6	0520N	0630W	17
23	WY101340397	WMC247996	WMC247925	BL #72	CROOK	LODE CLAIM	6	0520N	0630W	17
24	WY101340398	WMC249551	WMC249536	BL 315	CROOK	LODE CLAIM	6	0520N	0630W	21

25	WY101340783	WMC247983	WMC247925	BL #59	CROOK	LODE CLAIM	6	0520N	0630W	17
26	WY101344576	WMC249554	WMC249536	BL 318	CROOK	LODE CLAIM	6	0520N	0630W	21
27	WY101353276	WMC309537	WMC309537	BL 319A	CROOK	LODE CLAIM	6	0520N	0630W	21
28	WY101420800	WMC248001	WMC247925	BL #77	CROOK	LODE CLAIM	6	0520N	0630W	17
29	WY101422749	WMC247988	WMC247925	BL #64	CROOK	LODE CLAIM	6	0520N	0630W	17
30	WY101423174	WMC249544	WMC249536	BL 308	CROOK	LODE CLAIM	6	0520N	0630W	21
31	WY101423925	WMC249553	WMC249536	BL 317	CROOK	LODE CLAIM	6	0520N	0630W	21
32	WY101424316	WMC249552	WMC249536	BL 316	CROOK	LODE CLAIM	6	0520N	0630W	21
33	WY101424702	WMC249545	WMC249536	BL 309	CROOK	LODE CLAIM	6	0520N	0630W	21
34	WY101425598	WMC247987	WMC247925	BL #63	CROOK	LODE CLAIM	6	0520N	0630W	17
35	WY101426718	WMC248002	WMC247925	BL #78	CROOK	LODE CLAIM	6	0520N	0630W	17
36	WY101455170	WMC247984	WMC247925	BL #60	CROOK	LODE CLAIM	6	0520N	0630W	17
37	WY101455357	WMC247998	WMC247925	BL #74	CROOK	LODE CLAIM	6	0520N	0630W	17
38	WY101496708	WMC247985	WMC247925	BL #61	CROOK	LODE CLAIM	6	0520N	0630W	17
39	WY101498138	WMC270185	WMC270117	DEN 69	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
40	WY101498139	WMC270186	WMC270117	DEN 70	CROOK	LODE CLAIM	6	0520N	0630W	31
							6	0520N	0630W	32
41	WY101498140	WMC270187	WMC270117	DEN 71	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	30
							6	0520N	0630W	31
							6	0520N	0630W	32

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
42	WY101498141	WMC270188	WMC270117	DEN 72	CROOK	LODE CLAIM	6	0520N	0630W	31
43	WY101498142	WMC270189	WMC270117	DEN 73	CROOK	LODE CLAIM	6	0520N	0630W	30
							6	0520N	0630W	31
44	WY101498143	WMC270191	WMC270117	DEN 75	CROOK	LODE CLAIM	6	0520N	0630W	30
							6	0520N	0630W	31
45	WY101498144	WMC270204	WMC270117	DEN 88	CROOK	LODE CLAIM	6	0520N	0630W	28
46	WY101498145	WMC270205	WMC270117	DEN 89	CROOK	LODE CLAIM	6	0520N	0630W	28
47	WY101498146	WMC270206	WMC270117	DEN 90	CROOK	LODE CLAIM	6	0520N	0630W	28
48	WY101498147	WMC270207	WMC270117	DEN 91	CROOK	LODE CLAIM	6	0520N	0630W	28
49	WY101498148	WMC270208	WMC270117	DEN 92	CROOK	LODE CLAIM	6	0520N	0630W	28
50	WY101498149	WMC270209	WMC270117	DEN 93	CROOK	LODE CLAIM	6	0520N	0630W	29
51	WY101498150	WMC270210	WMC270117	DEN 94	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	29
52	WY101498151	WMC270212	WMC270117	DEN 96	CROOK	LODE CLAIM	6	0520N	0630W	29
53	WY101498152	WMC270213	WMC270117	DEN 97	CROOK	LODE CLAIM	6	0520N	0630W	29
54	WY101498153	WMC270214	WMC270117	DEN 98	CROOK	LODE CLAIM	6	0520N	0630W	29
55	WY101498154	WMC270215	WMC270117	DEN 99	CROOK	LODE CLAIM	6	0520N	0630W	29
56	WY101498155	WMC270216	WMC270117	DEN 100	CROOK	LODE CLAIM	6	0520N	0630W	29
57	WY101498156	WMC270217	WMC270117	DEN 101	CROOK	LODE CLAIM	6	0520N	0630W	29
58	WY101498157	WMC270218	WMC270117	DEN 102	CROOK	LODE CLAIM	6	0520N	0630W	29
59	WY101498158	WMC270219	WMC270117	DEN 103	CROOK	LODE CLAIM	6	0520N	0630W	29
60	WY101498159	WMC270296	WMC270117	OGDEN 20	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	22
							6	0520N	0630W	27
							6	0520N	0630W	28
61	WY101498160	WMC270297	WMC270117	OGDEN 21	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
62	WY101498161	WMC270298	WMC270117	OGDEN 22	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
63	WY101498162	WMC270299	WMC270117	OGDEN 23	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
64	WY101498163	WMC270300	WMC270117	OGDEN 24	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
65	WY101498164	WMC270301	WMC270117	OGDEN 25	CROOK	LODE CLAIM	6	0520N	0630W	28
66	WY101498165	WMC270302	WMC270117	OGDEN 26	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	28
67	WY101498166	WMC270303	WMC270117	OGDEN 27	CROOK	LODE CLAIM	6	0520N	0630W	27
68	WY101498167	WMC270304	WMC270117	OGDEN 28	CROOK	LODE	6	0520N	0630W	27

						CLAIM				
69	WY101498168	WMC270305	WMC270117	OGDEN 29	CROOK	LODE CLAIM	6	0520N	0630W	27
70	WY101498169	WMC270306	WMC270117	OGDEN 30	CROOK	LODE CLAIM	6	0520N	0630W	27
71	WY101498170	WMC270307	WMC270117	OGDEN 31	CROOK	LODE CLAIM	6	0520N	0630W	27
72	WY101498171	WMC270308	WMC270117	OGDEN 32	CROOK	LODE CLAIM	6	0520N	0630W	27
73	WY101498172	WMC270309	WMC270117	OGDEN 33	CROOK	LODE CLAIM	6	0520N	0630W	27
74	WY101498173	WMC270310	WMC270117	OGDEN 34	CROOK	LODE CLAIM	6	0520N	0630W	27
75	WY101498174	WMC270311	WMC270117	OGDEN 35	CROOK	LODE CLAIM	6	0520N	0630W	27
76	WY101498175	WMC270312	WMC270117	OGDEN 36	CROOK	LODE CLAIM	6	0520N	0630W	27
77	WY101498176	WMC270313	WMC270117	OGDEN 37	CROOK	LODE CLAIM	6	0520N	0630W	27
78	WY101498177	WMC270314	WMC270117	OGDEN 38	CROOK	LODE CLAIM	6	0520N	0630W	26
							6	0520N	0630W	27
79	WY101498178	WMC270315	WMC270117	OGDEN 39	CROOK	LODE CLAIM	6	0520N	0630W	26
80	WY101498179	WMC270316	WMC270117	OGDEN 40	CROOK	LODE CLAIM	6	0520N	0630W	26
81	WY101498581	WMC270320	WMC270117	OGDEN 44	CROOK	LODE CLAIM	6	0520N	0630W	27
82	WY101498582	WMC270321	WMC270117	OGDEN 45	CROOK	LODE CLAIM	6	0520N	0630W	27
83	WY101498583	WMC270322	WMC270117	OGDEN 46	CROOK	LODE CLAIM	6	0520N	0630W	27
84	WY101498584	WMC270323	WMC270117	OGDEN 47	CROOK	LODE CLAIM	6	0520N	0630W	27
85	WY101498585	WMC270324	WMC270117	OGDEN 48	CROOK	LODE CLAIM	6	0520N	0630W	26
							6	0520N	0630W	27
86	WY101498586	WMC270325	WMC270117	OGDEN 49	CROOK	LODE CLAIM	6	0520N	0630W	26
87	WY101498587	WMC270326	WMC270117	OGDEN 50	CROOK	LODE CLAIM	6	0520N	0630W	26
88	WY101498588	WMC270330	WMC270117	OGDEN 54	CROOK	LODE CLAIM	6	0520N	0630W	27

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
89	WY101498589	WMC270331	WMC270117	OGDEN 55	CROOK	LODE CLAIM	6	0520N	0630W	27
90	WY101498590	WMC270332	WMC270117	OGDEN 56	CROOK	LODE CLAIM	6	0520N	0630W	27
91	WY101498591	WMC270333	WMC270117	OGDEN 57	CROOK	LODE CLAIM	6	0520N	0630W	27
92	WY101498592	WMC270334	WMC270117	OGDEN 58	CROOK	LODE CLAIM	6	0520N	0630W	26
							6	0520N	0630W	27
93	WY101498593	WMC270335	WMC270117	OGDEN 59	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
94	WY101498594	WMC270336	WMC270117	OGDEN 60	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
95	WY101498595	WMC270337	WMC270117	OGDEN 61	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
96	WY101498596	WMC270338	WMC270117	OGDEN 62	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
97	WY101498597	WMC270339	WMC270117	OGDEN 63	CROOK	LODE CLAIM	6	0520N	0630W	26
							6	0520N	0630W	27
							6	0520N	0630W	34
							6	0520N	0630W	35
98	WY101498598	WMC270340	WMC270117	OGDEN 64	CROOK	LODE CLAIM	6	0520N	0630W	33
99	WY101498599	WMC270341	WMC270117	OGDEN 65	CROOK	LODE CLAIM	6	0520N	0630W	33
100	WY101498600	WMC270342	WMC270117	OGDEN 66	CROOK	LODE CLAIM	6	0520N	0630W	33
							6	0520N	0630W	34
101	WY101498758	WMC270343	WMC270117	OGDEN 67	CROOK	LODE CLAIM	6	0520N	0630W	34
102	WY101499149	WMC270220	WMC270117	DEN 104	CROOK	LODE CLAIM	6	0520N	0630W	29
103	WY101499150	WMC270221	WMC270117	DEN 105	CROOK	LODE CLAIM	6	0520N	0630W	29
104	WY101499151	WMC270222	WMC270117	DEN 106	CROOK	LODE CLAIM	6	0520N	0630W	29
105	WY101499152	WMC270223	WMC270117	DEN 107	CROOK	LODE CLAIM	6	0520N	0630W	29
106	WY101499153	WMC270224	WMC270117	DEN 108	CROOK	LODE CLAIM	6	0520N	0630W	29
107	WY101499154	WMC270225	WMC270117	DEN 109	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	30
108	WY101499155	WMC270226	WMC270117	DEN 110	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	30
109	WY101499156	WMC270227	WMC270117	DEN 111	CROOK	LODE CLAIM	6	0520N	0630W	30
110	WY101499157	WMC270228	WMC270117	DEN 112	CROOK	LODE CLAIM	6	0520N	0630W	30
111	WY101499158	WMC270229	WMC270117	DEN 113	CROOK	LODE CLAIM	6	0520N	0630W	30
112	WY101499159	WMC270230	WMC270117	DEN 114	CROOK	LODE CLAIM	6	0520N	0630W	30
113	WY101499160	WMC270231	WMC270117	DEN 115	CROOK	LODE CLAIM	6	0520N	0630W	30
114	WY101499161	WMC270232	WMC270117	DEN 116	CROOK	LODE CLAIM	6	0520N	0630W	30
115	WY101499162	WMC270233	WMC270117	DEN 117	CROOK	LODE	6	0520N	0630W	30

						CLAIM				
116	WY101499163	WMC270234	WMC270117	DEN 118	CROOK	LODE CLAIM	6	0520N	0630W	30
117	WY101499164	WMC270243	WMC270117	DEN 127	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	30
118	WY101499165	WMC270244	WMC270117	DEN 128	CROOK	LODE CLAIM	6	0520N	0630W	30
119	WY101499166	WMC270245	WMC270117	DEN 129	CROOK	LODE CLAIM	6	0520N	0630W	30
120	WY101499167	WMC270246	WMC270117	DEN 130	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	30
121	WY101499168	WMC270247	WMC270117	DEN 131	CROOK	LODE CLAIM	6	0520N	0630W	30
122	WY101499169	WMC270248	WMC270117	DEN 132	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	30
123	WY101499731	WMC270344	WMC270117	OGDEN 68	CROOK	LODE CLAIM	6	0520N	0630W	34
124	WY101499732	WMC270345	WMC270117	OGDEN 69	CROOK	LODE CLAIM	6	0520N	0630W	34
125	WY101499733	WMC270346	WMC270117	OGDEN 70	CROOK	LODE CLAIM	6	0520N	0630W	34
126	WY101499734	WMC270347	WMC270117	OGDEN 71	CROOK	LODE CLAIM	6	0520N	0630W	34
127	WY101499735	WMC270348	WMC270117	OGDEN 72	CROOK	LODE CLAIM	6	0520N	0630W	34
128	WY101499736	WMC270349	WMC270117	OGDEN 73	CROOK	LODE CLAIM	6	0520N	0630W	34
129	WY101499737	WMC270350	WMC270117	OGDEN 74	CROOK	LODE CLAIM	6	0520N	0630W	34
							6	0520N	0630W	35
130	WY101499738	WMC270351	WMC270117	OGDEN 75	CROOK	LODE CLAIM	6	0520N	0630W	21
131	WY101499739	WMC270352	WMC270117	OGDEN 76	CROOK	LODE CLAIM	6	0520N	0630W	21
132	WY101499740	WMC270353	WMC270117	OGDEN 77	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	28

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
133	WY101499741	WMC270354	WMC270117	OGDEN 78	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	28
134	WY101499742	WMC270355	WMC270117	OGDEN 79	CROOK	LODE CLAIM	6	0520N	0630W	28
135	WY101499743	WMC270356	WMC270117	OGDEN 80	CROOK	LODE CLAIM	6	0520N	0630W	28
136	WY101499744	WMC270357	WMC270117	OGDEN 81	CROOK	LODE CLAIM	6	0520N	0630W	21
137	WY101499745	WMC270358	WMC270117	OGDEN 82	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	22
138	WY101499746	WMC270359	WMC270117	OGDEN 83	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	28
139	WY101499747	WMC270360	WMC270117	OGDEN 84	CROOK	LODE CLAIM	6	0520N	0630W	21
140	WY101499748	WMC270361	WMC270117	OGDEN 85	CROOK	LODE CLAIM	6	0520N	0630W	21
141	WY101502924	WMC305380	WMC305380	COLE 61	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
142	WY101502925	WMC305381	WMC305380	COLE 61A	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
143	WY101502926	WMC305382	WMC305380	COLE 62	CROOK	LODE CLAIM	6	0520N	0630W	15
144	WY101502927	WMC305383	WMC305380	COLE 62A	CROOK	LODE CLAIM	6	0520N	0630W	15
145	WY101502928	WMC305384	WMC305380	SUN 117	CROOK	LODE CLAIM	6	0520N	0630W	9
							6	0520N	0630W	16
146	WY101503439	WMC247997	WMC247925	BL #73	CROOK	LODE CLAIM	6	0520N	0630W	17
147	WY101511136	WMC275672	WMC275664	SUN 9	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
148	WY101511137	WMC275673	WMC275664	SUN 10	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
149	WY101511138	WMC275674	WMC275664	SUN 11	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
150	WY101511139	WMC275675	WMC275664	SUN 12	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
151	WY101511140	WMC275757	WMC275664	SUN 94	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
152	WY101511141	WMC275758	WMC275664	SUN 95	CROOK	LODE CLAIM	6	0520N	0630W	8
153	WY101511142	WMC275759	WMC275664	SUN 96	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
154	WY101511143	WMC275760	WMC275664	SUN 97	CROOK	LODE CLAIM	6	0520N	0630W	8
155	WY101511144	WMC275761	WMC275664	SUN 98	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
156	WY101511145	WMC275762	WMC275664	SUN 99	CROOK	LODE CLAIM	6	0520N	0630W	8
157	WY101511146	WMC275763	WMC275664	SUN 100	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
158	WY101511147	WMC275764	WMC275664	SUN 101	CROOK	LODE CLAIM	6	0520N	0630W	8
159	WY101511148	WMC275765	WMC275664	SUN 102	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9

160	WY101511149	WMC275766	WMC275664	SUN 103	CROOK	LODE CLAIM	6	0520N	0630W	8
161	WY101511150	WMC275767	WMC275664	SUN 104	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
162	WY101511151	WMC275768	WMC275664	SUN 105	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	17
163	WY101511152	WMC275769	WMC275664	SUN 106	CROOK	LODE CLAIM	6	0520N	0630W	8
							6	0520N	0630W	9
							6	0520N	0630W	16
							6	0520N	0630W	17
164	WY101511153	WMC275770	WMC275664	SUN 107	CROOK	LODE CLAIM	6	0520N	0630W	17
165	WY101511154	WMC275771	WMC275664	SUN 108	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
166	WY101511155	WMC275772	WMC275664	SUN 109	CROOK	LODE CLAIM	6	0520N	0630W	9
167	WY101511156	WMC275773	WMC275664	SUN 110	CROOK	LODE CLAIM	6	0520N	0630W	9
168	WY101511157	WMC275774	WMC275664	SUN 111	CROOK	LODE CLAIM	6	0520N	0630W	9
169	WY101511158	WMC275775	WMC275664	SUN 112	CROOK	LODE CLAIM	6	0520N	0630W	9
170	WY101511159	WMC275776	WMC275664	SUN 113	CROOK	LODE CLAIM	6	0520N	0630W	9
171	WY101511160	WMC275777	WMC275664	SUN 114	CROOK	LODE CLAIM	6	0520N	0630W	9
172	WY101512289	WMC275778	WMC275664	SUN 115	CROOK	LODE CLAIM	6	0520N	0630W	9

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
173	WY101512290	WMC275779	WMC275664	SUN 116	CROOK	LODE CLAIM	6	0520N	0630W	7
174	WY101513436	WMC275676	WMC275664	SUN 13	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
175	WY101513437	WMC275677	WMC275664	SUN 14	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
176	WY101513438	WMC275678	WMC275664	SUN 15	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0640W	12
							6	0520N	0640W	13
177	WY101513439	WMC275679	WMC275664	SUN 16	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	18
							6	0520N	0640W	13
178	WY101513440	WMC275680	WMC275664	SUN 17	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	18
179	WY101513441	WMC275697	WMC275664	SUN 34	CROOK	LODE CLAIM	6	0520N	0630W	7
180	WY101513442	WMC275698	WMC275664	SUN 35	CROOK	LODE CLAIM	6	0520N	0630W	7
181	WY101513443	WMC275699	WMC275664	SUN 36	CROOK	LODE CLAIM	6	0520N	0630W	7
182	WY101513444	WMC275700	WMC275664	SUN 37	CROOK	LODE CLAIM	6	0520N	0630W	7
183	WY101513445	WMC275701	WMC275664	SUN 38	CROOK	LODE CLAIM	6	0520N	0630W	7
184	WY101513446	WMC275702	WMC275664	SUN 39	CROOK	LODE CLAIM	6	0520N	0630W	7
185	WY101513447	WMC275703	WMC275664	SUN 40	CROOK	LODE CLAIM	6	0520N	0630W	7
186	WY101513448	WMC275704	WMC275664	SUN 41	CROOK	LODE CLAIM	6	0520N	0630W	7
187	WY101513449	WMC275716	WMC275664	SUN 53	CROOK	LODE CLAIM	6	0520N	0630W	5
188	WY101513450	WMC275718	WMC275664	SUN 55	CROOK	LODE CLAIM	6	0520N	0630W	5
							6	0520N	0630W	8
189	WY101513451	WMC275720	WMC275664	SUN 57	CROOK	LODE CLAIM	6	0520N	0630W	8
190	WY101513452	WMC275721	WMC275664	SUN 58	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
191	WY101513453	WMC275722	WMC275664	SUN 59	CROOK	LODE CLAIM	6	0520N	0630W	8
192	WY101513454	WMC275723	WMC275664	SUN 60	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
193	WY101513455	WMC275724	WMC275664	SUN 61	CROOK	LODE CLAIM	6	0520N	0630W	8
194	WY101513456	WMC275725	WMC275664	SUN 62	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	8
195	WY101520752	WMC270117	WMC270117	DEN 1	CROOK	LODE CLAIM	6	0520N	0630W	26
196	WY101520753	WMC270122	WMC270117	DEN 6	CROOK	LODE CLAIM	6	0520N	0630W	26
							6	0520N	0630W	35
197	WY101520754	WMC270138	WMC270117	DEN 22	CROOK	LODE CLAIM	6	0510N	0630W	3
198	WY101520755	WMC270145	WMC270117	DEN 29	CROOK	LODE CLAIM	6	0510N	0630W	3

199	WY101520756	WMC270152	WMC270117	DEN 36	CROOK	LODE CLAIM	6	0520N	0630W	32
200	WY101520757	WMC270156	WMC270117	DEN 40	CROOK	LODE CLAIM	6	0520N	0630W	33
201	WY101520758	WMC270157	WMC270117	DEN 41	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33
202	WY101520759	WMC270158	WMC270117	DEN 42	CROOK	LODE CLAIM	6	0520N	0630W	33
203	WY101520760	WMC270159	WMC270117	DEN 43	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33
204	WY101520761	WMC270160	WMC270117	DEN 44	CROOK	LODE CLAIM	6	0520N	0630W	33
205	WY101520762	WMC270161	WMC270117	DEN 45	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33
206	WY101520763	WMC270162	WMC270117	DEN 46	CROOK	LODE CLAIM	6	0520N	0630W	33
207	WY101520764	WMC270163	WMC270117	DEN 47	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33
208	WY101521155	WMC268910	WMC268910	COLE 63	CROOK	LODE CLAIM	6	0520N	0630W	22
209	WY101521156	WMC268911	WMC268910	COLE 64	CROOK	LODE CLAIM	6	0520N	0630W	22
210	WY101521157	WMC268912	WMC268910	COLE 65	CROOK	LODE CLAIM	6	0520N	0630W	22
211	WY101521158	WMC268913	WMC268910	COLE 66	CROOK	LODE CLAIM	6	0520N	0630W	22
212	WY101521159	WMC268914	WMC268910	COLE 67	CROOK	LODE CLAIM	6	0520N	0630W	22
213	WY101521160	WMC268915	WMC268910	COLE 68	CROOK	LODE CLAIM	6	0520N	0630W	22
214	WY101521161	WMC268916	WMC268910	COLE 69	CROOK	LODE CLAIM	6	0520N	0630W	22
215	WY101521162	WMC268917	WMC268910	COLE 70	CROOK	LODE CLAIM	6	0520N	0630W	22

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
216	WY101521163	WMC268918	WMC268910	COLE 71	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	22
217	WY101521291	WMC270249	WMC270117	DEN 133	CROOK	LODE CLAIM	6	0520N	0630W	30
218	WY101521292	WMC270250	WMC270117	DEN 134	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	30
219	WY101521293	WMC270251	WMC270117	DEN 135	CROOK	LODE CLAIM	6	0520N	0630W	30
220	WY101521294	WMC270252	WMC270117	DEN 136	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	30
221	WY101521295	WMC270253	WMC270117	DEN 137	CROOK	LODE CLAIM	6	0520N	0630W	30
222	WY101521296	WMC270254	WMC270117	DEN 138	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	30
223	WY101521297	WMC270256	WMC270117	DEN 140	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	30
224	WY101521298	WMC270259	WMC270117	DEN 143	CROOK	LODE CLAIM	6	0520N	0630W	19
225	WY101521299	WMC270260	WMC270117	DEN 144	CROOK	LODE CLAIM	6	0520N	0630W	19
226	WY101521300	WMC270261	WMC270117	DEN 145	CROOK	LODE CLAIM	6	0520N	0630W	19
227	WY101521301	WMC270262	WMC270117	DEN 146	CROOK	LODE CLAIM	6	0520N	0630W	19
228	WY101521302	WMC270263	WMC270117	DEN 147	CROOK	LODE CLAIM	6	0520N	0630W	19
229	WY101521303	WMC270264	WMC270117	DEN 148	CROOK	LODE CLAIM	6	0520N	0630W	19
230	WY101521304	WMC270265	WMC270117	DEN 149	CROOK	LODE CLAIM	6	0520N	0630W	19
231	WY101521305	WMC270266	WMC270117	DEN 150	CROOK	LODE CLAIM	6	0520N	0630W	19
232	WY101521306	WMC270267	WMC270117	DEN 151	CROOK	LODE CLAIM	6	0520N	0630W	19
233	WY101521307	WMC270268	WMC270117	DEN 152	CROOK	LODE CLAIM	6	0520N	0630W	19
234	WY101521308	WMC270269	WMC270117	DEN 153	CROOK	LODE CLAIM	6	0520N	0630W	19
235	WY101521309	WMC270270	WMC270117	DEN 154	CROOK	LODE CLAIM	6	0520N	0630W	19
236	WY101521310	WMC270273	WMC270117	DEN 157	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
237	WY101521311	WMC270274	WMC270117	DEN 158	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
238	WY101521721	WMC268919	WMC268910	COLE 72	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	22
239	WY101521722	WMC268920	WMC268910	COLE 73	CROOK	LODE CLAIM	6	0520N	0630W	21
240	WY101521723	WMC268921	WMC268910	COLE 74	CROOK	LODE CLAIM	6	0520N	0630W	21
241	WY101521724	WMC268922	WMC268910	OGDEN 1	CROOK	LODE CLAIM	6	0520N	0630W	28
242	WY101521725	WMC268923	WMC268910	OGDEN 2	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	28
243	WY101521726	WMC268924	WMC268910	OGDEN 3	CROOK	LODE CLAIM	6	0520N	0630W	27

244	WY101521727	WMC268925	WMC268910	OGDEN 4	CROOK	LODE CLAIM	6	0520N	0630W	27
245	WY101521728	WMC268926	WMC268910	OGDEN 5	CROOK	LODE CLAIM	6	0520N	0630W	27
246	WY101521729	WMC268927	WMC268910	OGDEN 6	CROOK	LODE CLAIM	6	0520N	0630W	27
247	WY101521730	WMC268928	WMC268910	OGDEN 7	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33
248	WY101521731	WMC268929	WMC268910	OGDEN 8	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	28
							6	0520N	0630W	33
							6	0520N	0630W	34
249	WY101521732	WMC268930	WMC268910	OGDEN 9	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
250	WY101521733	WMC268931	WMC268910	OGDEN 10	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
251	WY101521734	WMC268932	WMC268910	OGDEN 11	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
252	WY101521735	WMC268933	WMC268910	OGDEN 12	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	34
253	WY101521884	WMC270362	WMC270117	OGDEN 86	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	28
254	WY101521885	WMC270363	WMC270117	OGDEN 87	CROOK	LODE CLAIM	6	0520N	0630W	28
255	WY101523096	WMC270164	WMC270117	DEN 48	CROOK	LODE CLAIM	6	0520N	0630W	33
256	WY101523097	WMC270165	WMC270117	DEN 49	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
257	WY101523098	WMC270166	WMC270117	DEN 50	CROOK	LODE CLAIM	6	0520N	0630W	33
258	WY101523099	WMC270167	WMC270117	DEN 51	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	33
259	WY101523100	WMC270168	WMC270117	DEN 52	CROOK	LODE CLAIM	6	0520N	0630W	32
							6	0520N	0630W	33
260	WY101523101	WMC270169	WMC270117	DEN 53	CROOK	LODE CLAIM	6	0520N	0630W	28
							6	0520N	0630W	29
							6	0520N	0630W	32
							6	0520N	0630W	33
261	WY101523102	WMC270170	WMC270117	DEN 54	CROOK	LODE CLAIM	6	0520N	0630W	32
262	WY101523103	WMC270171	WMC270117	DEN 55	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
263	WY101523104	WMC270172	WMC270117	DEN 56	CROOK	LODE CLAIM	6	0520N	0630W	32
264	WY101523105	WMC270173	WMC270117	DEN 57	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
265	WY101523106	WMC270174	WMC270117	DEN 58	CROOK	LODE CLAIM	6	0520N	0630W	32
266	WY101523107	WMC270175	WMC270117	DEN 59	CROOK	LODE CLAIM	6	0520N	0630W	32
267	WY101523108	WMC270176	WMC270117	DEN 60	CROOK	LODE CLAIM	6	0520N	0630W	32
268	WY101523109	WMC270177	WMC270117	DEN 61	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
269	WY101523110	WMC270178	WMC270117	DEN 62	CROOK	LODE CLAIM	6	0520N	0630W	32
270	WY101523111	WMC270179	WMC270117	DEN 63	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
271	WY101523112	WMC270180	WMC270117	DEN 64	CROOK	LODE CLAIM	6	0520N	0630W	32
272	WY101523113	WMC270181	WMC270117	DEN 65	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
273	WY101523114	WMC270182	WMC270117	DEN 66	CROOK	LODE CLAIM	6	0520N	0630W	32
274	WY101523115	WMC270183	WMC270117	DEN 67	CROOK	LODE CLAIM	6	0520N	0630W	29
							6	0520N	0630W	32
275	WY101523116	WMC270184	WMC270117	DEN 68	CROOK	LODE CLAIM	6	0520N	0630W	32
276	WY101523669	WMC270275	WMC270117	DEN 159	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
277	WY101523670	WMC270276	WMC270117	DEN 160	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
278	WY101523671	WMC270277	WMC270117	DEN 161	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
279	WY101523672	WMC270278	WMC270117	DEN 162	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
280	WY101523673	WMC270279	WMC270117	DEN 163	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0630W	19
281	WY101523674	WMC270280	WMC270117	DEN 164	CROOK	LODE CLAIM	6	0520N	0630W	18
282	WY101523675	WMC270281	WMC270117	DEN 165	CROOK	LODE CLAIM	6	0520N	0630W	18

283	WY101523676	WMC270282	WMC270117	DEN 166	CROOK	LODE CLAIM	6	0520N	0630W	18
284	WY101523677	WMC270283	WMC270117	DEN 167	CROOK	LODE CLAIM	6	0520N	0630W	18
285	WY101523678	WMC270284	WMC270117	DEN 168	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0640W	13
286	WY101523679	WMC270285	WMC270117	DEN 169	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0640W	13
287	WY101523680	WMC270286	WMC270117	DEN 170	CROOK	LODE CLAIM	6	0520N	0630W	18
288	WY101523681	WMC270287	WMC270117	DEN 171	CROOK	LODE CLAIM	6	0520N	0630W	18
289	WY101523682	WMC270288	WMC270117	DEN 172	CROOK	LODE CLAIM	6	0520N	0630W	18
							6	0520N	0640W	13
290	WY101523683	WMC270289	WMC270117	OGDEN 13	CROOK	LODE CLAIM	6	0520N	0630W	21
291	WY101523684	WMC270290	WMC270117	OGDEN 14	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	22
292	WY101523685	WMC270291	WMC270117	OGDEN 15	CROOK	LODE CLAIM	6	0520N	0630W	22
293	WY101523686	WMC270292	WMC270117	OGDEN 16	CROOK	LODE CLAIM	6	0520N	0630W	22
294	WY101523687	WMC270293	WMC270117	OGDEN 17	CROOK	LODE CLAIM	6	0520N	0630W	22
295	WY101523688	WMC270294	WMC270117	OGDEN 18	CROOK	LODE CLAIM	6	0520N	0630W	22

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
296	WY101523689	WMC270295	WMC270117	OGDEN 19	CROOK	LODE CLAIM	6	0520N	0630W	21
							6	0520N	0630W	28
297	WY101524353	WMC270381	WMC270381	IVAN 1	CROOK	LODE CLAIM	6	0520N	0630W	29
298	WY101524354	WMC270382	WMC270381	IVAN 2	CROOK	LODE CLAIM	6	0520N	0630W	32
299	WY101524355	WMC270383	WMC270381	IVAN 3	CROOK	LODE CLAIM	6	0520N	0630W	32
300	WY101524356	WMC270384	WMC270381	IVAN 4	CROOK	LODE CLAIM	6	0520N	0630W	32
301	WY101524357	WMC270385	WMC270381	IVAN 5	CROOK	LODE CLAIM	6	0520N	0630W	32
302	WY101524358	WMC270386	WMC270381	IVAN 7	CROOK	LODE CLAIM	6	0520N	0630W	28
303	WY101525536	WMC270387	WMC270381	IVAN 8	CROOK	LODE CLAIM	6	0520N	0630W	33
304	WY101525537	WMC270388	WMC270381	IVAN 9	CROOK	LODE CLAIM	6	0520N	0630W	33
305	WY101525538	WMC270389	WMC270381	IVAN 10	CROOK	LODE CLAIM	6	0520N	0630W	33
306	WY101525539	WMC270390	WMC270381	IVAN 11	CROOK	LODE CLAIM	6	0520N	0630W	33
307	WY101525540	WMC270391	WMC270381	IVAN 13	CROOK	LODE CLAIM	6	0520N	0630W	28
308	WY101525541	WMC270392	WMC270381	IVAN 14	CROOK	LODE CLAIM	6	0520N	0630W	33
309	WY101525542	WMC270393	WMC270381	IVAN 15	CROOK	LODE CLAIM	6	0520N	0630W	33
310	WY101525543	WMC270394	WMC270381	IVAN 16	CROOK	LODE CLAIM	6	0520N	0630W	33
311	WY101525544	WMC270395	WMC270381	IVAN 17	CROOK	LODE CLAIM	6	0520N	0630W	33
312	WY101525545	WMC270396	WMC270381	IVAN 19	CROOK	LODE CLAIM	6	0520N	0630W	28
313	WY101525546	WMC270397	WMC270381	IVAN 20	CROOK	LODE CLAIM	6	0520N	0630W	33
314	WY101525547	WMC270398	WMC270381	IVAN 21	CROOK	LODE CLAIM	6	0520N	0630W	33
315	WY101525548	WMC270399	WMC270381	IVAN 22	CROOK	LODE CLAIM	6	0520N	0630W	33
316	WY101525549	WMC270400	WMC270381	IVAN 23	CROOK	LODE CLAIM	6	0520N	0630W	33
317	WY101602482	WMC248000	WMC247925	BL #76	CROOK	LODE CLAIM	6	0520N	0630W	17
318	WY101606051	WMC249543	WMC249536	BL 307	CROOK	LODE CLAIM	6	0520N	0630W	21
319	WY101628797	WMC303660	WMC303651	BL 34	CROOK	LODE CLAIM	6	0520N	0630W	18
320	WY101628798	WMC303661	WMC303651	BL 35	CROOK	LODE CLAIM	6	0520N	0630W	18
321	WY101628799	WMC303662	WMC303651	BL 36	CROOK	LODE CLAIM	6	0520N	0630W	18
322	WY101628800	WMC303663	WMC303651	BL 47	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18

323	WY101628816	WMC303664	WMC303651	BL 48	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
324	WY101628817	WMC303665	WMC303651	BL 49	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
325	WY101628818	WMC303666	WMC303651	DEN 95	CROOK	LODE CLAIM	6	0520N	0630W	29
326	WY101628819	WMC303667	WMC303651	DEN 97A	CROOK	LODE CLAIM	6	0520N	0630W	29
327	WY101629415	WMC261020	WMC260901	REU-58	CROOK	LODE CLAIM	6	0520N	0630W	33
328	WY101629416	WMC261021	WMC260901	REU-59	CROOK	LODE CLAIM	6	0520N	0630W	33
329	WY101629417	WMC261022	WMC260901	REU-60	CROOK	LODE CLAIM	6	0520N	0630W	33
330	WY101629418	WMC261023	WMC260901	REU-61	CROOK	LODE CLAIM	6	0520N	0630W	33
331	WY101629419	WMC261024	WMC260901	REU-62	CROOK	LODE CLAIM	6	0520N	0630W	33
332	WY101629420	WMC261025	WMC260901	REU-63	CROOK	LODE CLAIM	6	0520N	0630W	33
333	WY101629421	WMC261026	WMC260901	REU-64	CROOK	LODE CLAIM	6	0520N	0630W	33
334	WY101629422	WMC261027	WMC260901	REU-65	CROOK	LODE CLAIM	6	0520N	0630W	33
335	WY101629423	WMC261028	WMC260901	REU-66	CROOK	LODE CLAIM	6	0520N	0630W	33
336	WY101629424	WMC261029	WMC260901	REU-67	CROOK	LODE CLAIM	6	0520N	0630W	33
337	WY101629425	WMC261030	WMC260901	REU-68	CROOK	LODE CLAIM	6	0520N	0630W	33
338	WY101629426	WMC261031	WMC260901	REU-69	CROOK	LODE CLAIM	6	0520N	0630W	32
							6	0520N	0630W	33
339	WY101629427	WMC261032	WMC260901	REU-70	CROOK	LODE CLAIM	6	0520N	0630W	32
							6	0520N	0630W	33
340	WY101629428	WMC261033	WMC260901	REU-71	CROOK	LODE CLAIM	6	0520N	0630W	32
341	WY101629429	WMC261034	WMC260901	REU-72	CROOK	LODE CLAIM	6	0520N	0630W	32
342	WY101629430	WMC261035	WMC260901	REU-73	CROOK	LODE CLAIM	6	0520N	0630W	23
343	WY101629431	WMC261036	WMC260901	REU-74	CROOK	LODE CLAIM	6	0520N	0630W	32
344	WY101629432	WMC261037	WMC260901	REU-75	CROOK	LODE CLAIM	6	0520N	0630W	32
345	WY101629433	WMC261038	WMC260901	REU-76	CROOK	LODE CLAIM	6	0520N	0630W	32
346	WY101629434	WMC261039	WMC260901	REU-77	CROOK	LODE CLAIM	6	0520N	0630W	32
347	WY101629435	WMC261040	WMC260901	REU-78	CROOK	LODE CLAIM	6	0520N	0630W	32
348	WY101651018	WMC260922	WMC260901	COLE-22	CROOK	LODE CLAIM	6	0520N	0630W	23
349	WY101651019	WMC260924	WMC260901	COLE-24	CROOK	LODE CLAIM	6	0520N	0630W	23
350	WY101651020	WMC260926	WMC260901	COLE-26	CROOK	LODE CLAIM	6	0520N	0630W	23
351	WY101651021	WMC260927	WMC260901	COLE-27	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	23

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
352	WY101651022	WMC260928	WMC260901	COLE-28	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	23
353	WY101651023	WMC260929	WMC260901	COLE-29	CROOK	LODE CLAIM	6	0520N	0630W	22
354	WY101651024	WMC260930	WMC260901	COLE-30	CROOK	LODE CLAIM	6	0520N	0630W	22
355	WY101651025	WMC260931	WMC260901	COLE-31	CROOK	LODE CLAIM	6	0520N	0630W	22
356	WY101651026	WMC260932	WMC260901	COLE-32	CROOK	LODE CLAIM	6	0520N	0630W	22
357	WY101651027	WMC260933	WMC260901	COLE-32	CROOK	LODE CLAIM	6	0520N	0630W	22
358	WY101651028	WMC260934	WMC260901	COLE-34	CROOK	LODE CLAIM	6	0520N	0630W	22
359	WY101651029	WMC260935	WMC260901	COLE-35	CROOK	LODE CLAIM	6	0520N	0630W	22
360	WY101651030	WMC260936	WMC260901	COLE-36	CROOK	LODE CLAIM	6	0520N	0630W	22
361	WY101651031	WMC260937	WMC260901	COLE-37	CROOK	LODE CLAIM	6	0520N	0630W	14
							6	0520N	0630W	23
362	WY101651032	WMC260938	WMC260901	COLE-38	CROOK	LODE CLAIM	6	0520N	0630W	14
363	WY101651033	WMC260939	WMC260901	COLE-39	CROOK	LODE CLAIM	6	0520N	0630W	14
							6	0520N	0630W	23
364	WY101651034	WMC260940	WMC260901	COLE-40	CROOK	LODE CLAIM	6	0520N	0630W	14
365	WY101651035	WMC260941	WMC260901	COLE-41	CROOK	LODE CLAIM	6	0520N	0630W	14
							6	0520N	0630W	23
366	WY101651036	WMC260942	WMC260901	COLE-42	CROOK	LODE CLAIM	6	0520N	0630W	14
367	WY101651037	WMC260943	WMC260901	COLE-43	CROOK	LODE CLAIM	6	0520N	0630W	14
							6	0520N	0630W	23
368	WY101651038	WMC260944	WMC260901	COLE-44	CROOK	LODE CLAIM	6	0520N	0630W	14
369	WY101652015	WMC260945	WMC260901	COLE-45	CROOK	LODE CLAIM	6	0520N	0630W	14
							6	0520N	0630W	15
							6	0520N	0630W	22
							6	0520N	0630W	23
370	WY101652016	WMC260946	WMC260901	COLE-46	CROOK	LODE CLAIM	6	0520N	0630W	14
							6	0520N	0630W	15
371	WY101652017	WMC260947	WMC260901	COLE-47	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
372	WY101652018	WMC260948	WMC260901	COLE-48	CROOK	LODE CLAIM	6	0520N	0630W	15
373	WY101652019	WMC260949	WMC260901	COLE-49	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
374	WY101652020	WMC260950	WMC260901	COLE-50	CROOK	LODE CLAIM	6	0520N	0630W	15
375	WY101652021	WMC260951	WMC260901	COLE-51	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
376	WY101652022	WMC260952	WMC260901	COLE-52	CROOK	LODE CLAIM	6	0520N	0630W	15
377	WY101652023	WMC260953	WMC260901	COLE-53	CROOK	LODE CLAIM	6	0520N	0630W	15

378	WY101652024	WMC260954	WMC260901	COLE-54	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
379	WY101652025	WMC260955	WMC260901	COLE-55	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
380	WY101652026	WMC260956	WMC260901	COLE-56	CROOK	LODE CLAIM	6	0520N	0630W	15
381	WY101652027	WMC260957	WMC260901	COLE-57	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
382	WY101652028	WMC260958	WMC260901	COLE-58	CROOK	LODE CLAIM	6	0520N	0630W	15
383	WY101652029	WMC260959	WMC260901	COLE-59	CROOK	LODE CLAIM	6	0520N	0630W	15
							6	0520N	0630W	22
384	WY101652030	WMC260960	WMC260901	COLE-60	CROOK	LODE CLAIM	6	0520N	0630W	15
385	WY101652031	WMC260963	WMC260901	REU-1	CROOK	LODE CLAIM	6	0510N	0630W	3
386	WY101652032	WMC260964	WMC260901	REU-2	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
387	WY101652033	WMC260965	WMC260901	REU-3	CROOK	LODE CLAIM	6	0510N	0630W	3
388	WY101652034	WMC260966	WMC260901	REU-4	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
389	WY101652035	WMC260967	WMC260901	REU-5	CROOK	LODE CLAIM	6	0510N	0630W	3
390	WY101652887	WMC260968	WMC260901	REU-6	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
391	WY101652888	WMC260969	WMC260901	REU-7	CROOK	LODE CLAIM	6	0510N	0630W	3

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
392	WY101652889	WMC260970	WMC260901	REU-8	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
393	WY101652890	WMC260971	WMC260901	REU-9	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0510N	0630W	4
394	WY101652891	WMC260972	WMC260901	REU-10	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0510N	0630W	4
							6	0520N	0630W	33
							6	0520N	0630W	34
395	WY101652892	WMC260973	WMC260901	REU-11	CROOK	LODE CLAIM	6	0510N	0630W	4
396	WY101652893	WMC260974	WMC260901	REU-12	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
397	WY101652894	WMC260975	WMC260901	REU-13	CROOK	LODE CLAIM	6	0510N	0630W	4
398	WY101652895	WMC260976	WMC260901	REU-14	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
399	WY101652896	WMC260977	WMC260901	REU-15	CROOK	LODE CLAIM	6	0510N	0630W	4
400	WY101652897	WMC260978	WMC260901	REU-16	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
401	WY101652898	WMC260979	WMC260901	REU-17	CROOK	LODE CLAIM	6	0510N	0630W	4
402	WY101652899	WMC260980	WMC260901	REU-18	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
403	WY101652900	WMC260981	WMC260901	REU-19	CROOK	LODE CLAIM	6	0510N	0630W	4
404	WY101652901	WMC260982	WMC260901	REU-20	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
405	WY101652902	WMC260984	WMC260901	REU-22	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0510N	0630W	33
406	WY101652903	WMC260986	WMC260901	REU-24	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
407	WY101652904	WMC260988	WMC260901	REU-26	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0520N	0630W	33
408	WY101652905	WMC260990	WMC260901	REU-28	CROOK	LODE CLAIM	6	0510N	0630W	4
							6	0510N	0630W	5
							6	0520N	0630W	32
							6	0520N	0630W	33
409	WY101652906	WMC260992	WMC260901	REU-30	CROOK	LODE CLAIM	6	0510N	0630W	5
							6	0520N	0630W	32
410	WY101652907	WMC260994	WMC260901	REU-32	CROOK	LODE CLAIM	6	0510N	0630W	5
							6	0520N	0630W	32
411	WY101653308	WMC303651	WMC303651	AF 58	CROOK	LODE CLAIM	6	0520N	0630W	28
412	WY101653309	WMC303652	WMC303651	AF 59	CROOK	LODE CLAIM	6	0520N	0630W	28
413	WY101653310	WMC303653	WMC303651	AF 60	CROOK	LODE CLAIM	6	0520N	0630W	28
414	WY101653311	WMC303654	WMC303651	AF 61	CROOK	LODE CLAIM	6	0520N	0630W	27
							6	0520N	0630W	28
415	WY101653312	WMC303655	WMC303651	AF 62	CROOK	LODE CLAIM	6	0520N	0630W	27
416	WY101653313	WMC303656	WMC303651	COLE 56A	CROOK	LODE CLAIM	6	0520N	0630W	15

417	WY101653314	WMC303657	WMC303651	COLE 58A	CROOK	LODE CLAIM	6	0520N	0630W	15
418	WY101653315	WMC303658	WMC303651	COLE 60A	CROOK	LODE CLAIM	6	0520N	0630W	15
419	WY101653316	WMC303659	WMC303651	DEN 128A	CROOK	LODE CLAIM	6	0520N	0630W	19
							6	0520N	0630W	20
							6	0520N	0630W	29
							6	0520N	0630W	30
420	WY101653849	WMC260999	WMC260901	REU-37	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
							6	0520N	0630W	35
421	WY101653850	WMC261000	WMC260901	REU-38	CROOK	LODE CLAIM	6	0520N	0630W	34
							6	0520N	0630W	35
422	WY101653851	WMC261001	WMC260901	REU-39	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
423	WY101653852	WMC261002	WMC260901	REU-40	CROOK	LODE CLAIM	6	0520N	0630W	34
424	WY101653853	WMC261003	WMC260901	REU-41	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
425	WY101653854	WMC261004	WMC260901	REU-42	CROOK	LODE CLAIM	6	0520N	0630W	34

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
426	WY101653855	WMC261005	WMC260901	REU-43	CROOK	LODE CLAIM	6	0510N	0630W	3
							6	0520N	0630W	34
427	WY101653856	WMC261006	WMC260901	REU-44	CROOK	LODE CLAIM	6	0520N	0630W	34
428	WY101653857	WMC261007	WMC260901	REU-45	CROOK	LODE CLAIM	6	0520N	0630W	34
429	WY101653858	WMC261008	WMC260901	REU-46	CROOK	LODE CLAIM	6	0520N	0630W	34
430	WY101653859	WMC261009	WMC260901	REU-47	CROOK	LODE CLAIM	6	0520N	0630W	3
431	WY101653860	WMC261010	WMC260901	REU-48	CROOK	LODE CLAIM	6	0520N	0630W	34
432	WY101653861	WMC261011	WMC260901	REU-49	CROOK	LODE CLAIM	6	0520N	0630W	34
433	WY101653862	WMC261012	WMC260901	REU-50	CROOK	LODE CLAIM	6	0520N	0630W	34
434	WY101653863	WMC261013	WMC260901	REU-51	CROOK	LODE CLAIM	6	0520N	0630W	34
435	WY101653864	WMC261014	WMC260901	REU-52	CROOK	LODE CLAIM	6	0520N	0630W	34
436	WY101653865	WMC261015	WMC260901	REU-53	CROOK	LODE CLAIM	6	0520N	0630W	33
							6	0520N	0630W	34
437	WY101653866	WMC261016	WMC260901	REU-54	CROOK	LODE CLAIM	6	0520N	0630W	33
							6	0520N	0630W	34
438	WY101653867	WMC261017	WMC260901	REU-55	CROOK	LODE CLAIM	6	0520N	0630W	33
439	WY101653868	WMC261018	WMC260901	REU-56	CROOK	LODE CLAIM	6	0520N	0630W	33
440	WY101653869	WMC261019	WMC260901	REU-57	CROOK	LODE CLAIM	6	0520N	0630W	3
441	WY101672470	WMC262061	WMC262061	BL 15	CROOK	LODE CLAIM	6	0520N	0630W	7
442	WY101672471	WMC262062	WMC262061	BL 16	CROOK	LODE CLAIM	6	0520N	0630W	7
443	WY101672472	WMC262063	WMC262061	BL 17	CROOK	LODE CLAIM	6	0520N	0630W	7
444	WY101672473	WMC262064	WMC262061	BL 18	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	18
445	WY101672474	WMC262065	WMC262061	BL 19	CROOK	LODE CLAIM	6	0520N	0630W	7
446	WY101673377	WMC262066	WMC262061	BL 20	CROOK	LODE CLAIM	6	0520N	0630W	18
447	WY101673378	WMC262067	WMC262061	BL 21	CROOK	LODE CLAIM	6	0520N	0630W	18
448	WY101673379	WMC262068	WMC262061	BL 22	CROOK	LODE CLAIM	6	0520N	0630W	18
449	WY101673380	WMC262069	WMC262061	BL 23	CROOK	LODE CLAIM	6	0520N	0630W	18
450	WY101673381	WMC262070	WMC262061	BL 24	CROOK	LODE CLAIM	6	0520N	0630W	18
451	WY101673382	WMC262071	WMC262061	BL 25	CROOK	LODE CLAIM	6	0520N	0630W	18
452	WY101673383	WMC262072	WMC262061	BL 26	CROOK	LODE CLAIM	6	0520N	0630W	18
453	WY101673384	WMC262073	WMC262061	BL 28	CROOK	LODE CLAIM	6	0520N	0630W	7

454	WY101673385	WMC262074	WMC262061	BL 29	CROOK	LODE CLAIM	6	0520N	0630W	7
455	WY101673386	WMC262075	WMC262061	BL 30	CROOK	LODE CLAIM	6	0520N	0630W	7
456	WY101673387	WMC262076	WMC262061	BL 31	CROOK	LODE CLAIM	6	0520N	0630W	7
							6	0520N	0630W	18
457	WY101673388	WMC262077	WMC262061	BL 32	CROOK	LODE CLAIM	6	0520N	0630W	18
458	WY101673389	WMC262078	WMC262061	BL 33	CROOK	LODE CLAIM	6	0520N	0630W	18
459	WY101673390	WMC262082	WMC262061	BL 37	CROOK	LODE CLAIM	6	0520N	0630W	18
460	WY101673391	WMC262083	WMC262061	BL 38	CROOK	LODE CLAIM	6	0520N	0630W	18
461	WY101673392	WMC262084	WMC262061	BL 39	CROOK	LODE CLAIM	6	0520N	0630W	18
462	WY101673393	WMC262085	WMC262061	BL 45	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
463	WY101673394	WMC262086	WMC262061	BL 46	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
464	WY101673395	WMC262090	WMC262061	BL 50	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
465	WY101673396	WMC262091	WMC262061	BL 51	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
466	WY101673397	WMC262092	WMC262061	BL 52	CROOK	LODE CLAIM	6	0520N	0630W	17
							6	0520N	0630W	18
467	WY101673398	WMC262093	WMC262061	BL 85	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
468	WY101674375	WMC262094	WMC262061	BL 86	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
469	WY101674376	WMC262095	WMC262061	BL 87	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
470	WY101674377	WMC262096	WMC262061	BL 88	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
471	WY101674378	WMC262097	WMC262061	BL 89	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
472	WY101674379	WMC262098	WMC262061	BL 90	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17

No.	Serial Number	Legacy Serial Number	Legacy Lead File Number	Claim Name	County	Claim Type	Meridian	Township	Range	Section
473	WY101674380	WMC262099	WMC262061	BL 91	CROOK	LODE CLAIM	6	0520N	0630W	16
							6	0520N	0630W	17
474	WY101674381	WMC262100	WMC262061	BL 300	CROOK	LODE CLAIM	6	0520N	0630W	21
475	WY101674382	WMC262101	WMC262061	BL 301	CROOK	LODE CLAIM	6	0520N	0630W	21
476	WY101674383	WMC262102	WMC262061	BL 302	CROOK	LODE CLAIM	6	0520N	0630W	21
477	WY101674384	WMC262103	WMC262061	BL 304	CROOK	LODE CLAIM	6	0520N	0630W	21
478	WY101674385	WMC262104	WMC262061	BL 310	CROOK	LODE CLAIM	6	0520N	0630W	21
479	WY101674386	WMC262105	WMC262061	BL 313	CROOK	LODE CLAIM	6	0520N	0630W	21
480	WY101674387	WMC262106	WMC262061	BL 314	CROOK	LODE CLAIM	6	0520N	0630W	21
481	WY101674388	WMC262107	WMC262061	BL 319	CROOK	LODE CLAIM	6	0520N	0630W	21
482	WY101680035	WMC260907	WMC260901	COLE-7	CROOK	LODE CLAIM	6	0520N	0630W	23
							6	0520N	0630W	26
483	WY101680036	WMC260908	WMC260901	COLE-8	CROOK	LODE CLAIM	6	0520N	0630W	23
484	WY101680037	WMC260909	WMC260901	COLE-9	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	23
							6	0520N	0630W	26
							6	0520N	0630W	27
485	WY101680038	WMC260910	WMC260901	COLE-10	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	23
486	WY101680039	WMC260911	WMC260901	COLE-11	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
487	WY101680040	WMC260912	WMC260901	COLE-12	CROOK	LODE CLAIM	6	0520N	0630W	22
488	WY101680041	WMC260913	WMC260901	COLE-13	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
489	WY101680042	WMC260914	WMC260901	COLE-14	CROOK	LODE CLAIM	6	0520N	0630W	22
490	WY101680043	WMC260915	WMC260901	COLE-15	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
491	WY101680044	WMC260916	WMC260901	COLE-16	CROOK	LODE CLAIM	6	0520N	0630W	22
492	WY101680045	WMC260917	WMC260901	COLE-17	CROOK	LODE CLAIM	6	0520N	0630W	22
							6	0520N	0630W	27
493	WY101680046	WMC260918	WMC260901	COLE-18	CROOK	LODE CLAIM	6	0520N	0630W	22
494	WY101680047	WMC260920	WMC260901	COLE-20	CROOK	LODE CLAIM	6	0520N	0630W	23
495	WY101732218	WMC247986	WMC247925	BL #62	CROOK	LODE CLAIM	6	0520N	0630W	17
496	WY101732220	WMC249541	WMC249536	BL 305	CROOK	LODE CLAIM	6	0520N	0630W	21
497	WY101745876	WMC308967	WMC308967	BL 310A	CROOK	LODE CLAIM	6	0520N	0630W	21
498	WY101854614	WMC249542	WMC249536	BL 306	CROOK	LODE CLAIM	6	0520N	0630W	21
499	WY101855619	WMC247999	WMC247925	BL #75	CROOK	LODE CLAIM	6	0520N	0630W	17

4 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

4.1 Accessibility

Access to the Bear Lodge REE Project is good, subject to winter month snowstorms which can impact travel. The project area is located 7 air miles (11 kilometers) or 12 road miles (19 kilometers) northwest of the town of Sundance (Wyoming), which is on US Interstate Highway 90, and 22 air miles (35 kilometers) west of the South Dakota state line.

The nearest major airport is Gillette-Campbell County Airport (GCC/KGCC), located in Gillette, Wyoming, and is 67 miles (108 kilometers) from the center of Sundance. Another major airport is Rapid City Regional Airport (RAP/KRAP), which is in Rapid City (South Dakota), approximately 92 miles (148 kilometers) from Sundance (*Figure 4-1*).

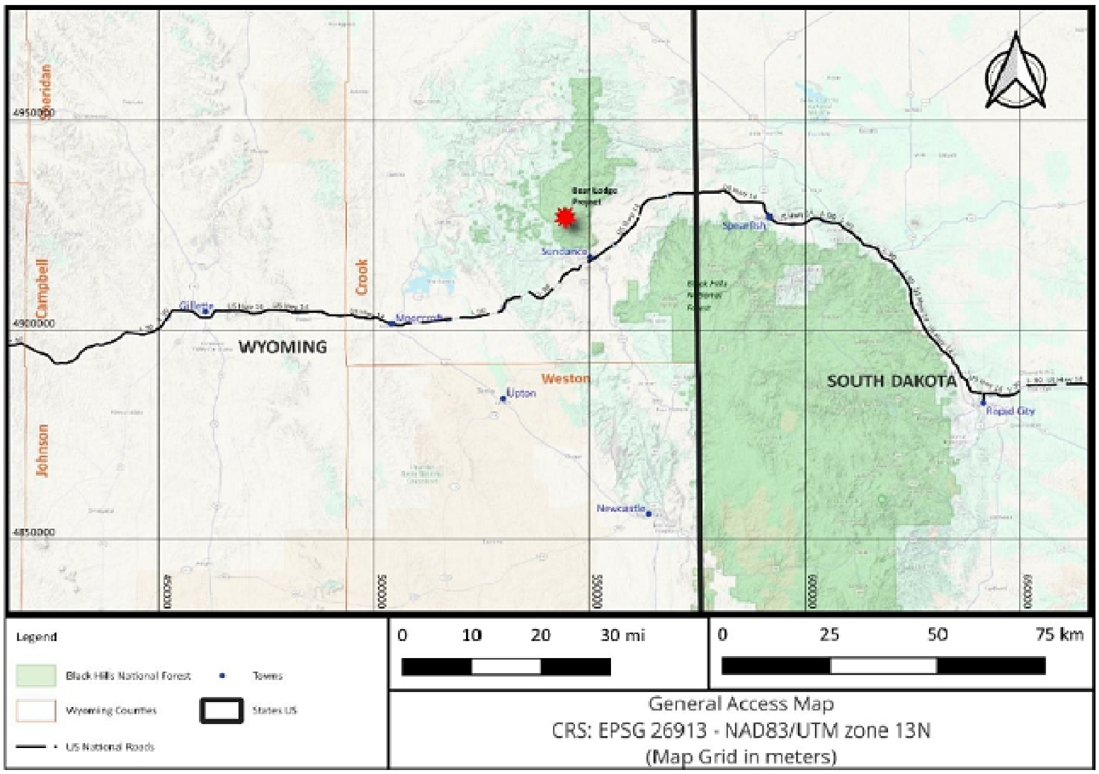


Figure 4-1. General Access Map to the Bear Lodge REE Project (Noble & Barrero, 2024)

Primary access to the property is from the town of Sundance, Wyoming. The project site is reached by traveling west from Sundance about one mile along I-90, then 1.5 miles west on US Highway 14, then north on the paved Sundance-Warren Peaks Road (USFS road #838, County roads 208 and 100) for 7.4 miles to the summit of Warren Peaks, just past the fire lookout tower. The final 3.2 miles to the Bull Hill area of the property is on well-maintained gravel roads (continuing County Road 100 or USFS #838 and then right on USFS #851) until the turnoff to Bull Hill Road. Road access within the property is relatively extensive via several good quality dirt logging roads and four-wheel-drive trails constructed originally during logging or exploration activities and subsequently rehabilitated. *Figure 4-2* displays the access routes to the Bear Lodge REE Project.

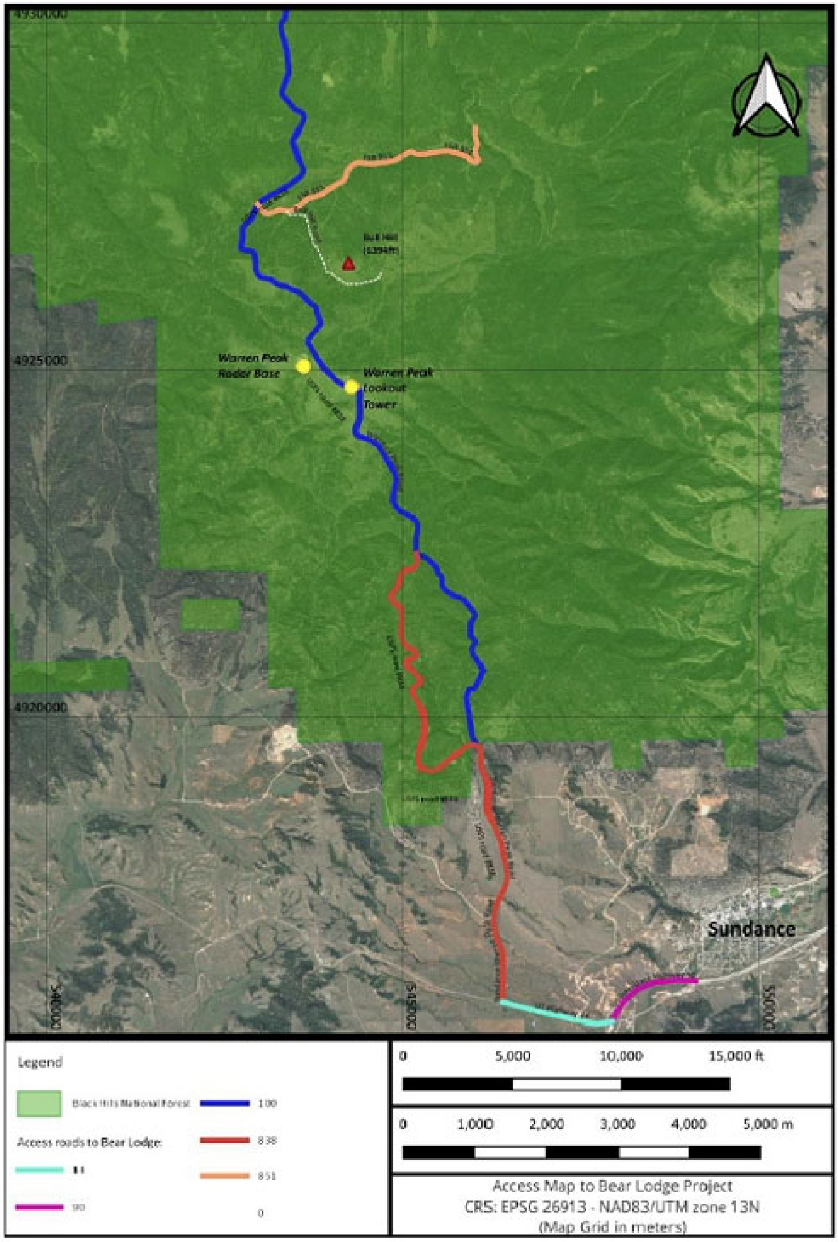


Figure 4-2. Detailed Access Map to the Bear Lodge REE Project from Sundance (Noble & Barrero, 2024)

4.2 Climate and Physiography

The Bear Lodge Mountains have a warm and relatively dry climate during summer, followed by cold winters with variable amounts of snow. Optimal field conditions extend from June through October.

The property lies within the Black Hills National Forest and covers the crest of the Bear Lodge Mountains, a narrow northwest-trending range situated in northeastern Wyoming. Physiographically, the mountains are a northwesterly extension of the Black Hills uplift of western South Dakota. The range is characterized by rounded grass and pine-covered mountains that reach an elevation of 6,400 feet (1,951 meters) above sea level within the property.

The mountains have moderate slopes covered by western yellow (ponderosa) pine and aspen forest interspersed with dense thickets of brush. Narrow, grassy meadows cover the upper reaches of seasonal drainages. The lowest point within the project area is about 5,800 feet (1,768 meters) above sea level.

The climate of Crook County varies with topography. The Bear Lodge Mountains and the lower-lying foothills and plains area are two major areas. Climatic data from the National Weather Service (NWS) Cooperative Observer Program (COOP) in Sundance is considered representative of the study area. The following summarizes the climatic data for the given period:

- 1991-2020: Average annual air temperature is 45.3°F (7.4 °C).
- 1893-2022: Lowest recorded temperature is -42°F (-41.1°C).
- 1893-2022: Highest recorded temperature is 107°F (41.7°C).
- 1991-2020: Average annual precipitation is 20.5 inches (52.2 centimeters).
- Lowest annual precipitation was 11.44 inches (29.1 centimeters) in 2021.
- Highest annual precipitation was 27.42 inches (69.6 centimeters) in 1998.
- 1991-2022: Average seasonal snowfall recorded for Sundance is 71.7 inches (182.2 centimeters).

Most of the precipitation occurs as thunderstorms during April through July. Winds are generally from the west or northwest.

4.3 Local Resources and Infrastructure

Motels, restaurants, gas stations, and other services are available at Sundance, Upton, and other nearby towns, and a greater variety of accommodations are available to the east in Spearfish, South Dakota. All necessary infrastructure, such as housing, food, fuel, etc., would be available in these towns or further to the west in Gillette and southeast in Newcastle.

Supplies can be trucked to the site 60 miles (100 kilometers) from Gillette, which is located on both US Interstate Highway 90 and rail lines. A Burlington Northern rail transport line is also located at Moorcroft, 34 miles (54 kilometers) west of Sundance, and at Upton, 40 miles (64 kilometers) south. The Powder River Basin contains multiple coal-fired power plants, and Gillette, the largest city in the basin, would be a major logistics center for any development at the Bear Lodge REE Project.

Water rights at the Bear Lodge REE Project are available through permitting by the Wyoming State Engineer's Office; these water rights have not been secured at the time of reporting. Near the Bull Hill area, a power line, which requires upgrading, runs to within a mile of the project area. Economical electrical power would be supplied by the Powder River Energy Corporation.

5 HISTORY

5.1 Exploration History

The Bear Lodge Mountains were initially prospected for gold and silver during the late nineteenth and early twentieth century, with a reportedly short-lived mine and mill in operation (the Bock Mine in 1880). Thorium and rare earth mineralization were first discovered in the area in 1950 due to uranium exploration activity by early prospectors. The mineralization and some carbonatite occurrences were first documented by a USGS report in 1953 (Wilmarth & Johnson, 1953). The US Bureau of Mines (USBM) completed a limited radiometric survey and a limited drilling program in the early 1950s to investigate the rare earth deposits on claims owned by the Telmor Engineering Company. However, the associated exploration activity, including the excavation of numerous bulldozer trenches, was short-lived, as there was no readily available market for these commodities at that time. *Table 5-1* provides a summary of the historic exploration activities by major companies.

Table 5-1. Historic exploration activities by major companies

Company	Dates	Exploration Activities
Duval Corporation	1972 - 1978	Surface mapping, sampling, petrography; 13 diamond drill holes, 5 reverse circulation (RC) drill holes, and 35 short claim validation holes; ground geophysics
Molycorp Inc.	1978 - 1980	Surface mapping and sampling, petrography; 12 diamond drill holes, 165 claim validation holes, ground geophysics (magnetics, radiometrics, Turam, IP)
Duval Corporation	1981 - 1984	Rotary drilling, gravity survey, trenching
Western Nuclear Inc.	1984 - 1985	Reconnaissance sampling: 3 diamond drill holes (total 997 ft).
FMC Corporation	1982 – 1986	Geological mapping, rock chip, and soil sampling, petrography; 31 RC drill holes and 57 claim validation holes; discovered East and West Breccia deposits
International Curator Resources Ltd.	1987 - 1988	Explored East and West Breccia deposits; 6 core and 18 RC drill holes; petrography and mineralogy.
Newmont Exploration Limited	1986 – 1988	Soil and rock chip sampling; RC drilling (10 holes); ground magnetic survey.
Hecla Mining Company	1986 – 1991	Soil and rock chip sampling; mapping; 12 core holes, 9 RC holes; ground geophysical surveys (magnetics, radiometrics, VLF); re-processed NURE geophysical data; petrography and mineralogy
ACNC	1988 – 1989	Soil and rock chip sampling; 22 RC drill holes; airborne magnetic interpretation.
Coca Mines Inc.	1990 - 1991	Reserve definition on the East and West Breccia deposits; 35 RC drill holes.
Phelps Dodge	1994 - 1996	Mapping; trenching; soil and rock chip sampling; 16 RC drill holes; ground geophysics (magnetics, radiometrics, VLF); reprocessing and interpretation of NURE mag and Rad data

In 1972, Duval Corporation acquired the exploration rights to the area based on the results of a stream sediment geochemical survey. They initiated an exploration program focused on a Climax exploration model for disseminated “porphyry-type” molybdenum-copper (Mo-Cu) mineralization. This program continued until the end of the 1977 field season. Duval Corporation identified locally high-grade occurrences of copper and rare-earth metals, and low-grade gold mineralization within an altered syenite-carbonatite alkaline intrusive complex. The company completed 13 diamond drill holes (WBD-1 to 13 for a total of 20,363 ft), 5 rotary drill holes (WBR-1 to 5 for 765 ft), and about 42 claim-validation rotary drill holes (DUVR-1 to 42 for 2,105 ft). Duval Corporation reported an intercept of 40 feet averaging 3.5 % copper and 4.7 oz/ton silver deep in hole WBD-5, and many drill holes encountered significant intercepts with total rare-earth abundances that ranged from 1 to 15% in association with carbonatite and carbonatite-related intrusive bodies. Duval Corporation recognized that the Bear Lodge property had the potential to host an economically significant rare-earth-element (REE) deposit, and they brought Molycorp Inc. into the project as an operating joint venture partner in 1978. Molycorp Inc. owned and operated the Mountain Pass rare-earth mine in California at that time. From 1978 to 1980, Molycorp Inc. completed 12 diamond drill holes (BL-1 to 12 for a total of 13,618 ft), 165 claim-validation holes (MOL-1 to 165 for 8,250 ft), and they conducted soil geochemical, and ground magnetic, IP/resistivity, and radiometric surveys. The company also completed a TEM survey and had all pre-existing cores analyzed for REE abundances.

The USGS conducted field and laboratory studies on the property between 1975 and 1979, including geological mapping, rock geochemistry, petrographic studies, and radiometric surveys covering a large area encompassing the current Bear Lodge REE Project area. In 1983, M.H. Staatz of the USGS documented the results in a report concluding that “the Bear Lodge disseminated deposits have one of the largest resources of both total rare earths and thorium in the United States” (Staazt, 1983). The work conducted by the USBM was reviewed in 1990 and resulted in an estimate of potential REE resources in the Bull Hill area (Gersic, et al., 1990).

Molycorp Inc. withdrew from the joint venture in 1980 following its purchase by UNOCAL. Duval Corporation continued with a diminished level of exploration activity until September 1984, completing trenching, gravity survey, and drilling of rotary holes WBR 84-1 and 2 (740 ft). With the divestiture of Duval Corporation and the spin-off of Battle Mountain Gold Company, the property was abandoned after a recommended metallurgical feasibility study was rejected by management.

Western Nuclear held claims in the district from 1984 to 1985 and focused on exploring for radioactive mineral occurrences; American Copper and Nickel Corporation (ACNC) conducted sampling, mapping, and a limited RC drilling program in the late 1980s.

In 1982, FMC Corporation acquired ground to the north, east, and south of the Duval Corporation property and initiated exploration for gold mineralization in the alkaline intrusive rocks. The company explored the property until 1986. They conducted geological mapping, soil geochemical surveys (gold and arsenic), and ground magnetic and radiometric surveys, and they drilled rotary holes totaling 7,742 feet. The work discovered and partially delineated two low-grade, gold-bearing breccia pipes.

International Curator Resources Ltd. optioned FMC’s property in 1987 and further defined the mineralized breccia pipes with 6 diamond drill holes (3,535 ft) and 18 rotary holes (7,063 ft) by the end of 1988. The property was acquired by Coca Mines Inc. in 1990. Coca drilled an additional 35 rotary holes totaling 9,265 feet and defined an estimated geologic resource of 8.2 million tons, averaging 0.023 ounces of gold per ton (a historical resource not compliant with Regulation S-K) in the East and West Breccia deposits in the Smith Ridge area.

Newmont Exploration Limited acquired a small land package in the district and carried out limited gold exploration activities from 1986 until 1988. The company drilled 10 reverse circulation holes totaling 3,115 feet (949 m).

Hecla Mining Company acquired a land position in the district in 1986 and added to it in 1988 by optioning additional claims. Hecla Mining Company discovered high-grade REE mineralization and concentrated on rare earth exploration until the end of the 1990 field season when rare earth prices were falling. Hecla Mining Company then acquired Coca Mines Inc., which controlled an adjacent property that hosted a small gold discovery. Following the Coca acquisition in 1991, Hecla Mining Company focused on the low-grade gold potential of the merged property position. Hecla Mining Company completed 12 diamond drill holes for 13,756 feet (4,194 meters) during its REE exploration phase and defined rare earth mineralization in several carbonatite dike sets along the southwestern flank of Bull Hill.

Phelps Dodge Corporation acquired a large part of the area in 1994 and focused its efforts on gold exploration over the next three years. It appears that Phelps Dodge ceased exploration due more to the downturn in gold prices than to lowered expectations for the property.

Paso Rico (USA), Inc. (now known as Rare Element Resources, Inc. (RER)) began looking at the Bear Lodge property in 1998-99, staked some claims, and negotiated a lease and option agreement on adjacent claims held by Phelps Dodge Corporation in March 2000. The lease was terminated and replaced by a 2% NSR royalty in September 2002. The 2% royalty was purchased from Freeport McMoRan Corporation (formerly Phelps Dodge Corporation) by RER in March 2009, so Phelps Dodge/Freeport has no further interests in the property.

Rare Element Resources Ltd. was incorporated in the province of British Columbia on June 3, 1999, and acquired Paso Rico Resources Ltd. in 2003 as a wholly owned subsidiary to explore and develop primarily the REE and gold mineralization. On June 1, 2006, Rare Element Resources Ltd., through its subsidiary, Paso Rico Inc., and Newmont North American Exploration Limited, a subsidiary of Newmont Mining Corporation, signed an agreement to establish a gold exploration venture. This agreement was terminated in May 2010, with RER becoming the sole participant in the combined gold-REE project.

5.2 Historical Resource Estimates

There are several historical resource estimates that are included as part of the historical record for the project; these were performed by Molycorp Inc., Hecla Mining Company, and USBM (Wineteer, 1991; Gersic et al., 1990). None of these estimates were prepared according to accepted reporting standards. No Qualified Person did sufficient work on these estimates to classify them as resources, and the reliability of the estimates is unknown. RER does not consider the historical estimates to be mineral resources and should not be relied upon.

In 2009, Rare Element Resources Ltd., parent company to Rare Element Resources, Inc., disclosed an estimate of the total inferred resource in the Bull Hill area consisting of 9.8 million tons (8.9 million tonnes) with an average grade of 4.1% Total Rare-Earth Oxides (TREO), using a cutoff grade of 1.5% TREO, in a NI 43-101 compliant technical report on the Bear Lodge property (Noble, 2009).

Subsequently, in 2010, Rare Element Resources Ltd. updated the resources of the claim block on and around Bull Hill to present a preliminary economic analysis (Scoping Study) to validate the project's potential value (John T. Boyd Company, 2010). The updated inferred resource estimate in the Bull Hill area was 17.5 million tons (15.9 million tonnes) with an average grade of 3.46% TREO, using a cutoff grade of 1.5% TREO.

RER progressed with the technical work at the Bear Lodge REE Project and provided a preliminary plan for the development of a REE open-pit mining operation at Bull Hill in a technical report on the mineral reserves and development of the Bull Hill Mine (Roche-Engineering, 2012). The disclosed mineral resources and reserves, and the associated mine plan were estimated in compliance with NI 43-101 and SEC's Industry Guide 7. The proven and probable mineral reserves consisted of a diluted 6.3 million tons (5.7 million tonnes) averaging 3.6% rare-earth oxide (TREO), plus 1.6 million tons (1.45 million tonnes) of lower grade stockwork material averaging 1.1% TREO. The mineral reserve was derived from a measured and indicated (M&I) mineral resource of 6.8 million tons (6.2 million tonnes), averaging 3.75% TREO. The report included 4.5 million tons (4.1 million tonnes) of high-grade oxide inferred mineral resource within the pit, and an additional 12 million tons (10.9 million tonnes) of near-surface inferred resources outside the pit.

Later, in 2014, RER. updated the technical studies at the Bear Lodge REE Project in an NI 43-101 compliant Pre-Feasibility Study Report (Roche-Engineering, 2014). This study considered an open pit mining operation at Bull Hill and Whitetail Ridge, a physical upgrading plant (PUG) for mineral pre-concentration, and a hydrometallurgical plant at Upton for further concentration of the rare earth elements into a mixed TREO concentrate. The updated estimated measured and indicated (M&I) mineral resource was 18.0 million tons (16.3 million tonnes) with an average grade of 3.05% TREO (using a cutoff grade of 1.5% TREO). The total proven and probable mineral reserve derived from and included as part of the M&I resource consisted of 15.6 million tons (14.2 million tonnes), averaging 2.78% TREO using a cutoff grade of 1.5% TREO.

All the described Rare Element Resources Ltd. and RER reports were prepared in accordance with Form 43-101F1 Technical Report and the CIM Definition Standards for Mineral Resources and Mineral Reserves and filed into SEDAR, the CSA web-based system used by all market participants to file, disclose, and search for information in Canada's capital markets.

6 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

Most of the information contained in this section is based on the compiled work of J. Ray (Noble, 2009; John T. Boyd Company, 2010; Roche-Engineering, 2012; Roche-Engineering, 2014), and M. Hutchinson (Hutchinson, et al., 2022; Hutchinson, 2016).

6.1 Regional Geology

The Bear Lodge Mountains of northeastern Wyoming are part of the Black Hills Uplift, a northwest-trending anticline formed during the Late Cretaceous-Tertiary Laramide Orogeny. The uplift has a northwesterly orientation and extends from the western South Dakota – Nebraska border through northeastern Wyoming into southeastern Montana (*Figure 6-1*).

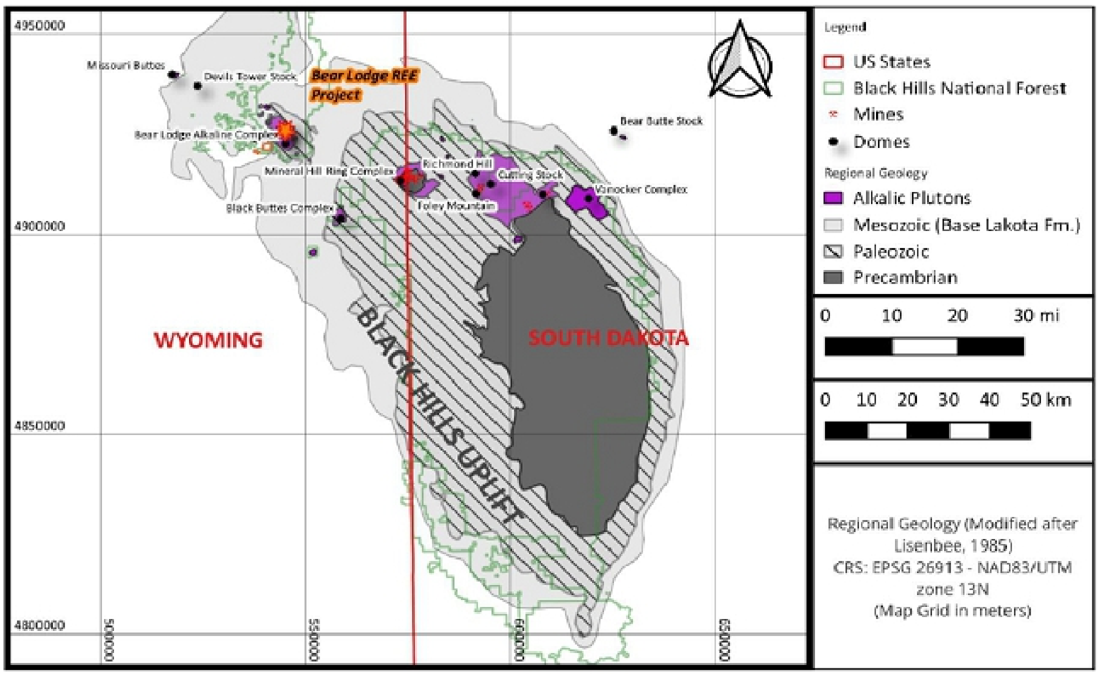


Figure 6-1. Simplified Geological Map of the Black Hills Uplift (Noble & Barrero 2024, modified from Lisenbee, 1985)

The exposed basement consists of Precambrian schist, gneiss, and granite overlain by Paleozoic and Mesozoic clastic and carbonate sedimentary rocks eroded from higher elevations. The Paleozoic and Mesozoic rocks were subjected to large-scale monoclinal folding that encircles the Black Hills Uplift. Younger Oligocene, Miocene, and Pliocene sediments disconformably overlie the older sedimentary and igneous rocks at lower elevations of the uplift.

Eocene (Tertiary) alkaline intrusive and extrusive bodies in the northern Black Hills form an N70°-80°W trending belt that extends from Bear Butte in South Dakota through the Bear Lodge Mountains, Devil's Tower, and Missouri Buttes in northeastern Wyoming. These rocks represent a group of alkalic, iron-rich, metaluminous to slightly peraluminous igneous rocks that intruded the Archean and Proterozoic basement and its cover of Paleozoic and Mesozoic sedimentary rocks along a linear, west-northwest trending belt in the northern Black Hills (Lisenbee & DeWitt, 1993). These alkaline igneous rocks are represented by dikes, sills, stocks, laccoliths, diatremes, and ring complexes, generally transitioning in composition from silica-saturated to silica-undersaturated from southeast to northwest (Snoke, 1993). These alkaline igneous rocks are associated with REE-enriched carbonatite dikes in the Bear Lodge alkaline-igneous complex.

Alkaline intrusive rocks' ages range from 39 to 60 Ma, with younger intrusions more common toward the western end of the belt. On a broader scale, the Bear Lodge alkaline complex and other Black Hills alkaline igneous bodies are part of a northerly trending belt of scattered alkaline-igneous systems from Mexico to Canada.

6.2 Local Geology

Surface rock exposures in the project area are limited, so considerable information was gleaned from float samples and trenches. Bedrock outcrop exposure is less than 5%, and extensive soil cover obscures details of the underlying rocks, structures, and alteration patterns.

The Bear Lodge REE Project is in the Bear Lodge alkaline-igneous complex, near the western end of the northern Black Hills intrusive belt (*Figure 6-1*), and is represented by a northwest-trending dome with surface dimensions of approximately 2.8 by 6 miles (4.5 by 10 km), consisting of multiple intrusions that were subjected to polyphase hydrothermal and metasomatic activity, and a variety of associated breccias and diatremes. The igneous textures (porphyritic to aphanitic) indicate a sharp thermal gradient between the intrusions and the country rocks, implying a shallow emplacement. The presence of minor volcanic rocks broadly contemporaneous with the intrusions suggests that the complex was part of a more extensive volcano-plutonic system (Moore, 2014).

The Bear Lodge dome elongates in a northwesterly orientation. It consists of a central elongated core overlain by older Paleozoic and Mesozoic sediments in the southern half of the range and by post-intrusion Tertiary sediments in the northern half (*Figure 6-2*). The core consists of the upper levels of a REE mineralized alkaline-igneous complex that intruded and domed the surrounding Paleozoic and Mesozoic sedimentary rocks in the early Tertiary.

The Bear Lodge alkaline-igneous complex consists predominantly of silica-undersaturated alkaline-igneous intrusive rocks, and it is the only intrusive series in the alkaline belt where associated carbonatitic intrusions are found. REE mineralization occurs in the north-central core and is associated with carbonatite dikes. Recognizable hydrothermal alteration includes pervasive fenitization (alkali-ferric iron metasomatism), K-feldspar-pyrite alteration, minor silicification, localized argillic alteration, superimposed surface weathering, and oxidation.

Several large and isolated blocks of Precambrian granitic bodies occur within the southern portion of the complex (~4,914,000N). The Precambrian units may be roof pendants or may be anchored in the basement. Screens of quartzite, conglomerate, and minor shaly limestone from the Deadwood Formation sediments occur along the periphery of the complex and can also host gold mineralization.

The simplified stratigraphic column in *Figure 6-3* summarizes the formations and rock units in and around the Bear Lodge REE Project area. Geological cross-sections of the local geology are shown in *Figure 6-4.*

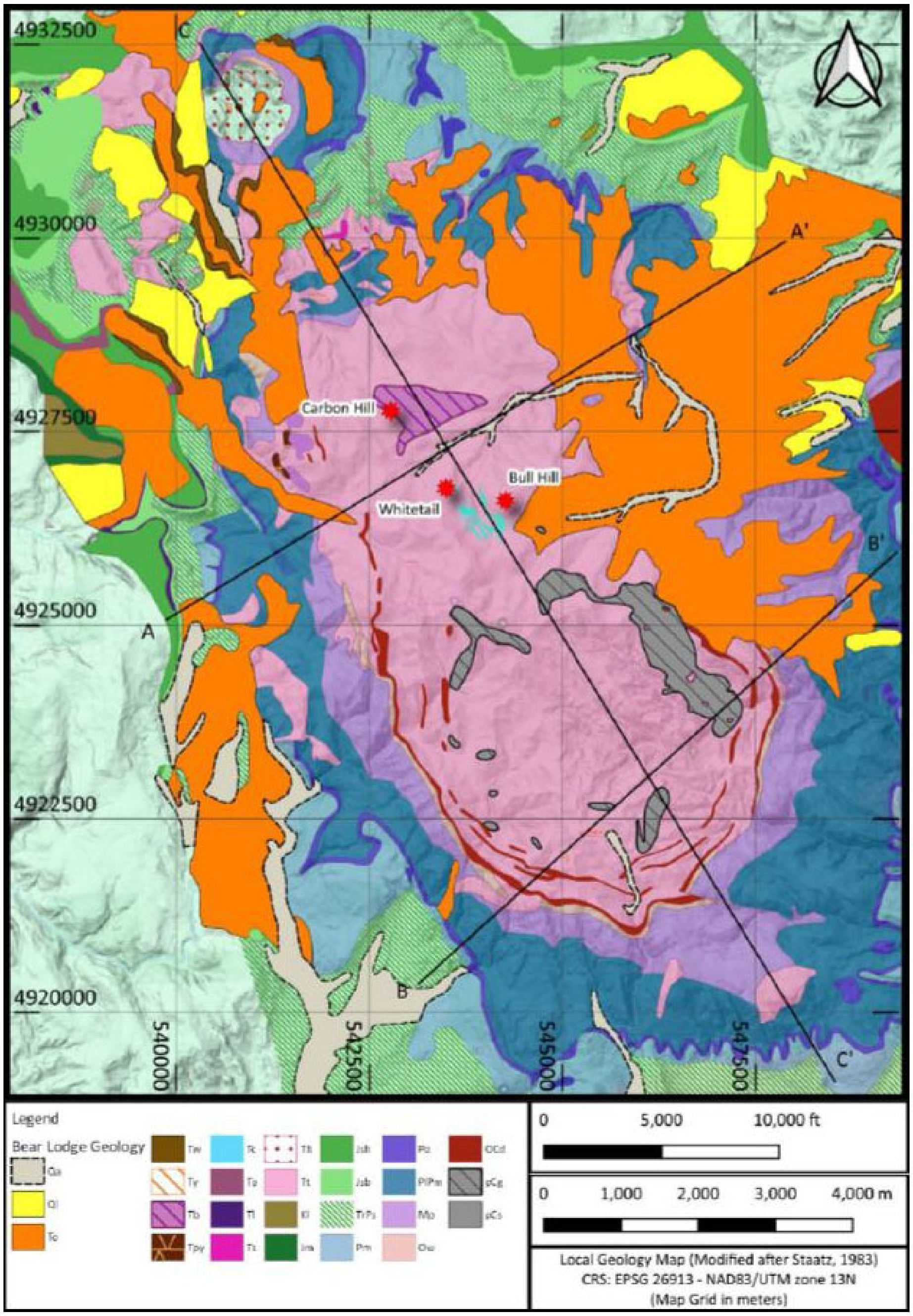


Figure 6-2. Geological Map of the Southern Bear Lodge Mountains (Noble & Barrero 2024, modified from Staatz, 1983)

The Paleozoic sedimentary rocks consist mainly of limestone and quartzite, with minor sandstone, shale, and siltstone. Mesozoic rocks include siltstone and shale, with minor sandstone. Tertiary sediments (White River and Ogallala Formations) unconformably overlie all older rocks and consist of loosely consolidated siltstone, sandstone, and conglomerate of local derivation. Quaternary deposits include alluvium, soil cover, and colluvial deposits.

As previously mentioned, thick soil cover and lack of outcrops hinder structural mapping and interpretation. However, geophysical surveys (magnetics, radiometric, and IP/resistivity) confirm the limited field data that indicate a predominance of major structural trends oriented west-northwesterly, northwesterly (parallel to the elongation of the complex), and northeast or east-northeasterly.

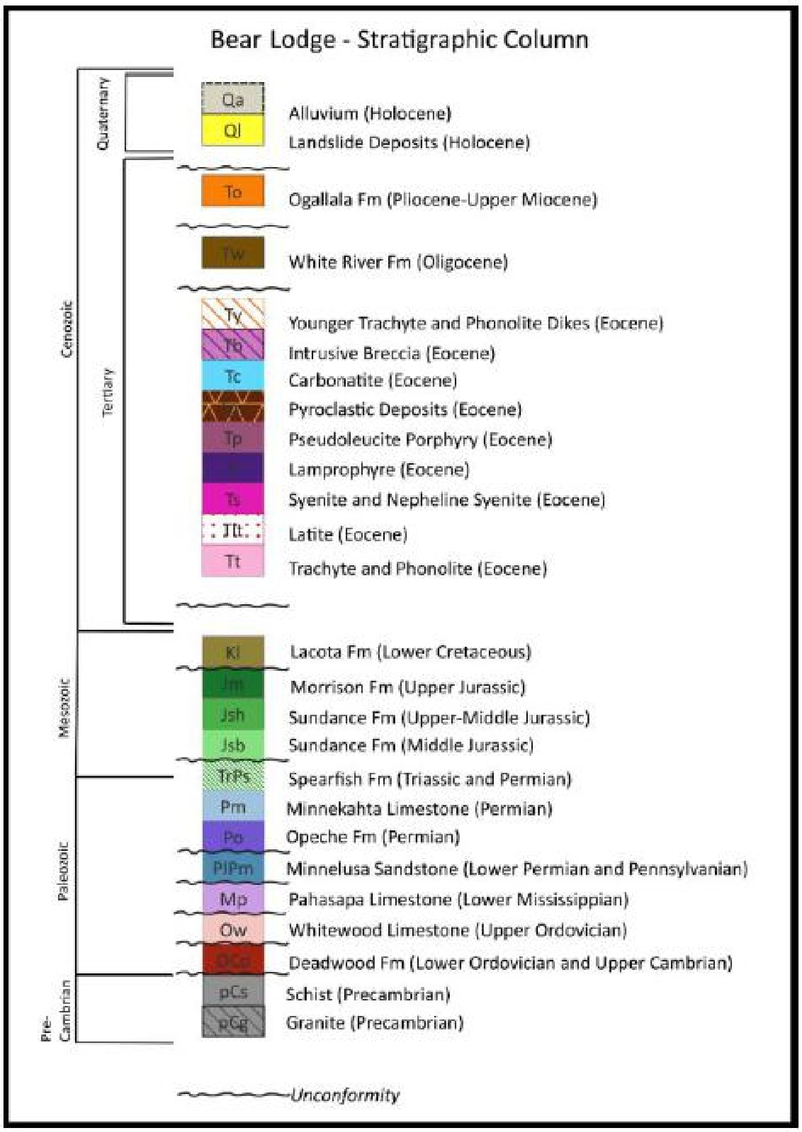


Figure 6-3. Stratigraphic Column of the Southern Bear Lodge Mountains (Noble & Barrero 2024, modified from Staatz, 1983)

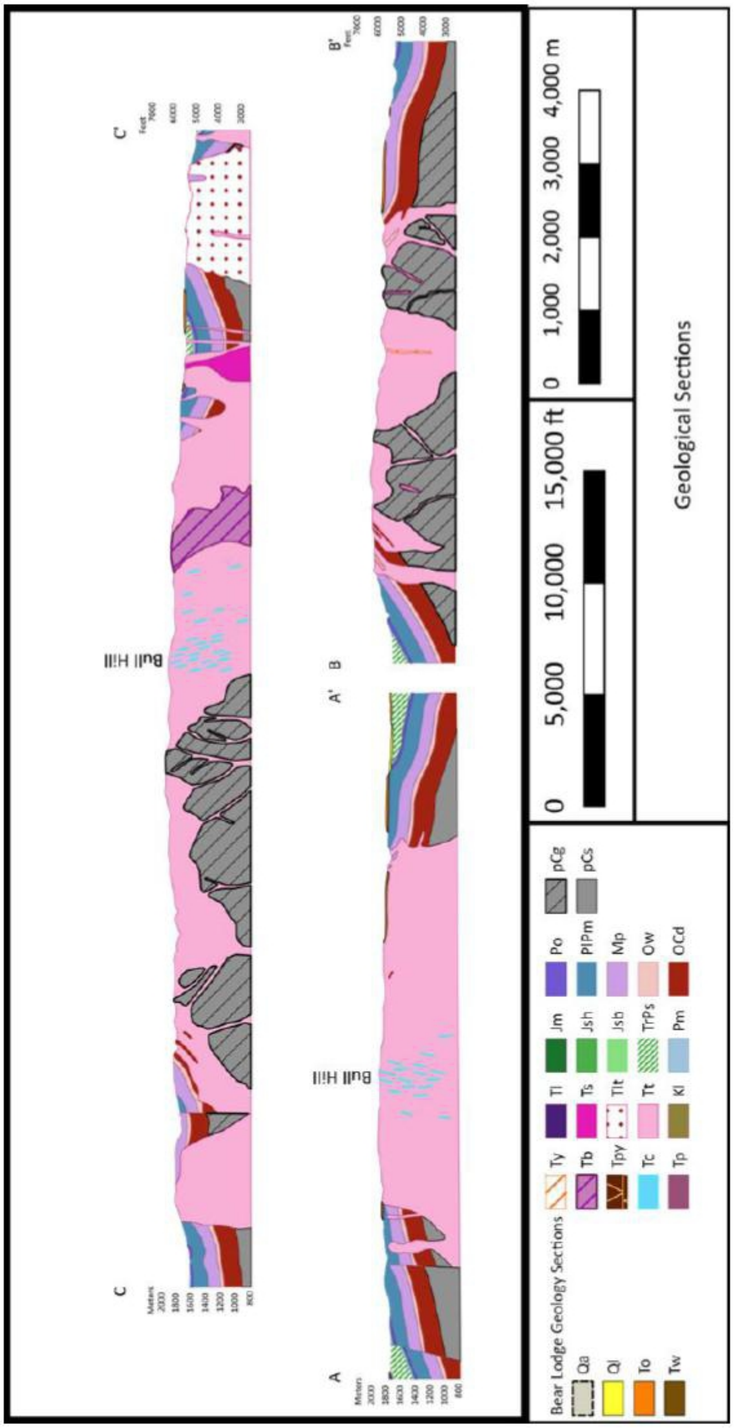


Figure 6-4. Geological Vertical Cross Cections of the Southern Bear Lodge Mountains (Noble & Barrero 2024, modified from Staatz, 1983). Section locations are shown in Figure 6-2

6.2.1 Igneous Rocks

6.2.1.1 Precambrian Granite

The Precambrian granite consists of alkali feldspar, biotite, and local quartz, with accessory magnetite, apatite, zircon, and monazite. This rock is subjected to variable degrees of fenitization. It is preserved in the southern part of the complex, representing the only igneous unit in the complex that is not directly associated with Eocene magmatism (Moore, 2014).

6.2.1.2 Tertiary Igneous Rocks

The Tertiary Bear Lodge alkaline-igneous complex may be grossly laccolithic in form and consists of a central intrusive body with subordinate plugs, sills, dikes, and laccoliths. Rock compositions are mainly trachyte and phonolite porphyry, with lesser amounts of syenite, latite, nepheline syenite, pseudo-leucite porphyry, malignite, pyroxenite, lamprophyre, and late-stage calcio carbonatite and silicocarbonatite. The alkalic rocks penetrated Precambrian granite and gneiss and intruded into the suprajacent Paleozoic sedimentary rocks as plugs, dikes, and sills. A variety of intrusive and diatreme breccia bodies cut through the igneous complex.

Crosscutting relationships indicate three stages in the Tertiary magmatism (Hutchinson, et al., 2022), an initial alkaline stage with the emplacement of syenite, microsyenite, porphyritic trachyte, and trachyte porphyry, with lesser amounts of latite, phonolite, and diatreme breccias, followed by the emplacement of calciocarbonatite and silicocarbonatite dike swarms crosscutting the older alkaline igneous rocks (carbonatite magmatism stage). The last phase is represented by alkaline magmatism, including phonolite intrusions, lamprophyre dikes, and volcanic breccias.

Major igneous rock units listed in approximate order from youngest to oldest units are summarized in *Table 6-1*.

6.2.1 Alteration

Hydrothermal alteration identified in the Bear Lodge alkaline-igneous complex is dominated by K- feldspar-pyrite alteration and/or fenitization (alkali-ferric iron metasomatism). Carbonate alteration is common but not as widespread as potassic alteration. Minor amounts of argillization, sericitization, and silicification are noted locally.

Carbonate is leached from many surface exposures during the supergene oxidation of pyrite, and it is largely absent within the zone of supergene oxidation, apparently replaced by silica and limonitic iron oxides (FeOx). Sulfides are strongly oxidized to limonite ± hematite, and biotite/phlogopite exhibits moderate to strong oxidation. It is difficult to discriminate alteration related to the intrusion of the carbonatitic bodies. However, stockworks of hairline calcite veinlets and patchy replacement of K-feldspar and biotite may be related to the carbonatite intrusions. Many of the clasts are carbonate-flooded, and some exhibit pyritic reaction rims. Pyrite is essentially the only sulfide phase in the breccia matrix and clasts, although various sulfide phases occur in the carbonatite. Near-surface carbonatite is strongly weathered and is depleted in calcite, the RER team had termed this material as FMR.

Table 6-1. Main igneous rock units at Bear Lodge REE Project (Roche-Engineering, 2014)

Rock type	Intrusion type	Composition
Carbonatite	Intrusions range from micro veinlets up to dikes approaching 120 feet in width. Drilling data indicates most commonly strike northwesterly and dip steeply to the southwest or northeast	Sovite: fine to coarsely crystalline calcite, with a range of essential to accessory minerals that may include biotite, K-feldspar, apatite, clinopyroxene, strontianite, dolomite, barite, celestite, sulfides, Fe-Ti oxides, and REE and Th minerals. Silicocarbonatite: calcite with significant biotite or phlogopite and K-feldspar ± accessory aegirine, apatite, strontianite, barite, celestite, sulfides, Fe-Ti oxides, and REE and Th minerals. Sulfide and oxide minerals: pyrite, pyrrhotite, chalcopyrite, specularite, galena, sphalerite, and rutile. REE mineralization: from trace amounts to more than 20%, REE minerals tend to be less abundant in silicocarbonatite
Heterolitic Intrusive Breccia	Diatremes (Bull Hill, Carbon Hill, and Whitetail Ridge) and as small dike-like bodies.	Fine-grained carbonate-K feldspar-biotite-sulfide matrix with abundant clasts of phonolite-trachyte, with subordinate syenite and lamprophyre.
Intrusion breccias	As contact breccias along the margins of intrusive bodies	Trachytic or phonolitic clasts dispersed in an igneous matrix of the same composition.
Pseudo-leucite porphyry	Small dikes that post-date trachyte/phonolite and as rare clasts within parts of some heterolithic breccias.	Pseudo-leucite and sanidine phenocrysts set in a dark brown to greenish grey, fine-grained groundmass of devitrified glass, nepheline, K feldspar, biotite, sodic pyroxene, and sulfides. Andradite garnet can occur rarely as both phenocrysts and groundmass.
Trachyte-phonolite porphyries	Stocks and sills in the core of the intrusive complex. The most abundant lithology types; associated with and can be found locally as extrusive flows along the outer margin.	Sparse to abundant sanidine phenocrysts ± subordinate phenocrysts of clinopyroxene, biotite, and/or feldspathoids dispersed in a fine-grained, aphanitic groundmass of alkali feldspar ± devitrified glass, nepheline, and/or sodalite, biotite, augite, alkali amphibole, and/or sulfide. Common disseminated pyrite.
Syenite		Syenite, nepheline syenite, and microsyenite and their porphyritic equivalents. Light to medium grey and range from fine-grained (microsyenite) to medium or coarse-grained. Composed of alkali feldspar ± subordinate nepheline, biotite, clinopyroxene, alkali amphibole, hornblende, sphene, olivine, magnetite, and pyrite. Rare allanite, apatite, pyrrhotite, and ilmenite as accessory phases.
Lamprophyre	Dikes and in local intimate association with syenite.	Dark grey to black and fine-grained. Contain a variable assemblage that may include biotite, pyroxene, alkali feldspar, nepheline, and/or sulfides (mafic mineral abundances may exceed 50 percent. Sulfides are principally pyrite, and magnetite is a common accessory.

FMR dikes and veins are interpreted to represent primary carbonatites that were subjected to heavy supergene oxidation and weathering. This material occurs as stockwork veinlets, veins, and dikes throughout the oxidation zone. They consist primarily of iron, manganese oxides, amorphous silica, and variable abundances of silicate and accessory minerals. Silicate and accessory minerals include biotite, quartz, chalcedony, K feldspar, apatite, barite, and celestite. The FMR veins and dikes can also host significant supergene REE minerals, generally of the bastnäsite group. Toward the bottom of the oxidation zone, the FMR veins become transitional to carbonatite and carry residual carbonate and sulfide, along with mixed primary and supergene REE mineralogy.

Fenitization (alkali-ferric iron metasomatism), an alteration type often associated with carbonatites, is widespread across the Bear Lodge property and may be genetically related to carbonatite intrusion. Fenitization was identified across the Bear Lodge property in a series of studies that utilized the cathodoluminescence petrographic method. This type of alteration is spotty in the Bull Hill deposit area, based on petrographic examination of the drill core and K abundance measurements made at the surface with a gamma ray spectrometer. Fenitized rocks are often difficult to recognize in the field or drill core, except in the case of altered Precambrian granitic rocks, where the absence of quartz strongly suggests interaction with alkali-ferric iron-rich fluids. The effect of fenitization in the Bear Lodge alkaline igneous rocks is the destruction of primary magnetite, the replacement of primary plagioclase by K- feldspar, and the substitution of Fe^{3+} for Al^{3+} in the lattice structures of the feldspars. This alteration may be accompanied by the precipitation of LREE-enriched apatite or the LREE enrichment of primary apatite, and by sulfide deposition. Its distribution and paragenesis are not entirely understood in the Bear Lodge REE Project. Duval Corporation drill hole WBD-12, collared south of Carbon Hill, intersected high-grade copper-silver mineralization in a massive fenite halo on a carbonatite dike.

6.2.2 Mineralization

The Bear Lodge alkaline-igneous complex hosts a variety of mineralization types, including gold, lanthanides (REE, rare earth elements), base metals (Cu, Pb, Zn, and Mo), thorium (Th), and uranium (U). The REEs are contained within carbonatite-related dikes, veins, and stockwork. Gold is generally associated with potassic alteration that may overlap or halo strong REE mineralization. Gold may be both structurally controlled and disseminated.

6.3 Project Geology

The Bear Lodge REE Project is located in the northern lobe and near the axis of the northwest-trending elongate dome, forming the Bear Lodge Mountain Range. REE mineralization is associated with carbonatite and silicocarbonatite dikes, veins, and stockwork that intrude diatreme, heterolithic breccias, and their host trachyte and phonolite intrusions. The northwest alignment of the three diatreme pipes (Bull Hill, Whitetail Ridge, and Carbon Hill) coincides with numerous north- to northwest-striking alkaline igneous dikes and mineralized zones (*Figure 6-5*). The calcio carbonatite and silicocarbonatite dikes and the surrounding stockworks form a swarm cutting the diatremes; the main dikes are generally concentrated within the margins of the diatreme, with smaller dikes and veinlets extending outward into the adjacent wall rocks along a northwest-trending corridor.

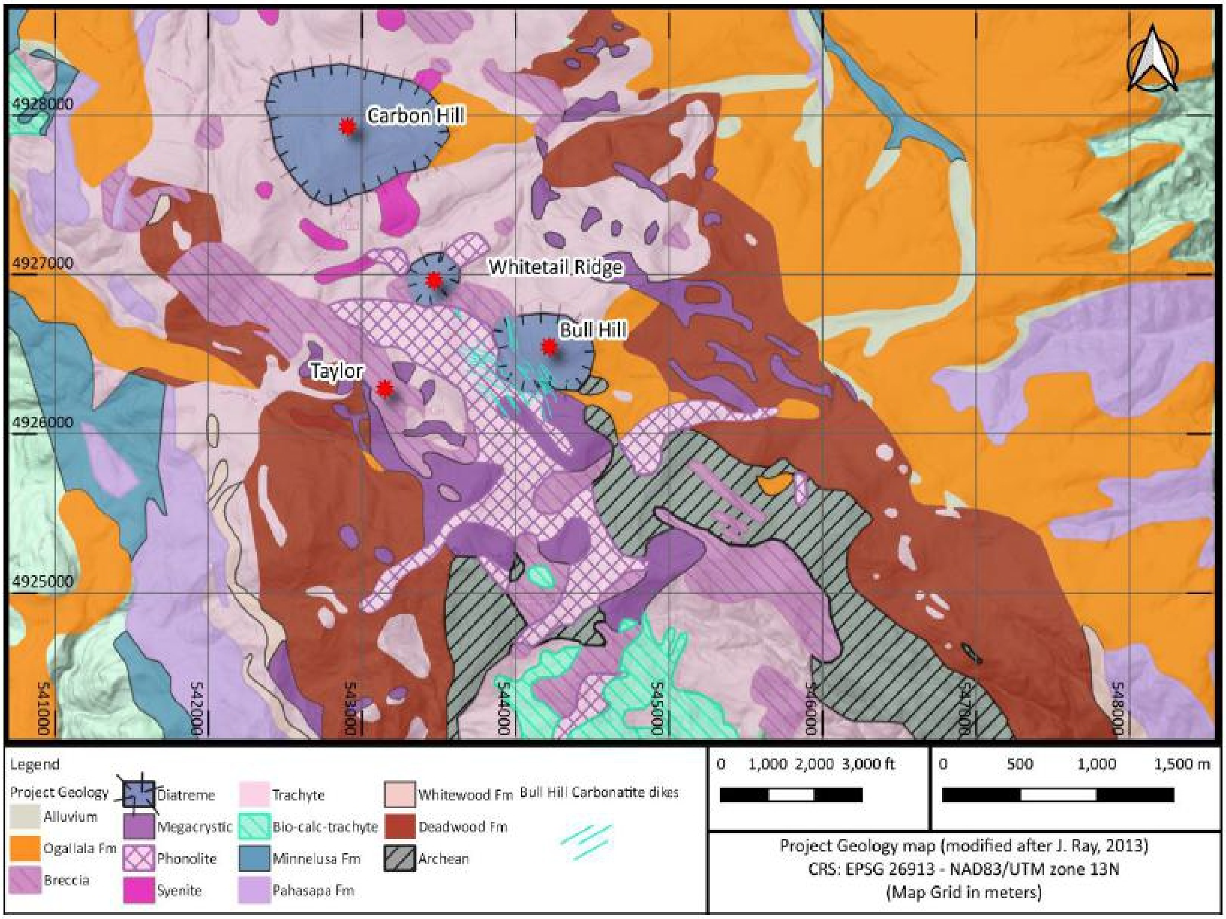


Figure 6-5. Geological Map of the Bear Lodge REE Project (Noble & Barrero 2024, modified after J. Ray-RER 2013)

Most rock units within the project area are affected by widespread potassic alteration and have a thick near-surface oxidized zone. Recognizable hydrothermal alteration includes pervasive fenitization (alkali-ferric iron metasomatism), K-feldspar-pyrite alteration, minor silicification, localized argillic alteration, superimposed oxidation, and surface weathering.

Major structural trends are oriented west-northwest, northwest (parallel to the axis of the dome), north, and northeast or east-northeast. Data obtained in 2011 and 2012 from surface mapping of drill pads, roads, and trenches, along with borehole televiewer data and detailed geological cross sections, support earlier district-wide observations that indicate a predominant orthogonal set of northwest and northeast structures, as well as subordinate north-northwest, east-northeast, and northerly trending structures. Geophysical surveys (magnetics, radiometric, and IP/resistivity) agree with the field data.

The emplacement of REE mineralized carbonatite and carbonatite-related dikes, veins, and stockwork is controlled primarily along the northwesterly structures, with subordinate controls along northerly and east-northeasterly structures. Carbonatite-related REE mineralization extends along the northwesterly trending zone for more than 1800 meters. The greatest concentration of REE-mineralized bodies occurs in NW-trending dike swarms and stockworks in the Bull Hill deposit area. Individual dikes can reach 80 feet in width (24.4m). Based on existing drilling, the REE mineralization is open at depth.

Changes in mineralogy and REE concentrations with depth are due to late-stage magmatic-hydrothermal and supergene alteration or weathering, which are responsible for the increase in the REE grade within the most weathered zones (Hutchinson, et al., 2022) and for the vertical zonation with depth. Weathering depth is variable with an upper weathered zone represented by strongly weathered/oxidized carbonatite with no residual calcite underlain by granular calcite-bearing oxide material representing the moderately weathered carbonatite (Hutchinson, 2016). At Bull Hill deposit, the basal portion of the latter is referred to as the transitional zone where the carbonatite is weakly weathered.

The main ore phases in the unoxidized dikes are ancylite-(Ce) plus lesser carbocernaite. Furthermore, the REE minerals calcioancylite, bastnäsite, parisite, synchisite, monazite, cheralite, burbankite, and cerianite occur in the oxidized and unoxidized carbonatites. Gangue minerals include calcite, biotite, K-feldspar, apatite, clinopyroxene, strontianite, dolomite, barite, celestite, sulfides, and Fe-Ti oxides.

6.3.1 Mineralization Zones

As mentioned earlier, REE mineralization at Bear Lodge REE Project exhibits a generalized vertical zonation related to the degree of supergene oxidation, weathering, and hydrothermal alteration of the carbonatite, which generally decreases with increasing depth. The generalized vertical distribution of REE mineralization zones (from top to bottom) is summarized in *Table 1-1* and described in detail in the following subsections.

Table 6-2. Zonal REE Mineralogy in the Bear Lodge Carbonatite and Derivative Dikes and Veins from the surface to depth.

Zones	Mineralized Body	REE Mineralogy
Oxide (Ox)	FMR dikes and veins; oxidized and leached carbonatite (surface to appx. 5,600 feet/ 1,707 meters elevation, ±300-500 feet (91-152 meters) thickness) FeOx-MnOx-REEs ± Ksp, ap, Q, bi	Bastnäsite group minerals (bastnäsite-dominant), monazite, ± variable, but generally subordinate cerianite
Oxide-Carbonate (OxCa)	Variably oxidized and partially leached carbonatite (variable thickness, surface to appx 5,600 feet/1,707 meters elevation) FeOx-MnOx-REEs-calc ± Ksp, ap, Q, bi	Bastnäsite group minerals (bastnäsite-dominant), ancylite, monazite, ± variable, but generally subordinate cerianite
Transitional (Tran)	Partly oxidized carbonatite (appx. 5,600 feet/1,707 meters elevation) Calc-REE-sulfides-FeOx-REE ± Ksp, ap, aeg, bi	Predominantly ancylite; minor to significant bastnäsite group minerals, ± monazite
Unoxidized/ Sulfide (Sulf)	Unoxidized carbonatite and silicocarbonatite (< 5,600 feet/1,707 meters elevation) Calc-REE-sulfides (py-po±cp,sl,gn,mb)-bi ± Ksp, ap, aeg	Predominantly ancylite; minor to significant bastnäsite group minerals; ± minor monazite, carbocernaite, and burbankite

6.3.1.1 Oxide Zone

The oxidized zone extends from the surface to depths of up to 600 feet (183m). Within this zone, FMR occurs as stockwork veinlets, veins, and dikes and represents primary carbonatite subjected to intense oxidation and complete to nearly complete leaching of gangue carbonates. FMR consists primarily of iron and manganese oxides and amorphous silica, along with variable abundances of silicate and accessory minerals, including biotite, quartz, chalcedony, K feldspar, apatite, barite, and celestite. The FMR hosts significant hydrothermal or supergene REE minerals, dominantly bastnäsite group minerals, with subordinate monazite and cerianite.

The FMR dikes and veins are typically black to rusty brown in color. Many are friable, and drill recoveries are often poor. However, some FMR bodies were subject to late silicification and may be highly competent. REE grades tend to be higher in the FMR bodies than in the corresponding carbonatite and can reach more than 20% TREO. The FMR bodies and mineralization style persist to depths of 300 feet (91 m) or more beneath the surface.

6.3.1.2 Oxide-Carbonate Zone (OxCa)

The oxide-carbonate zone generally occurs at the base of the oxidized zone but may reach the surface in places. It extends to nearly 500 feet (152m) in depth. This zone overlies the transitional zone and extends lateral to, or beneath, the oxidized zone. It is characterized by moderately to strongly oxidized carbonatite, with less than 10% residual sulfides. The OxCa zone is visually similar to the oxidized mineralization in the overlying oxide zone, with fully oxidized sulfides, but it contains variable quantities of residual matrix carbonate. The REE mineral assemblage comprises a mix of fibrous bastnäsite, stubby ancylite, and variable monazite. Hexagonal pseudomorphs are in evidence in this zone and contain bastnäsite group minerals and/or ancylite accompanied by strontianite and barite. Bastnäsite appears to form mainly from the partial to nearly complete replacement of ancylite. The upper boundary of this zone is irregular and locally shallows above some of the more robust dike zones.

6.3.1.3 Transitional Zone (Tran)

Directly overlying the unoxidized zone is a conformable, flat-lying, thin zone, generally less than 20 feet (6 m) thick, that occurs at depths of 500 to 600 feet (152-183m) beneath the surface.

This zone is characterized by carbonatite-style mineralization with variable sulfides and variable indications of gangue mineral leaching. Between 10% and 90% of the sulfides are oxidized to limonite. The transitional zone grades upward rapidly into the oxide-carbonate zone.

6.3.1.4 Unoxidized – Sulfide Zone

The upper contact of the unoxidized, or sulfide-bearing, zone is generally relatively flat-lying and extends from depth upward to within approximately 600 feet (183 meters) of the surface, locally deeper along structural zones. The bottom of this zone has yet to be reached by drilling. The unoxidized zone is characterized by REE mineralization accompanied by sulfides, apparently with no oxidation or leaching of minerals. REE mineralization in the carbonatite consists primarily of ancylite and subordinate REE fluocarbonates (bastnäsite group minerals including bastnäsite, parisite, and synchysite) and minor monazite. Ancylite forms stubby, prismatic crystals that are intimately intergrown with strontianite and minor barite ± minor bastnäsite group REE minerals in hexagonal pseudomorphs after an earlier REE phase. Ancylite and the bastnäsite group REE minerals may also occur as discrete phases intergranular to the gangue minerals. The gangue mineralogy in the carbonatite is dominated by calcite, with subordinate amounts of sulfide minerals ± biotite, apatite, sanidine, barite, and/or strontianite.

The sulfide minerals are present in amounts from less than 5% (locally less than 1%) to more than 20% and include pyrrhotite and pyrite ± minor amounts of chalcopyrite, galena, sphalerite, and/or molybdenite. Pyrite is commonly the most abundant sulfide phase, although it is not uncommon for pyrrhotite to be the most abundant. Sulfides are always unoxidized in this zone. REE grades in the carbonatite can reach over 10% TREO, although typical grades of the dikes are less than 5% TREO.

6.3.1.5 Stockwork Mineralization

Stockwork mineralization consists of zones of intersecting veins and veinlets that tend to occur as envelopes along and between larger FMR/carbonatite veins and dikes. Stockwork-type mineralization is common in all the REE mineralization zones summarized in *Table 1-1*. Individual veinlets can range from sub-millimeter to meter widths and exhibit either random orientation or orientation sub-parallel to the major dikes and veins. TREO grades in the stockwork mineralization tend to be lower than in the dikes and more prominent veins, ranging between approximately 0.5% and 3% TREO, contributing significantly to the contained TREO grade. Vein densities vary widely, with higher vein densities and abundance of contained vein material generally corresponding to higher TREO grades within a given stockwork zone.

6.3.1 Bear Lodge REE Project Deposits

The Bear Lodge REE Project comprises two main areas represented by the Bull Hill and Whitetail Ridge deposits, and the exploration targets of the Carbon Hill and East Taylor deposits (*Figure 6-5*). All the deposits have carbonatite-related dikes and veins that range in size from hairline fracture veinlets to dikes that may exceed 80 feet (24.4m) in width. Lower-grade stockworks of veinlets commonly surround the higher-grade REE-bearing dikes and veins. Oxidized mineralization (FMR and OxCa) extends to depths of 500 to 600 feet (152 to 183 meters). Oxide zone REE mineralization is dominated by REE minerals of the bastnäsite group, with variable and typically subordinate quantities of monazite and cerianite. Oxide-carbonate mineralization contains a variable mix of bastnäsite group minerals and ancylite, with varied and subordinate amounts of monazite and cerianite.

REE mineralization is widespread on the property. However, data suggest that the area proximal to the Bull Hill and Whitetail diatreme bodies is the most prospective for significant REE mineralization.

6.3.1.1 Bull Hill Deposit

The Bull Hill deposit area forms the bulk of the Bear Lodge REE deposit (*Figure 6-5*). Generally, it exhibits light REE-enrichment (generally including cerium/Ce, lanthanum/La, neodymium/Nd, praseodymium/Pr, and samarium/Sm). The mineralized zone extends approximately 1,700 feet (518 meters) in a north-westerly direction, by 300 feet (91 meters) to more than 700 feet (213 meters) in a north-easterly direction, reflecting the overall orientation of a relatively persistent swarm of steeply dipping, northwest-striking dikes and veins of FMR and carbonatite. Individual dikes display strike lengths of 300 to 800 feet (91 to 244 meters), down dip extensions of 300 feet (91 meters) to more than 800 feet (91 meters), and thicknesses of less than 20 feet (6 meters) to more than 80 feet (24.4m). Individual dikes can pinch, swell, and bifurcate along strike and down dip. These generally follow the interfingering contact between the Bull Hill diatreme and adjacent trachyte and phonolite.

The southern two-thirds of the dike swarm east of Whitetail Creek (the drainage that borders the west flank of Bull Hill) includes a persistent northwest-striking zone of dikes, veins, and stockwork and contains northerly-striking splays at either end. Within this zone is a relatively continuous dike, locally more than 80 feet (24.4m) thick, steeply dipping to vertical, and multiple subparallel dikes. The main dike zone appears to follow the interfingering contact between diatreme breccia and the host trachyte-phonolite unit in the south.

The West Bull Hill zone, FMR, and carbonatite dikes, veins, and stockwork are variably hosted by diatreme, trachyte, and phonolite. To the south of Bull Hill deposit, mineralization appears to be offset along an easterly-trending fault or feathers out close to the boundary with Section 20, which is currently withdrawn from mineral entry and drilling. In the Bull Hill area, the structure, the diatreme contact, and host rock lithology exhibit a complex interplay of controls on the localization of mineralization.

REE mineralization in the Bull Hill Northwest area is contained within dikes, veins, and minor stockwork of FMR and carbonatite/silicocarbonatite that intrude trachyte and phonolite. Less well-understood, owing to decreased drilling densities compared with the Bull Hill main area, the dikes, veins, and stockwork zones are northerly trending, steeply dipping to vertical, and relatively narrow and broadly spaced. Individual dikes appear to display strike lengths of less than 100 feet (30 meters), down dip extensions of more than 200 feet (60 meters), and thicknesses of 10 feet (3 meters). The oxide zone extends downward to a relatively flat-lying contact with a narrow oxide-carbonate zone conformable with a narrow transition zone (unlike the irregular oxide-carbonate upper contact at Bull Hill that locally extends to the surface).

Pre-existing fractures in more competent host rock in this area may have influenced the northerly orientations and size of the dikes and veins. The size and spacing of veins, an elevated original sulfide content, and faults or structural zones may have enhanced the leaching of gangue carbonate during oxidation, leaving little to no oxide-carbonate zone. In the northwest Bull Hill area, the structure appears to be the dominant control on the localization of mineralization, and there may be additional mineralized zones to the north.

6.3.1.2 Whitetail Ridge Deposit

REE mineralization in the Whitetail Ridge area (*Figure 6-5*) is contained within discontinuous dikes, veins, stockwork FMR, and carbonatite/silicocarbonatite hosted primarily by heterolithic breccia of the Whitetail diatreme. Higher-grade mineralized zones typically contain narrow, steeply dipping dikes and veins up to 10 feet (3 meters) in thickness. Although the strikes of these zones are still being determined with drilling, several dikes appear to trend north-northwesterly. This area exhibits enrichment of heavy REEs relative to the Bull Hill area, with increased variable but still subordinate quantities of monazite and cerianite accompanying the bastnäsite group minerals. In addition, the bastnäsite group minerals exhibit variable Ce depletion and common enrichment in Nd and Y. Monazite shows significant Nd enrichment. The oxide-to-oxide-carbonate boundaries are variable in the area, similar to zones observed in the Bull Hill area. Lithology appears to be the dominant control on the localization of mineralization. The diatreme seems to have been relatively permeable and less brittle than host rocks in the other areas. Mineralization is dominantly hosted within discontinuous stockwork veinlets and hairline fractures (referred to as disseminated deposits by Staatz, 1983).

6.3.1.3 *Carbon Hill and East Taylor Deposits*

In these areas, HREE-enriched FMR veins and stockwork zones were drilled from 2010 through 2012. They are particularly enriched in europium, terbium, dysprosium, gadolinium, and yttrium (Eu, Tb, Dy, Gd, and Y, respectively). Carbon Hill is located approximately 800 feet (244 meters) northwest of the Whitetail Ridge area (*Figure 6-5*). FMR veins and stockwork here are locally silicified and hosted by phonolite, trachyte, and syenite. The East Taylor target is located approximately 2,500 feet (760 meters) west of the main Bull Hill area, and 2,500 feet (760 meters) southwest of the Whitetail Ridge (*Figure 6-5*). Steeply dipping FMR veins and stockwork are hosted by trachyte and minor Deadwood Formation and define a zone that may extend more than 700 feet (213 meters) east-west by 250 feet (76 meters) north-south. More drilling is needed to further delineate the extent and orientation of the mineralization in these areas.

6.4 Deposit Type

6.4.1 Carbonatite-Hosted Rare Earths

Many of the world's REE deposits are associated with carbonatites and alkaline igneous complexes and their weathering products. Carbonatites are of considerable economic interest due to their geochemical enrichment in a range of elements, such as the rare earth elements (REEs), Nb, Ba, Sr, Ta, Th, U, V, F, P, and Zr. This enrichment may reach ore grade for certain elements in some carbonatites, and carbonatite-associated deposits continue to be the major source of Nb and REEs (Millonic & Groat, 2013). Some examples of well-known carbonatite deposits are Mountain Pass (LREEs, USA), Oka and St Honoré (Nb, Canada), and Jacupiranga (P, Brazil).

From the carbonatites known worldwide, only a small proportion host REE mineralization. The ages of carbonatites range from the Archean to the Cenozoic. However, most of the carbonatite-related REE deposits are concentrated in the Mesozoic, as is the case of Bear Lodge carbonatite. Carbonatite-related REE deposits have magmatic and hydrothermal signatures and are mainly hosted in igneous complexes composed of alkaline rocks and carbonatites. Carbonatite bodies are usually related to deep regional faults that act as conduits for the migration of magma (e.g., Mountain Pass, California).

The first stages of enrichment in carbonatite systems typically occur through fractional crystallization, resulting in late-magmatic fluids greatly enriched in REEs. These REE-bearing fluids may precipitate REE-rich minerals and/ or redistribute REEs via hydrothermal fluids, modifying existing carbonatite minerals. Late-magmatic and post-magmatic enrichment processes (hydrothermal alteration and supergene enrichment) can play an important role in the economics of rare earth element (REE)-bearing carbonatite deposits (Hutchinson, et al., 2022).

Many REE deposits also display upgrading due to in-situ weathering; this additional enrichment in REEs can occur through dissolution and remobilization of REEs, where minerals such as REE-fluorocarbonates are broken down, releasing REEs, which are reprecipitated as rhabdophane, gorceixite, or other minerals under meteoric conditions, and by removal of gangue materials, in which minerals such as gangue carbonates are dissolved and removed from the rock, generating porosity and increasing the concentration of REEs in the rock.

6.4.2 Bear Lodge REE Project

Bear Lodge REE Project deposits are, as a whole, one of the largest REE deposits in the United States (Staatz, 1983; Hutchinson, 2016) and are carbonatite dike-hosted REE deposits. The REE-bearing minerals are concentrated within dominantly NW-trending, steeply dipping carbonatite dikes that cut heterolithic diatreme breccias.

The REE-bearing carbonatite dikes are commonly oxidized and were formed late in the magmatic sequence of the alkaline igneous complex (<46 Ma). The dikes range from a few millimeters to 24 m wide and range in composition from calcite carbonatite to silicocarbonatite with a strong Mn, REE and Sr enrichment. The main ore phases in the unoxidized dikes are ancylite-(Ce) plus lesser carbocernaite. REE minerals calcioancylite, bastnäsite, parisite, synchisite, monazite, cheralite, burbankite, and cerianite occur in the oxidized and unoxidized carbonatites. Isotopic values are interpreted to indicate a dominantly asthenospheric source for the carbonatite dikes (Millonic & Groat, 2013).

Late magmatic-hydrothermal porosity generation and in situ weathering are responsible for the supergene REE enrichment. In the least weathered carbonatite, ancylite is the dominant REE-bearing mineral where it appears to replace magmatic burbankite, as well as in the moderately weathered intervals of carbonatite. The least altered carbonatite displays low porosity (~7–8%) with only trace oxidation of sulfides and minor precipitation of Fe oxides. As weathering intensity increases, carbonatite exhibits stronger sulfide oxidation, manganese oxide replacement of Mn-rich calcite, and partial dissolution of calcite. REE concentrations increased primarily because of volume loss from carbonate mineral dissolution. The most weathered occurrences of carbonatite lack primary igneous carbonate minerals and consist largely of Fe and Mn oxides (FMR) with other rare earth minerals (e.g., cerianite and REE-fluorocarbonates), suggesting subaerial exposure to oxidizing, meteoric fluids (Hutchinson, et al., 2022).

The Bear Lodge REE deposit exhibits a pronounced zonation between LREE- and HREE-enrichment. The Bull Hill deposit is enriched in light rare earth elements (LREE). In contrast, peripheral deposits at Whitetail Ridge, Carbon Hill, and East Taylor are characterized by relative enrichment in heavy rare earth elements, Yttrium (HREE’s and Y), and gold.

The Bear Lodge carbonatites occur within an alkaline intrusive complex and share similarities with the Mountain Pass (California) carbonatite-hosted REE deposit. Historically, starting in the late 1800s, the Mountain Pass district was prospected for base metals (Cu, Pb, and Zn) and gold with a small mining gold operation between 1939 and 1941 (Sulphide Queen Mine). Later, in the 1940s, uranium exploration led to the deposit's discovery in 1949. Mountain Pass deposit is the second largest REE deposit in the world. It is hosted in the Sulphide Queen Carbonatite that intrudes into the Precambrian metamorphic basement with magmatic bastnäsite as the main ore mineral. Carbonatite rocks intruded potash-rich igneous rocks (shonkinite, syenite, and granite) of Precambrian age forming swarms of thin dykes, stocks, and the tabular sill-like body of the Sulphide Queen Carbonatite (Olson, et al., 1954). REE mineralization is only associated with carbonatite intrusions. Carbonatite is genetically related to ultrapotassic rocks. Alteration is primarily fenitization of the adjacent country rocks and local hydrothermal alteration and silicification.

6.5 Qualified Persons' Statement on Geological Setting, Mineralization, and Deposit

In the Qualified Persons' opinion, the knowledge about regional, local and project geology, mineralization style, alteration, structural and geological controls on mineralization, and deposit type is considered adequate to support mineral resource estimation.

7 EXPLORATION

Most of the information contained in this section is based on the compiled work of J. Ray (Noble, 2009; John T. Boyd Company, 2010; Roche-Engineering, 2012, and Roche-Engineering, 2014).

7.1 Introduction

Several major mining companies have explored the Bear Lodge REE Project for REEs, precious metals, and base metals over the past 40 years. These various exploration campaigns identified some rare earth occurrences that RER believed warranted further exploration and evaluation. Initial exploration of the property was conducted by Molycorp, Hecla Mining Company, and Duval Corporation; the historical exploration activities undertaken by these companies are described in detail in *Chapter 5*.

The Bear Lodge REE Project comprises the RER exploration activities targeting REEs in several areas of the project (*Figure 7-1*). Past exploration activity for gold by Newmont Exploration Limited and RER was conducted under the auspices of the Sundance Gold Project, and this will not be described in the present report.

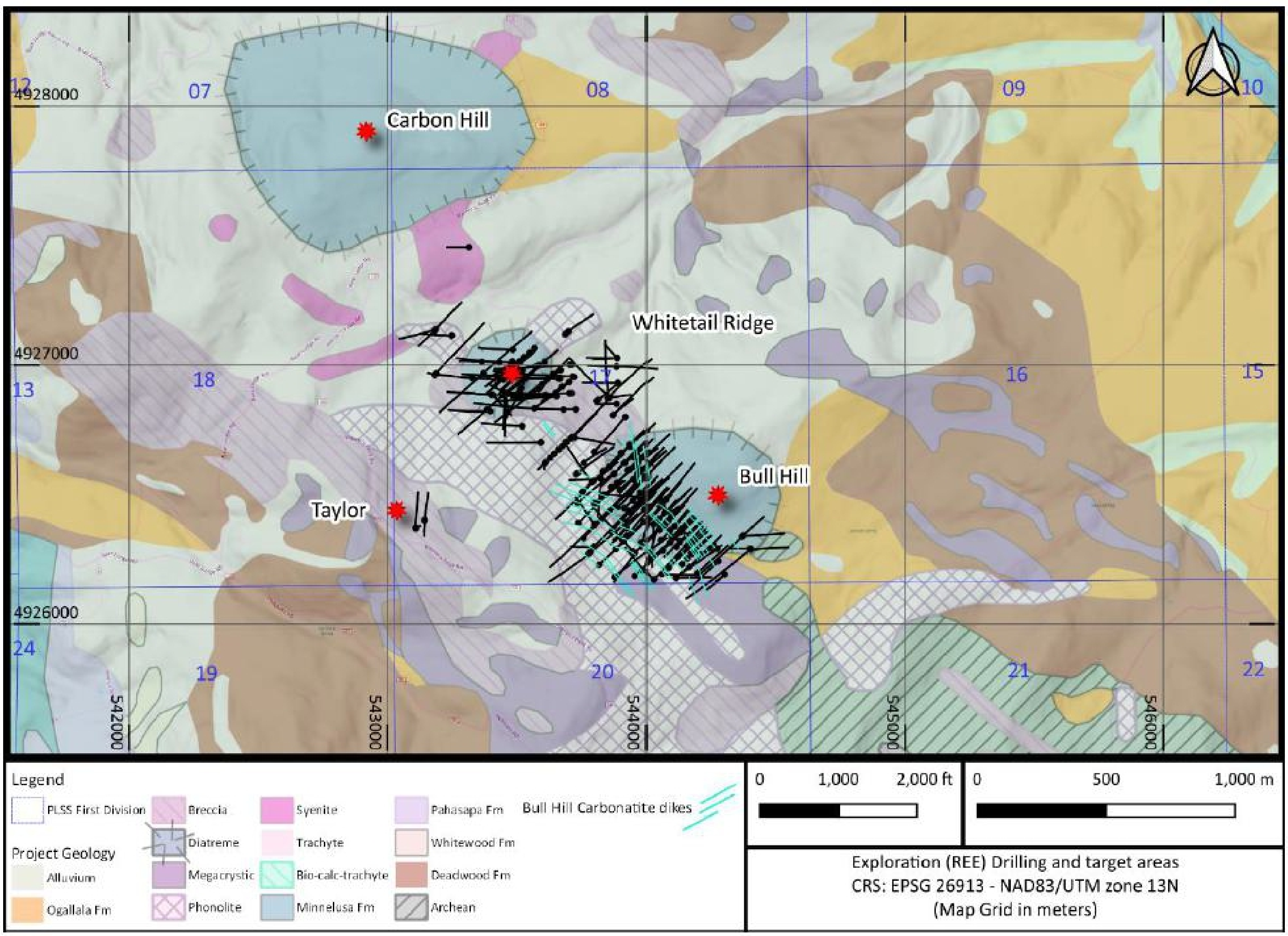


Figure 7-1. Location of exploration (REE) target areas and resource drill holes in the Bear Lodge REE Project

7.2 Exploration Target Areas

RER's Bear Lodge REE Project exploration activities focus on two carbonatite-related rare earth areas, the Bull Hill and Whitetail Ridge deposits, and two identified exploration target areas, Carbon Hill and Taylor deposits.

Several previous exploration target areas were incorporated into the Bull Hill deposit, referred to as Bull Hill SW, Bull Hill West, Bull Hill Southwest Extension, and the Carbonatite Plug, or deep Bull Hill West. Geological characteristics of the REE deposits and target areas have been described in detail in the previous chapter, and locations are provided in *Figure 7-1*. The exploration target areas are summarized in *Table 7-1* and briefly described in the following sections.

Table 7-1. Bear Lodge REE Project Exploration Target Areas, 2004 through 2013

Target Area	Location	Comment
Bull Hill (includes Bull Hill West and Bull Hill SE extension)	The west flank of Bull Hill	NW to N trending dike swarm, drilled previously by three Hecla Mining Company holes. 144 new core holes (2004 – 2013) delineate a system of dikes, veins, and stockwork; additional radiometric and soil surveys, trenches, and surface samples indicate mineralization.
Carbonatite Plug (Deep Bull Hill West)	Southwest of Bull Hill, west of drainage (previously inferred West Bull Hill Fault")	Postulated REE-mineralized carbonatite plug beneath stockwork carbonatite carapace, IP anomaly at depth; multiple RER, Hecla Mining Company, and Molycorp Inc., drill holes intersect FMR/CBT stockwork and veins at shallow to moderate depths. Two deep holes (2010) intersect dense CBT/SBT dikes, breccia, and stockwork at depth; possible down dip projection of dikes at SW Bull Hill and/or plug carapace.
Bull Hill Northwest	Approximately 1,000 feet (300 meters) north of the Bull Hill deposit	High-grade REE-mineralized dike or dikes first intersected by Hecla Mining Company drill hole WP-2. Approximately 18 core holes (2007-2011) indicate the presence of northerly trending, steeply dipping narrow dikes hosted primarily by trachyte and phonolite.
Whitetail Ridge	Approximately 500- 1,000 feet (150-300 meters) west of the Bull Hill NW deposit and 1500 feet (460 meters) NW of the Bull Hill deposit	Strong REE mineralization in FMR and Ox-Ca dikes, veins, and stockwork, with a coincident radiometric anomaly. Tested by Hecla Mining Company drill hole WP-1 and USBM shallow holes. Approximately 62 core holes (2010-2013) indicate N to WNW trending, steeply dipping narrow veins, and widespread disseminated stockwork zones, hosted primarily by diatreme; moderate HREE enrichment.
Carbon Hill	Approximately 800 feet (250 meters) northwest of Whitetail Ridge deposit	Area coincident with previous Au target areas; selected intervals from 2 RC holes (2010) contain strong REE mineralization within FMR veins and stockwork and localized silicification; hosted in syenite breccias and phonolite; 5 core and 6 RC holes (2011-2012) confirm strong REE mineralization and indicate HREE enrichment.
Taylor	Approximately 2,500 feet (700 meters) west of Bull Hill deposit	Area coincident with previous Au target areas: selected intervals from 1 RC hole (2010) contain strong REE mineralization within FMR dikes, veins, and stockwork hosted in trachyte-phonolite; 7 core holes (2011) confirm strong REE mineralization and indicate HREE enrichment.

7.2.1 Bull Hill

The Bull Hill deposit consists of an REE-mineralized carbonatite dike swarm and associated enveloping stockwork zones located within and along the western margin of the Bull Hill diatreme. Near-surface iron oxide-manganese oxide-rare earth (FMR) and oxide-carbonate (OxCa) dikes, and veins are interpreted to be intensely (FMR) and moderately to weakly (OxCa) oxidized and leached equivalents of the carbonatite dikes at depth. The Bull Hill dike swarm was discovered by Hecla Mining Company and described in an unpublished Hecla Mining Company report (Wineteer, 1991).

RER conducted additional drilling from 2004-2013 to confirm the mineralized bodies' continuity and grade. The increased drilling density shows that the southern two-thirds of the dike swarm east of the drainage (Whitelaw Creek) includes a persistent northwest-striking zone of dikes, veins, and stockwork that envelops a relatively continuous, steeply dipping main dike that locally reaches 80 feet (24 meters) in width and multiple sub-parallel dikes.

Drilling from 2010 through 2013 indicates that the zone of REE-mineralized dikes, veins, and stockwork persists well to the west of the main Bull Hill dikes. Drilling conducted during 2011 - 2013 indicates that the southeastern end of the dike swarm feathers out, terminates, and/or is offset along an easterly trending fault that is approximately coincident with the northern boundary of Section 20 (currently Mineral Withdrawal Land, *Figure 7-1*). The Bull Hill deposit remains open to the west, northwest, and north.

7.2.1 Carbonatite Plug (Deep Bull Hill West)

The presence of a deep carbonatite plug located beneath the Bull Hill West area (now part of the Bull Hill area) had been inferred from drilling and geophysical surveys that include airborne magnetics, ground IP/resistivity, and reprocessed NURE geophysical data. Molycorp Inc., drill holes BL-1, BL-8, BL-9, and BL-12, Hecla Mining Company drill holes WP-7 and WP-8, and several RER drill holes intersect significant intercepts of weakly mineralized (1-3% total REO) FMR stockwork, sulfide-bearing carbonatite, and silicocarbonatite stockworks and breccias in this area. The stockwork zones are interpreted to represent the brecciated carapace over a buried carbonatite plug.

During the 2010 drilling season, RES10-57 targeted the inferred carbonatite plug. It intersected extensive deep carbonatite dikes and brecciation with grades up to 3.8% TREO, consistent with an interpretation as the apical carapace of a large, buried carbonatite body. The deep carbonatite plug target has since been abandoned because mining of the sulfide zone is not currently part of the development plans. The overlying area was extensively drilled to target the shallower oxide and oxide-carbonate zones in 2011 and 2012, with further discovery of FMR and Ox-Ca dikes, veins, and stockwork.

7.2.2 Bull Hill Northwest

The Bull Hill Northwest deposit is located approximately 1,000 feet (300 meters) north of the main Bull Hill deposit. Hecla Mining Company discovered strongly mineralized FMR and carbonatite dike bodies in this area in drill hole WP-2. Drilling in 2010 provided evidence for a narrow, steeply dipping, northerly trending system of FMR, OxCa, and carbonatite dikes hosted predominantly by trachyte and phonolite. The RER drilling suggests that Hecla's drill hole WP-2 may have penetrated down-dip along a northerly-striking dike, resulting in a long high-grade mineralization intercept. Further drilling did not confirm the WP-2 intercept. Additional controls on mineralization in the Bull Hill NW area include widespread NE to ENE fractures and joints, and these structures may have played a role in focusing the mineralization. Several near-surface NNE trending hematitic fracture zones (possible faults) traverse this target area and may further complicate the dike orientation and distribution interpretation.

Soil geochemical and radiometric anomalies within approximately 500 feet (150 meters) NNE of this area and the current distribution of significant drill intercepts indicate that the deposit remains open to the north and provides an attractive exploration target area. Further drilling is needed to define mineralization in this area better.

7.2.3 Whitetail Ridge

The Whitetail Ridge deposit is located approximately 1,500 feet (460 meters) northwest of the Bull Hill deposit. The USBM explored a disseminated stockwork REE deposit in the Whitetail Ridge area in the early 1950's. Evaluation of the historic USBM data, along with results of detailed geological mapping and sampling, a positive ground radiometric anomaly, and REE mineralization in nearby drill holes, confirmed this area as a prospective target.

Historic drill hole WP-1, drilled within the Whitetail Ridge target area by Hecla Mining Company in 1987, intersected 430 feet (131 meters) averaging.44% TREO in a near-surface intercept from 0 to 430 feet (131 meters). Several 10-foot (3-meter) intercepts with grades ranging from 5.5 to 13.7% TREO are contained within the larger intercept. RER conducted additional detailed geological mapping and rock chip sampling in 2010 and drilled two core holes to follow up the anomaly at WP-1 (RES10-20 and RES10-21). Encouraging aspects of the drill holes include intercepts of more than 70 feet (21 meters) at 4.1% TREO (approximate true thickness of 36 feet or 11 meters) and the presence of several steeply dipping, higher-grade zones surrounded by lower grade stockwork. The deposit remains open, and further drilling is expected to expand the deposit and better define the extent and continuity of the REE mineralization.

7.2.4 Carbon Hill and Taylor

Two reverse circulation drill holes (SUN-076 and SUN-079) completed during the 2010 Sundance gold exploration program were collared south of the Carbon Hill diatreme and approximately 800 feet (250 meters) northwest of the Whitetail Ridge deposit. Significant moderate enrichment of HREE in FMR vein material hosted by trachytic and syenitic intrusive rocks was identified and suggests a new REE exploration target area that may be an extension of the Whitetail Ridge REE area. The Carbon target was tested by three (3) core holes in 2011, and by six (6) reverse circulation (RC) and two (2) core holes in 2012. Drilling results warrant further exploration drilling on the Carbon Hill target.

The Taylor target is located (approximately 2,500 feet (700 meters) west of Bull Hill. A reverse circulation drill hole (SUN-090), collared at Taylor and completed during the 2010 Sundance gold exploration program, yielded significant HREE-enriched REE mineralization in FMR dikes, veins, and stockwork in trachyte and the Deadwood Formation. In 2011, the RC hole was twinned and offset with a total of 7 core holes, confirming the presence and nature of mineralization drilled by SUN-090. The mineralized zone has an apparent East-West trend and remains open both to the east and west. These results and the significant HREE enrichment elevate the target to a high priority.

7.3 Exploration Activities

7.3.1 Exploration between 2004 and 2013

RER began the exploration of the Bear Lodge REE Project properties for REE in late 2004. Paso Rico (USA), the predecessor entity to RER, had conducted limited geological and geophysical work. Exploration was initially focused on the southwest Bull Hill area identified and explored by Hecla Mining Company from 1987 through 1991. Most of the core drill holes targeted strike and dip extensions of the carbonatite dike swarm at the Bull Hill SW target. RER's exploration activities at the Bear Lodge REE Project between 2004 and 2013 are summarized in *Table 7-2*.

Table 7-2. Bear Lodge REE Project Exploration Activities, 2004 through 2013

Year	Drilling	Other	Area	Results
2004- 2008	12 core holes 13,317 feet (4059m)		Bull Hill	Confirm dike continuity, grade from historic drilling. No drilling in 2006.
2009	20 core holes 15,388 feet (4690m)		Bull Hill, Bull Hill NW	Continued infill, step-off drilling, 200 feet (60 meters) centers, Bull Hill dike swarm; confirm Bull Hill NW
		Ground radiometric survey	Bull Hill, Bull Hill NW &W, Whitetail Ridge, Carbon Hill	Radiometric anomalies coincident with REE's and structures
		Mapping & rock chip sampling	Bull Hill drill roads	High REE associated with Fe-Mn Ox surface veins, stockwork
2010	65 core holes 42,409 feet (12,926m)		Bull Hill, Bull Hill NW, Whitetail Ridge, Bull Hill W	Continued infill, step-off drilling, 100 to 200 feet (30 to 60 meters) centers, Bull Hill deposit
	3 SUN RC		Carbon, Taylor	Selected intervals w/FMR and significant TREO
		Ground radiometric survey	Infill, expand prior Bull Hill to Carbon survey; Cole claims	NE broad anomalies cut by narrower NW zones; NS zone over Bull Hill (dike?)
		Soil survey	Infill Newmont survey, Bull Hill	NITON results comparable to lab; strong anomalies at Bull Hill, Bull Hill W
		CSAMT survey	Bull Hill and Au target areas (Carbon, Taylor)	Definition of Au and possible REE structures, dikes, and diatreme
		Mapping & rock chip sampling	Whitetail Ridge; drill roads, drill pads	High REE associated with Fe-Mn Ox surface veins, stockwork; exposed E-NE veins, Bull Hill
2011	63 core holes 48,474 feet (14,775m)		Bull Hill, Bull Hill W, Whitetail Ridge, Carbon, Taylor, Bull Hill NW	Continued infill, step-off drilling100 to 200 feet (30 to 60 meters) centers, Bull Hill deposit and target areas
		Borehole televiewer surveys	Bull Hill, Bull Hill W, Whitetail Ridge, Taylor	5 drill holes surveyed; lithologic, mineralization, and structural data; confirm NW and NE fabric
		CSAMT survey	Expansion of 2010 survey, esp. Bull Hill	Definition of structures, contacts, possible identification of diatreme and dikes
		Trenches; mapping, radiometric surveys, channel sampling	Bull Hill, Bull Hill W	Strong NE jointing fabric; also cross-cutting NW dikes, veins; exposed dikes Bull Hill W
		Mapping and rock chip sampling	Drill roads, drill pads	High REE associated with Fe-Mn Ox surface veins, stockwork; exposed E-NE, N veins, Bull Hill W, Taylor
2012	82 core holes 57,419.5 feet (14,719.4m)		Bull Hill, Bull Hill W, Whitetail Ridge	Definition and infill of Bull Hill, expansion of Bull Hill W, definition of Whitetail Ridge, PQ bulk sample core for met tests
		Geotechnical core holes	Bull Hill, Bull Hill W, Whitetail Ridge	Recommended drilling for slope stability studies
	42 SUN RC holes 24,805 feet (7,563m)		Pug site, Section 16, Whitetail Ridge, Taylor, Carbon	Core twin study and expansion at Whitetail Ridge, Section 16 condemnation, PUG site condemnation, exploration at Taylor and Carbon.
2013	14 core holes 11,698 feet (3566.5m)		Whitetail Ridge	Infill drilling for better definition

	21 core holes 10,651 feet (3,247m)		Bull Hill	Infill drilling for better definition of high- grade dike zone
	6 RC holes 2,730 feet (832.1m)		Bull Hill	Twin select PQ core holes to determine reliability of RC methodology in FMR ore zones

Drilling programs in 2004, 2005, 2007, and 2008 were limited; from 2009 through 2013, RER conducted aggressive core drilling campaigns in order to expand and upgrade the deposit at Bull Hill, as well as to test additional target areas, including Bull Hill NW, Whitetail Ridge, Bull Hill West, Carbon Hill, and Taylor. In addition, geophysical surveys, geological mapping, and sampling were carried out to identify additional targets and improve geological understanding of controls on mineralization. A summary of the drilling footage completed by RER is summarized in *Table 7-3*, and the drilling used for resource estimation is shown in *Figure 7-2*.

Table 7-3. Exploration drilling for REE performed by RER

	Date	DH Type	Number of Drill holes	Total Drilling ft	Total Drilling meters	Assayed Intervals
Exploration Drilling (not included in resource estimation)	2004	DDH Core	3	3,248.0	990.0	36
	2005		2	2,174.0	662.6	11
	2007		3	3,057.0	931.8	58
	2008		4	4,840.0	1,475.2	77
		Total Core	**12**	**13,319.0**	**4,059.6**	**182**
Exploration Drilling (included in resource estimation)	2009	DDH Core	22	16,232.5	4,947.7	1,650
	2010		63	41,021.0	12,503.2	4,384
	2011		64	49,363.5	15,046	5,139
	2012*		68	57,587.0	17,552.5	6,314
	2013		35	22,350.5	6,812.4	3,004
		Total Core	**252**	**186,712.5**	**56,910,0**	**20,491**
RC (not included in resource estimation)	2012	RC	42	24,805.0	7,560.6	2,481
	2013		6	2,730.0	832.1	442
		Total RC	**48**	**27,535.0**	**8,392.7**	**2,923**
	Total Drilling		**312**	**227,566.5**	**69,362.3**	**23,596**
Bulk Sampling/Met Testing (not included in resource estimation)	2010	DDH Core	40	3,870.0	1,179.6	
	2011		38	5,821.5	1,774.4	
	2012		14	6,853.5	2,088.9	
	Total Met Drilling		**92**	**16,545.0**	**5,042.9**	

* Includes seven unsplit geotechnical Holes

From 2010 through 2012, 92 large-diameter (PQ) core holes totaling 16,545 feet (5,042.9 m) were drilled to provide bulk sample material for metallurgical testing.

The 2009 exploration program was increased from previous years, as well as additional geological mapping and geophysical surveys in the Bull Hill and Whitetail Ridge areas. The extended 2010 through 2013 exploration and drilling programs were designed to continue expanding and upgrading existing resources and identify and explore new targets. Geological mapping and geophysical surveys were directed towards improving the understanding of the surface structural signatures and controls on mineralization within the deposits and project area.

Ground radiometric and soil surveys were conducted in 2009 and 2010, and controlled source audio-magneto-telluric (CSMAT) surveys over both rare earth and surrounding precious metal target areas in 2010 and 2011. Geological mapping, rock chip sampling, and radiometric surveys were carried out in areas with newly created exposures of sub-crop and outcrop, including drill roads and drill pads. Trenches excavated during the 2011 field season exposed sub-crops and outcrops in the Bull Hill resource area. The trenches were a focus of detailed mapping, sampling, and radiometric surveys.

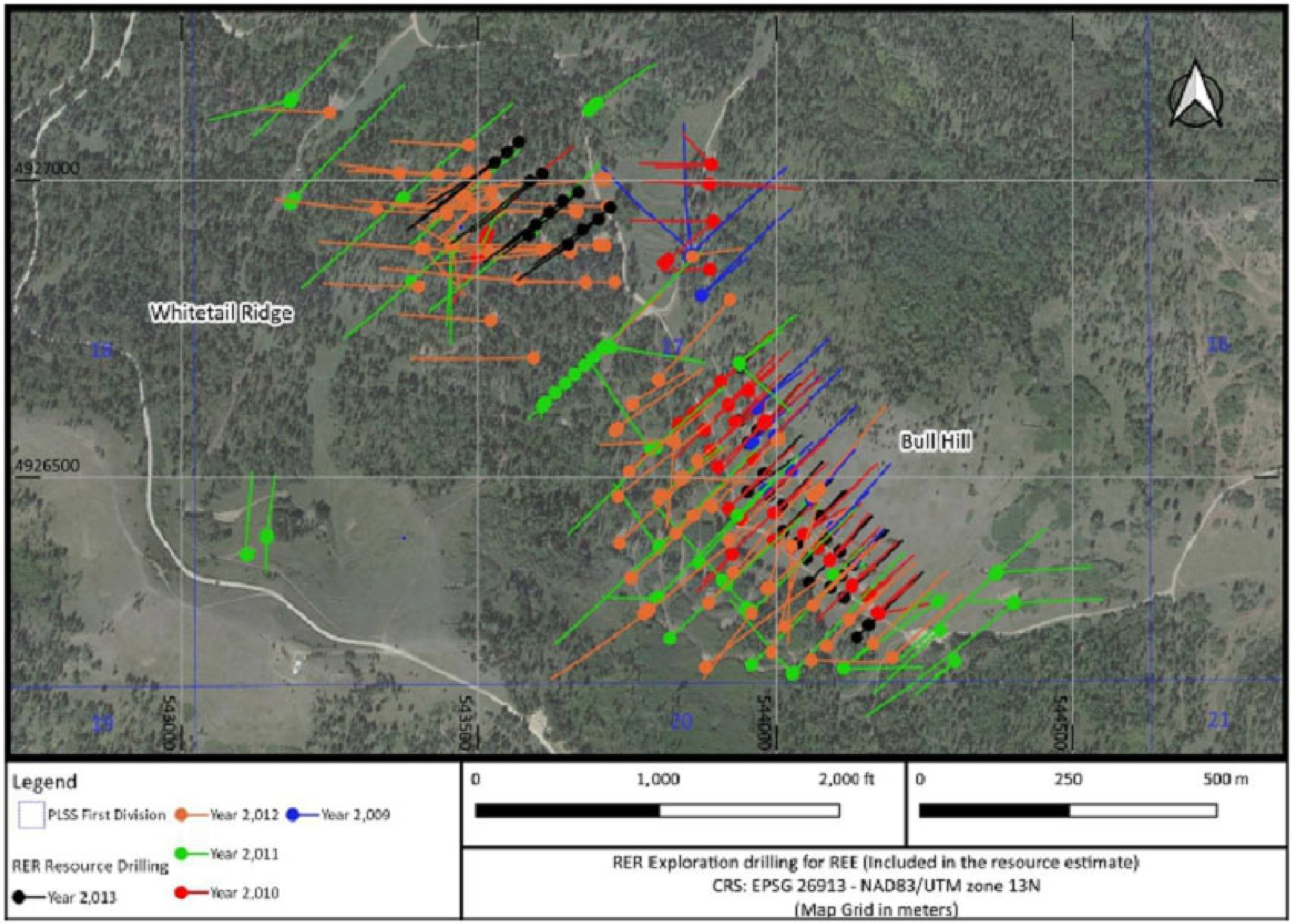


Figure 7-2. RER 2009-2013 Exploration drilling included in the mineral resource estimate (Noble & Barrero, 2024)

In 2013, fourteen HQ core holes were drilled at the Whitetail Ridge resource area for a total of 11,697.5 feet. The program's objective was to upgrade the size and resource category of the Whitetail Ridge oxide resources and further delineate the HREE (Eu, Tb, Dy, and Y) enrichment in the deposit. Borehole televiewer surveys were conducted on selected drill holes during the 2011 through 2013 drill seasons and provided additional detailed geological and structural information.

Following the Whitetail Ridge development drilling, 21 PQ core holes and six (6) reverse circulation (RC) drill holes were drilled along the high-grade dike zone at Bull Hill in order to gain a better understanding of the grade distribution in the zone and to provide additional material for ongoing pilot plant testing. The RC drill holes twinned selected PQ drill holes; however, the RC holes did not correlate well with the PQ holes, and the RC holes are not used for resource estimation purposes.

The current spacing between fences of drill holes within the main Bear Lodge REE Project area ranges from approximately 100 to 800 feet (30 to 250 m), with fences 100 feet (30 m) and 200 feet (60 m) apart in the three main project areas. Drill hole spacing along the fences ranges from 100 to 200 feet (30 to 60 m)

7.3.1.1 Drilling Methods

Core drilling operations between 2004 and 2013 were performed by several drilling contractors (AK Drilling of Butte, Montana; Godbe Drilling LLC of Montrose, Colorado; and Layne Christensen Company; Major Drilling of Salt Lake City, Utah).

The holes were generally drilled with HQ-sized core (77.8 mm inside diameter), reducing to NQ (60.3 mm inside diameter) with depth. In deep holes, the diameter was reduced from HQ to NQ and then from NQ to BQ (46.1 mm diameter). From 2009 through 2012, most holes were drilled with HQ-sized core, except for 15 holes that were reduced to NQ prior to the end of the hole. In 2013 HQ-sized core was used for the Whitetail Ridge infill drilling and PQ (101.6 mm diameter) for the Bull Hill high-grade infill drilling.

7.3.1.2 Core Recovery

The unoxidized carbonatite dikes, along with FMR and OxCa veins and dikes, the near-surface oxidized equivalents of the carbonatite dikes, were the target of most drilling completed in the Bull Hill area through 2008. From 2004 through 2008, core recovery in the friable, leached, and weathered FMR zones was generally much lower than in the more competent OxCa and sulfide-bearing carbonatite rocks, with a range from 0 to 100% and an average recovery of slightly better than 70 percent. The low recoveries are due primarily to the presence of the variably leached and fractured FMR dikes, veins, and stockwork, which tend to fracture and disaggregate easily during the drilling process. The zones may also contain void space that also reduces recoveries. The void space results from the dissolution of matrix carbonate in the original host.

After changing the mud formula, core recovery in the oxidized zone was improved significantly during the 2009 drilling program to better than 80%; core recovery in the transitional and unoxidized carbonatite zones was generally ≥ 90% to 100%. In 2010, 2011, and 2012, the efforts to improve core recoveries continued, achieving average core recoveries of FMR dikes and veins of 80% in the oxide zone and 88% in the oxide-carbonate zone. Recoveries in transitional and sulfide zones averaged 94%. Analysis of relative recoveries in the different resource areas and oxidation zones has been continual during the different campaigns.

The recovery issues with FMR in HQ core suggested using PQ core for bulk sampling of FMR and oxide-carbonate material for metallurgical testing. Friable FMR zones generally maintain integrity much better in PQ than in HQ core, owing to the larger diameter of the PQ core. The higher volume of material in the PQ-size core appears to better absorb the bit rotation torque. Consequently, less material is lost to the “plucking” of FMR veins and stockwork on the core surface. While this was the case for PQ core drilling conducted through 2012, recoveries were somewhat poorer and exhibited more variation in the 2013 Bull Hill high-grade infill program. Core recoveries in this program averaged 86.8% and ranged between 77 and 92 percent.

Core recovery is highly variable, primarily because the low strength of the FMR mineralization allows it to be easily broken and washed from the core sample. Overall, the average core recovery is 86.6% but is lower in oxidized, high-FMR zones and higher in the wall rock and fresh carbonatite zones. There is an inverse relationship between core recovery and FMR content; samples with FMR <30% generally have higher recovery than samples with FMR>30% (*Table 7-4*).

Table 7-4. Core Recovery by Oxide Type and FMR Content (Roche-Engineering, 2014)

Oxide Type	%FMR	Footage	Meters	Average Recovery (%)
Oxide	<30	99,885	30,445	85.5
Oxide	>30	13,915	4,241	77.5
Oxide	0-100	113,800	34,686	84.5
OxCa	<30	35,687	10,877	89.8
OxCa	>30	9,184	2,799	83.6
OxCa	0-100	44,871	13,677	88.5
Trans	<30	4,461	1,360	93.9
Trans	>30	640	195	94.1
Trans	0-100	5,102	1,555	93.9
Sulfide	<30	11,425	3,482	96.3
Sulfide	>30	1,734	529	95.9
Sulfide	0-100	13,158	4,011	96.2
Total	<30	151,458	46,164	87.5
Total	>30	25,472	7,764	81.4
Total	0-100	176,930	53,928	86.6

(Note: For purposes of this report, %FMR in transitional and sulfide mineralization refers to percent carbonatite).

The average core recovery for the different oxide types is generally above 80%. Transition and sulfide samples have the highest recovery, and more than 60% of non-oxidized samples have greater than 95% core recovery. The distribution of core recovery for oxide and OxCa samples is similar, but oxide samples are more heavily weighted towards recovery below 80% (*Figure 7-3*).

Local sampling bias resulting from poor recoveries in the FMR zones is likely as well-mineralized but poorly consolidated material might be washed away during the drilling process. There may also be void zones that lack mineralized material. In 2012, definitive void areas were not included in assay intervals and were tabulated as voids.

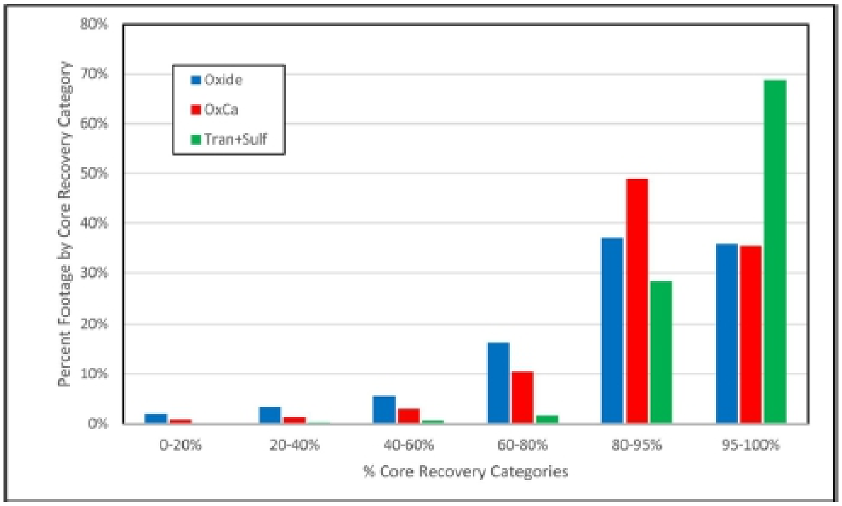


Figure 7-3. Core Recovery Distribution by Oxidation Type (Roche-Engineering, 2014)

7.3.1.3 Collar Surveys

Original collar location and down-hole survey data are available for only a few historical drill holes. However, these drill hole collar locations were re-surveyed using a hand-held GPS, and collar elevations were obtained by registering the drill holes on the USGS digital elevation model (DEM) for the appropriate quadrangle maps. Drill hole data prior to 2008 has not been used for resource estimates because the azimuths and inclinations were considered insufficiently accurate for use in resource estimates.

Drill hole collar surveys for 2008 through 2013 were surveyed by Bear Lodge Ltd., professional engineers and land surveyors based in Sundance, Wyoming. Collars were marked and surveyed after completing each hole in the WGS84 geographic coordinates and were measured and corrected on the fly while in the field. Geographic coordinate corrections are based on a correction factor transmitted from an accurately located base station set up by Bear Lodge Ltd. in the vicinity of the surveyed area. Bear Lodge Ltd. has also routinely provided the data in several coordinate systems, including NAD83 and the Wyoming State Plane System. Bear Lodge REE Project data utilized for development activities and resource estimates is reported in NAD83 UTM Zone 13N US survey feet coordinates.

7.3.1.4 Down-hole Surveys

Down-hole surveys were conducted on all core holes drilled by RER from the 2008 through 2013 drill programs. Survey point intervals were approximately every 100 feet (30.5 m), and surveys were carried out by the drillers utilizing an electronic single-shot instrument (Reflex EZ- SHOT). The instrument is sensitive to magnetic interference. After retrieval, measurements were read and recorded from a digital display on the instrument at the collar and subsequently entered into the database, where azimuth measurements were corrected to true north using appropriate magnetic declination for the drilling period, as determined by the NOAA declination calculator.

Deviations in azimuth and dip are considered acceptable and are usually lower in the PQ holes than in the HQ holes.

7.3.1.5 Density Determination Method

Oxidation of carbonatite mineralization removes substantial quantities of carbonates and sulfides, leaving behind FMR mineralization that is much lighter because of increased pore space. Thus, density highly depends on the degree of oxidation and the fraction of lighter FMR mineralization or heavier carbonatite mineralization relative to the surrounding wall rocks.

Through the 2013 drilling seasons, 337 dry density measurements were made on drill cores to determine the density of mineralization and wall rocks from all oxidation states (*Table 7-5*). Dry density was determined using a water-displacement method with vacuum sealing of the core samples in a polymer bag. This is an acceptable and more suitable method than the conventional water-displacement method, especially for difficult samples, such as vuggy/porous samples, weathered samples or samples with high clay content, friable samples, high FMR samples, and samples with poor cohesiveness.

Table 7-5. Summary of Density Measurements (Roche-Engineering, 2014)

Rock Type	Count	Min Density	Max Density	Average Density	Std. Dev. Density	Mean Std. Error of Mean	Average %H2O
Oxide FMR	66	0.918	3.069	1.814	0.434	0.054	18.9
OxCa FMR	67	0.878	2.859	2.158	0.415	0.051	11.2
Transition Carbonatite	3	2.07	2.547	2.322	0.433	0.25	7.4
Sulfide Carbonatite	17	2.116	3.7	2.909	0.437	0.106	0.8
Siliceous Carbonatite	2	2.807	2.834	2.82	0.433	0.306	0.4
Host Rock Oxide	93	1.692	2.585	2.261	0.132	0.014	3.8
Host Rock OxCa	46	1.945	2.652	2.324	0.143	0.021	3.6
Host Rock Transition	7	2.28	2.942	2.545	0.253	0.096	1.9
Host Rock Non-Oxide	36	2.348	2.845	2.588	0.096	0.016	0.7

7.3.2 2014 Test Trench

In August 2014, a trenching program was undertaken on the southwest flank of Bull Hill to provide high-grade REE ore for metallurgical research (*Figure 7-4*). A total of approximately 1200 tons of ore were extracted and stored. The trench system exposed a prominent NW-trending FMR zone with mineralized (nearly sheeted) veins and fractures trending from N10-15W to N50W, with predominant vertical and sub-vertical to moderate dips from NNE to ENE.

The main mineralized zone of the Bull Hill deposit was exposed, allowing the collection of geological information essential for evaluating dike dimensions and continuity, assessing grade variations, documenting ore and gangue mineralogy, and collecting geotechnical data. Trench exposures confirmed excellent continuity of the main dike along 300ft of strike with local bifurcations; dike widths vary from 8 to 20 feet (Ray, et al., 2014).

Each bulk sample was described during the collection process so that future batch-test results could be cross-referenced with respect to the inherent variability of the original extracted volume. Nine 120-ton bulk samples were collected on 25-foot spacing, with 2-ton representative sub-samples collected from each block. Nine 30-pound assay samples were collected from each sub-sample to estimate grade and grade continuity. These assays range from 3.65% to 14.65% TREO and average 10.1% TREO. Four cross trenches were excavated and sampled (six 12-ton bulk samples, each with a 0.5-ton sub-sample and an assay sample) to provide material to test the processing character of mid- to low-grade stockwork material and help ascertain the trend and character of the dike and adjacent stockwork zones.

Rock samples for various analytical and metallurgical tests were collected and described, and the location recorded under the supervision of the RER geological staff. The Main Met and Crosscut Met Samples are stored in sealed 55-gallon drums in a secure shed.

An additional 96 geological samples were collected for further research, including combinations of various petrographic techniques and assays (QEMSCANM, SEM, Cl, and standard thin section for mineralogical characterization). Sample preparation followed the same QAQC procedures as the drilling samples. Sample analysis was performed by Activation Laboratories.

Figure 7-4. View to the east of the Bull Hill Test Trench 2014 area showing the main cut parallel to the hill slope and four crosscut trenches along a trench length of 300 feet.

Although the test trench data has not been used for the current resource estimation, comparing the current estimation with the grade data obtained in the exposed mineralized dikes will be important for future studies. This trench material will be used for the Demonstration Plant, which is expected to be operational in the 3rd Quarter of 2024.

7.3.3 Geotechnical Drilling

Geotechnical drilling was completed as part of a field data collection program completed in 2012 by Sierra Geotechnical LLC. Seven (7) core holes totaling 4,550 feet (1387 m) were drilled to provide geotechnical information and were surveyed by a televiewer; the drill core of these holes remains unsplit and has been sub-sampled for geotechnical laboratory testing.

7.3.4 Hydrogeological Characterization

RER conducted an extensive hydrologic investigation in the past to support prior permitting related to the Bear Lodge REE Project. Groundwater monitoring wells were installed in the past, and RER continues with the data collection. However, the authors of this report have not investigated this data.

7.3.5 Qualified Persons' Statement on Exploration Drilling

Collar and downhole survey methods used by RER between 2009 and 2013 are considered to meet industry standards. Although the rock mass is not magnetic, a nonmagnetic continuous downhole surveying tool should be considered in the future.

Diamond drilling methods are considered adequate for resource estimation, although core recovery should be closely monitored during drilling in future drilling programs. Core recovery is a significant issue for resource estimation since low recovery implies preferential loss of the softer, more friable rare earth mineralization, especially in the oxide zone. RC drilling methods are not recommended in the future.

The density determination procedure on core samples was closely monitored in the past by ORE (Roche-Engineering, 2014) and is considered adequate for resource estimation.

Considering the observations in *section 7.3.1.2*, there appears to be a significant chance that TREO grade is biased low, especially for ore-grade mineralization. This bias was evaluated in previous reports (Roche-Engineering, 2014) by compiling footage-weighted average TREO grades for oxide and OxCa samples grouped by %FMR above and below 30% and by core recovery above and below 95% (*Table 7-6*).

The 30% FMR cutoff was chosen because it corresponds roughly to the threshold between stockwork-dominant mineralization (below 1.5% TREO) and vein-dominant mineralization (above 1.5% TREO).

The results of this evaluation suggest that low recovery, high-%FMR samples are biased low compared to high-recovery samples. The terminology apparent bias is used here because it cannot be shown that the bias is an actual bias rather than an artifact of some other parameter until large tonnages are mined and compared to drill-hole grades. In addition, even if the bias is real, it may be larger or smaller than shown in *Table 7-6* if the estimate of %FMR is also biased (Roche-Engineering, 2014).

Table 7-6. Apparent TREO grade bias for low and high core recovery samples (Roche-Engineering, 2014)

Grade Range	Oxidation Type	Low Recovery (0-95%)			High Recovery (>95%)			All Samples			Apparent Bias Relative to Low-Recovery Samples
		Footage	Meters	Average TREO	Footage	Meters	Average TREO	Footage	Meters	Average TREO	
<30% FMR	Oxide	64,399	19,611	0.838	37,257	11,356	0.770	101,656	30,985	0.813	9%
	OxCa	23,246	7,085	0.817	13,455	4,101	0.695	36,701	11,186	0.772	18%
	Ox+OxCa	87,646	26,715	0.833	50,712	15,457	0.750	138,358	42,172	0.802	11%
>30% FMR	Oxide	7,636	2,327	3.953	3,440	1,049	4.504	11,076	3,376	4.124	-12%
	OxCa	5,662	1,726	3.840	2,403	732	4.239	8,064	2,458	3.959	-9%
	Ox+OxCa	13,297	4,053	3.905	5,843	1,781	4.395	19,140	5,834	4.054	-11%

The Qualified Persons are unaware of any other factors that could materially affect the accuracy and reliability of the RER exploration drilling results between 2009 and 2013 and assume that the information was collected and processed using industry-standard practices.

Qualified Persons have no access to the existing geotechnical data. In the Qualified Persons' opinion, the previous design recommendations (Sierra Geotechnical LLC., 2013) are limited, although sufficient for the current level of pit optimization. Further geotechnical investigations are recommended to better characterize the rock mass parameters of the different oxide types and refine slope design parameters for future studies.

In the Qualified Persons' opinion, hydrological characterization is beyond the scope of this report. Additional hydrological investigations should be performed in future studies.

8 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 Introduction

This section has been updated from the Technical Reports of 2012 (Roche-Engineering, 2012) and 2014 (Roche-Engineering, 2014), as no further drilling has been performed at the Bear Lodge REE Project since 2013.

8.2 Sample Preparation Methods and Analytical Laboratories

8.2.1 Historic Sample Preparation and Analyses

Because of the limited amount of information available from the Molycorp, Inc., Hecla Mining Company, and Duval Corporation data, the historical drilling data are used only to assist in geologic interpretation and guide exploration; they are not used for resource estimation purposes.

8.3 Rare Element Resources (RER) Sample Preparation and Analyses

A summary of the sample preparation procedure, assay laboratory, and assay method for the different RER drilling programs is provided in *Table 8-1*. RER-trained personnel, using a hydraulic splitter, split the drill core longitudinally onsite. Half of the core was retained in the core box and stored, and the other half was bagged and shipped for sample preparation and analysis.

None of the 2004-2005 and the 2007-2008 assays are currently being used for resource estimation; the 2004-2005 and the 2007-2008 drill hole data were replaced with more reliable information from the 2009 through 2013 drill programs. In the Qualified Persons' opinion, the quality of sample preparation and analytical procedures followed by RER are considered adequate and within current industry standards.

8.4 Laboratory Certifications

ALS and Activation Laboratories are both ISO 9001 accredited and operate to standards consistent with ISO 17025 methods. Sample preparation laboratories do not require certification; however, RER conducted quality checks on the preparation laboratory by submitting preparation duplicates to the analytical laboratories and evaluating the resultant data.

Table 8-1. Summary of the sample preparation procedures and assay methods (RER drilling programs)

	Sample Preparation Laboratory	Sample Preparation Procedure	Assay Laboratory	Assay Method	Assayed Elements
2004-2005	ALS Chemex (Canada)	crushed to 70% passing -10 mesh (-2 millimeters). 250-gram split pulverized into a pulp of 85% passing -200 mesh (-75 microns)	ALS Chemex		REE, Au, Fe, Mn, U, Th, and Y.
2007-2008	Actlabs (Canada)	crushed to 70% -10 mesh (-2 millimeters). 250-gram split pulverized into a pulp 85% passing -200 mesh (-75 microns)	Actlabs	REE and multi-element geochemical with lithium metaborate fusion with ICP/MS finish (ActLabs code 4B2-STD). Au by 30-gram fire assay with a neutron activation finish (ActLabs code 1A1)	REE (La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, and Y), Au, V, Cr, Co, Ni, Cu, Zn, Ga, Ge, As, Rb, Sr, Zr, Nb, Mo, Ag, In,Sn, Sb, Cs, Ba, Hf, Ta, W, Tl, Pb, Bi, Th, and U
2009	Minerals Exploration & Environmental Geochemistry (MEG), (Reno, Nevada)	roll crusher followed by jaw crushing to 85% -10 mesh (-2 millimeters), 250-gram split pulverized into a pulp of 85% -200 mesh (-75 microns).	ActLabs	REE and multi-element geochemical with lithium metaborate fusion with ICP/MS finish (ActLabs code 4B2-QUANT). Au by 30-gram fire assay with AA finish (ActLabs code 1A2). Over-limit REE assays - 4B2-STD-QUANT	REE (La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, and Y), Au, V, Cr, Co, Ni, Cu, Zn, Ga, Ge, As, Rb, Sr, Zr, Nb, Mo, Ag, In, Sn, Sb, Cs, Ba, Hf, Ta, W, Tl, Pb, Bi, Th, and U
2010			ALS	REE and multi-element geochemical with lithium metaborate fusion with an ICP/MS finish (ALS code ME-MS81h). Au by 30-gram fire assay with an ICP/AES finish (ALS code Au-ICP21). Over-limit REE using a lithium metaborate fusion with ICP/AES finish (ALS Code ME-OGREE).	REE (La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, and Y), Sn, Ta, Tb, Th, U, W, Zr, and Au
2011			ALS		
2012			ActLabs	REE and multi-element geochemical with lithium metaborate fusion with ICP/MS finish (ActLabs code 8-REE). Au by 30-gram fire assay with AA finish (ActLabs code 1A2). Over-limit REE assays part of the (8-REE package)	REE (La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, and Y), Au, Ag, As, Ba, Be, Bi, Co, Cr, Cs, Cu, Ga, Ge, Hf, In, Mo, Nb, Ni, Pb, Rb, Sb, Sc, Sn, Sr, Ta, Th, Tl, U, V, W, Zn, Zr and major oxides (SiO_2, Al_2O_3, Fe_2O_3(T), MnO, MgO, CaO, Na_2O, K_2O, TiO_2, P_2O_5, and LOI)
2013			ActLabs		

8.1 Quality Control & Quality Assurance

8.1.1 RER´s Internal Standards

Eleven (11) internal standards were developed for the QAQC of the RER drilling programs between 2009 and 2013. All the materials were collected from REE mineralization on the Bear Lodge property. Material for Standard series RE09001X through RE09006X was collected from Bear Lodge REE Project drill rejects of oxide, transitional, and sulfide mineralization types. The RE09007X and RE10001X – RE10004X series standards were collected as bulk samples from mineralized outcrop exposed by roads being developed for new drill sites on the property.

MEG performed the sample preparation for the Round-Robin certification. Participating laboratories certificated to ISO 9003 Standards were ALS Chemex (Vancouver, Canada), Activation Laboratories (Mississauga, Ontario), SGS (Toronto, Canada), ACME Labs (Vancouver, Canada), and Genanalysis and UltraTrace (Perth, Australia). Participating laboratories not certificated to ISO 9003 Standards were Mountain States R&D International (Vail, Arizona), Memorial University of Newfoundland, and Hazen Labs (Golden, Colorado).

The analytical methods used for the certification were 4-acid digestion or a lithium metaborate fusion on 0 followed by an ICP finish for Y, Ce, La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu. Fusion digestions show improved accuracy and precision for REE analyses over analytical methods using 4-acids. Thus, the 4-acid data was not used for certification of the standards. Standards RE09007X and RE01001X-RE1004X were certified using lithium metaborate fusions with ICP-OES finish. The means and standard deviations were calculated for all the analytical data for each standard material and used to determine the certified values.

8.1.2 2009-2013 Assay Quality Control & Quality Assurance

RER. enacted a quality control program in 2007, concurrently with the change of analytical laboratories from ALS Chemex to Activation Laboratories.

The 2007-2008 Quality Assurance Protocol included:

- Blank samples to monitor contamination.
- Assays of internal standards provided by ActLabs.
- Assays of analytical duplicate samples.

The 2009-2013 Quality Assurance Protocol included:

- Individual drill holes are submitted as separate jobs.
- A minimum of two (2) duplicates, two (2) lower-grade standards, two (2) higher-grade standards, and two (2) blanks are included with each drill hole submitted for analysis.
- Sample numbers were used rather than drill hole numbers and footage to identify each sample. MEG prepared the core samples and inserted the quality control samples into the sample stream, which were then blinded to the analytical laboratories.
- MEG prepared crush (preparation) and pulp (analytical) duplicates from the materials submitted for preparation.
- 10% insertion rate of quality control samples, meaning eight control samples in an analytical batch size of eighty (80) samples (one (1) duplicate, one (1) high-grade standard, one (1) low-grade standard, and one (1) blank every forty (40) samples).

In 2014, at the request of RER, Dr. Jeffrey Jaacks of Geochemical Applications International Inc. (GAII) conducted a review of the results for the quality assurance and quality control (QA/QC) program used in rare earth element assaying for the Bear Lodge REE Project exploration drill programs conducted during 2009 and 2012-2013 at Activation Laboratories and drill programs conducted during 2010-2011 at ALS Laboratories. Quality control data reviewed include 2009 standards, blanks, preparation (crush), analytical (pulp) duplicate results, and the 2010-2013 check analysis program results. The results of the QAQC review are presented in the following sections.

8.1.2.1 Blanks

During the 2009-2011 drill programs, the blanks were prepared by MEG from the same volcanic matrix material in a series of batches. RER used a quartz sand sample blank for the 2012 and 2013 drilling campaigns. Both blank matrixes contained very low concentrations of the LREE. However, the LREE concentrations exceeded the background analytical threshold of 15 times the detection limit. HREE analyses (Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu) indicated detectable concentrations of these elements, but all were less than 15 times the lower detection limits.

The assay results indicate no carry-over contamination for the LREE elements and that the concentrations of LREE were due to natural background rather than contamination in the blanks. Analytical reproducibility of the LREE in these materials indicates that the blanks are excellent low-grade standards for the LREE. It is recommended not to continue using these blank materials as quality control material to monitor contamination in future drilling programs.

8.1.2.2 RER Internal Standards Results

When the number of quality control analyses for the laboratory of choice far exceeds the original number of analyses in the standard certificate, it is acceptable practice to use statistics for the standards, which are calculated based on the current analytical method at the laboratory(ies) used in the drill program to evaluate QA/QC results. These statistics ("historical mean and standard deviation") were used to evaluate the standard assay results and are within 2-5% of the original values established by the qualifying Round-Robin studies.

The historical statistics derived from analyses for the combined 2009-2013 drill programs, along with the number of assays used to generate these statistics, are shown in *Table 8-2*. The "% TREO" is each standard total percent average of rare earth oxide content.

The percent RSD or Relative Standard Deviation, the standard deviation divided by the mean, measures the standard's performance. A well-behaved standard has an RSD value of less than 5%. Materials with RSDs of less than 15% are acceptable for use as certified reference materials. Materials with RSDs of greater than 15% are generally not used or certified as reference materials. The percent RSD values for the assayed internal standards are shown in *Table 8-3*, where the elements with RSDs of greater than 15% have been highlighted.

The internal standards were initially certified for Y, La, Ce, Pr, Nd, and Sm analyses. The results in *Table 8-3* show that the standard history analyses have acceptable accuracy and precision for analyses of Y, La, Ce, Pr, Nd, Sm, Eu, and Gd but are not as effective for the heavier rare earth elements (Tb, Dy, Ho, Er, Tm, Yb, and Lu), because of the difficulty that both Actlabs and ALS have in producing consistently reliable analyses for samples with low concentrations of heavy rare earth element from year to year as the instrumental calibrations change. This fact should not significantly impact resource calculations, as the total heavy rare earth element oxide percentage of the combined heavy (Gd through Lu) oxides amounts to less than 1-2% of the samples' total rare earth oxide content. The RSD values for the %TREO shown in *Table 8-2* are acceptable, with values of less than 4.5.

The RSDs for %TREO for each individual laboratory are elevated by the year-to-year calibration changes, which impact the analytical results but should have no significant impact on resource calculations owing to the low concentrations of these elements.

Table 8-2. Standard Statistics Generated from 2009-2013 Drill Standard Analyses (Roche-Engineering, 2014)

Standard	**RE09001X**	**RE09003X**	**RE09004X**	**RE09006X**	**RE09007X**	**RE10001X**	**RE10003X**
Count	141	258	77	64	120	11	339
Element	**Mean ± 2SD**	**Mean ± 2SD**	**Mean ± 2SD**	**Mean ± 2SD**	**Mean ± 2SD**	**Mean ± 2SD**	**Mean ± 2SD**
TREO (%)	1.65 ± 0.13	1.69 ± 0.15	4.18 ± 0.24	4.11 ± 0.30	1.80 ± 0.08	0.88 ± 0.05	3.35 ± 0.54
Y (ppm)	154 ± 17	104 ± 12	160 ± 21	117 ± 13	234 ± 13	110 ± 9	447 ± 41
La (ppm)	3505 ± 346	3854 ± 399	10672 ± 765	10643 ± 740	4208 ± 206	1851 ± 86	8552 ± 728
Ce (ppm)	5997 ± 532	6444 ± 677	16008 ± 1070	16211 ± 1601	6319 ± 354	3132 ± 208	12934 ±1063
Pr (ppm)	711 ± 70	720 ± 73	1631 ± 125	1672 ± 136	694 ± 38	349 ± 17	1349 ± 119
Nd (ppm)	2705 ± 242	2581 ± 253	5706 ± 380	5328 ± 405	2581 ± 121	1385 ± 84	4893 ± 413
Sm (ppm)	526 ± 51	416 ± 43	837 ± 60	629 ± 42	576 ± 31	327 ± 23	1066 ± 100
Eu (ppm)	123 ± 13	86 ± 8	163 ± 11	114 ± 8	154 ± 8	80 ± 6	292 ± 22
Gd (ppm)	292 ± 64	195 ± 57	373 ± 69	299 ± 213	401 ± 41	183 ± 8	768 ± 126
Tb (ppm)	22.1 ± 4.2	13.7 ± 3.8	22.1 ± 3	17.8 ± 13.7	37.4 ± 4.2	15.8 ± 1.3	73.9 ± 9.5
Dy (ppm)	62.3 ± 9.1	38.6 ± 6.5	59.6 ± 10	40.2 ± 6.9	105 ± 9.3	43.2 ± 3.6	216.8 ± 26.8
Ho (ppm)	6.5 ± 1.7	4.1 ± 1.3	5.8 ± 2.5	4.1 ± 1.7	9.7 ± 0.9	4.2 ± 0.6	20.5 ± 3.9
Er (ppm)	11.7 ± 6.5	8 ± 5.3	10.1 ± 4.1	12.5 ± 19	14.3 ± 3.1	7 ± 1.5	29.5 ± 10.4
Tm (ppm)	1.2 ± 0.3	0.9 ± 0.2	1.2 ± 0.4	0.9 ± 0.2	1.4 ± 0.3	0.8 ± 0.1	2.6 ± 0.5
Yb (ppm)	7.7 ± 2	6 ± 1.3	8.1 ± 1.3	6.5 ± 2.1	7.8 ± 1.5	4.7 ± 0.6	14.8 ± 5.1
Lu (ppm)	1 ± 0.2	0.8 ± 0.1	1.2 ± 0.1	0.9 ± 0.2	1 ± 0.2	0.6 ± 0.1	1.9 ± 0.6

Table 8-3. Standard RSDs Generated from 2009-2013 Drill Standard Analyses (Roche-Engineering, 2014)

Standard	**RE09001X**	**RE09003X**	**RE09004X**	**RE09006X**	**RE09007X**	**RE10001X**	**RE10003X**
Count	141	258	77	64	120	11	339
Element	**% RSD**	**% RSD**	**% RSD**	**% RSD**	**% RSD**	**% RSD**	**% RSD**
TREO	3.8	4.5	2.9	3.6	2.2	2.7	3.6
Y	4.5	4.9	3.3	3.8	2.8	4	4.5
La	4.9	5.2	3.6	3.5	2.4	2.3	4.3
Ce	5.3	4.7	3.5	3.7	2.8	3.3	4.1
Pr	4.9	5.1	3.6	3.4	2.7	2.4	4.4
Nd	4.9	5	3.8	4.1	2.3	3	4.2
Sm	5.7	5.9	6.5	5.6	2.7	3.5	4.7
Eu	4.4	5.3	3.3	4.9	2.5	3.7	3.8
Gd	7.3	8.4	8.3	8.6	5.1	2.3	8.2
Tb	13.5	15.9	21.4	20.2	5.6	4.1	6.4
Dy	10.9	14.7	9.3	35.6	4.4	4.1	6.2
Ho	9.6	14.1	6.7	38.4	4.9	7.2	9.4
Er	13.4	10.9	7.8	15.7	10.8	10.4	17.7
Tm	27.9	33.2	20.4	76	11.2	7.6	9.6
Yb	9.7	8.1	5.7	8.2	9.9	6.1	17.2
Lu	10.9	10.8	14.8	12.9	11.1	9.6	16.6

The statistics of the quality control results for the standards are given in *Table 8-4*. As mentioned previously, the historical statistics compare favorably with the original Round-Robin statistics generated for the RER internal standards. The bias between the two sets of means is within 8.5 percent, with one exception. Analyses of the RE10001X standard are biased 27.7 percent higher than the original Round-Robin analyses.

The RSDs are all less than 5 when including analyses at both ALS and Actlabs. There are less than 17 samples, for any given standard, exceeding the warning control limit of the mean ± 2 standard deviations (or well below the 5% failure limit). A limited number of samples (less than 1%) exceed the mean ± 3 standard deviations. The accuracy of the internal standards analyses is considered acceptable for resource estimation.

Table 8-4. 2009-2013 Drill Standard Assay Results (Roche-Engineering, 2014).

TREO (%)	Certificate Mean	Historical Mean ± 2SD	Count	% Bias	% RSD	#>10%	# >2SD	# >3SD
RE09001X	1.49	1.65 ± 0.13	141	10.7	3.8	2	6	1
RE09003X	1.69	1.69 ± 0.15	258	0	4.5	6	3	2
RE09004X	4	4.18 ± 0.24	77	4.5	2.9	1	4	1
RE09006X	4.2	4.11 ± 0.3	64	-2.1	3.6	1	2	0
RE09007X	1.41	1.80 ± 0.08	120	27.7	2.2	0	6	0
RE10001X	0.88	0.88 ± 0.05	11	0	2.7	0	0	0
RE10003X	3.24	3.35 ± 0.54	339	3.4	3.6	6	17	5

The RE09003X and RE09006X standards were used for the 2009 analytical program at Actlabs. The RE09001X, RE09003X, RE09004X, RE09006X, RE09007X, and RE10003X standards were used for the 2010-2011 analytical program at ALS and the 2012 analytical program at Actlabs. The RE09003X, RE09007X, RE10001X, and RE10003X standards were used for the 2013 analytical program at Actlabs.

The results of the standard analyses for %TREO for the 2009-2013 drill programs are displayed graphically in *Figure 8-1* through

Figure 8-7. Sequence numbers are presented on the X-axis and concentration on the Y-axis. The historical mean is indicated by the solid red line, and the ± 2 standard deviation (SD) control limits are depicted by the dashed blue lines, located above and below the red historical mean line. The dashed red lines depict the ± 3 standard deviation control limits, and the ± 10% (of the mean) control limits are depicted by the dashed green lines.

Visual examination of the quality control plots for %TREO reveals that the standard analyses exceeding ± 2 standard deviations exceed these control limits, but very rarely exceed ± 3 standard deviations. None of the failures cluster, and the failures do not occur systematically within any given analytical certificate for the rare earth elements.

For Standards RE09003X (*Figure 8-2*) and RE09006X (*Figure 8-4*), the Actlabs assays display a better precision than the ALS analyses, but the analyses from both laboratories show comparable accuracy. There is less than a 2 percent bias in comparable analyses between the two laboratories.

The standards statistics and control plots indicate that rare earth element analyses from Actlabs and ALS for the 2009-2013 drill programs are of acceptable accuracy for resource analyses.

Figure 8-1. RE09001X Standard Analyses for % TREO (Roche-Engineering, 2014)

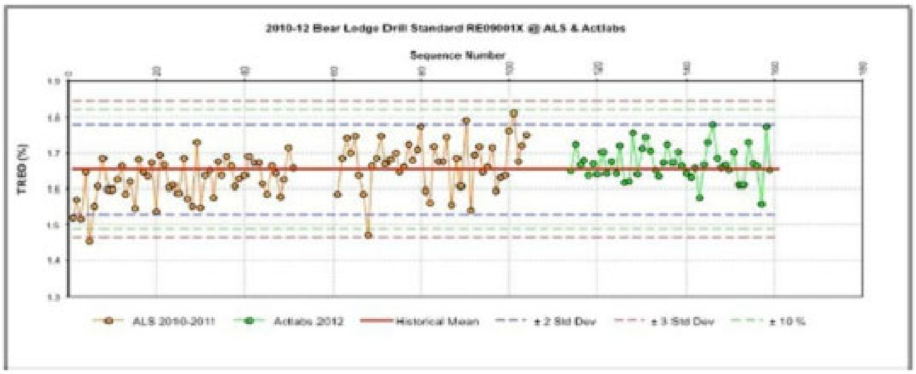


Figure 8-2. RE09003X Standard Analyses for % TREO (Roche-Engineering, 2014)

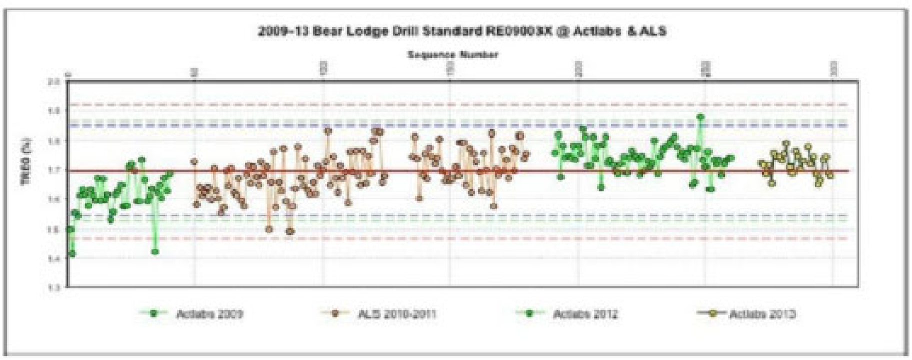


Figure 8-3. RE09004X Standard Analyses for % TREO (Roche-Engineering, 2014)

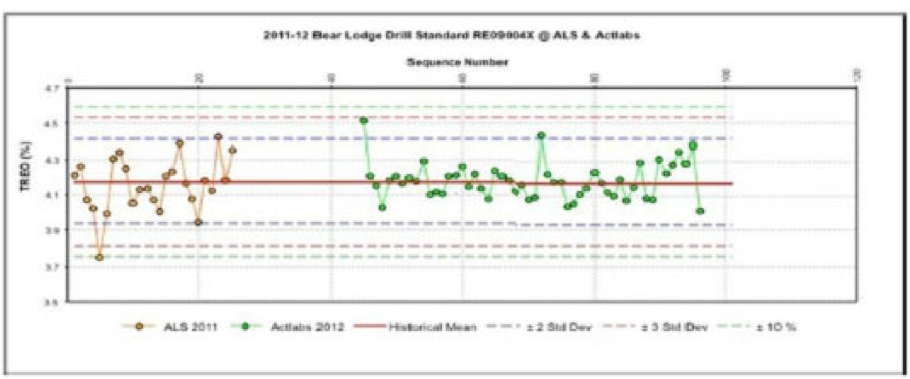


Figure 8-4. RE09006X Standard Analyses for % TREO (Roche-Engineering, 2014)

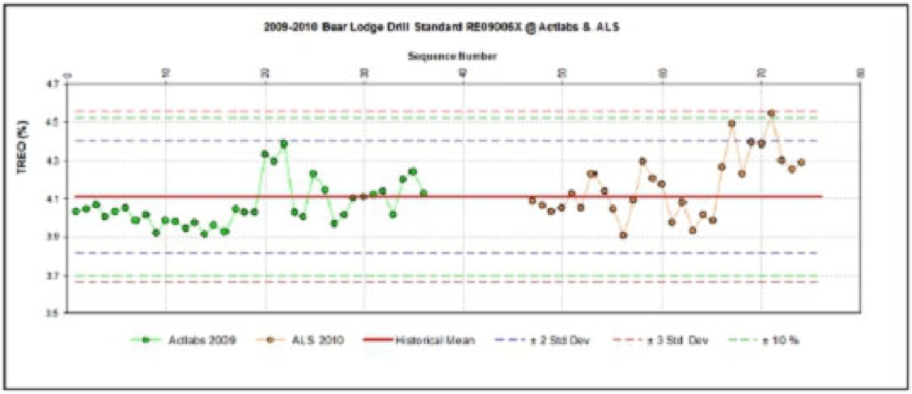


Figure 8-5. RE09007X Standard Analyses for % TREO (Roche-Engineering, 2014)

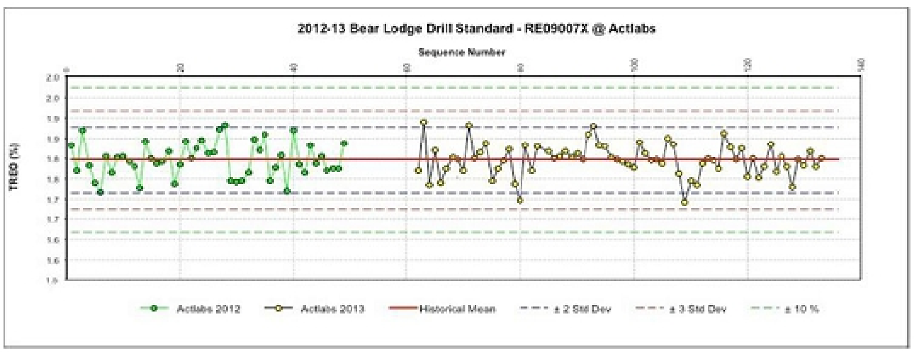


Figure 8-6. RE01001X Standard Analyses for % TREO (Roche-Engineering, 2014)

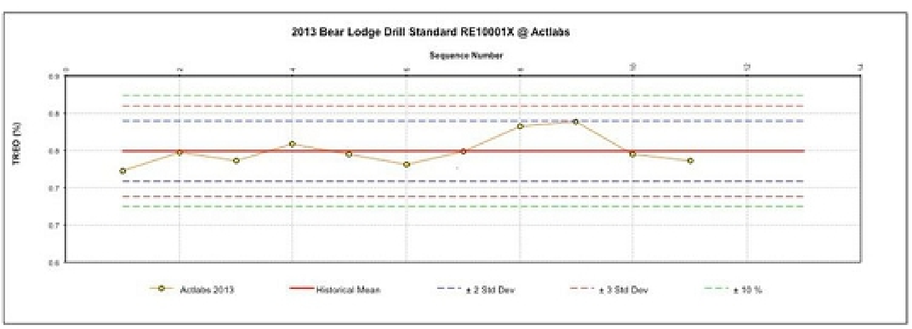
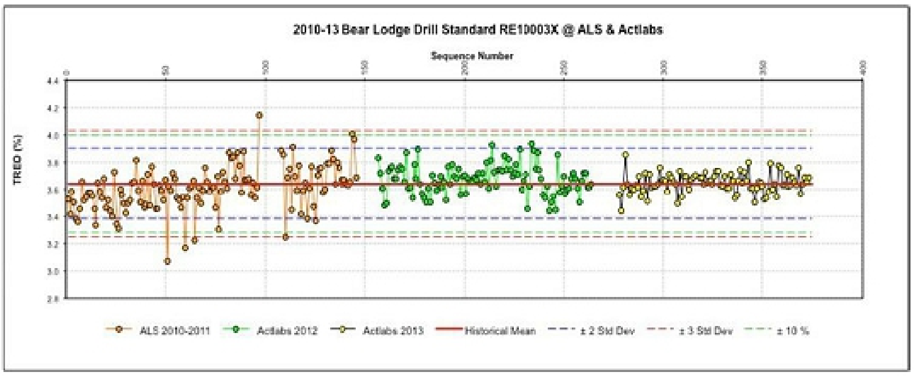


Figure 8-7. RE01003X Standard Analyses for % TREO (Roche-Engineering, 2014)



8.1.2.3 2009-2013 Duplicates

Five hundred and five (505) crush-duplicates (preparation duplicates) were prepared from selected drill intervals to evaluate preparation reproducibility at Minerals Exploration Geochemistry Laboratory (MEG). The %TREO statistics for the crush duplicates are tabulated in *Table 8-5*. The crush duplicates show acceptable preparation precision. The correlation between the original and duplicate results is high, and the bias is low. More than 95% of the crush-duplicate assays are within ± 20% of the original assays. The crush duplicates display acceptable preparation precision for resource estimation.

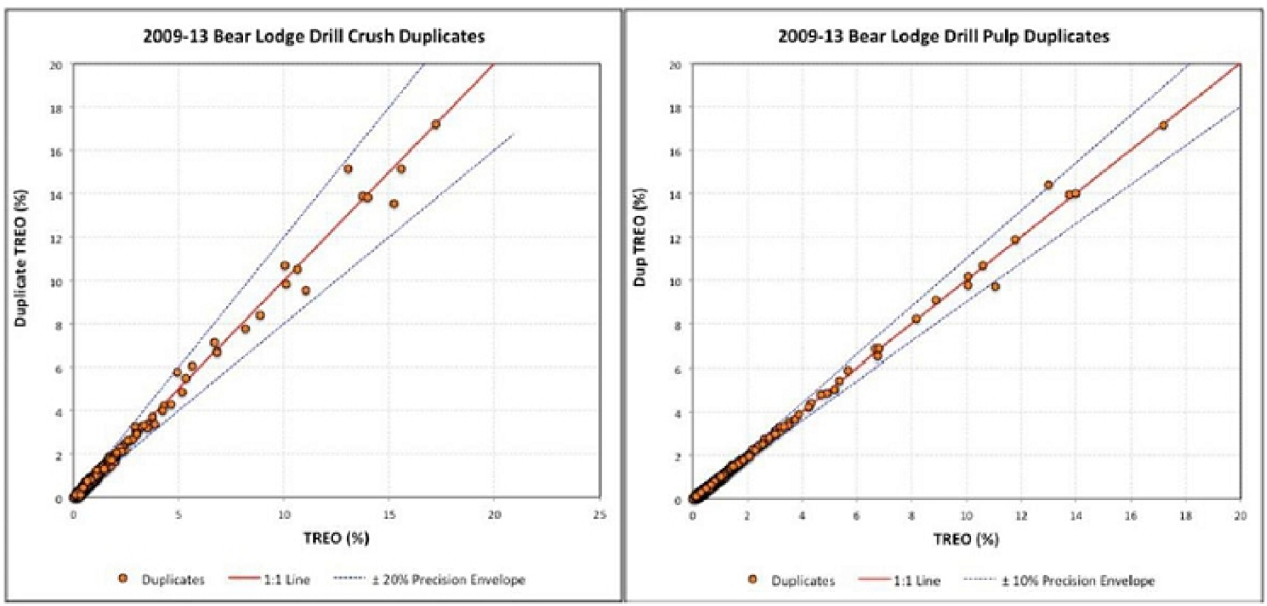
Four hundred and seventy-six (476) pulp duplicates (analytical duplicates) were prepared from selected drill intervals to evaluate analytical reproducibility at Actlabs and ALS laboratories. The %TREO statistics for the crush duplicates are tabulated in *Table 8-5*. The pulp duplicates show acceptable analytical precision for the %TREO assays. The correlation between the pulp duplicates and the original assays is high. Over 97% of the pulp duplicate analyses are within ± 10% of the original analyses. The pulp duplicates display acceptable analytical precision for resource estimation.

Figure 8-8 shows the quality control plots for the duplicates. A precision envelope of ± 20% is shown in blue dashed lines centered about the solid red 1:1 line (indicating 100 % correlation) for the crush duplicates. A precision envelope of ± 10% is shown in the analytical duplicates. Ninety-five percent (95%) of the crush duplicate analyses are within ± 20 percent of one another for the %TREO analyses. Ninety-seven percent (97%) of the pulp duplicate analyses are within ± 10 percent of one another for the %TREO analyses.

Table 8-5. 2009-2013 Crush and duplicate statistics (Roche-Engineering, 2014)

	TREO %			
Statistics	**Original Crush**	**Duplicate Crush**	**Original Pulp**	**Duplicate Pulp**
Count	505	505	476	476
Minimum	0.013	0.009	0.012	0.012
Maximum	22.83	24.486	22.813	24.063
Mean	1.246	1.234	1.32	1.32
Std Deviation	2.113	2.168	2.228	2.261
Precision	9.3		6.5	
% Bias	1.0		0.0	
Correlation	1.0		1.0	
% of samples within 10% of one another	79		97	
% of samples within 20% of one another	95		99	

Figure 8-8. 2009-2013 Crush and duplicate control plots (Roche-Engineering, 2014)



8.1.2.4 2010-2013 Check Analysis Programs

Four check analysis programs were conducted with samples from the annual drill programs. The check samples were randomly selected from the population of samples with %TREO grades exceeding 1.0% for each year. The 2010 and 2011 sets of check samples were sent to Actlabs for analysis. The 2012 and 2013 check analysis samples were sent to ALS for analysis, as both labs use a comparable analytical method to analyze the REE elements. Standards, blanks, and pulp duplicates were also inserted to monitor analytical accuracy and precision. These quality control samples indicated acceptable accuracy and precision within each check program. The results of the check analysis programs are presented in *Table 8-6*.

Five hundred and eighteen check samples were analyzed from 2010 to 2013 at ActLabs and ALS. All check analyses show strong correlation and acceptable precision for %TREO. Precision varied from 5.2 to 11.8%. The bias between laboratories varied from -0.5% in 2013 to 9.0% in 2010. However, the overall bias averages around 2.6% between the two laboratories, which is within acceptable limits. From 2010 to 2013 inclusive, more than 89% of check analyses are within ± 10% of the original analyses (the N<10% column), and more than 96% of the check analyses are within ± 20% (the N<20% column) of one another.

Table 8-6. 2010-2013 Check Analysis Program Results (Roche-Engineering, 2014)

1° Lab	Check Lab	Year	Number of Samples	Min %TREO	Max %TREO	Actlabs Bias (%)	Precision (%)	N < 10% (%)	N< 20% (%)
ALS	Actlabs	2010	75	0.99	11.3	5.8	7.6	92	97
ALS	Actlabs	2011	163	0.93	24	1.6	5.2	96	99
Actlabs	ALS	2012	114	0.91	5.08	9	11.8	72	96
Actlabs	ALS	2013	166	0.99	24.22	-0.5	8.8	92	94
		2010-2013	518	0.91	24.2	2.6	8.7	89	96

Figure 8-9 shows the quality control plot for the combined 2010-2013 check analysis programs for %TREO. A precision envelope of ± 10% is shown in blue dashed lines centered about the solid red 1:1 line for the check analyses. 2010 check analyses are shown with orange dots, 2011 check analyses with yellow dots, 2012 check analyses with green dots, and 2013 check analyses with red dots. Correlation within any given year is excellent. It can be observed that the 2010 and 2012 groupings are more biased (closer to the 10% control limit) than the 2011 or 2013 check analyses, which lie closer to the 1:1 red line.

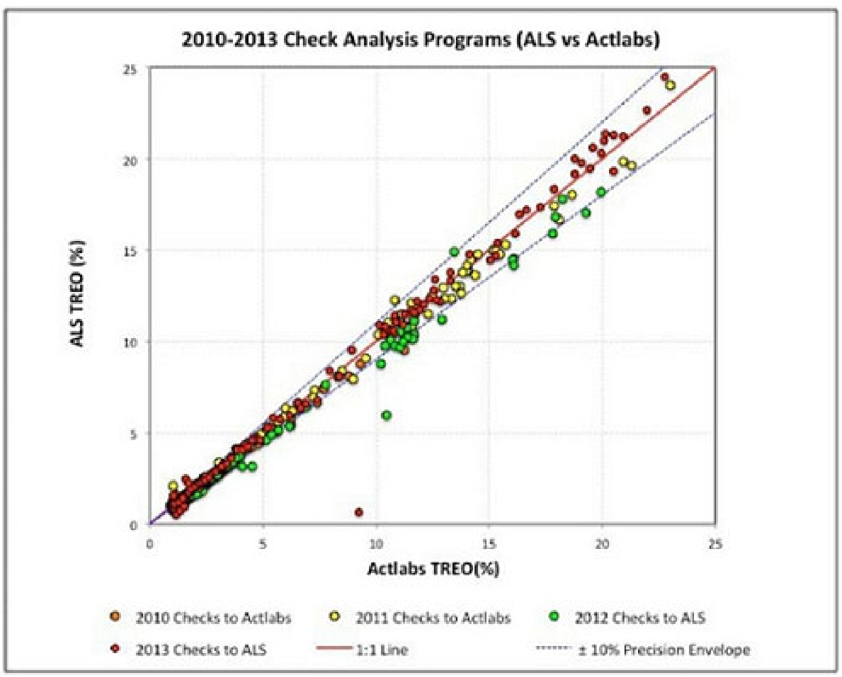


Figure 8-9. Control plot for the 2010-2013 check assay program (Roche-Engineering, 2014)

8.1.3 2009-2013 QA/QC Conclusions

- The blanks used in the 2009-2013 drill programs contained low concentrations of the light rare earth elements. It is recommended not to continue using these blank materials as quality control material to monitor contamination in future drilling programs.

- The quality control internal standards display acceptable accuracy for %TREO and the light rare earth elements (Y, La, Ce, Pr, Nd, Sm, Eu) analyses of 2009-13 drill samples. The %TREO results show that less than 3% of the standard assays exceed the mean ± 2 standard deviation control limits, and less than 0.1% exceed the mean ± 3 standard deviation failure limits.

- Crush duplicates indicate acceptable precision or reproducibility for sample preparation at MEG. Ninety-five percent (95%) of the crush duplicate analyses are within ± 20% of the original analyses. The crush duplicates display acceptable preparation precision for resource estimation.

- Pulp duplicates indicate acceptable precision or reproducibility for analyses at ALS and Actlabs. Ninety-seven percent (97%) of the pulp duplicate analyses are within ± 10% of the original analyses. The pulp duplicates display acceptable analytical precision for resource estimation.

- The 2010-2013 check analyses programs validate earlier analyses by the primary laboratory. Precision and bias are within acceptable limits. More than eighty-nine percent (89%) of check analyses are within ± 10% of the original analyses.

- The analytical accuracy of the analyses for the heavier rare earth elements (Tb, Ho, Er, Tm, Yb, and Lu) is more variable because of the laboratories' difficulty in producing consistently reliable analyses for samples with low concentrations of heavy rare earth elements. Year-to-year changes in instrumental calibrations affect the accuracy of these analyses, but this should not significantly impact resource calculations, as the total heavy rare earth element oxide percentage of the combined heavy (Tb through Lu) oxides amounts to less than 1% of the total rare earth oxide content of the samples.

- Actlabs and ALS use similar digestion methods and analytical finishes to analyze for rare earth elements. Data from the Round Robin procedure and the historical quality control data indicate that the analyses from both of these laboratories have acceptable accuracy and precision and are directly comparable (within 2.6% of one another) for the rare earth elements.

- In the Qualified Persons' opinion, the 2009-2013 drill program analyses/assays are of acceptable quality and are considered appropriate for resource estimation.

8.2 Sample Security

During the different drilling programs completed at the Bear Lodge REE Project, sample security was supervised by:

- 2004, 2005, and 2007: Dr. James Clark, a consultant to RER at that time.
- 2008-2009: RER senior geologists reporting to J. Clark.
- 2010-2011: Dr. Ellen Leavitt, CPG, consulting geologist.
- 2012-2013: John Ray, RER Chief Geologist and Richard Larsen.

All drill core was transported from the project site to a locked and secure storage facility each evening to the secure storage facilities at Sundance, Wyoming. No core was left unsupervised on site. The core was logged at the storage facilities, and successive intervals were split for analysis at these locations. Split core samples from each drill hole were shrink-wrapped and/or placed in rice bags on wooden pallets and then shipped by truck using NPT Transport and UPS to MEG. The shipper was responsible for delivery to MEG, and RER's personnel monitored the shipment's progress via tracking number. MEG was responsible for shipment and tracking from the sample preparation facility to the laboratory.

In 2009, RER leased the core facility in Vista West and transferred all of its 2004 – 2008 cores from storage units at Energy Electric in Sundance to this facility. In 2010, the Company acquired a secure storage warehouse at 2111 East Cleveland Street in Sundance and moved the drill core and splitting and logging operations to that location. In April 2012, the Company began leasing the old Energy Electric office and warehouse building at 2409 East Cleveland Avenue in Sundance, WY, moving most of the drill core, plus the splitting and logging operations, to that facility and conducting core storage, splitting, and logging operations there from 2012 to now.

In order to address data security and growth issues and merge RER and Newmont district-wide databases, project data was migrated into a unified database developed and maintained by EDM Solutions since 2011. The web-based system links to modeling programs, including Studio and Leapfrog. Since then, GIS spatial data has been generated directly from the database with automated updates.

Core storage facilities were inspected by the authors of this report during a site visit performed in November 2023 (*Figure 8-10*) and remain locked and secured. In the authors' collective opinion, the sample security measures followed by RER are all of excellent quality and in accordance with the industry's standards.

Figure 8-10. RER logging facility and storage warehouse at Sundance, Wyoming (Noble & Barrero, 2023)

8.3 Qualified Persons' Statement on Sample Preparation, Analyses, and Security

In the Qualified Persons' opinion, drilling procedures, drill core handling and storage, drilling data storage, and security procedures employed by RER during the 2009 to 2013 drilling campaigns are considered to have been performed to industry standards. Drilling database, sample handling procedures, and storage facilities are considered adequate and ensure sample integrity and security.

9 DATA VERIFICATION

9.1 Drill hole data

9.1.1 Drilling Database

RER obtained the geological, exploration, and drilling data package from Phelps Dodge and Newmont Corporation, covering most of the work done on the property by various companies and claim owners through 1996. The exploration reports by Duval Corporation, Molycorp Inc., FMC, Hecla Mining Company, and others referenced in this, and earlier technical reports exhibit relative consistency of reported rare earth values contained in carbonatites and FMR-type veins.

Even though the authors of this report did not review the historical data, they assume that the data and assay values are representative of the geology and mineralization in the REE-mineralized carbonatite system. Based on operating results and historical descriptions, there is strong evidence that the sampling, sample preparation, assaying, and security of samples were conducted according to industry-acceptable practices for the time in which the samples were collected and processed. Owing to the limited amount of information available from these historical programs, those data were used only to assist in geological interpretation and to guide exploration but were/are not employed in the resource estimate of the deposit.

From 2006 until spring 2010, RER conducted its own REE drilling programs throughout the joint venture with Newmont, maintaining a separate database of REE drilling results. While RER continued focusing on exploration for REEs, Newmont's efforts continued in gold exploration. Separation of the two exploration drilling programs for REEs and gold, and their respective drilling data continued through the 2009 drill season. RER assumed control of the gold exploration program and management of the gold drill database with the termination of Newmont's interest in the property in May 2010. The exploration and development focus turned to REE at the beginning of the 2012 drilling program, and the Sundance gold exploration effort concluded.

From 2008 through 2010, RER compiled analytical data in Excel, Access, and Datamine for use in GIS and 3D mapping software. Between 2010 and 2011, a drill data management system was implemented by EDM Solutions. The drill database was built on an MS SQL SERVER platform and was hosted on a secure "Cloud" server with restricted access. Security and backup features were built into the system and were considered industry standard. The data are currently in RER archives.

The on-site drilling programs conducted by RER were supervised by experienced geology professionals .

On-site RER geologists and ORE personnel conducted extensive reviews and verified data from the 2009 – 2013 drilling programs, which were used in the previous resource estimates (Roche-Engineering, 2014) and are used in the present resource estimate.

9.1.2 Collar Locations and Down-Hole Survey Data

Drill hole data prior to 2008 has not been used for resource estimates because the azimuths and inclinations were considered insufficiently accurate for their use in resource estimates.

Drill hole collar surveys for all 2008 through 2013 core holes were surveyed by Bear Lodge Ltd., professional engineers and land surveyors based in Sundance, Wyoming, and are considered adequate. Bear Lodge REE Project data utilized for development activities and resource estimates is reported in NAD83 Zone 13N US survey feet coordinates.

Down-hole surveys were conducted on all core holes drilled by RER from the 2008 through 2013 drill programs. Even though the drill hole deviations in azimuth and dip are considered acceptable,

No significant issues have been found on the collar positions or downhole survey traces when projected in 3D. Both collar and downhole survey methods are considered to meet industry standards. Although the rock mass is not magnetic, the use of a nonmagnetic continuous downhole surveying tool should be considered in the future.

9.1.3 Assay Data and QAQC

REE assays for the 2009, 2012, and 2013 programs were conducted by Activation Laboratories of Ancaster, Ontario, and assays for the 2010 and 2011 drill programs were done by ALS Laboratories. Both laboratories are independent of RER, both are ISO 9001 accredited, and operate to standards consistent with ISO 17025 methods.

Dr. Jeffrey Jaacks of Geochemical Applications International Inc. (GAII) conducted a review of the results for the quality assurance and quality control (QA/QC) program used in rare earth element assaying for the Bear Lodge exploration drill programs (2009-2013). The findings of this review are described in detail in *Chapter 8* of the present report.

In the Qualified Persons' opinion, the assaying methods used and QAQC procedures and protocols followed during the 2009-2013 drilling programs are considered adequate, the sample assays display acceptable accuracy and precision and are considered adequate for resource estimation.

9.1.4 Bulk Density Determination Methods

One of the authors, A. Noble, devised the method for density determination. Mr. Noble observed the execution of the density measurement process in 2011 and confirmed that the measurements correctly followed the procedure. The density measurements are considered adequate for resource estimation.

9.2 Topographic Data

The topographic model is based on the digital elevation model (DEM) obtained from Intermap Technologies in 2011 (Roche-Engineering, 2012). The DEM data were prepared using radar imagery (LIDAR) and were post-processed to filter out trees, buildings, etc. The elevation data are on a 3.94-meter grid and have a stated accuracy of one meter. Data were thinned to reduce the number of points in the grid by removing points with less than 0.1-meter variability in the topographic surface. The final topographic model contains 26% of the points of the original DEM with little difference in accuracy.

In the Qualified Persons' opinion, the topographic data has adequate accuracy for resource estimation.

9.3 Metallurgical Test Work

Samples were collected from a combination of PQ core holes and bulk sampling, as described in *Chapter 8*. The tested samples were representative of typical FMR and carbonatite mineralization, which represent the majority of the resource. Partially oxidized and stockwork mineralization were not tested in this program.

9.4 Qualified Persons' Statement on Data Verification

The present resource estimate only includes drill hole data of the drilling programs conducted by RER between 2009 and 2013. In the Qualified Persons' opinion, this data is considered adequate for resource estimation.

10 MINERAL PROCESSING AND METALLURGICAL TESTING

10.1 Introduction

The following data has been provided by RER and the contracted laboratories used to perform the test work and was reviewed by Jaye Pickarts.

Jaye Pickarts, P.E., is a Qualified Person as defined in Regulation S-K (§229.1300). In his opinion, the data provided is reasonable for this level of study at the time of reporting.

As of December 31, 2023, RER had filed U.S. provisional patent applications relating to processing methods, including (1) selective recovery of REEs from mixed chloride leach solutions using oxalic acid, and (2) separation of thorium from bulk REEs in a solvent extraction ("SX") process. These provisional applications provided the basis for the current patent portfolio, which includes two issued U.S. patents and one pending U.S. divisional patent application, and fifteen issued foreign patents across thirteen foreign jurisdictions. The issued U.S. patents have a term of 20 years measured from the filing date of the utility patent applications.

10.2 Historical Test work

Historically, prior to 2014, metallurgical test work was conducted on various components of the Bear Lodge REE Project to develop an effective process flowsheet.

This progression in testing is viewed as an important series of steps in determining the amenability to extracting rare earths from the Bear Lodge REE Project. Initial samples were collected from a combination of PQ core holes and bulk sampling. The tested samples were representative of typical FMR and carbonatite mineralization, which represent the majority of the resource.

These initial test programs were conducted at Mountain States Research and Development (MSRDI), Nagrom, Hazen Research, and SGS Lakefield. The results of these preliminary tests indicated that a combination of physical separation processes (including sink-float, scrubbing and attritioning, and gravity) produced the most technical and economical process for treating various REE mineralization types (Oxide, Transition, and Sulfide). Initial tests conducted on the three mineralization types using drill core splits were successful in treating the Oxide mineralized samples. However, in processing these samples, it was found that the rare earth values tended to migrate to fine-size fractions, with the minus 500-mesh fraction (-25 microns) assaying the highest TREO grades. Based on this observation, it was recommended that these tests be repeated on bulk (run-of-mine) samples, starting with the surface oxide mineralization (FMR mineralization type). The test results on the transition and sulfide core were unsatisfactory.

The subsequent pre-concentration tests were initiated on a 6,000-pound (2,727 kilograms) bulk sample of well-oxidized, bulk sample, assaying about 8% TREO. Based on the mineralogical data, it was apparent the simple scrubbing of the bulk sample ore would be sufficient to provide the required upgraded TREO values in the fine-size fractions. In actual practice, this simple scrubbing duplicated the action in an autogenous mill or a trommel and it was quite effective in removing the fine mineralization occurring in the coarser host rocks.

In tandem with the physical upgrading test program, MSRDI also evaluated the subsequent hydrometallurgical treatment of the upgraded product that averaged 15 to 20% TREO. MSRDI's initial hydrometallurgical test program included the determination of the best leaching agent for the dissolution of all the TREO. Leaching with hydrochloric acid (HCl) at a minimum concentration of about 14% was found to be the most effective for dissolving all the TREO values. It achieved an average recovery of approximately 95 to 98%. Additional studies also indicated that it was technically viable to regenerate the residual HCl from the spent solution by adding sulphuric acid and distilling the HCl off the solution to produce azeotrope HCl.

10.2.1 Acid Leaching Tests

Leaching with concentrated hydrochloric acid gave excellent results, with virtually all the REO values dissolved into a process leach solution. Since hydrochloric acid is far more expensive, it was appropriate to consider if the acid could be regenerated/recovered using less expensive chemicals.

Various commercial processes exist where hydrochloric acid is recovered from pickle liquor. Research into the various methods of recovering hydrochloric acid showed that the maximum concentration of hydrochloric acid produced by this process under atmospheric conditions is 20.2% (the hydrochloric acid–water system forms an azeotrope at 20.2%).

As a result, additional leach tests were conducted to see if acceptable results could be obtained using acid at the concentrations that would be obtained by atmospheric distillation. The results showed that acid concentrations lower than 20% can be used for leaching while maintaining high percentages of dissolution. Several distillation experiments were conducted to explore the viability of acid recovery. The results showed that acid recovery/regeneration is indeed a reasonable process option.

Leach tests were conducted by dissolving a pre-concentrate sample in hydrochloric acid while maintaining the temperature between 176 and 194 °F (80 to 90 °C) for six hours. The pregnant solution from the leaching step contained remaining free acid along with iron and other impurities.

The pre-concentrate sample used for all testing was prepared by screening and scrubbing. The composition of the head sample is presented in *Table 10-1*.

Table 10-1. Head Sample Composition (Bhappu, 2011)

SAMPLE IDENTIFICATION	**Ce_2O_3 %**	**La_2O_3 %**	**Nd_2O_3 %**	**Pr_2O_3 %**	**Sm_2O_3 %**	**Y_2O_3* %**	**TREO %**
Scrub Comp Head	7.6	5.35	2.44	0.76	0.28	N/A	**16.43**

Previous testing showed that a standard time of 6 hours gave satisfactory results in leaching. Testing also showed that elevated temperatures made leaching with relatively weak acid possible. Three tests were conducted at 176, 194, and 212°F (80, 90, and 100°C) to determine the optimum leaching temperature. The test results are presented in *Table 10-2*. Acid addition for these tests was 1.06 pounds of acid per pound of concentrate.

Table 10-2. Leach Efficiency vs. Temperature (Bhappu, 2011)

Temperature	Leach Efficiency
176°F (80°C)	98.45%
194°F (90°C)	98.56%
212°F (100°C)	98.70%

Initial hydrochloric acid leaching tests were conducted with concentrated acid. The possibility of using regenerated acid led to testing with concentrations less than 20%. Standard leaching conditions were proposed to be 1.35 oz. (40 milliliters) of reagent grade hydrochloric acid, 0.7 oz. (20 grams) of concentrate and 2.0 oz. (60 milliliters) distilled water. This equates to 0.6 oz. (17.1 grams) of 100% HCl in 3.4 oz. (100 milliliter) solution or slightly less than 17%. All leach tests performed under the conditions of 194°F (90°C), 6 hours retention time, and >15 % acid, produced extractions of over 90%. This demonstrates that the use of regenerated acid is feasible. In test WAA # 6, the leach time was reduced to 4 hours for comparison. The hydrochloric acid leach test results are presented in *Table 10-3*.

Table 10-3. Leach Tests Results (Bhappu, 2011)

WAA # 1 **6-hour leach, 90°C** **100 mL 1:1 HCl**

Sample Weight	Head % TREO	Grams REO	Residue Weight	Residue %TREO	Grams REO Solids
20	16.43	3.286	7.06	0.67	0.05
% Leached					98.56
Grams HCl per gram concentrate =			1.06		

WAA # 2 **6-hour leach, 80°C** **100 mL 1:1 HCl**

Sample Weight	Head % TREO	Grams REO	Residue Weight	Residue %TREO	Grams REO Solids
20	16.43	3.286	7.29	0.70	0.05
% Leached					98.45
Grams HCl per gram concentrate =			1.06		

In all cases, 6 hours of residence time and an acid concentration of 0.75 grams of acid per gram of concentrate or more gave extractions greater than 90%. This is equivalent to leaching with 15% HCl, which is easily produced by recycling/regeneration.

Therefore, based on these results, the process leach conditions would be:

- Leach temperature of 194°F (90°C)
- Six hours retention time
- Equivalent of 0.7 oz. (20 grams) concentrate in 3.4 oz. (100 milliliters) of 15+ % HCl.

10.2.2 Pilot Test work

A subsequent test program, including a pilot program, was conducted at SGS Lakefield. A bench-scale metallurgical program was conducted to test a flowsheet for processing whole ore samples originating from the Bear Lodge deposits. The findings from this work were considered in determining conditions for later pilot plant campaigns conducted at the SGS Lakefield Site in early 2014. Two different ore samples were processed during the piloting – known to SGS as "3.5% TREO" and "2.0% TREO".

Both direct and counter-current leaching (CCL) configurations were tested. Tests conducted at lower temperatures (55°C) and acid dosages resulted in excellent rare earth element (REE) leach efficiency with significant decreases in base metal co-extraction. CCL of the 3.5% total rare earth oxide (TREO) sample yielded 3 to 4% higher main REE extractions versus the best-performing direct leaching test. Iron extraction in these same tests was lower using the CCL configuration (25% versus 41%), leading to reductions in leach and downstream.

The best performance of CCL of the 3.5% TREO sample was achieved using no reductant and a test temperature of 45°C. Main element extractions were 93% Dy, 98% Eu, 98% Nd, 98% Pr, 97% Tb, and 85% Y. Iron extraction was 32%. Solids weight loss was 24%. Acid consumption was 148 kg/t.

All tests had a 4-hour retention time and were conducted at 16% initial solids.

Within the range of acid dosages studied (between 680 and 880 kg/t hydrochloric acid), there was a negligible effect on metal extraction. Under the tested conditions (16% solids, 90°C), REE and key base metal leaching efficiencies varied only minimally (3% for REE).

The leaching temperature was varied between 50°C, 70°C, and 90°C. Under the conditions tested (780 kg/t acid, 16% solids, 4-hour retention time), REE extraction varied minimally (~5% between extreme in LREE), while impurity metal leaching efficiencies at 50°C were drastically lower.

Reductive reagents, sodium sulfite, and sodium thiosulphate were added to all leaching tests during the last half hour of the tests to determine their effect on iron reduction and barium precipitation. At comparable test conditions (90°C, 16% solids, 4-hour residence time, 100% stoichiometric dosage of reductant to feed iron), the influence of either reductant on leach efficiency of REE and base metals was negligible. However, sodium sulfite caused ferric reduction to be double that observed for sodium thiosulphate.

Kinetic sampling indicated that a retention time of two hours could inhibit iron leaching and minimally impact neodymium and yttrium extraction. This was especially evident in the low-temperature condition where iron extraction was increased from 24% at 2 hours to 41% after 4 hours.

Best conditions for straight leaching were achieved at test conditions of 780 kg/t and 50°C. After four hours, the main element extractions were 91% Dy, 95% Eu, 95% Nd, 94% Pr, 93% Tb, and 88% Y. Iron extraction was only 41% after four hours of leaching. Weight loss was 25%.

10.2.2.1 Counter-Current Leaching

Counter-current leach (CCL) tests, consisting of sets of pre-leach and leach tests, were conducted to study the effect of a reductive reagent, temperature, and ore variability on leaching efficiency. All tests had a 4-hour retention time and were conducted at a hydrochloric acid addition of 680 kg/t and a leach test pulp density of 16% solids. Acid dosage in CCL tests is considered kilograms of 100% acid per tonne of pre-leach feed.

Reductive reagent, sodium sulfite, was determined to be detrimental to RE extraction in tests using “3.5% TREO” feed.

Leach temperature was varied between 45°C, 50°C, and 90°C. Under the conditions tested (using “3.5% TREO”), RE extractions were unaffected by the decrease in temperature with the exception of cerium and yttrium (dropping 7% and 9%, respectively), while impurity metal leaching efficiencies were drastically lower. In particular, iron extraction decreased from 95% to 32% across the temperature range tested.

Counter-current leach testing was performed on both the “3.5% TREO” and “2.0% TREO” ore samples. Little change was observed in REE extractions between the samples. Base metal extractions varied by sample. In particular, the “3.5% TREO” sample extracted 55% manganese, 94% magnesium, and 53% iron, while the same metal extractions in the “2.0% TREO” sample were 87%, 85%, and 61%.

The best results for CCL of the “3.5% TREO” sample were achieved using no reductant and a test temperature of 45°C. Main element extractions were 93% Dy, 98% Eu, 98% Nd, 98% Pr, 97% Tb, and 85% Y. Iron extraction was 32%. Weight loss was 24%. Acid consumption was 148 kg/t.

Counter-current leaching of the “2.0% TREO” sample achieved extractions of 91% Dy, 93% Eu, 95% Nd, 94% Pr, 96% Tb, and 85% Y. Iron extraction was 25%. Weight loss was 10%. Acid consumption was 118 kg/t.

The counter-current leaching of the “3.5% TREO” sample yielded 3 to 4% higher main REE extractions versus the best-performing direct leaching test. Iron extraction in these same tests was lower using the CCL configuration (25% versus 41%), leading to reductions in leach and downstream reagent costs.

10.2.2.2 Oxalate Precipitation

Oxalate precipitation tests were conducted to study the robustness of a set of precipitation conditions (constant temperature, dosage, retention time) to changes in feed composition. In these tests, pregnant leach liquor (PLS) was treated with oxalic acid to selectively precipitate trivalent REE as RE oxalate.

Under the conditions tested (85-90°C, 52.6 g/L oxalate, 4-hour retention time), selective precipitation of REE over base metals was confirmed with the exception of barium, which was higher (56%).

Feeds containing high levels of ferric iron suffered low RE precipitation efficiency (<4% in all REE except lutetium).

Precipitation efficiencies of 82% Dy, 87% Eu, 74% Nd, 71% Pr, 85% Tb, and 61% Y were achieved. Oxalate precipitation showed good selectivity against base metals with the exception of barium (20% to 56% precipitation).

The discharge solution from an oxalate precipitation test was concentrated to produce an oxalate solid containing 84.6% oxalate and 0.5% REE, with the highest impurity being magnesium at 1.3%. This product may be suitable for re-introduction to the oxalate precipitation process to offset the requirement for fresh oxalic acid.

10.2.2.3 Thorium Removal

Digesting the solids in hydrochloric acid was advantageous overusing nitric acid on the basis of higher solids weight loss (99% compared to 89%) and higher recovery of REE (100% compared to 91%). The liquors resulting from the HCl and HNO_3 digestion tests contained 36.6 and 31.8 g/L TREO and 678 and 526 mg/L Th, respectively.

Undigested solids from a pilot plant conducted in January 2014 were re-digested in nitric acid to determine if further weight loss could be achieved at higher acid strengths (from 9.6% nitric acid to 12%). Digesting the solids in 12% acid was found to increase overall weight loss from 80 to 88%.

The liquors from the solid's digestion tests were neutralized with ammonium hydroxide to selectively precipitate thorium. Under the conditions tested (25°C, 1 hour retention time), it was found that increasing the pH of the solution to 3.8 resulted in a 71% removal of thorium at a cost of only 1.4% REE. Conditions for complete removal of thorium were not found.

10.2.2.4 REE Nitrate Crystallization

A low thorium ammonium nitrate solution was concentrated by evaporation to 86% of its original weight, at which point its boiling point was 130°C. White solids were produced that contained 49% of the REE. The REE grade of the solids was 15.7%.

10.3 Pilot Testing

In 2014, RER extracted a high-grade sample from an excavated exploration trench within the Bull Hill deposit.

RER contracted Umwelt- und Ingenieurtechnik GmbH Dresden, Germany (UIT) to validate (and potentially optimize) processing steps of the Bear Lodge REE Project by pilot testing UIT's upgraded technology concept developed in 2018, including primary processing, separation, and refining of REE. This report describes the provisional economic assessment results based on the pilot test work performed by UIT in 2019.

In 2018, UIT demonstrated the technical feasibility of main process steps on the basis of lab tests, however, by considering and finally implementing significant improvements of RER's original technological concept. In 2019, UIT tested the processing of high-grade ore with low calcium/carbonate abundance (BHOxHG) on a pilot scale. The initial pilot-test results, together with UIT's novel solvent-extraction (SX) process simulation model/software, were the basis for further optimizations (in particular, regarding the REE separation and refining) that have already been pilot-tested or subject to final validation in 2020.

The primary processing of the comminuted ore to a TREO (Th) concentrate was piloted successfully (referred to as primary hydrometallurgical processing HYDROMET). The produced TREO-(Th) concentrate was successfully separated by applying an optimized SX processing scheme on a pilot scale to produce pure NdPr (in oxide form). These data showed:

1. **Primary processing from ore to TREO(Th) concentrate**
   - Counter-current leach performance.
     - Excellent leach efficiency (92.5%)
     - 54% of Th leached.
     - Long living 228Ra kept in tailings (initiated precipitation of Ra in leach process)
   - Selective REE precipitation
     - Precipitation efficiency for NdPr 99.5%
     - Highly pure TREO(Th) concentrate (≥95% REO)
   - Hot filtration option for ore feed containing abundant calcareous minerals.
     - Suppression of Ca
   - Calcination tests 600/700/900°C – subject to further optimization (reduction to probably 450°C to minimize the acid consumption in TREO(Th) digestion and subsequent processing stages)
   - Acid recycling
     - HCl acid recycle ≥55%
     - Oxalic acid recycle ≥65%
2. **TREO(Th) digestion and Th/Ce separation**
   - Practically 100% of TREO digestion in HNO3
   - Very high REE concentrations in feed solution to SX_0
   - 100% extraction of tetravalent Th
   - >97% extraction of Ce (potential for complete Ce separation identified, in particular, by considering redox kinetics)
   - High-efficient counter-current precipitation strip (practically 100% Th)
   - Highly efficient removal of NORM (naturally occurring radioactive material) demonstrated.
3. **REE separation/refining**
   - Optimization based on UIT's first principles thermodynamic extraction and separation model as basis of a simulation software tool that can be configured for any SX setup (in particular, for counter-current SX operation)
   - Steeper extraction/scrubbing curves and improved separability between individual REE for the consequent counter-current setup of SX sequences key to significantly improved SX performance
   - Reliable simulation of feed pH to achieve the optimum equilibrium pH for maximized separability under given solute composition (ionic strength), O/A ratio, and extractant concentration in component O, and considering the chemical distribution effects between aqueous solute and organic extractant.
   - Improved NdPr separation/refining strategy (neutralization by NH3(aq), SX sequences and combinations in various arrangements) – to be applied to Nd and Pr as well.

Based on the pilot test results and the novel SX process simulation tool for systematizing the pilot test results within an optimized processing regime, a provisional economic assessment of the processing from Bull Hill deposit ore to the pure NdPr product has been developed with a focus on the Operational Expenditures (OPEX). This assessment is based on process flow diagrams (PFDs) that were developed for an up-scaled (industrial) processing plant setup and mass balance schemes that were created by applying the novel SX simulation software (calibrated on the basis of pilot test results) for fully consistent systematics.

The results from the pilot test have produced the following table of REE yield estimates that have been used in this resource estimate; these results are summarized in *Table 10-4*.

Table 10-4. Pilot Test Results (UIT, 2020)

		REE yield compared to PP feed									
		La	**Ce**	**Nd**	**Pr**	**Sm**	**Eu**	**Gd**	**Dy**	**Y**	**HREE**
Process	**Product**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
PP Leaching	PP Precip.	91.7	97.2	92.2	92.2	92.2	91.2	91.7	88.8	83.8	87.1
PP Precipitation	TREO (Th)	90.7	96.1	91.2	91.2	91.2	90.2	90.7	87.7	82.8	86.1
TCS SX	ER_0	90.7	33.6	89.8	90.2	91.2	91.3	92.4	83.5	78.8	81.6
SX_A Separation	SR_A	9.0	11.8	68.8	52.1	40.0	22.8	23.1	0.8	0.2	2.9
	ER_A	81.7	21.8	20.6	38.1	0.1	0.0	0.0	0.0	0.0	0.0
	HREEOx/SEGOx	0.0	0.0	0.4	0.0	51.0	68.5	69.3	82.7	78.5	80.9
SX_B1 Separation	ER_B1	9.0	11.8	67.9	52.0	0.4	0.0	0.0	0.0	0.0	0.0
	SEGOH	0.0	0.0	0.9	0.0	39.6	22.8	23.1	0.8	0.3	0.7
SX_B2-3 Separation	LaCeOH	90.6	33.5	0.4	14.3	0.0	0.0	0.0	0.0	0.0	0.0
	NdPRO	0.0	0.2	88.2	75.8	0.6	0.0	0.0	0.0	0.0	0.0
Total	All end-products	90.7	33.6	89.8	90.2	91.2	91.3	92.4	83.5	78.8	81.6

10.4 Demonstration Project

The demonstration project involves the physical processing of this already extracted exploration sample followed by chemical processing to produce a pure TREO(Th) concentrate followed by the separation of NdPr oxide.

The demonstration project plant is scheduled to be in operation in 3rd Quarter of 2024 and will provide the necessary design criteria for a larger commercial-scale facility. A description of this demonstration plant is provided in *Chapter 14*.

11 MINERAL RESOURCE ESTIMATES

11.1 Introduction

This Mineral Resource estimate was prepared by Alan C. Noble, P.E. of Ore Reserves Engineering, and by Monica Barrero Bouza, EurGeol, who are independent Qualified Persons as described in Regulation S-K (§229.1300). The effective date of the Mineral Resource estimate is 31 December 2023.

The current Mineral Resource estimate updates the previous mineral resource estimates prepared by A. Noble (Ore Reserves Engineering) for the Bull Hill rare earth deposit (Roche-Engineering, 2014). The present Mineral Resource estimate includes an update of the Bull Hill deposit oxide zones (Ox and OxCa) for more selective mining consistent with a 10x10x10-foot selective mining unit and a more conservative resource classification criteria. The 10x10x10-foot selective mining unit is justified by a lower production rate and more selective mining that takes advantage of the sharp visual contrast between higher-grade mineralization and lower-grade wall rock. The Whitetail deposit has not been updated nor included in this update. Estimation was done using 252 core holes drilled between 2009 and 2013, including 20,491 assay intervals that totaled 186,712.5 feet (56,910 meters) of drilling. Resource modeling and estimation were done using Datamine Studio RM software; pit optimization was performed with Datamine Studio Maxipit and pit design with Studio OP.

11.2 Block Model Parameters

A three-dimensional (3D) block model using 10x10x10-foot (approximately 3x3x3-meter) blocks was created for resource estimation, which is consistent with the estimated selective mining unit. The 10-foot blocks were not sub-celled on geological boundaries to provide better compatibility with pit optimization software. The block model location parameters remain the same as previous models, and the coordinate system is UTM Zone 13, geometric horizontal North American Datum of 1983 (NAD83), and North American Vertical Datum of 1988 (NAVD88) in US Survey feet units. Size and location parameters for the block model are summarized in *Table 11-1*.

The horizontal extent of the model is defined to cover the main mineralized areas of the Bull Hill deposit, plus sufficient space outside the deposit for pit optimization.

Table 11-1. Model Size and Location Parameters (UTM Zone 13-NAD83-NADV88).

		Minimum		Maximum		Block Size		Number of Blocks	Model Size	
		feet	**meters (approx.)**	**feet**	**meters (approx.)**	**feet**	**meters (approx.)**		**feet**	**meters (approx.)**
Easting	**X**	1,781,500	543,001	1,786,900	544,647	10	3.05	540	5,400	1,646
Northing	**Y**	16,160,700	4,925,781	16,166,000	4,927,397	10	3.05	530	5,300	1,615
Elevation	**Z**	5,000	1,524	6,520	1,987	10	3.05	152	1,520	463

11.3 Estimation Domains and Trend Surfaces

Estimation domains are defined based on nine (8) bounding solids constructed from cross-sectional-view strings that enclose areas with consistent overall grades and grade zoning; these estimation domains have not changed from the previous estimate (Roche-Engineering, 2014). Cross-sections were spaced at 50-to-100-ft intervals and aligned roughly perpendicular to the overall mineralization trend in each domain. The description of the estimation domains is summarized in *Table 11-2*, and a plan view of the location of each domain is shown in *Figure 11-1*.

Since the boundaries between domains are generally indistinct and/or gradational, the domain boundaries were drawn with a slight overlap. The domain boundaries were linked to form wireframed solids, and the solids were filled with 10x10x10-foot blocks to create the domain block model.

The overlapping boundaries between domains were resolved for the block model by overprinting the individual models with the Studio RM ADDMOD process in the order of the priorities listed in *Table 11-2*. Thus, W2 is overprinted onto NE; W2 is overprinted onto the NW+W2 result; and so on.

Drill hole composites were selected within the entire volume of each domain for resource estimation. Thus, the domain boundaries were treated as semi-soft boundaries for composite selection. The use of semi-soft boundaries for composite selection is justified by the indistinct/gradational nature of the domain boundaries.

Good continuity is generally indicated for the REE-bearing veins, but continuity is not planar in either the vertical or horizontal view. Accordingly, trend surfaces were created to define the continuity of mineralization within each estimation domain. The trend surfaces were defined using the same cross-sectional alignment used for the interpretation of the domains.

After linking the trend strings to form wireframed surfaces, the intersection of the trend surfaces in the plan view was checked to ensure consistency of trends, both laterally and vertically. The intersections of the trend surfaces with the 5600-ft level are shown as dashed lines in *Figure 11-1*.

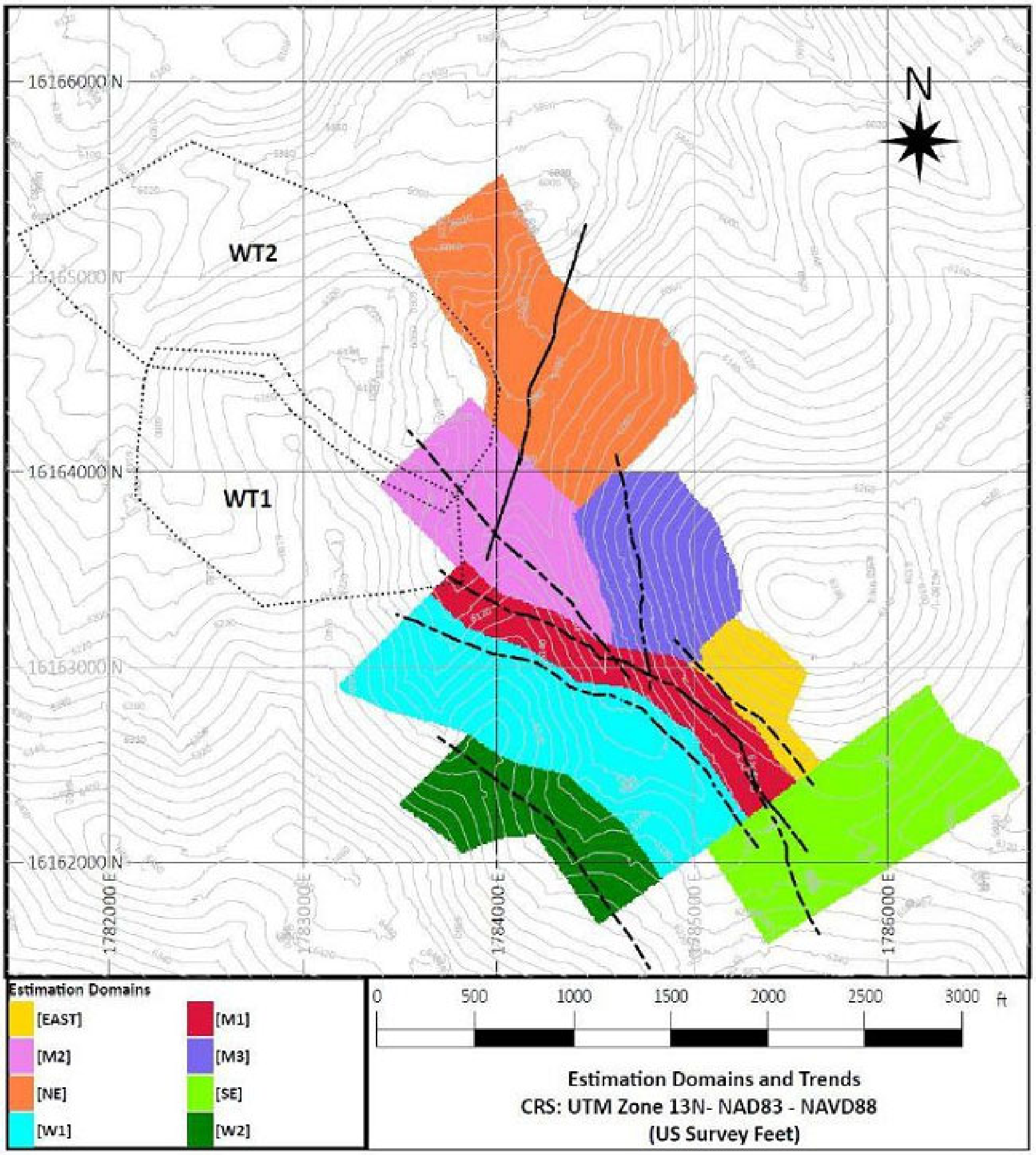


Figure 11-1. Plan view of the estimation domains and trends (dash-lines) at 5600ft elevation; Whitetail estimation domains (WT1 and WT2) are shown for reference (after A. Noble, Roche-Engineering, 2014)

Table 11-2. Estimation Domains Detailed Description (A. Noble, in Roche-Engineering, 2014)

Domain Code	Priority	Name	Description
M1	7	Main 1	This is the main mineralization domain with the best continuity, the widest veins, and the highest REE grades. It is characterized by strong, near-vertical, high-grade veins with excellent continuity and an NW-SE trend. As it continues to the northwest, it splits into 3 zones, of which the west-most branch is interpreted as the continuation of Main 1. The zone contains high-grade mineralization in a vein/dike with 20 to over 100 feet widths.
M2	4	Main 2	This is the center of the three branches off of Main 1. Mineralization is not as continuous nor high-grade as Main 1 or Main 3. The northwestern extension of Main 2 is poorly drilled, but appears to be mostly barren, although there may be a weak connection to Whitetail to the northwest.
M3	6	Main 3	This is the easternmost splay off of Main 1. High-grade, near-vertical, north-south trending veins are present but are narrower and less continuous than in Main 1 but more continuous than in Main 2.
East	5	East	The East domain is located just east of Main 1 and terminates to its northwest on Main 3. The predominant mineralization is a single, narrow vein with a strike length of over 1000 feet, sub-parallel to Main 1.
NE	1	Northwest Bull Hill	Veins in this area are much less continuous than veins in the Main, East, and West 1 domains. Veins appear to strike about N15E and dip 65° to the NW. Continuity is poorly defined.
SE	8	Southeast	The Southeast Domain terminates the Main 1, West 1, and East domains on their southeast limits. This domain is defined by a sudden decrease in the intensity of REE mineralization across a discontinuity that dips approximately 80 degrees to the northwest and strikes approximately N55E. The details of the discontinuity are not understood, but it may be a fault or intrusive contact.
W1	3	West 1	West 1 is immediately adjacent to and similar to Main 1. Veins in West 1 are thinner, lower grade, less continuous, and more widely spaced.
W2	2	West 2	Mineralization in West 2 is poorly defined by only a few drill holes. It appears less continuous than West 1 and may trend more north-south than northwest-southeast.

11.4 Oxidation Model

The oxidation state model was prepared using the oxidation state codes in the drill-hole database, which designate drill-hole intervals as oxidized (Ox), oxidized with calcite (OxCa), transition (Tran), or non-oxidized (Sulf). The initial interpretation was made on cross-sections by drawing lines along the bottom of the oxidized material, the top of the transition material, and the top of the non-oxidized material. These lines were then linked to form three-dimensional (3D) surfaces used to create the oxidation state model.

The top of the oxidized zone was defined as ten (10) feet below the topographic surface, leaving a 10-foot (3.05 meter) thick layer below the surface for soils, alluvium, and colluvium. Rare-earth element grades were not estimated in the Soils-alluvium-colluvium layer, which is assumed to be waste for resource estimation purposes.

The oxide zones have not been modified since the last study in 2014. In the present update, grade estimation has been updated for a more selective mining unit in the Ox and OxCa oxide zones, and no estimation has been performed in the transition and sulfide oxide zones, which are excluded from the resource. A plan view at 5600ft elevation showing the oxidation state interpretation is shown in *Figure 11-2*; *Figure 11-3* includes vertical sections through the deposit.

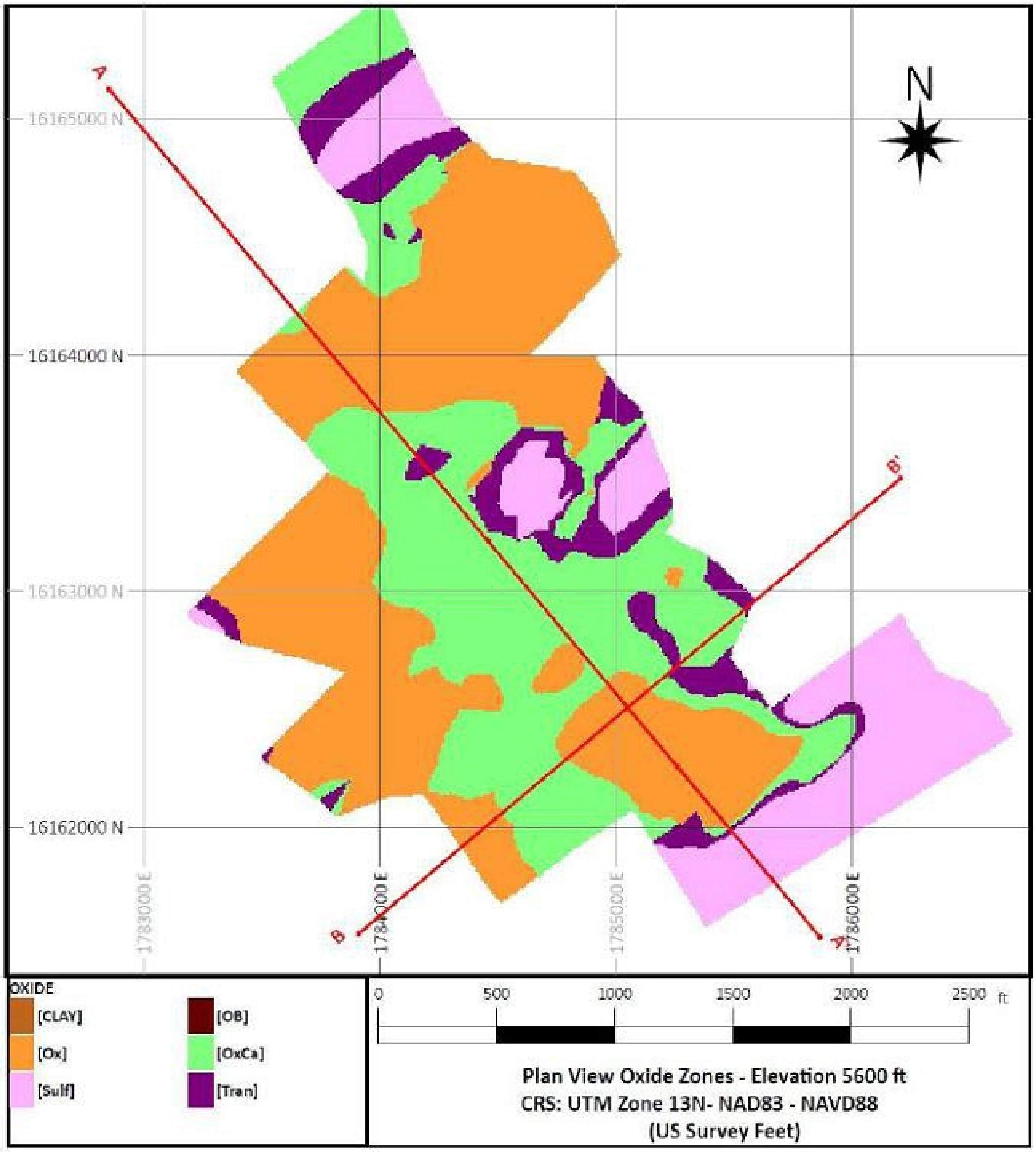


Figure 11-2. Plan view of the oxidation state model at 5600ft elevation (A. Noble, Roche- Engineering, 2014)

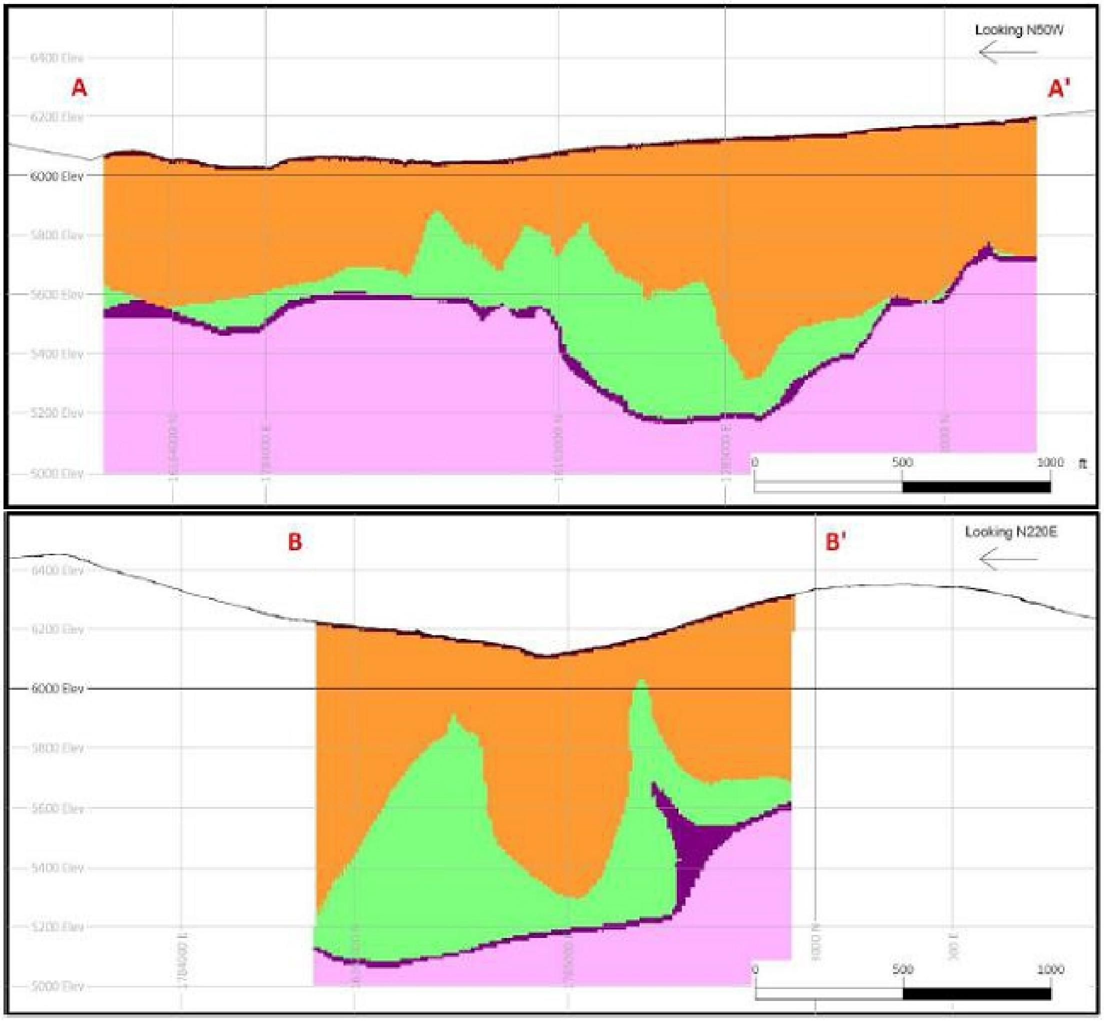


Figure 11-3. Vertical sections of the oxidation state model; the location of the sections is shown in Figure 11-2

11.5 Trend-Oriented Modeling

Because the shape of all mineralized domains is too irregular for the use of simple search ellipses, trend models were developed to allow interpolation to follow the shape of the mineralized zone. The trend models are based on the general shape of the domains and on a visual interpretation of the continuity of mineralization. The primary objective of developing the trend shapes was to provide generally reasonable shapes rather than simply connecting high-grade samples to other high-grade ones.

The trend surfaces were used to flatten and iron-out the wrinkles in the mineralization trends using a set of "trend-flattened" coordinates to replace the normal UTM coordinates.

The method used to create the trend-flattened coordinates from the trend models was created by A. Noble for the previous estimate (Roche-Engineering, 2014) and is summarized below:

1. The distance between the trend surface and the block model block centroids was measured by calculating the perpendicular distance between the block center and the nearest face in the trend surface wireframe. The same procedure was repeated for the center point location of composites.

2. The distance between the trend surface and the block model block centroids was measured by calculating the perpendicular distance between the block center and the nearest face in the trend surface wireframe. The same procedure was repeated for the center point location of composites.

3. The final trend flattened coordinate space is roughly equivalent to viewing each domain as a longitudinal cross-section.

The rotation parameters used to flatten the trend model are summarized in *Table 11-3*.

Table 11-3. Rotation Parameters to Flatten the Trend Models (A. Noble in Roche-Engineering, 2014)

Domain	Rotation Point (UTM-Feet)			Rotation Angle Around Axis (left-hand rule)	
	X	Y	Z	Z-axis	Rotated X-axis
East	1,785,264	16,162,820	5,600	48	-90
Main 1	1,784,704	16,162,935	5,600	35	-90
Main 2	1,784,121	16,163,655	5,600	48	-90
Main 3	1,784,715	16,163,514	5,600	90	-90
Northeast	1,784,160	16,164,376	5,600	107	-64
Southeast	1,785,477	16,162,036	5,600	68	-90
West 1	1,784,551	16,162,845	5,600	33	-90
West 2	1,784,307	16,162,132	5,600	40	-90

11.6 Compositing

Given the highly variable orientation of drill holes with respect to the mineralization trends, a method was developed to composite drill-hole samples into widths that approximate the horizontal true width of the veins. In addition, the composites were optimized to provide composite intervals that were above a specified cutoff grade and longer than a specified minimum width. There were two objectives for this procedure:

1. The resulting composites should be partitioned into low-grade and high-grade populations representing stockwork-dominant and dike-dominant mineralization.

2. The composites should have sufficient width to provide geometric dilution for a reasonable minimum mining width.

True width compositing was done using parameters specific to each estimation domain, as summarized in *Table 11-4*. Width and cutoff parameters were developed heuristically to provide subpopulations of low-grade and high-grade composites as close to lognormal populations as possible, subject to a minimum mining width of at least 10 feet.

Table 11-4. Parameters for Optimized Grade-Zone Compositing (Noble & Barrero, 2024)

Domain	Minimum TRUE Width (Feet)	Minimum True Width (Meters)	Cutoff Grade (%TREO)	Generalized Trend-Plane	
				Dip Direction	Dip
East	10	3.05	1.5	48	90
M1	10	3.05	1.5	35	90
M2	10	3.05	1.4	48	90
M3	10	3.05	1.5	90	90
NE	10	3.05	1.5	287	64
SE	10	3.05	1.5	68	90
W1	10	3.05	1.2	33	90
W2	10	3.05	1.2	40	90

The procedure for the optimized grade-zone compositing is described below:

1. The average orientation of the drill hole was compared to the generalized trend plane orientation to compute the drill hole length required to achieve the minimum true width perpendicular to the trend plane.

2. The Studio RM COMPSE process was used to compute composites with at least the minimum true width (perpendicular to the trend plane) that were also above the cutoff grade (*Table 11-4*).

3. An OreZONE Flag code was set to one (1) to identify composite intervals above the cutoff (*Table 11-4*) and zero (0) below the cutoff.

4. The drill holes were composited again, using down-hole compositing that was set for a nominal 10-foot (3.05 meter), true-width composite within OREFLAG intervals of the same type (0 or 1). In this process, composites start and stop at OREFLAG boundaries, and the composite length is adjusted to include the entire interval defined by the OREFLAG zone while maintaining a nominal 10-foot-wide, true-width composite length.

11.6.1 Grade-Zoned Composite Statistics

Basic statistics for TREO, FMR, calcium, iron, and manganese oxides, uranium, and thorium for the Bull Hill deposit in the Oxide and OxCa are shown in *Table 11-5*

The statistics indicate that the grade-zoning process partitions TREO into high-grade and low-grade populations (*Figure 11-4*). The TREO OreZONE partitions also subdivide the distributions of FMR, iron oxide, manganese oxide, thorium, and uranium abundances into higher-grade and lower-grade populations (*Figure 11-5*). However, the process is less efficient for calcium and manganese oxide, where the ratio of grades in the high-grade OreZONE to the low-grade OreZONE is lower than that for TREO.

Table 11-5. Basic Statistics for Grade-Zoned Composites of Bull Hill Deposit (updated from A. Noble, Roche-Engineering, 2014)

Field	OXIDE	Low-Grade OreZONE			High-Grade OreZONE			All Samples			Ratio HG:LG
		Number Samples	Mean	Coef of Variation	Number Samples	Mean	Coef of Variation	Number Samples	Mean	Coef of Variation	
%TREO	Ox	4,689	0.612	0.487	1,221	3.358	0.831	5910	1.179	1.448	5.489
	OxCa	854	0.684	0.452	648	3.452	0.585	1502	1.878	1.023	5.043
%FMR	Ox	4,652	7.7	1.090	1,212	31.3	0.755	6518	13.0	1.307	4.062
	OxCa	854	9.6	0.967	648	53.2	0.600	1597	28.9	1.065	5.559
%CaO	Ox	2,966	0.639	1.820	779	0.955	1.860	3745	0.704	1.874	1.496
	OxCa	576	4.019	0.858	431	15.005	0.627	1007	8.721	0.988	3.734
%Fe_2O_3	Ox	2,966	8.055	0.278	779	13.700	0.417	3745	9.229	0.434	1.701
	OxCa	576	7.311	0.197	431	11.902	0.378	1007	9.276	0.418	1.628
%MnO	Ox	2,966	1.238	0.985	779	3.351	1.310	3745	1.678	1.451	2.706
	OxCa	576	1.015	0.455	431	2.775	0.800	1007	1.768	0.978	2.733
ppm Th	Ox	4,688	99	0.725	1,221	353	1.228	5909	151	1.529	3.578
	OxCa	854	93	0.993	648	317	1.012	1502	190	1.311	3.428
ppm U	Ox	4,688	35	0.784	1,221	101	0.628	5909	48	0.955	2.907
	OxCa	854	47	0.754	648	102	0.533	1502	71	0.741	2.186

The distribution of high-grade TREO is nearly lognormal, as shown by the nearly straight line in the lognormal cumulative frequency distribution (*Figure 11-4*). About 75% of the high-grade composites are above 1.5% TREO; an additional 25% are internal low-grade zones that are included to makeup the minimum mining width. Less than 3% of the low-grade OreZONE composites are above 1.5% TREO, and those composites represent patchy higher-grade stockwork mineralization.

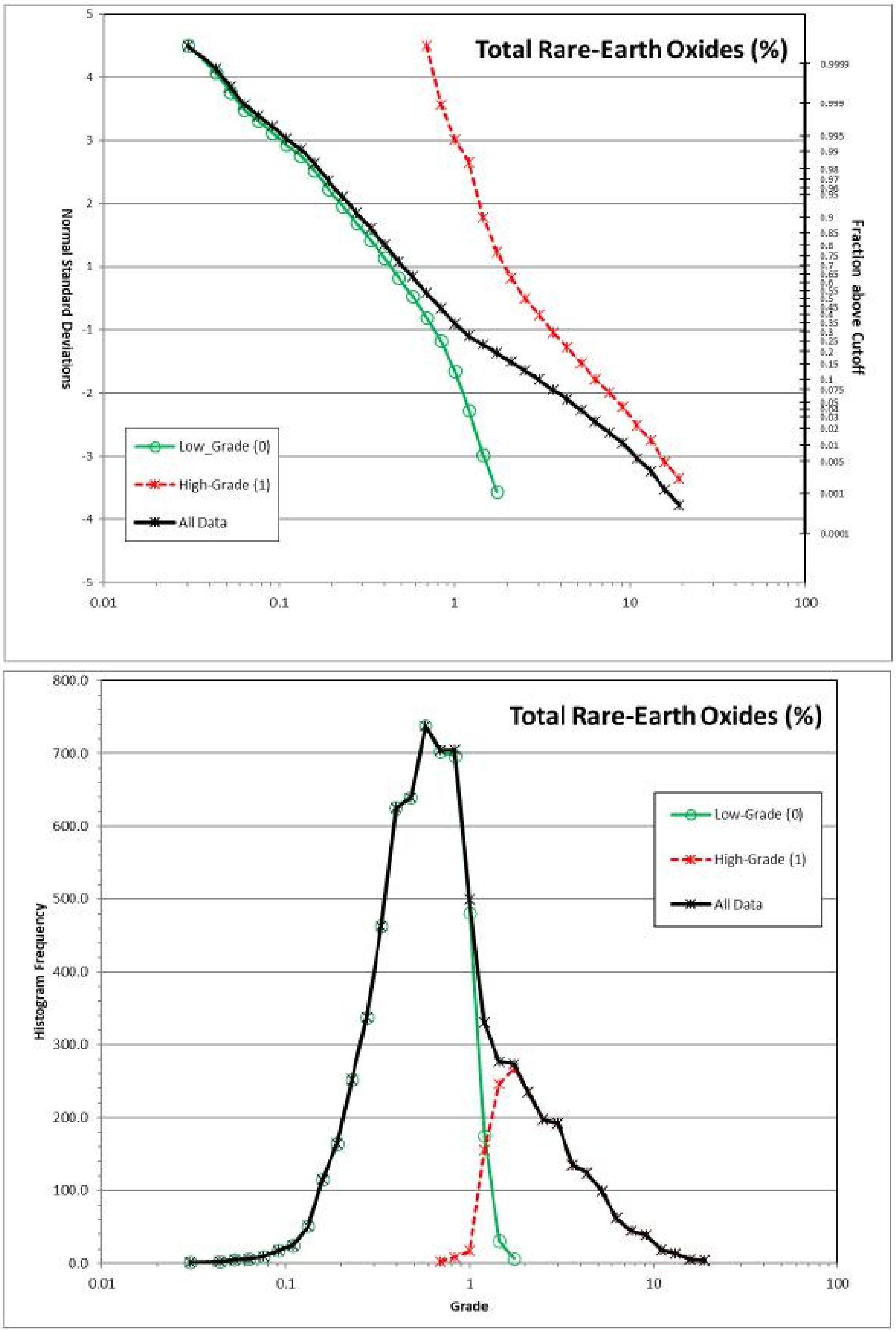


Figure 11-4. Lognormal grade cumulative frequency distributions and histograms for TREO by OreZONE-Oxides and OxCa Composites (Noble & Barrero, 2024)

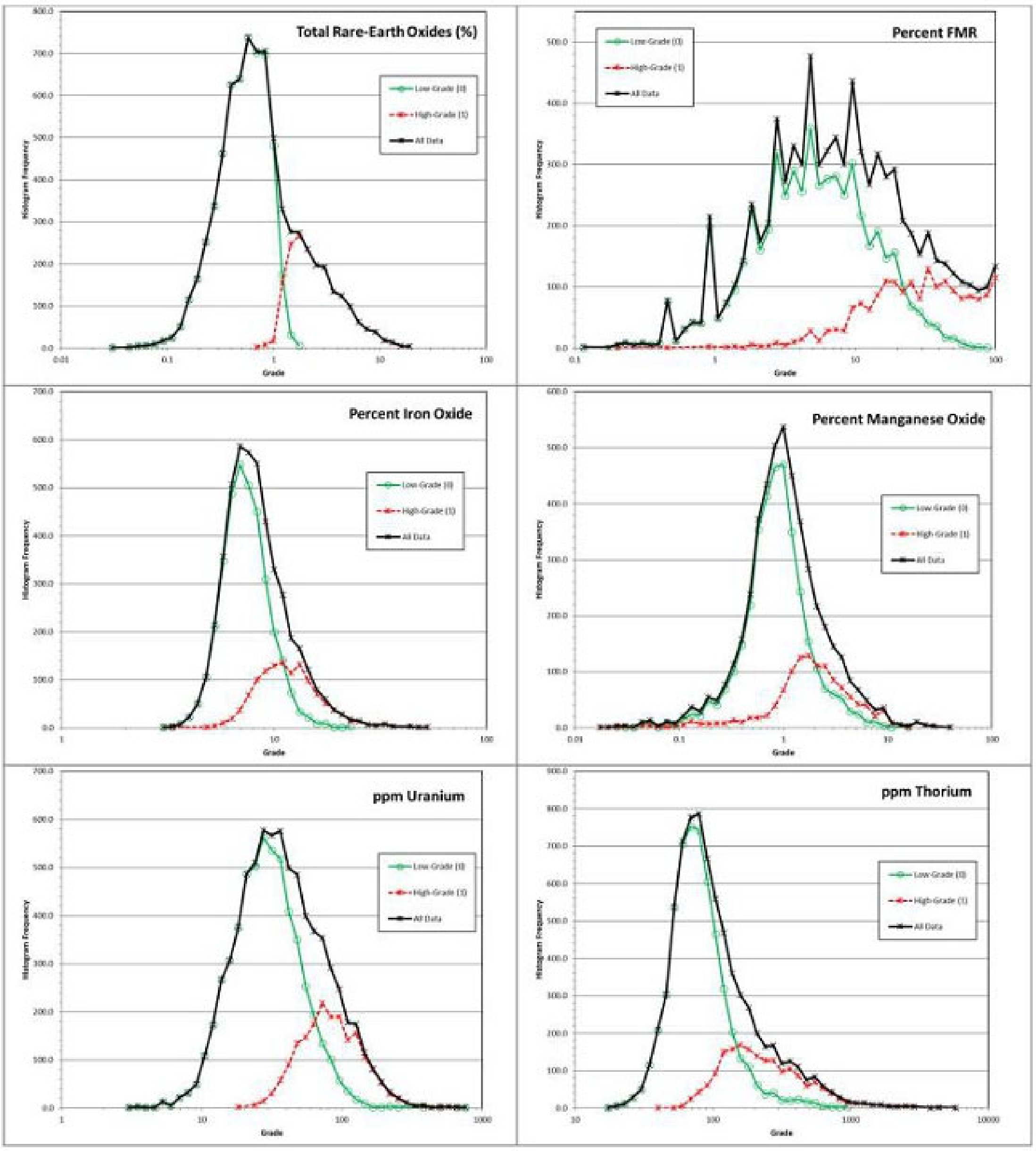


Figure 11-5. Log-transformed Histograms for TREO, FMR, Iron Oxide, Manganese Oxide, Thorium and Uranium (Noble & Barrero, 2024)

The TREO OreZONEs do not effectively partition calcium oxide, as the oxide type is the dominant factor in the calcium oxide distribution. As shown in *Figure 11-6*, TREO OreZONE codes effectively partition the OxCa zone into low and high-grade calcium oxide. However, the leaching of carbonates in the oxide zone reduces calcium oxide grade to a similar level regardless of the TREO OreZONE code.

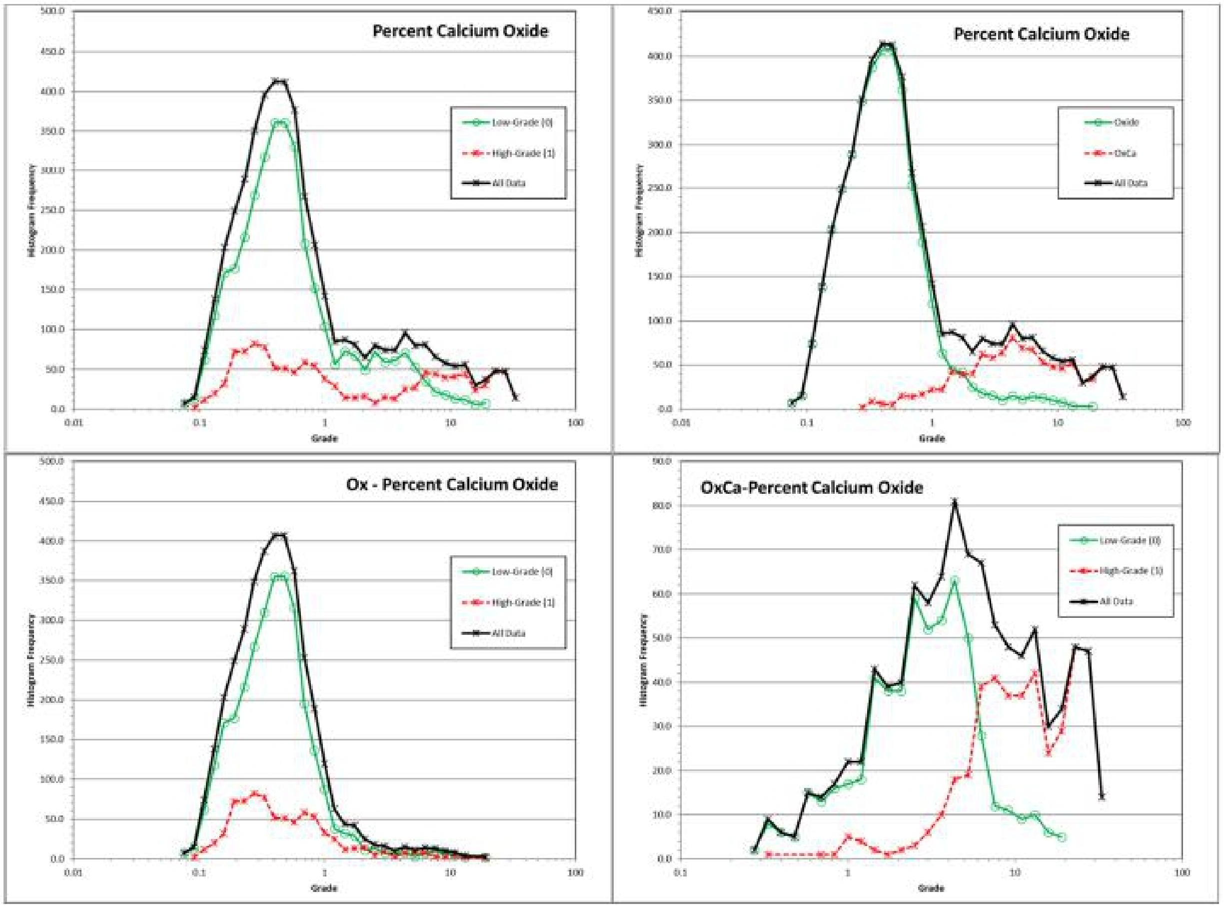


Figure 11-6. Log-transformed Histograms for Calcium Oxide by OreZONE and Oxide Type (Noble & Barrero, 2024)

11.6.1 Missing Grades for Iron, Manganese and Calcium Oxides

Whole rock assays were not done for early drill holes from 2009 and 2010, thus there are missing assays for iron, manganese, and calcium oxides in the main drill hole database. The missing assays are estimated based on the 2014 regressions (A. Noble in Roche-Engineering, 2014) based on oxide type, and TREO grade (*Table 11-6*). Because the iron, manganese, and calcium oxides are critical elements for acid consumption in the treatment process, it is recommended that the pulps be retrieved for the intervals with missing assays and assayed for the full suite of elements used for later drilling.

Table 11-6. Regression Formulas for the Estimation of Missing Iron, Manganese, and Calcium Oxides Grades for the Bull Hill Deposit (Roche-Engineering, 2014)

Oxide	$Fe_2O_3 = 9.884 * TREO^{0.3199}$
	$MnO = 1.697 * TREO^{0.6985}$
	$CaO = 0.498 + 0.031 * TREO$
OxCa	$Fe_2O_3 = 8.335 * TREO^{0.3279}$
	$MnO = 1.282 * TREO^{0.7024}$
	$CaO = 0.820 + 4.712 * TREO$

11.6.2 TREO-Grade Adjustments for Oxidation Zones

Statistical analysis shows that high-grade oxide composites tend to be higher grade than composites from the high-grade zones of the OxCa type. This means that using oxide composites to estimate grades in the OxCa would tend to overestimate grades in that oxidation type. Conversely, using OxCa composites to estimate grades in the oxide zone would tend to underestimate grades in this zone.

Despite this fact, to provide continuity of data for estimation it is desirable to use as much of the data as possible. Accordingly, a conservative composite selection and discounting strategy was developed to minimize the risk of overestimating REE grades while using as many samples as possible. The composite selection strategy followed is described below:

1. Only composites from the low-grade zone were used to estimate low-grade blocks and only composites from the high-grade zone were used to estimate high-grade blocks.

2. The adjustment factors summarized in *Table 11-7* were used to adjust composite grades before block grade estimation. Where the adjustment factor for a block-composite oxide type is shown with an “X” in the table, that oxide-type pairing was not used for estimation.

Table 11-7. Updated adjustment Factors for Grade Estimation–Block Zone and Composite Zone Combinations (Noble & Barrero, 2024)

Block OXIDE	Composite OXIDE	OreZone = 0 (Low-Grade)				OreZone = 1 (High-Grade)			
		TREO	Fe_2O_3	MnO	CaO	TREO	Fe_2O_3	MnO	CaO
Ox	Ox	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	OxCa	1.00	1.00	X	X	1.00	1.00	X	X
OxCa	Ox	0.96	0.94	X	X	0.93	0.92	X	X
	OxCa	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

11.7 Variograms

To study the spatial continuity of the composited TREO, FMR, iron, manganese, and calcium oxides, uranium, thorium, and the OreZONE flag (0 or 1), the variograms were computed with Snowden Supervisor (Datamine) using the trend-flattened coordinate space.

In the trend-flattened coordinate space, the XY plane in the variogram space is equivalent to a flattened longitudinal section subparallel to the ore zoning, and the Z-variogram axis is perpendicular to the ore zoning.

Using the trend-flattened coordinate space improves continuity evaluation by allowing the variograms to follow the irregular shape of the vein trends. The ability to follow the zoning is particularly important for these deposits since the anisotropy perpendicular to the trend can be more than 20:1, and a slight misalignment perpendicular to the trend introduces a large variability to the variogram.

TREO and the other grade variograms were independently evaluated using log-transformed correlograms for each estimation domain and within the high-grade and low-grade OreZONEs using data only from the Oxide and OxCa zones. In some cases, variogram computation was also evaluated within a certain grade range, for example, for iron oxide.

Variograms for the OreZONE indicator variable were computed using correlograms without any transformation of the zero/one (0,1) indicator.

Variogram models were fitted to the experimental variograms using Supervisor and up to two nested, exponential variograms, using the practical convention for the exponential variogram range.

The resulting variogram model parameters are summarized in *Table 11-8*. Experimental variograms and models are shown for directions closest to the principal variogram axes in *Figure 11-7* through *Figure 11-17*.

F-function values for 10x10x10-foot blocks were computed for each variogram for later use in validating the grade estimation. The F-function value is equal to the variance of samples within a block of a particular size and shape. Smoothing factors, which are the variance reduction factors that would be expected when moving from the distribution of samples to the distribution of blocks, are listed in *Table 11-8*.

Table 11-8. Summary of Exponential Variogram Models (Noble & Barrero, 2024)

Variable	OXIDE	OreZONE	Domain	Grade Range	Rotation	Nugget	Structure 1				Structure 2				$10ft^3$ Smoothing Factor
							Sill	Range			Sill	Range			
								X'	Y'	Z'		X'	Y'	Z'	
OreZone	Ox	All	All	All	60	0.00	0.58	102	83	20	0.42	349	109	109	0.71
TREO (%)	Ox	LG	Global -M1	All	50	0.15	0.38	112.0	141.0	115.0	0.47	1554.0	2000.0	2000.0	0.79
			M1	All	-50	0.20	0.36	309.0	221.0	109.0	0.44	310.0	603.0	259.0	0.74
		HG	Global -M1	All	-20	0.10	0.49	223.0	31.0	31.0	0.41	428.0	232.0	232.0	0.69
			M1	All	60	0.20	0.52	253.0	274.0	68.0	0.28	776.0	424.0	93.0	0.69
FMR (%)	Ox	LG	Global -M1	All	70	0.35	0.65	888	888	558	-	-	-	-	0.63
			M1	All	50	0.11	0.30	259	67	64	0.59	601	465	127	0.78
		HG	Global -M1	All	0	0.24	0.34	55	55	55	0.42	430	430	430	0.64
			M1	All	0	0.24	0.36	479	271	79	0.40	1134	272	239	0.69
Fe_2O_3 (%)	Ox	LG	Global	2<=Fe_2O_3<20	90	0.08	0.31	136	136	136	0.61	1087	802	500	0.86
		HG	Global	5<=Fe_2O_3<45	90	0.19	0.46	99	215	138	0.35	775	932	502	0.74
MnO (%)	Ox	LG	Global-M1	All	70	0.10	0.36	155	143	70	0.54	1065	859	641	0.83
			M1	All	90	0.10	0.50	418	418	84	0.40	419	419	161	0.81
		HG	Global-M1	All	40	0.10	0.53	654	654	175	0.37	789	789	467	0.86
			M1	All	0	0.10	0.33	211	57	57	0.57	730	88	88	0.73
	OxCa	LG	Global	0.2<=MnO<3	50	0.20	0.26	290	290	38	0.54	814	814	464	0.72
		HG		All	80	0.20	0.32	217	113	113	0.48	342	291	291	0.73
CaO (%)	Ox	LG	Global	All	-20	0.10	0.09	369	90	106	0.81	1027	314	419	0.85
		HG		All	-10	0.13	0.29	865	304	304	0.58	1060	335	346	0.83
	OxCa	LG		0.6<=CaO<18	30	0.10	0.40	611	44	44	0.50	706	235	235	0.75
		HG		CaO>=3	80	0.20	0.36	115	94	104	0.44	625	625	188	0.71
Th (ppm)	Ox	LG	Global	All	50	0.10	0.46	113	158	278	0.44	5000	1900	297	0.83
		HG		All	50	0.12	0.40	241	258	221	0.48	5000	616	269	0.83
U (ppm)	Ox	LG	Global	All	60	0.10	0.36	305	551	167	0.54	1382	552	640	0.86
		HG		All	80	0.20	0.49	356	172	114	0.31	424	398	424	0.73

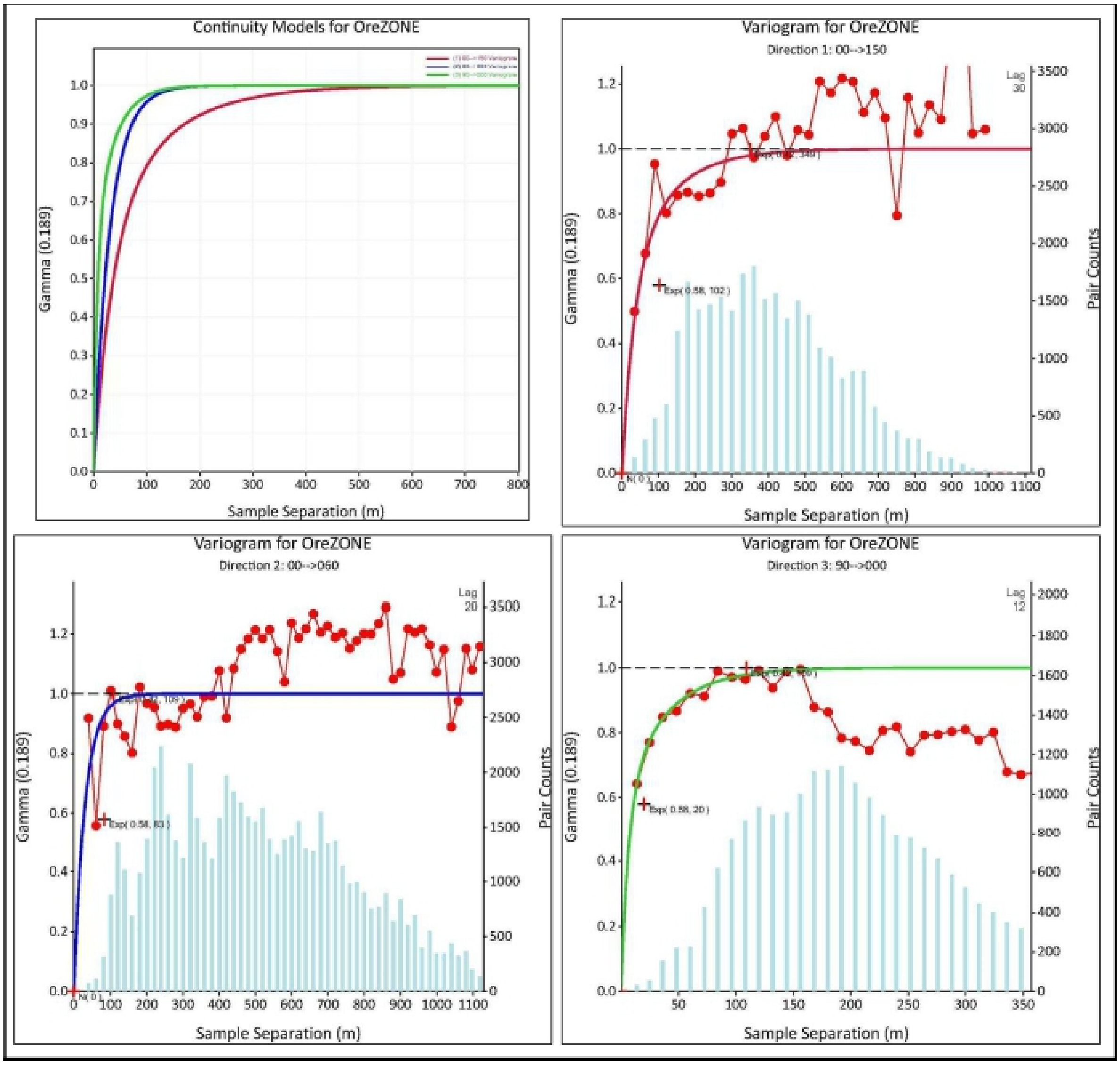


Figure 11-7. Experimental Variograms and Models for the OreZONE Indicator (Noble & Barrero, 2024)

The OreZONE variograms in *Figure 11-7* measure the continuity of the OreZONE flag, which is a zero/one (0,1) indicator variable that is used to define Low-Grade (0) and High-Grade (1) zones for the resource block model. Variograms are well defined, indicating a strong anisotropy along the 150 direction (+60 degrees rotation), and isotropic in the other two directions, with the longest range of 349 feet along the primary axis (X’), and 109 feet in the secondary axis (Y’) and in the tertiary axis (Z’-perpendicular to the trend).

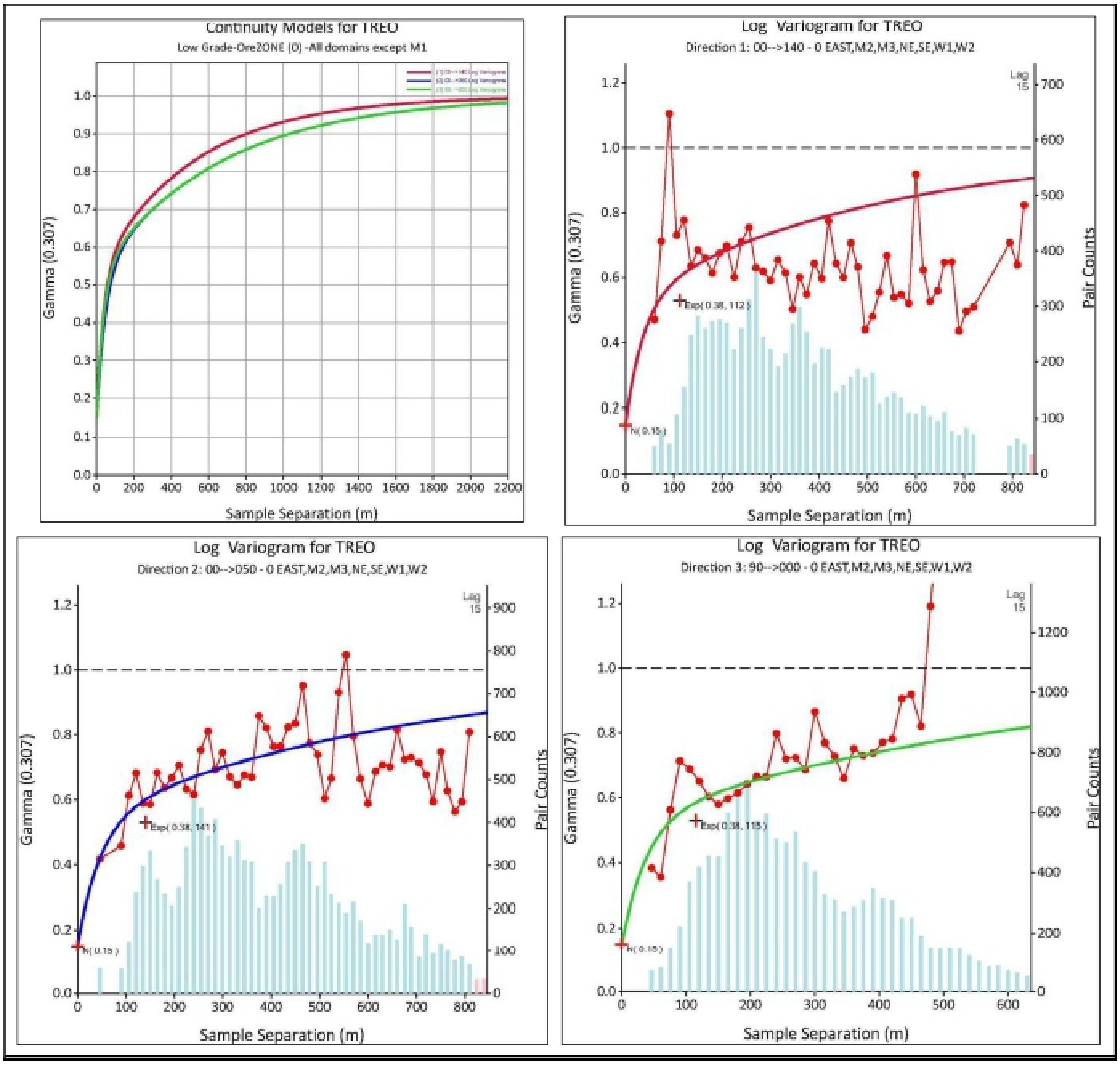


Figure 11-8. Experimental Variograms and Models for TREO in the Low-Grade OreZONE, domain M1 not included (Noble & Barrero, 2024)

Variograms for TREO in the low-grade zone (*Figure 11-8*), for all domains except M1, are isotropic in the secondary axis (Y') and in the tertiary axis (Z'-perpendicular to the trend) with the longest ranges of 2000ft along these directions. The shortest range of 1554 feet is found along the primary axis (X') in the 140 direction (+50 degrees rotation).

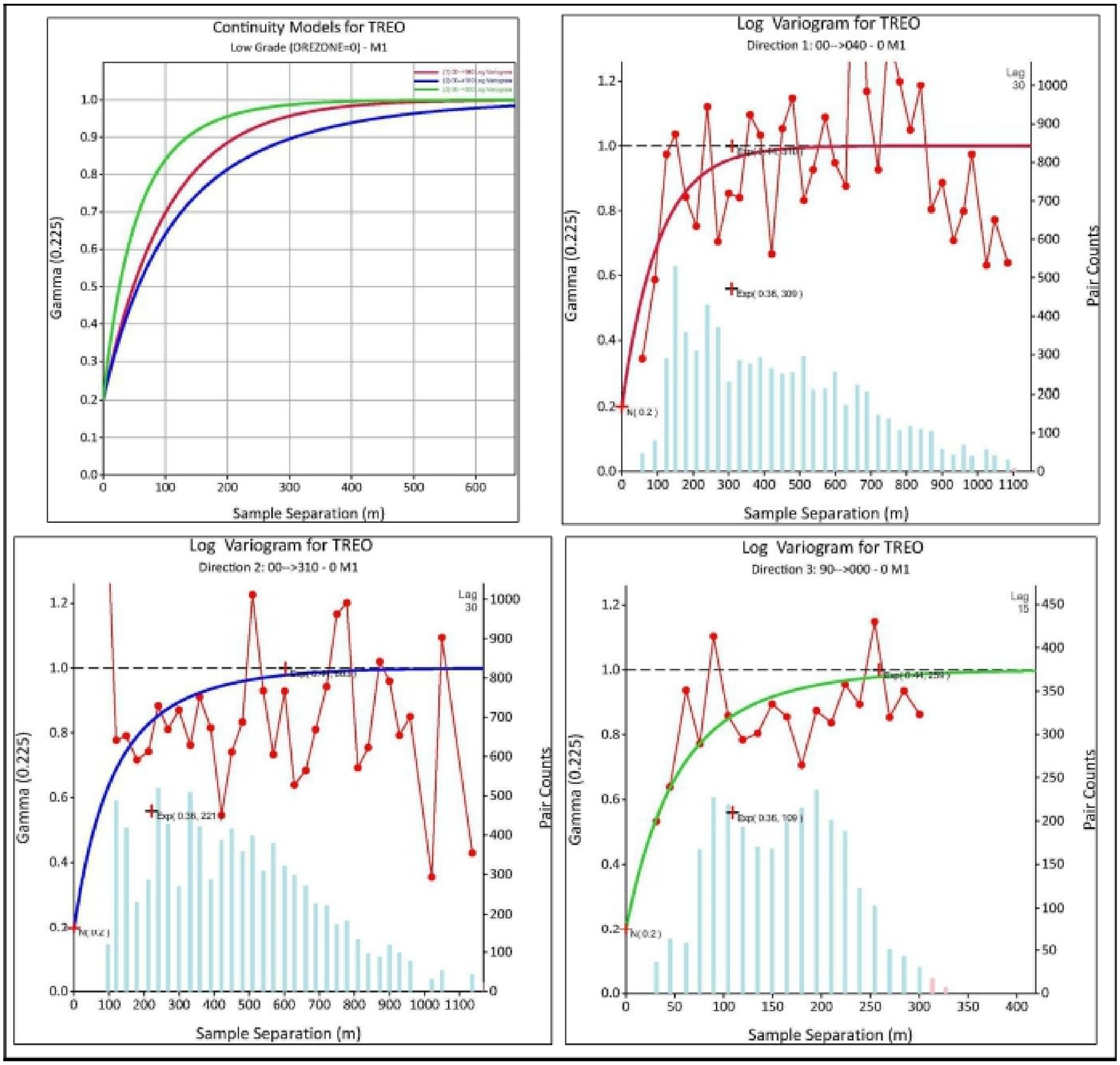


Figure 11-9. Experimental Variograms and Models for TREO in the Low-Grade OreZONES in domain M1 (Noble & Barrero, 2024)

Variograms for TREO in M1 domain for the low-grade OreZONE (*Figure 11-9*) indicate a strong geometric anisotropy, with better continuity along the 310/140 direction (-50 degrees rotation), with the longest range of 603 feet along this secondary axis (Y'). A medium range of 310 feet in the primary axis (X') and the shortest range of 259 feet along the tertiary axis (Z'), perpendicular to the trend.

In general, in all domains except M1, continuity is better in low-grade than high-grade zones.

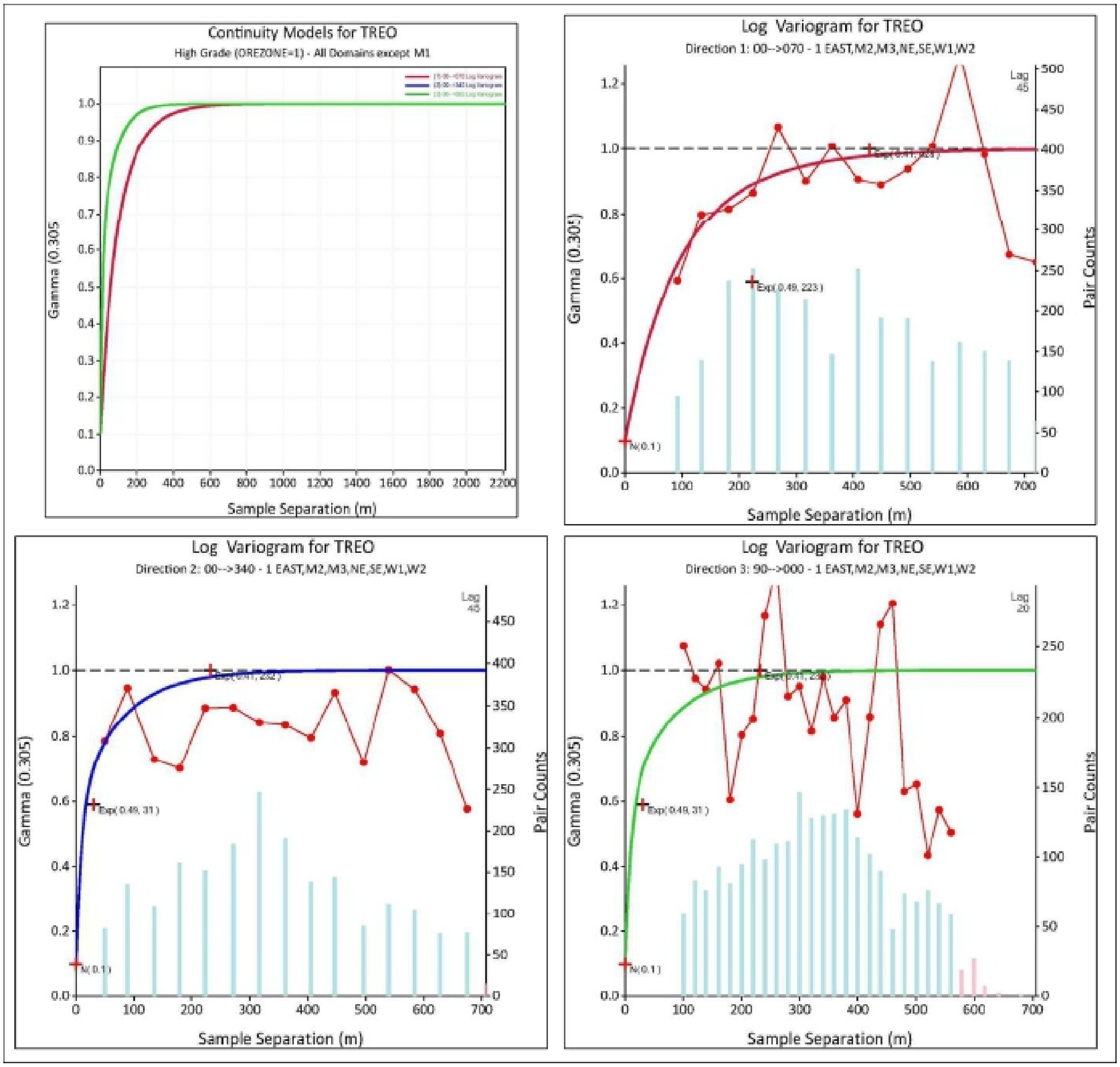


Figure 11-10. Experimental Variograms and Models for TREO in the High-Grade OreZONE, domain M1 not included (Noble & Barrero, 2024)

Variograms for TREO in the high-grade zone for all domains except M1 (*Figure 11-10*), are isotropic in the YZ plane with the shortest ranges of 232ft along these directions. The better continuity is found along the 070 direction (-20 degrees rotation), with the longest range of 428 feet along this axis (X'), in the up-down direction of the mineralized dikes.

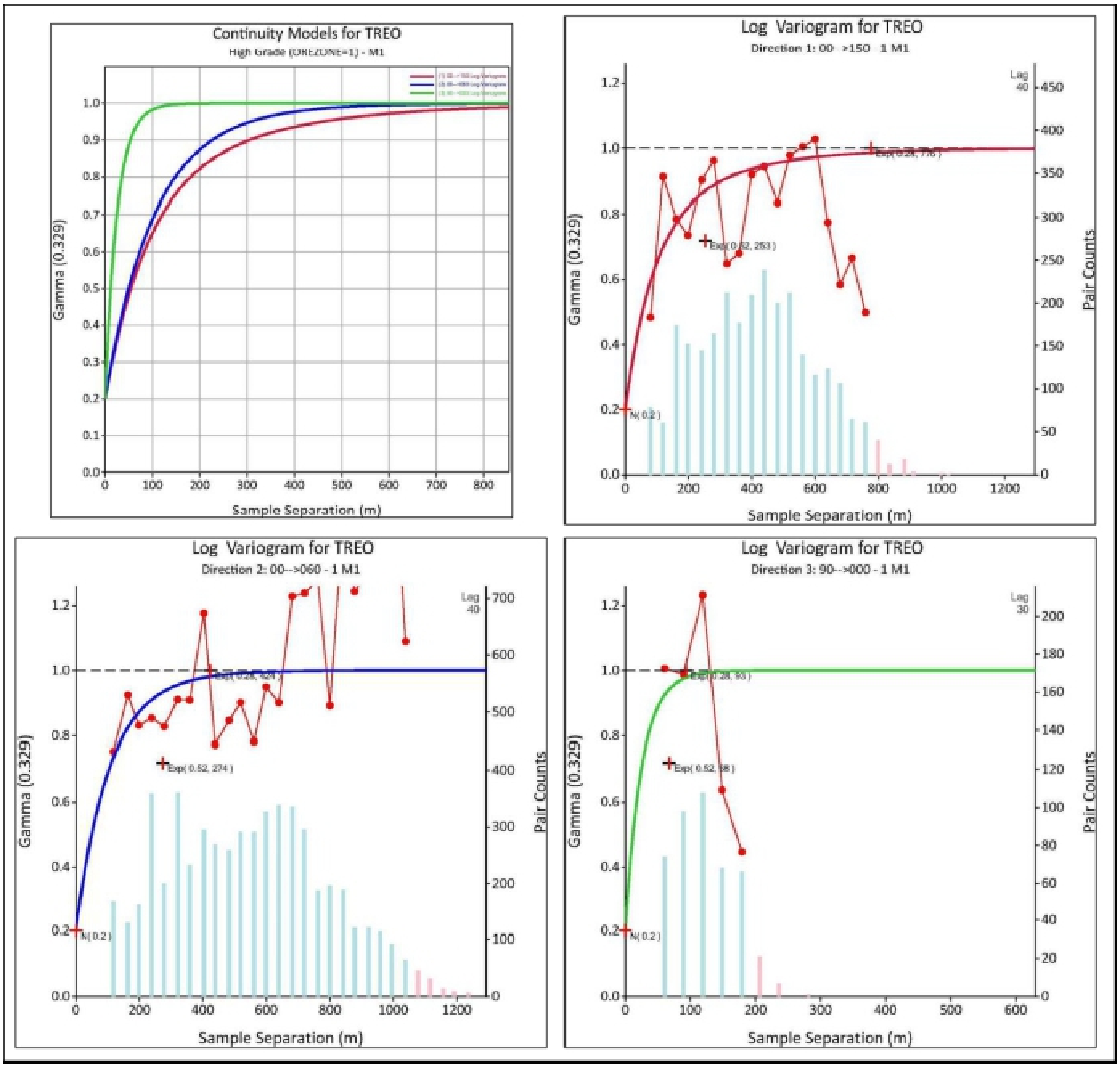


Figure 11-11. Experimental Variograms and Models for TREO in the High-Grade Zone OreZONE in domain M1 (Noble & Barrero, 2024)

Variograms for TREO in the high-grade zone of the M1 domain (*Figure 11-11*), show a strong geometric anisotropy with the best continuity along the 150 direction (+60 degrees rotation) with the longest range of 776 ft in this axis (X') and a shorter range of 424ft in the secondary axis (Y'); this indicates that the continuity is better along the direction of the dikes than in the up-down direction of these. The shortest range of 93 feet is found along the tertiary axis (Z'), or perpendicular to the dikes.

The spatial continuity study of the TREO indicates that the high-grade OreZONE is dominated by the orientation of the dikes, parallel to the ore zoning and that the low-grade is more continuous and dominated by the stockwork-type mineralization.

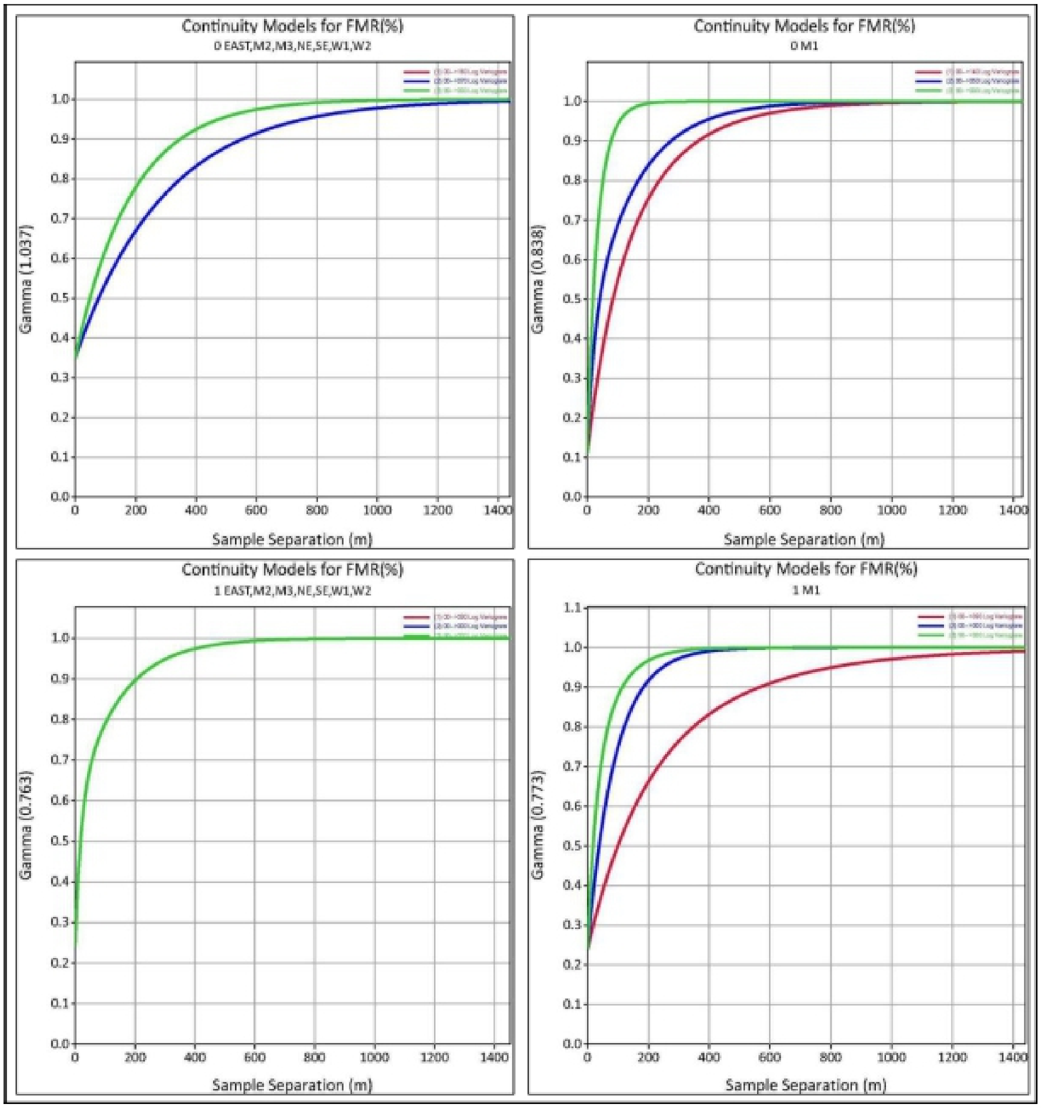


Figure 11-12. Variogram models for FMR (%) in the low-grade (above) and high-grade OreZONES (below), in domain 1 (left) and the other domains (right), (Noble & Barrero, 2024)

Variogram Models for FMR are shown in *Figure 11-12*. FMR in domain M1 is characterized by a strong geometric anisotropy, especially in the high-grade OreZONE with a very short range along the Z axis perpendicular to the trend, indicating also zonal anisotropy. When considering the other domains, the low-grade shows the best continuity in the trend plane with ranges of 888ft in both X and Y axes (isotropic), with the shortest ranges and continuity in the isotropic high–grade OreZONE.

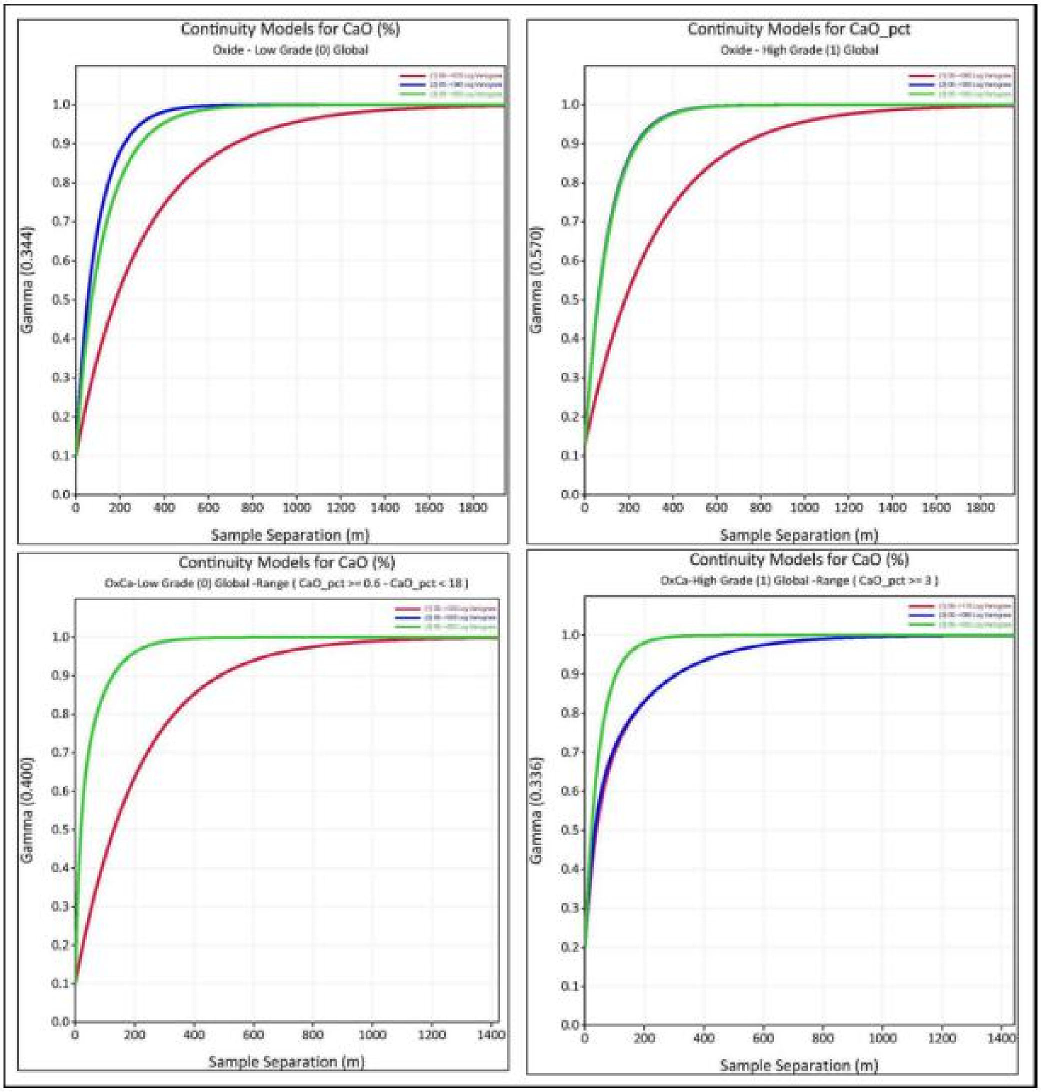


Figure 11-13. Variogram models for calcium oxide (%) in the Oxide (above) and OxCa (below) zones, low- grade and high-grade zones OreZONES, in all domains (Noble & Barrero, 2024)

Calcium oxide variogram models have been studied for all domains but separately in the Oxide and OxCa zones (*Figure 11-13*). In the Oxide zone, the best continuity and longest ranges are found in the up-down direction of the trend plane with similar and much shorter ranges along the trend and perpendicular to it. For the low-grade zone in the OxCa zone, continuity is similar to the Oxide zone with longer ranges also parallel to the up-down direction of the trend plane; in the high-grade zone, continuity is isotropic in the trend plane (XY) with ranges of 625 ft, and a very short range across the trend (188 ft).

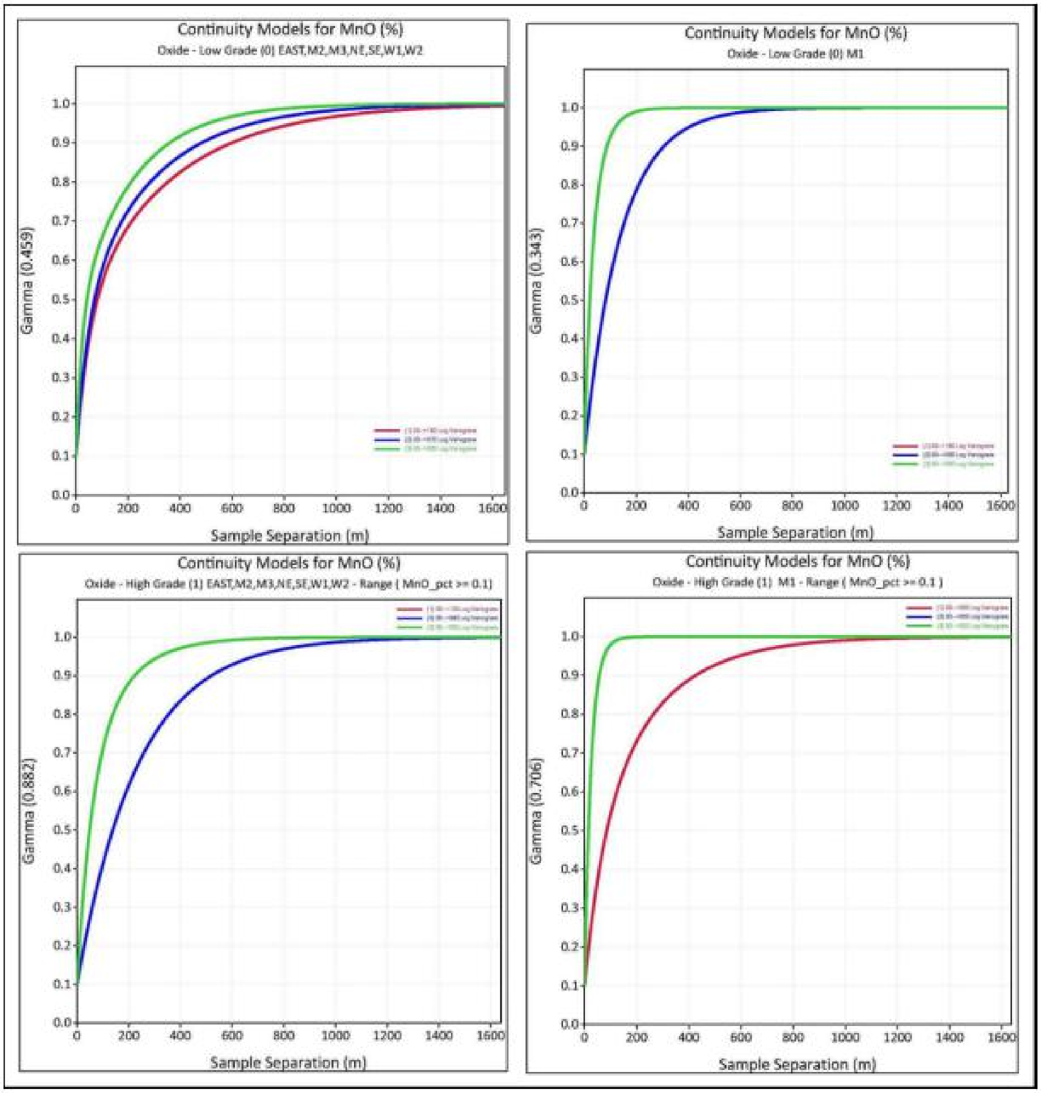


Figure 11-14. Variogram models for manganese oxide (%) in the Oxide zone, in the M1, and in the other domains for low-grade (above) and high-grade (below) OreZONES (Noble & Barrero, 2024)

Manganese oxide variogram models have been studied separately in the Oxide and OxCa zones (*Figure 11-14*). In the low-grade, oxide OreZONE, manganese oxide is almost isotropic except for M1. There are strong anisotropies in low-grade M1 and in all high-grade OreZONES.

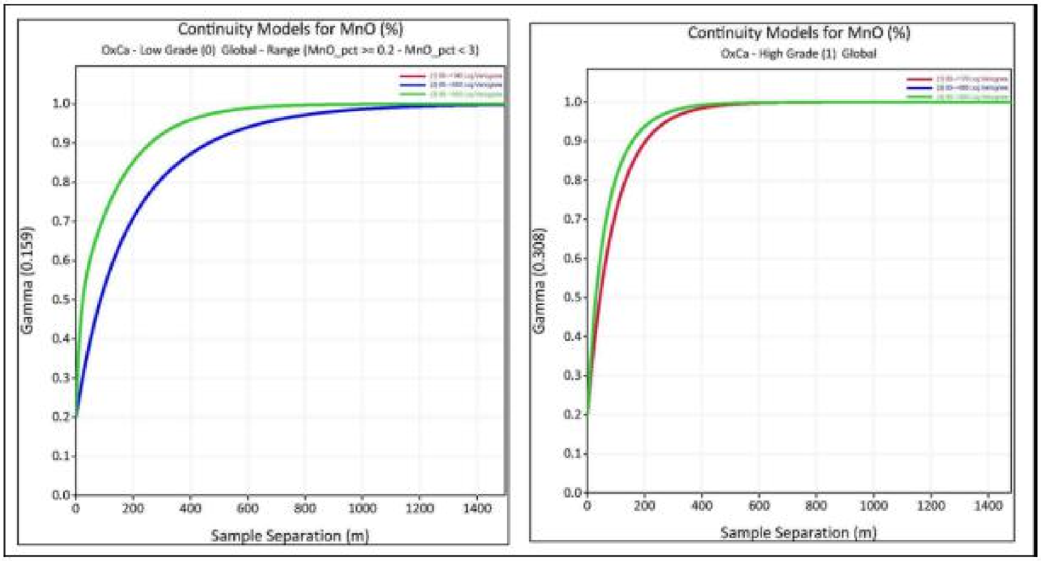


Figure 11-15. Variogram models for manganese oxide (%) in the OxCa zone, for low-grade and high- grade zones OreZONEs in all domains (Noble & Barrero, 2024)

In the OxCa Zone (*Figure 11-15*), the continuity of the calcium oxide is mostly isotropic within the trend plane with slightly shorter ranges perpendicular to the trend. In general, the shortest ranges are associated with the high-grade zones.

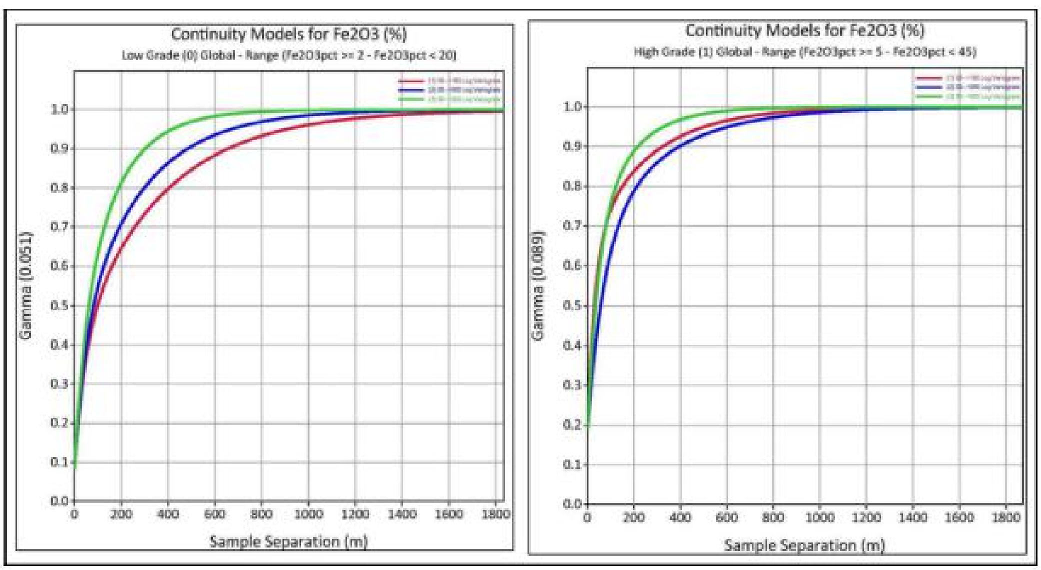


Figure 11-16. Variogram models for iron oxide (%) in all domains for the low-grade and high-grade OreZONEs (Noble & Barrero, 2024)

Iron oxide variogram models for all domains are similar to those for manganese oxide (*Figure 11-16*), demonstrating geometric anisotropy along the strike of the trend surface and shortest ranges perpendicular to the trend.

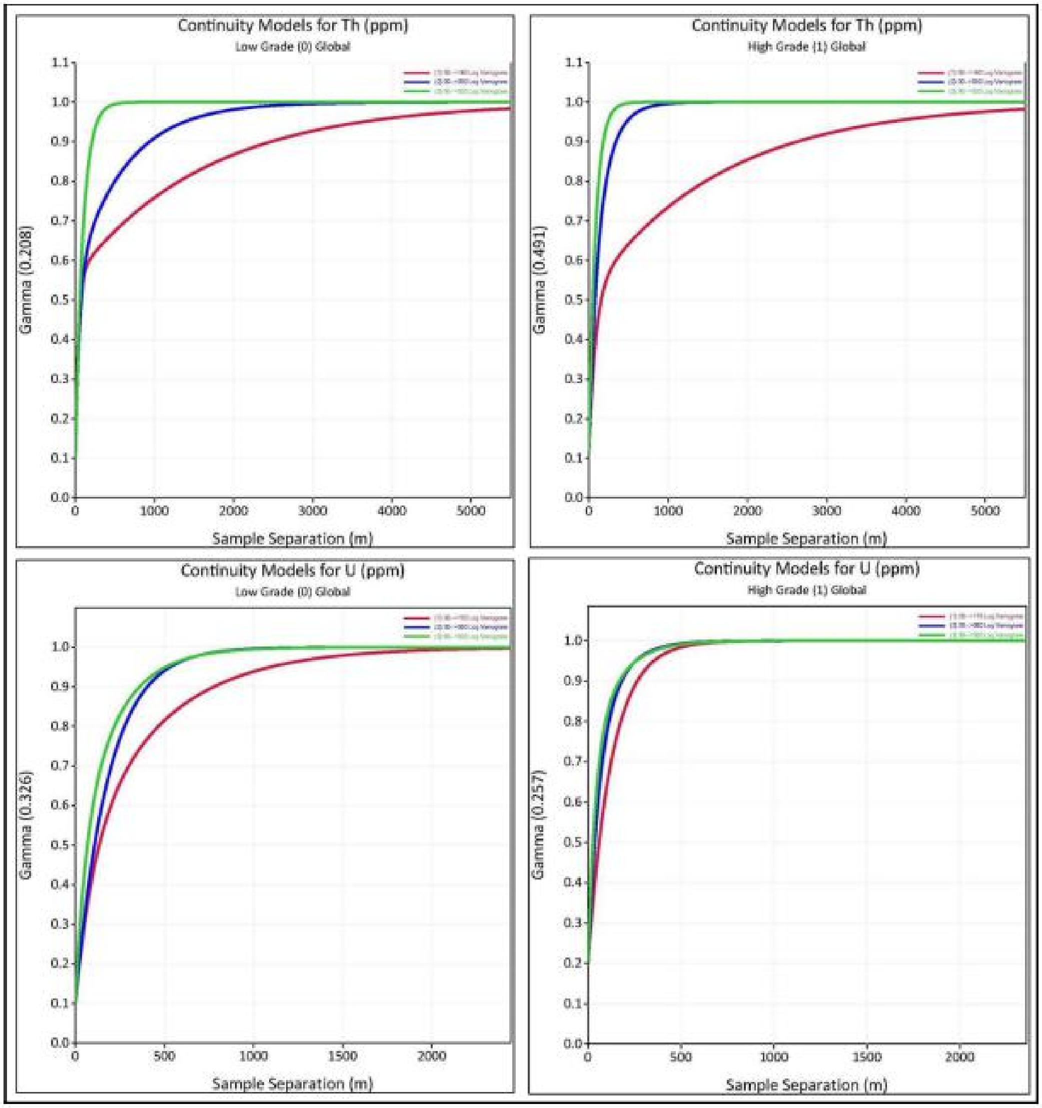


Figure 11-17. Variogram models for Thorium (above) and Uranium (below) in the low-grade and high- grade zones, in all domains (Noble & Barrero, 2024)

Thorium and uranium variogram models are displayed in *Figure 11-17*. Thorium shows the strongest geometric anisotropy and best continuity along the trend orientation with ranges of 5000ft along the main axis (X') and the shortest ranges perpendicular to the trend (Z axis). In the case of uranium, continuity is better in the low-grade OreZONE with longer ranges along the 150 orientation (60 degrees rotation) or along the trend. In the high-grade zone is almost isotropic.

11.8 OreZONE Block Model

The OreZONE block model was created using nearest-neighbor assignment (NN) to assign the OreZONE Flag from composites to blocks without regard to oxidation type (*section 11.6*). The OreZONE search ellipse radii and rotation are developed based on variogram ranges for the OreZONE flag parameter (*Table 11-8*), with 500 ft search dimension in X, 350 ft in Y, and 15 ft in Z, and a rotation of 60 degrees around the Z axis of the ellipse. The rotation and the search ellipse dimensions are relative to the trend flattened coordinates. A plan map through the OreZONE block model at the 5600 ft elevation is shown in *Figure 11-18.*

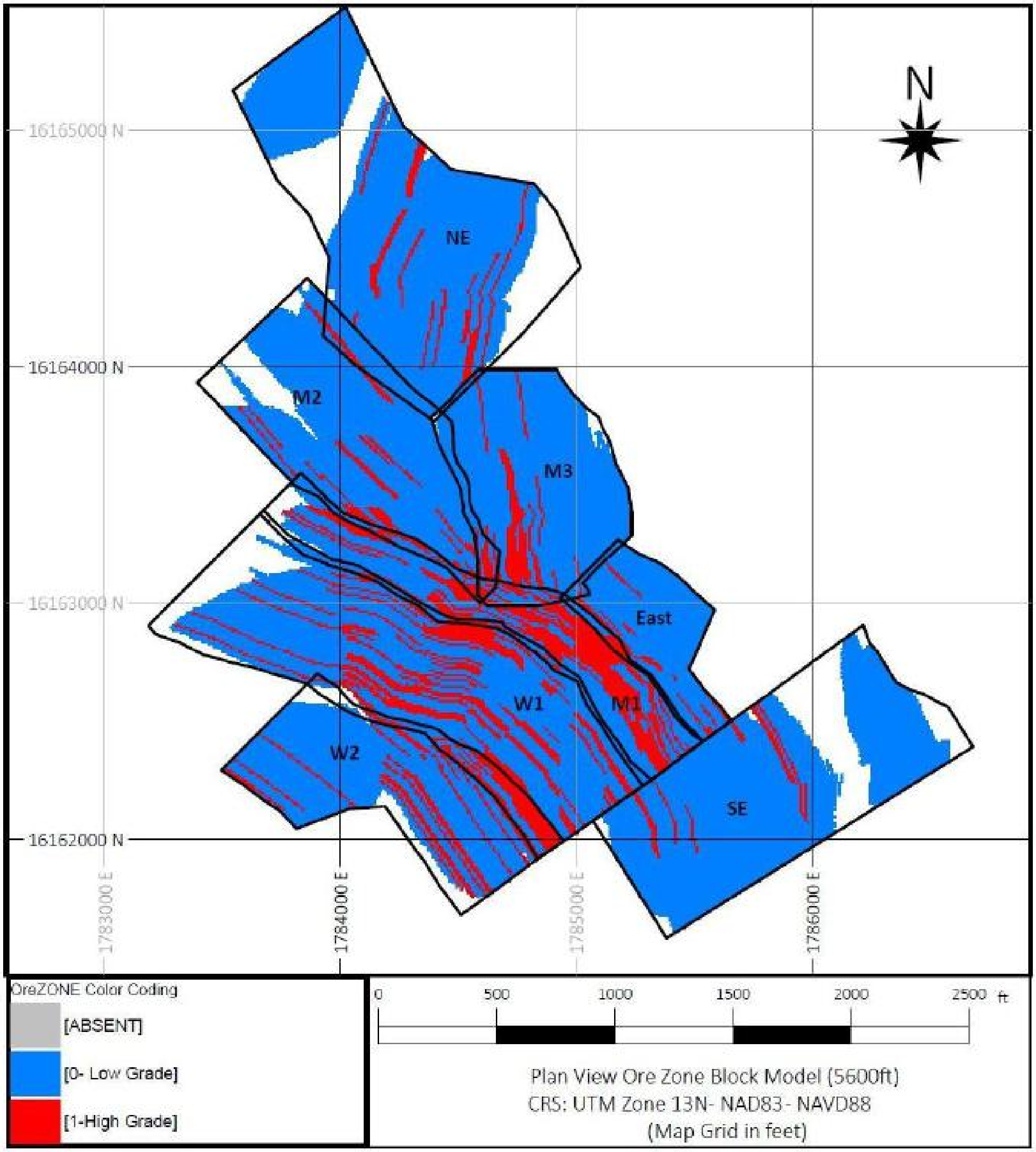


Figure 11-18. Plan Map Showing the OreZONE Block Model at Elevation 5600 ft; the estimation domain contours are plotted for reference (Noble & Barrero, 2024)

11.9 Grade Estimation

The estimation of individual rare-earth-element grades and TREO, iron oxide (%Fe_2O_3), manganese oxide(%MnO), calcium oxide (%CaO), and uranium (ppm U) and thorium (ppm Th) grades was done using inverse-distance-power (IDP) interpolation with nearest-neighbor (NN) estimation to provide a comparison check for the IDP estimates and also to evaluate the degree of smoothing of the estimates. The estimation procedure was done in the trend-flattened coordinate space using estimation parameters specific to each combination of element, OreZONE, and estimation domain.

Specific search ellipse parameters have been defined, depending on the grade variable, globally (for all estimation domains), for M1 domain, or for all domains excluding M1. The search-ellipse parameters for all data are summarized in *Table 11-9*. Search ellipses use the Datamine Studio RM search ellipse expansion option, which increases the search radius until the desired minimum number of samples is selected, with a maximum of one composite for the estimation from any given hole. For the first pass (no expansion), a minimum of 6 and a maximum of 9 composites are selected. The second pass uses an expansion factor of 1.5 of the original searches and the same parameters for composite selection. An expansion factor of 3 is used in the last pass, with a minimum of one composite and a maximum of 9 composites.

Table 11-9. Search Parameters for IDP and NN Estimation of Grades (Noble & Barrero, 2023).

				TREO		Fe_2O_3	MnO		CaO	Th	U
OreZONE	**OXIDE**	**Domain**		**M1**	**Global (not M1)**	**Global**	**M1**	**Global (not M1)**	**Global**	**Global**	**Global**
Low-Grade OreZONE	Oxide	Rotation		40	0	90	0	70	-20	50	60
		Search Radius	X'	300	300	300	300	300	300	300	300
			Y'	225	300	225	300	45	90	115	176
			Z'	30	30	30	45	30	120	85	30
	OxCa	Rotation		40	0	90	0	0	30	50	60
		Search Radius	X'	300	300	300	300	300	300	300	300
			Y'	225	300	225	300	300	75	115	176
			Z'	30	30	30	100	100	60	85	30
High-Grade OreZONE	Oxide	Rotation		60	-20	0	0	0	-10	50	80
		Search Radius	X'	300	300	300	300	300	300	300	300
			Y'	235	105	300	50	300	100	75	190
			Z'	30	30	30	45	30	120	25	30
	OxCa	Rotation		60	-20	0	80	80	0	50	80
		Search Radius	X'	300	300	300	300	300	300	300	300
			Y'	235	105	300	220	220	300	75	190
			Z'	30	30	30	30	30	30	25	30
Note – TREO parameters were used for all REE and TREO											

Grade estimation parameters are optimized for each element/zone/OreZONE combination, and, in particular, the power is optimized to provide the desired smoothing factor for the block variance (F-function, *Table 11-8*). The estimation parameters are summarized in *Table 11-10*.

Table 11-10. Estimation Parameters for IDP Estimation of Grades (Noble & Barrero, 2023)

				TREO		Fe2O3	MnO		CaO	Th	U
OreZONE	**OXIDE**	**Domain**		**M1**	**Global (not M1)**	**Global**	**M1**	**Global (not M1)**	**Global**	**Global**	**Global**
Low-Grade OreZONE	Oxide	Rotation		40	0	90	70	70	-20	50	60
		Anisotropy distances	X'	300	300	300	300	300	300	100	300
			Y'	225	300	225	245	245	95	300	176
			Z'	120	300	140	180	180	120	85	145
		Power		4	4	4	4	4	4	3	4
	OxCa	Rotation		40	0	90	0	0	30	50	60
		Anisotropy distances	X'	300	300	300	300	300	300	100	300
			Y'	225	300	225	300	300	60	300	176
			Z'	120	300	140	150	150	60	85	145
		Power		4	4	4	4	3.2	4	3.1	4
High-Grade OreZONE	Oxide	Rotation		60	-20	0	0	0	-10	50	80
		Anisotropy distances	X'	300	300	300	300	300	300	300	300
			Y'	235	105	300	300	300	100	45	190
			Z'	60	105	250	115	115	100	25	150
		Power		3.5	3.6	4	4	4	4	3.9	4
	OxCa	Rotation		60	-20	0	80	80	0	50	80
		Anisotropy distances	X'	300	300	300	300	300	300	300	300
			Y'	235	105	300	220	220	300	45	190
			Z'	60	105	250	220	220	135	25	150
		Power		3.6	3.5	4	4	3	3.6	3	4
Note – TREO parameters were used for all REE and TREO											

11.10 Block Model Verification

The IDP grade model was verified in comparison with the NN grade model to ensure that the estimates were unbiased on an overall basis, and to verify that the variance of the block estimates was similar to the variance predicted from the variogram F-Functions.

The comparison for TREO, tabulated in *Table 11-11*, was done using only those blocks classified as measured and indicated blocks, since the inferred blocks don't have sufficient reliability for this comparison. The results of NN vs. IDP comparisons show that the difference between the average IDP and NN grades is generally better than 2% for individual zones or the average of any oxide zone/OreZONE combination. The variance reduction from NN block estimates is also generally in the expected range.

Table 11-11. Comparison of IDP vs. NN Estimates for TREO (Noble & Barrero, 2023)

Oxide Type	OreZONE	Domain	IDP Estimates			NN Estimates		Ratio IDP : NN		Target Smoothing Ratio
			#Blocks	Average Grade	Relative Variance	Average Grade	Relative Variance	Average Grade	Rel. Var. (Smoothing Ratio)	
Oxide Zone	Low-Grade	M1	119,543	0.738	0.122	0.738	0.175	1.000	0.698	0.740
		Global (not M1)	259,070	0.669	0.125	0.669	0.171	1.001	0.727	0.790
	High-Grade	M1	46,450	4.227	0.418	4.239	0.608	0.997	0.688	0.690
		Global (not M1)	84,233	2.892	0.398	2.897	0.578	0.998	0.688	0.690
OxCa Zone	Low-Grade	M1	60,619	0.804	0.091	0.801	0.131	1.005	0.691	0.740
		Global (not M1)	46,673	0.668	0.138	0.663	0.184	1.007	0.751	0.790
	High-Grade	M1	65,471	3.775	0.185	3.780	0.268	0.999	0.692	0.690
		Global (not M1)	24,273	2.840	0.298	2.844	0.433	0.999	0.689	0.690

IDP vs NN comparisons for Fe_2O_3, CaO, MnO, thorium, and uranium are tabulated in *Table 11-12* through *Table 11-16* and show that those estimates are also unbiased and that volume-variance effects are accounted for within reasonable limits.

Table 11-12. Comparison of IDP vs. NN Estimates for Fe_2O_3 (Noble & Barrero, 2023)

Oxide Type	OreZONE	Domain	IDP Estimates			NN Estimates		Ratio IDP : NN		Target Smoothing Ratio
			#Blocks	Average Grade	Relative Variance	Average Grade	Relative Variance	Average Grade	Rel. Var. (Smoothing Ratio)	
Oxide Zone	Low-Grade	Global	378,613	8.548	0.036	8.558	0.050	0.999	0.718	0.86
	High-Grade	Global	130,683	13.912	0.107	13.952	0.148	0.997	0.723	0.74
OxCa Zone	Low-Grade	Global	107,292	7.482	0.023	7.448	0.032	1.005	0.707	0.86
	High-Grade	Global	89,744	12.276	0.085	12.270	0.117	1.000	0.729	0.74

Table 11-13. Comparison of IDP vs. NN Estimates for CaO (Noble & Barrero, 2023)

Oxide Type	OreZONE	Domain	IDP Estimates			NN Estimates		Ratio IDP : NN		Target Smoothing Ratio
			#Blocks	Average Grade	Relative Variance	Average Grade	Relative Variance	Average Grade	Rel. Var. (Smoothing Ratio)	
Oxide Zone	Low-Grade	Global	378,613	0.583	1.233	0.581	1.592	1.004	0.775	0.85
	High-Grade	Global	130,683	0.913	1.679	0.910	2.661	1.003	0.631	0.83
OxCa Zone	Low-Grade	Global	107,291	4.122	0.312	4.151	0.427	0.993	0.731	0.75
	High-Grade	Global	89,645	16.574	0.230	16.538	0.323	1.002	0.713	0.71

Table 11-14. Comparison of IDP vs. NN Estimates for MnO (Noble & Barrero, 2023)

Oxide Type	OreZONE	Domain	IDP Estimates			NN Estimates		Ratio IDP : NN		Target Smoothing Ratio
			#Blocks	Average Grade	Relative Variance	Average Grade	Relative Variance	Average Grade	Rel. Var. (Smoothing Ratio)	
Oxide Zone	Low-Grade	M1	119,543	1.422	0.373	1.424	0.563	0.998	0.662	0.81
		Global (not M1)	259,070	1.351	0.396	1.348	0.569	1.002	0.696	0.83
	High-Grade	M1	46,450	4.352	0.598	4.432	0.854	0.982	0.700	0.73
		Global (not M1)	84,233	3.157	0.892	3.101	1.151	1.018	0.775	0.86
OxCa Zone	Low-Grade	M1	60,619	1.108	0.115	1.105	0.188	1.003	0.615	0.72
		Global (not M1)	46,673	0.979	0.147	0.967	0.205	1.012	0.718	0.72
	High-Grade	M1	65,471	3.223	0.326	3.229	0.493	0.998	0.661	0.73
		Global (not M1)	24,174	2.342	0.248	2.337	0.338	1.002	0.734	0.73

Table 11-15. Comparison of IDP vs. NN Estimates for thorium (Noble & Barrero, 2023).

Oxide Type	OreZONE	Domain	IDP Estimates			NN Estimates		Ratio IDP : NN		Target Smoothing Ratio
			#Blocks	Average Grade	Relative Variance	Average Grade	Relative Variance	Average Grade	Rel. Var. (Smoothing Ratio)	
Oxide Zone	Low-Grade	Global	378,613	94.401	0.298	94.094	0.386	1.003	0.772	0.77
	High-Grade	Global	130,683	329.639	1.122	328.905	1.433	1.002	0.783	0.78
OxCa Zone	Low-Grade	Global	107,292	77.307	0.170	77.005	0.221	1.004	0.770	0.77
	High-Grade	Global	89,744	288.034	0.569	285.621	0.728	1.008	0.782	0.78

Table 11-16. Comparison of IDP vs. NN Estimates for uranium (Noble & Barrero, 2023)

Oxide Type	OreZONE	Domain	IDP Estimates			NN Estimates		Ratio IDP : NN		Target Smoothing Ratio
			#Blocks	Average Grade	Relative Variance	Average Grade	Relative Variance	Average Grade	Rel. Var. (Smoothing Ratio)	
Oxide Zone	Low-Grade	Global	378,613	39.037	0.253	38.777	0.339	1.007	0.745	0.86
	High-Grade	Global	130,683	99.087	0.307	99.873	0.433	0.992	0.709	0.73
OxCa Zone	Low-Grade	Global	107,292	52.169	0.356	51.736	0.454	1.008	0.783	0.86
	High-Grade	Global	89,744	112.346	0.238	112.806	0.337	0.996	0.706	0.73

11.11 Block Model Density Estimation

Densities were estimated for each block based on the fraction of FMR/carbonatite mineralization using IDP estimation and the same procedure used for estimating the TREO and REE grades. The formulae used for the block model density estimates are summarized in *Table 11-17*.REminIDP is the IDP estimate of the percentage of FMR and Carbonatite. Default density is assigned to blocks with no REminIDP estimate using a value of zero (0.00) for REminIDP. Metric densities are divided by 32.036927 to convert from t/m3 to short tons/ft^3.

Table 11-17. Formulae for Block Density Estimation (A. Noble, in Roche-Engineering, 2014)

Oxidation Type	Default Density (t/m^3)	Density Formula
Overburden & Clay	1.8	
Oxide	2.26	*DENSITY=0.01* (REminIDP*1.81+(100 - REminIDP)*2.26)*
OxCa	2.32	*DENSITY=0.01* (REminIDP*2.16+(100 - REminIDP)*2.32)*
Tran	2.55	
Sulf	2.59	

11.12 Dilution

Dilution is introduced to the resource estimate in three ways:

First, the sampling interval for assaying is generally a consistent 10-foot interval. Accordingly, an assay interval may consist of a mixture of two or more types of mineralization. For example, an interval may consist of 9 feet of high-grade FMR and 1 foot of wall rock, resulting in 10% dilution. Alternatively, an interval may have 1 foot of high-grade FMR and 9 feet of wall rock, resulting in 90% dilution. It is impossible to quantify the amount of dilution introduced by the 10-foot sampling interval, but it would be significant in those areas with narrow veins and less so in parts of the Bull Hill Main dike, which can exceed 50-feet in width.

The second source of dilution is compositing into true-width composites with a nominal length of 10 feet. Because the nearly vertical ore zones are intersected by drill holes with an average angle of 60 degrees, a 10-foot ore intersection on the drill hole will only result in a true-width intersection of 5-feet. When the 5-foot true-width intervals are combined to make an ore-zone composite of at least 10-feet, there is inevitable dilution and loss of higher-grade mineralization, as summarized in *Table 11-18*. At the resource cutoff of 2.18% TREO, compositing dilution adds 13.9% to the composite length, with a corresponding reduction in TREO grade.

Table 11-18. Compositing Dilution Summary (Noble, 2023)

Cutoff % TREO	Drill Holes				Composites				% Difference		
	Total Length	Total True Length	True Length* %TREO	Average % TREO	Total Length	Total True Length	True Length* % TREO	Average %TREO	True Length	Contained %TREO	% TREO Grade
1	48,101	25,424	74,469	2.929	50,489	26,476	72,959	2.756	4.1%	-2.0%	-5.9%
2	21,210	11,093	54,757	4.936	24,551	12,738	54,194	4.255	14.8%	-1.0%	-13.8%
2.18	19,497	10,185	52,861	5.190	22,423	11,601	51,821	4.467	13.9%	-2.0%	-13.9%
2.5	16,947	8,763	49,538	5.653	18,801	9,714	47,403	4.880	10.9%	-4.3%	-13.7%
3	13,854	7,143	45,085	6.312	14,805	7,603	41,600	5.472	6.4%	-7.7%	-13.3%
3.5	11,590	5,947	41,215	6.930	11,381	5,856	35,935	6.137	-1.5%	-12.8%	-11.4%
3	13,854	7,143	45,085	6.312	14,805	7,603	41,600	5.472	6.4%	-7.7%	-13.3%

(length in US Survey ft)

The third source of dilution is introduced by the averaging effects of the IDP grade estimation method. Because data from several drill holes is used for estimation, the grade of the estimates will tend to be lower than the highest-grade drill holes and higher than the lowest-grade drill holes. This is referred to as the smoothing effect and can be quantified by comparing the tonnage and grade of NN and IDP estimates at different cutoffs, as shown in *Table 11-19*. At the resource cutoff of 2.18 TREO, 13.4% tonnage is added, and grade is reduced by 8.6%.

Table 11-19. Dilution from Inverse-Distance-Power Estimation (Noble, 2023)

Cutoff% TREO	Nearest Neighbour			Inverse Distance			% Difference		
	Short Tons Resource (1000's)	Short Tons TREO (1000's)	Average % TREO	Short Tons Resource (1000's)	Short Tons TREO (1000's)	Average % TREO	Short Tons Resource (1000's)	Contained TREO	% TREO Grade
1	32,790	846	2.58	29,583	807	2.73	-9.8%	-4.6%	5.7%
2	14,809	602	4.07	16,891	630	3.73	14.1%	4.5%	-8.4%
2.18	13,336	572	4.29	15,128	593	3.92	13.4%	3.7%	-8.6%
2.5	10,917	515	4.72	12,289	527	4.28	12.6%	2.3%	-9.1%
3	8,273	442	5.35	9,035	438	4.84	9.2%	-1.1%	-9.4%

While it is believed this level of dilution can be reasonably achieved with selective mining practices, the authors emphasize that intense grade-control procedures must be used, or excessive dilution will result.

11.13 Resource Classification

Classification of mineral resources into measured, indicated, and inferred resource classes is based on drill-hole spacing and the number of drill holes selected for estimation.

Drill-hole spacing is measured in the trend-flattened coordinate space using the variance from the kriging of a flag variable. A zero-nugget, linear variogram is used for the kriging runs, resulting in a kriging variance directly proportional to the drill-hole spacing. In addition, limits were placed on the estimation expansion volume to ensure that measured and indicated blocks were defined by at least 6 drill holes within search volumes 1 and 2. The parameters for resource classification are summarized in *Table 11-20*.

The variable RCLASS is used to identify the resource class in each block. RCLASS= 1 is assigned to blocks in the measured category, and RCLASS=2 is assigned to blocks in the indicated category. RCLASS=3 is assigned to blocks in the inferred category, unless the drill-hole spacing is greater than 300 feet, in which case the block is unclassified.

Table 11-20. Parameters for Resource Classification in the Ox and OxCa zones (Noble & Barrero, 2023)

	Grid Spacing (feet)			Search Volume		
Resource Class	**Measured**	**Indicated**	**Inferred**	**Measured**	**Indicated**	**Inferred**
RCLASS	**1**	**2**	**3**	**1**	**2**	**3**
East	-	≤200	> 200 and ≤ 300	-	2	3
Main 1	≤ 125	>125 and ≤250	> 250 and ≤300	1	2	3
Main 2	-	-	≤ 300	-	-	-
Main 3	-	≤200	> 200 and ≤ 300	-	2	3
Northeast	-	-	≤ 300	-	-	-
Southeast	-	-	≤ 300	-	-	-
West 1	-	≤200	> 200 and ≤ 300	-	2	3
West 2	-	-	≤ 300	-	-	-

The overburden, clay, transition, and sulfide oxidation zones are all unclassified, which means that no resources are assigned in these zones.

11.14 Mineral Resource

The Bull Hill Mineral Resource estimate was first summarized using a Lerchs-Grossmann (LG) pit shell computed using Datamine Studio Maxipit software that was run using all resources, including inferred resources. Pit optimization was constrained to the south by the limit of Section 20, which is Mineral Withdrawal Land.

Based on the resulting optimized pit shell, a preliminary pit design was performed to further delineate the resource. Pit design was done using Datamine Studio OP software and was constrained to the south by a 50ft buffer from Section 20.

At the time of reporting, the Mineral Resource summarized by the resulting preliminary pit design is considered to have reasonable prospects for eventual economic extraction by open pit methods. Mineral resources are estimated from the current topography and are dated 31 December 2023.

11.14.1 Key Assumptions and Parameters for Pit Optimization

The Lerchs-Grossmann (LG) algorithm was used to analyze economic pit limits based on metallurgical recoveries and other parameters. Considered key assumptions and parameters are described below:

1. Rock Types: A model of the Bull Hill deposit rock types was created as a three-dimensional (3D) block model using Datamine Studio RM software with a block size of 10x10x10-foot. This rock-type block model is necessary to provide slope, mining, and processing cost parameters to the ores (Oxide and OxCa) and the non-ore-bearing geologic units (Overburden, Clay, Transition, and Sulfide).

2. Density: Default densities were assigned to the rock type model based on the average density of the different rock types; these densities are summarized in *Table 11-17*.

3. Overall Slope Angles (OSAs): Based on the historical geotechnical investigations (Sierra Geotechnical LLC., 2013), an OSA of 30° was used for the entire upper 150ft below the ground surface where weak rock mass conditions are anticipated, and 35° below this upper section. The OSAs were used to control the LG shell wall projections. A minimum width of 40ft was set for the bottom of the pit shell.

4. Mine and Plant Operating Costs: These are factored costs estimated based on 2019 cost data and contractor-estimated costs; RER provided all costs. In the Qualified Persons' opinion, these costs are considered reasonable for establishing the prospects of economic extraction for mineral resources at the time of reporting. Both mining and processing operating costs are summarized in *Table 11-21*.

Table 11-21. Estimated Operating Costs; prices in US Dollars (provided by RER, 2023)

Description	2019 Cost Estimate	2023 Cost Estimate, w/assumptions		
		Ore	Waste	Comments
Cost Mining/Mined Ton of Ore/waste	$3.00	$6.40	$4.00	Contract Mining cost from Wood Plc
Cost CrushScreen/Ore Ton of Ore	$4.75	$4.00		Contract Crush cost from Wood Plc
Cost HwyTransport/Hydromet Feed Ton of Ore	$11.26	$13.39		*
Cost TSF Ops/Hydromet Feed Ton of Ore	$6.00	$7.14		
Cost G&A/Hydromet Feed Ton of Ore	$25.19	$29.98		*
Cost Hydromet_SepRef/Hydromet Feed Ton of Ore	$253.00	$301.07		*

Total Crush-Screen+Transport +Plant costs + G&A per Ton of Ore	**$356**

* CPI Inflation Calculator
$1 in 2019 = $1.19 in 2023
US Bureau of Labor Statistics 28/08/2023
28/08/2023

5. Metallurgical Recoveries, Pay Factors, and Commodity Prices: Updated metallurgical plant recoveries for the different elements have been provided RER (see *Chapter 10*), and these are presented in *Table 11-22*. Only La, Nd, Pr, Dy, and HREE (Yb+Tm+Tb+Er+Ho+Lu) are considered payable for pit optimization purposes. The rare-earth oxide prices by element used are Q3 2023 actual prices in US $ per Kg, provided by RER (Wood Mackenzie, 2023). In the Qualified Persons' opinion, the metallurgical recoveries, pay factors, and selected commodity prices provide an adequate basis to establish reasonable prospects for economic extraction of the Bull Hill Mineral Mineral Resource.

Table 11-22. Pay Factors, Hydromet Plant Recoveries, and Rare-Earth Elements Prices (provided by RER, 2023)

Element	Pay Factor	Hydromet Plant Recoveries	Prices (US $ /Kg)
La	1	0.907	0.93
Nd	1	0.898	77.25
Pr	1	0.902	76.48
Dy	0.75	0.835	320
HREE	0.5	0.816	1200
Ce	0	0.336	0
Sm	0	0.912	0
Eu	0	0.913	0
Gd	0	0.924	0
Y	0	0.788	0

6. Dilution and Ore Loss: No additional provisions outside of the block model have been made for mining dilution and ore loss. A discussion on composite and block model dilution is included in *Section 11.12*.

7. Geometrical constraints: Pit optimization was constrained by the Section 20 limit to the south and by a 100ft buffer around the sulfide zone.

11.14.2 Preliminary Pit design

Based on the resulting LG economic shell, a preliminary pit design was completed in Datamine Studio OP. The open pit design parameters used are based on historical geotechnical investigations (Sierra Geotechnical, 2013) and were assigned to three-dimensional (3D) slope regions. Road width was set to 40ft for one-way traffic roads and 70ft for two-way traffic, with a maximum road gradient of 10%. The pit design parameters are summarized in *Table 11-23*, and a plan view of the location of the three-dimensional (3D) slope regions is shown in *Figure 11-19.*

Table 11-23. Pit design parameters (Sierra Geotechnical LLC., 2013)

Slope Region	Bench Face Angle (degrees)	Berm Width (ft)	Bench Height (ft)
1	64°	19	20
2	75°	19	20
3	75°	19	20
4	64°	19	20
5	64°	19	20
10 (upper 150ft)	52°	19	20

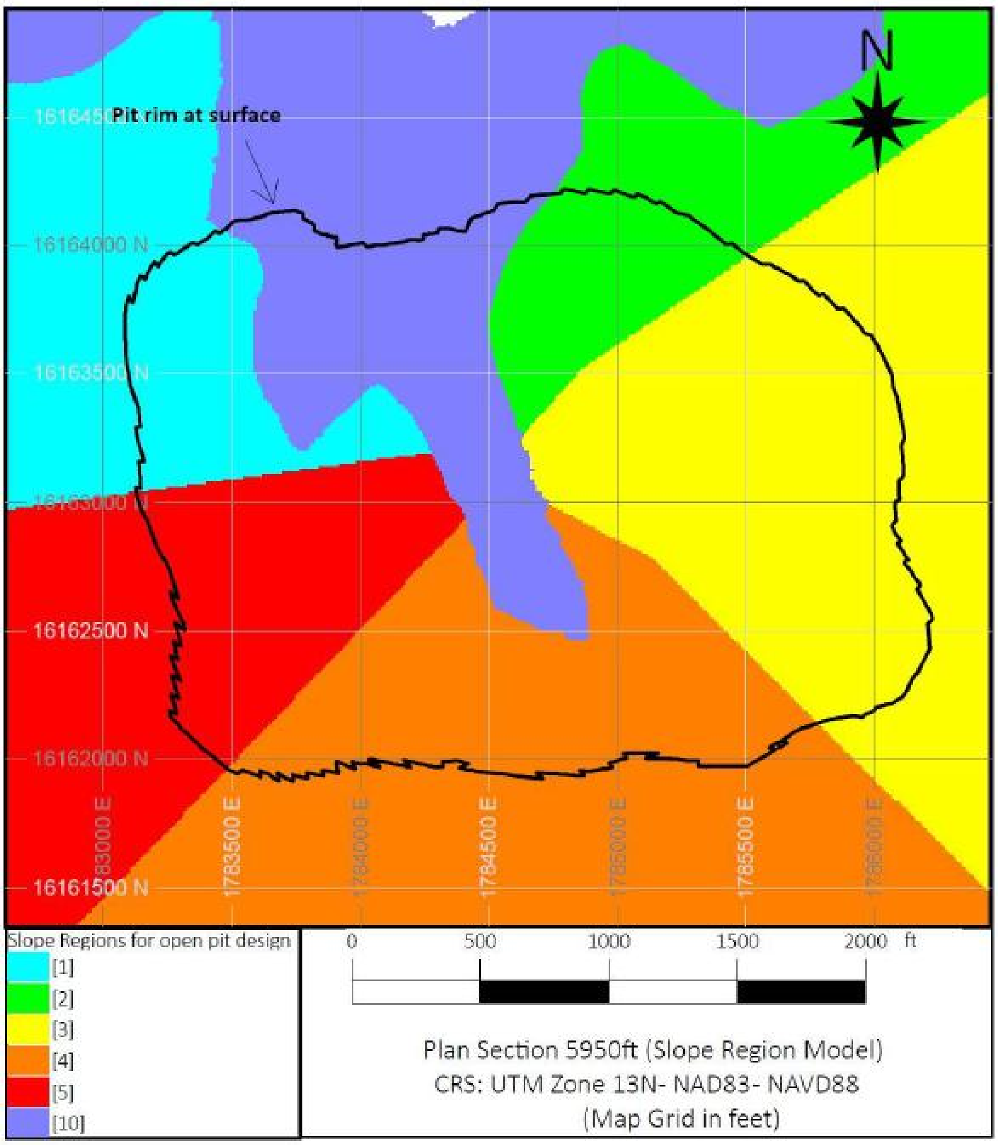


Figure 11-19. Plan View Showing the Slope Region Model (Noble & Barrero, 2024)

A plan view of the Bull Hill preliminary pit design used to summarize the mineral resource is shown in *Figure 11-20*. Pit design bottoms are located at 5570 and 5590 ft; additionally, a 40ft width catch-berm was designed in the south slope at 5970ft elevation to reduce the inter-ramp height. *Figure 11-21* shows a plan view of the grade model and the design pit rim at 5800 ft elevation; a typical vertical cross-section perpendicular to the mineralized zones is included in *Figure 11-22*.

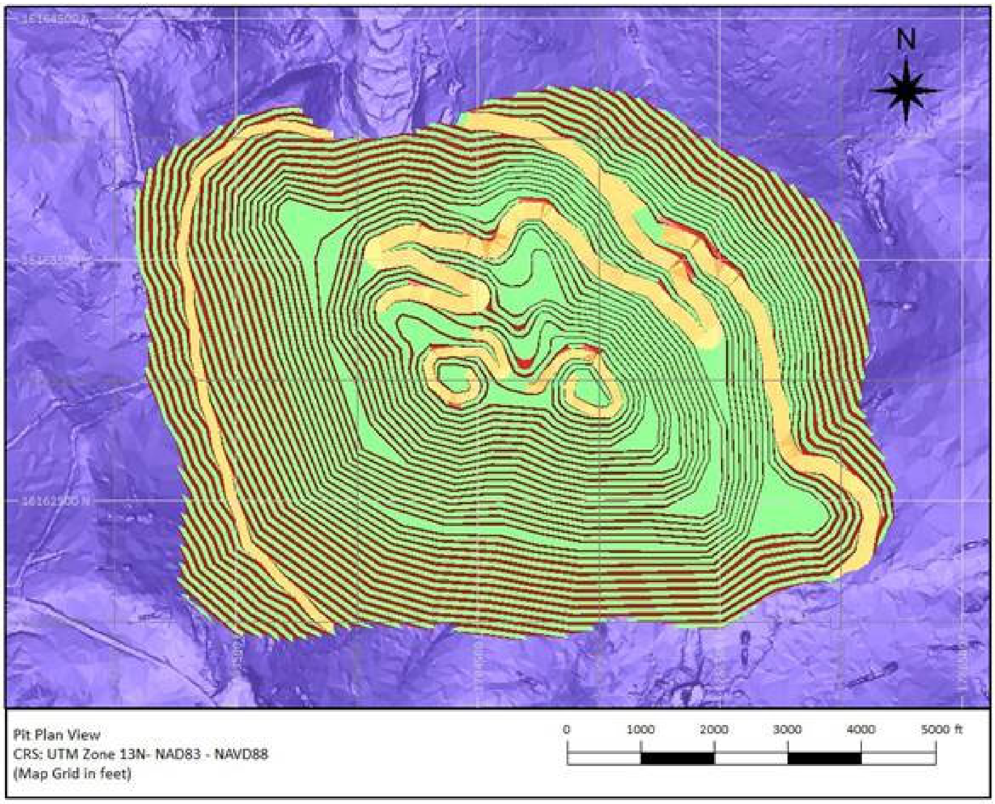


Figure 11-20. Plan view of the Preliminary Pit Design Used to Summarize the Bull Hill Mineral Resource (Noble & Barrero, 2024)

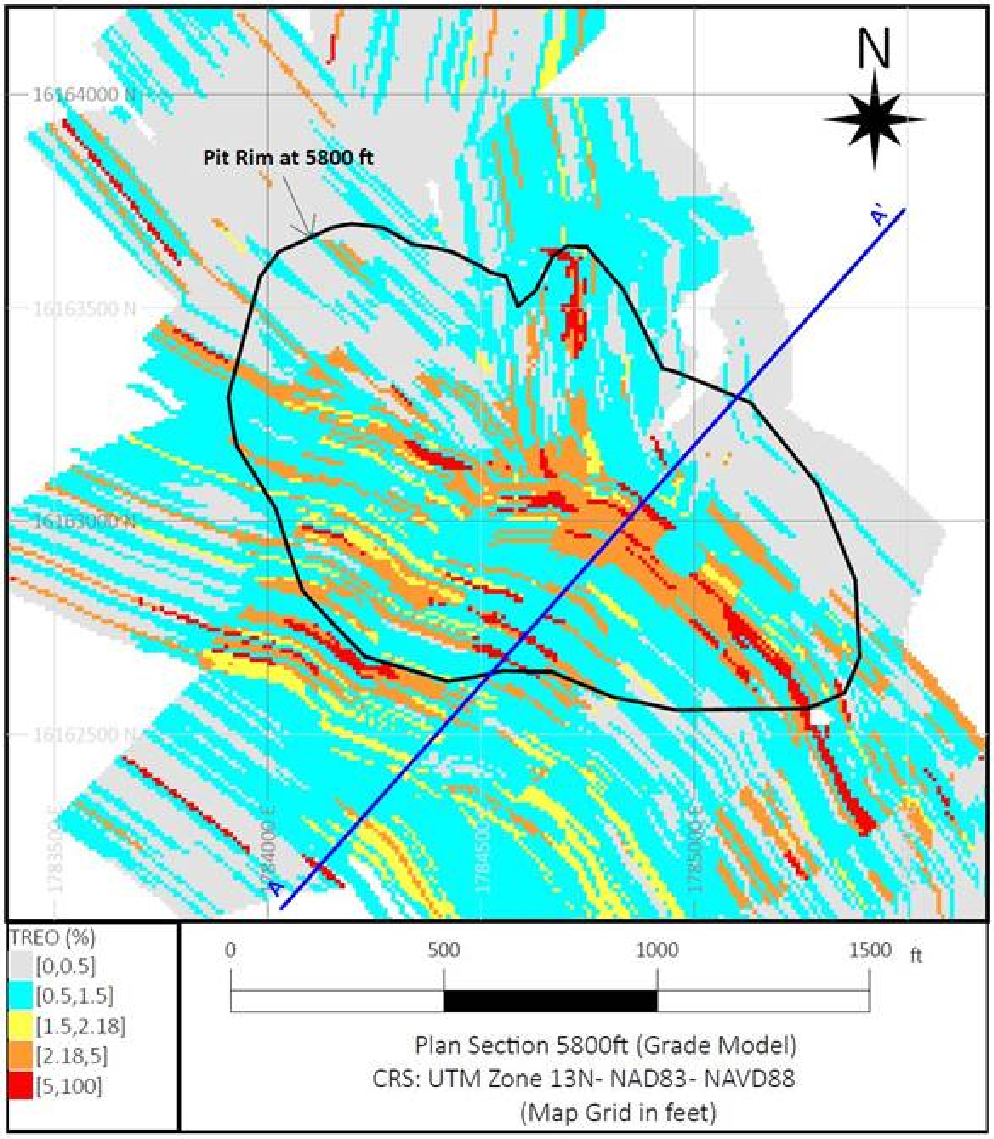


Figure 11-21. Plan View at 5800ft Elevation with the TREO Grade Model (Noble & Barrero, 2024)

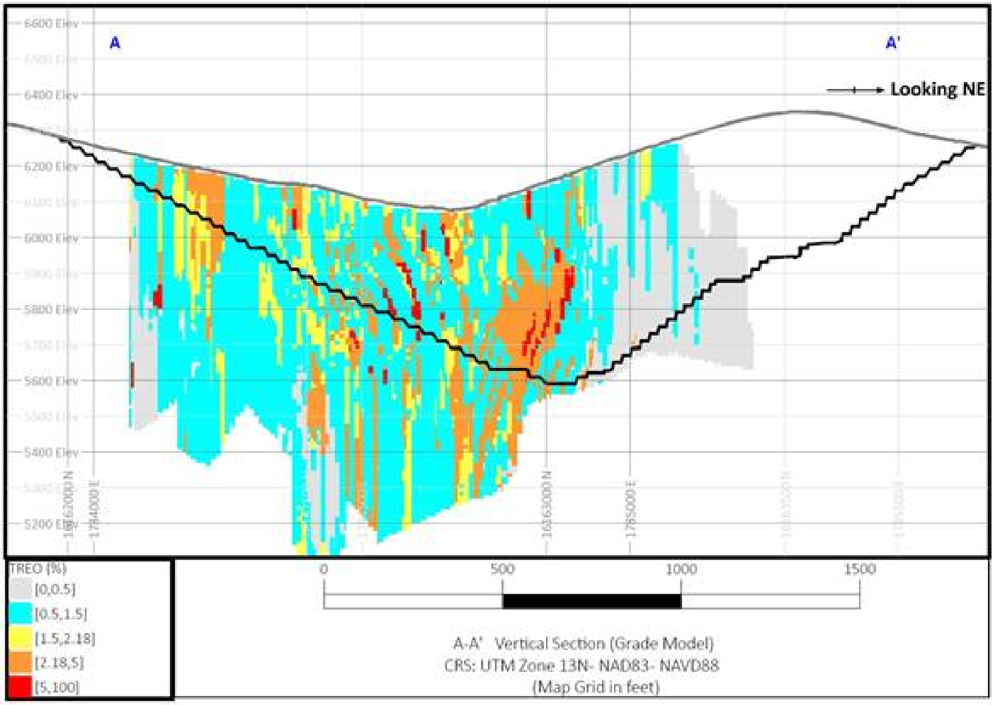


Figure 11-22. Vertical Section (A-A') Showing the Grade Model and the Preliminary Pit Design. Section Location is shown in Figure 11-21 (Noble & Barrero, 2024)

11.14.3 Mineral Resource Summary

This Mineral Resource estimate is reported in accordance with the Regulation S-K (Title 17 Part 229 Item 601(b)(96) and 1300-1305).

Bull Hill deposit estimated measured, indicated, and inferred mineral resources contained in the preliminary open pit design, using a base-case cutoff grade for resource reporting of 2.18% TREO., are summarized in *Table 11-24*. The effective date of the Mineral Resource Estimate is 31 December 2023.

A cutoff grade of 2.18 % TREO was selected as the base case cutoff to summarize the Bull Hill mineral resource; this is roughly equivalent to using an economic cut-off grade of US $ 356 (see *Table 11-21*).

Table 11-24. Bull Hill TREO Mineral Resource Summary by Oxide Type, 31 December 2023 (Noble & Barrero,2023)

Resource Class	OxideType	Cutoff %TREO	Short Tons (millions)	Metric Tonnes (millions)	% TREO	Contained TREO Metric Tonnes (1000's)	Recovered TREO Metric Tonnes (1000's)	Recovered NdPr Metric Tonnes (1000's)
Measured	Oxide	2.18	1.13	1.03	4.80	49.3	32.4	9.5
	Oxide+Calcite	2.18	1.12	1.02	4.25	43.2	28.3	8.9
	TotalOxide	**2.18**	**2.25**	**2.04**	**4.53**	**92.4**	**60.6**	**18.4**
Indicated	Oxide	2.18	3.12	2.83	3.90	110.4	72.1	22.5
	Oxide+Calcite	2.18	1.26	1.15	3.72	42.7	27.8	8.8
	TotalOxide	**2.18**	**4.38**	**3.98**	**3.85**	**153.1**	**99.9**	**31.3**
Measured & Indicated (MI)	Oxide	2.18	4.25	3.86	4.14	159.7	104.4	32.0
	Oxide+Calcite	2.18	2.38	2.16	3.97	85.8	56.1	17.7
	TotalOxide	**2.18**	**6.63**	**6.02**	**4.08**	**245.5**	**160.5**	**49.7**
Inferred	Oxide	2.18	1.79	1.62	3.65	59.3	38.9	12.4
	Oxide+Calcite	2.18	0.30	0.28	3.36	9.3	6.0	2.0
	TotalOxide	**2.18**	**2.09**	**1.90**	**3.61**	**68.5**	**44.9**	**14.4**

Mineral Resources do not have demonstrated economic viability. There is no guarantee that any part of the mineral resource will be converted to mineral reserves in the future.

All figures are rounded to reflect the accuracy of the grades and tonnage estimates.

11.15 Mineral Resource Uncertainty Discussion

Mineral Resource classification is based on the level of geological uncertainty that may or may not allow the application of relevant economic and technical factors to support the prospects for economic extraction.

Mineral Resource estimates may be materially affected by the quality of geological data, continuity of the mineralization, and the level of accuracy of the assumptions supporting the prospects for economic extraction, including estimation strategy, geotechnical parameters, metallurgical recovery, commodity prices, and mining and processing costs.

The highest level of geological certainty is associated with resources in the domain Main 1 because the resource is high-grade ore, has excellent geological and grade continuity, and is locally drilled with closely spaced drilling supporting the mineral resource measured category.

In domains Main 3, East, and West 1, the level of geological certainty is lower than in Main 1. Mineral resources in these domains are classified into indicated and inferred. For an indicated resource, the geological evidence is adequate to assume geological and grade continuity, but these need to be confirmed with additional drilling.

All resources are inferred in Main 2, Northeast, Southeast, and West 2 domains. The highest level of geological uncertainty is associated with these domains where drilling is widely spaced, and the geological and grade continuity must be verified with further drilling.

In the Qualified Persons' opinion, the uncertainty associated with the resource estimation and resource classification strategy is low, and it is unlikely that this will materially affect this Mineral Resource estimate.

In the Qualified Persons' opinion, the highest level of uncertainty is associated with the assumptions regarding metallurgical recoveries, associated processing costs, and commodity prices, which could have a material impact on the prospects for economic extraction. Metallurgical recoveries and detailed processing costs should be confirmed in future technical studies. Commodity prices and pay factors for all products need to be refined.

The current level of geotechnical and hydrogeological knowledge is considered sufficient to support the estimation of Mineral Resources at Bull Hill. However, further geotechnical and hydrological investigations are recommended to reduce the uncertainty associated with slope stability.

No environmental, permitting, legal, titles, taxation, socio-economic, marketing, political, or other factors that would detrimentally affect this Mineral Resource estimate have been recognized at the time of reporting.

In the Qualified Persons' opinion, this Mineral Resource estimate might be materially impacted by any future changes in the cutoff grade resulting from unanticipated changes in metallurgical recoveries, commodity prices, or changes in mining and processing costs.

12 MINERAL RESERVE ESTIMATES

This section does not apply to this TRS.

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13 MINING METHODS

This section does not apply to this TRS.

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14 PROCESSING AND RECOVERY METHODS

The mineral processing of RER ores related to this updated mineral resource estimate has not been defined. However, in 2014, RER extracted a bulk exploration sample (see *Chapter 7*), averaging 10.1% total rare earth oxide (TREO), from the Bull Hill deposit to support the Rare Earth Element (REE) separation and processing demonstration project.

The demonstration project plant (See *Chapter 10*) involves the physical processing of this extracted exploration sample, followed by chemical processing to produce a pure TREO(Th) concentrate, followed by the separation of NdPr oxide.

The demonstration project plant is scheduled to be in operation in 3rd Quarter of 2024 and will provide the necessary design criteria for a larger commercial-scale facility.

The demonstration project plant consists of four main process stages, as shown in *Figure 14-1*. These include:

(1) Physical upgrading (**PUG**) or comminution of the extracted exploration sample containing minor amounts of Naturally Occurring Radioactive Materials (NORM).

(2) Primary hydrometallurgical processing (**PP**) of the comminuted exploration sample to produce a highly pure TREO(Th) concentrate (the precursor), which separates out a significant portion of the natural radioactivity contained in the exploration sample. It is based on:

   a. State-of-the-art techniques optimized to suppress radioactive constituents (most critically, the Ra isotopes) as well as other contaminants such as earth alkali metals, metals, and others.

   b. State-of-the-art recycling technologies to recover acids and water for reuse.

(3) Thorium/Cerium Separation (**TCS**) of radioactivity, mainly due to Th and progenies, together with Ce, which is not currently considered to be a marketable REO product. An innovative technology allows the complete removal of the NORM. It allows for a high recycling rate of process streams and reduces the production of waste significantly.

(4) Neodymium/Praseodymium Separation (**NPS**) and refining of REE groups, including high purity NdPr oxide (the primary product), lanthanum and cerium (LaCe) concentrate, samarium, europium, and gadolinium (SEG) concentrate, and a heavy rare earth element (HREE) concentrate. The innovative technology applies multi-functional separators in a network for the recycling of valuable product streams to optimize product quality and yield. The network is controlled by proprietary software combining real-time monitoring data of critical process streams with a unique process simulation software.

The process will produce these main products and byproducts and implement extensive materials recycling to reduce waste as much as possible. Data collected during the operation will be used to develop design criteria for a future commercial facility.

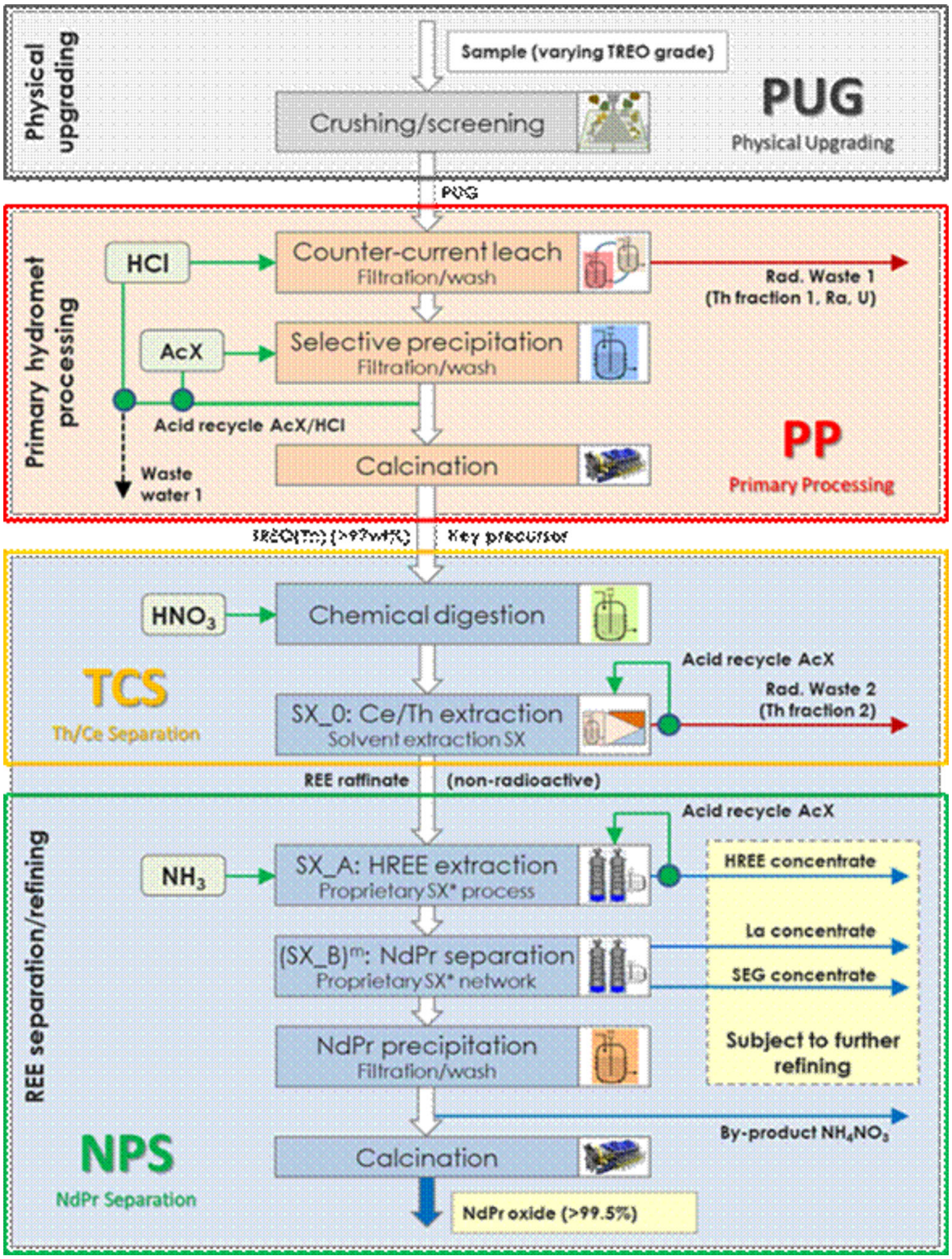

Figure 14-1. Demonstration Project Process Flowsheet (RER, 2022)

15 INFRASTRUCTURE

Infrastructure requirements have not been defined.

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16 MARKET STUDIES

The University of Wyoming's Center for Business and Economic Analysis (CBEA) in the College of Business was contracted by RER to provide an independent analysis of REE markets, including supply and demand forecasts. Led by David Aadland, the resulting market analysis report and projections were used to create this chapter.

As of December 2022, China accounts for 63% of the world's rare earth elements (REE) mining, 85% of REE processing/separation, and 92% of REE magnet production. REEs are the most critical component of high-strength permanent magnets (neodymium iron boron magnets, or NdFeB)– essential to the defense, electric vehicle (EV), and offshore wind turbine markets.

In 2022, the US Secretary of Commerce and the US Department of Homeland Security found that NdFeB magnet imports threaten national security. However, there are 17 rare earth elements (REE), four of them make up ~90% of all REE value: Neodymium (Nd), Praseodymium (Pr), Dysprosium (Dy) and Terbium (Tb). For the US to have a secure supply of high-temperature permanent magnets (NdFeB with Dy/Tb ± holmium [Ho] doping), every step of the supply chain must be domestic.

The global rare earth elements (REE) market demand in 2023 was estimated to be ~179,000 tons of TREO across all end-product categories, of which magnet applications account for 46%. In 2023, North America only accounted for 14% of total TREO global demand or roughly 25,000 tons of TREO. The end-products that use REEs can be broken down into 10 categories: Batteries, Catalysts, Ceramics, Glass, Magnets, Metallurgical, Phosphors, Polishing Powders, Pigments, and Others. *Figure 16-1* shows the global REE market demand for selected years by end-product category, as well as the relative global magnet demand and the relative total TREO North American demand.

The global demand for TREO is forecasted to increase by 89% by 2050 to ~339,000 tons of TREO. Likewise, the relative global REE magnet demand will also continue to increase, from 46% in 2023 to 57% by 2050. The North American total demand is predicted to increase and then stay relatively constant: going from 24,700 tons in 2023 – to 33,200 tons in 2030 – and ultimately to 35,400 tons & 35,700 tons in 2040 and 2050, respectively.

China uses its production quota system to "flood" the market with TREO and lower the overall price of all TREOs to what it calls "rational prices." China does this because the REE price rally over the early 2020s was preventing their industries, particularly China's growing EV industry, from accessing raw materials at reasonable costs. Additionally, low REE prices hurt the interests of Western governments and producers, who require higher (and stable) prices to begin developing domestic REE supply chains. In the past, China has used its quota system to affect the market in the opposite direction; by restricting the export of REEs, the market saw extraordinary price increases from July 2010 through August 2011.

The price projections of the key magnet TREOs are shown in *Table 16-1*.

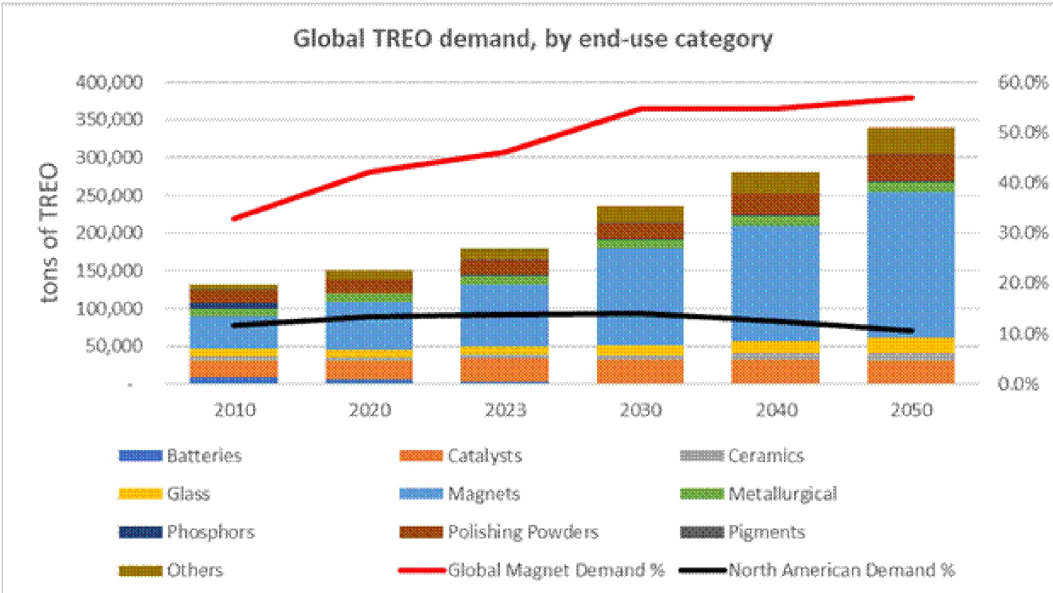

Figure 16-1. Global TREO Demand broken down by 10 end-product categories + Relative Global Magnet Demand + Relative total North American Demand (CBEA, 2024).

Table 16-1. Historical and forecasted TREO prices in 2023 US Dollars (CBEA, unpublished data,2024)

Forecasted & Historical Rare Earth Oxide Prices in 2023 (US Dollars)							
		2010	**2020**	**2023**	**2030**	**2040**	**2050**
Pr	Praseodymium Oxide (99.5-99.9%)	$63	$54	$76	$93	$110	$130
Nd	Neodymium Oxide (99.5-99.9%)	$67	$57	$80	$94	$113	$130
NdPr	Praseodymium-Neodymium Oxide (min.99%)	$60	$52	$77	$90	$108	$120
Tb	Terbium Oxide (min99.99%)	$750	$792	$1,320	$1,200	$1,000	$900
Dy	Dysprosium Oxide (min99.5%)	$318	$307	$330	$360	$320	$290
Ho	Holmium Oxide (min99.5%)	-	$45	$90	$90	$75	$55

RER is engaged in multiple discussions with potential strategic alliance partners for off-take agreements and has not consummated contracts for the sale of TREO or other products.

RER's Bear Lodge REE Project, located in northeast Wyoming, is a world-class mining district (confirmed by more than 500 drill holes resulting in over 285,000 feet of core-defining mineralized material), giving it the ability to be a dependable, long-term, domestic source of REEs.

RER's proprietary processing/separation process has been advanced by General Atomics (GA), whose affiliate is a majority shareholder of RER and its technology partners, and has successfully separated TREO into saleable products, including ≥99.0% pure NdPr oxide. RER's process is expected to result in greater efficiency and lower environmental impact than current industry methods. These factors combine to give RER and its Bear Lodge REE Project the opportunity to be a leading domestic source of the REEs essential to advanced technologies, from mine to separated NdPr oxide. RER has used an NdPr production rate of 2,000 metric tons per year to meet some of the demands mentioned in this chapter. This can be adjusted according to market demands.

Once in production, the Bear Lodge REE Project has the potential to produce decades' worth of 100% of the US Department of Defense's (DOD) annual NdPr oxide needs for its critical NdFeB magnet demand.

17 ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

17.1 Introduction

RER will be required to obtain permits and licenses to further develop the Bear Lodge REE Project from the USFS, the WDEQ-LQD, and other federal and state agencies. In accordance with RER's Environmental, Health, and Safety Policy, RER will comply with applicable federal and state environmental statutes, standards, regulations, and guidelines in permitting of Bear Lodge REE Project.

The issuance of a permit to mine on USFS land will be a major federal action that will significantly affect the quality of the human environment in the Bear Lodge REE Project area. The permitting process will trigger the preparation of an environmental impact statement (EIS) under the NEPA, Council of Environmental Quality (CEQ) guidelines, and USFS NEPA procedures.

17.2 Historical Permitting

A Plan of Operations was submitted by RER in May 2013 (and later updated in February 2014) for the construction and operation of the Project on USFS Lands. The Plan of Operations triggered the need for the DEIS (Draft Environmental Impact Statement) to satisfy the NEPA requirements to properly evaluate the Project. Concurrently, a license application to possess source material incidental to the processing of rare earth elements was submitted to the NRC, and a Permit to Mine application was submitted to the WDEQ-LQD.

The Bearlodge Ranger District of the Black Hills USFS prepared a DEIS in January 2016 for the Bear Lodge REE Project. The DEIS analyzes the no-action alternative (Alternative A) and six action alternatives (Alternatives C, D, E, F, G, and H). Alternative H was the preferred alternative at the time. Shortly after the DEIS was prepared and the notice posted in the federal register for review and comment, EIS number 20160008 was withdrawn by the USFS, on behalf of the applicant, and the Project has been on hold since that time. The NRC source material license and Permit to Mine applications were also suspended by the Company.

Historical technical and design reports related to the Project, and more specifically, the following documents were submitted:

- Permit to Mine document submitted to the WDEQ LQD on June 3, 2015. The application was suspended in 2016. A baseline data supplemental report was submitted to the WDEQ LQD in January 2019. A second baseline data supplemental report dated February 2023 was also submitted to the WDEQ LQD to continue to supplement the original permit application data.

- Draft Plan of Operations for Mining Activities on National Forest System Lands (Plan of Operations) prepared in February 2014. The Plan is not currently approved.

- DEIS was prepared by the Bearlodge Ranger District in January 2016. The DEIS has not been finalized or approved yet.

- NRC license application for the possession of source material incidental to the processing of rare earth elements submitted to the NRC in May 2015. The NRC license has not been approved.

Closure planning was conducted in April 2012. Closure and reclamation plans were also developed as part of the previous Plan of Operations on federal lands in 2014. A May 2015 Reclamation Plan was also submitted as part of the Permit to Mine submittal to the WDEQ. Updated closure and closure and reclamation plans will be included in the revised Plan of Operations and will also need the Reclamation Plan to be updated with the WDEQ.

17.3 Planned Regulatory Requirements

A good working relationship has been established with the agencies, and RER continues to keep the WDEQ-LQD updated on the additional baseline work that has been occurring since the DEIS was placed on hold.

A January 2019 baseline Data Supplement Report was submitted to the WDEQ-LQD in support of the previously submitted permit to mine application. This included updates to climatology (conducted in 2018), hydrology (surface water and groundwater, conducted in 2018), vegetation (conducted in 2018), and wildlife (conducted in 2014, 2015, and 2018). Most recently, a February 2023 baseline data supplement report was submitted to the WDEQ LQD that included hydrology and climatological updates only but acknowledges that vegetation and wildlife assessments need to occur prior to resuming the permitting action.

The Plan of Operations will need to be updated to reflect the current Bear Lodge REE Project schedule as well as other changes that have occurred. The sections in the Plan of Operations where updates are anticipated are as follows:

- General Information and Principals,
- Changes to Access or Mine Facilities (as applicable),
- Utilities (as applicable),
- Environmental Protection Measures,
- Reclamation and Closure, and

Fifteen appendices were included as part of the Plan of Operations, and roughly half would require updates as well.

The NEPA review will restart once the Plan of Operations is approved for technical completeness by the USFS. The Project DEIS will require updates, and potentially, a new Memorandum of Understanding (MOU) with the USFS will be required once the permitting process resumes. The MOU will define the roles of the USFS and RER in the preparation of updates for the DEIS. This will also require a professional services agreement between RER and a third-party EIS contractor, a disclosure statement of no conflicts of interest from the EIS contractor, and a schedule for the completion of the DEIS. Following other federal agencies and public review and comment, the culmination of the DEIS process will result in a Record of Decision and subsequent approval of the Plan of Operations by the USFS.

The NRC source material possession license application may require more minor updates to reflect the future Bear Lodge REE Project schedule as well as other changes. The sections in the license application where updates are anticipated are as follows:

- NRC Form 313,
- Site Characterization (specifically Transportation and Population Distribution as well as inclusion of new data from updated baseline studies),
- Responsible Individuals,
- Facilities and Equipment (as applicable),
- And the following Appendices: Decommissioning Funding Plan and Detailed Process Flow Diagrams (as applicable)

The Environmental Report associated with the NRC license application may also require updates for consistency with updated baseline studies.

While some applications have been prepared and advanced, the following applications will be prepared/submitted for the Project: WDEQ Air Quality Permit, WDEQ Wyoming Pollutant Discharge Elimination System (WYPDES) permit, and WDEQ Industrial Siting; Wyoming State Engineers Office Water Rights and Dam Safety. Additionally, local county permits are anticipated to be required. Two permits, the DEIS and the Plan of Operations, were previously prepared but would require updates as permitting efforts resume.

18 CAPITAL AND OPERATING COSTS

This section does not apply to this TRS.

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19 ECONOMIC ANALYSIS

This section does not apply to this TRS.

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20 ADJACENT PROPERTIES

RER's Bear Lodge REE Project property consists of 15 contiguous square miles (24 kilometers) and includes all known significant rare earth occurrences in the Bear Lodge Mountains. The property hosts deposits of rare earths and minor gold deposits. There are no other known significant occurrences of rare earths in the region surrounding the Bear Lodge Mountains.

21 OTHER RELEVANT DATA AND INFORMATION

21.1 Potential By-Products

The Bull Hill resource contains minor amounts of other minerals that could be potentially recovered. As discussed in *Chapter 14*, the processing methods include a combination of gravity/screening unit operations and acid leaching to recover rare earth minerals. The potential economically recoverable ore minerals include minor amounts of gold, uranium, iron, and manganese.

An economic recovery method has not been investigated for any of these by-products. The potential extraction of any of these minerals would be a distraction from RER's core business.

22 INTERPRETATION AND CONCLUSIONS

The present Mineral Resource estimate includes an update of previous studies of the Bull Hill deposit oxide zones (Ox and OxCa) for more selective mining and a more conservative resource classification criteria.

Based on the available data and the analysis presented in this TRS, the resource block model has been validated using accepted industry methods. At the time of reporting, the Mineral Resource summarized by the resulting preliminary pit design is considered to have reasonable prospects for eventual economic extraction by open pit methods. Mineral resources are estimated from the current topography and are dated 31 December 2023.

The Qualified Persons have drawn the conclusions presented in this section.

22.1 Resource Estimation

22.1.1 Risks

Mineral Resource estimates are sensitive to commodity prices, operating and processing costs, and metallurgical recoveries, which directly affect the cutoff grade.

Economic evaluations for the resource estimate include inferred mineralization, which is not allowed for reserves. If the inferred resource within the resource pit is not converted to measured and indicated, project life and economics will be reduced.

The Lerchs-Grossmann (LG) analysis of economic pit limits and the subsequent pit design summarizing the mineral resource are sensitive to the slope pit design parameters used.

22.1.2 Opportunities

Additional opportunities exist from the potential to convert current inferred mineral resources into indicated and measured resources within the present pit limits.

The limits of the REE-mineralized system on the Bear Lodge property have yet to be determined. The development of existing deposits outside of the Bull Hill mine area, identifying areas peripheral to the Bull Hill deposit that carry significant enrichment in HREE, and excellent potential for discovering new REE exploration target areas all add significant upside potential to the project.

There is significant REE mineralization at Whitetail, and important REE mineralization has been identified in the sulfide zone, both of which may be economical but are not examined in this TRS.

Higher commodity prices could increase mineral resources through both lower cutoff grades and potentially larger pit limits. Lower processing costs and improved metallurgical performance could potentially increase mineral resources.

22.2 Demonstration Plant

22.2.1 Risks

The Demonstration Plant, which is expected to be operational in the 3rd Quarter of 2024, has received the required permits and licenses to construct and operate the plant. If the operation of the plant is unsuccessful or experiences technical problems, this would have a material adverse effect on RER economics, funding, and future development plans.

The Demonstration Plant will provide the necessary design criteria for a larger commercial-scale facility. The results of this project are uncertain and may adversely impact the project's future development.

22.2.2 Opportunities

Demonstration Plant results have the potential to reduce costs and improve metallurgical performance and product quality, positively affecting the project economics.

22.3 Markets and Commodity Prices

22.3.1 Risks

Changes in demand for, and the market price of, REE products could significantly affect RER's ability to develop or finance the Bear Lodge REE Project.

REE product prices may fluctuate and are affected by numerous factors beyond RER's control, such as interest rates, exchange rates, inflation or deflation, fluctuation in the relative value of the U.S. dollar against foreign currencies on the world market, global and regional supply, demand for REE products, and the political and economic conditions of countries that produce and use REEs.

Demand for REE products is impacted by demand for downstream products incorporating rare earths, including hybrid and electric vehicles, wind power equipment, military equipment, and other clean technology products, as well as demand in the general automotive and electronics industries. Lack of growth in these markets or the introduction of substitute products could adversely affect the demand for REE products, which would adversely affect the development of the Bear Lodge Project.

22.3.2 Opportunities

The future creation of new markets associated with emerging technologies and the successful commercialization of REE products in existing and emerging markets may positively affect REE product prices.

22.4 Permitting & Environmental

22.4.1 Risks

It is uncertain if RER will be able to complete future licensing or permitting necessary for the development of the Bear Lodge REE Project in a timely and cost-effective manner.

Future changes in environmental laws and regulations may require significant capital outlays and may cause material changes or delays in future activities.

Regulations and pending legislation governing climate change issues could result in increased operating costs, adversely affecting RER's development plans.

The potential opposition from non-governmental organizations, environmental, indigenous, or local groups, or inhabitants may delay or prevent development activities on the Bear Lodge REE Project.

22.4.2 Opportunities

The rare earth metals are priority minerals for development in the US, which may ease permitting issues. The Bear Lodge REE Project will allow RER to enhance the existing infrastructure in northeast Wyoming, specifically Crook and Weston Counties. The project adds to the effort of economic diversification of Wyoming's mostly mineral-based economy, which is strongly supported by the Wyoming government and business community. Instead of shipping the mineral resources out to other states/countries, the Bear Lodge REE Project sets an example for producing value-added products in Wyoming, thus significantly changing the US rare earth industry, which is characterized by a lack of rare-earth supply chain at each of the following stages: mining, extraction, separation, refining oxides into metal, manufacturing magnets/catalysts, and other device components.

23 RECOMMENDATIONS

The authors recommend that Rare Element Resources Inc. (RER) continue with the development and engineering of the Bear Lodge REE Project, which will lead to a definitive feasibility study. This preparation program should include additional investigations within the mining, the PUG, hydromet, and environmental areas.

23.1 Mining

1) Renew and obtain a drilling permit for site development that will include Infill drilling to upgrade the inferred material inside the pit to at least the indicated category (US $ 3,500,000).

2) Test and evaluate the use of a downhole probe during infill drilling for grade control applications (US $ 25,000-30,000)

3) Further geotechnical investigations to better characterize the rock mass parameters, refine slope design parameters, and review pit slope stability. (US $ 55,000).

23.2 Processing

1) Physical upgrading (PUG) (US $ 25,000):

   - Additional testing is needed to define screening parameters in the 1-3% TREO range.
   - Screen tests should be conducted on all samples before proceeding to other tests.

2) Test ore sorting (US $ 5,000).

3) Investigations included in the demonstration plant project (costs are already included in the Demonstration Project budget):

   - Confirm Ox and OxCa processing costs and recoveries.
   - Confirm impact on throughput as it relates to tonnage, TREO content, and a combination of both.
   - Define the proportionality of feed tonnage, TREO content, or a combination of both.
   - Confirm processing costs for different REE elements as desired.
   - Evaluate the separation of other REE elements.
   - Evaluate Uranium and Thorium segregation and waste reduction.
   - Evaluate chemical and energy efficiencies.

23.3 Government and Industrial Relations

RER has invested more than US $ 140M into the Bear Lodge REE Project to develop, permit, test, and characterize the mineral resource and advance its proprietary metallurgical processing/separation technology, making it one of the most advanced Rare Earth Mining Projects in development in North America. The company should focus on the next steps required to bring it forward through final feasibility, financing, and then development and operations.

23.3.1 Relationships with Downstream Domestic and Allied REE Industry

RER has further progressed the Bear Lodge REE Project and developed relationships with domestic rare earth alloy and magnet manufacturers. RER has entered into conversations and received letters of support that commit to evaluating and testing RER's product and to considering off-take agreements to meet future requirements. These relationships include General Atomics Electromagnetics Systems, Advanced Magnet Lab, Inc., and Arnold Magnetic Technologies.

These product tests and relationships will be the first steps toward signing future off-take agreements of RER's final REE products.

23.3.2 Government Support

In the past, the Bear Lodge REE Project received widespread support from government officials. In the future, RER should continue pursuing support from various government agencies.

23.4 Additional Studies

A significant future step is the completion of the Bear Lodge REE Project Feasibility Study. This will render the project financially and technically robust enough to warrant investment and construction. Once operational, the project will establish a fully domestic upstream REE supply chain, leading to the manufacturing of high-strength permanent magnets, outside of Chinese influence, critical to the defense, EV, and renewable energy industries.

The Feasibility Study is divided into five distinct deliverables. The estimated cost to complete these deliverables is US $ 15M.

(1) **Mineral Resource Study & Technical Report** – A phased technical study and report that meets SEC's Regulation SK 1300 for a concise and accurate summary of the Bear Lodge REE Project's mineral resource.

(2) **Processing/Separation Plant Siting Study** – A report evaluating historical data and a fatal flaws analysis for the proposed hydrometallurgical plant and waste management. Prospective locations will be evaluated using a ranking system based on key evaluation criteria and weighting factors to identify any fatal flaws for the proposed site location.

(3) **Basic Engineering Study & Technical Report** – A phased engineering study and report that contains but is not limited to: 1) The mineral reserve and resource model; 2) Geotechnical evaluation for facilities; 3) A detailed mine plan; 4) An environmental summary; 5) A detailed description of mineral concentration and hydrometallurgical processing and separation; and 6) An economic analysis of the rare earth project.

(4) **Environmental Studies** – Including: 1) Establishment of a pre-mining baseline from which to monitor environmental impacts during and following operations; 2) Identification of environmental risks related to mining through standardized approaches; 3) Formulation of best environmental practices and controls; 4) Cultural resource studies; 5) Social and economic evaluation; 6) Formulation of an environmental closure and decommissioning plan; and 7) Sustainable design alternatives analysis for commercial operations.

(5) **Definitive Engineering Study & Technical Report** – A study and report that confirms: 1) Mine design and production rate; 2) Supportive metallurgical test work and flow sheet; 3) Quotes for major equipment procurement; 4) Revenue and financing sources; and 5) Key environmental applications.

24 REFERENCES

Bhappu, R. (2011). *Pre-Concentration and Leaching of Bear Lodge Oxide Ores.*

Gersic, J., Peterson, E., & Schreiner, R. (1990). *Appraisal of selected mineral resources of the Black Hills National Forest, South Dakota and Wyoming.* USBM, Mineral Land Use Assessment Open File Report 5-90.

Hutchinson, M. (2016). *REE enrichment in weathered carbonatite, Bull Hill: Bear Lodge Mountains, Wyoming.* Golde, Colorado: Unpublished M. Sc. Thesis, Colorado School of Mines.

Hutchinson, M., Slezak, P., Wendlant, R., & Hitzman, M. (2022). Eare Earth Element Enrichment in the Weathering Profile of the Bull Hill Carbonatite at Bear Lodge, Wyoming, USA. *Economic Geology, 117*(4), 813-831.

John T. Boyd Company. (2010). *Technical Report: Preliminary Economic Assessment (Scoping Study) of the Bear Lodge Rare-Earths Project - A National Instrument 43-101 Report.*

Lisenbee, A. (1985). *Tectonic map of the Black Hills uplift, Montana, Wyoming, and South Dakota.* Geological Survey of Wyoming Map Series 13, scale 1:250,000.

Lisenbee, A., & DeWitt, E. (1993). Laramide evolution of the Black Hills uplift. En G. Glass, *Geology of Wyoming: Geological Survey of Wyoming Memoir No. 5.* Laramie, Wyoming: A.W. Snoke, J.R. Steidtmann & S.M. Roberts, eds.

Lujan, M. (1980). *Bear Lodge Progress Report.* Louviers: Molycorp, Inc., unpulished report.

Millonic, L., & Groat, L. (2013). *Carbonatites in Western North America-Occurrences and Metallogeny.* Society of Economic Geologists Special Publication, 17.

Moore, M. (2014). *Carbonatite-Related Rare-Earth Mineralization in the Bear Lodge Alkaline Complex, Wyoming: Paragenesis, Geochemical and Isotopic Characteristics.* Master of Science Thesis, University of Manitoba.

Noble, A. (2009). *Technical Report On the Mineral Resources of the Bear Lodge Rare-Earths Project (Ore Reserves Engineering, ORE).*

Olson, J., Shawe, D., Pray, L., & Sharp, W. (1954). Rare-Earth Mineral Deposits of the Mountain Pass District, San Bernardino County, California. *USGS Professional Paper 261*.

Rare Element Resources Inc. (2021). Form 8-K.

Ray, J., Felsman, J., Van Rythoven, A., Monks, J., Buck, S., & Lenerville, H. (2014). *Geology of the Test Trench 2014.* Rare Element Resources Unpublished Report.

Roche-Engineering. (2012). *Technical Report on the Mineral Reserves and Development of the Bull Hill Mine.*

Roche-Engineering. (2014). *Bear Lodge Project Canadian NI 43-101 Pre-Feasibility Study Report On the Reserves and Development of the Bull Hill Mine, Wyoming.*

Sierra Geotechnical LLC. (2013). *Bear Lodge Pit Slope Stability FEasibility Study Summary.* Sierra Geotechnical LLC.

Snoke, A. (1993). Geologic history of Wyoming within the tectonic framework of the North American Cordillera. En G. Glass, *Geology of Wyoming: Geological Survey of Wyoming Memoir No. 5.* A.W. Snoke, J.R. Steidtmann & S.M. Roberts, eds.

Staatz, M. (1983). *Geology and Description of Thorium and Rare-Earth Deposits in the Southern Bear Lodge Mountains, Northeastern Wyoming.* USGS Professional Paper 1049-D.

Staazt, M. (1983). Geology and Description of Thorium and Rare Earth Deposits in the Southern Bear. *USGS Professional Paper 1049D*.

U. S. Department of Energy (DOE). (2023). *Critical Materials Assessment.*

Wang, Z., Fan, H., Yang, K., & She, H. (2020). Carbonatite-related REE Deposits: An Overview. *Minerals, 10 (11)*(965).

Wilmarth, V., & Johnson, D. (1953). *Preliminary reconnaissance survey for thorium, uranium, and rare-earth oxides, Bear Lodge Mountains, Crook County, Wyoming.* USGS, Trace Elements Investigations 172.

Wineteer, C. (1991). *Exploration Summary, Bear Lodge Project, Bear Lodge Mountains Alkalic Complex, Crook County, Wyoming.* Coeur d'Alene: Hecla Mining Company, unpublished report.

Wood Mackenzie. (2023). *Rare Earth Markets Sto August-2023.*

25 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

In the preparation of this TRS, the Qualified Persons relied on information provided by RER (the registrant) for the following:

1) Historical Information

Information related to historical exploration studies and historical drilling contained in *Chapter 5* and *Chapter 7* was obtained from the registrant.

2) Technical studies provided by third-party consultants.

Information realted to drilling QAQC contained in *Chapter 8* was obtained from the registrant. This information supports the assessment of reasonable prospects for economic extraction of the mineral resource estimates in *Chapter 11*.

Information related to geotechnical work associated with slope design parameters (Sierra Geotechnical LLC., 2013) contained in *Chapter 11* (*Table 11-23*) was obtained from the registrant. This information supports the assessment of reasonable prospects for economic extraction of the mineral resource estimates in *Chapter 11*.

Information related to metallurgical recoveries, pay factors and comodity prices (Wood Mackenzie, 2023) contained in *Chapter 11* (*Table 11-22*) was obtained from the registrant. This information supports the assessment of reasonable prospects for economic extraction of the mineral resource estimates in *Chapter 11*.

3) Macroeconomic Trends

Information relating to pay factors contained in *Chapter 11* (*Table 11-22*) was obtained from the registrant. This information supports the assessment of reasonable prospects for economic extraction of the mineral resource estimates in *Chapter 11*.

4) Marketing Information

The information relating to product prices contained in *Chapter 11* (*Table 11-22*) was obtained from the registrant. This information supports the assessment of reasonable prospects for economic extraction of the mineral resource estimates in *Chapter 11*.

The information relating to market studies contained in *Chapter 16* was obtained from the registrant.

5) Legal Matters

Information relating to the ownership, the mineral tenure (concessions, payments to retain property rights), surface rights, water rights, royalties, permitting requirements, and the ability to maintain and renew permits was obtained from the registrant.

This information is used in support of the property description and ownership information in *Chapter 3* and the permitting descriptions in *Chapter 17*. It supports the reasonable prospects of economic extraction for the mineral resource estimates in *Chapter 11*.

The information on the 499 RER active mining claims was confirmed by independently reviewing and downloading the digital record listed in the Mineral & Records System of the Bureau of Land Management Website (https://reports.blm.gov/reports/MLRS/). This information is relied upon in *Chapter 3*.

6) Environmental Matters

Information relating to baseline and supporting studies for environmental permitting and monitoring requirements was obtained from the registrant.

This information is used in the permitting discussions in *Chapter 17*. It supports the reasonable prospects of economic extraction for the mineral resource estimates in *Chapter 11*.

In the Qualified Persons' opinion, the information provided by the registrant is reliable for its use in this TRS for the following reasons:

- The registrant has employed industry professionals with expertise in the areas listed above.
- The registrant has considerable experience in each of the areas listed above.