



March 23, 2023

The Honorable Click Bishop
Chair, Senate Department of Natural Resource Finance Subcommittee
Alaska State Capitol
Juneau, Alaska 99801

RE: Division Responses to March 9 and March 16 Meeting

Dear Senator Bishop,

Thank you for the opportunity to present before the Natural Resources Subcommittee. This letter is in response to questions that were raised in the last two committee meetings that needed additional follow up from the divisions.

Office of Project Management and Permitting

Sen. Bishop – Is Illinois Creek going back into production?

Illinois Creek is a past-producing gold-silver oxide mine with a reclaimed run-of-mine heap leach pad that operated between 1997 and 2002. Western Alaska Minerals is developing a new mine plan for Illinois Creek, while conducting exploration of the Round Top (copper silver molybdenum porphyry), Honker (low sulfide gold) and Waterpump Creek prospects. These prospects are located on state land.

Over the past 10 years, Western Alaska Minerals has worked to consolidate multiple resources and conduct targeted exploratory drilling. Work over the past several years has included sampling from the run-of-mine material on the historic leach pad to see if the economics of reprocessing the heap leach material to recover the remaining gold and silver is feasible, in addition to new exploratory geotechnical drilling.

Additional work has focused on rounding out the resource information and working on the financials. To date, the company has not submitted mine development plans for review, or announced a target date for when those plans will be available.

Information about Western Alaska Minerals and the Illinois Creek suite of projects can be found on the company website: <https://www.westernalaskaminerals.com/>

Information about state permitting for exploration activities can be found at DNR's Large Mine Permitting Website: <https://dnr.alaska.gov/mlw/mining/large-mines/illinois-creek-roundtop-honker/>

Additionally, Western Alaska Minerals released an NI 43-101 Technical Report for Illinois Creek in 2021, attached in this response.

Oil & Gas

Sen. Wielechowski – What are the details around the ruling about the confidentiality of oil well data? Would releasing well data impact oil development?

The case involved a challenge to an Alaska Oil and Gas Conservation Commission (AOGCC) statute, 31.05.035(c). The AOGCC is reviewing the order on partial summary judgment with the Department of Law. There is not a final judgment from the case at this time. Moreover, the order was particular to the release of data from the NPR-A and would not impact well data confidentiality on state lands. The referenced order is attached.

Releasing well data can certainly impact oil development. Well data in the public record allows competing companies to evaluate different exploration concepts. The legislature in adopting AS 31.05.035(c) struck a balance of allowing the exploring firm to take advantage of its information while encouraging responsible development.

Sen. Bishop - please provide an update on Smith Bay.

Petroleum News reported in May of 2022 that the Smith Bay Company planned to pursue unitization and drilling in 2023. A unit formation application was received by the Division of Oil & Gas in October 2022. It has not been deemed complete, pending data submittals in support of the application, so it has not yet been publicly noticed for comment. Two wells have been drilled in the Smith Bay lease block, though they have not been tested. The Smith Bay Company has purchased and analyzed seismic surveys for the area in the interest of future exploration. Their stated plan of exploration under the application is to drill during the 2025–2026 winter season.

Forestry & Fire Protection

Sen. Wielechowski – Do you see wildfire management changing with potential passage of the carbon sequestration bill? Should we expect larger budget requests if this bill passes?

If the state establishes a carbon offset project on a state forest, the state forests would be managed under the same three principles as today: (1) the sustained yield principle, (2) Alaska Statutes Title 41, Chapter 17 Forest Resources and Practices, and (3) forest management plans. Additionally, that part of a forest that is also part of a carbon offset project would be managed for that carbon offset project purposes; to maintain or increase the amount of carbon on the landscape over time, through the project term (which is capped at 55 years under the legislation).

Continued forest timber harvest is considered compatible with the Improved Forest Management category of carbon offset projects, and the state expects timber sales to continue.

Wildfire management is not expected to change with passage of SB 48/HB 49 Carbon Offset Program on State Land. State projects would be required to sign on with a registry, which requires projects to pay a portion of credits generated by the project into a risk buffer pool that covers involuntary project carbon losses, such as from a wildfire.

Sen. Bishop – Regarding firefighting crew support vehicles – do we have those vehicles in our possession now?

They are in DOT procurement to be purchased. We are anticipating having them in service by July or August.

On a side note, during the Hotshot Crew report outs at the Spring Operation meeting a couple of weeks ago, the Crew Superintendents voiced their thanks and noted the morale boost these vehicles are for the crews. These crew support vehicles are the first new vehicles the crews will have been issued since they were formed in 2002. They have gotten by with hand me downs for many years. Besides providing a safer operation, these are a great source of pride to the firefighters, and will be very helpful with the retention of crew members. This shows progress and support and is very much appreciated.

Geological & Geophysical Surveys

Sen. Bishop – What do you anticipate for your field season in north of Brooks Range?

Planned Fieldwork by the Division of Geological & Geophysical Surveys on the North Slope Spring-Summer 2023:

Energy Resource Section Petroleum Studies

Conduct 24 days of helicopter-based fieldwork spanning the central North Slope foothills. Objectives include geologic mapping and stratigraphic studies of potential petroleum source and reservoir rocks.

Work in collaboration with the U.S. Geological Survey for approximately 30 days to drill two stratigraphic test cores. These sites have been carefully selected to maximize what we can learn about potential oil source rocks and hydrocarbon reservoir characteristics for the Nanushuk and Seabee Formations.

Hydrology and Surficial Geology Section Sand and Gravel Resource Assessment and Hydrologic Studies

Conduct 14 days of fieldwork near Point Lay, supporting ASTAR sand and gravel resource assessment work. We will use the data to refine terrain unit mapping and construction material resource maps.

Complete publication of shothole data that includes subsurface sand and gravel information collected at over 25,000 sites, mainly within NPRA.

Conduct snow surveys to collect information on snow depth, surface elevation, and snow density between Utqiagvik and Atkasuk (will take place in March and early April).

Download data and make any necessary repairs to stream gauges and weather stations installed in summer 2022.

Set up repeaters to enable remote data collection.

Install stream gauges between Utqiagvik and Atkasuk to collect stream stage heights and calculate discharge.

Geologic Hazards Section

Elevation (LiDAR) and bathymetry data will be collected at Point Lay, Wainwright, and Utqiagvik for use in developing flood assessments (time TBD).

The above work is supported by State CIPs, including the multi-year Arctic Strategic Transportation and Resources (ASTAR) project. Results from petroleum-related work will provide important framework data on the North Slope petroleum system, attracting industry investment and lowering exploration risk in northern Alaska. Resulting data will also contribute to understanding geologic carbon storage potential. Results from the sand and gravel assessment supports infrastructure development in the region. Data from the hydrology work will be used in the design of the proposed Triangle Road connecting the communities of Utqiagvik, Atkasuk, and Wainwright.

Sen. Bishop – requests for a whitepaper on ASTAR and its timeline.

Please see attached – “ASTAR Project Legislative Update.”

Agriculture

Sen. Wielechowski – How is industrial hemp program going? How many growers do we have? Are we seeing large scale production? How much are we producing, how it’s being used. Is it being shipped outside of Alaska? Is it a value add to the State?

Alaska has four hemp growers under the Industrial Hemp Program. Growers use about 30 acres in field production. Green house production covers about 5000 sq. ft. Since the inception of the Industrial Hemp Program following the passage of SB 6 in 2018, the division has not seen the development of a large-scale agricultural products industry with exports going outside the state of Alaska. Current growers primary focus is on hemp buds and flowers used to manufacture cannabinoid products.

Parks & Outdoor Recreation

Sen. Bishop – Regarding the federal funds for Kids Don’t Float – is the source Dingell-Johnson funds?

The Recreational Boating Safety (RBS) Federal financial assistance program was first established by the Federal Boat Safety Act (FBSA) in 1971. Reestablished in 1982 by the Recreational Boating Safety and Facilities Improvement Act of 1980, the user pays –user benefits mechanism for sustainable funding was created using federal excise motorboat fuel taxes.

The Aquatic Resources (Wallop-Breaux) Trust Fund of 1984 united under one umbrella two programs: the RBS program administered by the US Coast Guard and the Sport Fish Restoration (Dingell-Johnson) program administered by the US Fish and Wildlife Service.

The Boat Safety Account is funded solely from motorboat fuel taxes, whereas the Sport Fish Restoration fund receives motorboat fuel taxes as well as other trust funds, such as excise taxes on sport fishing equipment and all types of boats.

At the state level, the DPOR Office of Boating Safety is the state partner / administrator of the RBS state program, and ADFG is the state partner / administrator of the Sport Fish Restoration Fund (Dingell-Johnson).

Sen. Wielechowski – asks for public use cabins’ revenue generation potential and plans for future cabins.

By private sector standards, Public Use Cabins (PUC) are considered a sound investment. Utilizing a conservative estimate of 45% yearly occupancy, PUCs pay for themselves in just under five years and incur little to no maintenance costs.

New cabins would be strategically located for a yearly occupancy goal of above 50%. (info from FY 2020 PUC CIP)

Plans for future cabins: (info from FY24 PUC CIP)

New cabins along the road system with high occupancy rates include:

- Chugach State Park
- Denali State Park
- Chena River State Recreation Area
- Eagle Beach State Recreation Area
- Johnson Lake State Recreation Area
- Nancy Lake State Recreation Area
- Halibut Point State Recreation Site
- Pasagshak River State Recreation Site
- Settlers Cove State Recreation Site

The FY24 PUC capital request is one of DPOR top priorities in expanding its statewide general fund program receipts.

Sen. Giessel: Relative to the question regarding access / parking issues on Rabbit Lake Trail

DPOR is in the process of submitting a Land & Water Conservation Fund (LWCF) grant application to build a new 90-vehicle parking lot at the park entrance along Rabbit Creek road, as a Phase One approach to build additional capacity for user vehicles.

If approved, design would be conducted in 2024 and construction likely in 2025. Recent vehicle surveys indicate that 200+ vehicle access the Sunnyside and Rabbit Creek Trails at peak times throughout the summer.

Though we do not have a cost estimate at this time, Phase Two will have significant higher expenses, as the design will include a road extension up valley, the cost of a bridge / culvert stream crossing, and the addition parking area.

Mental Health Trust Lands Administration

Sen. Bishop – asks about Mental Health funding of a position in the lands office.

After further research and discussion with MHTLO leadership, we are unable to identify an RSA that funds a position outside of the MHTLO. All positions within the MTHLO are funded with the appropriated Mental Health Trust Authority Authorized Receipts (1092) authority.

Please feel free to reach out should you have additional questions.

Sincerely,



Joe Byrnes
Legislative Liaison
Department of Natural Resources

Enclosure:

Illinois Creek Project NI 43 101 Technical Report 15Aug2021
ConocoPhillips vs AOGCC Reference Order
ASTAR Project Legislative Update

March 2023 Legislative Update:

ARCTIC STRATEGIC TRANSPORTATION AND RESOURCES

The Arctic Strategic Transportation and Resource (ASTAR) is a partnership between the State of Alaska Department of Natural Resources and the North Slope Borough. ASTAR seeks to work with North Slope communities and stakeholders to identify projects, resources, and studies which offer the most cumulative benefit to the North Slope region and its communities.

Mission: Identify, evaluate, and advance opportunities to enhance the quality of life and economic opportunities in North Slope communities through responsible infrastructure development.

Goal: Prioritize community needs and identify infrastructure opportunities that offer the most cumulative benefit and best enhance the quality of life for the region.

ASTAR Accomplishments to Date

Stakeholder Engagement (OPMP)

- Fourteen in-person community meetings/workshop (Round 1)
 - At least one community meeting in each North Slope community
- Six in-person workshops with community leadership (Round 2)
 - Due to COVID we have not been able to complete round 2 meetings with Kaktovik and Nuiqsut
- One workshop with the North Slope Borough Planning Commission
 - North Slope Borough Planning Commission monthly updates
- Several North Slope Borough Assembly presentations
- Hosted a North Slope Gravel workshop
- Regularly scheduled meetings with North Slope Borough Mayor and Port Authority
- Provided a series of virtual trainings to North Slope communities for the ASTAR Project Evaluation tool and the ASTAR Infrastructure Site Selection tool (software/computer programs)
- Three ASTAR (virtual) Community open houses/update meetings
- Presented or attended seven (virtual) Community “Trilateral” or “Steering Committee” meetings for various North Slope Communities
- Mail deliverables to each North Slope community
 - ASTAR reports, studies, data, prioritization tool, and more
 - Delivered reports and studies to each community
- Over 50 community and leadership meetings (both in-person and virtual)

Geology-Hydrology (DGGS)

- Sand & Gravel:
 - Completing final edits to terrain unit mapping, field data, bibliography, and shothole data; preparing these for publication and dissemination to communities
 - Lidar survey of the Utqiagvik-Atqasuk segment of the proposed all-season road for the communities of Utqiagvik, Atqasuk, Wainwright (aka “Triangle Road”)
 - 2019 Gravel Survey
 - Fieldwork focused on eastern portion of NPR-A
 - Work included partnering with DOT&PF to drill priority targets
 - 2021 and 2022 Gravel Surveys

- Fieldwork focused on locating gravel for an all-season road for the communities of Utqiagvik, Atkasuk, Wainwright
- Work included partnering with DOT&PF to drill priority targets
- Work in this area was strongly encouraged by the North Slope Borough and the impacted communities
- Partnered with DOT&PF to conduct Ohmmapper geophysical survey of a test portion of the proposed Triangle Road alignment to identify different soil types and subsurface anomalies, including permafrost
- Hydrology:
 - Sub-bottom profiler instrument purchased and 13 lakes surveyed in 2021 for lake depth and sand & gravel resources.
 - Three weather stations, nine snow measurement stations, and five river discharge stations installed in 2022 to measure and monitor precipitation in drainage basins where new roads are planned
 - 35 stream gages installed in 2022 to support culvert design
 - Data from field stations streamed to the internet for real time updates and monitoring flood levels in the rivers
 - Assisting DOT&PF with the road design to plan for minimal permafrost degradation and flood impact on the new road
- Coastal Hazards:
 - Tidal datums completed for the five coastal communities
 - Topographic and bathymetric data under assessment
 - Baseline erosion assessment near completion (4/5 communities complete)
 - Baseline flood assessments underway
 - Unmanned aerial vehicle (UAV-drone) shoreline and infrastructure monitoring training of North Slope Borough complete; follow up data oversight ongoing
 - 2021 and 2022 Coastal Hazards Assessment
 - Conducted in partnership with National Ocean and Atmospheric Administration (NOAA)
 - Collect baseline field data necessary to survey and monitor water levels, flooding, and erosion; installed tide and water level monitoring instruments in North Slope coastal communities
- Petroleum Geology:
 - Completed major geologic mapping and associated petroleum-related field studies in summer 2021 and 2022; analyses, data compilation, and reports are in progress
 - New publicly available results will provide an improved framework for understanding the regional stratigraphy, helping to constrain basin models and reduce exploration risk, ultimately attracting new investment to the region

ASTAR Completed Studies and Reports

OPMP:

1. North Slope Transportation Study
2. North Slope Workforce Development Study
3. All-season route analysis for the communities of Utqiagvik, Wainwright, Atkasuk
4. All-season route analysis from Utqiagvik to the Colville River
5. Colville River crossing route analysis
6. “Project Library” specific to each community

7. Project Evaluation Tool (OPMP); on NSSI webpage
 - a. This tool helps communities rate and prioritize projects using their own values system for projects they choose
8. Infrastructure Site Selection Tool (OPMP); on NSSI webpage
 - a. This tool uses GIS (Geospatial Information System) to help communities decide where to locate needed infrastructure

DGGS:

1. Published eight (8) technical reports on reservoir geology of the Nanushuk Formation
2. Submitted two (2) detailed geologic maps spanning 520 mi² to the U.S. Geological Survey
3. Published profile and discharge data for five (5) waterways in the Utqiagvik-Atkasuk-Wainwright region, Alaska, collected August 2022
4. Published digital data addendum to S.E. Rawlinson's analytical data and field observations from surficial geology and morphology of the Alaskan central Arctic Coastal Plain, 1981-1987

Next Steps

Stakeholder Outreach (OPMP)

- Received several letters of support from community and regional leadership for advancing an all season road connecting the communities of Utqiagvik, Atkasuk, and Wainwright
- North Slope Borough Mayor Brower requested DOT&PF complete a Planning and Environmental Linkage (PEL) study for an all-season road connecting the communities of Utqiagvik, Atkasuk, and Wainwright ("Triangle Road")
 - DOT&PF put the PEL study in the Statewide Transportation Improvement Plan (STIP)
 - Uses Federal Highway Funds
 - PEL Studies are meant to streamline Environmental Impact Statements (EIS) and ensure the project is eligible for future DOT&PF funding (i.e. permitting construction)
 - PEL just starting, estimated completion 2025

Upcoming Geologic Project Work (DGGS)

- Sand & Gravel (2023 and 2024)
 - Complete mapping, data collection, data evaluation, and resource assessments
 - Additional fieldwork focused on filling data gaps between Wainwright, Atkasuk, and Utqiagvik along the route of the proposed Triangle Road
 - Work with DOT&PF on new road embankment design utilizing fine-grained materials
 - Seek additional funding for lidar for remainder of Triangle Road and extension to Point Lay; potential funding sources include Denali Commission and DOT&PF STIP (if road project advances toward construction)
- Hydrology (2023 and 2024)
 - Install additional instruments and collect more field data
 - Collate historical data with a focus on developing the datasets to calculate the 50-year flood parameters needed for road/bridge planning and construction
 - Network the data collection stations with repeaters to connect all stations to the internet

- Work with the Coastal Hazards group to conduct a joint shoreline erosion, permafrost degradation, and inland flooding assessment for Kaktovik
- Coastal Hazards (2023 and 2024)
 - Complete baseline data collection for the five North Slope Borough coastal communities
 - Install seven wave buoys and a time lapse camera to support community-based flood/erosion monitoring
 - Complete flood assessments for the five North Slope Borough coastal communities
 - Install two water level sensors to fill gaps in coastal coverage
- Petroleum Geology (2023 and 2024)
 - 24-day field studies (2023) to continue characterization of regional reservoir potential
 - 30-day collaborative drilling program (2023) with the U.S. Geological Survey to acquire, describe, and analyze two unique stratigraphic cores
 - Conduct gap analysis based on available data to inform follow-up field studies (2024) to further assess controls on Brookian reservoir quality

Timeline of Deliverables

- Sand & Gravel
 1. 2021 field data reports – site locations and analytical data (in press)
 2. 2022 field data reports – site locations and analytical data (in press)
 3. Shothole database (in press)
 4. 2022 DOT&PF drill hole test data report (mid 2023)
 5. 2022 Ohmmapper (capacitively-coupled resistivity, or CCR) geophysics report (fall 2023; with DOT&PF)
 6. 2019 field data report – site locations (fall 2023)
 7. Bibliographic reference database (fall 2023)
 8. 2019 DOT&PF drill hole test data report (spring 2024)
 9. Terrain unit mapping – regional (mid 2024)
 10. Materials unit mapping – regional (mid 2024)
 11. Terrain unit mapping – communities (mid 2024)
 12. Resource analysis report (fall 2025)
- Hydrology
 1. Sonar and seismic lake surveys along the proposed Triangle Road corridor, northwestern Alaska, collected July 6–13, 2021 (in press)
 2. Hydrological station installation report (in press)
 3. Profile and discharge data report for 2023 (fall 2023)
 4. Report on first year of weather data (fall 2023)
 5. Profile and discharge data report for 2024 (fall 2024)
 6. Report on second year of weather data (fall 2024)
 7. Profile and discharge data report for 2025 (fall 2025)
 8. Report on third year of weather data (fall 2025)
 9. With Coastal Hazards group, publish joint shoreline erosion, permafrost degradation, and inland flooding assessment for Kaktovik (fall 2025)
 10. Final ASTAR hydrology report (fall 2026)
- Coastal Hazards
 1. Summer 2023 for Wainwright, Point Lay, and Utqiagvik; summer 2024 for Kaktovik and Point Hope:

- a. Publish bathymetry and aerial imagery
 - b. Coastal profiles updated in online coastal profile tool
 - c. First floor surveys uploaded to Environmentally Threatened Communities (ETC) Dashboard (online database)
- 2. Flood assessment reports (five total) for Wainwright, Point Lay, Utqiagvik, Kaktovik, and Point Hope (spring 2025)
- 3. Color index elevation maps (five total) for Wainwright, Point Lay, Utqiagvik, Kaktovik, and Point Hope (summer 2025)
- Petroleum Geology
 - 1. Synthesis of key Nanushuk outcrops (publish summer 2023)
 - 2. Geology of Prince Creek Formation (submit July 2023)
 - 3. High precision age-control for Nanushuk (publish fall 2023)
 - 4. Summary of chronostratigraphy of central North Slope (submit mid-2024)
 - 5. Preliminary results of coring project (submit fall 2024)
 - 6. Rooftop Ridge geologic map (submit late 2024)
 - 7. Racetrack Basin geologic map (submit late 2024)
 - 8. Final sedimentology and analytical data from cores (submit late 2025)
 - 9. Final geologic map of central Nanushuk belt (submit late 2025)

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ALASKA**

CONOCOPHILLIPS ALASKA, INC.,

Plaintiff,

v.

ALASKA OIL AND GAS
CONSERVATION COMMISSION,

Defendant.

Case No. 3:22-cv-00121-SLG

**ORDER RE MOTION TO DISMISS COMPLAINT AND MOTION FOR PARTIAL
SUMMARY JUDGMENT**

Before the Court are two motions: Defendant Alaska Oil and Gas Conservation Commission's ("AOGCC") Motion to Dismiss Complaint pursuant to Federal Rule of Procedure 12(b)(6) at Docket 8, and Plaintiff ConocoPhillips Alaska, Inc.'s ("CPAI") Motion for Partial Summary Judgment at Docket 12.¹ The motions are fully briefed.² Oral argument on the motions was held on November 22, 2022.³ This case involves one legal dispute: does federal law preempt state law with respect to the public release of CPAI's Well Data from the National Petroleum Reserve in Alaska?

¹ See *also* Docket 13 (Declaration of John F. Schell, Jr. in Support of ConocoPhillips Alaska, Inc.'s Motion for Partial Summary Judgment).

² See Docket 11 (Plaintiff's Opp'n to Motion to Dismiss); Docket 18 (Defendant's Reply in Support of Motion to Dismiss); Docket 22 (Defendant's Opp'n to Motion for Partial Summary Judgment); and Docket 26 (Reply in Support of Motion for Partial Summary Judgment).

³ Docket 33 (Minutes re Oral Arg.).

BACKGROUND

The National Petroleum Reserve in Alaska (“NPR-A”) is a 23.6-million-acre area on Alaska’s North Slope and is the nation’s largest single unit of public land.⁴ Formerly known as Naval Petroleum Reserve Numbered 4, the NPR-A was established in 1923 and was one of four Naval Petroleum Reserves created from public lands to assure the Navy’s ships would have adequate petroleum supplies.⁵ “However, the Organization of Petroleum Exporting Countries (‘OPEC’) oil embargo during the 1970s established that the Nation had a need for oil that exceeded the needs of the Navy.”⁶ In response, in 1976, Congress enacted the Naval Petroleum Reserves Production Act (“NPRPA”), 42 U.S.C. § 6501, *et seq.*, which transferred NPR-A management authority from the Secretary of the Navy to the Secretary of the Interior.⁷ As first enacted, only the federal government was permitted to explore for petroleum.⁸ In 1980, the NPRPA was amended by an appropriations rider (“Rider”) that directed the Secretary of the Interior to open the

⁴ *Sovereign Inupiat for a Living Arctic v. Bureau of Land Mgmt.*, 516 F. Supp. 3d 943, 946 (D. Alaska 2021).

⁵ H.R. REP. NO. 94-81, at 5-6 (1975).

⁶ *N. Alaska Env’t Ctr. v. Norton*, 361 F. Supp. 2d 1069, 1072 (D. Alaska 2005), *aff’d sub nom. N. Alaska Env’t Ctr. v. Kempthorne*, 457 F.3d 969 (9th Cir. 2006).

⁷ Pub. L. No. 94-258; 42 U.S.C. § 6503(a).

⁸ *Sovereign Inupiat*, 516 F. Supp. 3d at 953-54.

NPR-A to private exploration and establish “an expeditious program of competitive leasing of oil and gas in the” NPR-A.⁹

The Rider, titled “Competitive leasing of oil and gas,” was codified at 42 U.S.C. § 6506a and governs oil and gas leasing in the NPR-A.¹⁰ Certain provisions of the Rider incorporate provisions of the Outer Continental Shelf Lands Act (“OCSLA”), which governs oil and gas leasing on the Outer Continental Shelf.¹¹ First, the Rider directs that the bidding systems used in NPR-A lease sales be based on the OCSLA bidding systems.¹² Second, the Rider subjects any information acquired in geological and geophysical explorations in the NPR-A “to the conditions of 43 U.S.C. 1352(a)(1)(A),”¹³ which is a subsection within OCSLA’s § 1352 titled “Oil and Gas Information Program.”¹⁴ The text of 43 U.S.C. § 1352(a)(1)(A) reads as follows:

(a) Access to data and information obtained by lessee or permittee from oil or gas exploration, etc.; data obtained by Federal department or agency from geological and geophysical explorations

⁹ Pub. L. No. 96-514, 94 Stat. 2964 (1980) (codified at 42 U.S.C. § 6506a).

¹⁰ 42 U.S.C. § 6506a.

¹¹ 43 U.S.C. § 1331, *et seq.*

¹² 42 U.S.C. § 6506a(f).

¹³ 42 U.S.C. § 6506a(m) states: “Any agency of the United States and any person authorized by the Secretary may conduct geological and geophysical explorations in the National Petroleum Reserve in Alaska which do not interfere with operations under any contract maintained or granted previously. Any information acquired in such explorations shall be subject to the conditions of 43 U.S.C. 1352(a)(1)(A).”

¹⁴ 43 U.S.C. § 1352.

(1)(A) Any lessee or permittee conducting any exploration for, or development or production of, oil or gas pursuant to this subchapter shall provide the Secretary access to all data and information (including processed, analyzed, and interpreted information) obtained from such activity and shall provide copies of such data and information as the Secretary may request. Such data and information shall be provided in accordance with regulations which the Secretary shall prescribe.¹⁵

No other provision within the Rider—or within the NPRPA—addresses information or data obtained from NPR-A explorations.

Within OCSLA's Oil and Gas Information Program, however, paragraph (c) provides for the confidentiality of privileged or proprietary exploration information “received by the Secretary,” and paragraph (g) expressly preempts “[a]ny provision of State or local law which provides for public access to any privileged information received or obtained by any person pursuant to this subchapter”¹⁶

CPAI's complaint alleges it is a Delaware corporation registered to do business in Alaska and is “Alaska's largest oil producer and leader in oil and gas exploration and development in the state for more than 50 years.”¹⁷ CPAI states it has “acquired and developed significant lease holdings in the northeast portion of the NPR-A” pursuant to the NPRPA by obtaining federal leases with the Bureau of Land Management (“BLM”).¹⁸ Each of CPAI's leases with BLM is for an initial

¹⁵ *Id.* § 1352(a)(1)(A).

¹⁶ *Id.* § 1352.

¹⁷ Docket 1 at 2, ¶ 2.

¹⁸ Docket 1 at 7, ¶ 17; 8, ¶ 26.

period of 10 years and “subject to renewal or extension.”¹⁹ CPAI has drilled several wells on its leases and “obtained substantial Well Data from its well drilling operations,” which it then transmitted to BLM “as required by 43 C.F.R. § 3152.6.”²⁰ BLM “hold[s] the Well Data confidential under the federal oil and gas lease terms”²¹ and will not disclose the Well Data “to the public until after the leases expired.”²²

CPAI asserts it “rel[ies] upon assurances of confidentiality for its well data when it makes sizable exploratory investments of th[e] type” it has done in the NPR-A,²³ in which it “has invested tens of millions of dollars.”²⁴ CPAI maintains it has never publicly disclosed the Well Data, which CPAI asserts is proprietary, contains trade secrets, holds substantial economic value to CPAI, and provides CPAI with a significant competitive advantage over its competitors that would be lost should the data be publicly disclosed.²⁵ CPAI maintains that if AOGCC “or any other state agency . . . [were] to disclose CPAI’s confidential Well Data prior to the

¹⁹ See Docket 13-1 at 2, 6, 11, 17, 26. 42 U.S.C. § 6506a(i)(1) provides that each lease “shall be extended for so long thereafter as oil or gas is produced from the lease in paying quantities, oil or gas is capable of being produced in paying quantities, or drilling or reworking operations, as approved by the Secretary, are conducted on the leased land.”

²⁰ Docket 1 at 7, ¶¶ 18-19; Docket 13 at 2, ¶ 3.

²¹ Docket 1 at 8, ¶ 23.

²² Docket 13 at 3, ¶ 5.

²³ Docket 13 at 4, ¶ 5.

²⁴ Docket 13 at 2, ¶ 3.

²⁵ Docket 1 at 8, ¶¶ 23-25; Docket 13 at 3, ¶ 4.

time set by federal law, it would serve as a disincentive for CPAI to drill further wells in the NPR-A.”²⁶

AOGCC is “an independent quasi-judicial agency of the State of Alaska that acts to prevent waste, protect correlative rights, improve recovery, and protect underground freshwater through oversight of oil and gas drilling, development and production, reservoir depletion, and metering operations on all lands subject to the State of Alaska’s police powers.”²⁷ Pursuant to Alaska Statute (“AS”) 31.05.035, AOGCC may require permittees to provide Well Data to the agency “within 30 days after the completion, abandonment, or suspension of a well.”²⁸ AS 31.05.035(c) and Title 20 of the Alaska Administrative Code (“AAC”), Section 25.537(d) (collectively, the “State Disclosure Laws”), provide that such data will be kept confidential for 24 months following the 30-day filing period unless the permittee grants permission for early release.²⁹ After 24 months has passed, AS 31.05.035(c) and 20 AAC 25.537(d) require AOGCC to make the filed Well Data public unless the Commissioner of the Department of Natural Resources (“DNR”) has made a finding “that the required reports and information [from a well] contain

²⁶ Docket 13 at 4, ¶ 6.

²⁷ Docket 8-1 at 1-2.

²⁸ ALASKA STAT. § 31.05.035(b) (2007).

²⁹ *Id.* § 31.05.035(c); ALASKA ADMIN. CODE tit. 20, § 25.537(d) (2018).

significant information relating to the valuation of unleased land in the same vicinity.”³⁰

CPAI’s federal leases with BLM include express terms that BLM will withhold CPAI’s Well Data from the public during the “existence of [the] lease.”³¹ CPAI also “applied for and received AOGCC prescribed permits to drill the Wells, made the AOGCC prescribed reports, and submitted the data prescribed by AOGCC”³² in order to “allow the federal and state regulatory systems to work harmoniously.”³³ When CPAI transmitted the Well Data to AOGCC, CPAI “included an express statement that the Well Data must be held confidential pursuant to federal law.”³⁴ CPAI indicates that the Well Data “provided to AOGCC was a subset of the same Well Data . . . provided to BLM.”³⁵

To date, AOGCC has kept CPAI’s Well Data confidential, but “the 24-month period provided by AS 31.05.035(c) has run for each of the Wells.”³⁶ When CPAI requested that the DNR Commissioner continue to keep the Well Data confidential

³⁰ ALASKA STAT. § 31.05.035(c); ALASKA ADMIN. CODE tit. 20, § 25.537(d).

³¹ Docket 1 at 8, ¶ 21.

³² Docket 1 at 9, ¶ 27.

³³ Docket 13 at 5, ¶ 7.

³⁴ Docket 1 at 9, ¶ 27; Docket 13 at 5, ¶ 7; Docket 13-2.

³⁵ Docket 13 at 5, ¶ 7.

³⁶ Docket 1 at 9, ¶ 29.

for the duration of the leases, the DNR Commissioner denied CPAI's request.³⁷ The "AOGCC has indicated that, absent judicial action, the Well Data will be disclosed to the public—including CPAI's competitors."³⁸ CPAI contends that such a disclosure would violate federal law and cause CPAI to lose its competitive advantage, which resulted "from its investment in the leases and drilling, for which [CPAI] took on the risks of failure and paid tens of millions of dollars."³⁹

CPAI filed a complaint in this Court challenging the State Disclosure Laws, seeking declaratory relief and a permanent injunction.⁴⁰ On June 24, 2022, the AOGCC filed its Motion to Dismiss Complaint.⁴¹ On July 29, 2022, CPAI filed its Motion for Partial Summary Judgment.⁴²

JURISDICTION

The Court has jurisdiction pursuant to 28 U.S.C. § 1331 because this is a civil action with certain claims arising under federal law, 42 U.S.C. § 6501, *et seq.* Whether a federal law preempts a state law is a question of federal law.⁴³

³⁷ Docket 1 at 10, ¶¶ 30, 32.

³⁸ Docket 1 at 10, ¶ 32.

³⁹ Docket 1 at 11, ¶ 33.

⁴⁰ Docket 1 at ¶¶ 34-52. There is also a pending state court case: *ConocoPhillips Alaska, Inc. v. Alaska Dep't of Nat. Res.*, No. 3AN-21-09171CI (Alaska Super. Ct. filed Dec. 27, 2021).

⁴¹ Docket 8.

⁴² Docket 12. CPAI seeks summary judgment only as to its request for a declaratory judgment. Docket 12 at 3 n.1.

⁴³ See *Allis-Chalmers Corp. v. Lueck*, 471 U.S. 202, 214 (1985).

LEGAL STANDARD

I. Rule 12(b)(6)

To survive a motion to dismiss under Rule 12(b)(6), “a complaint must contain sufficient factual matter, accepted as true, to ‘state a claim for relief that is plausible on its face.’”⁴⁴ A complaint must provide “well-pleaded facts, not legal conclusions, that ‘plausibly give rise to an entitlement to relief.’”⁴⁵

II. Rule 56(a)

Federal Rule of Civil Procedure 56(a) directs a court to “grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” A case with no disputed material facts that presents a pure question of law is suitable for dispositive relief.⁴⁶

⁴⁴ *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009) (quoting *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 570 (2007)).

⁴⁵ *Whitaker v. Tesla Motors, Inc.*, 985 F.3d 1173, 1176 (9th Cir. 2021) (first citing *Twombly*, 550 U.S. at 570; and then quoting *Iqbal*, 556 U.S. at 679).

⁴⁶ *See Smith v. Califano*, 597 F.2d 152, 155 n.4 (9th Cir. 1979) (holding that where “parties . . . have agreed on the material facts” and “the dispute involv[ed] the proper interpretation of relevant statutes and regulations[,] . . . the case could . . . be resolved as a matter of law, [and] summary judgment was the proper procedural device”).

DISCUSSION

At issue is whether federal law preempts state law so as to preclude AOGCC from releasing to the public CPAI's Well Data from the National Petroleum Reserve in Alaska prior to the expiration of CPAI's leases.⁴⁷

CPAI asserts that "AOGCC's application of the State Disclosure Laws to allow early public disclosure of CPAI's Well Data is preempted under both the conflict preemption and express preemption doctrines."⁴⁸ CPAI contends that the Rider's reference to one section of 43 U.S.C. § 1352—"the conditions of 43 U.S.C. 1352(a)(1)(A)"⁴⁹—incorporates the Oil and Gas Information Program as a whole.⁵⁰ CPAI maintains that its Well Data is therefore covered by paragraph (c) of § 1352,

⁴⁷ See Docket 8-1 at 9 ("CPAI's preemption claim in its complaint sets forth a pure question of law this court can decide in this motion to dismiss . . ."); Docket 12 at 19 ("CPAI's preemption claim . . . is thus appropriate for resolution by summary judgment.").

⁴⁸ Docket 12 at 18. CPAI also notes that this is an "as applied" preemption challenge "because AOGCC's proposed application of the State Disclosure Laws in this instance is unconstitutional. If AOGCC adhered to the federal law confidentiality protections, thus reconciling the two systems, there would be no preemption issue." Docket 12 at 18 n.83.

⁴⁹ 43 U.S.C. § 1352(a)(1)(A) provides:

(a) Access to data and information obtained by lessee or permittee from oil or gas exploration, etc.; data obtained by Federal department or agency from geological and geophysical explorations

(1)(A) Any lessee or permittee conducting any exploration for, or development or production of, oil or gas pursuant to this subchapter shall provide the Secretary access to all data and information (including processed, analyzed, and interpreted information) obtained from such activity and shall provide copies of such data and information as the Secretary may request. Such data and information shall be provided in accordance with regulations which the Secretary shall prescribe.

⁵⁰ Docket 1 at 6, ¶ 15.

which directs the Secretary to prescribe regulations to protect the confidentiality of the lessees' and permittees' data, and paragraph (g), which provides that "[a]ny provision of State or local law which provides for public access to any privileged information received or obtained by any person pursuant to this subchapter is expressly preempted by the provisions of this section, to the extent that it applies to such information."⁵¹ CPAI asserts that paragraph (g) thus expressly preempts the State Disclosure Laws that would permit disclosure of the Well Data before CPAI's leases expire.⁵²

CPAI also contends that the Alaska state "laws and regulations conflict with federal law and impermissibly interfere with Congress's important objectives and are thus preempted."⁵³ CPAI asserts that 30 C.F.R. Part 552, which are the regulations prescribed by the Secretary pursuant to 43 U.S.C. § 1352(a)(1)(A), "contain explicit language providing that a lessee's exploration data will remain confidential absent the lessee's permission for public disclosure."⁵⁴

AOGCC does not dispute that the NPRPA's reference to the specific paragraph of 43 U.S.C. § 1352(a)(1)(A) incorporates 43 U.S.C. § 1352 as a whole. Rather, it asserts that the express preemption clause in 43 U.S.C. § 1352(g)

⁵¹ Docket 1 at 11-12, ¶¶ 37-38; 43 U.S.C. § 1352(c), (g).

⁵² Docket 1 at 13, ¶ 41.

⁵³ Docket 1 at 14-15, ¶ 45.

⁵⁴ Docket 1 at 12-13, ¶ 39.

applies only to “information received or obtained . . . pursuant to” federal law and does not apply to CPAI’s Well Data because AOGCC obtained that data directly from CPAI pursuant to Alaska state law.⁵⁵ AOGCC further asserts that the State Disclosure Laws do not obstruct Congress’s objective to incentivize private oil and gas exploration in the NPR-A.⁵⁶ Rather, AOGCC contends that 43 U.S.C. § 1352(a)(1)(A) imposes a “disclosure condition on information acquired during exploration of the NPR-A” that is not an incentive but rather “a requirement placed on permittees and lessees in exchange for the opportunity [to] explore for oil and gas.”⁵⁷ AOGCC also points out that 43 U.S.C. § 6506a(k) of the NPRPA specifically addresses exploration incentives, but that keeping exploration data confidential does not appear in that section.⁵⁸

The Supremacy Clause establishes that “the Law of the United States . . . shall be the supreme Law of the Land.”⁵⁹ At issue is whether Congress, in enacting the Rider and referencing a section of OCSLA’s Oil and Gas Information Program, intended to preempt the State Disclosure Laws that would permit public disclosure of CPAI’s Well Data before CPAI’s leases expire.

⁵⁵ Docket 8-1 at 10.

⁵⁶ Docket 8-1 at 17.

⁵⁷ Docket 8-1 at 17.

⁵⁸ Docket 8-1 at 18.

⁵⁹ U.S. Const. art. VI, cl. 2.

I. Express Preemption

CPAI contends that Alaska state law is expressly preempted by paragraph (g) of the OCSLA Oil and Gas Information Program, as incorporated by the NPRPA Rider.⁶⁰ AOGCC does not dispute that the NPRPA incorporates paragraph (g) of the OCSLA Oil and Gas Information Program, but it asserts that the preemption clause applies only to information obtained pursuant to federal law and not to information that AOGCC obtained directly from CPAI pursuant to state law.⁶¹ “Congress may withdraw specified powers from the States by enacting a statute containing an express preemption provision.”⁶² “Express preemption is a question of statutory construction, requiring a court to look to the plain wording of the statute and surrounding statutory framework to determine whether Congress intended to preempt state law.”⁶³

In looking at the “plain wording” of § 6506a(m) of the NPRPA, the statute references only subparagraph (a)(1)(A) of the OCSLA Oil and Gas Information Program.⁶⁴ That subparagraph requires lessees or permittees to provide

⁶⁰ 43 U.S.C. § 1352(g); Docket 12 at 29-38.

⁶¹ Docket 8-1 at 10; Docket 34 at 8 (Partial Tr. of Oral Arg., Nov. 22, 2022).

⁶² *Arizona v. United States*, 567 U.S. 387, 399 (2012).

⁶³ *Jones v. Google L.L.C.*, 56 F.4th 735, 739-40 (9th Cir. 2022).

⁶⁴ 42 U.S.C. § 6506a(m) (“Any information acquired in such explorations shall be subject to the conditions of 43 U.S.C 1352(a)(1)(A).”).

exploration information to the Secretary of the Interior.⁶⁵ While Congress clearly could have expressly incorporated the entire Oil and Gas Information Program into the NPRPA, it did not. Although CPAI and AOGCC seem to agree that NPRPA § 6506a(m)'s reference to subparagraph (a)(1)(A) means incorporation of the entire OCLSA Oil and Gas Information Program statute, neither party points to any case law or secondary sources supporting the proposition that a reference to one specific section of a statute incorporates more than just that section.⁶⁶ On the contrary, “[a] statute of specific reference adopts only the particular parts of the statute to which it refers.”⁶⁷

While the Court does find some ambiguity as to what Congress intended in making “the conditions” of subparagraph (a)(1)(A) apply to NPR-A leases, there is no “clear statement” that the express preemption clause of the OCSLA Oil and Gas Information Program is incorporated by reference into the NPRPA.⁶⁸ Accordingly, the Court finds that the State Disclosure Laws are not expressly preempted.

⁶⁵ 43 U.S.C 1352(a)(1)(A). The subparagraph also directs that “data and information shall be provided in accordance with regulations which the Secretary shall prescribe”; such regulations are found at 30 C.F.R. § 552.1, *et seq.* *Id.* See further discussion *infra* at paragraph II.C.

⁶⁶ Docket 12 at 29-40; Docket 8-1 at 10-15.

⁶⁷ 2B NORMAN J. SINGER & SHAMBIE SINGER, STATUTES AND STATUTORY CONSTRUCTION § 51:8 (7th ed. 2012).

⁶⁸ *Google L.L.C.*, 56 F.4th at 739 (“Congress may expressly preempt state law by enacting a clear statement to that effect.” (quoting *In re Volkswagen “Clean Diesel” Mktg., Sales Pracs., & Prods. Liab. Litig.*, 959 F.3d 1201, 1211 (9th Cir. 2020))); see discussion *infra* at paragraph II.B.

II. Conflict Preemption

CPAI asserts that if the State Disclosure Laws are not expressly preempted, then they are preempted under a theory of obstacle preemption. CPAI contends that the Rider preempts the State Disclosure Laws “because they conflict with and stand as an obstacle to Congress’s objective to incentivize private oil and gas exploration and development in the NPR-A.”⁶⁹ CPAI asserts there is ambiguity in 42 U.S.C. § 6506a(m) insofar as “it says that Congress is adopting the conditions of” 43 U.S.C. § 1352(a)(1)(A).⁷⁰ AOGCC maintains that there is no ambiguity⁷¹ and that the State Disclosure Laws “do[] not interfere with private exploration of the NPR-A for oil and gas development.”⁷²

“Congress may expressly preempt state law by enacting a clear statement to that effect.”⁷³ However, “Congress may also preempt state law implicitly.”⁷⁴ The task of determining whether Congress intended to preempt state law in the absence of an expressly stated intent to do so is “guided by two cornerstones of .

⁶⁹ Docket 12 at 21. CPAI does not assert field preemption or the subset of conflict preemption where “compliance with both state and federal law is impossible.” See Docket 12 at 20-40; *In re Volkswagen*, 959 F.3d at 1212.

⁷⁰ Docket 34 at 7-8.

⁷¹ Docket 34 at 6.

⁷² Docket 8-1 at 19.

⁷³ *In re Volkswagen*, 959 F.3d at 1211 (citing *Kansas v. Garcia*, 140 S. Ct. 791, 801 (2020)).

⁷⁴ *Id.*

. . . pre-emption jurisprudence.”⁷⁵ “First, ‘the purpose of Congress is the ultimate touchstone in every pre-emption case.’”⁷⁶ “Second, “[i]n all pre-emption cases, and particularly in those in which Congress has ‘legislated . . . in a field which the States have traditionally occupied,’ . . . we ‘start with the assumption that the historic police powers of the States were not to be superseded by the Federal Act unless that was the clear and manifest purpose of Congress.’”⁷⁷

The Supreme Court has identified two circumstances in which “Congress’s implicit intent to preempt state law clears that high threshold.”⁷⁸ The first circumstance occurs “when federal law occupies a field of regulation so comprehensively that it has left no room for supplementary state legislation.”⁷⁹ The second circumstance occurs “when a state law actually conflicts with federal law, either because compliance with both state and federal law is impossible, or because the state law stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress.”⁸⁰ Here, CPAI asserts that obstacle preemption applies.

⁷⁵ *Wyeth v. Levine*, 555 U.S. 555, 565 (2009).

⁷⁶ *Id.* (quoting *Medtronic, Inc. v. Lohr*, 518 U.S. 470, 485 (1996)).

⁷⁷ *Id.* (quoting *Lohr*, 518 U.S. at 485) (alterations in original).

⁷⁸ *In re Volkswagen*, 959 F.3d at 1212.

⁷⁹ *Id.* (quoting *Murphy v. Nat’l Collegiate Athletic Ass’n*, 138 S. Ct. 1461, 1480 (2018)) (internal quotations omitted).

⁸⁰ *Id.* (internal quotations and citations omitted).

A. Presumption Against Preemption

Preliminarily, AOGCC asserts that a presumption against preemption should apply here as the issue involves a matter of health and safety and the state's historic regulation of the development and conservation of oil and gas.⁸¹ While courts “start with the assumption that the historic police powers of the States were not to be superseded . . . unless that was the clear and manifest purpose of Congress,”⁸² that “assumption of nonpre-emption is not triggered when the State regulates in an area where there has been a history of significant federal presence.”⁸³

From the time that President Harding “created the National Petroleum Reserve by Executive Order in 1923” until the present, the federal government has “exercise[d] ownership and control over [oil and gas production in] the NPR-A.”⁸⁴ Moreover, the federal government has enacted multiple statutes since the 1920s regulating oil and gas on federal lands and waters.⁸⁵ For the past century, there has been a clear history of significant federal presence in oil and gas matters on

⁸¹ Docket 8-1 at 11.

⁸² *Jones v. Rath Packing Co.*, 430 U.S. 519, 525 (1977).

⁸³ *United States v. Locke*, 529 U.S. 89, 90 (2000).

⁸⁴ Docket 11 at 17, 17 n.51 (citing *United States v. Alaska*, 521 U.S. 1, 36, 39 (1997) (discussing the federal government's involvement in the NPR-A since Alaska's statehood)).

⁸⁵ See, e.g., the Mineral Leasing Act of 1920, 30 U.S.C. § 181, *et seq.*; Mineral Leasing Act for Acquired Lands of 1947, 30 U.S.C. § 351, *et seq.*; Outer Continental Shelf Lands Act of 1953, 43 U.S.C. § 1331, *et seq.*; Naval Petroleum Reserves Production Act of 1976, 42 U.S.C. § 6501, *et seq.*; Federal Onshore Oil and Gas Leasing Reform Act of 1987, 30 U.S.C. § 181, *et seq.*

federal lands, including the NPR-A. Therefore, the Court finds that the presumption against preemption is not triggered in this case.

B. Ambiguity

The Court next turns to whether there is ambiguity in the NPRPA with respect to the preemption of the State Disclosure Laws. The definition of “ambiguous” is “capable of being understood in two or more possible senses or ways.”⁸⁶ Although AOGCC maintains that there is no ambiguity in the NPRPA because “Congress’s intent” was “clear” as “expressed through the language of the statute and its structure and purpose,”⁸⁷ the Court disagrees. First, as discussed *supra* in Section I, both parties seem to assume that 42 U.S.C. § 6506a(m)’s reference to subparagraph (a)(1)(A) of § 1352 means incorporation of the entire OCSLA Oil and Gas Information Program statute.⁸⁸ However, in this Court’s view, this may run afoul of statutory construction, which limits incorporation by reference only to the particular part of the statute referenced.⁸⁹ These conflicting views of what exactly is incorporated into the NPRPA demonstrates ambiguity.

⁸⁶ *Ambiguous*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/ambiguous> (last visited Mar. 2, 2023).

⁸⁷ Docket 18 at 2.

⁸⁸ Docket 12 at 29-40; Docket 8-1 at 10-15.

⁸⁹ SINGER & SINGER, *supra* note 77, at § 51:8.

Second, assuming that the express preemption clause in paragraph (g) of § 1352 is incorporated in the NPRPA Rider, AOGCC acknowledges some ambiguity there. Counsel for AOGCC stated at oral argument that the “subchapter” referenced in paragraph (g)’s clause “pursuant to this subchapter” may refer to both the OCSLA and the NPRPA “as it utilizes the information program, . . . but another interpretation could be that it . . . refers to the [OCSLA] and Congress never intended those sections to apply to the NPRPA.”⁹⁰ The Court also finds ambiguous whether paragraph (g) applies only to Well Data information submitted directly to the federal government “pursuant to” the Oil and Gas Information Program, or more broadly to exploration information about wells drilled on the NPR-A, even if that information was submitted directly to the state.

Third, the Court finds the phrase “the conditions of” in 42 U.S.C. § 6506a(m) ambiguous. Rather than writing, “Any information acquired in such explorations shall be subject to 43 U.S.C. 1352(a)(1)(A),” Congress wrote, “Any information acquired in such explorations shall be subject to *the conditions of* 43 U.S.C. 1352(a)(1)(A).”⁹¹ Courts construe a statute to give effect “to all [its] provisions, so that no part will be inoperative or superfluous, void or insignificant.”⁹² Because

⁹⁰ Docket 34 at 8.

⁹¹ 42 U.S.C. § 6506a(m) (emphasis added).

⁹² *Ysleta Del Sur Pueblo v. Texas*, 142 S. Ct. 1929, 1939 (2022) (quoting *Corley v. United States*, 556 U.S. 303, 314 (2009)); see also 2A NORMAN J. SINGER & SHAMBIE SINGER, STATUTES AND STATUTORY CONSTRUCTION § 46:6 (7th ed. 2014).

Congress added the phrase “the conditions of,” the question becomes: what conditions, beyond what is already included in 43 U.S.C. § 1352(a)(1)(A), did Congress mean?

For the foregoing reasons, the Court finds that the federal law is ambiguous as to whether Congress intended to preempt the State Disclosure Laws regarding the public disclosure of Well Data from the NPR-A.

C. NPRPA Rider Purpose and Legislative History

When “language is ambiguous or is capable of more than one reasonable interpretation, [courts] ‘consult the legislative history, to the extent that it is of value, to aid in [their] interpretation.’”⁹³ Courts also look to a “statute’s ‘purpose’” to guide their analysis.⁹⁴ When Congress first enacted the NPRPA in 1976, only the federal government was permitted to explore for petroleum, and the “production of petroleum” was generally prohibited.⁹⁵ It appears from the congressional record that there was very limited exploration activity on the NPR-A by the federal government after 1976.⁹⁶

⁹³ *United States v. Thompson*, 728 F.3d 1011, 1015 (9th Cir. 2013) (quoting *Merkel v. Comm’r of Internal Revenue*, 192 F.3d 844, 848 (9th Cir. 1999)).

⁹⁴ *Thompson*, 728 F.3d at 1015 (citing *Jonah R. v. Carmona*, 446 F.3d 1000, 1005, 1010-11 (9th Cir. 2006)).

⁹⁵ Pub. L. No. 94-258, § 104(c), 90 Stat. 303 (1976) (directing the Secretary of the Navy and the Secretary of the Interior, upon transfer of management authority, to “continue the ongoing petroleum exploration program”); see also *id.* § 104(a), (e) (prohibiting production except to provide gas to the Village of Barrow, other communities, and agencies of the federal government).

⁹⁶ See 126 CONG. REC. 20489-90 (1980).

In 1979, the Nation experienced its second energy crisis of that decade with “oil prices beg[inning] to rise rapidly in mid-1979, more than doubling between April 1979 and April 1980.”⁹⁷ In late 1980, Congress noted the inadequacy of the government’s exploration efforts to date and debated whether to open the NPR-A to private oil and gas leasing and development.⁹⁸ In December 1980, Congress added the Rider to the Department of Interior appropriations bill, authorizing the “expeditious program of competitive [private] leasing of oil and gas in the National Petroleum Reserve in Alaska[.]”⁹⁹ Faced with a critical oil shortage and the federal government’s limited exploratory program, it appears Congress intended to open the NPR-A to private leasing and exploration and production in order to increase domestic oil supply as expeditiously as possible.

Before enacting the Rider, Congress directed that a study be done pursuant to NPRPA Section 105(b) “to determine the best overall procedures to be used in the development, production, transportation, and distribution of petroleum

⁹⁷ Laurel Graefe, *Oil Shock of 1978–79*, Federal Reserve History, available at www.federalreservehistory.org/essays/oil-shock-of-1978-79 (last visited Feb. 17, 2023).

⁹⁸ H.R. Rep. No. 96-1147, at 32-33 (1980). The debate was also between Congress and the Carter Administration. The Carter Administration proposed discontinuing government exploration prior to commencing a private leasing program. Some members of Congress, on the other hand, supported continued government drilling until a leasing program for private exploration was established. See *id.*

⁹⁹ Pub. L. No. 96-514, 94 Stat. 2964. Paragraph (d) of the Rider mandated that the first lease sale “shall be conducted within twenty months of December 12, 1980.”

resources in the reserve.”¹⁰⁰ The resulting report (“Report”) was issued in December 1979.¹⁰¹ The Report highlighted “several potential approaches to exploration and development of the NPR-A” and evaluated three options: a private sector program, a public sector program, and a mixed public and private sector program.¹⁰² The Rider cites to the Report, and it is thus reasonable to assume Congress relied upon the Report when drafting the Rider.¹⁰³ Because Congress ultimately created a private leasing program in the Rider, the Court examines the Report’s evaluations of a private sector program to gain insight into “the purpose of Congress.”¹⁰⁴

As CPAI points out, the Report noted that the government’s role in a private sector program “would be similar to its role in managing oil and gas operations on the OCS.”¹⁰⁵ The Report further compared an NPR-A private leasing program to the OCSLA oil and gas program, stating, “As on the OCS, the Government would

¹⁰⁰ Pub. L. No. 94-258, § 105(b) (codified at 42 U.S.C. § 6505(b)).

¹⁰¹ OFF. OF MINS. POL’Y & RSCH. ANALYSIS, U.S. DEP’T OF THE INTERIOR, FINAL REPORT OF THE 105(B) ECONOMIC AND POLICY ANALYSIS (1979) (hereafter cited as “105(b) REPORT”).

¹⁰² Docket 12 at 5; 105(b) REPORT 6-10, 37.

¹⁰³ See 42 U.S.C. § 6506a(n)(2) (referring to “the comprehensive land-use studies carried out in response to sections 6506(b) and (c) of this title”). The Court notes that while the statute refers to “sections 6506(b) and (c),” this is an apparent typographical error, as the statute should instead refer to section “6505(b) and (c).” Section 6506 of the NPRPA is about antitrust provisions and contains no paragraphs. See *id.*; 42 U.S.C. § 6505(b) and (c); 42 U.S.C. § 6506.

¹⁰⁴ *Wyeth*, 555 U.S. at 565.

¹⁰⁵ Docket 12 at 5; 105(b) REPORT 37.

establish leasing schedules, terms and conditions, and enforce regulations”¹⁰⁶

That Congress intended the NPRPA private leasing process to replicate the OCS leasing process is reflected in § 6506a(f).¹⁰⁷

Of further relevance to the congressional intent of the Rider is the section of the Report on “Information Externalities” under the private sector program.¹⁰⁸ “Information Externalities” is identified as a problem in the private sector program but not in the public sector program. The Report makes clear that exploration information, if it “become[s] known in the industry,” or if there is an “information spillover,” is “of particular value to competitors holding leases on nearby tracts or nearby areas.”¹⁰⁹ The Reports notes that “the exploring firm is not automatically compensated for the value of benefits accruing to competitors from knowledge concerning the explorer’s discoveries. . . . [T]he uncompensated information spillover may result in less exploration.”¹¹⁰ The Report then provides various solutions to this problem, the first being a regulation providing for the “early public release of information.” However, it remarks that “a requirement to release

¹⁰⁶ 105(b) REPORT 37. The Report discusses five management approaches but uses “Approach 2, which assumes management of NPRA through traditional OCS-type leasing and development procedures,” as “the reference point for th[e] study.” *Id.* at 6.

¹⁰⁷ “Bidding systems used in lease sales shall be based on bidding systems included in section 205(a)(1)(A) through (H) of the Outer Continental Shelf Lands Act Amendments of 1978 (92 Stat. 629).” 42 U.S.C. § 6506a(f).

¹⁰⁸ 105(b) REPORT 38.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

exploration information does not compensate the exploring firm for the value of information and could have serious disincentive effects.”¹¹¹ Therefore, “[t]o maintain some competitive edge” for “companies involved in exploration,” the Report recommended publicly releasing the exploration information only *after* the explorer “relinquished [the leased land] to the Government.”¹¹²

As for how long the initial leases should be, the Report recommended a term of 10 years with an option to extend “upon adequate showing of diligence and compliance with the work commitment.”¹¹³ The Report noted that “if the lease term is too short, prospective lessees may be discouraged from acquiring leases.”¹¹⁴ Congress subsequently adopted these recommendations into the NPRPA by establishing 10-year leases with extension options.¹¹⁵

¹¹¹ *Id.* Of note, while AOGCC contends in its briefing that keeping exploration data confidential is not an incentive to private exploration, it seemed to acknowledge during oral argument that there is some incentive. Counsel for AOGCC stated that the Alaska disclosure laws “do[] maintain confidentiality for a set amount of time to ensure that the *incentive* to invest early is there for these operators,” and that “the State will continue to hold [significant information] confidential if that land is released . . . [s]o these companies do have this *incentive* to invest.” Docket 34 at 3-4 (emphasis added).

¹¹² 105(b) REPORT 57.

¹¹³ *Id.* at 53.

¹¹⁴ *Id.*

¹¹⁵ 42 U.S.C. § 6506a(i)(1) states: “Each lease shall be issued for an initial period of not more than 10 years, and shall be extended for so long thereafter as oil or gas is produced from the lease in paying quantities, oil or gas is capable of being produced in paying quantities, or drilling or reworking operations, as approved by the Secretary, are conducted on the leased land.”

Additional evidence demonstrates that Congress was aware of the problem that public disclosure of exploration information would cause in a private leasing context. In testimony before Congress regarding the Rider, at least one oil and gas industry witness specifically addressed the value of exploration information, testifying that, “[T]he collection of geophysical data is competitive, as any aspect in exploring for oil. Each of us companies feel that we have an edge in some way or another in terms of collecting geophysical data.”¹¹⁶

Moreover, Congress had already become aware of the need for confidentiality during hearings on the OCSLA Amendments of 1977. The Secretary of the Interior wrote to Congress, “The problems of confidentiality or full disclosure of drilling results are central to the value of any [private] exploration program. Confidentiality . . . is essential if there is to be an incentive for firms to invest their own funds in pre-lease exploration.”¹¹⁷ The Administrator of the Federal Energy Administration also weighed in, stating, “Disclosure of information which is of a proprietary nature may seriously jeopardize the competitive position of the participants in the OCS program, and may effect [sic] their willingness to

¹¹⁶ *Dep’t of the Interior & Related Agencies Appropriations for 1981: Hearings Before a Subcomm. of the Comm. on Appropriations*, 96th Cong. 799 (1980) (statement of W.E. Crain, Alaskan Division Manager, Exploration, Chevron, U.S.A.).

¹¹⁷ *Outer Cont’l Shelf Lands Act Amends. of 1977, Part 1: Hearings Before the Ad Hoc Select Comm. on Outer Cont’l Shelf*, 95th Cong. 200 (1977) (statement of Cecil D. Andrus, Secretary of the Interior) (hereafter “OCSLA Hearings”).

spend the sums necessary to obtain such information.”¹¹⁸ In contrast, with a “publicly financed drilling program, . . . full disclosure is essential [because] . . . [t]he major purpose of the publicly supported program is to make information as widely available as possible so as to enhance competition for leases and government revenue.”¹¹⁹

In enacting the NPRPA Rider, Congress intended to permit and incentivize private exploration of the NPR-A.¹²⁰ Based on the testimony Congress received regarding the Rider, Congress’s consideration of OCSLA when drafting the Rider, and the testimony from the OCSLA hearings, the Court finds that Congress recognized the need to keep exploration information confidential in a private leasing program such as the one authorized by the Rider. Congress had previously demonstrated its significant interest in protecting that information when it enacted the OCSLA Oil and Gas Information Program, which directed the executive to enact regulations to “assure . . . the confidentiality of privileged or proprietary information received by the Secretary” in paragraph (c) and expressly preempted state public disclosure laws in paragraph (g).¹²¹

¹¹⁸ *Id.* at 223 (statement of John F. O’Leary, Administrator, Federal Energy Administration).

¹¹⁹ *Id.* at 200 (statement of Cecil D. Andrus, Secretary of the Interior).

¹²⁰ As CPAI points out, “[t]his is reflected in the NPRPA’s larger lease tracts, longer lease terms, exploration incentives, and data confidentiality protections for explorers.” Docket 26 at 10; see also 42 U.S.C. § 6506a(h), (i), (k), (m).

¹²¹ 43 U.S.C. § 1352. Paragraph (c) also provides that “no such information will be transmitted to any affected State” unless the lessee or permittee consents. *Id.* § 1352(c).

In reviewing the NPRPA and its enabling regulations, 43 C.F.R. § 3130, *et seq.*, the Court found only one provision governing the confidentiality of exploration information: paragraph (m) of the Rider, which incorporates “the conditions of 43 U.S.C. 1352(a)(1)(A).”¹²² As discussed above, 43 U.S.C. § 1352(a)(1)(A) of the OCSLA directs lessees or permittees to provide information to the Secretary of the Interior in accordance with prescribed regulations. The regulations are found at 30 C.F.R. Part 552 and “provide[] procedures and requirements for the submission of oil and gas data and information” to the federal government.¹²³ Multiple sections in 30 C.F.R. Part 552 govern when and how the exploration information provided to the government can be disclosed, and they further provide rules on maintaining confidentiality.¹²⁴ For example, 30 C.F.R. § 552.7 directs that “[p]rior to the transmittal of any privileged or proprietary data or information to any State, . . . the State shall agree . . . to . . . [p]rotect and maintain the confidentiality of privileged or proprietary data or information in accordance with the laws and regulations listed

¹²² 42 U.S.C. § 6501, *et seq.*; 43 C.F.R. § 3130, *et seq.*

¹²³ 30 C.F.R. § 552.1.

¹²⁴ *See id.* §§ 552.3-552.7.

in paragraph (a)(3) of this section.”¹²⁵ One of the laws “listed in paragraph (a)(3)” is the OCSLA, which contains the Oil and Gas Information Program.¹²⁶

When the OCSLA Oil and Gas Information Program was created, “Congress asserted exclusive federal jurisdiction over the seabed and subsoil of the OCS.”¹²⁷ Explorers submitted their OCS exploration information only to the federal government, and as both parties note, the only way states could obtain that information was through the federal government because states “did not have the jurisdiction to obtain the information themselves.”¹²⁸ “In contrast, the NPR-A is . . . subject to both federal and state jurisdiction.”¹²⁹ Given this different context, the Court must determine whether, by referencing the OCSLA Oil and Gas Information Program, Congress intended to protect only the confidentiality of Well Data that was submitted to the federal government, or whether it intended to protect the confidentiality of all well data generated by NPR-A lease holders, including CPAI’s Well Data submitted directly to the AOGCC.

¹²⁵ *Id.* § 552.7(a)(4)(i); *see also id.* § 552.2 (“Information, when used without a qualifying adjective, includes analyzed geological information, processed geophysical information, interpreted geological information, and interpreted geophysical information.”).

¹²⁶ 30 C.F.R. § 552.2(a)(3) cites to the OCSLA as “the Act (92 Stat. 629).”

¹²⁷ Docket 22 at 19.

¹²⁸ Docket 22 at 19; Docket 26 at 9.

¹²⁹ Docket 22 at 20.

D. Obstacle Preemption

The Court now addresses whether Congress demonstrated an implicit intent to preempt the State Disclosure Laws when it enacted the NPRPA Rider. The Supreme Court has found obstacle preemption in two circumstances.

First, where the federal legislation at issue involved a “uniquely federal area of regulation,” the Court has inferred a congressional intent to preempt state laws “that directly interfered with the operation of the federal program.” . . . Second, the Court has inferred that Congress made “a considered judgment” or “a deliberate choice” to preclude state regulation when a federal enactment clearly struck a particular balance of interests that would be disturbed or impeded by state regulation.¹³⁰

When determining whether an act of Congress preempts state law, “[t]here is no ‘rigid formula or rule.’”¹³¹ “Rather, what constitutes ‘a sufficient obstacle is a matter of judgment, to be informed by examining the federal statute as a whole and identifying its purpose and intended effects.’”¹³²

As discussed above, the purpose of the NPRPA Rider was to effectuate a competitive private oil and gas leasing program on the NPR-A. In enacting the Rider, Congress recognized the need to protect confidential information from public disclosure, but it also mandated disclosure of such information—with

¹³⁰ *In re Volkswagen*, 959 F.3d at 1212 (alteration omitted) (first quoting *Chamber of Com. v. Whiting*, 563 U.S. 582, 604 (2011); and then quoting *Arizona*, 567 U.S. at 405).

¹³¹ *Chamber of Com. v. Bonta*, No. 20-15291, 2023 WL 2013326, at *6 (9th Cir. Feb. 15, 2023) (quoting *Hines v. Davidowitz*, 312 U.S. 52, 67 (1941)).

¹³² *Id.* (quoting *Crosby v. Nat’l Foreign Trade Council*, 530 U.S. 363, 373 (2000)).

limits—for governmental purposes.¹³³ This exemplifies a “balance of interests” between incentivizing private exploration by protecting data and satisfying governmental interests such as conservation and oversight of federal lands by directing the submission of data.¹³⁴ Indeed, testimony regarding the OCSLA Amendments of 1977 specifically pointed out this balance of interests: the Secretary of the Interior stated, “On balance, there seems to be adequate access for the use of information by parties with a legitimate need to have such knowledge, and yet sufficient controls so that the sources of such information are equitably protected and encouraged to produce and share information on the OCS.”¹³⁵

AOGCC contends that it can disclose the Well Data because it obtained that data directly from CPAI and not from the federal government.¹³⁶ Paragraph (g) of the OCSLA Oil and Gas Information Program preempts state laws providing public access to exploration information “obtained by any person pursuant to this subchapter.”¹³⁷ AOGCC asserts that this preemption provision is “narrow” and only applies to information states obtain pursuant to the “subchapter”—that is,

¹³³ See, e.g., 43 U.S.C. § 1352(a)(1)(A); 30 C.F.R. Part 552.

¹³⁴ *In re Volkswagen*, 959 F.3d at 1212.

¹³⁵ OCSLA Hearings, 95th Cong. 202-03 (statement of Cecil D. Andrus, Secretary of the Interior) (discussing the confidentiality provision in the OCSLA Oil and Gas Information Program, paragraph (c)).

¹³⁶ AOGCC makes this argument in both the express preemption and conflict preemption sections of its Motion to Dismiss Complaint. See Docket 8-1 at 13-20.

¹³⁷ 43 U.S.C. § 1352(g).

through the OCSLA Oil and Gas Information Program or through the NPRPA Rider.¹³⁸ AOGCC acknowledges that if it had obtained CPAI's Well Data from the federal government, then paragraph (g) of § 1352 would prohibit public disclosure of that Well Data on a timeline different from federal law.¹³⁹ But AOGCC asserts that because it obtained CPAI's Well Data *not* from the federal government but "pursuant to a state's own laws regulating oil [and] gas production and conservation"¹⁴⁰—that is, directly from CPAI—then paragraph (g) does not apply to restrict its dissemination of the Well Data after two years.¹⁴¹

And yet CPAI, and other private oil and gas companies, would not have any NPR-A exploration information to submit to either the federal or state government but for their leases authorized by the NPRPA. It is not through the State of Alaska's authority that CPAI is exploring for oil and gas in the NPR-A, but through the federal government's authority. Therefore, "[a]ny information acquired in [NPR-A] explorations"¹⁴² exists only because of the NPRPA, and *any* such information—whether submitted directly to the federal government or directly to the state

¹³⁸ Docket 8-1 at 14-15.

¹³⁹ Docket 34 at 5-6.

¹⁴⁰ Docket 8-1 at 14.

¹⁴¹ Docket 34 at 2-3; *see also* ALASKA STAT. § 31.05.035(c); ALASKA ADMIN. CODE tit. 20, § 25.537(d).

¹⁴² 42 U.S.C. § 6506a(m).

government—is obtained pursuant to the NPRPA and its incorporated provisions of the OCSLA Oil and Gas Information Program.¹⁴³

If the federal confidentiality provision does not apply to the State Disclosure Laws and AOGCC were to disclose CPAI's Well Data pursuant to Alaska law well before the time allowed under federal law, Congress's "particular balance of interests . . . would be disturbed or impeded by state regulation."¹⁴⁴ CPAI asserts that such a disclosure would diminish "the value of the Well Data to CPAI . . . because CPAI would lose its competitive advantage as to other companies."¹⁴⁵ The Court finds this argument persuasive because the early disclosure of Well Data by the State of Alaska would "serve as a disincentive for CPAI to drill further wells in the NPR-A . . . [and] would inevitably create a scenario in which oil and gas exploration companies . . . 'wait out' their competitors in the hopes that some other company would conduct exploration activities that could then be exploited.

¹⁴³ AOGCC also contends that it would be "impractical" to keep "information a state receives directly from lessees" confidential under the OCSLA Oil and Gas Information Program because the state would not know if the information actually fell "under the Information Program's confidentiality provisions." Docket 22 at 20-21. For the same reasons set forth above, the Court rejects this argument and finds that any exploration information acquired from NPR-A leases is governed by the confidentiality restrictions of the Oil and Gas Information Program.

¹⁴⁴ *In re Volkswagen*, 959 F.3d at 1212; *see also Garcia*, 140 S. Ct. at 801 ("If federal law imposes restrictions or confers rights on private actors and a state law confers rights or imposes restrictions that conflict with the federal law, the federal law takes precedence and the state law is preempted." (internal quotation marks and citation omitted)).

¹⁴⁵ Docket 13 at 3, ¶ 4.

Because explorers would be incentivized to wait . . . , there would be less exploration of the NPR-A.”¹⁴⁶

Less exploration of the NPR-A is the opposite of Congress’s objective in enacting the Rider, which was to promote the expeditious private exploration of this federal land. Congress recognized the need to protect the confidentiality of Well Data in order to promote that goal. It would make no sense for Congress to prohibit the federal government from publicly disclosing Well Data for the duration of an NPR-A lease but permit a state to disclose such information prior to the end of the lease. Allowing the State of Alaska to disclose CPAI’s Well Data after just two years would clearly impede Congress’s intent to expeditiously advance private oil and gas development on the NPR-A. The Court thus finds that the State Disclosure Laws “stand[] as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress” and are preempted by the OCSLA Oil and Gas Information Program as incorporated into the NPRPA Rider.¹⁴⁷

III. Rule 56(d) Continuance

AOGCC, in its opposition to CPAI’s Motion for Partial Summary Judgment, requested a Rule 56(d) continuance to conduct discovery on additional facts.¹⁴⁸

¹⁴⁶ Docket 13 at 4, ¶ 6.

¹⁴⁷ *Google L.L.C.*, 56 F.4th at 741.

¹⁴⁸ Docket 22 at 34-35. AOGCC asserts that it needs the business records Mr. John Schell relied on to make his declaration and the Well Data CPAI provided to BLM to verify if CPAI provided any of the same Well Data to AOGCC. Docket 22 at 34-35; see *also* Docket 13. However, AOGCC does not explain how “the sought-after facts are essential to oppose summary judgment.” *Fam.*

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Order re Motion to Dismiss Complaint and Motion for Partial Summary Judgment

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And yet, AOGCC acknowledges in its Motion to Dismiss Complaint that the preemption issue “sets forth a pure question of law.”¹⁴⁹ “Preemption is almost always a legal question, the resolution of which is rarely aided ‘by development of a more complete factual record.’”¹⁵⁰ The Court finds that the preemption issue in this case is a pure question of law that requires no additional factfinding to determine. The Court therefore denies the requested continuance.

CONCLUSION

In light of the foregoing, IT IS ORDERED that Defendant’s Motion to Dismiss Complaint at Docket 8 is DENIED; that Defendant’s request for a Rule 56(d) continuance is DENIED; and that Plaintiff’s Motion for Partial Summary Judgment at Docket 12 is GRANTED. The State Disclosure Laws that would permit the public disclosure of CPAI’s Well Data sooner than is permitted by federal law are preempted.

DATED this 8th day of March, 2023, at Anchorage, Alaska.

/s/ Sharon L. Gleason

UNITED STATES DISTRICT JUDGE

Home & Fin. Ctr., Inc. v. Fed. Home Loan Mortg. Corp., 525 F.3d 822, 827 (9th Cir. 2008).

¹⁴⁹ Docket 8-1 at 9.

¹⁵⁰ *ReadyLink Healthcare, Inc. v. State Comp. Ins. Fund*, 754 F.3d 754, 761-62 (9th Cir. 2014) (quoting *Hotel Emps. & Rest. Emps. Int’l Union v. Nev. Gaming Comm’n*, 984 F.2d 1507, 1513 (9th Cir. 1993)).



NI 43-101 TECHNICAL REPORT

Western Alaska Copper & Gold Inc.

ILLINOIS CREEK PROJECT

Illinois Creek Mining District, Western Alaska, USA

PREPARED FOR:

1246779 B.C. Ltd.

1200 Waterfront Centre
200 Burrard Street
Vancouver, BC V7X 1T2

Western Alaska Copper & Gold Inc.

3573 E. Sunrise Drive, Suite 233
Tucson, AZ 85718
(520) 237-1475

EFFECTIVE DATE: 15 January 2021

RELEASE DATE: 21 July 2021

AUTHORS & QUALIFIED PERSONS:

Bruce Davis, PhD, FAusIMM

BD Resource Consulting, Inc.,
Larkspur, Colorado

Robert C. Sim, P.Geo.

SIM Geological Inc., Vancouver, B.C.

Jack DiMarchi, Principal Geologist

Core Geoscience, LLC, Seattle, Washington

Deepak Malhotra, PhD, SME-RM

Pro Solv, LLC, Lakewood, Colorado

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1 SUMMARY

This Technical Report (Report) provides the first estimate of mineral resources for the Illinois Creek Property in the State of Alaska, U.S. (Figure 1-1).

The Illinois Creek Property is one of three properties controlled by Western Alaska Copper & Gold Inc. (WAC&G) in the Illinois Creek mining district. WAC&G is a private exploration company registered in Alaska, and, since 2010, it has been exploring and advancing its interests in the Illinois Creek mining district located in western Alaska near the Yukon River.

This Technical Report was prepared by Bruce Davis, PhD, Robert Sim, P.Geo. and Jack DiMarchi, Principal Geologist in accordance with National Instrument 43-101 and Form 43-101F1 (collectively NI 43-101). All are independent “qualified persons” (QPs) as defined by Canadian Securities Administrators *NI 43-101 Standards of Disclosure for Mineral Projects* and as described in Section 28 (Date and Signature Pages) of this Technical Report.

The effective date of this report is January 15, 2021.

Figure 1-1: Property Location Map (West-Central Alaska, U.S.)



Source: WAC&G (2019)

PROPERTY DESCRIPTION AND OWNERSHIP

The Illinois Creek Property is located in the southern Kaiyuh Mountains just east of the Yukon River in western Alaska, approximately 490 km west of Fairbanks, 52 km southeast of the village of Kaltag, and 85 km south-southwest of the community of Galena. The Property is geographically isolated with no current road access or nearby power infrastructure.

In October 2018, PIEK, Inc. and WAC&G entered into a joint venture agreement to actively explore and develop the Illinois Creek Property, whereby WAC&G can earn 100% of the Illinois Creek Property through shares, work commitments, and payments to PIEK, Inc., the underlying 100% owner of the claims. The agreement consolidates WAC&G's land holdings in the district to 222 State of Alaska mining claims or roughly 55.5 square miles (35,520 acres or approximately 14,374 ha); this total includes Illinois Creek Property (110 claims), and the Round Top (88 claims) and Honker (24 claims) properties. As of the effective date of this report, WAC&G owns 100% of the Illinois Creek Project through the acquisition of PIEK, Inc.

GEOLOGY AND MINERALIZATION

The Illinois Creek mining district is characterized by two distinctly different types of mineralization: porphyry copper deposits (PCDs) and surrounding carbonate replacement deposits (CRDs) along with distal low-sulfidation precious-metal veins likely related to the porphyries. The porphyries of mid- and late-Cretaceous age, respectively called the Illinois Creek and Round Top porphyries, intrude Triassic rocks of the obducted Angayucham terrain and a thick, poorly documented lower Paleozoic sedimentary stratigraphy.

At the Illinois Creek Property, gold and silver mineralization is hosted in gossans related to the deep oxidation of a major CRD system developed at or near the contact with a thick, basal dolomitic quartzite section capped by extensive graphitic, chloritic and quartz muscovite schists.

The Illinois Creek gossan is a deeply weathered, massive sulfide body oxidized to as much as 400 m below the existing surface. The adjacent Waterpump Creek deposit, an unoxidized massive sulfide CRD, is likely a direct analog to the primary mineralization at the Illinois Creek deposit. Sulfide mineralization at Waterpump Creek is dominated by coarse-grained sphalerite, argentiferous galena, minor chalcopyrite, and native gold within coarse-grained ferroan dolomite.

Gold and silver mineralization at the Illinois Creek deposit is characterized as massive iron-oxide gossans which occur as both filled structures and stratigraphically controlled replacement bodies within the basal lower Paleozoic dolomitic quartzite stratigraphy.

Analogous to the Illinois Creek mining district would be the Red Mountain porphyry mining district in the Patagonia Mountains of southern Arizona, where the Hermosa (Taylor) zinc-lead-silver CRD system flanks the Sunnyside porphyry, and the Superior mining district of central Arizona, where the Magma Mine replacement deposits flank the Resolution deposit porphyry.

STATUS OF EXPLORATION

Exploration on the Property began in the early 1980s and an open pit mine was built in the late 1990s with limited production through the early 2000s, when mining was halted due to falling metal prices and corporate financial difficulties for the operators at that time.

METALLURGY

Preliminary metallurgical work indicates that the highly oxidized rocks are amenable to a relatively low-cost leaching extraction of gold and silver using cyanide solutions.

MINERAL RESOURCE ESTIMATE

These are the first estimates of mineral resources produced for WAC&G for the Illinois Creek deposit, and they include estimates of the in-situ mineral resources, as well as estimates for the leach pad area, where mineralized material was stacked during previous mining activities but only leached intermittently from 1979 through mine closure. The mineral resource estimates were generated using drill hole sample assay results and the interpretation of geologic models that relate to the spatial distribution of gold, silver, and copper. Grade estimates are made using ordinary kriging into 3D model blocks measuring 10 × 10 × 5 m (L × W × H) and the effects of anomalous high-grade samples were controlled by a combination of top cutting and outlier limitations, which restrict the distance of influence of high-grade samples during estimation. The results of the modeling process were validated using a combination of visual and statistical methods to ensure the model grades are reasonable representations of the underlying sample data.

Mineral resources delineated by drilling on a maximum nominal spacing of 30 m are included in the Indicated category. In-situ mineral resources within a maximum distance of 100 m from a drill hole are included in the Inferred category. Inferred resources on the leach pad are within a maximum distance of 60 m from a drill hole. To ensure the mineral resources exhibit reasonable prospects for eventual economic extraction, the in-situ resources are constrained within a pit shell generated using projected technical and economic parameters and tabulated at a base case cut-off grade of 0.35 g/t gold equivalent (AuEq). The leach pad mineral resources are tabulated at a zero cut-off grade.

Estimates of the in-situ, leach pad and combined mineral resources are shown in Tables 1.1 through 1.3, respectively.

Table 1.1: Mineral Resource Estimate for In-Situ Mineral Resources

Class	Tonnes (M)	Average Grade				Contained Metal			
		AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	7.4	1.39	0.98	32.7	0.17	331	234	7.8	28
Inferred	3.1	1.47	1.02	35.9	0.20	148	102	3.6	14

In-Situ Mineral Resources are constrained within a pit shell developed using a metal prices of US\$1,600/oz Au and US\$20/oz Ag, mining costs of US\$2.50/t, processing costs of US\$10/t, G&A cost of US\$4.00/t, 92% metallurgical recovery Au, 65% metallurgical recovery Ag and an average pit slope of 45 degrees. The cut-off grade for resources considered amenable to open pit extraction methods is 0.35 g/t AuEq.

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted into Mineral Reserves.

Mineral resources in the Inferred category have a lower level of confidence than that applied to Indicated mineral resources, and, although there is sufficient evidence to imply geologic grade and continuity, these characteristics cannot be verified based on the current data. It is reasonably expected that the majority of Inferred mineral resources could be upgraded to Indicated mineral resources with continued exploration.

Table 1.2: Mineral Resource Estimate for Leach Pad Mineral Resources

Class	Tonnes (000)	Average Grade				Contained Metal			
		AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	1,300	1.00	0.44	44.3	0.42	41.8	18.6	1.9	12
Inferred	152	0.90	0.37	42.6	0.33	4.4	1.8	0.2	1

It is assumed that the entire volume of the material on the leach pad will be processed and therefore, no selectivity is possible, and the Mineral Resources are presented at a zero-cut-off grade.

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted into Mineral Reserves.

Mineral resources in the Inferred category have a lower level of confidence than that applied to Indicated mineral resources, and, although there is sufficient evidence to imply geologic grade and continuity, these characteristics cannot be verified based on the current data. It is reasonably expected that the majority of Inferred mineral resources could be upgraded to Indicated mineral resources with continued exploration.

Table 1.3: Mineral Resource Estimate for Combined In-Situ and Leach Pad Mineral Resources

Class	Tonnes (M)	Average Grade				Contained Metal			
		AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	8.7	1.33	0.90	34.4	0.21	373	253	9.6	40
Inferred	3.3	1.44	0.99	36.2	0.21	152	104	3.8	15

In-Situ Mineral resources are stated as contained within a pit shell developed using a metal prices of US\$1,600/oz Au and US\$20/oz Ag, mining costs of US\$2.50/t, processing costs of US\$10/t, G&A cost of US\$4.00/t, 92% metallurgical recovery Au, 65% metallurgical recovery Ag and an average pit slope of 45 degrees. The cut-off grade for resources considered amenable to open pit extraction methods is 0.35 g/t AuEq. It is assumed that the entire volume of the material on the leach pad will be processed and

CONCLUSIONS

Based on the evaluation of the data available from the Illinois Creek Project, the authors of this Technical Report conclude the following:

- At the effective date of this Technical Report (January 15, 2021), the Illinois Creek Property consists of 110 contiguous mining claims which are part of a larger mineral tenure package totaling 222 mining claims covering 14,374 ha, and WAC&G owns 100% of the Illinois Creek Property through the acquisition of PIEK, Inc.
- The Illinois Creek deposit is characterized as a carbonate replacement deposit (CRD) in which zones of predominantly massive sulfides have been pervasively oxidized to depths approaching 400 m below surface. The remaining iron-oxide gossans contain appreciable amounts of gold and silver, plus minor amounts of copper, lead and zinc.
- Exploration on the Property began in the early 1980s. In the late 90s and early 2000s, there was limited production, and exploration was halted due to falling metal prices and corporate financial difficulties for the operators at that time.
- The Illinois Creek deposit is estimated to contain 7.4M tonnes of mineral resources in the Indicated category at a grade of 0.98 g/t Au and 33 g/t Ag plus 3.1M tonnes mineral resources in the Inferred category at an average grade of 1.02 g/t Au and 36 g/t Ag. These mineral resources are constrained within a pit shell generated using a gold price of US\$1,600/oz and a silver price of US\$20/oz and summarized using a base case cut-off grade of 0.35 g/t AuEq.
- A leach pad area on the Property contains a volume of mineralized material that was stacked during previous mining activities and leached intermittently from 1979 through mine closure. Poor recoveries plagued the leach pad due to a variety of reasons, including pad construction, a change from crush/agglomeration stacking to run-of-mine (ROM) material, and high copper content. During the summer of 2020, WAC&G drilled and sampled the leach pile. It is estimated to contain 1.3M tonnes of mineral resources in the Indicated category at a grade of 0.44 g/t Au and 44 g/t Ag and 152k tonnes of mineral resources in the Inferred category at a grade of 0.37 g/t Au and 43 g/t Ag.
- Preliminary metallurgical work indicates that the highly oxidized rocks are amenable to relatively low-cost leaching extraction of gold and silver using cyanide solutions.
- There are no known factors related to metallurgical, environmental, permitting, legal, title, taxation, socio-economic, marketing or political issues which could materially affect the mineral resource estimates.
- Nearby high-grade mineralization occurs at both Honker Vein (gold) and Waterpump Creek (silver) targets on the Illinois Creek Property.

RECOMMENDATIONS

Based on the evaluation of the data available from the Illinois Creek Project, the authors of this Technical Report recommend the following:

1. Conduct a drilling program on the Illinois Creek deposit to test for extensions of the deposit both down dip and along strike. Budget is \$500,000 (2,000 m @ \$250/m).
2. Generate interpretations of lithology, alteration, mineralization and structural domains and evaluate the potential impact of these on the estimate of mineral resources. Budget is \$25,000.
3. Complete a PEA on the Illinois Creek project. Budget is \$100,000.
4. Conduct a drilling program to evaluate the nearby Honker deposit followed by the generation of a mineral resource estimate. Budget is \$500,000 (1,800 m @ \$250/m, plus resource estimate).
5. Conduct metallurgical studies to determine the most appropriate process for treating mineralized material from the Illinois Creek deposit. Budget is \$75,000.
6. Continue environmental baseline monitoring to support environmental and permitting activities. Budget is \$30,000.

Total budget is \$1,230,000.

2 INTRODUCTION

2.1 TERMS OF REFERENCE

Western Alaska Copper & Gold Inc. (WAC&G) is a private exploration company registered in Alaska. Since 2010, WAC&G has been exploring and advancing its interests in the Illinois Creek mining district located in western Alaska near the Yukon River.

WAC&G retained Bruce Davis, PhD, FAusIMM of BD Resource Consulting, Inc. (BDRC) and Robert Sim, P.Geo. of SIM Geological Inc. (SGI) to provide an estimate of mineral resources for the Illinois Creek Oxide Gold-Silver Project (the Project), which includes the in-situ mineral resources and the mineral resources on the leach pad. BDRC and SGI were assisted by Jack DiMarchi, a principal geologist with Core Geoscience LLC., who provided information related to environmental and permitting, and Deepak Malhotra, PhD, SME-RM, the President of Pro Solv, LLC, who provided information related to metallurgy.

2.2 UNITS OF MEASUREMENT

The coordinate system used in this report is Universal Transverse Mercator (UTM) Zone 4W, and the datum used is the North American Datum 1983 (NAD 83).

All units of measurement in this report are metric, unless otherwise stated. Imperial units are used in Section 6 (History).

All currency is expressed in 2020 U.S. dollars, unless otherwise stated.

2.3 QUALIFIED PERSONS

Bruce Davis, Robert Sim, Jack DiMarchi and Deepak Malhotra are independent qualified persons (QPs) as defined in NI 43-101, *Standards of Disclosure for Mineral Projects*, and are responsible for the preparation of this Technical Report on the Project, which has been prepared in accordance with NI 43-101 and Form 43-101F1 (collectively NI 43-101).

Bruce Davis, Robert Sim, Jack DiMarchi and Deepak Malhotra have no beneficial interest in WAC&G or the Property. These Consultants are not insiders, associates, or affiliates of WAC&G. The results of this Technical Report are not dependent on any prior agreements concerning the conclusions of this report, and there are no undisclosed understandings concerning future business dealings between WAC&G and the Consultants. The Consultants are paid a fee for their work in accordance with normal professional consulting practices. These Consultants are also independent of the vendor of the Property, PIEK, Inc.

2.4 SITE VISIT

Bruce Davis conducted a site visit to the Illinois Creek Project on June 12-14, 2018 and July 15-18, 2021. He reviewed the drilling procedures, site facilities, historical and recent drill core where available, logging procedures, data capture, and sample handling. Robert Sim, Jack DiMarchi, and Deepak Malhotra have not visited the property.

2.5 INFORMATION SOURCES

In preparing this Technical Report, the authors reviewed geological reports, maps and miscellaneous technical papers listed in Section 27 (References) of this Technical Report. Additional information was provided by WAC&G personnel.

This Technical Report is based on information known to the authors as of July 18, 2021.

2.6 ABBREVIATIONS AND ACRONYMS

Abbreviations and acronyms used throughout this report are shown in Table 2.1.

Table 2.1: Glossary

Description	Abbreviation or Acronym
degrees Celsius	°C
degrees Fahrenheit	°F
atomic absorption	AA
atomic absorption spectrometry	AAS
Alaska Biological Research, Inc	ABR
Alaska Department of Environmental Conservation	ADEC
Alaska Department of Fish and Game	ADF&G
Alaska Department of Natural Resources	ADNR
silver	Ag
Annual Hardrock Exploration Activity	AHEA
Alaska Industrial Development and Export Authority	AIDEA
Anaconda Minerals Company	Anaconda
Alaskan Native Claims Settlement Act	ANCSA
argon	Ar
argon-argon	Ar-Ar
Atlantic Richfield Company	ARCO
American Reclamation Group	ARG
Alaska Resources Library and Information Services	ARLIS
arsenic	As
Angayucham/Tozitna/Innoko	ATI
gold	Au
cyanide-soluble gold	AuCN
recoverable gold equivalent	AuEqR
BD Resource Consulting, Inc.	BDRC
bismuth	Bi
Core Geosciences LLC	CG
Canadian Institute of Mining, Metallurgy, and Petroleum	CIMM
Cook Inlet Region, Inc.	CIRI
cyanide	CN
Certified Professional Geologist	CPG
carbonate replacement deposit	CRD
copper	Cu
Clean Water Act	CWA

Description	Abbreviation or Acronym
Dakota Mining Corporation	Dakota
diamond drill	DD
diamond drill hole	DDH
Illinois Creek deposit	deposit
deep penetrating geochemistry	DPG
Environmental Assessment	EA
Echo Bay Mines	Echo Bay
exploratory data analysis	EDA
Exploration Data Consultants	Edcon
Environmental Impact Statement	EIS
electromagnetic	EM
Environmental Protection Agency	EPA
Ertec Western Inc.	Ertec
fire assay	FA
Fellow of the Australasian Institute of Mining and Metallurgy	FAusIMM
Food and Drug Administration	FDA
iron	Fe
ferruginous gossan	FG
ferruginous manganiferous gossan	FMG
ferruginous manganiferous quartzite	FMQ
ferruginous quartzite	FQ
feet	ft
general and administrative	G&A
grams per cubic centimeter	g/cc
hectare	ha
hydrochloric acid	HCl
mercury	Hg
nitric acid	HNO ₃
hydrothermal quartz	HQ
Illinois Creek	IC
inductively coupled plasma	ICP
inverse distance weighted	ID ²
inch	in.
induced polarization	IP
joint venture	JV
potassium	K
potassium-argon	K-Ar
Kilometer	km
thousand ounces	Koz
Kilowatt	kW
Pound	lb
inductively coupled plasma	ICP
nanoteslas	nT
Million	M

Description	Abbreviation or Acronym
Meter	m
million years ago	Ma
meters above sea level	masl
Magnesium	Mg
milligal	mgal
McClintock Land Associates	MLA
millimeter	mm
Manganese	Mn
Molybdenum	Mo
million ounces	Moz
Mineral Resource Development, Inc.	MRDI
North American Datum	NAD
National Environmental Policy Act	NEPA
National Instrument 43-101	NI 43-101
Northern Land Use Research	NLUR
nearest neighbor	NN
NovaGold Resources Inc.	NovaGold
North Pacific Mining Company	NPMC
net smelter return	NSR
nanoTesla	nT
ordinary kriging	OK
osmium	Os
ounce	oz
ounces per ton	oz/t
100% passing	P ₁₀₀
80% passing	P ₈₀
95% passing	P ₉₅
Professional Geoscientist	P.Geo.
lead	Pb
porphyry copper deposit	PCD
preliminary economic assessment	PEA
Piek Exploration LLC	Piek Exploration
Plan B Minerals	Plan B
public-private partnership	PPP
Illinois Creek Project	Project
Illinois Creek Property	Property
quartzite	Q
altered quartzite	Qa
quality assurance/quality control	QA/QC
qualified person	QP
sanded quartzite	Qs
reverse-circulation	RC
rhenium–osmium	Re-Os
run-of-mine	ROM
reverse takeover	RTO

Description	Abbreviation or Acronym
Salisbury & Associates Inc.	Salisbury & Associates
sulfidize, acidify, recycle and thicken	SART
antimony	Sb
scanning electron microscope	SEM
specific gravity	SG
SIM Geological Inc.	SGI
Silver Predator Inc.	Silver Predator
tin	Sn
SRK Consulting	SRK
short ton	st
tonne	t
U.S. Army Corps of Engineers	USACE
United States Mining Corporation	USMX
Universal Transverse Mercator	UTM
Viceroy Resource Corporation	Viceroy
very low frequency	VLF
Western Alaska Copper & Gold Inc.	WAC&G
Waterpump Creek	WPC
Yukuskokon Professional Services	YKPS
zinc	Zn

3 RELIANCE ON OTHER EXPERTS

This Technical Report was prepared by Bruce Davis, FAusIMM of BD Resource Consulting, Inc. (BDRC), Robert Sim, P.Geo. of SIM Geological Inc. (SGI), Jack DiMarchi, CPG of Core Geosciences LLC (CG) and Deepak Malhotra, PhD, SME-RM Pro Solv, LLC (PS). Davis, Sim, DiMarchi, and Malhotra are qualified persons for the purposes of NI 43-101, and each fulfills the requirements of an “independent qualified person”.

BDRC, SGI, CG and PS have relied exclusively on information provided by WAC&G’s management team for matters related to mineral tenure and mining rights permits, surface rights, royalties, agreements and encumbrances relevant to this report.

Active State of Alaska claims and their ownership have been verified at the Alaska Department of Natural Resources website dnr.alaska.gov/. The authors have not researched the property title or mineral rights for the Illinois Creek Project and express no legal opinion as to the ownership status of the Property.

The authors believe the data and information provided by WAC&G are essentially complete and correct to the best of their knowledge and that no information was intentionally withheld that could affect the conclusions made herein.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 LOCATION

The Illinois Creek Project is located in the State of Alaska, approximately 490 km west of Fairbanks, 52 km southeast of the village of Kaltag, and 85 south-southwest of the regional supply center of Galena (Figure 4-1). Geographic coordinates of the Property are N64°2' 7.31" latitude and W157° 54' 55.92" longitude [Universal Transverse Mercator (UTM) North American Datum (NAD) 83, Zone 4W coordinates 7101400N, 553000E].

The Property is located in the southern Kaiyuh Mountains of west-central Alaska just east of the Yukon River. The Property is in the Nulato A-4 and A-5 quadrangles, Kateel River Meridian T16S, R5E, sections 25, 26, 34, 35 and 36; T17S, R5E, sections 2, 3, 4, 5, 7, 8, 9, 10, 11, 15, 16 and 17; and T17S, R4E, sections 11, 12, 13, and 14.

Figure 4-1: Property Location Map



4.2 MINERAL TENURE

The WAC&G-controlled lands in the Illinois Creek mining district include three distinct properties: Illinois Creek, Round Top, and Honker. The total land tenure package consists of 222 State of Alaska mining claims: Illinois Creek (110 claims), Round Top (88 claims) and Honker (24 claims) totaling 14,374 ha (55.5 square miles or 35,520 acres).

WAC&G owns 100% of the Illinois Creek Property through the acquisition of PIEK Inc. Both the Round Top and Honker Properties are 100% owned by WAC&G.

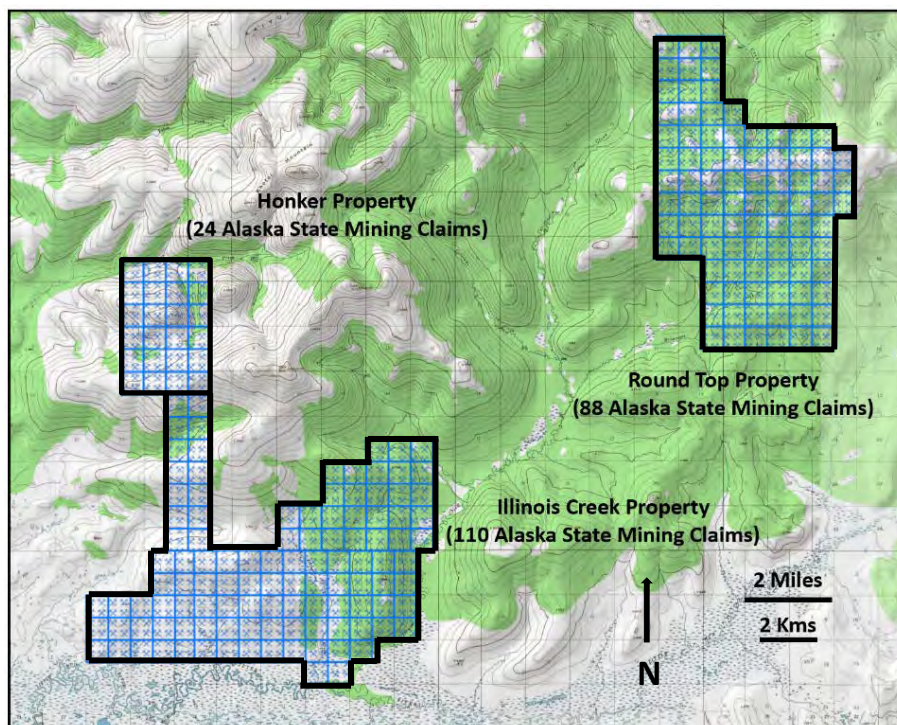
A summary of the WAC&G lands is shown in Table 4.1.

Table 4.1: Summary of WAC&G Lands

Owner	Property	Number	Type	Acres	Hectares
WAC&G	Round Top	88	State Claims	14,080	5,698
	Honker	24	State Claims	3,840	1,554
PIEK, Inc.	Illinois Creek	110	State Claims	17,600	7,122

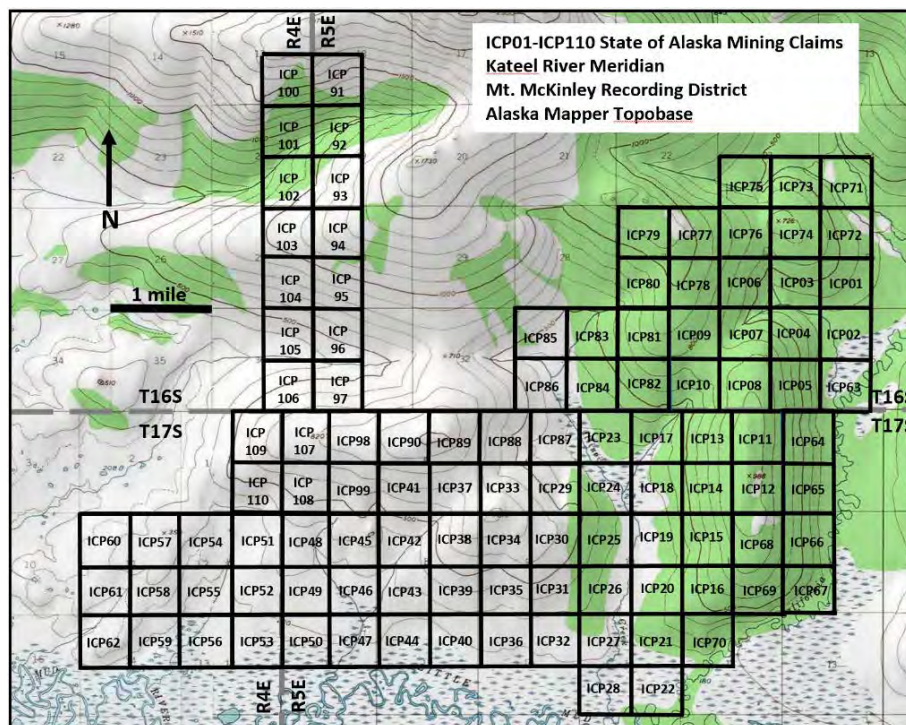
Figure 4-2 shows WAC&G land holdings within the Illinois Creek Mining District, and Figure 4-3 shows the Illinois Creek Property and claims.

Figure 4-2: Land Holdings of WAC&G in the Illinois Creek Mining District



Source: WAC&G (2020)

Figure 4-3: Illinois Creek Property and Claims



Source: WAC&G (2020)

4.3 ROYALTIES, AGREEMENTS AND ENCUMBRANCES

4.3.1 State of Alaska Claims

All lands controlled by WAC&G lie on lands owned by the State of Alaska and are subject to State of Alaska mining claim regulations. As such, the State of Alaska maintains a 3% net income production royalty on all production from state claims, as outlined in Alaska Statute Sec. 38.05.212 Production Royalty.

4.3.2 Illinois Creek Joint Venture Agreement

On October 17, 2018, PIEK, Inc. and WAC&G entered into a joint venture (JV Company) agreement to actively explore and develop the Illinois Creek Property owned 100% by PIEK, Inc., an Alaska-based corporation.

In 2021, Piek and WAC&G agreed to wind down the joint venture entity, dissolving it in accordance with the applicable law and the terms of the JV agreement. As a result, the 800 shares of Piek which had been contributed to the joint venture entity were returned to Joe Piekenbrock. Immediately following the dissolution, WAC&G acquired all of the issued and outstanding shares of Piek from Mr. Piekenbrock in accordance with the Piek Acquisition Agreement, and now holds 100% of the issued and outstanding securities of Piek, which owns 100% of the Illinois Creek Property.

On March 31, 2021, WAC&G entered into a stock purchase agreement (the Piek Acquisition Agreement) to acquire all of the issued and outstanding shares of common stock of Piek for a total purchase price of US\$3,698,000, which WAC&G satisfied by the issuance of a promissory note (the Piek Promissory Note). The Piek Promissory Note bears interest at a rate equal to 2.0% per annum and matures on March 31, 2024. Pursuant to the Piek Promissory Note, WAC&G made a payment of US\$100,000 against the principal amount (together with all accrued interest) upon completion of the Pre-RTO Private Placement. Upon completion of the Private Placement, WAC&G will be required to make an additional payment against the principal in the amount of US\$398,000 (plus accrued interest), and thereafter will be required to make annual payments of US\$1,000,000 (plus accrued interest) on the anniversary date of the Piek Promissory Note.

4.4 ENVIRONMENTAL LIABILITIES

After closure of the historical Illinois Creek mine, the State of Alaska remediated the site through its agreement with American Reclamation Group (ARG). Though there are no current environmental liabilities related to the mine, the State of Alaska continues to monitor water quality at the site. WAC&G purchased a portion of the historical Illinois Creek workforce camp which is used for ongoing exploration. WAC&G maintains responsibility for cleanup and closure of the workforce camp.

4.5 PERMITS

Multiple permits are required during the exploration phase of the Property. Permits are issued by state and regional agencies, including the Alaska Department of Environmental Conservation (ADEC), the Alaska Department of Fish and Game (ADF&G), and the Alaska Department of Natural Resources (ADNR). The State of Alaska permit for exploration on the Property, the Annual Hardrock Exploration Activity (AHEA) Permit, is obtained and renewed every five years through the ADNR – Division of Mining, Land and Water.

WAC&G holds an AHEA permit that has been in good standing with the ADNR since 2010, and WAC&G is currently amending its AHEA permit for the Illinois Creek Property. The Illinois Creek exploration camp is permitted by the ADEC.

A number of statutory reports and payments are required annually to keep the State of Alaska claims in good standing.

The Illinois Creek Project holds all necessary environmental permits and is in compliance with all applicable legal and regulatory requirements. To the extent known, there are no other significant factors or risks that may affect access, title, or the ability to perform work on the property.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 ACCESSIBILITY

The Illinois Creek Property is located in western Alaska, approximately 490 km west of Fairbanks, 52 km southeast of the village of Kaltag, and 85 south-southwest of the regional supply center of Galena.

5.1.1 Air

Primary access to the Property is by air using either fixed-wing aircraft or helicopters.

There is a 1,340 m (4,400 ft), well-maintained gravel airstrip located on the Property that can accommodate charter fixed-wing aircraft, up to and including C-130 and DC-6 aircraft. There is daily commercial air service from Fairbanks to the nearby village of Galena (largest local community) and from Galena to Kaltag (closest community to the Property).

5.1.2 Water

There are no direct water routes that provide access to the Property. Following the discovery of the Illinois Creek deposit in 1980 by Anaconda Minerals Company (Anaconda), a winter ice-road was built from the Yukon River to the Project to transport heavy machinery into the Project area to help construct the Illinois Creek airstrip. This access corridor was again used during construction and decommissioning of the Illinois Creek mine in 1996 and 2003, respectively.

During operation of the mine, the Alaska Industrial Development and Export Authority (AIDEA) commissioned an engineering study of the Yukon River access route. The study proposed a 47.5 km (29.5 mile) access road that connected to a port located on the river with a greater than 40 ft draft and serviceable by deep-water barges for five months of the year from either upstream at Nenana or downstream at Saint Mary's/Emmonak deep-water port (NPMC, Hughes, R. and Smith, M., 1993).

AIDEA is a public-private partnership (PPP) whose mission is to promote, develop, and advance economic growth and diversification in Alaska by providing various means of financing and investment. AIDEA has the authority to own and operate facilities which advance this goal.

5.2 CLIMATE

The climate in the region is typical of a subarctic environment. Exploration is generally conducted from late May until late September. Weather conditions on the Property can vary significantly from year to year and can change suddenly. During the summer exploration season, average maximum high temperatures reach up to 20 °C (68 °F), and average low temperatures in January reach -28 °C (-18 °F) (Western Regional Climate Center, 2019). By early October, unpredictable weather conditions can limit safe helicopter travel on the Property. Winter temperatures are routinely below -25 °C (-13 °F) and can occasionally exceed -50 °C (-58 °F). Precipitation in the region averages 335 mm (13.2 in.) per year with the most rainfall occurring from June through September, and the most snowfall occurring from November through January.

5.3 LOCAL RESOURCES

Galena (population 472; 2017 U.S. Census), Nulato (population 248; 2017 U.S. Census) and Kaltag (population 177; 2017 U.S. Census) are the nearest communities and, as was the case during operation of the Illinois Creek mine, they provided a significant portion of the workforce at the mine.

Galena is a potential source of limited mining-related supplies; it is the nearest center serviced by regularly scheduled, large commercial aircraft (via Fairbanks). Fairbanks (population 31,644; 2017 U.S. Census) has a long mining history and can provide most mining-related supplies and support that cannot be sourced closer to the Property.

Drilling and mapping programs are seasonal and supported out of the Illinois Creek mine camp which WAC&G purchased in 2013 from NovaGold Resources Inc. (NovaGold). The camp provides office space and accommodations for the geologists, drillers, pilots, and support staff.

In 2018, the Illinois Creek mine camp consisted of 12 sleeping tents, storage and shower/bath tents, and a main administrative ATCO building which includes a kitchen and dining facility and a large administrative office. Portions of the historical ATCO trailer camp are used as overflow sleeper rooms and added shower and bathroom facilities. Camp capacity is approximately 30 beds. A 90 m by 20 m tent core-logging facility was also built in the summer of 2018.

Power for the Illinois Creek Project is supplied by a 5 kW generator. Water is provided by pump from Illinois Creek and then transported by tank to camp where it is stored in 500-gallon bladders. The Illinois Creek water pumping site is located roughly 1 km west of the camp facilities.

5.4 INFRASTRUCTURE

Proposed infrastructure is discussed in greater detail in Section 18 (Project Infrastructure). Currently, the Illinois Creek Project does not have access to Alaskan power or transportation infrastructure.

5.5 PHYSIOGRAPHY

The Illinois Creek Project is located adjacent to the confluence of the Illinois Creek and the Little Mud River at the southern edge of the Kaiyuh Mountains in west-central Alaska. Topography in the area is gentle with the maximum relief in the Kaiyuh Hills of approximately 800 masl (2,800 ft). The Illinois Creek mine camp lies at roughly 230 masl (750 ft), and the confluence of the Illinois Creek and the Little Mud River lies at approximately 45 masl (150 ft). Talus covers the upper portions of the Kaiyuh Mountains; glacial and fluvial sediments cover low-lying hills and occupy the valleys.

The Kaiyuh Mountains are located at the transition between boreal forest and Arctic tundra. Spruce, birch, and poplar are found in portions of the valley, with a ground cover of lichens (reindeer moss). Willow and alder thickets and isolated cottonwoods follow drainages, and alpine tundra is found at higher elevations. Tussock tundra and low, heath-type vegetation covers most of the valley floor.

Wildlife in the area is typical of arctic and subarctic fauna and includes larger animals such as moose, grizzly and black bears, wolves, lynx, and fox. Fish species include salmon and arctic grayling.

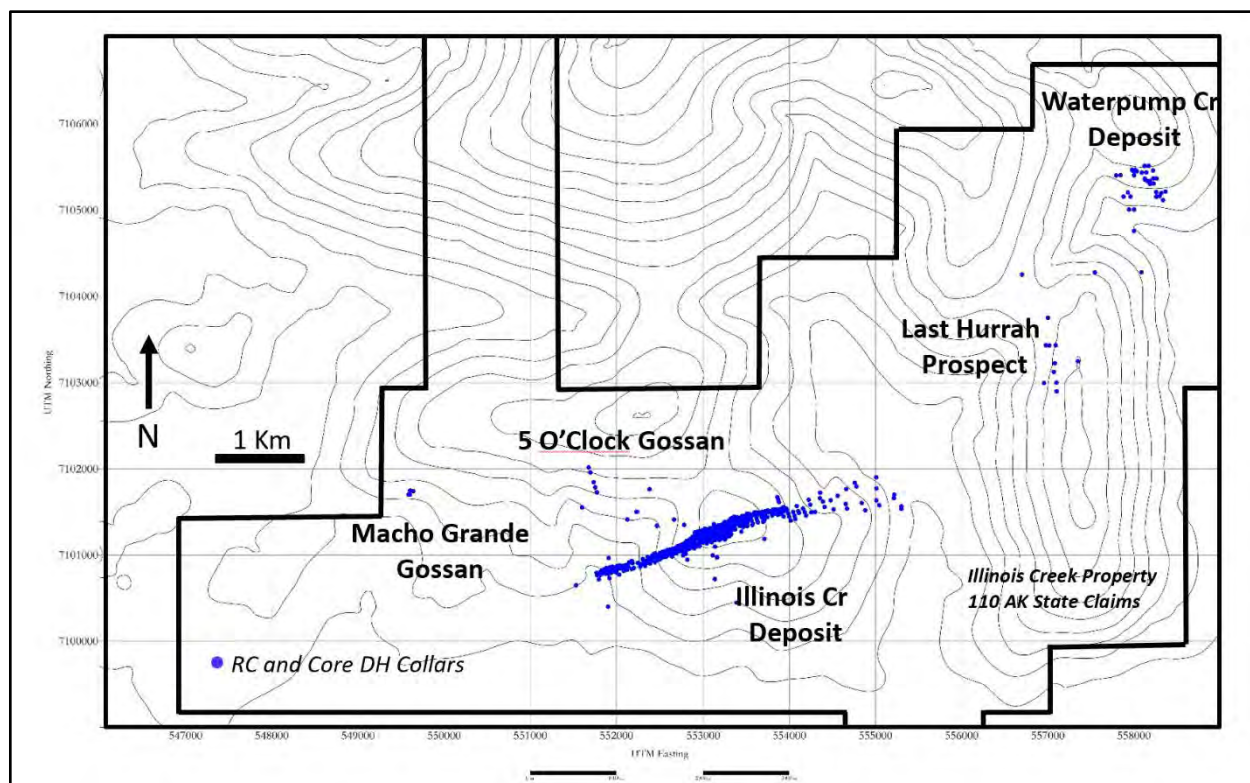
6 HISTORY

6.1 HISTORICAL EXPLORATION

Regional exploration in the Kaiyuh Hills began with the Anaconda Minerals Company (Anaconda)/Cook Inlet Region, Inc. (CIRI) joint venture. CIRI is one of the 13 regional native corporations defined in ANCSA (Alaskan Native Claims Settlement Act). The Anaconda/CIRI joint venture identified prospective mineral-endowed lands for CIRI to select under that federal legislation.

In July 1980, a reconnaissance team, headed by Gorol Dimo, made a series of gossan discoveries, most notably at the Round Top porphyry prospect located 24 km to the northeast of the Illinois Creek deposit. Figure 6-1 shows the distribution of the various mineralized occurrences and exploration drilling on the Property that has taken place between 1980 and 2006. The image is annotated with local nomenclature. Reconnaissance silt sampling led to the recognition of six anomalous areas, and follow-up of a 0.6 ppm Ag and 38 ppm Pb anomaly led to the discovery of the Illinois Creek gossan. At that time, monthly reporting by Anaconda field geologists recorded “A very large, high-grade polymetallic massive sulfide gossan has been discovered near Illinois Creek. The gossan is exposed in a 3.2 km (2 mile) long linear zone of rubble float and outcrop. The width of the zone varies from 120 to at least 450 feet. Preliminary assays from 12 grab samples of the gossan are as follows: copper 1,000 ppm to 2%, lead 1,000 ppm to 1%, silver 6 to 100 ppm, zinc less than 650 ppm, and gold 50 ppb to 3,075 ppb” (Dimo, 1980).

Figure 6-1: Plan Showing Mineralized Zones and Drill Hole Locations



Source: WAC&G (2020)

In 1981, Anaconda completed extensive soil sampling and mapping at Illinois Creek and completed nine initial diamond drill holes (DDHs) totaling 1,427.60 m. Five of the drill holes encountered significant intervals of oxidized gossanous mineralization to depths approaching 350 m below surface. Soil sampling in 1981 outlined a 2,000 m by 50 m anomaly with very high values of lead, zinc, copper, silver, gold and arsenic with zinc zoned to the east and copper zoned to the west (Brewer, 1982).

Anaconda also drilled 1,668.4 m at the nearby Round Top porphyry prospect in seven DDHs. Ongoing exploration led to the discovery of the nearby high-grade Honker gold vein with rock chip samples up to 31.5 g/t Au.

In the spring of 1982, heavy equipment was mobilized by Cat train to Illinois Creek, and a major expansion of the airstrip and camp was completed. Exploration in 1982 included four additional DDHs totaling 1,586 m, 18 reverse-circulation (RC) drill holes totaling 2,344 m, and 11 bulldozer and backhoe trenches.

Approximately 1,000 m of drilling at Honker was also completed in 10 short drill holes. Five holes intersected mineralization from 0.08 oz/t to 0.21 oz/t Au, varying in thickness from 0.5 m to 4.5 m. Reports from the drilling program state that overall sample recoveries were poor (Brewer and Millholland, 1982).

In 1983, follow-up drilling of a 500 m by 150 m soil anomaly located northeast of the Illinois Creek gossan intersected a 28.9 m interval grading 16.2 oz/t Ag and 28.3% Pb. Adjacent trench sampling returned a 70 m interval of 12.8% Zn. The prospect, named Waterpump Creek, quickly became the focus of ongoing exploration by Anaconda along with the continued evaluation of the gold potential of the gossan.

During 1983 and 1984, a total of 38 drill holes totaling 5,166.5 m were completed at the Waterpump Creek prospect. At Illinois Creek, seven additional trenches were cut and 10 drill holes, totaling 1,264 m, were completed. Six DDHs, totaling 254 m, were also completed at Macho Grande, a major gossan-showing located roughly 2 to 3 km west-northwest of the Illinois Creek gossan. IP and resistivity surveys were also completed in selected areas (Gillerman and Brewer, 1985).

In 1985, the Illinois Creek Project went into a hiatus following ARCO's decision to close and liquidate Anaconda; this ended one of the world's premier copper mining companies founded in 1881. (The loss of its Chilean assets during the Allende nationalization, along with the diminishing mineral reserves at its Butte operations, had gradually undermined the company to the point that ARCO simply closed its copper assets and gradually divested itself of Anaconda's coal, shale and uranium assets).

After Anaconda closed, the Illinois Creek Property was taken over by CIRI, Anaconda's JV partner on the Project. In 1988, CIRI entered into a JV agreement to explore the Illinois Creek Property with the Goldmor Group, Ltd. (Goldmor), an Alaskan-based corporation.

During 1988, the Goldmor JV completed 49 short RC holes and 1 DDH for a total of 1,115 m of drilling targeting the central area of the Illinois Creek deposit to depths of about 30 m (100 ft) below surface.

In 1990, the Goldmor JV drilled an additional 38 RC holes totaling 1,815.8 m that also targeted the central area of the Illinois Creek deposit to depths of about 60 m (200 ft) below surface (Goldmor, 1990).

In 1991, North Pacific Mining Company (NPMC), a wholly owned subsidiary of CIRI, began the process of purchasing Goldmor's JV ownership in the Property and completed the transaction in June 1992 to again control 100% of the Property.

In 1991, NPMC drilled 21 DDHs totaling 1,560.5 m that primarily targeted the central area of the Illinois Creek deposit.

In 1992, an additional 21 DDHs, totaling 1,528.9 m, tested the western and eastern extensions of the Illinois Creek deposit (NPMC, 1991).

In January 1993, NPMC and Echo Bay Mines (Echo Bay) entered into a JV agreement whereby Echo Bay could earn a 70% interest in the Project subject to certain performance requirements until a production decision was reached.

In 1993, Echo Bay drilled 166 RC holes totaling 18,849.2 m. This program delineated most of the 3.5 km strike length of the Illinois Creek deposit to depths approaching 200 m below surface with holes spaced at approximately 30 m to 60 m (100 to 200 ft) intervals. In 1993 to 1994, after a series of major gold acquisitions, Echo Bay elected to withdraw from the Project (Kirkham and Apel, 1993).

In July 1994, NPMC entered into a JV agreement to develop the Illinois Creek mine with United States Mining Corporation (USMX) with the option for NPMC to revert to a participating interest or net smelter return (NSR) royalty when a production decision was reached.

In 1994, USMX drilled 37 additional DDHs totaling 2,364.3 m on the Illinois Creek deposit and also initiated a feasibility study. A series of water-monitoring and geotechnical holes were also completed, and, although the collar locations of these holes are known, the majority of drill logs and assay results are missing (USMX, 1994).

In 1995, an additional 84 drill holes (10 DDHs and 74 RC holes, totaling 5,961.3 m) were completed that further delineated the western and eastern parts of the Illinois Creek deposit. Additional geotechnical and monitoring wells were also completed.

In February 1996, USMX published a feasibility study on the Property. In the summer of 1996, construction began resulting in limited ore production that fall (USMX, 1996a; Fluor Daniel, 1996).

In early 1997, USMX merged with Dakota Mining Corporation (Dakota), and USMX became a wholly owned subsidiary of Dakota. Mining began in May 1997, and heap leaching was initiated. Mining ceased through the 1997 winter, but heap leaching of run-of-mine (ROM) ore continued year-round.

In 1998, hampered by early cost overruns, falling gold prices, and corporate financial difficulties, USMX and Dakota were forced to close the mine and declare bankruptcy. At that time, the State of Alaska took control of the Project.

In 1999, Viceroy Resource Corporation (Viceroy) entered into an agreement with the State of Alaska to lease and manage the Property pending a March 2000 decision-date to either develop a reclamation and mining plan to exploit the remainder of the deposit or return the Project to the State of Alaska.

As a result, Viceroy commissioned Mineral Resource Development, Inc. (MRDI) to complete the following:

- audit the drill-hole sample database supporting mineral resource estimates.
- evaluate geological interpretations of ore controls.
- review the current mineral resource model.
- assist in revising the mineral resource model to meet industry standards.

Based on the results of the MRDI audit and review, Viceroy declined to develop a reclamation and mining plan with the State of Alaska (MRDI and Viceroy, 2000).

In 2001, American Reclamation Group (ARG), under the direction of a former head of the ADNCR, entered into an agreement with the State of Alaska to develop a reclamation and mining plan to exploit the remainder of the deposit. Though the agreement and production figures during this time were not made public, ARG continued mining and remediation efforts through early 2003 when, under the terms of the agreement, the mine was closed.

In 2002, Piek Exploration LLC (Piek Exploration) began to acquire the lands surrounding the Illinois Creek mining leases while the Property was in remediation and closure by ARG. Unfortunately, during this period, ARG destroyed all the Illinois Creek core and core storage facilities, except for a handful of core holes from one of the late USMX drill campaigns.

In 2003, as part of an agreement to purchase components of the Illinois Creek mine for its Rock Creek mine development outside of Nome, Alaska, NovaGold agreed to scan and provide to the state all of the data files stored in the Illinois Creek mine offices.

In 2004, Piek Exploration optioned its portion of the Property to NovaGold, who then actively explored the Waterpump Creek area. During that option period, NovaGold staked claims and re-staked the core claims as the ARG mining lease was terminated.

In 2006, NovaGold returned the Property, the scanned files, drill core, and results of its exploration to Piek Exploration.

In June 2011, Piek Exploration optioned the Property to Silver Predator Inc. (Silver Predator) who expanded the claim block and completed limited compilation, largely rebuilding the dataset contained within the scanned data files captured by NovaGold.

In 2013, hampered by deteriorating market conditions, Silver Predator sub-optioned the Property to Plan B Minerals (Plan B) who began preparations for an updated preliminary economic assessment (PEA) based on the historical drilling. Plan B contracted with Yukuskokon Professional Services (YKPS) to complete an updated PEA who in turn completed a draft NI 43-101 mineral resource estimation and then contracted Lyntek Inc., the process plant design team for the original mine, to cost out a rebuild of the original plant. Although work by Plan B was never

published in any technical reports, it made some of its draft studies available to Piek Exploration and WAC&G.

In 2014, as market conditions continued to worsen, Plan B returned the Property to Silver Predator who in turn returned it to Piek Exploration.

In 2018, Piek Exploration dropped the claims, and they were re-staked by PIEK, Inc. to rectify some potential technical discrepancies in filings from a decade earlier.

In October 2018, PIEK, Inc. and WAC&G entered into a JV agreement to explore and develop the Illinois Creek Property.

6.2 GEOCHEMISTRY

Due to the relatively flat topography and abundance of wind-blown loess, surface mapping has had only limited impact in exploration targeting beyond the few discovery outcrops that were originally found by Anaconda. Most importantly, deep-soil sampling through the wind-blown loess layer and up slope from alluvial-filled creek bottoms has been the preferred exploration targeting tool.

In 2001, ARG compiled a database of all the known soil programs conducted on the Property between 1980 and the development of the mine in 1997.

Between 1980 and 1984, Anaconda completed more than 14 individual surveys totaling 2,624 soil samples. These surveys are summarized in Table 6.1.

Table 6.1: Anaconda Soil Surveys 1980–1984

Company	Survey	#	Year	Sample Density	Analyzed Elements
Anaconda	IC Recon	44	1980	400 ft by 50 ft	Cu Pb Zn Au Ag
	IC Detail	1,011	1981	100 m by 50 m to 50 m by 10 m	Cu Pb Zn Au Ag As
	IC Regional	727	1981	200 m by 100 m	Cu Pb Zn Au Ag As Sb Mn
	Last Hurrah Recon	--	1981	Recon lines	Cu Pb Zn Au Ag As Sb
	Waterpump Creek Recon	61	1981	50 m by 25 m	Pb Zn Ag
	Airstrip 'Sinter' Recon	38	1982	Recon lines	Cu Pb Zn Au Ag As
	IC Detailed Bulk Soils	138	1982	10 m by 10 m	Cu Pb Zn Au Ag As Sb Mn
	Last Hurrah Recon	--	1982	Recon lines	unknown
	Waterpump Creek Hand	42	1982	50 m by 25 m	Pb Zn Ag As
	Waterpump Creek Power	40	1982	50 m by 25 m	Pb Zn Ag
	Waterpump Creek Detail	173	1983	Miscellaneous	Cu Pb Zn Au Ag As Sb
	5 o'clock Detail	44	1984	100 m by 50 m	Cu Pb Zn Au Ag As Sb Mn
	5 o'clock Recon	12	1984	Recon lines	Cu Pb Zn Au Ag As Sb Mn
	Last Hurrah	97	1984	200 m by 100 m to 50 m by 50 m	Cu Pb Zn Au Ag As Sb Mn
	Macho Grande Detail	17	1984	100 m by 100 m	Cu Pb Zn Au Ag As Sb Mn
	Macho Grande Recon	--	1984	Recon lines	Cu Pb Zn Au Ag As Sb Mn
	Waterpump Creek Detail	180	1984	Miscellaneous	Cu Pb Zn Au Ag As Sb Mn

In 1993, Echo Bay completed 41 soil test pits. In 1995, USMX completed six surveys totaling at least 340 samples. These surveys are summarized in Table 6.2.

Table 6.2: Echo Bay and USMX Soil Surveys 1993–1995

Company	Survey	#	Year	Sample Density	Analyzed Elements
Echo Bay	East and West Test Pits	41	1993	Miscellaneous	Cu Pb Zn Au Ag Mo Hg
USMX	5 o'clock	294	1995	200 by 50 ft	Au Ag As some Cu
	West Reconn	29	1995	50 ft spacing	Au Ag As
	West BL Lines	?	1995	25 ft spacing	Au Ag
	4,200 M Line	?	1995	50 ft spacing	Au Ag
	West Extension	?	1995	25 and 50 ft spacing	enzyme leach package
	Test Pits	17	1995	Miscellaneous	Au Ag and some Cu As Sb

In 2006, NovaGold completed a detailed survey along the Waterpump Creek to Last Hurrah CRD trend. For the first time, a multi-element ICP analyses was used.

In 2015, Piek Exploration conducted a single line of deep penetrating geochemistry (DPG) using two separate low-detection leach techniques to determine if there was a geochemical response over the West Illinois porphyry target under valley colluvial and alluvial cover, west of the Illinois Creek mine. DPG is an ultra-trace ion leach technique designed to detect oxidizing sulfide mineralized bodies below deep cover.

Also, in 2015, Piek Exploration captured an additional 44 ICP sample analyses along four short lines over projections of the fault offset west extension of the Illinois Creek deposit. Results are discussed in Section 9 (Exploration).

The NovaGold and Piek Exploration surveys are summarized in Table 6.3.

Table 6.3: NovaGold and Piek Exploration Soil Surveys 2006–2015

Company	Survey	#	Year	Sample Density	Analyzed Elements
NovaGold	Waterpump Creek /Last Hurrah	500	2006	100 m x 50 m	ICP multi-element
Piek Exploration	West Illinois Creek Mag	26	2015	50 m	DPG leach miscellaneous
	West Extension	44	2015	4 lines roughly 10 m spacing	ICP multi-element

6.3 GEOPHYSICS

Since Anaconda's initial discovery, a series of magnetic, electric and gravitational techniques have been used to explore the Property, all with varying levels of success.

The following subsections outline the majority of the programs implemented over time. WAC&G has limited documentation on many of the programs conducted prior to 2000. In many instances, where data are available in these earlier surveys, the lack of details in data acquisition, coordinate systems, and data reduction procedures limit their usefulness.

6.3.1 Ground and Aeromagnetic Surveys

In September 1981, Anaconda, under the direction of John Wilson, engaged Ertec Western Inc. (Ertec) to complete an aeromagnetic survey of the Kaiyuh Hills. Line spacing was approximately 500 m with an optimal altitude of 150 m.

In 1984, a subsequent, much more detailed survey combining aeromagnetic and electromagnetic (EM) surveys of the Illinois Creek area was completed by Aerodat Limited (Aerodat) for Anaconda. Lines were spaced every 200 m in three separate blocks; each oriented approximately perpendicular to the underlying stratigraphy. The optimized flight height is unknown (Kilty and McDermott, 1981; Aerodat, 1984).

In 1984, a ground magnetic survey of the Waterpump Creek area was also completed. The survey used varying line spacing from 50 m to as much as 200 m with 100 m stations and covered an area of approximately 2 km by 2 km.

In 2015, a short 4-line ground magnetic survey follow-up of the West Illinois Creek magnetic target first recognized in the Aerodat survey (1984) was undertaken by Piek Exploration to confirm the presence of the anomaly, suspected as the possible porphyry center driving the Illinois Creek CRD system.

Magnetic surveys are summarized in Table 6.4.

Table 6.4: Airborne and Ground Magnetic Surveys at Illinois Creek

Company	Year	Survey	Type	Area
Anaconda	1981	Ertec	Airborne	Kaiyuh Mountains
	1984	Aerodat	Airborne	Illinois Creek
	1984	In-house	Ground	Waterpump Creek
Piek Exploration	2015	In-house	Ground	West Illinois Creek Magnetic Anomaly

6.3.2 IP and Other Electrical Technique Surveys

Numerous electrical geophysical techniques have been used at the Property and are summarized in Table 6.5 (McDermott, 1981; McDermott, 1984).

Table 6.5: Various Electrical Geophysical Surveys at Illinois Creek

Company	Survey	km	Year	Line Spacing	Target
Anaconda	MaxMin, VLF	--	1980	Reconn lines	Illinois Creek
	IP/Resistivity	9.2	1981	Pole/Dipole Dipole/Dipole 50 m a-spacing	Illinois Creek
	MaxMin	3.6	1982	--	Waterpump Creek
	IP/Resistivity	--	1983	Test line Dipole/Dipole 25 m a-spacing	Waterpump Creek
	MaxMin	--	1984	Check	Waterpump Creek
	IP/Resistivity	--	1984	Check	Waterpump Creek
NovaGold	IP/Resistivity	17.7	2005	Pole/Dipole 100 m a-spacing	Waterpump Creek Last Hurrah

In general, the techniques have been very effective at mapping various lithological units but have not been effective in directly targeting sulfides. This is likely due to the local depth of oxidation and the use of narrow a-spacings. The term a-spacing refers to the distance between electrodes used in IP surveys; it effectively controls the depth of information gathered. The narrow a-spacings used at Illinois Creek preclude significant depth penetration of the surveys (Aurora Geosciences, 2005).

The 2005, a NovaGold survey, conducted by Aurora Geosciences, used 100 m a-spacing which very effectively mapped the CRD mineralized contact between the underlying dolomite and thin Survey Ridge quartzite in juxtaposition with overlying graphitic, chloritic and quartz chlorite muscovite schists (QCMS) of the Kaiyuh formation. Significant, highly conductive chargeability features at this contact occur south of Waterpump Creek but have not been tested yet. These target areas are discussed in Section 9 (Exploration).

6.3.3 Gravity Surveys

A series of gravity surveys were conducted on the Property.

In 1983, Anaconda contracted Exploration Data Consultants (Edcon) to complete a helicopter-supported gravity survey of the southern Kaiyuh Hills in and around the Illinois Creek and Round Top deposits.

In 1984, Anaconda conducted a detailed survey of Waterpump Creek deposit with 50 m line spacing and individual stations every 10 m.

In 2004, NovaGold, again using Edcon, completed a detailed gravity survey of an approximately 3 km by 3 km area from just north of the Waterpump Creek deposit to south of the Last Hurrah anomaly about 2 km east of the end of the Illinois Creek oxide drilling. The survey used east-west

lines spaced roughly 250 m with sample interval stations approximately every 150 m. In addition, a few reconnaissance lines with similar spacing were conducted in and around the West Illinois Creek magnetic anomaly. The gravity surveys at Illinois Creek are summarized in Table 6.6 (Edcon, 1983).

Table 6.6: Gravity Surveys at Illinois Creek

Company	Year	Survey	Type	Area
Anaconda	1983	Edcon	Reconn density	Southern Kaiyuh Mountains
	1984	Edcon	50 m x 10 m	Waterpump Creek
NovaGold	2004	Edcon	250 m x 150 m	Waterpump Creek/Last Hurrah
			Reconn lines	West Illinois Creek Magnetic Anomaly

Implications of all of the geophysical techniques used at Illinois Creek and how each impacted ongoing exploration targeting and vectoring on the Property are discussed in Section 9 (Exploration).

6.4 DRILLING

Extensive drilling at the Illinois Creek Property has targeted the oxidized gossans and, to a far lesser extent, the Waterpump Creek and Last Hurrah CRDs. Only minimal exploration has targeted the remainder of the Property, and the potential to find additional mineralized zones is considered by WAC&G to be very good.

Table 6.7 summarizes the mineral resource delineation and exploration drill campaigns on the Property between 1980 and 2006 conducted by the previous operators of the Property.

Table 6.7: Drill Campaigns 1980–2006 at Illinois Creek

Company	Years	# Core Holes	# RC Holes	Core (m)	RC (m)	Total (m)
Anaconda	1980–1984	73	18	10,132.7	2,266.1	12,398.8
Goldmor	1988–1990	1	87	16.8	2,914.0	2,930.8
NPMC	1991–1992	42	0	3,089.4	0.0	3,089.4
Echo Bay	1993	0	166	0.0	18,739.5	18,739.5
USMX	1994–1995	65	78	4,657.9	5,054.3	9,712.2
Viceroy	1999	0	23	0.0	731.6	731.6
ARG	2002	5	0	215.3	0.0	215.3
NovaGold	2005–2006	20	0	2,746.8	0.0	2,746.8
Total		206	372	20,858.9	29,705.5	50,564.4

6.5 OTHER STUDIES

6.5.1 Petrology, Mineralogy and Research

Several studies have reviewed the geology and geochemistry of the Illinois Creek Property. Most notable are Anaconda's Tucson research lab's efforts throughout its tenure on the Property. Important contributions include a series of internal Anaconda memos in 1984 and 1985 by Hossein Salek. Most notable are two summaries: "Mineralogical and Alteration Study of Samples from the Waterpump Creek Prospect, AK, 1984" and "Mineralogy and Gold/Silver Occurrence Studies of Samples from the Illinois Creek Project, AK, 1984" (Salek, 1984a; Salek, 1984b).

In 1984, Anaconda also completed lead isotope studies using Teledyne Isotopes Inc. In addition to the geological and mineralogical studies at Illinois Creek, Anaconda also completed some age-dating of rocks in the district.

In 1994, Brian P. Flanigan completed an MS thesis at the University of Alaska Fairbanks titled "Genesis and Mineralization of Ore Deposits in the Illinois Creek Region, West-Central, Alaska". The thesis summarizes mineralogical zonation studies across the Illinois Creek deposit and clearly establishes the distinct zonation of copper, bismuth, arsenic and gold to the west and lead, zinc and manganese to the east. The thesis used reflected light microscopy and scanning electron microscope (SEM) analyses to complete a comprehensive compilation of the ore mineralogies at Illinois Creek and Waterpump Creek. The thesis also looked at oxygen isotopes and completed additional age dating. Flanigan concluded by suggesting timing and mineralization events for prospects and deposits across the district (Flanigan, 1994).

6.5.2 Geotechnical and Hydrological

Between 1994 and 1996, in the run-up to construction of the Illinois Creek, USMX compiled earlier studies and completed a series of studies to support the feasibility study and required permits. In addition, during 1994 and 1995, USMX completed a series of geotechnical and water-monitoring holes.

Only portions of the studies are currently available from either PIEK, Inc. or WAC&G, but they should be available through the ADNR or Alaska Resources Library and Information Services (ARLIS) library in Anchorage.

The following significant studies were completed for and by USMX:

- Consolidated Permit Application, Volume I, Application, USMX, 1996b.
- Consolidated Permit Application, Volume II, Hydrogeology Report: Pollution Prevention Plan, USMX, 1996c.
- Consolidated Permit Application, Volume III, Heap Leach Design Report, USMX, 1996d.
- Consolidated Permit Application, Volume IV, Ore and Waste Rock Characterization Report, Assessment of Acid Generating Potential Report, and Reclamation Plan, USMX, 1996e.
- Illinois Creek Gold Mine Project Archaeological Survey Kaiyuh Hills, Alaska, NLUR, September 1995.
- Illinois Creek Gold Mine Project profile, RTR, February 1995.
- Illinois Creek Gold Mine Project Aquatic Resources Analysis, Morsell, 1991/1994.

- Illinois Creek Gold Mine Project Fisheries Study, ADF&G, November 1995.
- Illinois Creek Gold Mine Project Water Quality Reconnaissance, Montgomery Watson, November 1994.
- Illinois Creek Gold Mine Project Wetlands and Wildlife report, ABR and Montgomery Watson, October 1994.
- Wetlands Survey of the proposed Illinois Creek Mine and Barge Site, ABR, 1995.
- Soil Survey of Proposed Illinois Creek Mine Site, ABR, November 1995.
- USMX Illinois Creek Project, Alaska Air Quality Permit Application, TRC, October 1995.
- Illinois Creek Project Assessment of Acid Generating Potential, SRK, July 1995.

6.5.3 Metallurgical

Anaconda initiated a series of early studies to determine the overall metallurgical characteristics of the Illinois Creek and Waterpump Creek mineralization types. Early studies looked at cyanidation, flotation, gravity and magnetic separation characteristics of the ores.

The following Anaconda internal memos and reports summarize these studies:

- Summary of Illinois Creek Metallurgical Test Results, P.R. Engelhardt and L.J. Garcia, Anaconda internal memo, March 7, 1984.
- Summary of the Flotation and Gravity Characteristics of the Waterpump Creek Mineralization, P.R. Engelhardt, L.J. Garcia, and D.A. Norrigran, Anaconda internal memo, March 14, 1984.
- Metallurgical test work continued with NPMC after Anaconda left the project. Between 1988 and 1991, Goldmor and then NPMC contracted McClelland Laboratories to complete a series of tests related to cyanidation of the ores including the following reports and memos:
 - Preliminary Cyanidation Test Work – Illinois Creek Cuttings Composites, McClelland Laboratories Inc., March 15, 1990.
 - Column Leach Test Work – Illinois Creek, McClelland Laboratories Inc., June 29, 1990.
 - Report on Direct Cyanidation of Agglomerate Strength and Stability Test Illinois Creek Bulk Ore Samples, McClelland Laboratories Inc., November 11, 1991.
 - Metallurgical Environmental Test Work and Analyses Illinois Creek Core and Bulk Composites, McClelland Laboratories Inc., July 10, 1995.
 - Consolidated Permit Application, Volume IV, Ore and Waste Rock Characterization Report, Assessment of Acid Generating Potential Report, and Reclamation Plan, USMX, 1996e.

6.6 HISTORICAL MINERAL RESOURCE ESTIMATES

A series of historical mineral resource estimates for the Illinois Creek deposit, and one for the Waterpump Creek Deposit, were made prior to the implementation of NI 43-101. These do not conform to NI 43-101 reporting standards, and a QP has not reviewed any of these historical estimates and, as a result, they should not be relied on or interpreted as such. WAC&G does not

consider these estimates to be current, nor does WAC&G treat them as current. They are presented here for information purposes only.

6.6.1 Illinois Creek Deposit Historical Resource (Anaconda, 1984)

In 1984, V.S. Gillerman and N.A. Brewer conducted a limited estimate based on the initial 5 m of the gossan exposed at Illinois Creek as a result of the extensive trenching completed at that time. The results of that study are summarized in Table 6.8.

Table 6.8: Illinois Creek Deposit Historical Resource Estimate (1984; top 5 meters)

Type	Tonnes	Au (oz/t)	Au (oz)
Probable	202,900	0.1	20,290
Possible	60,200	0.13	7,826
Total	263,100	0.11	28,116
Soil	10,500	0.5	5,250

Note: A QP has not reviewed or verified this historical estimate, and it is not considered as a current mineral resource.

6.6.2 Illinois Creek Mine Feasibility Study (USMX, 1996)

In 1996, USMX completed a feasibility study for the development of the Illinois Creek mine. The mining reserve estimate is summarized in Table 6.9.

Table 6.9: Illinois Creek Deposit Historical Mining Reserve Estimate (USMX Feasibility Study, 1996)

Tons	Au Cut-off (oz/t)	Au Cut-off (g/t)	Au (oz/t)	Au (g/t)	Ag (oz/t)	Ag (g/t)	Waste:Ore Strip Ratio
7,761,000	0.02	0.69	0.063	2.16	1.38	47.31	2.01:1

Note: A QP has not reviewed or verified this historical estimate, and it is not considered as a current mineral resource or mineral reserve.

6.6.3 Illinois Creek Deposit Historical Resource (Viceroy/MRDI, 2000)

In 1999, Viceroy Resource Corporation (Viceroy) entered into an agreement with the State of Alaska to lease and manage the Property pending a March 2000 decision-date to develop a reclamation and mining plan to exploit the remainder of the deposit or return the Project to the State of Alaska.

In early 2000, Viceroy commissioned MRDI to audit the drill-hole sample database supporting mineral resource estimates, evaluate geological interpretations of ore controls, review the resource model in progress, and assist in revising the resource model to meet industry standards at that time.

Table 6.10 shows the results of the MRDI historical resource estimate at varying cut-offs, and a base case cut-off grade was not provided. These results were not pit-constrained, and MRDI used the gold price and mining costs from the ongoing operation, which were not stated in the report.

**Table 6.10: Illinois Creek Deposit Historical Mineral Resource Estimate
(MRDI, 2000)**

Au Cut-off (oz/t)	KTons	Au (oz/t)	Ag (oz/t)	Contained Au (Koz)	Contained Ag (Moz)
0.000	45,671.0	0.010	0.432	448	19,712
0.005	14,905.3	0.026	0.733	388	10,930
0.010	9,603.6	0.037	0.847	354	8,135
0.015	7,849.9	0.043	0.902	334	7,084
0.020	6,627.7	0.047	0.942	313	6,245
0.025	5,624.8	0.052	0.986	291	5,548
0.030	4,756.8	0.056	1.028	268	4,891
0.035	4,024.8	0.061	1.062	245	4,275
0.040	3,387.2	0.065	1.092	221	3,699
0.045	2,800.7	0.070	1.113	197	3,117
0.050	2,316.4	0.075	1.137	174	2,634
0.055	1,898.5	0.080	1.161	152	2,203
0.060	1,561.2	0.085	1.187	133	1,853
0.065	1,254.6	0.091	1.214	114	1,523
0.070	1,001.6	0.097	1.227	97	1,228
0.075	783.8	0.104	1.239	81	971
0.080	616.1	0.111	1.292	68	796
0.085	506.4	0.117	1.336	59	676
0.090	411.8	0.124	1.402	51	577
0.095	339.6	0.131	1.457	44	495
0.100	285.5	0.138	1.453	39	415

Note: A QP has not reviewed or verified this historical estimate, and it is not considered as a current mineral resource.

6.6.4 Illinois Creek Deposit Historical Resource (Plan B Minerals, 2013)

In 2013, Plan B Minerals (Plan B) commissioned Yukuskokon Professional Services (YKPS) to prepare an NI 43-101 technical report. Although the technical report was never completed, a draft mineral resource estimate provided to Piek Exploration reported an Indicated pit-constrained mineral resource estimate (see Table 6.11) that used the following parameters:

- Gold price \$1,600/oz
- Silver price \$22/oz
- Process recovery 80% for gold; no reported recovery for silver
- Mining cost \$2.12/ton
- Processing cost \$13/ton
- G&A cost \$1.50/ton
- Pit slope 45 degrees

Table 6.11: Illinois Creek Deposit Historical Mineral Resource Estimate (YKPS, 2013)

Cut-off (oz/t)	MTons	Au grade (oz/t)	Ag grade (oz/t)	Au (Koz)	Ag (Moz)	AuEq (Koz)
0.00	8.994	0.028	0.912	254	8.16	417
0.01	7.998	0.031	0.949	247	7.59	399
0.02	5.358	0.039	1.034	208	5.54	319

Note: A QP has not reviewed this historical estimate and it is not considered as a current mineral resource.

The historic resources were provided at a series of cut-off limits and a base case cut-off grade was not defined in the report.

6.6.5 Waterpump Creek Deposit Historical Resource (Anaconda, 1984)

In 1984, G.E. Wilson of Anaconda conducted a polygonal mineral resource estimate of the Waterpump Creek prospect. The estimate focused on both an upper oxide pod and a lower down-dip sulfide pod. The estimates were based on drilling intercepts spaced no more than 50 m apart. In a 1984 Waterpump Creek Summary report (Teller, 1984), Anaconda suggested that width estimation of the pods was very conservative and the likely potential suggested 500,000 tons. A summary of the historical mineral resource estimate is shown in Table 6.12.

Table 6.12: Waterpump Creek Deposit Historical Resource Estimate (Anaconda, 1984)

Type	Tonnes	Ag (oz/t)	Pb (%)	Zn (%)
Oxide	110,800	11.9	21.2	3.2
Sulfide	55,210	4.8	5.8	10.0
Total	166,010	9.5	16.1	5.5

Note: A QP has not reviewed or verified this historical estimate, and it is not considered as a current mineral resource.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL GEOLOGY

The Illinois Creek Project is located within the Ruby Terrane, a sequence of mostly late Proterozoic to middle Paleozoic continental margin rocks that make up the Kaiyuh Mountains (see Figure 7-1). Lithologies within the belt include metapelites, quartzites, carbonates and greenstones. Thinly bedded, carbonate-rich dolomitic quartzites host the deposit. The Cretaceous Khotol pluton, the Round Top porphyry, and the interpreted Illinois Creek porphyry intrude metasediments north, northeast and west of Illinois Creek. Age-dating suggests that mineralization from the Illinois Creek systems is temporally related to the emplacement of the 112 Ma Khotol granite pluton.

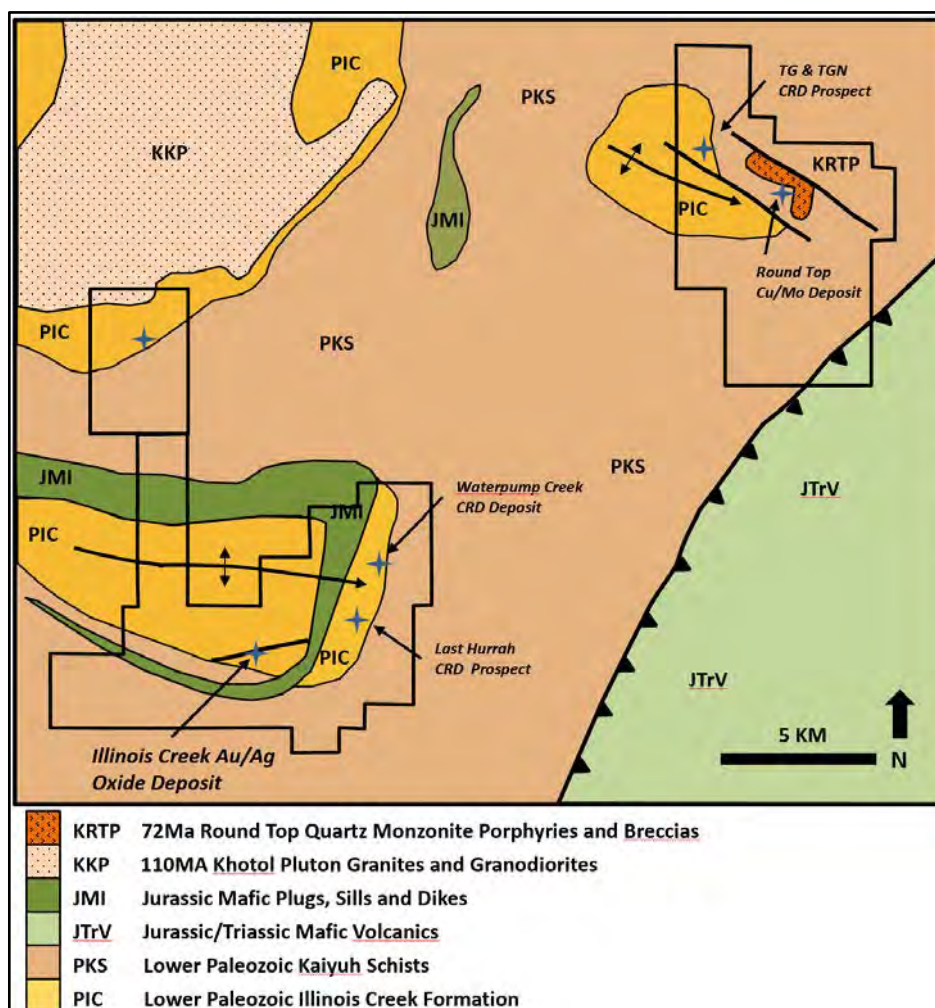
Regional structure is dominated by east-northeast-trending faults oriented subparallel to the Kaltag fault—a large, trans-current shear zone located 24 km (15 miles) north of the deposit. Post-Laramide movement on the Kaltag fault is characteristically right lateral taking up rotation along the Tintina trench into central Alaska as a consequence of north-northwest directed subduction under the Aleutians.

Structural and stratigraphic interpretations suggest that the pre-Laramide Cretaceous motion on the Kaltag fault was likely left-lateral with north-northeast-trending extensional faults forming pull-apart zones between left stepping offsets along the east-northeast trans-current shears. This local northeast-directed extension appears to have controlled elongation of the Khotol pluton and emplacement of the Round Top porphyry.

Broad east-northeast to east-southeast-directed folds appear to be a consequence of east-southeast-directed compression perpendicular to the north-northeast extension. These folds play a critical role in the erosional level of permissive carbonate stratigraphy which hosts the carbonate replacement mineralization developed adjacent to the porphyry intrusions within the district.

The Illinois Creek deposit (a deeply oxidized CRD) is located within an east-northeast-trending shear zone analogous to the Kaltag fault orientation. Mineralization occurs as both a filling within the fault structure and as a replacement within and along selective bedding planes and stratigraphic contacts particularly at or near the uppermost contact of the dolomitic quartzite stratigraphy with overlying metapelitic schists.

Figure 7-1: Generalized Geologic Map of the Southern Kaiyuh Mountains

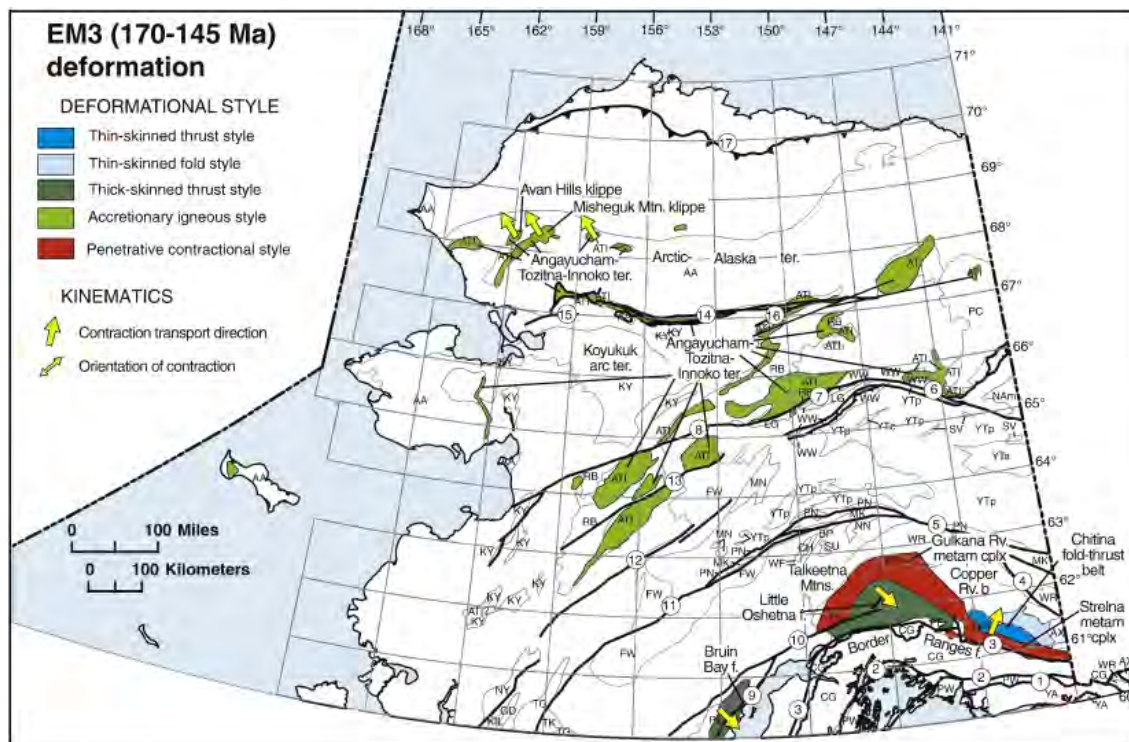


Source: Modified after Anaconda (1981), Geologic Map of the Nulato A-4 Quadrangle

7.1.1 Tectonic History

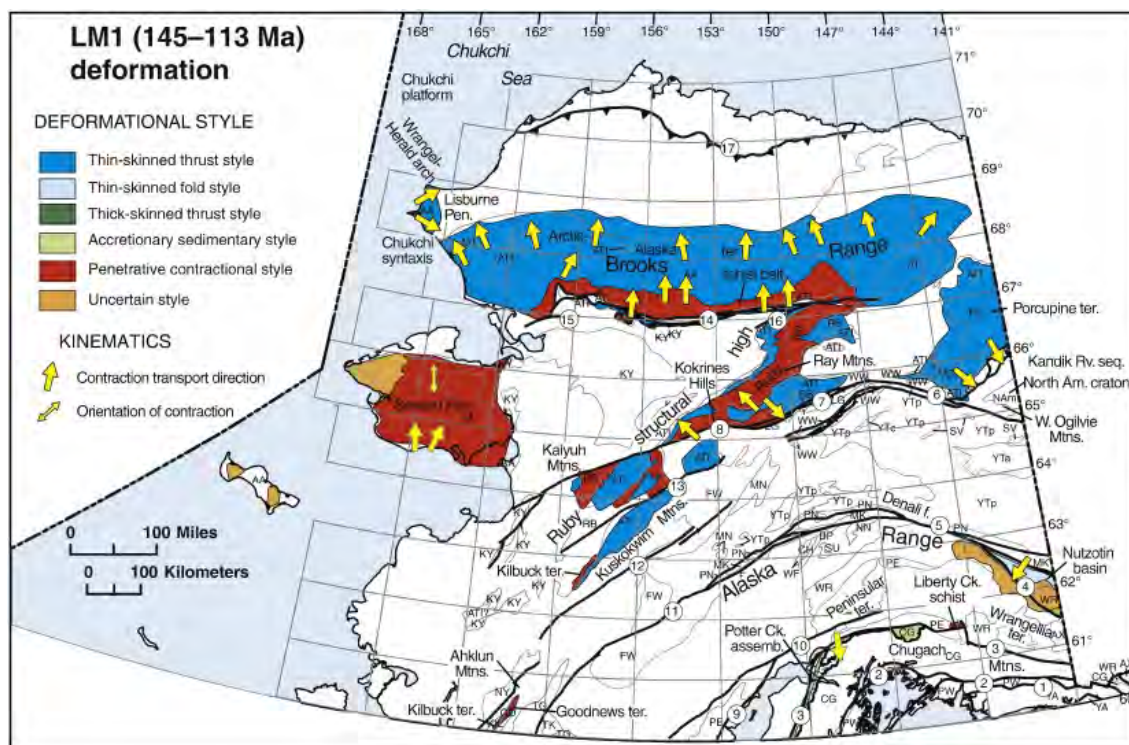
The deformation and tectonic history of the Kaiyuh Mountains remains poorly understood. The Project area underwent regional deformation and metamorphism during the Middle Jurassic to Early Cretaceous Brooks Range orogeny. The collision of the Ruby Terrane and Koyukuk Arc Terrane from present-day south caused north-directed imbrication and partial subduction of the Arctic Alaska passive margin sedimentary sequence. A recent review of the tectonic history is summarized by Moore et al. (Moore and Box, 2016) who present a series of tectonic reconstructions and deformational styles related to the Brooks Range orogeny. Figures 7-2 through 7-5 show the evolution of the Ruby Terrane and the timing of the Illinois Creek and Round Top deposits. The reconstructions show the accretion of the ATI (Angayucham/Tozitna/Innoko) Terrane immediately to the east and overlapping the Ruby Terrane in latest Jurassic times. The deformation continues into the Cretaceous with northwest-directed thrusting until 113 Ma. North-northeast to northeast-directed extension then dominates the deformational history through the emplacement of both the Illinois Creek and Round Top porphyry systems in the mid to earliest Cretaceous times.

Figure 7-2: West-Central Alaska Deformation 170–145 Ma



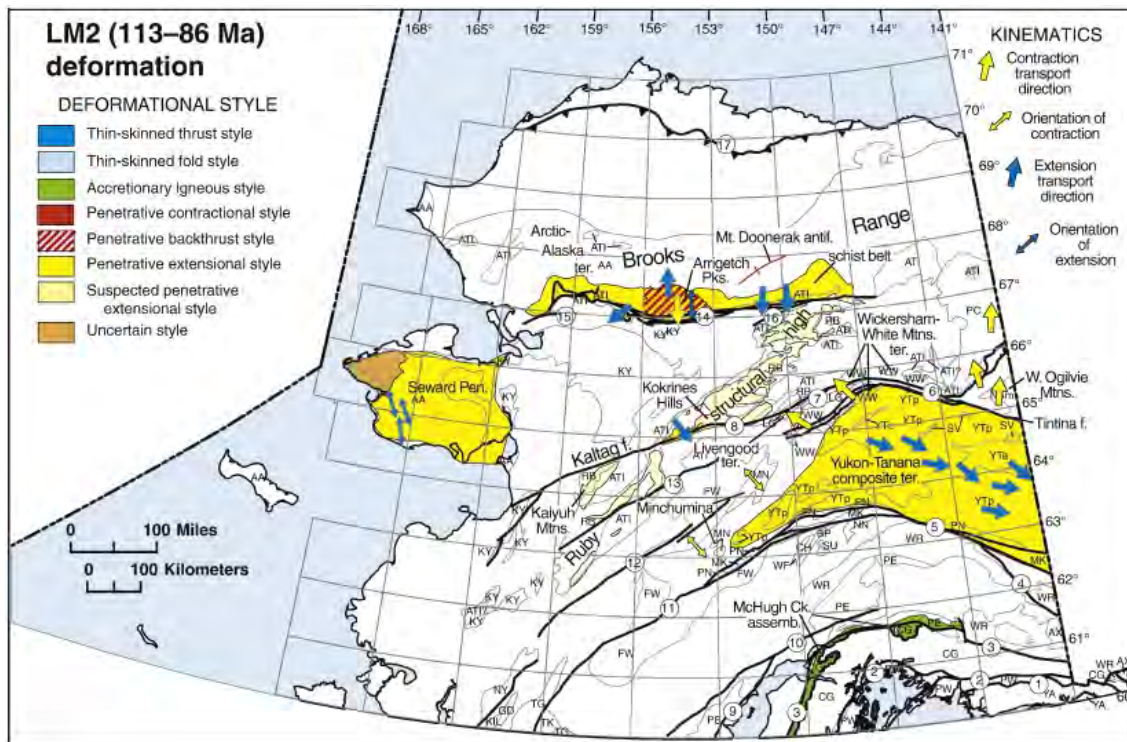
Source: Moore and Box (2016)

Figure 7-3: West-Central Alaska Deformation 145–113 Ma



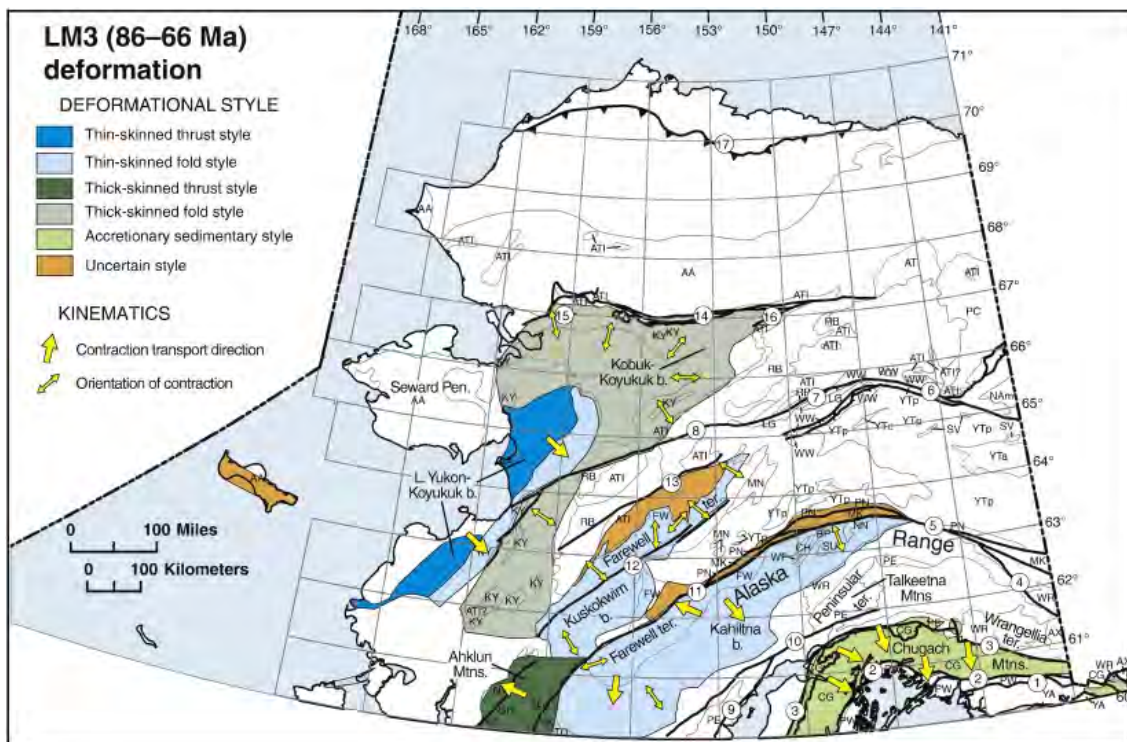
Source: Moore and Box (2016)

Figure 7-4: West-Central Alaska Deformation 113–86 Ma



Source: Moore and Box (2016)

Figure 7-5: West-Central Alaska Deformation 86–66 Ma



Source: Moore and Box (2016)

7.1.2 Regional Stratigraphy

The stratigraphy of the Kaiyuh Mountains is poorly documented and is only partially based on regional mapping by both the U.S. Geological Survey and Anaconda. The Illinois Creek district is largely covered with overburden, with only limited outcrops on ridge lines. This is even more evident on the Illinois Creek Property where stratigraphic interpretation is based largely on geophysics and the limited deep drilling by Anaconda at both Illinois Creek and Waterpump Creek. Several possible stratigraphic interpretations exist (see Table 7.1).

Table 7.1: Stratigraphic Units of the Illinois Creek Area

	Unit	Lithology	Approximate Thickness
Kaiyuh Schist	Kaiyuh Schist	Quartz Chlorite Muscovite Schists (QCMS) Thin 5 m to 10 m magnetite/chlorite schist units at or near base	>1,000 m
	Basal Kaiyuh Graphitic Schist	Graphitic schist Possible angular unconformity at base	20 m to 30 m
Illinois Creek Formation	Survey Ridge Quartzite	Quartzite Clean quartz arenite	20 m to 40 m
	Waterpump Creek Dolomite	Massive Dolomite and Dolomitic Quartzite	200 m+?
	Diabase	Sill-like mass of greenstone Possibly Jurassic?	100 m?
	Illinois Creek Graphite Schist	Graphitic schist	20 m to 30 m
	Illinois Creek Calcareous Quartzite	Calcareous Quartzite with thin Phyllitic horizons	60 m to 80 m
	Illinois Creek Dolomitic Quartzite	Dolomitic Quartzite with thin Phyllitic horizons	300 m to 350 m
	Illinois Creek Calcareous Graphitic Schist	Calcareous Graphitic Schist	120 m
	Basal Schists	Mixed Graphitic and Chloritic Schists	>200 m

Source: Modified from Brewer and Millholland (1982) and Teller (1984)

Igneous Rocks

Igneous rocks within the Illinois Creek Property are limited in distribution. Most important are a series of greenstone or diabase sills. The units are typically fine- to coarse-grained and composed of chlorite, actinolite, plagioclase and quartz. These intrusive rocks are likely part of the Jurassic ophiolitic rocks of the Rampart group to the east.

A few highly altered felsic porphyry dikes are also found in the Waterpump Creek area and are characteristically unfoliated, cream to tan in color with 10% to 15%, 1 mm feldspar phenocrysts and trace quartz set in an aphanitic matrix (Teller and Wilson, 1985).

The nearby 111 to 113 Ma Khotol pluton is characteristically equigranular to sub-porphyritic biotite granite to granodiorite containing up to 15% biotite and abundant quartz. Plagioclase dominates over potassium feldspar and makes up to 60% of the rock.

The Round Top stock and intrusive complex lies 19.3 km (12 miles) to the northeast and is characterized by a complex series of quartz monzonite intrusion and high-level breccia diatremes emplaced into the lower Paleozoic sequence. A high-level lithocap with sheeted copper veins and a well-developed enrichment blanket overlie porphyry copper/molybdenum/silver mineralization at depth.

7.1.3 Timing of Mineralization in the District

Two significant periods of porphyry and associated CRDs are evident in the Illinois Creek district:

- K-Ar and Ar-Ar dating of sericites at both Waterpump Creek and Illinois Creek by Anaconda and Flanigan support a temporal tie between the Khotol magmatism (108 to 113 Ma) and the mineralization at Illinois Creek.
- K-Ar, Ar-Ar and Re-Os dating by Anaconda, Flanigan and Antofagasta all suggest timing of emplacement of the Round Top porphyries and copper porphyry mineralization at 72 to 75 Ma.

All mineralization ages postdate the extensive 134 to 153 Ma metamorphic dates related to Brooks Range orogeny and obduction of the ATI Terrane.

K-Ar age dates in the district are summarized in Table 7.2.

Table 7.2: Age Dates – Illinois Creek District

Company	Location	Year	Type	Material	Date Ma	+/- Ma
Metamorphic Dates						
Anaconda	Waterpump Creek	1984	K-Ar	Muscovite (schist)	157	6
	Waterpump Creek	1984	K-Ar	Muscovite (schist)	153	6
	Waterpump Creek	1984	K-Ar	Muscovite (schist)	149	5
Flanigan	Waterpump Creek	1995	Ar-Ar	Whole Rock	145.4	1.9
	Honker	1995	Ar-Ar	Whole Rock	139.3	1.8
	Illinois Creek	1995	Ar-Ar	Muscovite	137.9	1.3
Patton et al.	Kaiyuh Mtns	1979	K-Ar	Muscovite	136	4.1
	Kaiyuh Mtns	1979	K-Ar	Muscovite	134	4.0
Flanigan	Illinois Creek	1995	Ar-Ar	Muscovite	127.9	2.2
Intrusive Dates						
Patton et al.	Khotol	1979	K-Ar	Biotite	112	3.4
Anaconda	Khotol	1982	K-Ar	Biotite	111	4.0
	Khotol	1982	K-Ar	Biotite	108	4.0
Flanigan	Khotol	1995	Ar-Ar	Biotite	107.3	1.4
Anaconda	Round Top	1984	K-Ar	Feldspar	74.8	2.8
	Round Top	1984	K-Ar	Feldspar	72.9	2.8
Mineralization Dates						
Flanigan	Illinois Creek	1995	Ar-Ar	Sericite	113.1	0.4
Anaconda	Waterpump Creek	1982	K-Ar	Sericite	113.0	4.0
Antofagasta	Round Top	2018	Re-Os	Molybdenite	72.7	0.3

7.2 PROPERTY GEOLOGY

Broad, east-northeast to east-southeast-directed folds in the Illinois Creek district, occur as a consequence of east-southeast-directed compression perpendicular to north-northeast extension.

At Illinois Creek, the oxide deposit (a deeply oxidized CRD) is located within an east-northeast-trending shear near the southern margin of the broad east-northeast-trending Illinois Creek antiform. Mineralization occurs both as a filling within the fault structure and as replacement mineralization within and along selective bedding planes and stratigraphic contacts in the Illinois Creek calcareous and dolomitic quartzite. A Property-wide diabase dike occurs just above the graphitic schist overlying these carbonate quartzites and is mapped throughout the Property using gravity and its moderate aeromagnetic signature.

At Waterpump Creek, mineralization is particularly focused at or near the uppermost contact of the dolomitic quartzite stratigraphy (Survey Ridge quartzite and Waterpump Creek dolomite) with overlying metapelitic Kaiyuh schists. That contact appears, in part, to be an unconformity characterized by a thin 20 m to 30 m graphitic schist and a thin marker horizon chlorite/magnetite schist. The marker horizon is recognized by an intense aeromagnetic feature traceable through much of the district.

At Illinois Creek, very deep and poorly understood oxidation of the original CRD has resulted in the extensive development of gossan to depths exceeding 400 m below surface. Original primary mineralization is assumed to have been analogous to that seen at the Waterpump Creek deposit, where primary sulfides occur as typical carbonate replacement mineralization dominated by galena, sphalerite, pyrite and minor chalcopyrite and sulfosalts hosted in magnesium, manganese, iron, and calcium carbonates.

At Honker, mineralization occurs in two northeast-trending veins, the Main Vein and West Vein, and associated massive sulfide horizons adjacent to the veins. The veins and replacement deposits occur within a host rock assemblage consisting of metamorphosed siltstones, shales, sandstones, and minor limestone and metabasite. Outcropping rocks adjacent to the veins in the immediate property area consist of quartz-muscovite-plagioclase-biotite schist. The metamorphic rocks are intruded by the lower Cretaceous Khotol pluton dated at 113 Ma (Flannigan, 1998). The Main Vein is traceable for approximately 1 km along strike before it disappears beneath alluvium and tundra to the northeast and southwest. The West Vein is traceable for 550 m along strike. The veins range in width from 1 m up to 5 m and consist of vein breccia of rounded fragments of wall rock and vein silica cemented by later generations of silica and limonite and cut by planar veins of silica and limonite. Based on surface channel sampling, gold values for the veins range up to 87 g/t Au and drill intercepts from a 1982 drilling program range from 3.8 to 15.6 g/t Au.

The Honker prospect has the potential to provide important upside to any future advancement of the Illinois Creek development.

7.2.1 Lithology Units

The main gossan body at the Illinois Creek oxide deposit is hosted in a sequence of quartzites, calcareous quartzites and dolomitic quartzites overlain by a graphitic schist and a Property-wide diabase sill. Since much of the primary lithology is homogenous and difficult to develop, any easily observable distinctions and efforts to domain lithology have focused on significant differences recognized in the gossan and alteration features as “lithologies” or domains. Work by Anaconda, NPMC and Echo Bay has resulted in a final logging scheme devised to incorporate the relative abundance to three variables: quartz, iron and manganese (Tolbert, 1992).

The following descriptions of the “lithology” domains are from Tolbert (1992) and are summarized in Table 7.3.

Quartzite (Q): white, light gray to tan, fine- to medium-grained. Several textural varieties of the quartzite occur and have been logged. Quartzite ranges from relatively pure, blocky massive (Q) to limy (Ql) and dolomitic (Qd) varieties. Carbonate-bearing quartzite is gradational between two fabrics, 1) mottled (Qlt and Qdt), and 2) carbonate/quartz banded (Qlb and Qdb). Unaltered quartzite comprises the country rock in the vicinity of the gossan but seldom directly borders mineralization.

Altered Quartzite (Qa): cloudy, pale yellow green with weak to strong carbonate and clay alteration and possibly weak propylitic alteration. Qa is soft and chalky, occasionally sanded and generally highly calcareous. Blue-gray quartz stock work veins are usually abundant. Qa directly borders gossan in the footwall and sometimes forms a narrow screen between gossan and Qs in

the hanging wall. Potentially mineralized variants included quartzite stained with secondary iron oxide (Qf) or manganese oxide (Qm).

Sanded Quartzite (Qs); quartzite decomposed to sand and ranging from very fine powder to medium-sized grains. Locally highly calcareous, commonly stained with secondary iron oxide, manganese oxides and copper carbonates.

Ferruginous Quartzite (FQ): granular white quartz quartzite and hydrothermal quartz) with <50% brown, yellow or red brown iron oxide, variably brecciated and or cut iron oxide +/- quartz stock work veins. Earthy cellular and botryoidal iron oxide (goethite, limonite and hematite) are present as breccia matrix and irregular masses. The unit is massive to extremely vuggy in texture.

Ferruginous Manganiferous Quartzite (FMQ): similar to FQ but contains significant manganese oxide to impart a sooty black or dark gray color to all or portions of the rock (Mn generally >1%). Manganese oxide occurs as purple-gray stain/flooding, earthy/sooty bands and clots, botryoidal psilomelane masses or rarely as acicular pyrolusite needles lining cavities. FMQ is often distinctly banded with alternating <0.4 in. bands of granular quartz, iron oxide and manganese oxide.

Ferruginous Gossan (FG): massive gossan with >50% iron oxide as earthy, cellular and botryoidal limonite, goethite and rare hematite. Locally abundant rhombohedral pseudomorphs suggest much of the gossan has replaced massive coarse-grained carbonate (siderite, ankerite, dolomite and rhodochrosite) in some areas. Quartz comprises up to 50% of the rock as milky veins, quartzite clasts or granular masses. Primary textures are highly obscured. FG occasionally contains copper oxides and bindheimite veins.

Ferruginous Manganiferous Gossan (FMG): similar to FG with prominent dark gray to black manganese oxide coloration in addition to brown iron oxide. Both oxides usually occur as distinct alternating bands or as wormy intergrowths. Coarse-grained rhombohedral pseudomorphs are locally present.

Hydrothermal Quartz (HQ): Massive, vuggy, prismatic or granular hydrothermal quartz as veins, pods, or masses. Sometimes contains pseudomorphs and iron oxide veins. HQ is rare accounting for <2% of the material within the gossan.

Table 7.3: Lithology Domains at the Illinois Creek Deposit

Code	Unit
Q	Quartzite
Qa	Altered Quartzite
Qs	Sanded Quartzite
FQ	Ferruginous Quartzite
FMQ	Ferruginous Manganiferous Quartzite
FG	Ferruginous Gossan
FMG	Ferruginous Manganiferous Gossan
HQ	Hydrothermal Quartz

Figure 7-6 shows typical core intervals for both FG and FMG (Ferruginous and Ferruginous Manganiferous Gossan) from Illinois Creek deposit.

Figure 7-6: Core Sample Photograph of FG and FMG



A) Ferruginous Gossan (FG) - Sample IC95-025 188 m grading 0.3 ppm Au and 45.3 ppm Ag.

B) Ferruginous Manganiferous Gossan (FMG) - Sample IC95-040A 93 m grading 1.31 ppm Au and 6.2 ppm Ag

Source: WAC&G (2019)

7.2.2 Structure

In 2000, MRDI, under the direction of Viceroy, audited the USMX database and model. At that time, MRDI concluded that although the codes reflected host domains that controlled the distribution of gold/silver mineralization, the mineralization clearly crossed those lithologic domains. Sections constructed during the review suggest that the gold and silver zones meandered in and out of individual rock units, much as would be expected if mineralization were controlled by a shear zone that roughly followed the strike of bedding of the host rocks. The common thickening and bifurcation of gold zones that are seen in the hanging wall and strike extensions of the deposit are common to braided shear systems (MRDI and Viceroy, 2000).

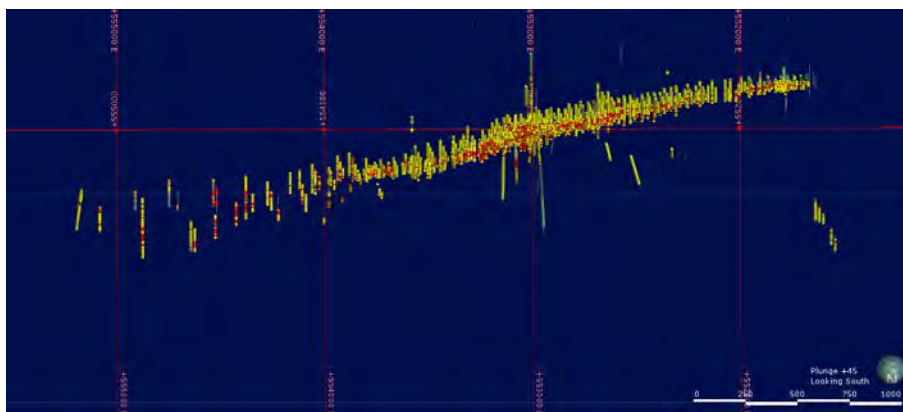
MRDI concluded that the primary control of mineralization was the presence of bedding plane shears, with local zones of dilation (and thickening of ore zones) occurring at favorable changes in the strike of individual shears. Shearing preferentially occurred within sandy dolomite, calcareous to dolomitic quartzite, and calcareous phyllite.

7.3 MINERAL DEPOSITS

Gold and silver mineralization occur throughout the zone of gossanous material that strikes east-northeast and dips from 40 to 70 degrees south. Drilling and trenching have defined mineralization and anomalous gold values over a total strike length of about 3,600 m, a true thickness of up to 100 m, and a vertical depth of 400 m. Individually recognized subunits mostly consist of massive hematite and limonite, strongly ferruginous quartzite, manganiferous-ferruginous quartzite and manganiferous iron oxides.

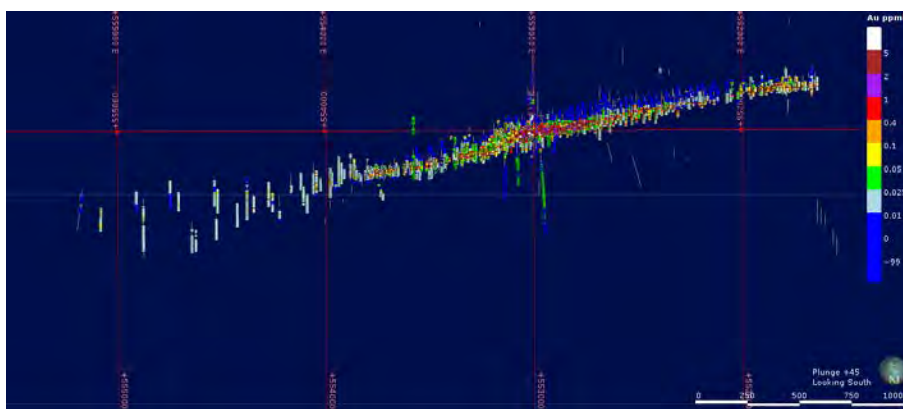
Figure 7-7 shows a 3D perspective view of the FG and FQ units within the surrounding calcareous and dolomitic quartzites at the Illinois Creek deposit looking south at 45 degrees. Figures 7-8 and 7-9 show similar perspectives with gold and silver grades.

Figure 7-7: 3D Perspective View of Illinois Creek Deposit showing Ferruginous and Manganiferous FG and FQ Units (red) and Calcareous & Dolomitic Quartzites (yellow) (looking South at -45 degrees)



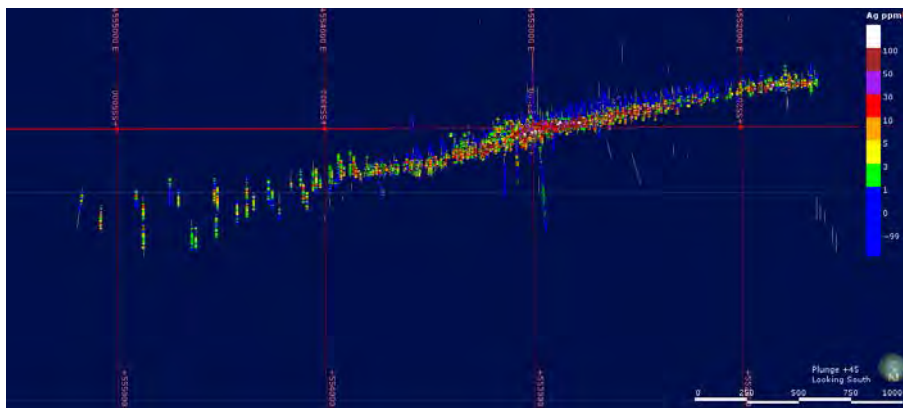
Source: WAC&G (2109)

Figure 7-8: 3D Perspective View of Illinois Creek Deposit showing Gold Grades (looking South at -45 degrees)



Source: WAC&G (2019)

Figure 7-9: 3D Perspective View of Illinois Creek Deposit showing Silver Grades (looking South at -45 degrees)



Source: WAC&G (2019)

7.3.1 Mineralization

In the zone of oxidation, mineralization consists of hematite, goethite, limonite, jarosite, psilomelane (wad) and manganite. Iron oxides show a variety of textures ranging from in-situ crystals derived from oxidation of sulfides and carbonates to botryoidal growths and acicular needles of transported iron. Earthy, hematitic gossan and quartzite contain the highest gold grades. According to Kirkham and Apel (1993), quartz veining and groundmass silicification is spatially related to better gold mineralization.

Analysis of polished sections and scanning electron microscope (SEM) measurements by Anaconda and NPMC suggest that the gold is present in its native state and as electrum in grains less than 20 microns in diameter. Gillerman et al. (1985), note that high gold grades are associated with visible copper oxides and brick red, hematitic limonites. SEM work by Hossein Salek (Gillerman and Brewer, 1985) found micron-size native gold grains in iron oxides. MRDI's evaluation of theoretical grain sizes, based on duplicate assays of sample pulps, supports a relatively small grain size.

Silver is present as electrum, argentojarosite and native silver and is strongly associated with the occurrence of manganese oxides.

Deep holes drilled by Anaconda in 1982 provide some limited information regarding the nature of unoxidized mineralization located down-dip from the gossan zones. At a depth of >400 m below surface, unoxidized mineralization consists of iron and manganese-rich carbonate, with arsenopyrite, pyrite, quartz, base-metal sulfides and sulfosalts.

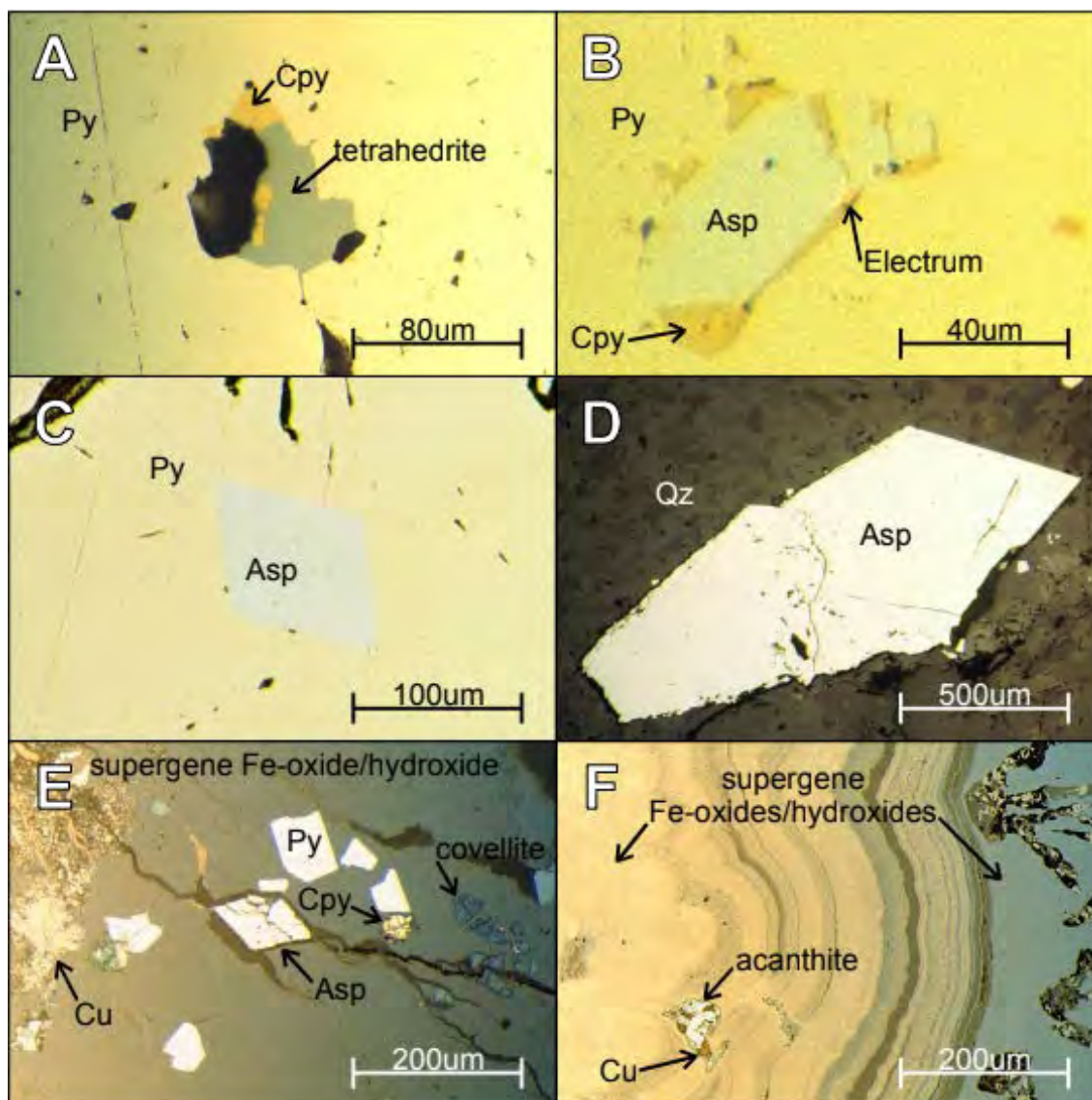
In addition to the information gleaned from the deep Anaconda holes at Illinois Creek, Anaconda drilling at Waterpump Creek encountered classic carbonate replacement mineralization with sulfides dominated by sphalerite, galena, argentite, chalcopyrite, boulangerite, pyrite, and arsenopyrite.

Flanigan (1998), as a part of his thesis, conducted detailed reflected-light and SEM analyses to further define the mineralogy of the Illinois Creek and Waterpump Creek deposits. Though the Illinois Creek deposit is almost entirely oxidized, a few intervals with trace primary sulfides remain and, even in the most highly oxidized samples, some microscopic sulfides are present.

At Illinois Creek, pyrite appears to be the most abundant primary sulfide, with most other primary sulfide minerals occurring as inclusions in pyrite or on pyrite-grain boundaries. These include sphalerite, chalcopyrite, arsenopyrite, tetrahedrite, and electrum. Additional minerals, too fine-grained to be recognized petrographically, were identified using the electron microprobe and include native bismuth, bismuthinite, stannite, tetrahedrite, stibnite, boulangerite, and galena.

Figure 7-10 shows photomicrographs of typical primary mineralization at the Illinois Creek deposit.

Figure 7-10: Reflected Light Photomicrographs of Rare Primary Minerals at Illinois Creek



- A) Sample IC9103-195.5' showing tetrahedrite with associated chalcopyrite included in pyrite.
 B) Sample IC9103-195.5' showing arsenopyrite with associated chalcopyrite and electrum included in pyrite.
 C) Sample IC9103-195.5' showing euhedral arsenopyrite in pyrite.
 D) Sample IC10-862m showing euhedral arsenopyrite in vein quartz.
 E) Sample from trench 9109 showing remnant sulfides in a highly supergene oxidized matrix.
 F) Sample from trench 9109 showing varying degrees of hydration in limonite with supergene related native copper and acanthite.

Source: Teller and Wilson (1985)

Additional results from mineralogical studies conducted by Hossein Salek from Anaconda's Tucson research lab are documented in a series of internal memos (1984 and 1985). Table 7.4 shows recognized oxide zone minerals at the Illinois Creek deposit (Salek, 1984a; Salek, 1984b).

Table 7.4: Mineralogy of the Illinois Creek Deposit

Oxide Zone Minerals
Anglesite
Argentojarosite
Arsenobrackenbushite
Azurite
Beudantite
Bindheimite
Carminite
Cerrusite
Cornwallite
Delafossite
Electrum
Fluorite
Fraipontite
Hemimorphite
Hopeite
Malachite
Massicot
Mimetite
Native gold
Plattnerite
Plumbojarosite
Schultenite
Scorodite
Geothite
Hematite
Todorokite
Psilomelane
Pyrolusite

7.3.2 Alteration

Alteration along the margins of gold zones at the Illinois Creek deposit consists of removal of carbonate cement from the original host rock, forming friable, "sanded" quartzites and arenaceous phyllites. This sanding is likely further exacerbated by the intense oxidation and leaching of the proto massive sulfides.

8 DEPOSIT TYPES

The Illinois Creek district hosts a series of deposits related to Cretaceous-age magmatism, including porphyry copper/molybdenum/gold/silver systems as well as marginal CRDs and low sulfidation gold veins.

The Illinois Creek deposit is a deeply oxidized (to >400 m depth) zoned CRD developed in the Illinois Creek dolomitic quartzite. Mineralization is characterized by ferruginous and manganiferous gossans strongly zoned with copper/gold/bismuth to the south and west and lead/zinc/silver/manganese to the north and east.

Appropriate analogs to the Illinois Creek district would be the Red Mountain porphyry mining district in the Patagonia Mountains of southern Arizona where the Hermosa (Taylor) zinc-lead-silver CRD system flanks the Sunnyside porphyry, and the Superior mining district of central Arizona, where the Magma Mine replacement deposits flank the Resolution deposit porphyry.

9 EXPLORATION

9.1 INTRODUCTION

Summaries of the exploration conducted by the previous operators of the Illinois Creek Property are shown in Section 6 (History). This section of the report mainly summarizes the exploration completed by Piek Exploration and WAC&G. Some of these studies are a continuation of exploration initiated by the various previous operators.

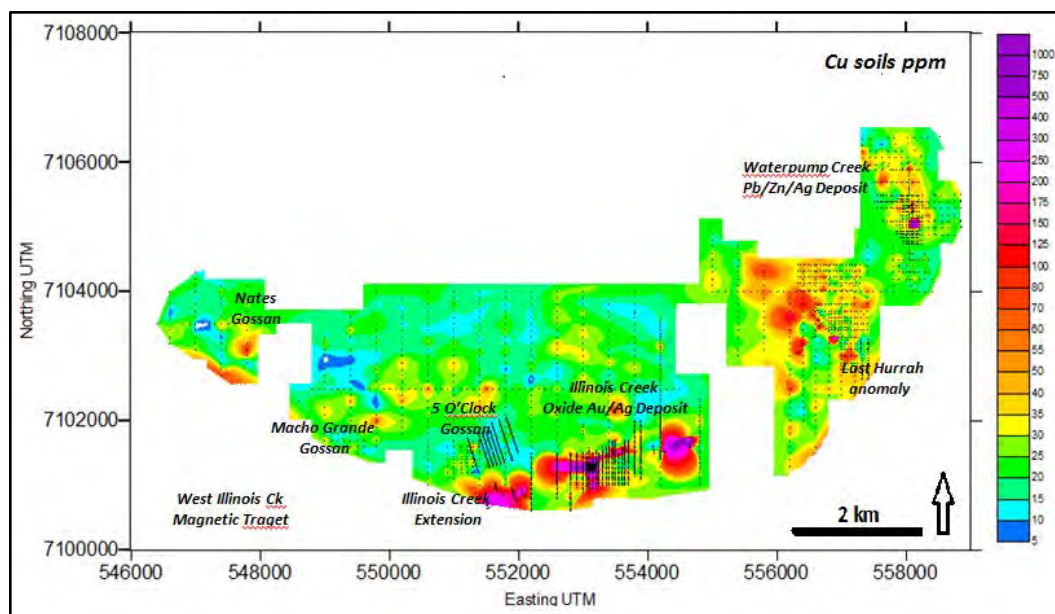
9.2 GEOCHEMISTRY

In 2015, Piek Exploration compiled all of the available soil surveys. A total of 27 discrete surveys by five companies were completed at Illinois Creek resulting in an overall database of 3,575 samples. Unfortunately, the majority of the soils are only available for a limited number of elements, primarily copper, lead, zinc, gold, silver, antimony, arsenic, and manganese.

9.2.1 Soil Geochemistry - District Soils

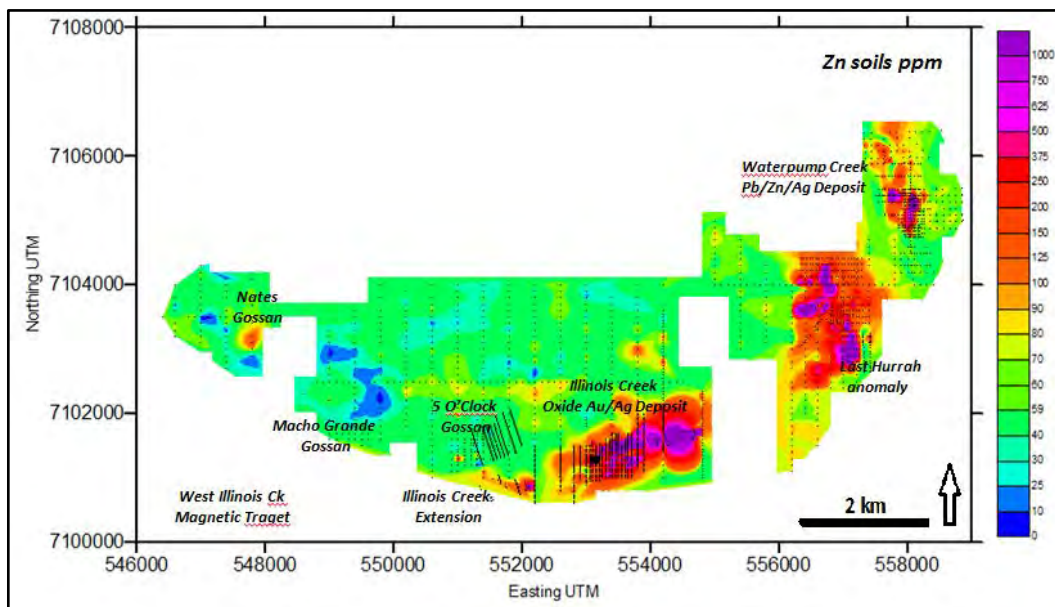
Plots of the consolidated district soil database are seen in Figures 9-1 to 9-5. The plots show copper, zinc, lead, silver and gold, respectively, along with major target areas on the Property. The plots effectively show the gross Property-wide zonation from copper, gold and silver in the west-central area near the Illinois Creek deposit to high lead, zinc, and silver in the eastern parts of the Property at Last Hurrah and Waterpump Creek.

Figure 9-1: Copper Soil Geochemistry – Illinois Creek Property



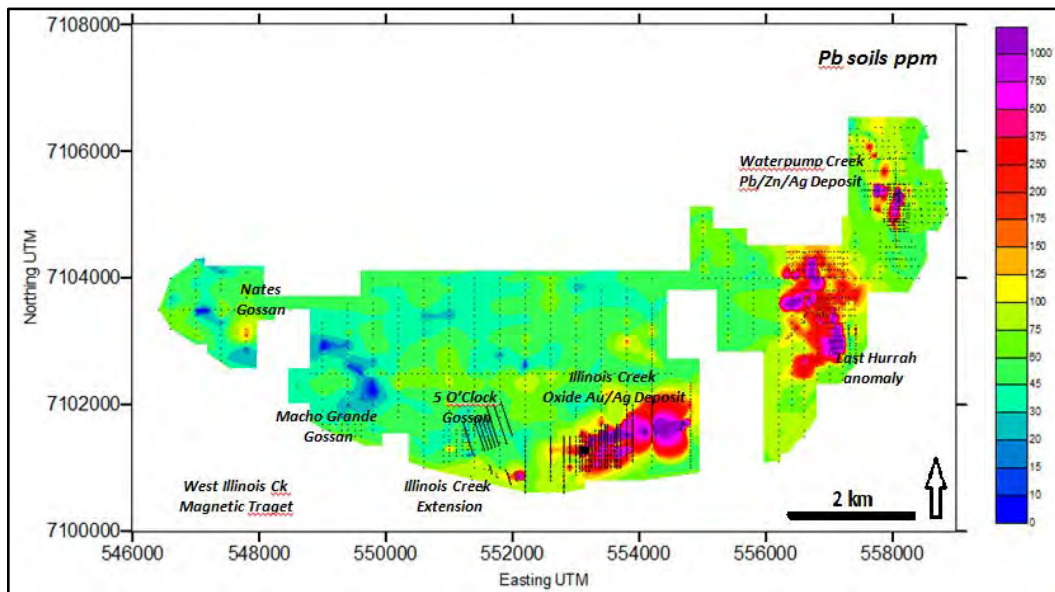
Source: Piek Exploration (2015)

Figure 9-2: Zinc Soil Geochemistry – Illinois Creek Property



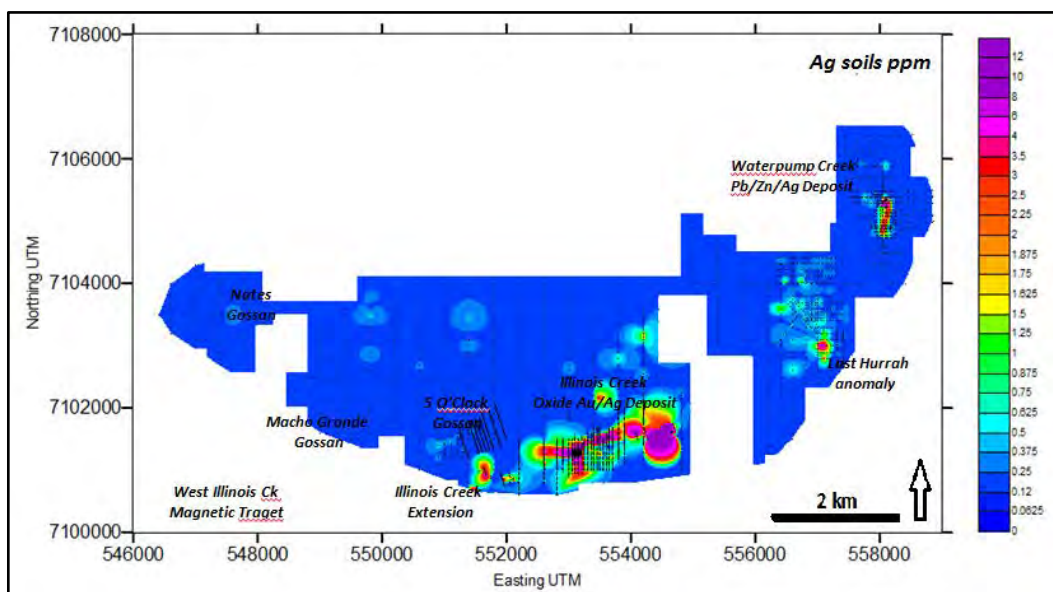
Source: Piek Exploration (2015)

Figure 9-3: Lead Soil Geochemistry – Illinois Creek Property



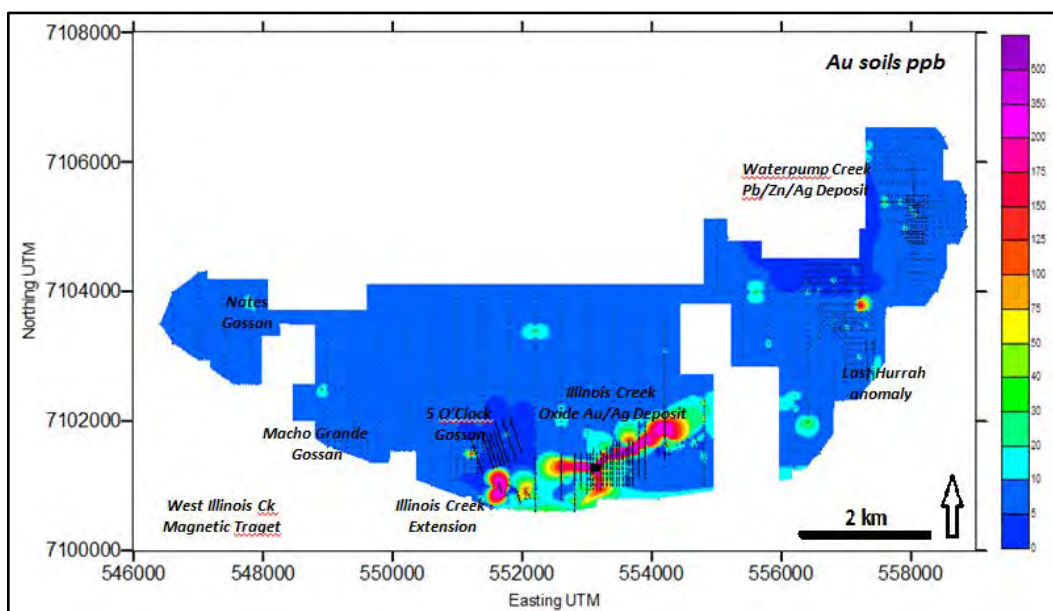
Source: Piek Exploration (2015)

Figure 9-4: Silver Soil Geochemistry – Illinois Creek Property



Source: Piek Exploration (2015)

Figure 9-5: Gold Soil Geochemistry – Illinois Creek Property



Source: Piek Exploration (2015)

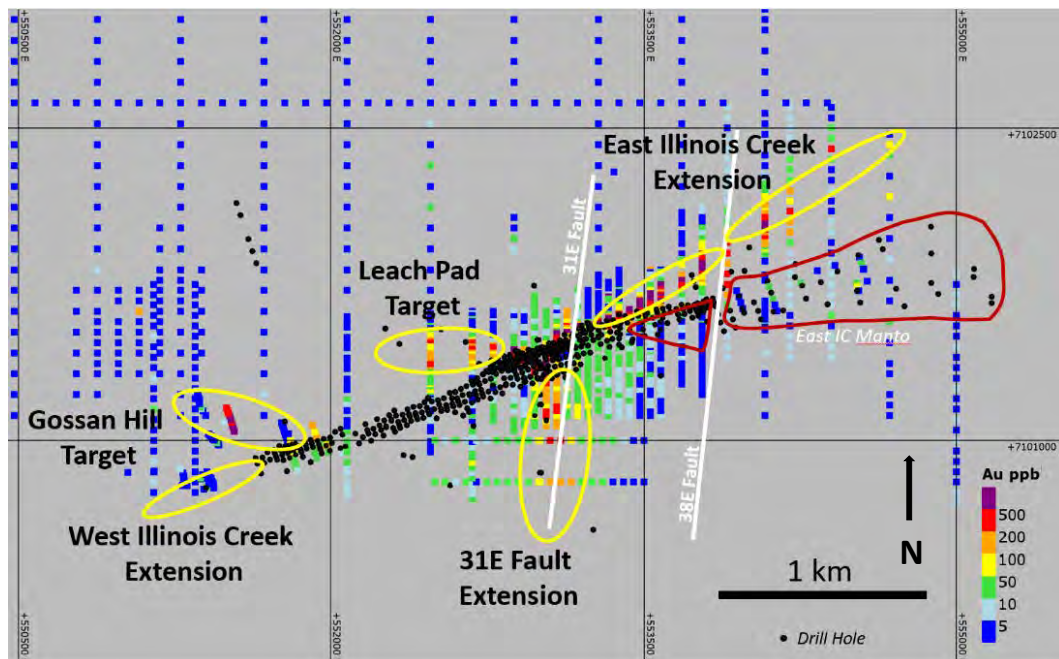
In 2015, Piek Exploration collected an additional 44 ICP sample analyses along four short lines over projections of the west extension of the Illinois Creek deposit. The results produced values as high as: 219 ppm Cu, 988 ppm Zn, 425 ppm Pb, 22 ppb Au, and 8 ppm Ag.

Based on the metal zonation characteristics exhibited in the district soil geochemistry, the potential for the causative porphyry fluid source, responsible for the emplacement of the mineralization, is likely south and/or west of the Illinois Creek deposit.

9.2.2 Soil Geochemistry - Extensions of the Illinois Creek Deposit

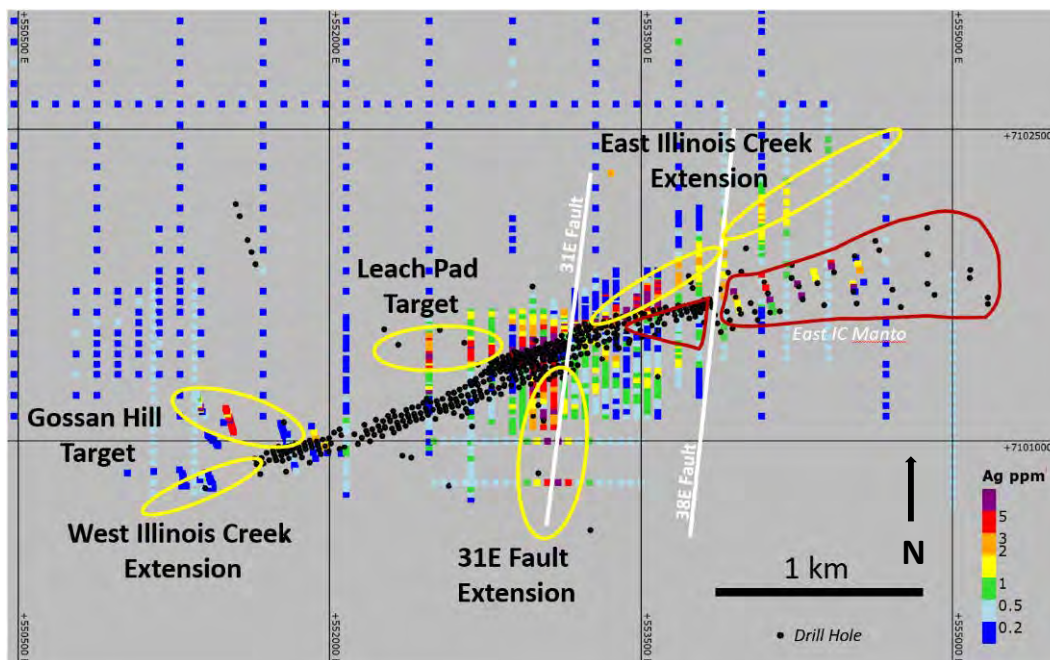
In 2020, to better understand the mineral resource expansion potential adjacent to the Illinois Creek deposit, WAC&G completed an additional 182 multi-element ICP soil samples. The compiled soil geochemistry data, together with the recompiled 2001 ARG mapping and sampling, have resulted in the identification of several exploration targets extending from the Illinois Creek deposit as shown in Figures 9-6 through 9-11.

**Figure 9-6: Gold Soil Geochemistry and Exploration Targets
Near the Illinois Creek Deposit**



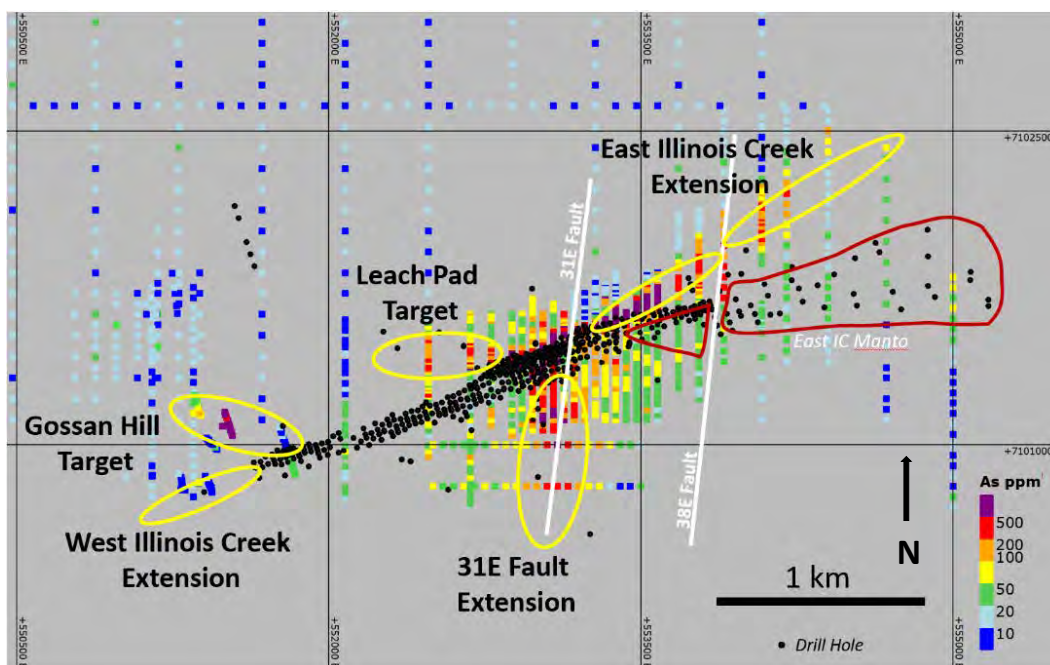
Source: WAC&G (2020)

**Figure 9-7: Silver Soil Geochemistry and Exploration Targets
Near the Illinois Creek Deposit**



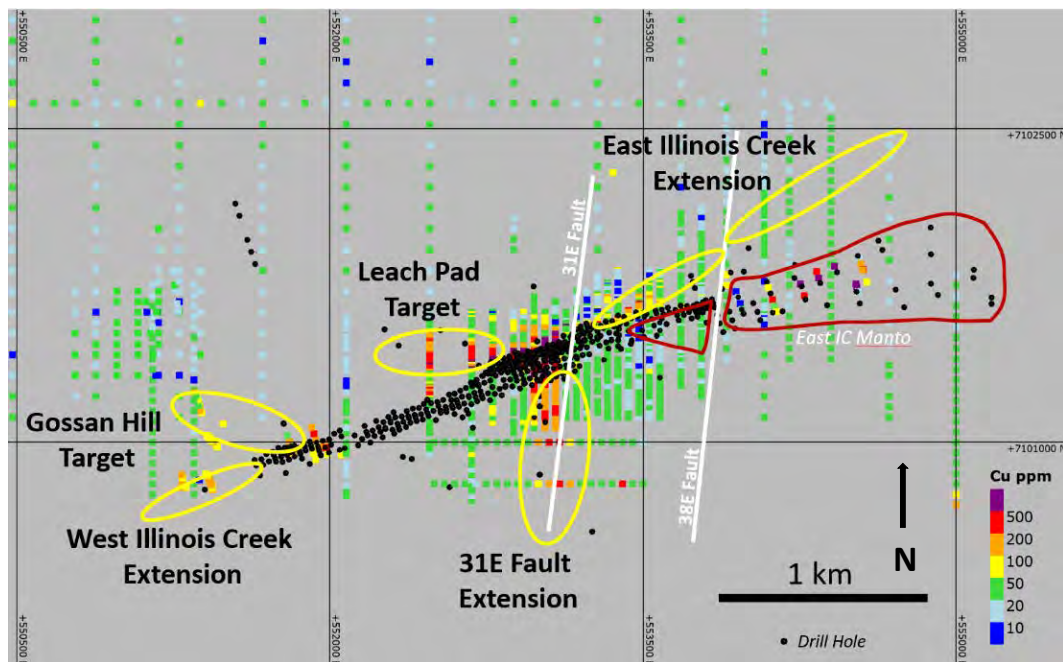
Source: WAC&G (2020)

**Figure 9-8: Arsenic Soil Geochemistry and Exploration Targets
Near the Illinois Creek Deposit**



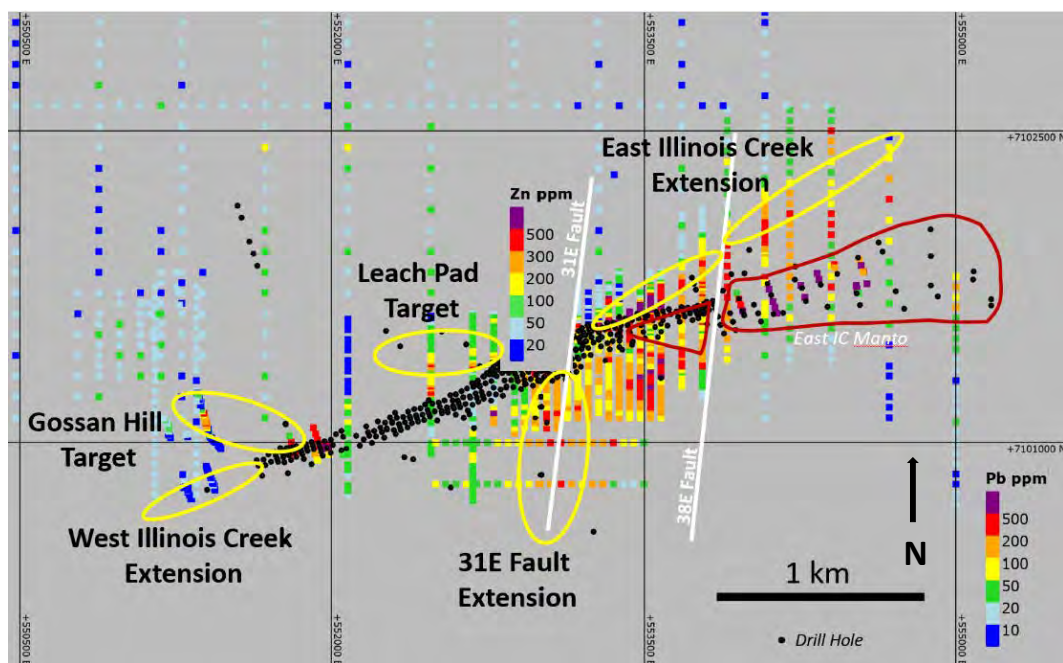
Source: WAC&G (2020)

**Figure 9-9: Copper Soil Geochemistry and Exploration Targets
Near the Illinois Creek Deposit**



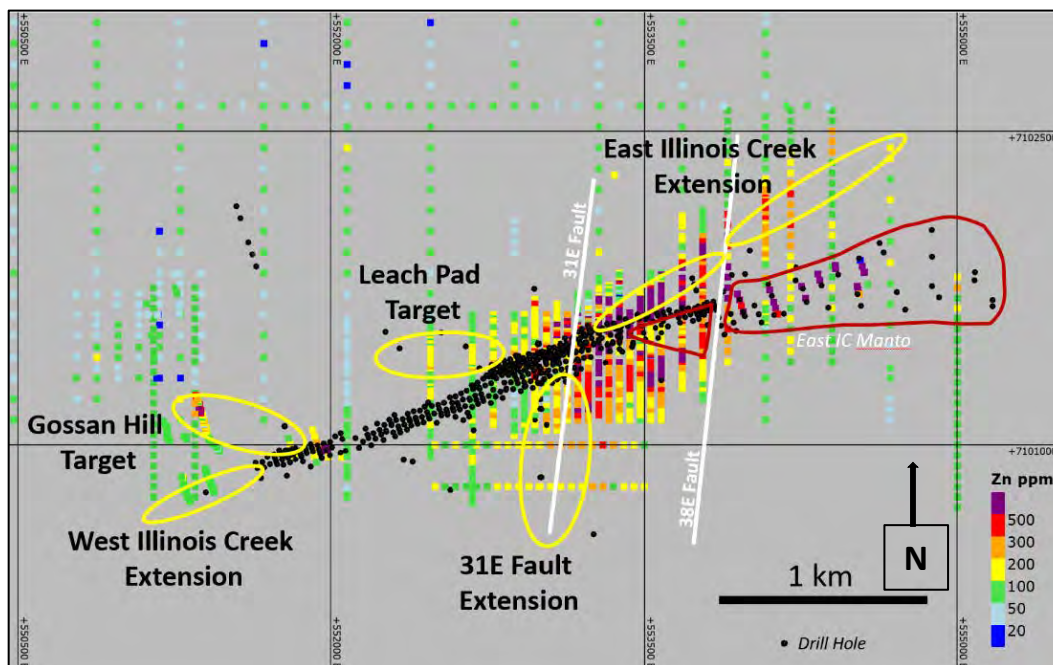
Source: WAC&G (2020)

**Figure 9-10: Lead Soil Geochemistry and Exploration Targets
Near the Illinois Creek Deposit**



Source: WAC&G (2020)

**Figure 9-11: Zinc Soil Geochemistry and Exploration Targets
Near the Illinois Creek Deposit**



Source: WAC&G (2020)

The following section discusses these high-potential extension targets.

East Illinois Creek Extension Target

ARG 2002 mapping and exploration soil sampling using a shallow blasthole drill rig, identified a major offset of the Illinois Creek main structure across two north-northeast-trending faults, the 31E and 38E cross faults. These fault offsets have confused exploration drilling on the east side of the Illinois Creek deposit, where from 1993 to 1996, drilling focused on the shallow south-dipping East Illinois Creek Manto gossan, rather than the offset mineralized structure further to the north. In 2020, expanded soil sampling by WAC&G showed a kilometer-long multi-element soil anomaly that remains unexplored. Individual soil samples reach as high as 9.2 g/t Au, 26 g/t Ag, >1,000 ppm As, 4,300 ppm Pb and 4,200 ppm Zn.

South 31E Fault Extension Target

A poorly understood Anaconda-generated soil anomaly striking south from the Illinois Creek pit aligns along the projection of the 31E fault. In 2020, WAC&G added two additional lines of soil sampling in this area, and the anomaly now stretches over 750 m and remains open to expansion to the south. This area hosts some high individual samples returning up to 460 ppb Au, 5.7 ppm Ag, 410 ppm Cu, 445 ppm Pb, 675 ppm Zn and 1,000 ppm As. Importantly, the sampling suggests that the 31E fault is syn or pre-mineral in nature, and the high copper component suggests more proximal porphyry fluids, similar to those seen along the western part of the main Illinois Creek structure. A very strong gravity low, seen in the 1983 Edcon gravity reconnaissance survey, roughly mimics the location and orientation of this geochemical anomaly, again suggesting a possible source of fluids from the south or at depth. Nearby Anaconda drilling, oriented to the north-northwest, may not have properly tested this elongate anomaly.

Gossan Hill and Leach Pad Targets

Two significant soil geochemistry anomalies extend into the footwall from the Illinois Creek main structure. The Leach Pad target, defined in early Anaconda soil sampling, shows values up to 545 ppb Au, 8.3 ppm Ag, 600 ppm Cu, 430 ppm Pb, 260 ppm Zn and >1,000 ppm As. This target remains untested and is open along a 400 m length just south of the area of the leach pad. The Gossan Hill anomaly extends for roughly 500 m in a west-northwest direction from the hanging wall of the west pit at the Illinois Creek deposit to an area referred to as “Gossan Hill”. At Gossan Hill, small exposures of sub-cropping gossan are present, and sampling of the proximal gossan-stained soils show values up to 864 ppb Au, 5.4 ppm Ag, 1,150 ppm As, 308 ppm Pb, and 208 ppm Zn.

West Illinois Creek Extension Target

The current drilling at the western limits of the Illinois Creek deposit indicates that mineralization remains open to possible expansion in this direction. Several select soil samples in this area show elevated copper values and a few isolated high gold and silver values. It should also be noted that a shallow water monitoring hole (MW-1), located approximately 275 m to the west-southwest of the west pit, returned 1.5 m (5 ft) of 2.75 g/t Au.

9.2.3 Other Targets

WATERPUMP CREEK TARGET

Historical drilling at Waterpump Creek, the distal extension of the Illinois Creek mineralization, shows some exceptional silver, lead and zinc values. Individual drill core intervals in both oxidized and sulfide mineralization have encountered over 1,000 g/t Ag. Potentially high-grade oxide and sulfide mineralization is an important exploration target at Waterpump Creek.

HONKER TARGET

Extensive chip and channel sampling along with limited historical drilling by Anaconda have shown significant gold values in veins and massive sulfide mineralization at the Honker high-grade gold target. Due to its nearby location and possible high grade, Honker is a high-priority target on the Illinois Creek Property.

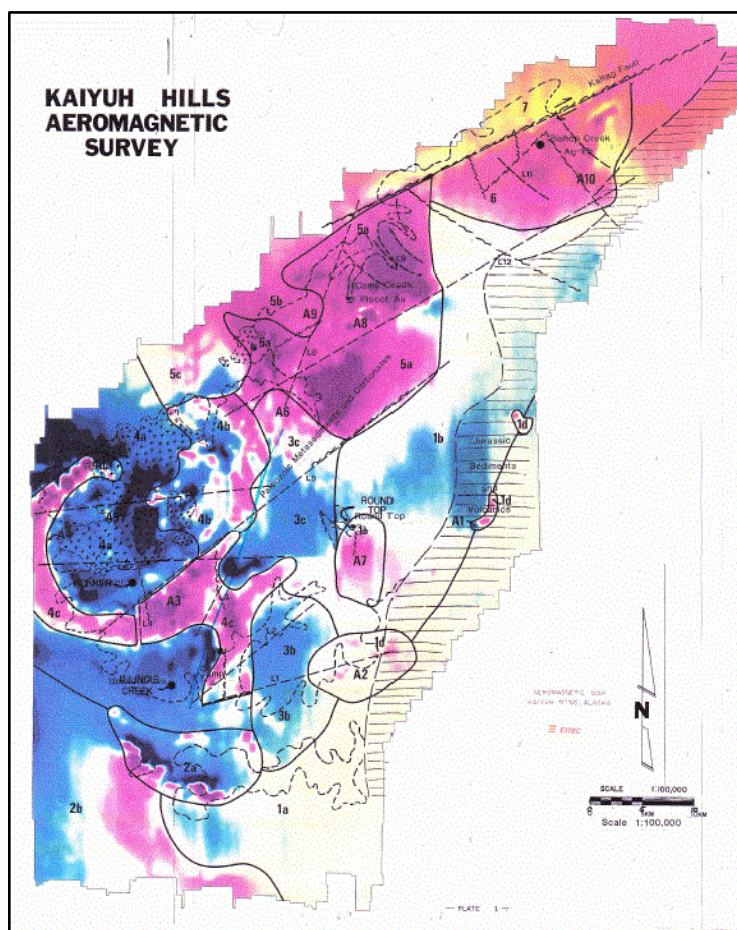
9.3 GEOPHYSICS

Since Anaconda’s initial discovery, a series of magnetic, electric and gravitational techniques were used to explore the Property, all with varying levels of success. The following subsections summarize the geophysical work that was conducted and how WAC&G interprets this information in support of the ongoing exploration targeting on the Property.

9.3.1 Ground and Aeromagnetic Surveys

In 1981, Anaconda engaged Ertec (Kilty and McDermott, 1981) to complete an aeromagnetic survey of the Kaiyuh Hills. Line spacing was approximately 500 m with an optimal altitude of 150 m. The survey effectively recognized the magnetic anomalies related to the Round Top porphyry intrusion and the strong magnetic signatures related to magnetite schists at or near the contact between the Illinois Creek formation carbonate and the overlying Kaiyuh schists. The relatively coarse scale of the survey did not allow any direct detection of targets, but it provided a rough spatial location of the significant lithologic domains in the district. The original data were lost, but a scanned plot of the data is shown in Figure 9-12.

Figure 9-12: Total Field Magnetics

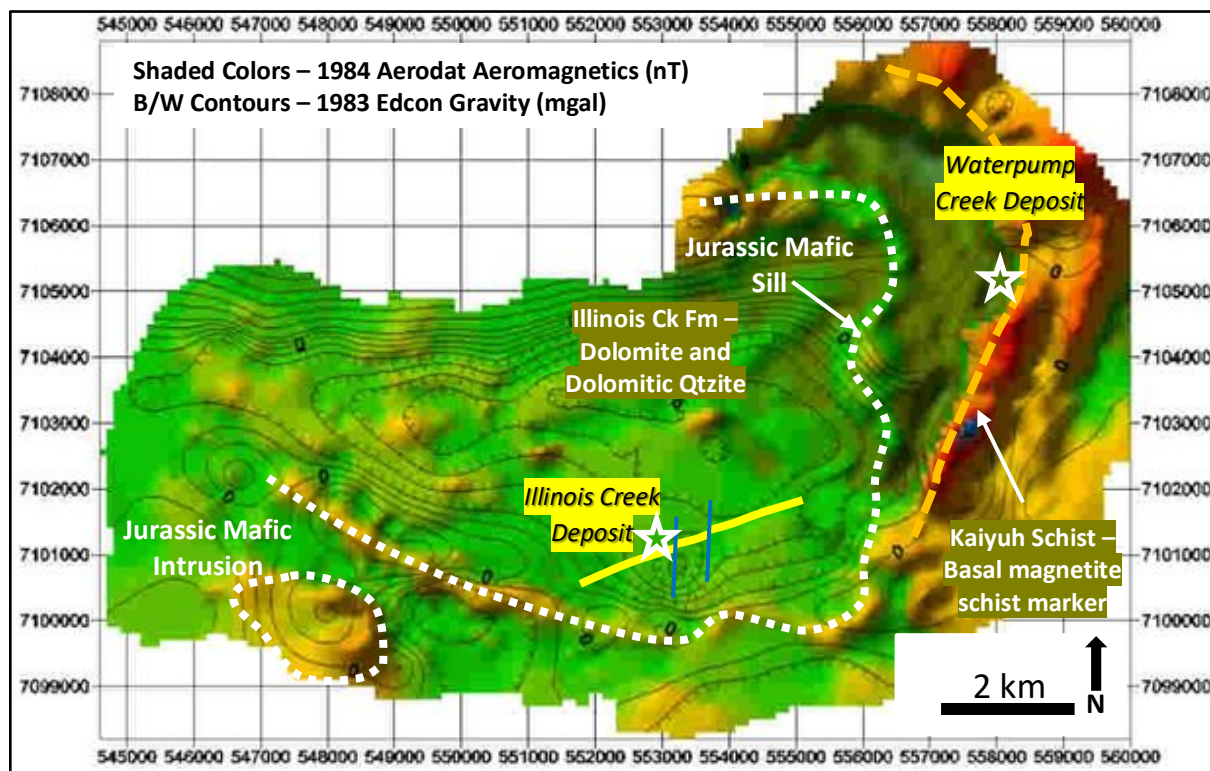


Source: Ertec (1982)

In 1984, Aerodat completed a more detailed, combined aeromagnetic and EM survey of the immediate Illinois Creek area for Anaconda. Lines were spaced every 200 m in three separate blocks, each oriented approximately perpendicular to the underlying stratigraphy. The optimized flight height is unknown, but flight lines of the analog data are still available (Aerodat, 1984).

Figure 9-13 shows the colored and shaded results of the 1984 Aerodat magnetic survey and contours of the 1983 Edcon gravity survey discussed in Section 9.3.2.

**Figure 9-13: Total Field Magnetics (Aerodat, 1984)
and Regional Gravity Survey (Edcon, 1983)**



Source: WAC&G (2020) compiled from Aerodat (1984) and Edcon (1983)

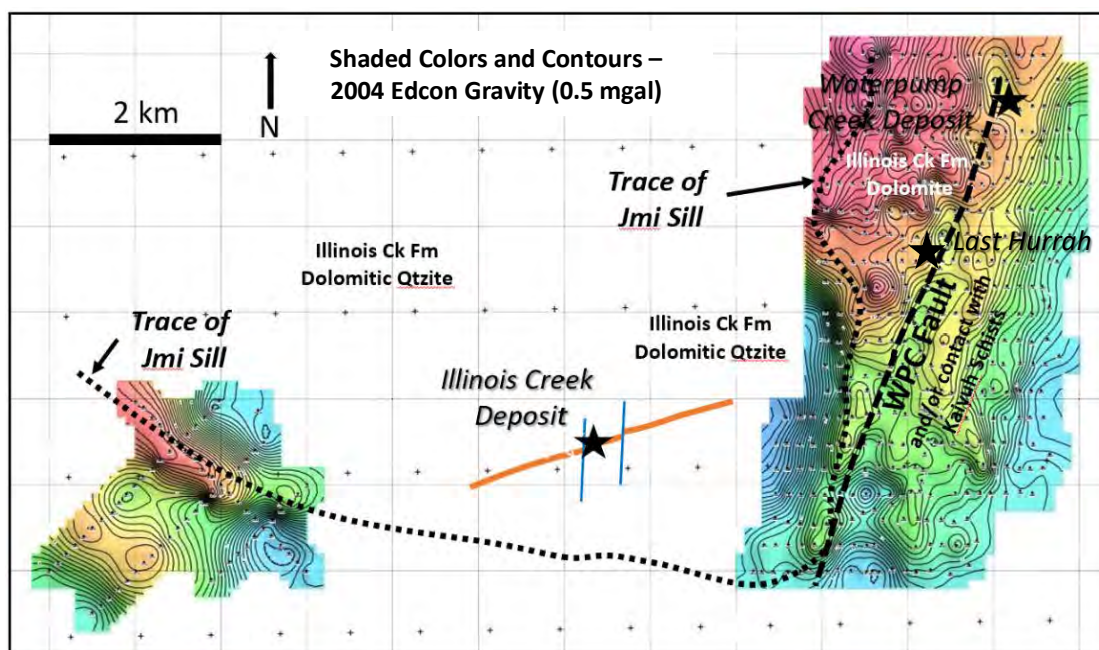
In 2015, Piek Exploration completed a short (4-line) ground magnetic survey to follow-up the West Illinois Creek magnetic target, first recognized in the Aerodat survey in 1984. This area was suspected as the possible porphyry center responsible for the emplacement of the Illinois Creek CRD system, but subsequent drilling in 2019 by WAC&G showed the anomaly to be the result of a Jurassic mafic intrusion.

9.3.2 Gravity Surveys

In 1983, Anaconda contracted Edcon to complete a helicopter-supported gravity survey of the southern Kaiyuh Hills in and around Illinois Creek. A portion of the survey results are shown in Figure 9-13 as 1 milligal gravity contours.

In 2004, NovaGold contracted Edcon again to complete a detailed gravity survey of a roughly 3 km by 3 km area from just north of the Waterpump Creek deposit to south of the Last Hurrah occurrence, located about 2 km east of the end of the Illinois Creek deposit drilling. A few reconnaissance lines with similar spacing were also conducted in and around the West Illinois Creek magnetic anomaly. Figure 9-14 shows the results of the 2004 NovaGold/Edcon survey.

Figure 9-14: 2004 NovaGold/Edcon Gravity Survey



Source: Edcon (2004) and WAC&G (2020)

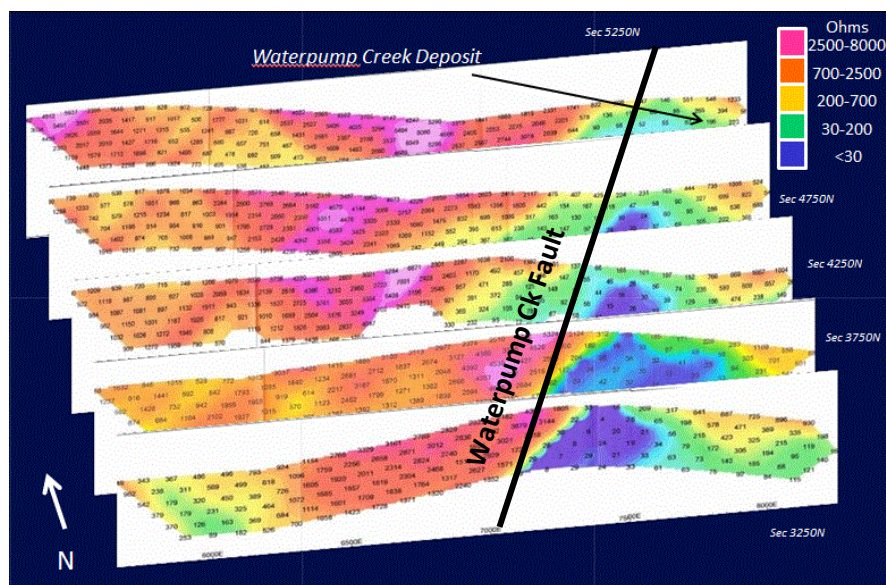
The two Edcon gravity surveys show lows over the gossans at Illinois Creek, Last Hurrah and Waterpump Creek.

9.3.3 IP and Other Electrical Techniques

Numerous electrical geophysical techniques have been used at the Property. In general, the techniques have been effective at mapping various lithological units but have not been effective in direct targeting of the presence of sulfides; this is likely due to the local depth of oxidation and/or the relatively shallow depths tested by the early geophysical surveys that were conducted in the district.

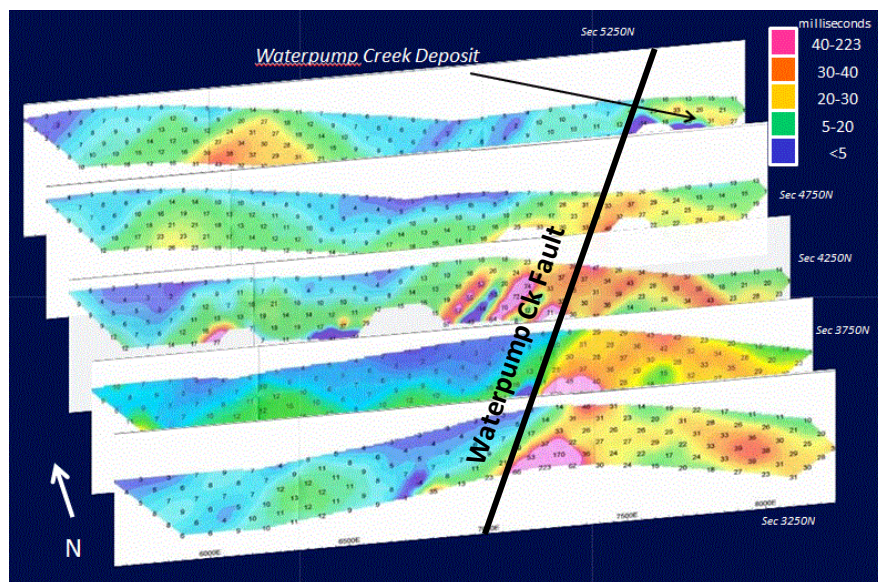
In 2005, NovaGold contracted Aurora Geosciences to conduct an IP survey which mapped the CRD mineralized contact between underlying dolomitic quartzites and overlying graphitic and chloritic schists. A highly conductive chargeability feature occurs at this contact south of Waterpump Creek and remains to be tested by WAC&G. Figure 9-15 shows the resistivity results from the 2005 NovaGold/Aurora Geosciences IP survey, and Figure 9-16 shows the chargeability (Aurora Geosciences, 2005).

Figure 9-15: IP Resistivity Survey - Waterpump Creek/Last Hurrah Area



Source: WAC&G (2019) from NovaGold/Aurora Geosciences (2005)

Figure 9-16: IP Chargeability Survey - Waterpump Creek/Last Hurrah Area



Source: WAC&G (2019) from NovaGold/Aurora Geosciences (2005)

9.4 EXPLORATION TARGETS

Minimal interpretation and development work, with respect to a coherent exploration model that drives targeting, has occurred on the Property since the Illinois Creek and Waterpump Creek deposits were discovered by Anaconda. This is reflected in the lack of exploration drilling outside the currently defined deposits. Outside of Anaconda's five shallow drill holes at Macho Grande gossan, USMX's drill profile at the 5 o'clock gossan, NovaGold's limited drilling at Last Hurrah, and WAC&G's three drill holes at the West Illinois Creek magnetic anomaly, there was virtually no additional exploration drilling on the Property.

The Illinois Creek Property represents a major epigenetic porphyry-centered system which presents opportunities to find both the causative porphyry driving the system and distal CRD mineralization focused within carbonate-rich clastic sediments and carbonates within the lower Paleozoic Illinois Creek formation. Deep leaching in the district has allowed for extensive oxidation and the development of the Illinois Creek deposit oxide gossans.

Due to the lack of rock exposure and limited exploration drilling, it was difficult to interpret the lithology and structural framework of the district. As such, the current exploration model and targeting is largely based on soil sampling, geophysical tools, and the mineralization-control characteristics of the Illinois Creek and Waterpump Creek deposits.

WAC&G have identified a series of exploration targets that include both extensions of the existing deposits as well as targets for new satellite zones of mineralization. A series of the more prominent exploration targets on the Illinois Creek Property are shown in Table 9.1.

Table 9.1: Primary Exploration Targets – Illinois Creek Property

Target	Style of Mineralization	Exploration Opportunity
Extensions of the Illinois Creek Deposit	oxide Au/Ag	Test the eastern extension of Illinois Creek structure soil anomaly.
	oxide Au/Ag	Test the geochemical soil anomaly related to the 31E Fault.
	oxide Au/Ag	Test west soil extensions of the Illinois Creek deposit including the main structure and the Gossan Hill and Leach Pad targets.
Waterpump Creek	CRD	Test for extensions to the Waterpump Creek deposit.
Honker	Vein/CRD	Test high-grade gold vein and replacement mineralization.
Waterpump Creek/Last Hurrah Trend	CRD	Untested IP chargeability and resistivity anomalies strike south from Waterpump Creek through the Last Hurrah area and may bridge to the Illinois Creek deposit.
Illinois Creek/Last Hurrah Structural Intersection	CRD	Test the intersection of eastern Illinois Creek deposit mineralization with the Last Hurrah/Waterpump Creek stratigraphy.
Macho Grande/5 o'clock/Nates Gossans	oxide Au/Ag	Limited exploration was completed on these adjacent gossan zones.

10 DRILLING

10.1 INTRODUCTION

A total of 654 drill holes (51,576.4 m) were completed on the Illinois Creek Property: 209 diamond core holes (21,224.7 m) and 445 reverse-circulation (RC) rotary drill holes (30,351.7 m).

Seventeen different annual campaigns dating from 1981 through to 2020 were conducted by nine different operators. Table 10.1 summarizes the operators, annual campaigns, number of drill holes and total meters drilled on the deposit.

Table 10.1: Drill Campaigns 1981 through 2020

Company/Operator	Year	Drill Hole (DH)	
Anaconda	1981	DH-001 to DH-009, DH-007B, DH-007A	
Anaconda	1982	DH-010 to DH-023	
Anaconda	1982	82-301 to 82-318	
Anaconda	1983	WP-83-001 to WP-83-007	
Anaconda	1984	WP-84-008 to WP-84-038	
Anaconda	1984	MG-1 to MG-6	
Goldmor	1988	88-001 to 88-049	
Goldmor	1988	88-006A	
Goldmor	1990	90-001 to 90-038	
NPMC	1991	91-001 to 91-021	
NPMC	1992	92-001 to 92-021	
Echo Bay	1993	93-001 to 93-166	
USMX	1994	94-001 to 94-041	
USMX	1994	Miscellaneous geotech/monitoring	
USMX	1995	95-001, 95-006A, 95-003 to 95-024, 95-028 to 95-033, 95-035 to 95-039, 95-044 to 95-082	
USMX	1995	95-002, 95-025 to 95-027A, 95-034, 95040A, 95-040 to 95-043	
USMX	1995	Miscellaneous geotech/monitoring	
USMX	1995	Miscellaneous geotech/monitoring	
Viceroy	1999	99-001 to 99-023	
ARG	2002	IC02-01 to IC02-05	
NovaGold	2005	KH05-001 to KH05-009	
NovaGold	2006	KH06-010 to KH06-020	
WAC&G	2019	IC19-001 to IC19-003	
WAC&G	2020	L20-001 to L20-073	
Subtotal (RC)			
Subtotal (Core)			
Total			

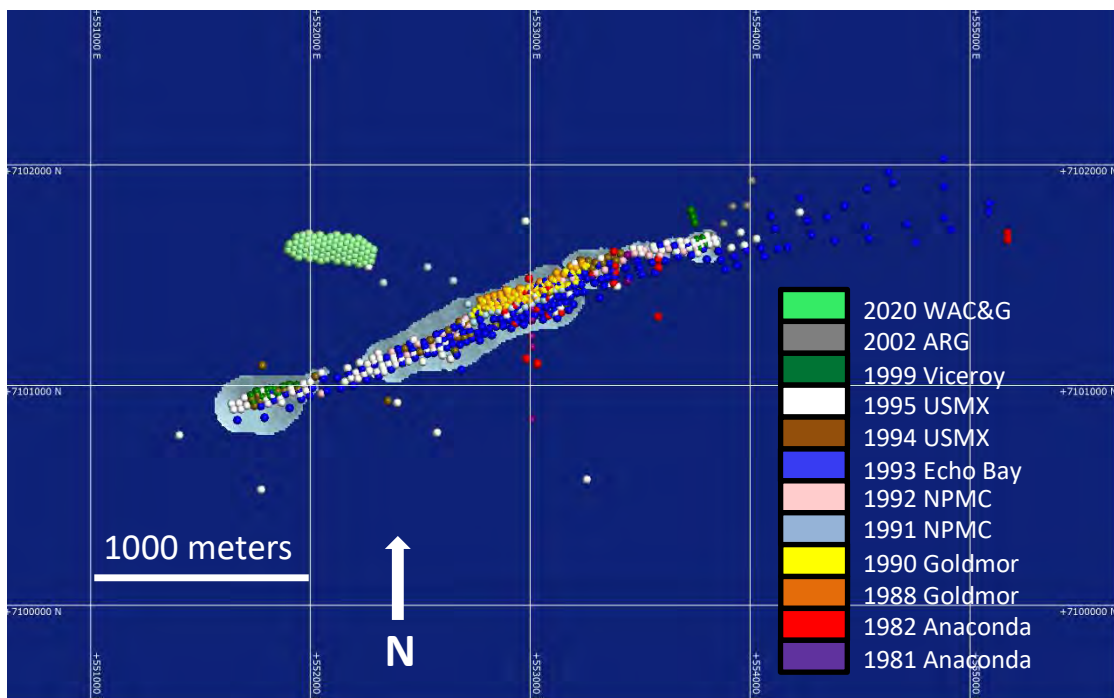
Table 10.2 summarizes the drill campaigns, core sizes, and contractors, where known.

Figure 10-1 is a plan map showing the drill campaigns used in the mineral resource estimate and Figure 10-2 is a plan map showing RC versus core drill holes used in the mineral resource estimate.

Table 10.2: Summary of Illinois Creek Drill Hole Campaigns by Drill Contractor

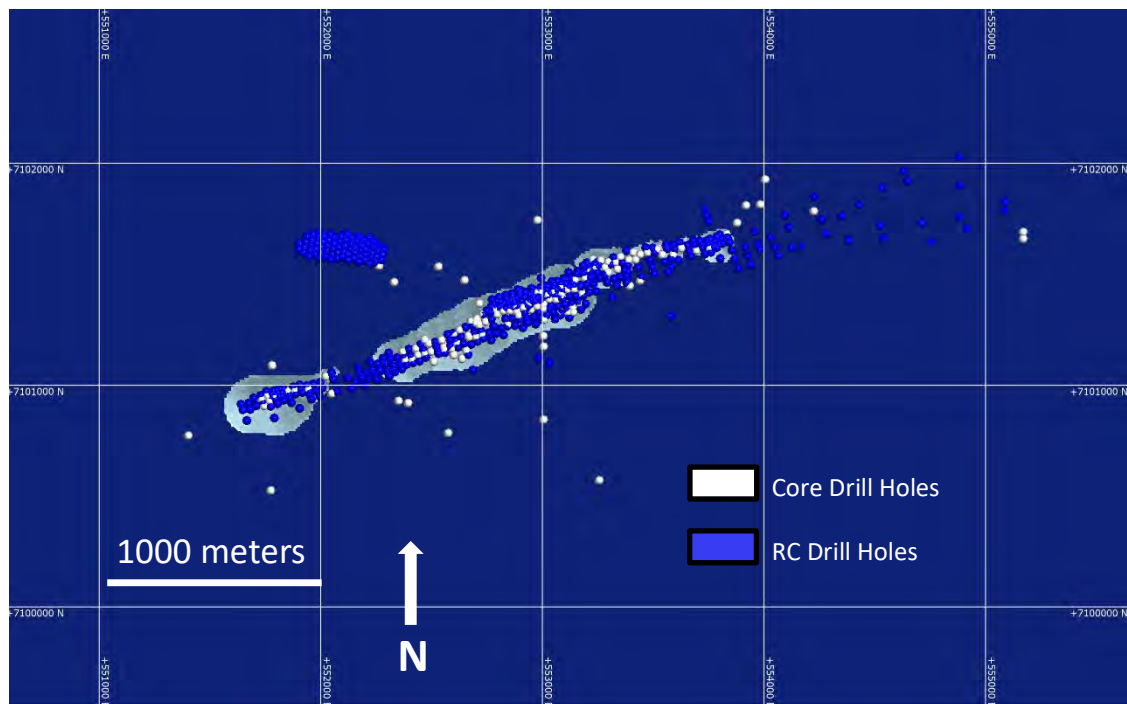
Year	Total Drill Holes	Meters	Reverse Circulation	Core Size	Drilling Contractor
1981	10	1,433.4	--	HQ/NX	Arctic Resources - core
1982	32	5,128.8	4 7/8" Tricone 5" Hammer	HQ/NX	Arctic Resources - core SDS – rotary
1983	7	427.7	--	HQ/NX/BX	Nana-Coates?
1984	42	5,408.9	--	HQ/NX/BX	Nana-Coates
1988	50	1,115.0	4" Tricone 4" Hammer	--	M and W Drilling
1990	38	1,815.8	4" Tricone 4" Hammer	--	M and W Drilling?
1991	21	1,560.5	--	HQ/NX	Boyles Bros.
1992	21	1,528.9	--	HQ/NX	Boyles Bros.
1993	166	18,739.5	5.5" Hammer	--	Becker
1994	42	2,565.4	--	HQ/NX	Boyles Bros.
1995	101	7,146.8	4 7/8" Tricone 4 7/8" Hammer	HQ/NX	Boyles Bros. Tester
1999	23	731.6	5 3/8" Tricone 5 3/8" Hammer	--	Tester
2002	5	215.3	Unknown	Unknown	Unknown
2005	9	1,215.0	--	NQ & HQ	Boart Longyear
2006	11	1,531.8	--	NQ & HQ	Boart Longyear
2019	3	365.8		NQ	More Core
2020	73	646.2	2 5/8" Hammer		More Core
Total	654	51,576.4	--	--	--

Figure 10-1: Plan Map Showing Drill Campaigns in the Illinois Creek Deposit Area



Source: WAC&G (2020)

Figure 10-2: Plan Map Showing RC and Core Drill Holes in the Illinois Creek Deposit Area



Source: WAC&G (2020)

10.2 DRILLING PROCEDURES

Viceroy contracted MRDI to produce an audit report of the drilling and sampling methods, including sample preparation and assaying processes used during Viceroy's 1999 option with the State of Alaska to mine and then reclaim the remaining mineral resources.

The following review provides excerpts taken from the MRDI audit report. WAC&G, PIEK, Inc. and the QP's of this report relied extensively on the MRDI audit for validation of the historical data procedures at Illinois Creek.

MRDI used reports prepared by Gillerman and Brewer (1985; covering a portion of Anaconda work), Salisbury & Associates (1989; covering Goldmor work), Kirkham and Apel (1993; covering Echo Bay work), USMX (1996; covering USMX work and summarizing all previous work), and an audit report by Fluor Daniel (1996).

Where possible, MRDI confirmed descriptions of the sampling with more detailed reports on file. During its review, MRDI could not locate all of the historical data and reports regarding drilling methods, sampling methods and sample recovery, as described in Kirkham and Apel's report and the Fluor Daniel audit; at that time, USMX had dissolved into bankruptcy proceedings and could not provide the information to MRDI.

Though aspects of the USMX data were lost, NPMC did provide MRDI with a large number of original records (logs, assay certificates, survey records and density test results) for Anaconda, Goldmor, NPMC and Echo Bay work. These were sufficient for MRDI to conduct a complete audit of the drilling and sampling work. Copies of all drill logs, including all the USMX holes, were present at the mine office during MRDI's review and are most likely the source of the data scanned by NovaGold in 1992 for the State of Alaska.

During the audit, MRDI compiled and imported all available sample assays, check assays, sampling recovery, logs, density measurements and survey data into a Medsystem® database. MRDI extracted assays, geological codes, collar surveys and down-hole surveys which were the basis for its audit and review. Unfortunately, the Medsystem® database did not survive the mine reclamation by ARG.

The current project database was compiled from scanned files of assay certificates, drill logs and memos, compiled annual summaries, miscellaneous reports, and various internal compilations in the scanned data provided to Piek Exploration by NovaGold. Assay data, where available, were entered by hand directly from assay certificates and, where unavailable, were taken from assay-annotated drill logs, seasonal compilations and tabulated data. Though the majority of assay certificates are available, the author recommends that the database is brought up to date with all data sources.

Although extensive trench data were collected and used in previous historical mineral resource estimations, this type of data has not been used in the estimate of mineral resources contained in this Technical Report. WAC&G personnel believe most of the trench sample data were derived from areas in the deposit that were already mined-out.

All drilling and trenching at the Illinois Creek deposit were oriented to a mine grid in which mine grid north is N17°07'15"W and mine grid east follows the strike direction of mineralization at N71°

53'45" E. A majority of diamond and RC holes were inclined at -60 to -70 degrees which is roughly perpendicular to the dip of mineralization with the exception of the Goldmor RC holes which were drilled vertically and generally to depths of only 30 m to 45 m below surface.

Trenches were cut by a backhoe or tracked excavator along a line perpendicular to the strike of mineralization. MRDI reviewed trench maps prepared by Anaconda and NPMC and found that, in all cases, the trenches used in the database reached bedrock at depths ranging from 1 m to 3 m below the surface.

The water table is approximately at the 75 masl elevation throughout the Project site. The surface elevation ranges from 235 masl to as low as 90 masl on the western limit of the drilling.

10.2.1 Reverse-Circulation Drilling Procedures

Some of the RC holes were drilled below the water table and only along the western margin of the deposit.

RC drilling programs carried out by Anaconda, USMX and Viceroy used water injection to stabilize drill holes. Echo Bay and Goldmor drilled dry, except when water injection was required for drill hole stabilization or when hammer bits plugged in soft material (which was noted to occur frequently). MRDI did a review of the RC drilling in its 1999 study and concluded they were similar in character to the diamond drill sample results. Comparisons made by BDRC and SGI found that RC and DDH samples in proximity compare favorably. There is no reason to believe there is any bias in the RC drill results.

There is only partial knowledge of specific drill sample handling procedures.

Anaconda

The holes were reportedly drilled with either a 4 $\frac{7}{8}$ in. tricone or 5-in. hammer bit. Samples weighing 9 kg to 12 kg (20 lb to 26 lb) were collected on 1.5 m (5 ft) intervals, representing a 13% to 30% cut of the entire sample (Miller, 1982). Anaconda RC holes are all located away from the Illinois Creek deposit and, as a result, none of these data were used in the estimate of in-situ mineral resources for the Illinois Creek deposit.

Kirkham and Apel (1993) reported that the Anaconda RC holes produced poor recoveries, ranging from 25% to 85% in the gossan. MRDI did not locate Anaconda reports or drill logs that confirmed this, and it did not allow for an independent calculation of recovery versus grade. MRDI stated that RC recoveries of 40% to 60% are normal for drilling in dry conditions or drilling with limited water injection and that Anaconda sample weights were adequate for mineral resource estimations. Note: The QPs for this report agree with these comments.

Goldmor

Goldmor drilling was completed without water injection and above the water table at depths less than 45 m. Goldmor drill holes comprise about 9% of the total meters of drilling used to estimate the in-situ mineral resources at the Illinois Creek deposit.

Kirkham and Apel (1993) reported that the Goldmor drilling experienced "fair to good" recoveries. This was apparently based on a subjective assessment by the rig geologist and not on accurately measured sample weights.

MRDI did not find documentation regarding the size of samples collected or the range of recoveries obtained. Therefore, it is not known if the RC sampling met industry standards.

MRDI inspected assays for intervals of Goldmor holes where those intervals were crossed later by inclined Echo Bay RC and USMX core holes. This assessed the quality of Goldmor drilling relative to drilling for which sample quality was documented. Gold grades were found to be comparable between Goldmor RC holes and Echo Bay RC or USMX core holes. The QPs of this report also noted reasonable comparison of the older, predominantly RC drilling with the more recent diamond core drilling results.

Echo Bay

Echo Bay RC drilling comprises about 49% of the total meters of drilling used to estimate the in-situ mineral resources for the Illinois Creek deposit. Echo Bay's RC drilling program was carried out to confirm previous drilling and to fill in the gaps in drilling data. Drilling equipment, ground conditions, sample weights, split fraction, water flow and sampling problems were recorded for each sample interval. This information was preserved in Illinois Creek files as photocopies of spreadsheet printouts only. Echo Bay did not tabulate all recovery data, but recoveries varied from 20% to 120%. The average was approximately 40% to 50% based on MRDI's inspection of the drill logs, which is normal for an RC drill program in highly oxidized rocks.

Echo Bay used a conventional hammer bit in the hanging wall of mineralization and switched to a skirted tricone bit within mineralization. The cyclone discharge was riffle split to 0.125 or 0.25 of the original mass to produce a nominal sample weight of 4.5 kg to 7 kg (10 lb to 15 lb) for 1.5 m (5 ft) sample intervals. Sample weights from 2.3 kg to 11 kg (5 lb to 25 lb) were obtained from a rotary wet splitter for samples below the water table or when water injection was used for drill hole stabilization.

MRDI compared recovery data and gold grades for a series of Echo Bay RC holes. Plots show that gold grades within mineralized sections are generally depressed in intervals with low recovery. Therefore, low recoveries may have resulted in a local under-estimation of grades rather than over-estimation of grades.

Echo Bay found that holes drilled beneath the water table exhibited a loss in collected sample weight and a loss of fines, mostly due to high-water flows that could not be managed with the available sampling equipment. Echo Bay's test sampling determined that the fines are preferentially mineralized and that from 5% to 10% of the gold was lost in unrecovered fines (Kirkham and Apel, 1993). Echo Bay did not find evidence of grade spikes or down-hole contamination.

Unfortunately, RC recovery data are not available in the current sample database. MRDI appears to have conducted a thorough review of the information it had available at that time and come to the conclusion that some gold was likely lost in zones of poor RC recoveries.

Echo Bay's drilling method and recorded data meet industry standards except for holes drilled beneath the water table at the west end of the deposit. The results for 12 holes drilled below the water table in the western end of the Illinois Creek deposit are average for these conditions, and these have relatively little impact on the overall estimate of mineral resources.

USMX

USMX RC holes comprise about 11% of the total amount of drilling used to estimate the in-situ mineral resources for the Illinois Creek deposit. The RC holes cover a majority of the strike length of the deposit. USMX used a 4 $\frac{7}{8}$ in. hammer or tricone bit. Drilling was dry except when water injection was required due to hole conditions. Samples were collected from a cyclone or rotary splitter at 1.5 m (5 ft) intervals and reduced to a nominal 2.3 kg (5 lb) with a Jones splitter. MRDI determined the USMX sample size was adequate for mineral resource estimation, and the QPs agree with this comment.

USMX geologists visually estimated sample recovery because there was a lack of actual sample weights to calculate the relationship between grade and recovery. MRDI questioned USMX procedures but concluded sample results were adequate given the particle size and distribution of gold within samples.

Viceroy

Viceroy RC drilling represents only about 2% of the total amount of drilling used to estimate the mineral resources at the Illinois Creek deposit. Viceroy RC drill holes used a 5 $\frac{3}{8}$ in. conventional hammer bit in the hanging wall of gossan and a 5 $\frac{3}{8}$ in. tricone bit through gossan and adjacent, highly altered rocks (such as sanded, dolomitic quartzite). All drilling was completed with water injection.

Samples were collected with a rotary wet splitter. The primary sample was discharged into a micro-pore sample bag within a 5-gallon bucket. A split, representing between $\frac{1}{8}$ to $\frac{1}{4}$ of the total volume, was used to maintain a sample weight of about 4.5 kg (10 lb). Fifty percent of the outer shell discharge of the splitter was collected as a rig duplicate and stored at the mine. Total sample weight was not recorded; therefore, sample recovery was not calculated. Some fines were lost in the primary sample due to water overflow from the sample bucket but, again, given the fine-grain size of gold in the Illinois Creek deposit, the Viceroy samples are considered to be adequate.

WAC&G

None of the drilling by WAC&G was used in the estimate of in-situ mineral resources at Illinois Creek. WAC&G drilled all of the RC holes that test the leach pad area. All other drilling by WAC&G tested other exploration targets located away from the Illinois Creek deposit.

WAC&G drilled 73 RC holes using a 2 $\frac{5}{8}$ in. conventional hammer in dry drilling conditions. Each 1.5 m (5 ft) sample was collected in its entirety and placed in a labeled 6 mil, 18 × 22 in. bag, sealed and transported to camp and then weighed. At camp, a sample batch of a minimum 60 samples or >60 samples to the nearest complete hole were defined. A total of eight QA/QC samples, including two blanks, two duplicates and four standard samples (three different standards: OREAS 153b, 235, and 601b) were placed in each batch and sample numbers were assigned.

A Jones splitter was then used to reduce the original sample to an 8 to 10 kg split, placed in a pre-labeled bag with a perforated sample card number and zip tied. Split samples were again weighed to provide moisture content after lab drying. Any remaining reject from the Jones splitter was saved in the original bag and again labeled with the sample number and stored on site. A

double split in consecutive bags with consecutive samples numbers was completed for the duplicate intervals. Both blank samples and standards were inserted in the sample sequencing.

The samples were then placed in pre-labeled rice bags, sealed and securely stored pending air transport back to Fairbanks. ALS Chemex was notified at the time of each shipment and met the samples to take custody from the air transport contractor.

10.2.2 Diamond Drilling Procedures

There is limited information about specific drill core handling procedures.

Core drilling was used by Anaconda, NPMC and USMX. This comprises approximately 30% of the total assay footage reviewed and used by MRDI in its audit and estimate of the Illinois Creek deposit. Drilling elsewhere on the Property at 5 o'clock, Macho Grande, Waterpump Creek and Last Hurrah used only core drilling; these holes were not used in the mineral resource estimation contained within this technical report.

Core holes in the Illinois Creek mineral resource were drilled almost entirely with core rigs producing either HQ (2.5 in. diameter) or NX (2.155 in. diameter) core. In 1984, Anaconda drilled three short BX (1.655 in. diameter) holes.

Anaconda

Anaconda core holes DDH01 to DDH23 are located entirely within the central portion of the deposit, and these core assays comprise about 11% of the total amount of drilling used to estimate the in-situ mineral resources at Illinois Creek. At least half of Anaconda's holes were drilled to intersect the gossan at deep levels, testing the upside potential for sulfide mineralization below the oxide deposit. Subsequent core drilling by NPMC and USMX emphasized shallow (< 120 m) holes to delineate the deposit on spacing of 30 m or less.

Minimal documentation exists with respect to Anaconda's sampling methods. Drill logs show that core was sampled at geological contacts on nominal 1.5 m intervals, and some sample intervals are considerably shorter. Core was not photographed, and existing core was destroyed during mine reclamation by ARG.

"Low" recoveries were reported for Anaconda holes in Echo Bay's (Kirkham and Apel, 1993) and USMX's (USMX, 1996a) evaluation of drilling data. MRDI's inspection of core logs revealed recoveries from 60% to 90% in mineralized gossan. MRDI plotted recovery versus gold grade for holes DDH04 and DDH22. Gold values exhibit no relationship to recovery in DDH04. Depressed gold values are associated with low recovery at 26, 44, 55, 88 and 94 m in DDH22. Results suggest that grades may have been somewhat under-estimated in intervals of low recovery.

Anaconda core drilling meets industry standards for drilling this type of deposit.

North Pacific Mining Company

Data for 41 North Pacific Mining Company (NPMC) core holes comprise about 7% of the total amount of drilling used to estimate the in-situ mineral resources for the Illinois Creek deposit. Core was logged and then split for sampling on 0.3 m to 1.5 m (1 ft to 5 ft) intervals. Core was not photographed. MRDI inspected all drill logs and found that core recovery (obtained by measuring cored intervals) was 90% or greater for all but a few intervals of mineralized gossan.

NPMC core drilling meets industry standards for drilling this type of deposit.

USMX

USMX drilled 65 core holes in 1994 and 1995 to provide nominal 30 m (100 ft) drill spacing for the deposit. A series of monitoring and geotechnical holes was drilled in addition to the holes for mineral resource definition. A total of 4,657.9 m (15,281.7 ft) of core drilling was completed, comprising about 8% of the drilling used to generate the estimate of in-situ mineral resources at the Illinois Creek deposit. Drill core was logged for geological and geotechnical parameters, photographed and marked for sampling. Samples nominally measuring 1.5 m (5 ft) were sampled within major lithologies. The core was split with a hydraulic splitter or sawed in half. One half was sent to a laboratory for assay. The other half was retained in core boxes on the Property, and that was subsequently destroyed during mine reclamation.

USMX did not compile or evaluate core recoveries. MRDI's inspection of core logs revealed generally poor (<60%) core recoveries in mineralized gossan. Consequently, MRDI constructed recovery versus grade plots for nine holes with "ore-grade" intercepts. These plots generally show no correlation between grade and recovery.

USMX's relatively poor core recoveries during drilling does not meet typical industry standards for drilling this type of deposit; however, the degree to which this may influence the estimation of mineral resources appears to be limited. The thickness and grade of mineralized intervals appear to be similar to holes drilled nearby using other methods.

10.3 DRILLING RECOVERIES

To understand the relationship between sample recovery and grade more clearly, MRDI created an electronic spreadsheet of sample recoveries during its historical audit. MRDI used recoveries recorded on logs from Anaconda core holes, NPMC core holes, Echo Bay RC holes and USMX core holes. Detailed recovery information does not exist for RC holes for Anaconda, Goldmor and USMX.

MRDI analyses show the following:

Core Drilling

- Core drilling by Anaconda and USMX exhibits low (less than 90%) recoveries in mineralized zones.
- NPMC core holes were drilled with core recoveries exceeding 90%.
- MRDI's inspection of core recovery versus gold grades shows that there is no correlation between core recoveries and gold grade.

Reverse-Circulation (RC) Drilling

- Echo Bay was the only company that accurately measured RC sample weights. Average sample recovery was about 50%, which is adequate for RC drilling above the water table.
- Anaconda, Goldmor, USMX and Viceroy did not measure sample weights but qualitatively estimated recoveries from the sample size. These companies reported "good" recoveries in most cases.

- WAC&G leach pad RC drilling used a 2.675 in. hammer and 5 ft sample intervals with an assumed 2.3 specific gravity yield 28 lb/sample. Sample recoveries averaged 37 lb/sample. It is not unusual to have some sloughing when RC drilling in unconsolidated material. It is unlikely that these overweight samples have biased the results.
- The water table was only encountered in the far western portion of the deposit where the static water level is 30 m below the surface.
- MRDI's evaluations indicate that intervals of poor RC recovery have lower gold grades suggesting that some gold may have been lost during drilling and sampling.

MRDI also reviewed five twinned holes representing twins of core holes and RC holes or different campaigns of RC holes. Its review, although very limited in scope, noted the following:

- The position of gold zones is nearly identical in all twins.
- RC and core holes, or RC holes from different drill campaigns, intersected the same mineralized sections.
- Though one twin pair showed slightly higher values in core relative to RC, the encountered zones were the same in both holes. In general, agreement is remarkably good for the five twins.

MRDI concluded that the drilling method, sample size and average recovery were generally adequate to support mineral resource estimates. The lack of coarse gold compensates for relatively low core recoveries in two of the drill campaigns. Poor sample recovery, however, has most likely led to local under-estimation of gold grades. The QP of this report agrees with the conclusions made by MRDI.

10.4 COLLAR SURVEYS

The drill collar locations and trench locations during Anaconda exploration were established using Brunton (compass) and tape surveys. No survey records for Goldmor RC holes were found. In 1992, NPMC contracted McClintock Land Associates (MLA), a licensed surveyor, to resurvey the mine grid system and all drill collar and trenches that existed at that time (MLA, 1992). MLA used a Topcon GTS-302D total station. Drill collar locations are quoted as accurate to 0.1 m or less.

MLA was able to relocate and survey the location of all but 34 drill holes. Most of these were from the earliest work by Anaconda. MLA used Anaconda's location records for the 34 holes relative to grid cross lines and readjusted the locations relative to the new grid survey. MLA estimated the accuracy of these drill collars to be about ± 3 m (10 ft). This level of accuracy is considered sufficient for use in the estimation of mineral resources.

In 1994, USMX contracted MLA to update the survey to include Echo Bay and USMX holes to that date (MLA, 1994). Subsequent holes by USMX and Viceroy were surveyed using the mine's total station survey equipment (Scott Bennett, pers. comm.). Data were entered into the MRDI Medsystem[®] database electronically; therefore, a written survey report does not exist for 1995 and 1999 drill holes.

Where required, the drill hole collar database was subsequently rotated by Piek Exploration to UTM NAD83 coordinate system which is the basis for the current mineral resource study.

Leach pad drill holes were surveyed and staked by MLA prior to the 2020 drill program.

The collar surveys meet industry standards and are adequate to support this mineral resource study.

10.5 DOWN-HOLE SURVEYS

Only 56% of core holes (Anaconda and NPMC campaigns) and none of the RC holes were surveyed down hole. Surveyed holes show strong deviations in early Anaconda core holes, but minimal deviations in subsequent NPMC core holes.

Due to the relatively shallow depth of drilling (<120 m), it is not expected that any down-hole deviations have had a material impact on the mineral resource estimation. In addition, mineralized shapes in the 1998 mineral resource model reviewed by MRDI compared very well with the outline of actual zones mined in 1996 and 1997.

11 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 SAMPLE PREPARATION

Aspects of the field sampling procedures are described in Section 10 (Drilling) of this Technical Report.

11.1.1 Protocols

Sample preparation protocols, where known, are shown in Table 11.1.

Table 11.1: Sample Preparation Procedures Drill Campaigns 1981 through 2020

Company	Year	Laboratory	Preparation Protocols
Anaconda	1981–1984	Rainbow Resource Lab, Anchorage, AK Bondar-Clegg, Vancouver, B.C.	Crush Pulverize -100 mesh
Goldmor	1988–1990	Acme Labs	Unknown
NPMC	1991–1992	Chemex, Spark, NV	Crush -10 mesh 250 g split Pulverize 90% passing -150 mesh (208)
Echo Bay	1993	Bondar-Clegg, Vancouver, B.C.	Crush and split Specifics unknown
USMX	1994–1995	Chemex, Spark, NV	Crush -10 mesh 300 g split Pulverize 90% passing -150 mesh (208)
Viceroy	1999	Mine site	Crush -10 mesh 500 g split Pulverize 90% passing -150 mesh
ARG	2002	Mine site	Unknown
NovaGold	2005–2006	Chemex, Spark, NV	Crush -10 mesh 250 g split Pulverize 90% passing -150 mesh (208)
WAC&G	2020	ALS, Fairbanks, AK	ALS Sample Preparation Procedure: Crush to 70% passing 2 mm 1,000 g split Pulverize 85% passing 75 microns

Note: ALS, Fairbanks, AK is an ISO/IEC 17025:2017 and ISO 9001:2015 certified laboratory. The certifications of the laboratories prior to 2020 are unknown. All laboratories are independent of both WAC&G and PIEK, Inc.

11.1.2 Density Determinations

Specific gravity determinations were derived for a total of 220 samples by NPMC between 1991 and 1994 and by USMX in 1994. MRDI found records of NPMC measurements in Project files. NPMC data account for 143 measurements or 68% of the total 220 measurements.

Specific gravity (SG) was determined using the caliper method. This is an appropriate method for Illinois Creek ores because the vuggy, porous nature of the gossan is not conducive to using the process of wax- or lacquer-coatings and water emersion.

No records were found documenting the procedure used for USMX measurements. MRDI checked USMX values for each rock type and found the mean of USMX SG values to be no more than $\pm 5\%$ of the mean of NPMC values for the same rock type.

Table 11.2 shows the SG values outlined in USMX's 1996 Feasibility Study.

Table 11.2: Specific Gravity – USMX 1996 Feasibility Study*

Lithology Code	#	Maximum g/cc	Minimum g/cc	Mean g/cc
FG – ore	40	3.10	2.00	2.48
FQ – ore	67	2.99	2.02	2.47
FQ, high pyrite – ore	2	3.14	2.67	2.91
FMG – ore	17	2.96	1.90	2.41
MFG – ore	4	2.99	2.74	2.81
FMQ – ore	25	3.07	2.07	2.50
HQ – ore	2	2.53	2.36	2.45
Q – waste	11	2.75	2.51	2.67
Total	168			

* The term ore is used in the historical context of the table.

The 168 SG values (Table 11.2) suggest, for reasons unknown, that USMX did not use some of the currently available SG measurements.

USMX derived one SG for “ore” and one for “waste” using a volume weighting of SG measurements. This assumed that the ore units FQ, FG and FMG+FMQ+MFG, comprise 67%, 17% and 16% of the deposit, respectively. This produces an average SG of 2.48 g/cc for the “ore” or mineralized units. Q and Qa were assigned weightings of 85% and 15% waste, respectively, giving an average SG of 2.63 g/cc for the “waste” or less mineralized units. Note that the intense oxidation of the “ore” units results in lower SG values compared to the “waste” units.

MRDI could not easily check the volume percent assigned to each unit. Drill hole sections show that FQ and FG are the dominant ore hosts; therefore, the weightings of these units are reasonable. The weightings are not really significant, however, because the SG of most ore units varies no more than $\pm 3\%$ from the mean. FQ with high-pyrite content is rare. Values obtained for ore units and wall rocks are reasonable for these rock types.

MRDI grouped samples using its core-hole ID and found that only three FQ samples and one FG sample were from the West Illinois Creek deposit area. All other samples were from the main central part of the Illinois Creek deposit. There are no SG samples from the east area of the deposit. Drill logs suggest that rock units do not change significantly along strike of the gossan zone. However, MRDI recommended that at least 30 SG measurements should be obtained from ore and waste units in each deposit so that tonnage calculations are supported by local values. Due to the often highly oxidized state of the mineralized units at the Illinois Creek deposit, it is likely difficult to obtain appropriate or representative material for additional SG determinations at this time. Further SG determinations are recommended during all future drilling programs.

SG values were assigned to sample intervals based on the lithology type designations. Not all sample intervals have associated lithology codes, and, as a result, approximately 90% of the sampled intervals in the database have assigned SG values. The QP believes the approach used to assign SG values is reasonable for use in the estimation of mineral resources.

11.1.3 Leach Pad Density

Several test pits, dug and filled with water, provided the SG values: the larger test pits (dug by backhoe) showed SG ranges from 2.1 to 2.6 with an average of 2.3; the several smaller test pits (dug by hand) showed SG ranges from 1.8 to 2.2 with an average of 2.0. Historical production records indicate a total of 1.59M tonnes of ore was stacked on the leach pad. With a pad volume estimated to be 631,360 cubic meters, this gives an average SG of 2.5. Although some of the rocks at Illinois Creek contain high-sulfide contents, and the leach pad appears to be well compacted, an average SG of 2.5 is considered too high for material of this type. Therefore, an average SG of 2.3 is considered reasonable for determining the mineral resource tonnage on the leach pad.

11.2 SECURITY

Security measures taken during historical programs are not known to WAC&G; however, WAC&G has no reason to suspect that any of these samples were tampered with prior to analysis.

11.3 ASSAYING AND ANALYTICAL PROCEDURES

The laboratories and assay procedures used during the various exploration and infill drill campaigns are summarized in Table 11.3.

Table 11.3: Analytical Labs and Protocols Drill Campaigns 1981 through 2020

Company	Year	Laboratory	Analytical Procedures
Anaconda	1981–1984	Rainbow Resource Lab, Anchorage, AK Bondar-Clegg, Vancouver, B.C.	Au – 1 assay ton FA/AA Aqua Regia finish Ag, Cu, Pb, Zn – AA with HNO ₃ /HCL digestion Select As, W – colorimetric Select Sn, Sb XRF
Goldmor	1988–1990	Acme Labs	Au – 1 assay ton FA/Unknown finish Ag – 1 assay ton FA/Unknown finish Select AA? Cu Pb Zn Sb
NPMC	1991–1992	Chemex, Spark, NV	Au – 1 assay ton FA/Gravimetric finish Ag – AA with Aqua Regia digestion ICP - 32 element Aqua Regia digestion (229)
Echo Bay	1993	Bondar-Clegg, Vancouver, B.C.	Au – 1 assay ton FA/AAS finish Ag – 1 assay ton FA/AAS finish
USMX	1994–1995	Chemex, Spark, NV and Chemex, Vancouver, B.C.	Au – 1 assay ton FA/AAS finish Ag – 1 assay ton FA/AAS finish Cu – AA with Aqua Regia digestion Select 32 element ICP
Viceroy	1999	Mine site	Au – 1 assay ton FA/AAS finish Ag – 1 assay ton FA/AAS finish >10 g/t – Gravimetric finish
ARG	2002	Mine site	Unknown
NovaGold	2005–2006	Chemex, Spark, NV	ICP – 32 element 4-acid digestion
WAC&G	2020	ALS, Sparks, NV	Au-AA23 – 30g FA/AAS finish ME-ICP61 AA13 – 30g cyanide leach Au Cu and Ag Au-Gra21 overage with Gravimetric finish ME-OG62 overages ICP

Note: ALS, Sparks, NV is an ISO/IEC 17025:2017 and ISO 9001:2015 certified laboratory. The certifications of the laboratories prior to 2020 are unknown. All laboratories are independent of both WAC&G and PIEK, Inc.

11.4 QUALITY ASSURANCE/QUALITY CONTROL

Historical quality assurance/quality control (QA/QC) programs are lacking or poorly documented. MRDI and Viceroy, in the 1999 audit of the Property, documented and outlined the following historical QA/QC procedures. No additional documentation is available.

11.4.1 Core Drilling Sampling

During its historical audit, MRDI outlined the following documented QA/QC procedures.

Goldmor

The earliest documented check assays were performed by Acme Labs on 20 pulps originally assayed by Bondar-Clegg and likely from Anaconda drilling. Results are shown in Table 11.4 and indicate good agreement between lab results because the relative difference of the means for gold and silver is less than 5%.

Table 11.4: Acme Check Assays Bondar-Clegg (20 Pulps)

oz/t	Average Original Pulps	Average Check Pulps	Relative Difference (%)
Au	0.1068	0.1028	3.8
Ag	2.423	2.429	-0.2

North Pacific Mining Company

In 1992, North Pacific Mining Company (NPMC) reported it had selected samples from coarse rejects and submitted them for pulp preparation and assaying to Chemex. Selections were reportedly made from Goldmor (1988 and 1990) rotary drilling and Anaconda (1981 to 1984) core drilling. NPMC reported that there was "no overall variance" suggesting that large differences were not observed between the original assays and reassays.

A Chemex (Sparks, Nevada location) assay certificate (A9113093) from 1991 shows 189 assays for portions of some of Goldmor's 1988 drill holes. These one assay-ton gold and silver reassays were made on pulps, and it is unclear whether this is a separate study from the 1992 coarse rejects described here. MRDI entered the gold and silver data from the Chemex assay report and matched it to the data in the assay database. The laboratory providing the original assays is undocumented. Results are shown in Table 11.5. The data show consistently good agreement across the entire grade range of checked data.

Table 11.5: Chemex Check Assays 1991 (189 Pulps)

oz/t	Average Original Pulps	Average Check Pulps	Relative Difference (%)
Au	0.0554	0.0545	1.7
Ag	2.328	2.361	-1.4

NPMC also had Chemex insert a laboratory standard every 20 samples, a duplicate pulp every 40 samples, and a blank sample every 40 samples during its programs. Results of these checks are not documented.

Echo Bay

In 1993, Echo Bay selected from stored rejects of NPMC core that had been drilled in 1991 and 1992. These rejects were submitted to Bondar-Clegg for check assays and were reported to have "excellent correlation" with NPMC results (USMX, 1996a), although no data or correlations are presented.

Echo Bay also reportedly twinned seven of Goldmor's rotary drill holes with RC drills; the results were presented in USMX's 1996 Feasibility Study. No statistical analysis was provided. Visual inspection of these graphs suggests reasonable agreement.

USMX

According to the USMX Feasibility Study, USMX "twinned several existing drill holes with good confirmation." It is not clear whether these are twins of NPMC drilling, Echo Bay drilling, or both. If both, no distinction was made between twins of Echo Bay and NPMC drilling. Therefore, results cannot be interpreted.

Finally, in 1994 or 1995, USMX carried out a check assay program of all previous drill assays: 10% of the drill holes within the proposed pit plan were checked. The population of selected holes covered all areas of the proposed pit, and all drill campaigns, to the extent that pulps were available.

A comparison of means in Table 11.6 shows very close agreement between the results from Chemex and Bondar-Clegg.

Table 11.6: USMX Bondar-Clegg vs Chemex Check Assays 1996 (173 Pulps)

oz/t	Average Bondar-Clegg Pulps	Average Chemex Pulps	Relative Difference (%)
Au	0.1499	0.1505	-0.4%
Ag	1.451	1.439	0.8%

Viceroy

Duplicate samples were collected on every 10th sample during drilling conducted by Viceroy in 1999. These duplicates capture all the sampling and measurement errors introduced from the point of sample collection to the instrument reading. These field duplicate results show very close agreement for both gold and silver.

11.4.2 WAC&G Leach Pad Drilling

Three standards certified by Ore Research were used to validate the assays for leach pad drill samples. The three standards, Oreas 153b, Oreas 235, and Oreas 601b, had certified values of 0.313, 1.59, and 0.775 g/t Au, respectively. No assay results from standard material fell outside of control limits.

Blank material was also submitted at a rate of two per batch. All assays of blank material fell within the control limit.

Two coarse reject duplicates were assayed in every batch, and results suggested the sample preparation protocol produced more heterogeneity than was desirable. There was no evidence that variation introduced bias in the results, and, therefore, there was no reason to reject assay results.

11.5 CONCLUSION

The QP believes the database meets industry standards for data quality and data integrity and that sample preparation, security, and analytical procedures are adequate to support a mineral resource estimation.

12 DATA VERIFICATION

12.1 INTRODUCTION

The original USMX mine dataset was lost during the reclamation of the mine, so the current database was reconstructed using historical scans made from available files from the mine office during reclamation.

Anaconda assay results were entered directly from either available assay certificates or Anaconda logs accompanying its annual reports.

Goldmor assay certificates are unavailable for 1988, but the 1988 drill logs report assay values for each sample interval. The 1990 Acme Lab assay certificates are all available. The 1991 and 1992 Chemex assay certificates for NPMC are also available. Sample summary forms with gold and silver assays by Bondar-Clegg for Echo Bay's 1993 program are also complete; original assay certificates are available for most, but not all, of the drill holes. The 1994 and 1995 assays by Chemex for USMX are largely complete; where assay certificates are missing, some drill logs report assay values. A few USMX drill holes have not been recovered. The 1999 Viceroy assay certificates are available and complete.

The 1994 and earlier collar data are based on Illinois Creek Drill Grid Survey Report conducted and written by McClintock Land Associates (McClintock, 1994) for USMX. The 1994 and 1995 collars are based on scanned USMX spreadsheet summaries of survey data.

Piek Exploration has conducted two 5% data verification checks of the assay and collar databases. In both instances, only two errors in the assay values were encountered and those appeared to be transcription errors.

The QP randomly selected the sample data from 15 drill holes, representing about 4% of the data using in the estimate of in-situ mineral resources. The grades in these holes were compared to those contained in the certified assay certificates provided by the laboratories. In this suite of 818 individual samples, there were four errors found in the gold data and three errors in the silver data. These results are similar to those achieved during previous database audits.

The sample data from an additional four drill holes from the leach pad area were randomly selected, and the assay results were compared to the values contained in the assay certificates. There were no errors identified.

The QP observed evidence of mineralization in core consistent with assays and historical production; therefore, he collected no additional samples.

12.2 CONCLUSION

The QP believes the database was generated using accepted industry standards, and the contained data are sufficient for the estimation of Indicated and Inferred mineral resources.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

No recent metallurgical testing has been completed for the Project. Available historical metallurgical test work was reviewed, and conceptual process flowsheets were developed for the deposit.

13.1.1 Anaconda Mineral Company (1982–1985)

In 1981, Anaconda drilled three holes, and several metallurgical studies were completed on individual depth intervals or composites prepared from these drill hole samples. These samples were designated as RD81-345, and the holes were designated as IC 4, 5 and 6. The objective of these studies was to evaluate different processing options, including gravity, flotation, agitated leach and heap leach for recovery of gold and silver minerals.

The highlights of these studies indicated the following:

- Three high-grade composites were prepared from selected intervals of the three holes. These composites assayed 0.05 to 0.08 oz/t Au and 0.6 to 2.7 oz/t Ag.
- The samples were not amenable to gravity concentration.
- The samples were amenable to agitated cyanide leach at primary grind of P_{80} of 100 mesh. The gold and silver extractions ranged from 83.2% to 90.5% and 23.5% to 42.3%, respectively, in 24 hours. However, the cyanide consumption was high at ± 11.6 lb/t, and the lime consumption was ± 8 lb/t.
- Additional test work completed on a high-grade bulk sample, assaying 0.394 oz/t Au and 9.61 oz/t Ag (1983–1984), included gravity concentration, magnetic separation, flotation and agitated cyanidation leach tests. The bulk sample material was not amenable to flotation, magnetic separation or gravity concentration. The agitated cyanidation leach tests recovered more than 96% of gold in 24 hours at three grind sizes: 10 mesh, 100 mesh and 200 mesh. However, the maximum silver extraction of 26.1% was obtained at a grind size of 200 mesh. Preliminary test work had also indicated that the mineralized material was amenable to heap leaching with gold extraction of $\pm 80\%$ and silver extraction of $\pm 20\%$ at P_{80} of 10 mesh. The material was agglomerated before loading the column. Again, the cyanide consumption was high at 4.5 lb/t.
- Bottle roll tests were completed (1984–1985) on additional bulk samples (designated as RD84-106). Twenty-four agitated leach tests at P_{95} of 200 mesh resulted in gold extraction ranging from 84.2% to 97.7% and averaged 93.6%. The silver extraction ranged from 13.2% to 45.4% and averaged 29.7%. The average feed grade was 0.271 oz/t Au and 8.85 oz/t Ag. The average sodium cyanide consumption was 12.4 lb/t of test material, and average lime consumption was 7.1 lb/t of test material.

13.1.2 Goldmor Group (1988–1990)

Goldmor completed metallurgical testing in several laboratories including Bondar Clegg; Salisbury and Associates; Bacon, Donaldson and Associates; and McClelland Laboratories, Inc.

The highlights of these studies are as follows:

- The results from the 24-hour cyanidation leach tests on seven samples assaying 0.1 to 0.2 oz/t Au showed excellent leachability of gold with extraction ranging from 87% to 92%. Silver extractions ranged from 33% to 46%. The cyanide consumptions were high.
- Cyanidation tests on two composites samples assaying 3.16 and 3.4 g/t Au had gold extraction of $\pm 85\%$. The “as received” material had P_{90} of 10 mesh. The silver extraction ranged from 35% to 45%. The NaCN consumption was extremely high and ranged from 7.7 to 11 lb/t.
- Bacon, Donaldson and Associates (1989) evaluated the historical test work on the deposit and concluded that higher cyanide strength resulted in increased gold extraction. However, the presence of copper minerals in the mineralized material is responsible for the lower gold extraction with lower cyanide strength. They also concluded: the higher the feed grade, the higher the gold extraction. The copper values in the selected historical samples ranged from 0.26% to 2.10%.
- McClelland Laboratories, Inc. performed agitated leach and heap leach tests on a 5-ton bulk ROM sample assaying 0.094 oz/t Au, 1.67 oz/t Ag and 0.45% Cu. Gold and silver extractions of 78.4% and 19.7%, respectively, were obtained at P_{100} of 0.25 in. Copper recovery was 11.4%. Cyanide consumption and lime requirements were 2.69 lb/t and 18.9 lb/t, respectively.
- Both gold and silver extraction improved (84.8% and 27%, respectively) with higher concentration of cyanide (2 g/L versus 1 g/L, respectively). Cyanide consumption was much higher at 4.79 lb/t.
- Column percolation tests were performed at P_{100} of 6 in. (ROM) and P_{80} of 1.5 and 0.5 in. The charges in all tests were agglomerated with 5 lb/t of lime and 10 lb/t of cement. The metallurgical tests indicated that precious metal recovery and cyanide consumption increased with decreasing feed size. Gold recoveries of 81.0, 83.3, 86.4 and 91.6% were achieved from the ROM, 6 mesh, 1.5 in. and 0.5 in. feed sizes, respectively. Respective silver recoveries were 24.7, 28.0, 24.9 and 34.1%. Copper recovery was about 12% for all feed sizes. The respective cyanide consumptions were 1.86, 2.40, 2.92 and 3.08 lb/t.
- Based on this study, the optimum leach size was determined to be P_{80} of 0.5 in. The study concluded that leaching of the mineralized material at ROM feed size was not practical, even though high recovery was achieved, because agglomeration pre-treatment is required. Silver-to-gold ratio in solution was high (up to 5:1) and the copper solution grades were also high (more than 200 ppm). Therefore, zinc precipitation process should be considered.

13.1.3 North Pacific Mining Company (1991–1992)

McClelland Laboratories completed agitated cyanidation (bottle roll) and heap leach (column) tests on three ROM bulk samples designated high-grade, Mn/Sb and SQB for North Pacific Mining Company.

The highlights of the test program indicated the following:

- The head grades of the three composites are shown in Table 13.1. The high-grade sample contained significant amounts of copper.
- The bulk samples were amenable to direct agitated cyanidation treatment at a 90% passing minus ¼ in. feed size. Gold recoveries of 79.2, 86.2 and 84.4% were achieved from high-grade, Mn/Sb and SQB feeds, respectively, in 96 hours of leaching. Respective silver recoveries were 29.6, 27.3 and 42.4%.
- The deep zone high-grade composite was marginally amenable to agitated cyanidation treatment at the “as received” feed size. The other composites were amenable at that feed size. Gold recoveries of 51.6, 76.2 and 82.6%, respectively, were achieved in 96 hours of agitated cyanidation. Respective silver recoveries were 29.2, 34.8 and 30.2%.
- Reagent consumptions were high, ranging from 3.30 to 13.36 lb/t for sodium cyanide and 10.6 to 18.9 lb/t for lime.
- Optimum agglomerating conditions required 15 to 20 lb of cement per ton of material. The agglomerates for Mn/Sb bulk sample did not markedly degrade under simulated freeze/thaw conditions.
- Column testing was mentioned, but no report was available for review. However, a memorandum dated March 11, 1991 did indicate problems with maintaining pH in the columns. The gold and silver extractions for agglomerated minus 1 in. material for three bulk samples are summarized in Table 13.2. The results were reasonable with gold extraction ranging from 69.2% to 84%. The cyanide consumption was reasonable ranging from 1.87 to 2.93 lb/t.

Table 13.1: Feed Analyses of Three Bulk Samples

Sample	Head Grade		
	Au (oz/t)	Ag (oz/t)	Cu (%)
High-Grade	0.123	4.76	0.91
Mn/Sb	0.025	0.38	0.08
SQB	0.056	0.60	0.32

Table 13.2: Column Leach Test Results for Three Bulk Samples

Parameters	Composite		
	FG	FMG/FMQ	FQ
Feed Grade			
Au (oz/t)	0.095	0.75	0.10
Ag (oz/t)	2.56	3.32	0.71
Cu (%)	0.96	0.78	0.20
Extraction % (110 days)			
Au	73.3	69.2	84.0
Ag	11.2	10.8	25.4
Cyanide Consumption (lb/t)	2.93	2.19	1.87
Cement (lb/t)	15	15	15

13.1.4 USMX (1994–1995)

USMX entered into a letter agreement with North Pacific Mining Company (NPMC) to evaluate the Illinois Creek Project. It prepared a year-end report (1994) summarizing the activities on the Project.

Some relevant highlights extracted from the report are summarized here:

- The deposit occurs as a large gossan zone which was intersected over a strike length of 14,500 ft to a depth of greater than 2,000 ft. Oxidation of the mineralization which originally contained arsenopyrite, pyrite and lesser base-metal sulfides and sulfosalts in a variable silicious matrix is nearly complete to a depth of about 1,400 ft below the present surface.
- Economic gold-silver mineralization is present in portions of the gossan and is associated with elevated copper and/or lead content.
- The gossan is broken into three lithologies: ferruginous quartzite (FQ), ferruginous gossan (FG) and ferruginous/manganiferous quartzite/gossan (FMQ/FMG). FQ unit constitutes about 67% of the mineralized portion, and the remaining is split equally between the other two lithologies.
- Mineralogically, gossan contains several oxide minerals, including hematite, goethite, jarosite, psilomelane and manganite. Gold is present in the native phase and to a lesser degree as electrum, forming small grains (<20 microns) intimately associated with amorphous iron limonites. Silver occurs as argentojarosite and less commonly in the native phase and is closely associated with manganese oxides.
- Though copper assays were available in the drill hole database, they were neglected in the initial evaluation.
- McClelland Laboratories performed tests in 1994–1995 on the three bulk samples representing mineralized material types: FG, FQ and FMG/FMQ. Bottle roll tests for 96 hours on P₁₀₀ of 0.25 in. feed resulted in gold extraction of 74% to 79% for the three types. The column tests on ROM material resulted in gold extraction of ±90% for FQ and

FMQ/FMG material and 77.5% for FG material. The average recovery projected for the deposit was 80.5% for gold and 28.9% for silver. The feed for the columns assayed 0.066 oz/t to 0.173 oz/t Au and 0.70 to 6.31 oz/t Ag.

- The ROM screen analyses indicated that 20% to 25% of the material is finer than 65 mesh. This amount of fines could potentially cause permeability issues, especially during winter months. This has been noted by MRDI in the audit report in 2000.

13.1.5 Conceptual Process Flowsheet

A review of all the metallurgical studies indicated that the following factors should be considered in order to develop a reliable extraction process for the climatic conditions in Alaska:

- The mineralized material is amenable to both heap leaching and agitated leach process.
- The material is friable and will produce sufficient fines to warrant agglomeration before stacking on the heap.
- The material contains sufficient oxide copper to consume high quantities of cyanide; therefore, it would be economical to recover cyanide. The incorporation of a SART process is recommended in either of the two processing options selected.
- Approximately 30% to 50% of the silver will be recovered in the heap leach process. Remaining silver is refractory (argentojarosite) and will require additional processing steps in the circuit to improve extraction.
- Silver-to-gold ratio in the pregnant solution is greater than 5:1. Therefore, Merrill Crowe process should be selected for recovery of gold and silver from pregnant solution.
- Metal recoveries for a milling/cyanidation process with Merrill Crowe are estimated at 92% for gold and 65% for silver. Additional metallurgical testing is required to confirm these recovery projections.

14 MINERAL RESOURCE ESTIMATE

14.1 INTRODUCTION

This section of the Technical Report describes the mineral resource estimation methodology and summarizes the key assumptions considered by the QP to prepare the mineral resource model for the gold, silver and copper mineralization for the Illinois Creek deposit. This includes estimates of the in-situ mineral resources (Section 14.2) and estimates of the mineral resources located on the leach pad area (Section 14.3), where mineralized material was stacked during previous mining activities and leached intermittently from 1979 through mine closure.

In the opinion of the QP, the mineral resource estimate reported herein is a reasonable representation of the mineralization found at the Illinois Creek Project at the current level of sampling. The mineral resources were estimated in conformity with generally accepted CIM *Estimation of Mineral Resources and Mineral Reserves Best Practices Guidelines* (November 29, 2019) and is reported in accordance with National Instrument (NI) 43-101.

Mineral resources are not mineral reserves, and they do not have demonstrated economic viability. There is no certainty that all or any part of the mineral resources will be converted into mineral reserves upon application of modifying factors.

Estimations are made from 3D block models based on geostatistical applications using commercial mine planning software (MinePlan® v15.7). The project limits are based in the UTM coordinate system (NAD83) using a nominal block size measuring 10 m × 10 m × 5 m (l × w × h).

The mineral resource estimate was generated using drill hole sample assay results and the interpretation of a geological model which relates to the spatial distribution of gold, silver and copper. Interpolation characteristics were defined based on the geology, drill hole spacing, and geostatistical analysis of the data.

The mineral resources were classified according to their proximity to the sample data locations and are reported according to the CIM *Definition Standards on Mineral Resources and Mineral Reserves* (May 2014), as required by NI 43-101.

These are the first estimates of mineral resources produced for WAC&G for the Illinois Creek deposit.

14.2 APPROACH TO ESTIMATION OF IN-SITU MINERAL RESOURCES

This section of the report describes the approach used to estimate the in-situ mineral resources at the Illinois Creek deposit.

14.2.1 Available Data

On March 20, 2019, WACG provided the updated drill hole sample data for the Illinois Creek deposit. Since that time, there has been no additional exploration in the area of the in-situ mineral resources.

The data comprised a series of ASCII files (.csv spreadsheet) containing collar locations, down-hole survey results, geologic information and assay results for a total of 583 drill holes representing 51,558 m of drilling. Of these, 505 drill holes, totaling 41,488 m of drilling, test the

Illinois Creek deposit and contribute to the estimation of the in-situ mineral resources. The other 78 drill holes are exploratory in nature and test for extensions east of the Illinois Creek deposit or other satellite deposits on the Property. Note: These drilling statistics are derived from the database used to generate the estimate of mineral resources and may differ slightly from those presented in Section 10 (Drilling) of this report. WAC&G has made some changes to the drilling database since March 2019 that accounts for these differences. These minor changes have no impact on the estimate of mineral resources for the Illinois Creek deposit.

It should be noted that the drilling data for the Illinois Creek deposit were initially reported in the imperial system using a local “drill grid” coordinate system. All of this information was converted to metric units (in other words, feet to meters), and the coordinates were rotated to UTM grid coordinates (UTM NAD83 Zone 4W).

Of the 505 holes that test the Illinois Creek deposit, 145 are diamond drill (DD) holes and the other 360 holes are reverse circulation (RC) drill holes. Comparisons were made between the data produced from each type of drilling. DD holes tend to provide higher gold grades than RC drilling, but these differences are inconsistent and may only be local occurrences. Previous studies conducted by MRDI suggest that the RC drilling may not effectively capture all of the gold in some areas. DD and RC results show local variations, but, overall, they seem to correspond quite well. There were no modifications made to the database based on the type of drill hole.

There are no recovery data included in the database. MRDI, as part of its March 2000 audit, reported that recoveries tend to be quite good in most cases, but some gold losses were observed in holes that encountered poor recoveries.

Drilling on the Illinois Creek deposit was conducted between 1981 and 2006 with the majority of holes completed during campaigns run from 1990 through 1995. Drill holes penetrate the south-southeast dipping Illinois Creek deposit over a strike length of more than 2,500 m and to depths that exceed 200 m below surface.

The distribution of gold grades in drill holes that are proximal to the Illinois Creek deposit is shown in plan view in Figure 14-1.

In the Illinois Creek sample database, a total of 16,936 individual samples, representing 25,611 m of drilling, were analyzed for gold and silver content. About 50% of these samples were also analyzed using a multi-element (whole-rock, 26-element) package. The results for copper, lead and zinc were selected for potential inclusion in this mineral resource evaluation. Further evaluation of the available data show that only about 30% of samples were tested for lead and zinc content, and based on these results, the distributions of lead and zinc data are considered insufficient to support estimates of mineral resources. The distributions of available gold, silver and copper sample data in the vicinity of the Illinois Creek deposit are shown in Figures 14-2, 14-3 and 14-4, respectively.

Figure 14-1: Plan View of Gold Grades in Drilling

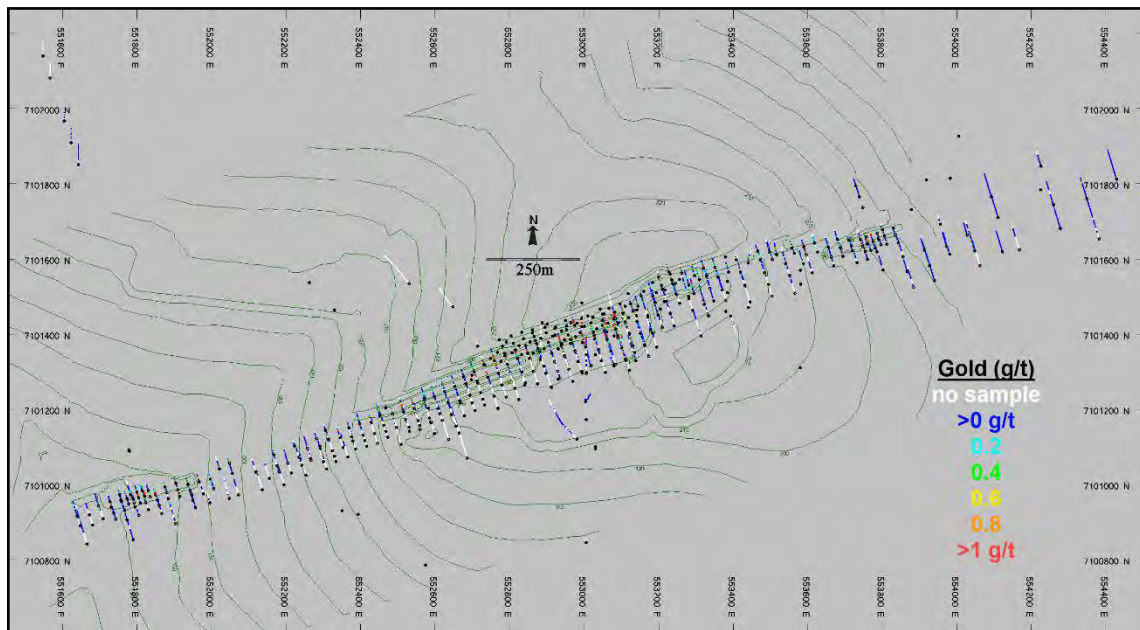


Figure 14-2: Isometric View of Available Gold Data in Drilling

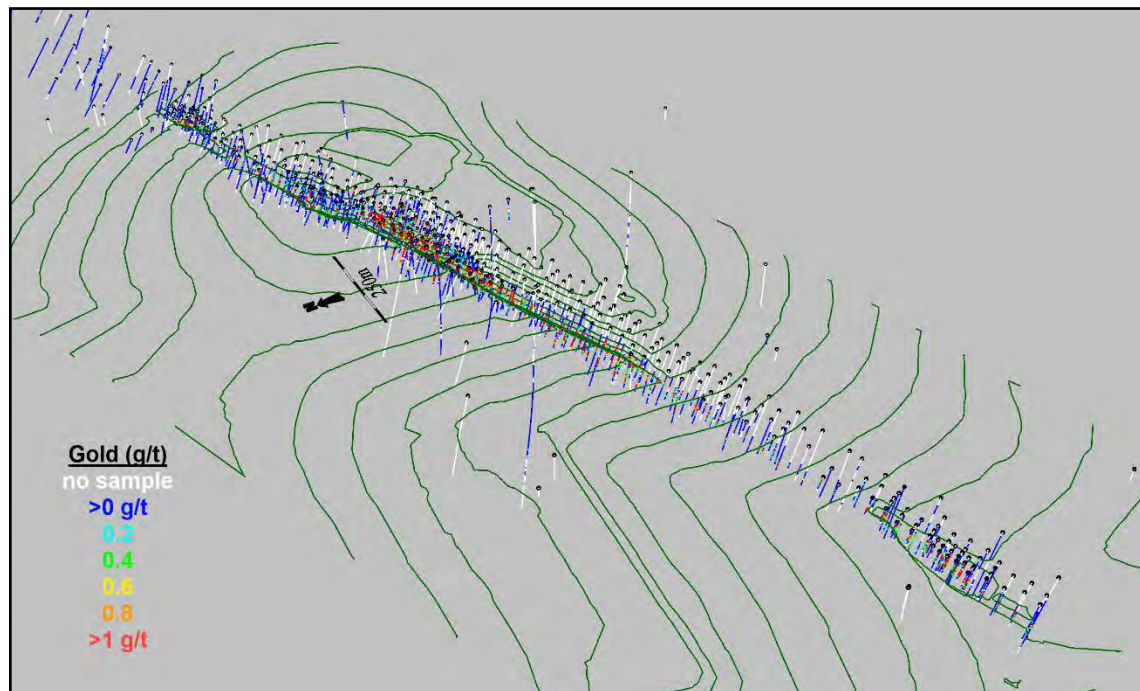


Figure 14-3: Isometric View of Available Silver Data in Drilling

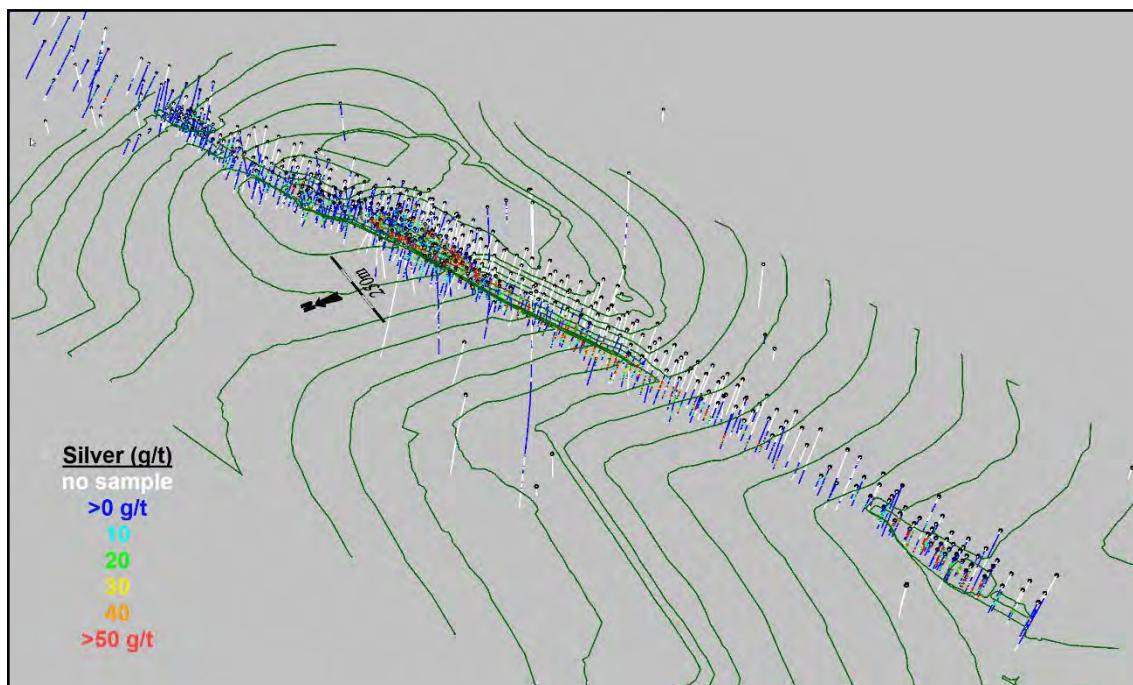
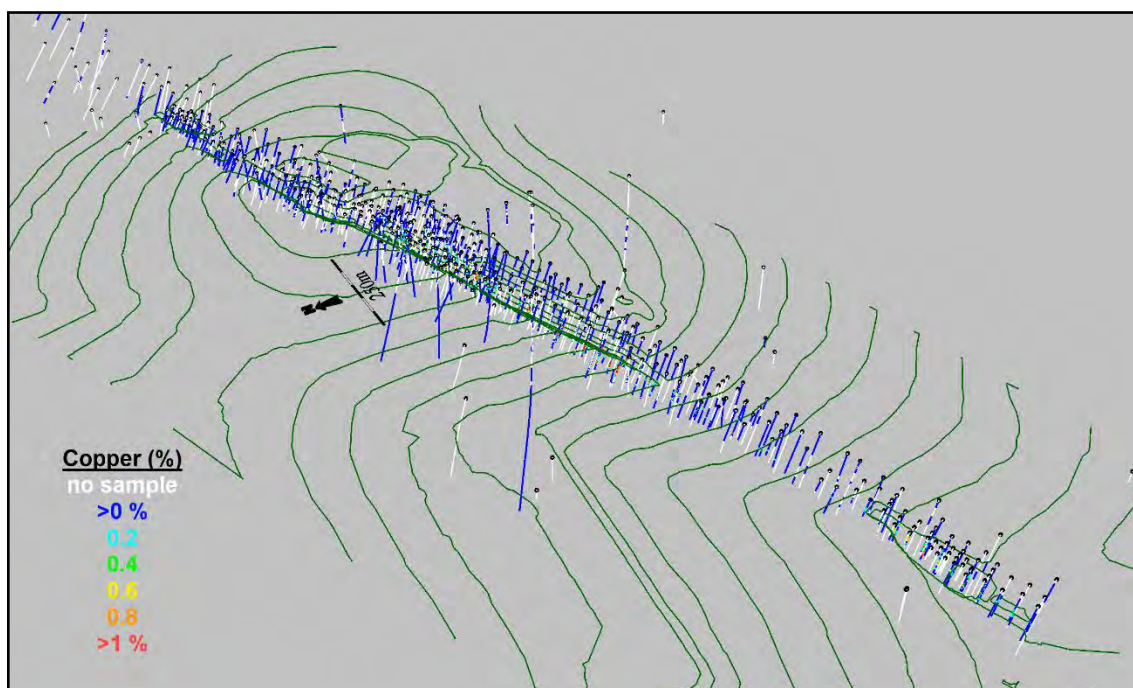


Figure 14-4: Isometric View of Available Copper Data in Drilling



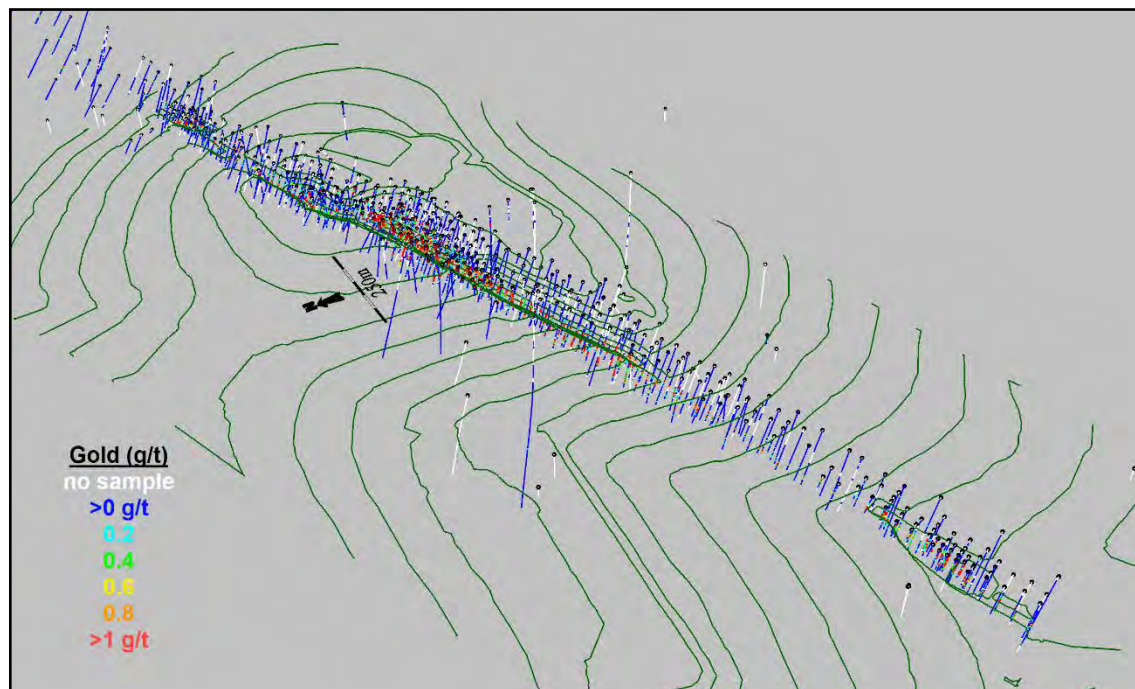
As shown in Figures 14-1 through 14-4, it is not uncommon to have drill hole intervals that have no associated assay data. The drill hole logging information was reviewed in an attempt to identify why some sample data may not be present.

Unsampled drilling intervals that represent no recovery, overburden, lost assay data, or logged intervals that appear to represent some potential for mineralization (ferruginous or manganiferous quartzite) are shown as “missing” in the sample database.

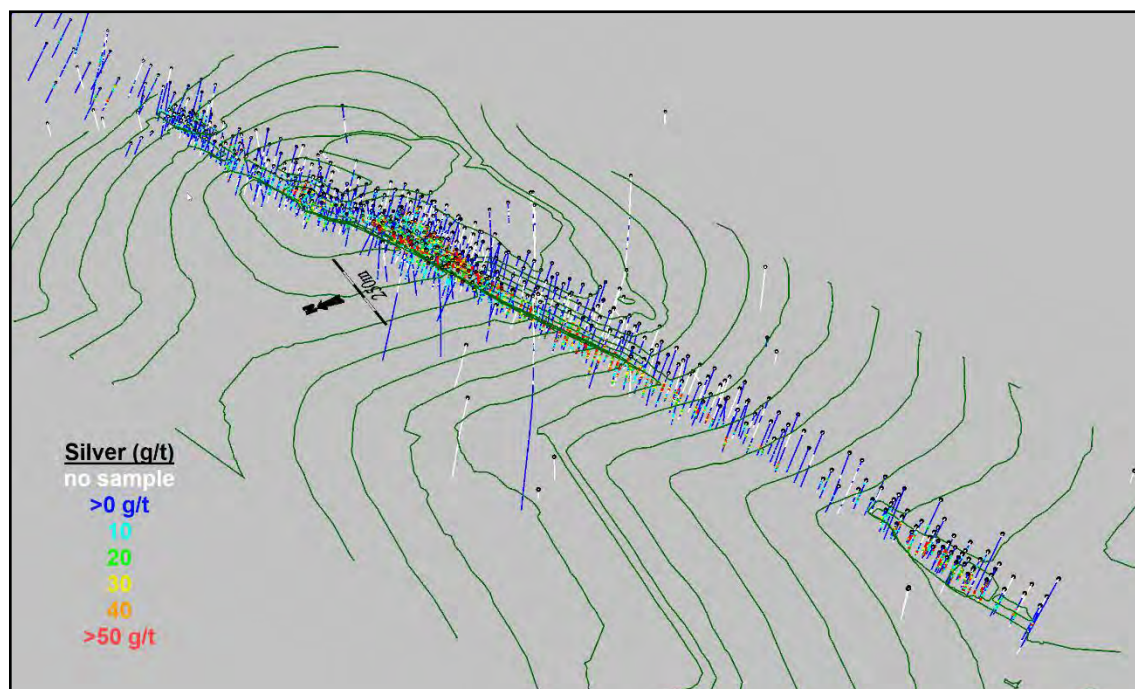
Unsampled drilling intervals that, based on the logging descriptions, show no visible signs of the presence of mineralization, have been identified and assigned zero grade values for gold and silver content. This represents a total of 5,655 m of drill hole intervals that have been assigned default zero grade values for gold and silver.

Figures 14-5 and 14-6 show the distribution of gold and silver sample data, respectively, following the treatment of unsampled intervals. Note the differences between Figures 14-2 and 14-5 for gold sample data and between Figures 14-3 and 14-6 for silver sample data.

**Figure 14-5: Isometric View of Gold Data in Drilling
following Treatment of Unsamed Intervals**



**Figure 14-6: Isometric View of Silver Data in Drilling
following Treatment of Unsamed Intervals**



The distribution of missing copper data is not consistent, and, as a result, there have been no modifications to the copper database to account for missing copper assay results.

Individual sample intervals range from a minimum of 0.06 m to a maximum of 28.35 m and average 1.58 m long. Essentially, all of the RC samples (>99%) were taken on 5 ft (1.52 m) sample intervals. The length of DD samples is more variable, but the majority of these samples (33%) were also taken over 5 ft (1.52 m) intervals, and the overall average of DD samples is 1.42 m long.

As described in Section 11 (Sample Preparation, Analyses and Security) of this report, a series of 220 samples were selected for specific gravity (SG) determinations by NPMC and USMX between 1991 and 1994. Based on these results, average SG values were assigned to the various lithology units. This provides SG values for approximately 90% of the sample intervals in the database (approximately 10% of the sample intervals do not have defined lithology types, and, therefore, do not have associated SG values).

SG values range from 2.29 to 2.67 and average 2.56. The mineralized core of the deposit tends to have lower SG values due to the intense oxidation that is present. The available SG data are considered sufficient to support the estimation of mineral resources, and the distribution of SG data are considered sufficient to support the interpolation of SG values into blocks in the resource block model.

A topographic surface was provided in the local “drill grid” imperial coordinate system that represents the topographic surface as of May 2013 (Note: Since the mine closed in 2003, there has been some minor remedial reclamation work, but it appears that this topographic surface represents the extent of mining that has taken place at Illinois Creek). The topographic surface was converted to metric coordinates and translated to the NAD83 projection. The current surface is represented by the topographic contours shown in Figures 14-1 through 14-8. Note: The topographic surface in the leach pad area was updated using the surveyed RC collar locations and a series of additional proximal point locations.

An additional topographic surface was generated using the drill hole collar locations that represent the “pre-mining” surface. The resource block model was generated to include the portions of the deposit that have already been mined out (for comparison purposes). However, the estimate of in-situ mineral resources presented in this report was truncated by the May 2013 topographic surface.

Geologic information, derived from observations during core and RC chip logging, provide lithology code designations for the various rock units present on the Property.

The statistical properties of the data in the vicinity of the Illinois Creek deposit, excluding exploration drill holes, are shown in Table 14.1.

Table 14.1: Summary of Basic Statistics of Data Proximal to the Mineral Resource Model

Element	# of Samples	Min	Max	Mean	Std. Dev.
Gold (g/t)	19,330	0	91.749	0.444	1.895
Silver (g/t)	19,327	0	2,564.6	15.2	53.93
Copper (%)	9,836	0	11.40	0.07	0.270
SG	17,864	2.29	2.67	2.56	0.090

Note: Original sample data are weighted by sample length. The data used in Table 14.1 are restricted to drill holes in the vicinity of the Illinois Creek deposit. Default zero-grade values are assigned to unsampled intervals that do not show signs of the presence of mineralization.

14.2.2 Compositing

Compositing the drill hole samples helps standardize the database for further statistical evaluation. This step eliminates any effect that inconsistent sample lengths might have on the data.

To retain the original characteristics of the underlying data, a composite length was selected that reflects the average, original sample length. The generation of longer composites can result in some degree of smoothing which could mask certain features of the data.

A composite length of 1.5 m was selected for the Illinois Creek deposit, reflecting the fact that the vast majority of samples were collected on 1.5 m intervals.

Drill hole composites are length-weighted and were generated down-the-hole; this means that composites begin at the top of each hole and are generated at 1.5 m intervals down the length of the hole.

Generation of Gold and Silver Probability Shell Domains

The distributions of gold and silver (and copper) are similar, but there are areas where gold is present and silver grades are low (or vice versa). As a result, separate probability shell domains were generated based on the distributions of gold and silver in the deposit. Indicator values are assigned to 1.5 m composited sample data based on a threshold grade of 0.10 g/t Au and 10 g/t Ag. Probability estimates are made in model blocks for both metals using ordinary kriging. During interpolations, a dynamic search approach was used in which the search orientations are controlled using an interpreted plane that represents the center of the mineralized zone. This approach retains the stratigraphic sequence of the mineralization and replicates any inherent banding in the deposit's grade distributions in the block model. Following interpolation, 3D domains were produced in which the areas inside the probability shells represent areas where there is a >50% probability that the grade will be above the defined threshold grade limits. The shape and extent of the grade probability shell domains are shown in Figures 14-7 and 14-8.

Figure 14-7: Isometric View of Gold Probability Grade Shell Domain

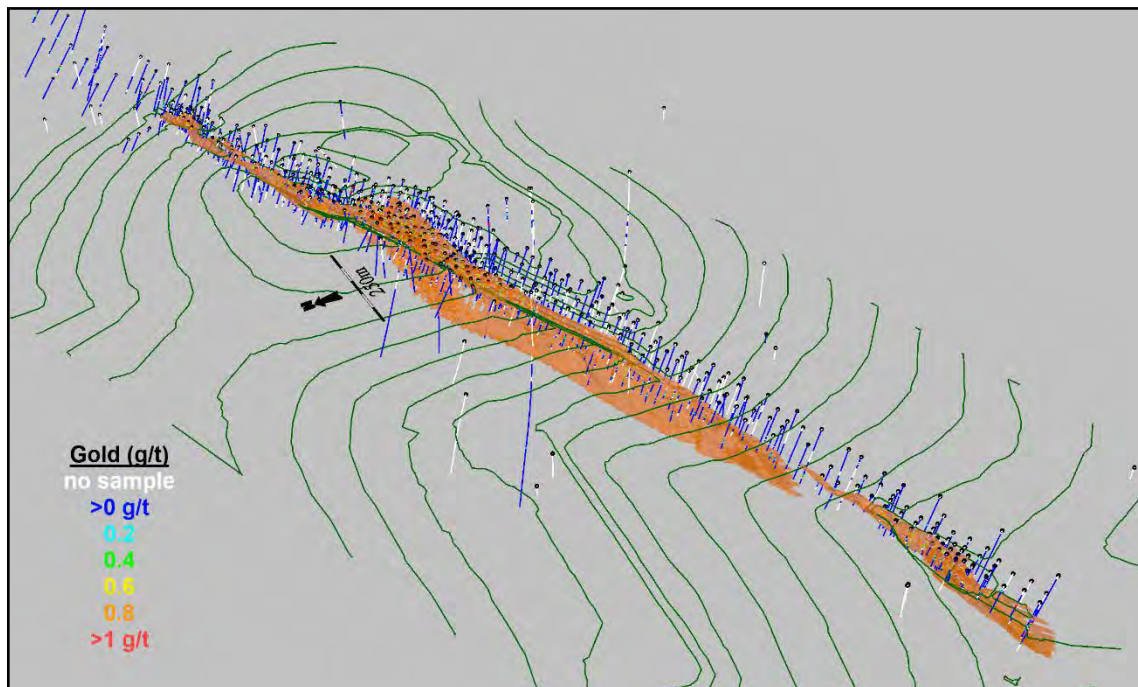
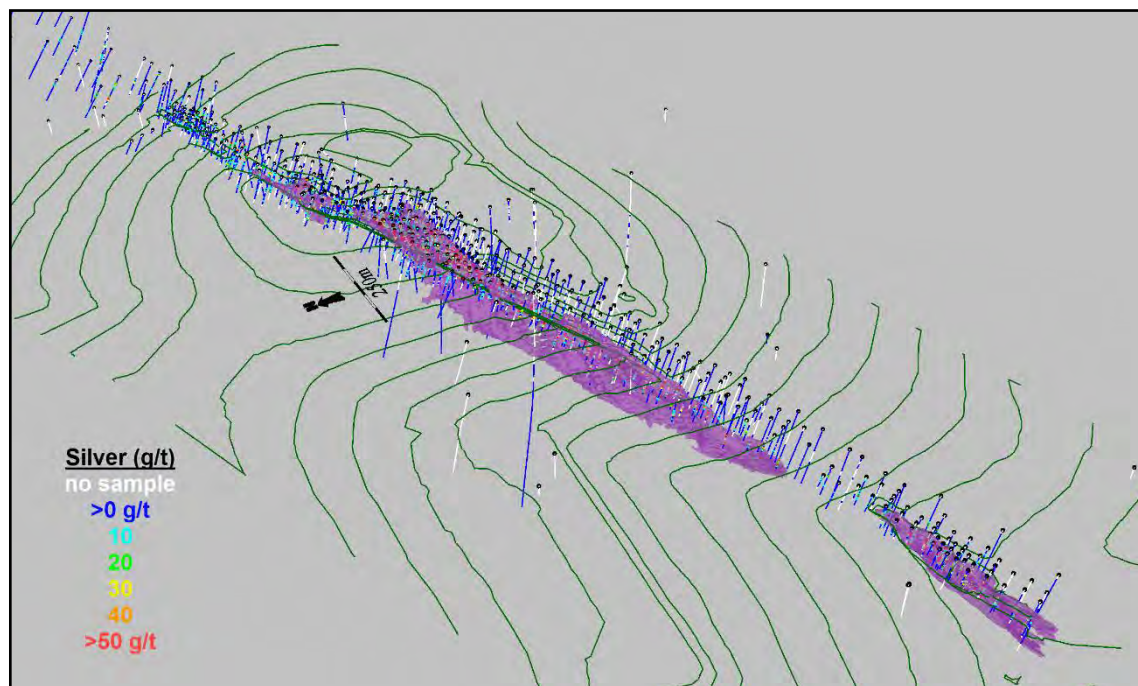


Figure 14-8: Isometric View of Silver Probability Grade Shell Domain



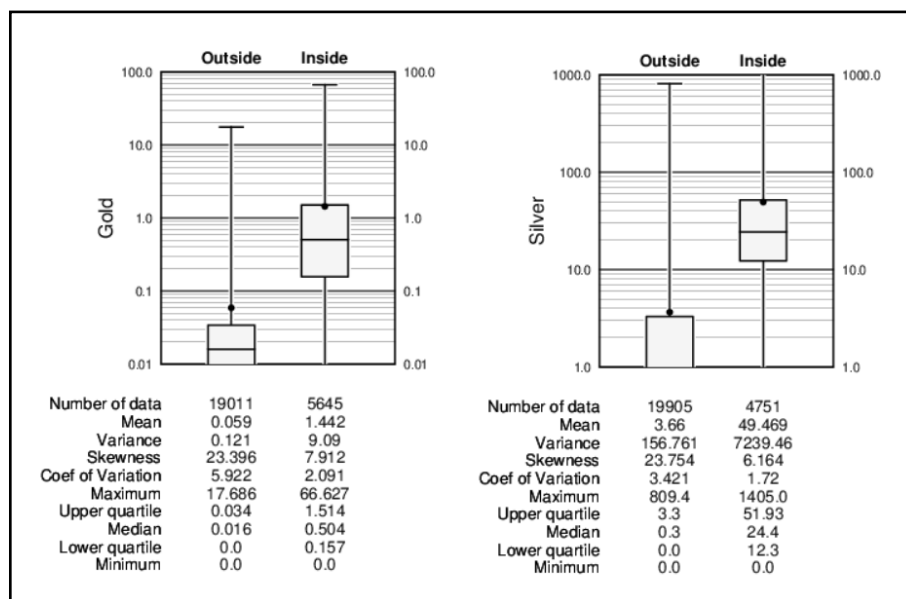
14.2.3 Exploratory Data Analysis

Exploratory data analysis (EDA) involves the statistical summarization of the database to better understand the characteristics of the data that may control grade. One of the main purposes of this exercise is to determine whether there is evidence of spatial distinctions in grade which may require the separation and isolation of domains during interpolation. The application of separate domains prevents unwanted mixing of data during interpolation, and, therefore, the resulting grade model will better reflect the unique properties of the deposit. However, applying domain boundaries in areas where the data are not statistically unique may impose a bias in the distribution of grades in the model.

A domain boundary, which segregates the data during interpolation, is typically applied when the average grade in one domain is significantly different from that of another domain. A boundary may also be applied if there is evidence that a significant change in the grade distribution has occurred across the contact.

A series of boxplots were generated to compare the statistical properties of sample data inside versus outside of the probability shell domains. Figure 14-9 shows the distribution of gold and silver data located inside versus outside of their respective probability grade shell domains. Note the very distinct differences in the data with very little overlap of the contained data.

Figure 14-9: Boxplots of Gold and Silver Data Inside vs Outside of the Probability Grade Shell Domains

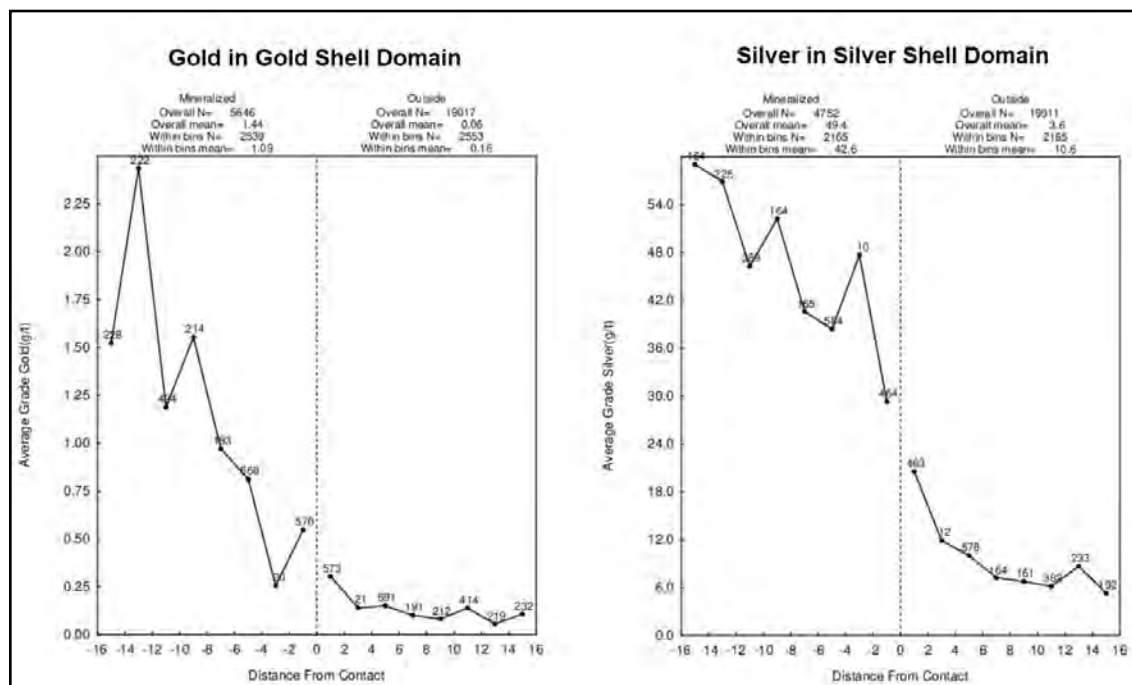


Comparison of copper data contained inside versus outside of both the gold and silver probability grade shell domains show that the distribution of copper is more distinct inside and outside of the silver shell, with less overlap of the grade distributions and more distinct differences between the mean grades inside and outside of the silver domain.

A series of contact profiles were also generated that evaluate the nature of grade changes across the various domain boundaries. The example in Figure 14-10 shows somewhat transitional grade

changes, as grades tends to decrease near the contacts inside the shell domains. These figures are generated using 1.5 m composite sample data. At the scale of blocks in the model ($10 \times 10 \times 5$ m), the grade transition at the contact is much more abrupt, indicating that these domains have segregated two distinct populations of sample data.

**Figure 14-10: Contact Profiles of Gold and Silver Grades
Across Grade Shell Domains Boundaries**



Conclusions and Modeling Implications

The results of the EDA indicate that the gold and silver grades within their individual probability shell domains are significantly different than those in the surrounding area, and that the probability shell domains should be treated as distinct or hard domains during block grade estimations for these metals.

The distribution of copper is more closely related to that of silver, and, therefore, the silver grade probability shell domain was used during the estimation of copper grades in the block model.

14.2.4 Evaluation of Outlier Grades

Histograms and probability plots for the distribution of gold, silver and copper were reviewed to identify the presence of anomalous outlier grades in the composited (1.5 m) database. Following a review of the physical location of potentially erratic samples in relation to the surrounding sample data, it was decided that these would be controlled during block grade interpolations using the application of outlier limitations. An outlier limitation controls the distance of influence of samples above a defined grade threshold. During grade interpolations, samples above the outlier thresholds are limited to a maximum distance of influence of 20 m (approximately $\frac{1}{2}$ the distance between drill holes). The grade thresholds for gold, silver and copper are shown in Table 14.2.

Overall, these applications result in a 5% reduction in both contained gold and silver and a 4% reduction in contained copper. These measures are considered appropriate for a deposit with this distribution of delineation drilling.

Table 14.2: Treatment of Outlier Sample Data

Element	Domain	Maximum	Outlier Limit
Gold (g/t)	Inside Shell	66.627	20
	Outside Shell	17.686	5
Silver (g/t)	Inside Shell	2,307.0	800
	Outside Shell	809.4	100
Copper (%)	Inside Shell	9.28	2
	Outside Shell	6.86	1

Note: Table 14.2 reflects 1.5 m composited drill hole data.

14.2.5 Variography

The degree of spatial variability in a mineral deposit depends on both the distance and direction between points of comparison. Typically, the variability between samples increases as the distance between those samples increases. If the degree of variability is related to the direction of comparison, then the deposit is said to exhibit *anisotropic* tendencies which can be summarized with the search ellipse. The semi-variogram is a common function used to measure the spatial variability within a deposit.

The components of the variogram include the nugget, the sill and the range. Often samples compared over very short distances, even samples compared from the same location, show some degree of variability. As a result, the curve of the variogram often begins at some point on the y-axis above the origin: this point is called the *nugget*. The nugget is a measure of not only the natural variability of the data over very short distances but also a measure of the variability which can be introduced due to errors during sample collection, preparation, and the assay process.

The amount of variability between samples typically increases as the distance between the samples increases. Eventually, the degree of variability between samples reaches a constant, maximum value: this is called the *sill*, and the distance between samples at which this occurs is called the *range*.

In this report, the spatial evaluation of the data was conducted using a correlogram rather than the traditional variogram. The correlogram is normalized to the variance of the data and is less sensitive to outlier values, generally giving better results.

Variograms were created using the commercial software package Sage 2001[®] developed by Isaaks & Co.

Multidirectional variograms for gold, silver and copper were generated from the distributions of data located inside the respective probability shell domains. The same variograms are used to estimate the grades both inside and outside of the domains. Variograms were generated using a

z-coordinate relative to the interpreted central trend plane of the mineralization. This approach represents the dynamic search orientation approach described previously that retains any stratigraphic banding that may be present in the deposit. The variograms are summarized in Table 14.3.

Table 14.3: Variogram Parameters

Element				1st Structure			2nd Structure		
	Nugget	Sill 1	Sill 2	Range (m)	Azimuth (°)	Dip	Range (m)	Azimuth (°)	Dip
Gold	0.350	0.554	0.096	23	56	22	514	66	1
	Spherical			18	13	-62	165	336	1
				7	139	-18	19	220	88
Silver	0.325	0.480	0.195	20	26	67	196	51	-2
	Spherical			10	187	22	61	142	-18
				4	100	-7	28	134	72
Copper	0.289	0.550	0.161	48	100	16	1,231	87	3
	Spherical			22	219	59	286	177	17
				9	2	26	66	348	73

Note: Correlograms were conducted on 1.5 m composite sample data.

14.2.6 Model Setup and Limits

A block model was initialized in MinePlan®, and the dimensions are defined in Table 14.4. The selection of a nominal block size measuring 10 × 10 × 5 m (l × w × h) is considered appropriate with respect to the current drill hole spacing as well as the selective mining unit (SMU) size typical of an operation of this type and scale.

Table 14.4: Block Model Limits

Direction	Minimum	Maximum	Block Size (m)	# of Blocks
X (east)	551400	555400	10	400
Y (north)	7100700	7102200	10	150
Z (elevation)	-200	300	5	100

Blocks in the model were coded on a majority basis with the gold and silver probability grade shell domains. During this stage, blocks along a domain boundary are coded when more than 50% of the block occurs within the boundaries of that domain.

The proportion of blocks that occur below the topographic surface is also calculated and stored within the model as individual percentage items. These values are used as weighting factors to determine the in-situ mineral resources for the deposit. Note: Grades were estimated into all model blocks below the pre-mining topographic surface. The current (remaining) mineral resources were calculated below the current topographic surface that accounts for the portion of the deposit that has already been mined out.

14.2.7 Interpolation Parameters

The in-situ block model grades for gold, silver and copper were estimated using ordinary kriging (OK). The results of the OK estimation were compared with the Hermitian Polynomial Change of Support model (also referred to as the Discrete Gaussian Correction). This method is described in more detail in Section 14.2.8.

The Illinois Creek OK model was generated with a relatively limited number of samples to match the change of support or Herco (*Hermitian Correction*) grade distribution. This approach reduces the amount of smoothing or averaging in the model, and, while there may be some uncertainty on a localized scale, this approach produces reliable estimates of the recoverable grade and tonnage for the overall deposit.

Estimates for SG are made using the inverse distance weighting (ID²) interpolation method.

The estimation parameters for the various elements in the mineral resource block model are shown in Table 14.5. All grade estimations use length-weighted composite drill hole sample data.

Table 14.5: Interpolation Parameters for In-Situ Mineral Resources

Element	Search Ellipse Range (m)			# of Composites			Method
	X	Y	Z ¹	Min/block	Max/block	Max/hole	
Gold	200	200	7	5	40	10	OK
Silver	200	200	7	5	40	10	OK
Copper	200	200	7	5	40	10	OK
SG	200	200	10	5	32	8	ID ²

¹ The vertical search range is relative to the interpreted trend of the mineralized zone.

14.2.8 Validation

The results of the modeling process were validated using several methods. These include a thorough visual review of the model grades in relation to the underlying drill hole sample grades, comparisons with the change of support model, comparisons with other estimation methods and grade distribution comparisons using swath plots.

Visual Inspection

A detailed visual inspection of the block model was conducted in both section and plan to ensure the desired results following interpolation. This includes confirmation of the proper coding of blocks within the grade probability shell domains. The estimated gold, silver and copper grades in the model appear to be valid representations of the underlying drill hole sample data. Examples of the distribution of gold and silver grades in model blocks compared to the drill hole sample data are shown in several selected vertical cross sections oriented at an azimuth of 340 degrees in Figures 14-11 and 14-12. Figure 14-13 shows gold equivalent grades in model blocks for comparison purposes.

Figure 14-11: Gold Grades in Drilling and Block Model

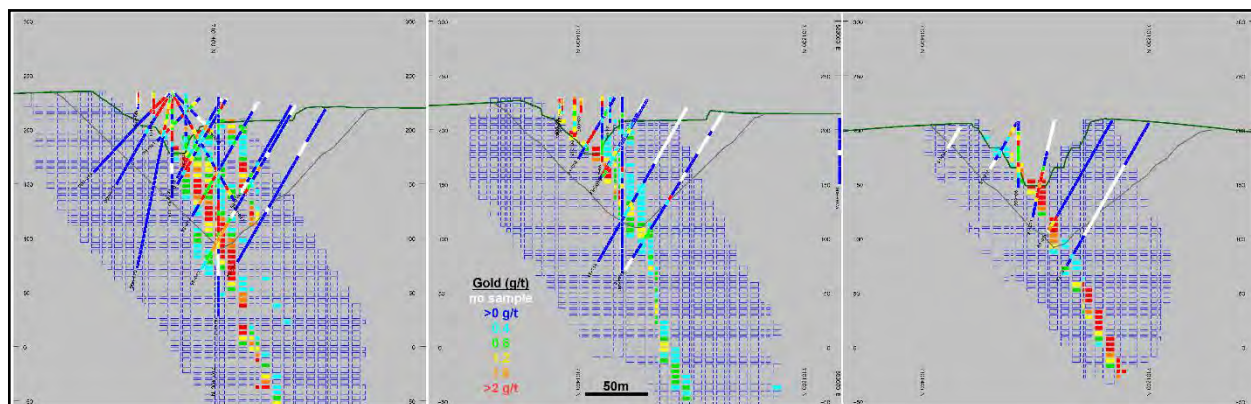


Figure 14-12: Silver Grades in Drilling and Block Model

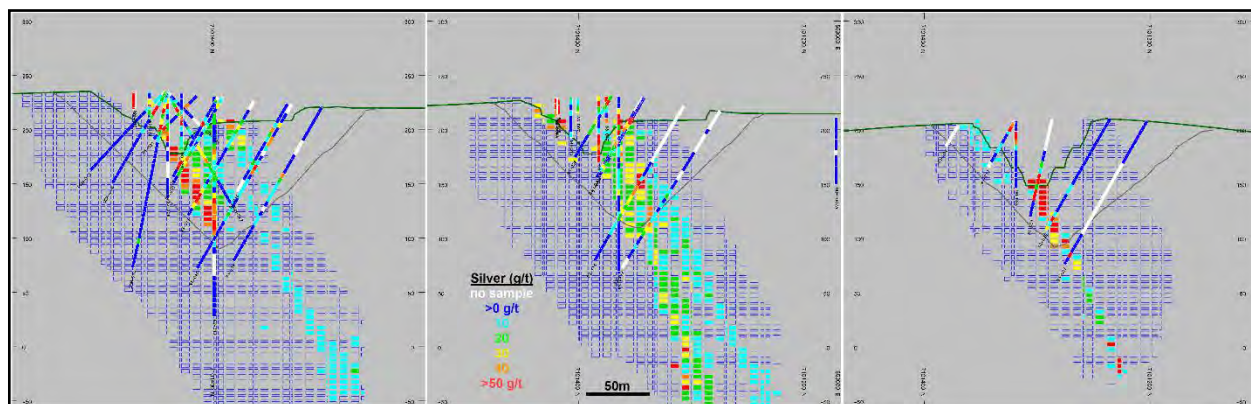
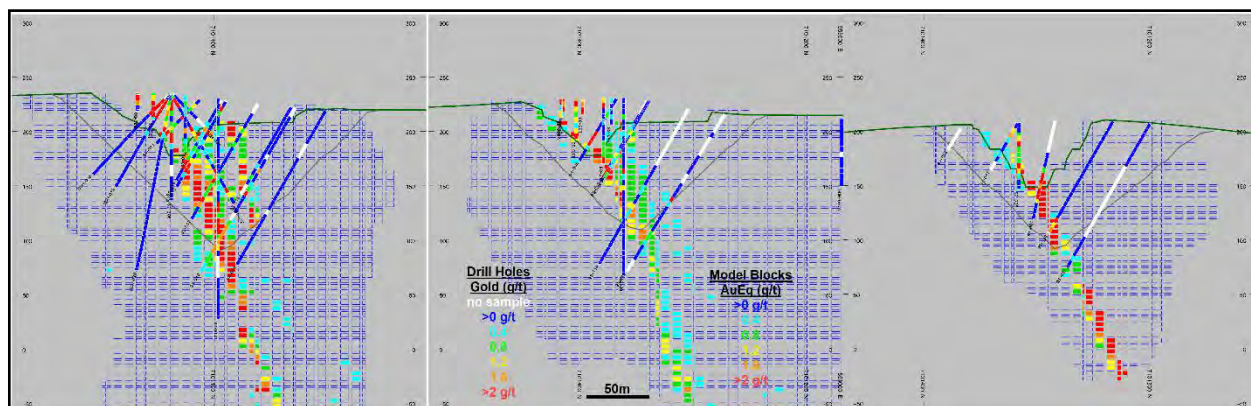


Figure 14-13: Gold Equivalent Grades in Block Model



Model Checks for Change of Support

The relative degree of smoothing in the block model estimates were evaluated using the Discrete Gaussian or Hermitian Polynomial Change of Support method (described by Rossi and Deutsch, Mineral Resource Estimation, 2014).

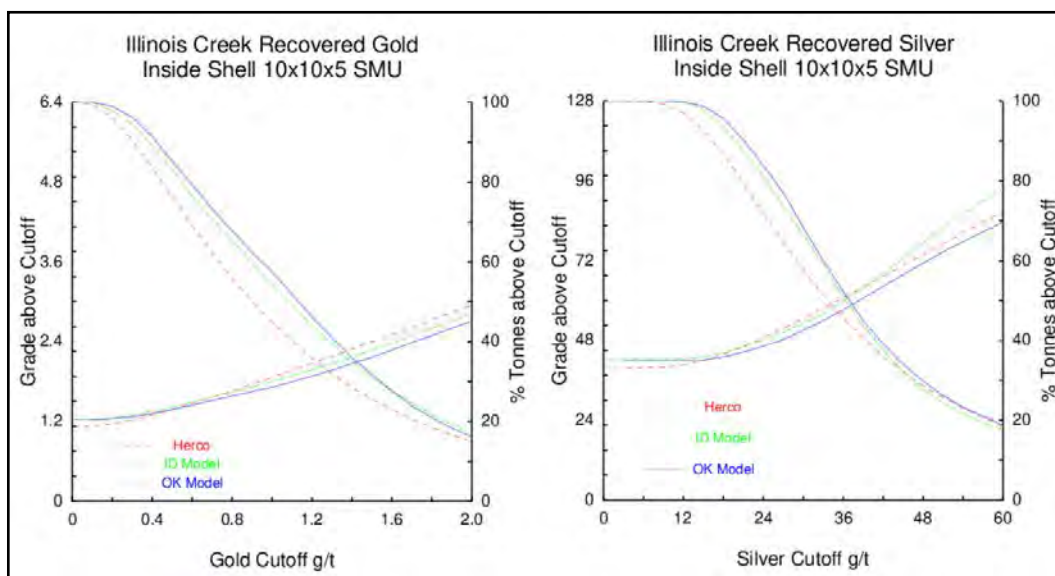
With this method, the distribution of the hypothetical block grades can be directly compared to the estimated (OK) model through the use of pseudo-grade/tonnage curves. Adjustments are made to the block model interpolation parameters until an acceptable match is made with the Herco distribution. In general, the estimated model should be slightly higher in tonnage and slightly lower in grade when compared to the Herco distribution at the projected cut-off grade. These differences account for selectivity and other potential handling issues which commonly occur during mining.

The Herco distribution is derived from the declustered composite grades which were adjusted to account for the change in support, going from smaller drill hole composite samples to the large blocks in the model. The transformation results in a less skewed distribution but with the same mean as the original declustered samples.

The Herco analysis was conducted on the distribution of gold and silver in the block model and level of correspondence was achieved in all cases.

Examples showing the distributions of the gold and silver models inside their respective probability grade shell domains are shown in Figure 14-14.

Figure 14-14: Herco Grade/Tonnage Plot for Gold and Silver Models



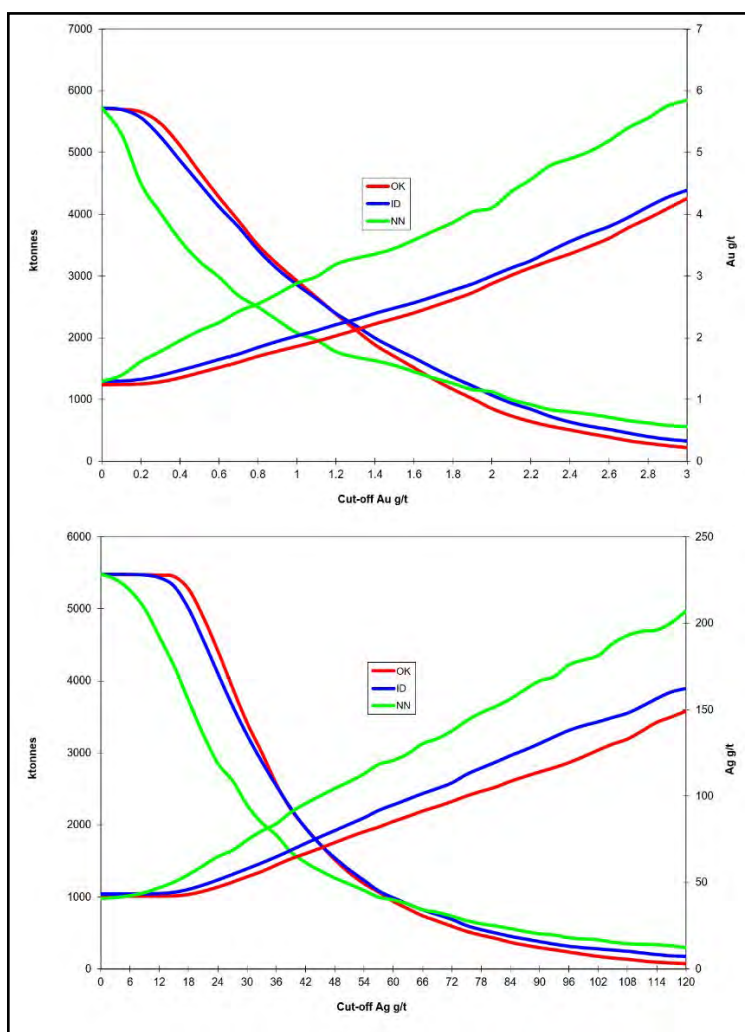
Comparison of Interpolation Methods

For comparison purposes, additional models for gold, silver and copper were generated using both the inverse distance weighted (ID²) and nearest neighbor (NN) interpolation methods (the NN model was generated using data composited to 5 m intervals).

Comparisons are made between these models on grade/tonnage curves. Examples of the grade/tonnage curves for gold and silver are shown in Figure 14-15 (these are restricted to model blocks within their respective probability shell domains and in the Indicated category). There is good correlation between the OK and ID² models throughout the range of cut-off grades. The NN distribution, generally showing less tonnage and higher grade, is the result of the absence of smoothing in this modeling approach. Similar results were achieved with the copper model.

Reproduction of the model using different methods tends to increase the confidence in the overall mineral resource estimate.

Figure 14-15: Grade/Tonnage Comparison of Gold and Silver Models



Note: restricted to Indicated class blocks inside grade shell domains.

Swath Plots (Drift Analysis)

A swath plot is a graphical display of the grade distribution derived from a series of bands, or swaths, generated in several directions through the deposit. Grade variations from the OK model are compared using the swath plot to the distribution derived from the declustered (NN) grade model.

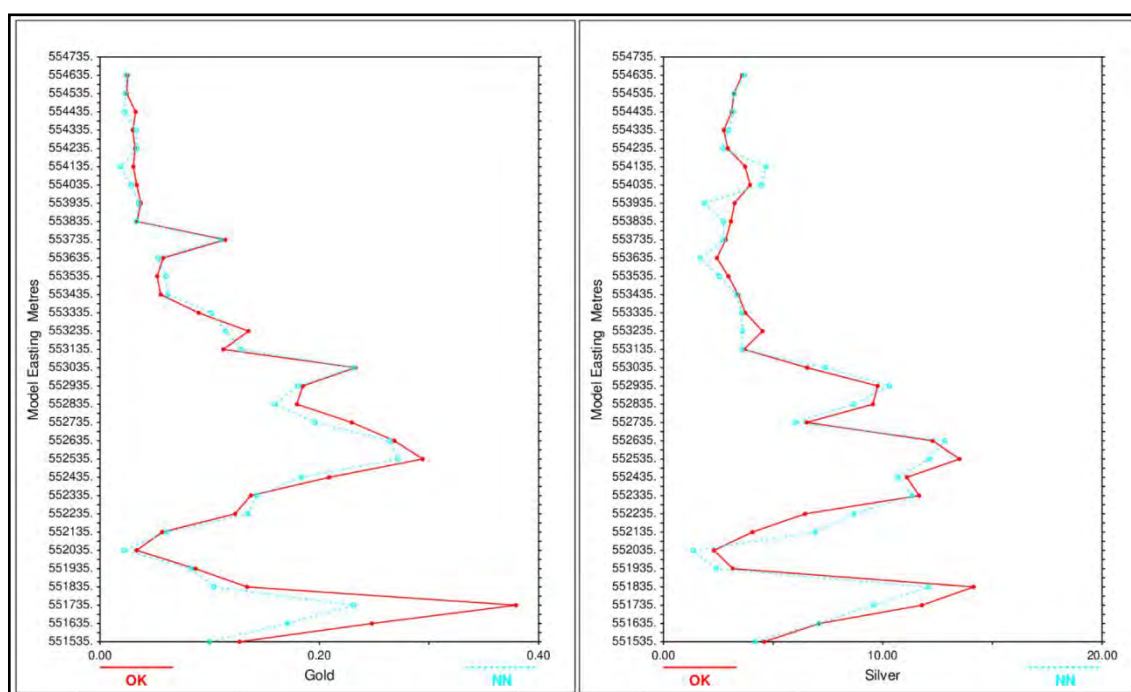
On a local scale, the NN model does not provide reliable estimations of grade, but, on a much larger scale, it represents an unbiased estimation of the grade distribution based on the underlying data. Therefore, if the OK model is unbiased, the grade trends may show local fluctuations on a swath plot, but the overall trend should be similar to the NN distribution of grade.

Swath plots were generated in three orthogonal directions for all models. An example of the gold and silver distributions in north-south swaths is shown in Figure 14-16.

There is good correspondence between the models in most areas. The degree of smoothing in the OK model is evident in the peaks and valleys shown in the swath plots. Areas where there are large differences between the models tend to be the result of “edge” effects, where there is less available data to support a comparison. Note: The majority of the mineral resources occur in three separate zones: West (between 551600E to 552000E), Central (between 552300E to 553400E) and East (between 553600E to 553800E).

The validation results indicate that the OK model is a reasonable reflection of the underlying sample data.

Figure 14-16: Swath Plot of Gold and Silver OK and NN Models by Easting



14.2.9 Mineral Resource Classification

The in-situ mineral resources for the Illinois Creek deposit were classified in accordance with the CIM *Definition Standards on Mineral Resources and Mineral Reserves* (May 2014). The classification parameters are defined relative to the distance between gold sample data and are intended to encompass zones of reasonably continuous mineralization that exhibit the desired degree of confidence. These parameters are based on visual observations and statistical studies. Classification parameters are based primarily on the nature of the distribution of gold data as it is the main contributor to the relative value of this polymetallic deposit.

The following criteria were used to define in-situ mineral resources in the Indicated and Inferred categories.

Indicated Mineral Resources (In-situ)

Mineral resources in this category exhibit good continuity of mineralization in which there is a consistent pattern or distribution of drill holes that are on a maximum nominal spacing of 30 m.

Inferred Mineral Resources (In-situ)

Mineral resources in this category include model blocks that are located within a maximum distance of 100 m from a drill hole.

A domain was interpreted that encompasses model blocks that are included in the Indicated category. This step ensures consistency of classification of Indicated resources across the deposit.

At this stage of project evaluation, there are no in-situ mineral resources included in the Measured category.

14.3 APPROACH TO ESTIMATION OF LEACH PAD MINERAL RESOURCES

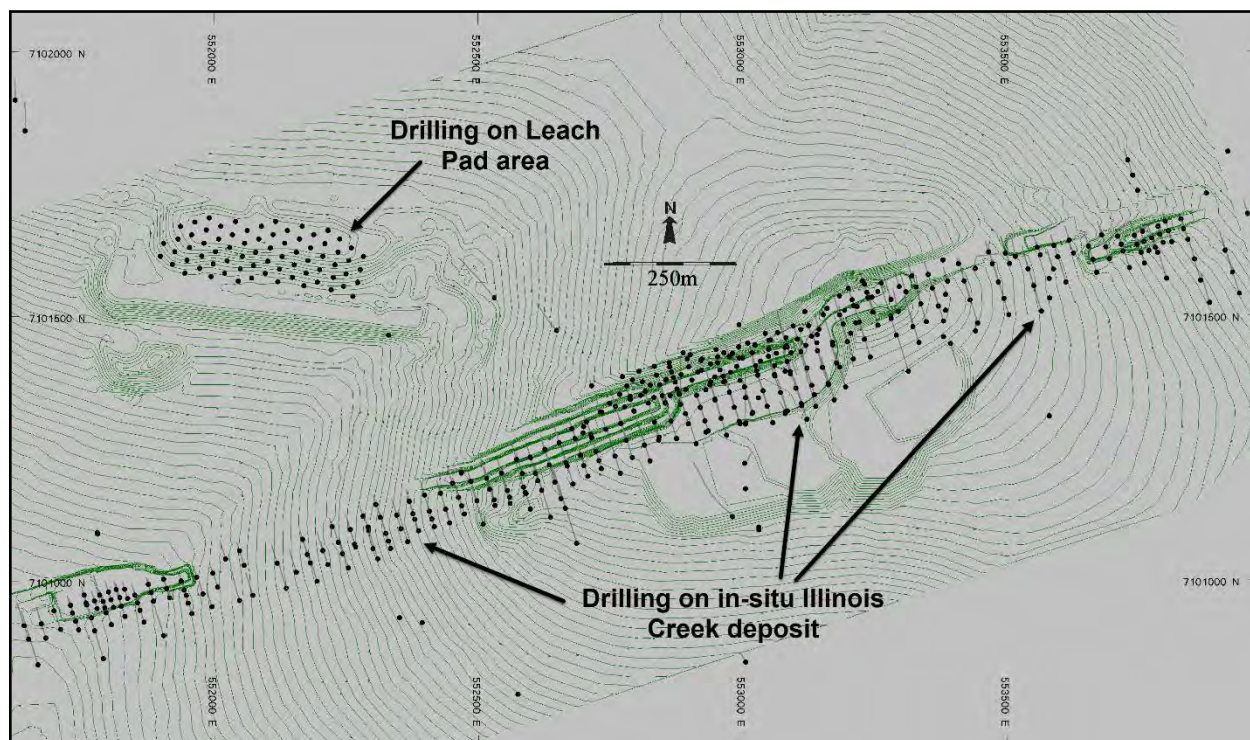
This section of the report describes the approach used to estimate the mineral resources on the leach pad at the Illinois Creek deposit. This is the first estimate of mineral resources for the material located on the leach pad at the Illinois Creek deposit.

The leach pad material was stacked and leached intermittently starting in 1979 through mine closure. Recovery problems were encountered due to the change from a crush/agglomeration process envisioned in the feasibility study to a run-of-mine (ROM) scenario and, as a result, very little of the contained gold was ever extracted from the material on the leach pad. During reclamation, the pad was slightly recontoured and covered with a thin 1 m topsoil cap.

In the summer of 2020, WAC&G tested the leach pad area by drilling a series of 73 vertically oriented reverse circulation (RC) drill holes spaced on a regular 25 to 30 m grid pattern. The RC drill holes were stopped approximately 2 to 3 m above the impermeable liner location at the bottom of the leach pad.

Figure 14-17 shows the location of drilling in the leach pad area in relation to the drill holes that test the in-situ Illinois Creek deposit. The leach pad mineral resource estimate was generated using the RC drill hole sample assay results. Interpolation characteristics were defined based on the assumption that the leach pad material was stacked in a series of horizontal lifts.

Figure 14-17: Plan View Showing Drilling on the Illinois Creek Deposit and in the Leach Pad Area



14.3.1 Available Data

On October 16, 2020, WAC&G provided the updated drill hole sample data for the Illinois Creek deposit.

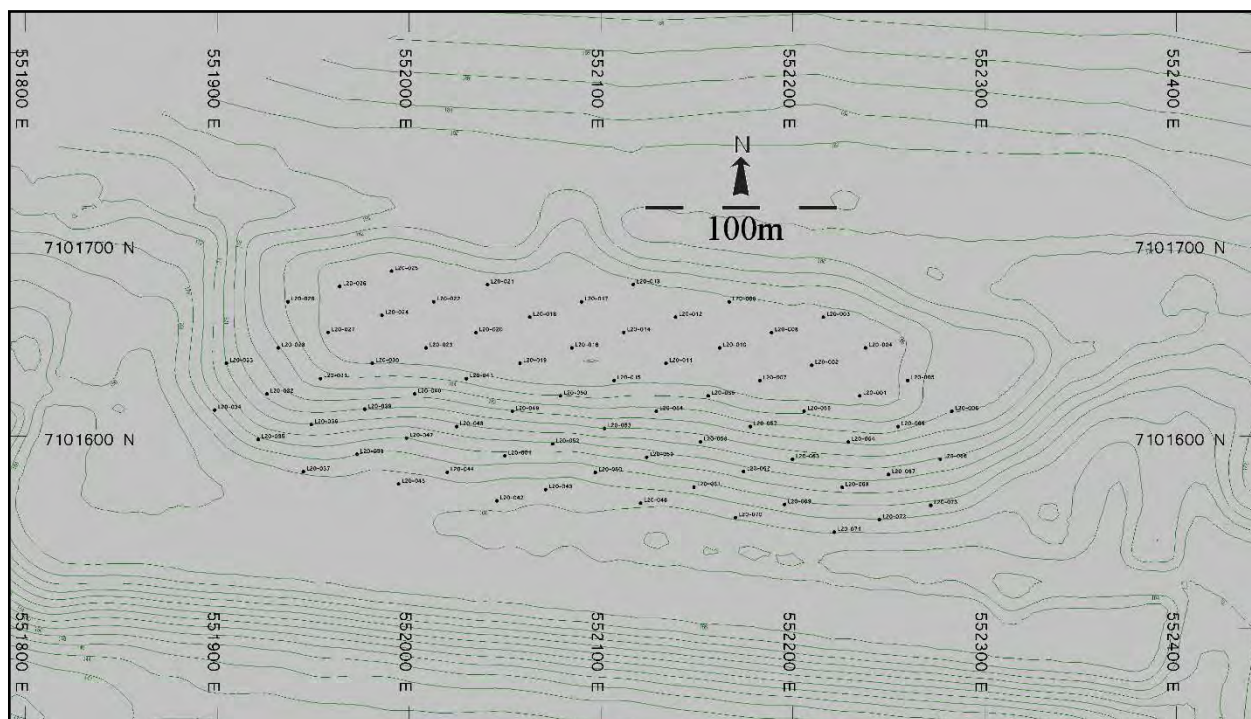
The data comprised a series of Excel files (.xls spreadsheet) containing collar locations and assay results for a total of 73 drill holes representing 643.15 m of drilling. There was no associated geologic information provided with this drilling.

As stated previously, all of the drilling on the leach pad was completed using RC drilling equipment. Drilling was conducted in imperial units and the from-to intervals have been converted to metric equivalents for mineral resource estimation purposes. All holes are vertically oriented and range from a minimum of 3.05 m (10 ft) long to a maximum of 18.29 m (60 ft) long. Samples are taken on 1.52 m (5 ft) intervals.

All drilled intervals were sampled and analyzed using a multi-element ICP package plus fire assay for gold and additional analyses for cyanide-soluble gold, silver and copper. Sample data for gold, silver, copper, lead and zinc plus cyanide-soluble gold, silver and copper values were exported and retained for mineral resource estimation purposes. At this stage of project evaluation, it is likely that lead, zinc or copper would not be effectively extracted from the leach pad, but estimates are retained for information purposes. Assay results for copper, lead, zinc and cyanide-soluble copper are expressed in parts per million (ppm) units; these have been converted to percentage values for this study. Note: 15 samples exceed the maximum ICP grade ranges for lead (values

The distribution of drill holes on the leach pad is shown in plan view in Figure 14-18.

Figure 14-18: Plan View of Drilling on the Leach Pad Area



The distributions of available gold, silver, copper, lead and zinc sample data are shown in Figures 14-19, 14-20, 14-21, 14-22 and 14-23, respectively.

The ratio of cyanide-soluble gold to total gold (AuCN/AuTotal) was also calculated from the sample data to provide some information regarding the solubility of the material on the leach pad. These ratios, shown in Figure 14-24, tend to be quite variable over the leach pad.

Figure 14-19: Isometric View of Available Gold Data in Leach Pad Drilling

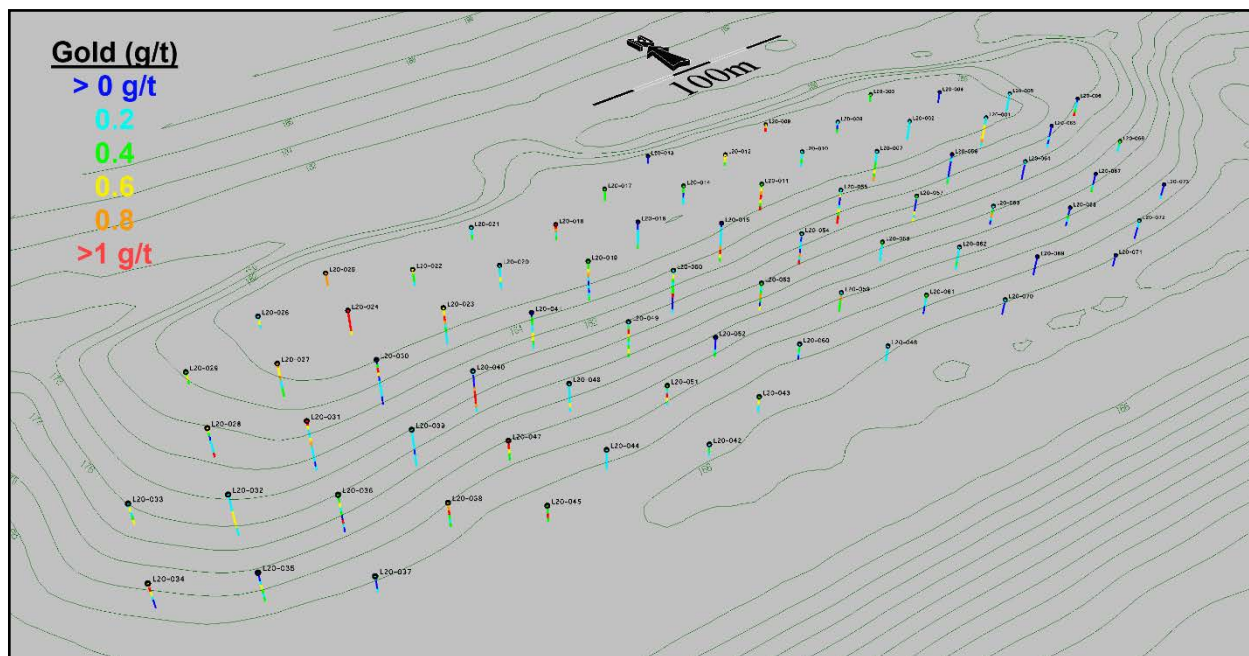


Figure 14-20: Isometric View of Available Silver Data in Leach Pad Drilling

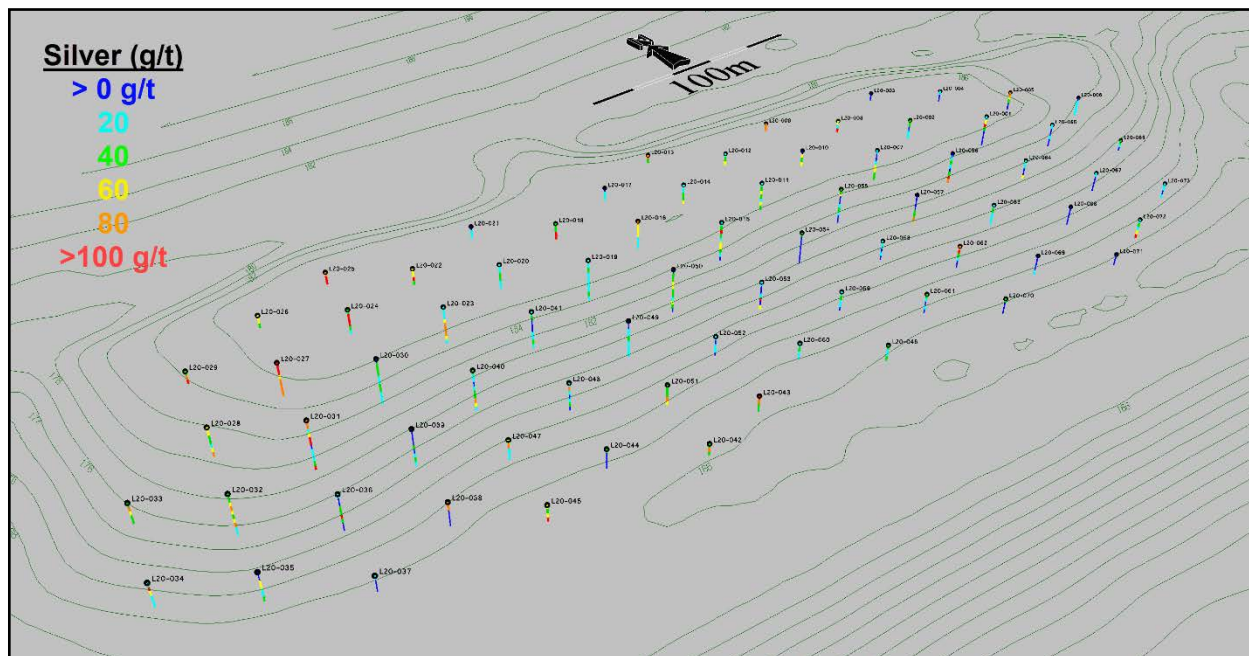


Figure 14-21: Isometric View of Available Copper Data in Leach Pad Drilling

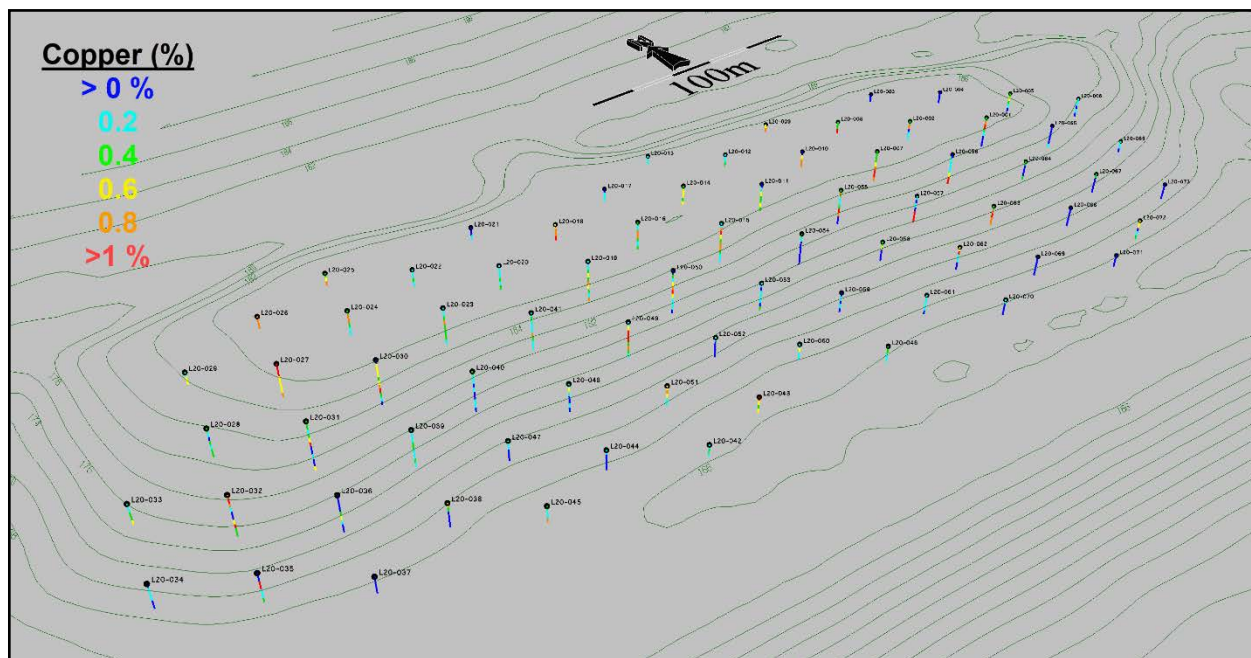


Figure 14-22: Isometric View of Available Lead Data in Leach Pad Drilling

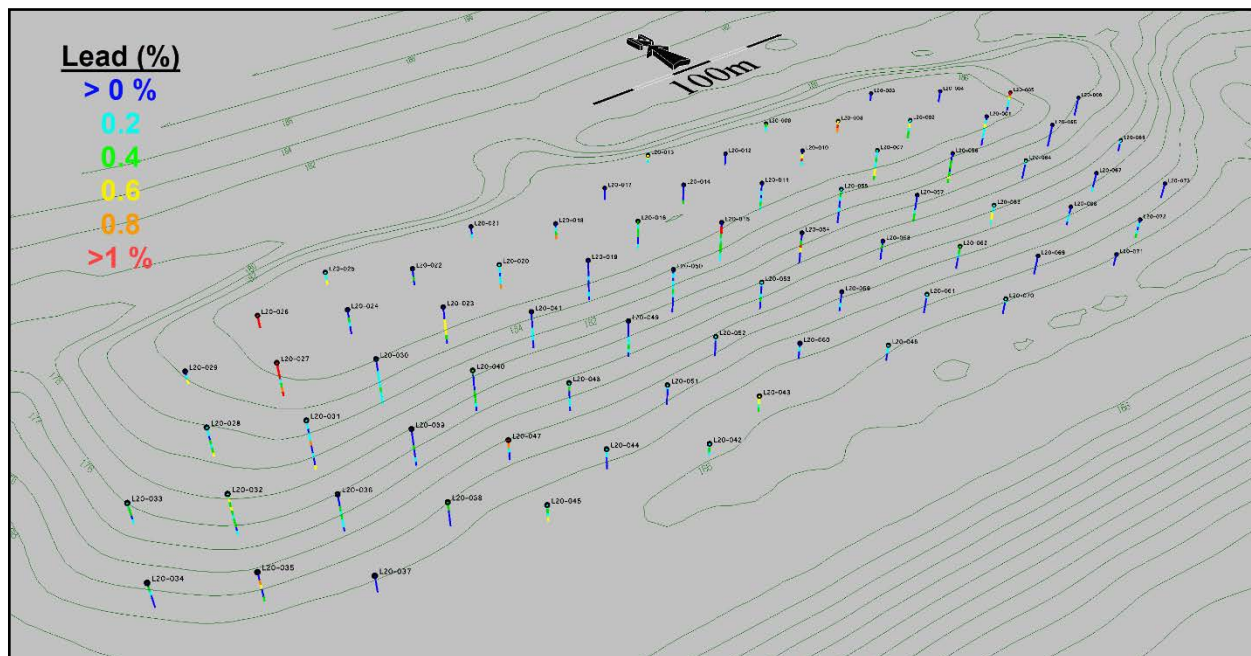


Figure 14-23: Isometric View of Available Zinc Data in Leach Pad Drilling

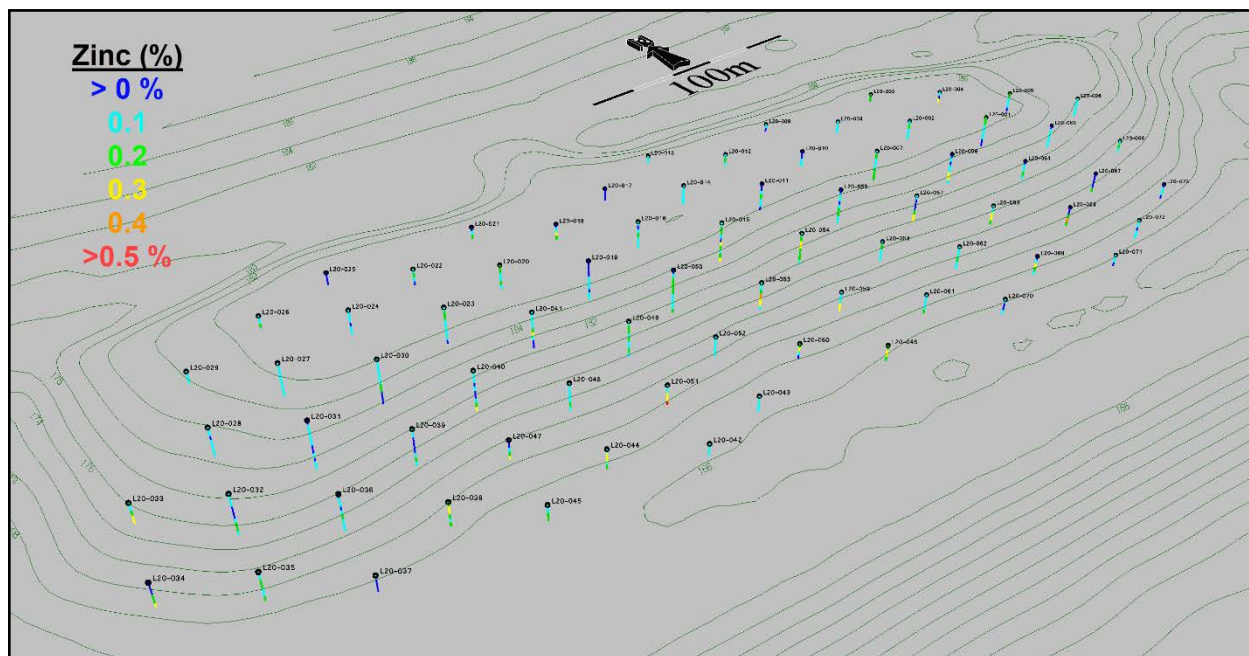
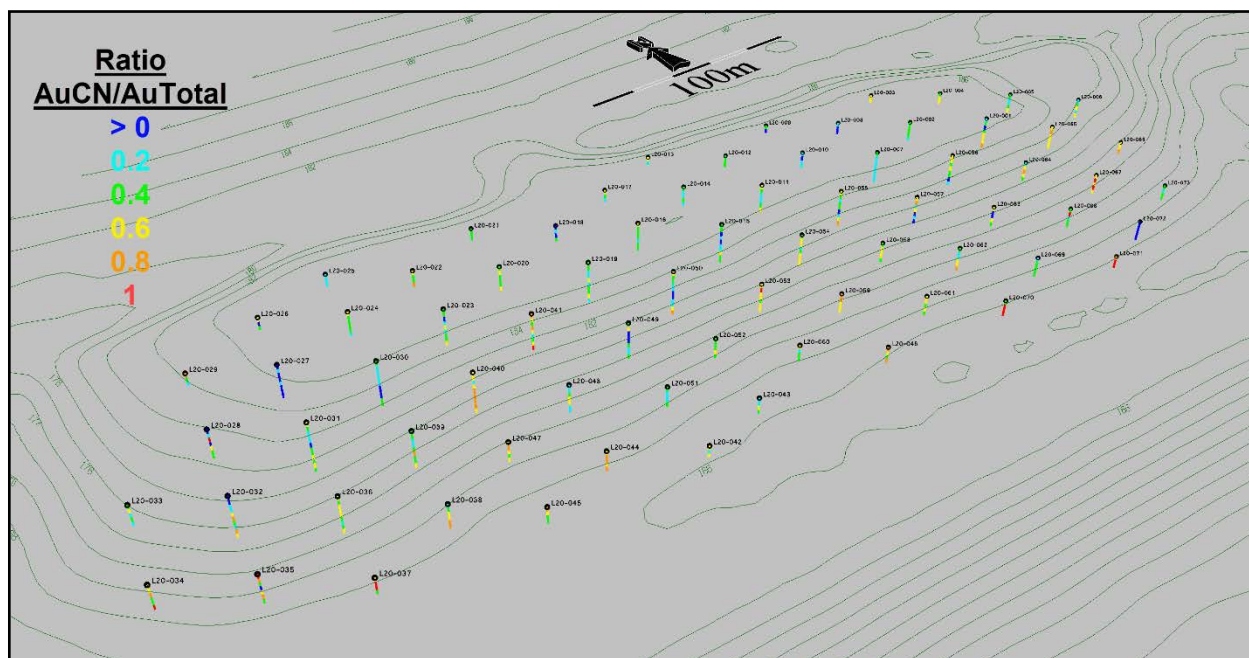


Figure 14-24: Isometric View of AuCN/AuTotal Ratios in Leach Pad Drilling



A 3D topographic surface in the area of the leach pad was generated using the drill hole collar locations plus a series of additional points surveyed by McClintock Land Associates. The topographic contours shown in Figures 14-18 to 14-24 have been generated from the updated topographic surface. A surface representing the base of the leach pad was created using the “as-built” information originally generated by SRK Consulting (SRK). During drilling of the leach pad, drill holes were stopped 2 to 3 m above the base of the leach pad to prevent damage to the liner.

Several test pits, dug and filled with water, provided the specific gravity (SG) values: the larger test pits (dug by backhoe) showed SG ranges from 2.1 to 2.6 with an average of 2.3; the several smaller test pits (dug by hand) showed SG ranges from 1.8 to 2.2 with an average of 2.0. Historical production records indicate a total of 1.59M tonnes of ore was stacked on the leach pad. With a pad volume estimated to be 631,360 cubic meters, this gives an average SG of 2.5. Although the rocks at Illinois Creek contain high-sulfide contents, and the leach pad appears to be well compacted, an average SG of 2.5 is considered too high for material of this type. Therefore, an average SG of 2.3 was considered reasonable to determine the mineral resource tonnage on the leach pad.

The statistical properties of the leach pad sample data are shown in Table 14.6.

Table 14.6: Summary of Basic Statistics of Leach Pad Sample Data

Element	# of Samples	Min	Max	Mean	Std. Dev.
Gold (g/t)	422	0	3.740	0.467	0.444
Silver (g/t)	422	0	409.0	46.2	43.04
Copper (%)	422	0	4.37	0.44	0.406
Lead (%)	422	0	1.01	0.29	0.237
Zinc (%)	422	0	1.00	0.16	0.089
CN Soluble Gold (g/t)	422	0	3.29	0.239	0.325
CN Soluble Silver (g/t)	422	0	78.3	8.9	9.825
CN Soluble Copper (%)	422	0	0.20	0.07	0.060

Note: Original sample data are weighted by sample length.

There is quite a high amount of variability in the sample weights, but there is no evidence that a relationship exists between sample size and grade.

14.3.2 Compositing

See Section 14.2.2 for the description of compositing.

A composite length of 1.5 m was selected for the leach pad samples, reflecting the fact that all samples were collected on 1.52 m (5 ft) intervals.

Drill hole composites are length-weighted and were generated down-the-hole; this means that composites begin at the top of each hole and are generated at 1.5 m intervals down the length of the hole.

14.3.3 Exploratory Data Analysis

See Section 14.2.3 for the description of exploratory data analysis (EDA).

A series of histograms and cumulative probability plots were generated for the various elements of interest. In essentially all cases, the sample data exhibit skewed distributions and pseudo-lognormal trends. A series of scatterplots were also generated that show weak to moderate correlation between gold and the other metals.

There are no geologic domains related to the mineralized material located on the leach pad. Historical data suggests the material was placed on the pad in horizontal lifts, which would suggest there may be weak lateral trends present but limited-to-no vertical continuity of sample grades.

14.3.4 Evaluation of Outlier Grades

Histograms and probability plots for the distribution of gold, silver, copper, lead and zinc were reviewed to identify the presence of anomalous outlier grades in the composited (1.5 m) database. Following a review of the physical location of potentially erratic samples in relation to the surrounding sample data, it was decided that these would be controlled during block grade interpolations using a combination of top-cutting plus the application of outlier limitations. An outlier limitation controls the distance of influence of samples above a defined grade threshold. During grade interpolations, samples above the outlier thresholds are limited to a maximum distance of influence of 20 m (approximately $\frac{1}{2}$ the distance between drill holes). The grade thresholds for all elements are shown in Table 14.7.

Overall, these applications result in a 3.3% reduction in contained gold, 3.5% reduction in contained silver, 2.1% reduction in contained copper, and 1.4% and 1.8% reductions in contained lead and zinc, respectively. These measures are considered appropriate for this leach pad area.

Table 14.7: Treatment of Outlier Samples in Leach Pad Data

Element	Maximum	Top-Cut Limit	Outlier Limit
Gold (g/t)	3.640	-	1.500
Silver (g/t)	409.0	300.0	150.0
Copper (%)	4.24	2.50	1.70
Lead (%)	1.01	-	0.90
Zinc (%)	1.00	0.50	0.40

Note: Table 14.7 reflects 1.5 m composited drill hole data.

14.3.5 Variography

See Section 14.2.5 for the description of variography.

Multidirectional variograms for gold, silver, copper, lead, zinc and the ratio of AuCN/AuTotal were generated using the composited (1.5 m) sample data. Variograms were “flattened” in the horizontal directions to restrict or limit the amount of smoothing in the vertical direction (this approach is in response to the horizontal stacking approach used to build the leach pad). The variograms are summarized in Table 14.8.

Table 14.8: Variogram Parameters of Leach Pad Sample Data

Element				1st Structure			2nd Structure		
	Nugget	Sill 1	Sill 2	Range (m)	Azimuth (°)	Dip	Range (m)	Azimuth (°)	Dip
Gold	0.062	0.805	0.133	37	96	0	2203	0	0
	Spherical			16	6	0	23	90	0
				6	90	90	9	90	90
Silver	0.226	0.364	0.410	53	341	0	411	62	0
	Spherical			17	71	0	47	332	0
				5	90	90	18	90	90
Copper	0.075	0.625	0.300	48	104	0	88	4	0
	Spherical			17	14	0	30	94	0
				5	90	90	9	90	90
Lead	0.033	0.741	0.226	34	80	0	201	28	0
	Spherical			31	350	0	47	118	0
				5	90	90	10	90	90
Zinc	0.260	0.545	0.195	26	33	0	1669	65	0
	Spherical			19	123	0	57	335	0
				8	90	90	9	90	90
Ratio AuCN/AuTotal	0.328	0.608	0.065	65	44	0	874	34	0
	Spherical			28	134	0	786	124	0
				10	90	90	21	90	90

Note: Correlograms were conducted on 1.5 m composite sample data.

14.3.6 Model Setup and Limits

The block model described in Table 14.4 not only covers the area of the in-situ mineral resources but also extends to the area of the leach pad. The nominal block size, measuring 10 × 10 × 5 m (l × w × h), is considered appropriate with respect to the current drill hole spacing in the leach pad area. Grade estimates used to estimate the leach pad mineral resources are restricted to model blocks that intersect the volume of material located on the leach pad.

The proportion of blocks that occur within the volume of material on the leach pad is also calculated and stored within the model as individual percentage items. These values are used as weighting factors to determine the volume (tonnage) of mineral resources located on the leach pad.

14.3.7 Interpolation Parameters

The block model grades for gold, silver, copper, lead, zinc and the ratio of AuCN/AuTotal were estimated using ordinary kriging (OK). The results of the OK estimation were compared with the Hermitian Polynomial Change of Support model (also referred to as the Discrete Gaussian Correction described previously in Section 14.2.8 of this report).

The Illinois Creek OK model for the leach pad mineral resources was generated with a relatively limited number of samples to match the change of support or Herco (*Hermitian Correction*) grade distribution. This approach reduces the amount of smoothing or averaging in the model, and, while there may be some uncertainty on a localized scale, this approach produces reliable estimates of the recoverable grade and tonnage for the overall deposit.

The estimation parameters for the various elements in the mineral resource block model are shown in Table 14.9. All grade estimations use length-weighted composite drill hole sample data.

Table 14.9: Interpolation Parameters for Leach Pad Area Mineral Resources

Element	Search Ellipse Range (m)			Number of Composites			Comments
	X	Y	Z ¹	Min/block	Max/block	Max/hole	
Gold	100	100	7	3	20	5	1 DH per Octant
Silver	100	100	7	3	20	5	1 DH per Octant
Copper	100	100	7	3	20	5	1 DH per Octant
Lead	100	100	7	3	20	5	1 DH per Octant
Zinc	100	100	7	3	20	5	1 DH per Octant
Ratio AuCN/AuTotal	100	100	7	3	20	5	1 DH per Octant

¹ The vertical search range is relative to the interpreted trend of the mineralized zone. DH = drill hole.

14.3.8 Validation

The results of the modeling process were validated using several methods. These include a thorough visual review of the model grades in relation to the underlying drill hole sample grades, comparisons with the change of support model, comparisons with other estimation methods and grade distribution comparisons using swath plots.

Visual Inspection

A detailed visual inspection of the block model was conducted in both section and plan to ensure the desired results following interpolation. The estimated gold, silver, copper, lead and zinc grades in the leach pad area appear to be valid representations of the underlying drill hole sample data. Examples of the distribution of gold and silver grades in model blocks compared to the drill hole sample data are shown in several selected vertical cross sections oriented at an azimuth of 340 degrees in Figures 14-25 and 14-26.

Figure 14-25: Gold Grades in Drilling and Block Model in the Leach Pad Area

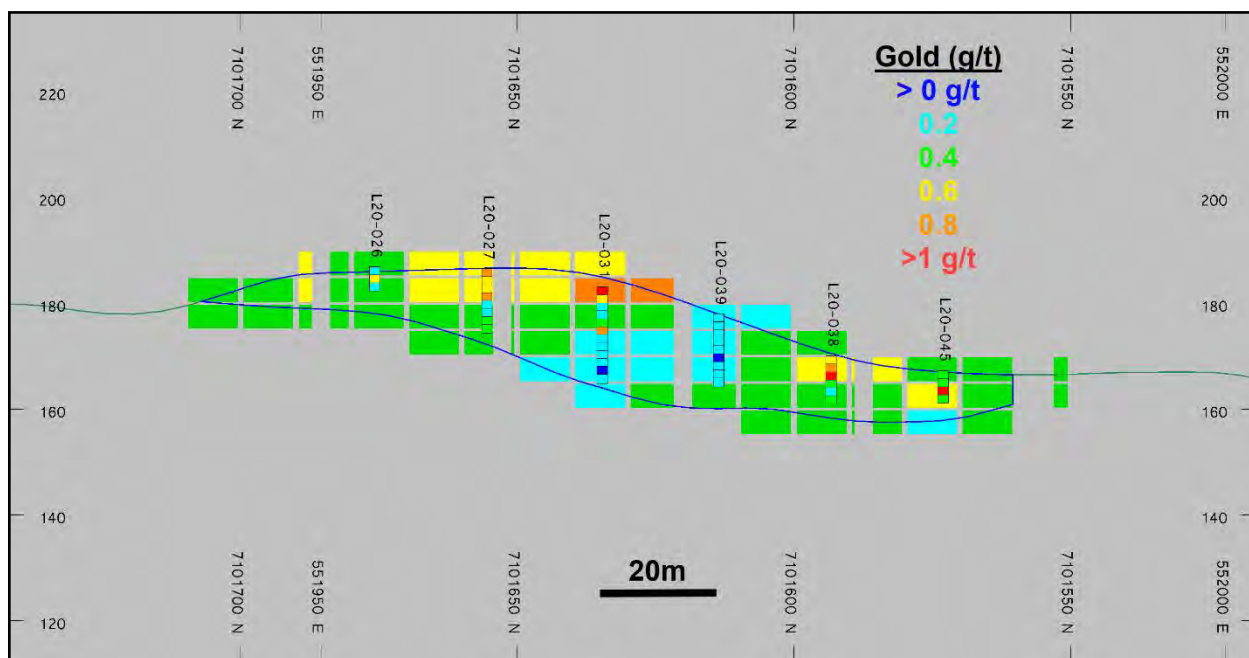
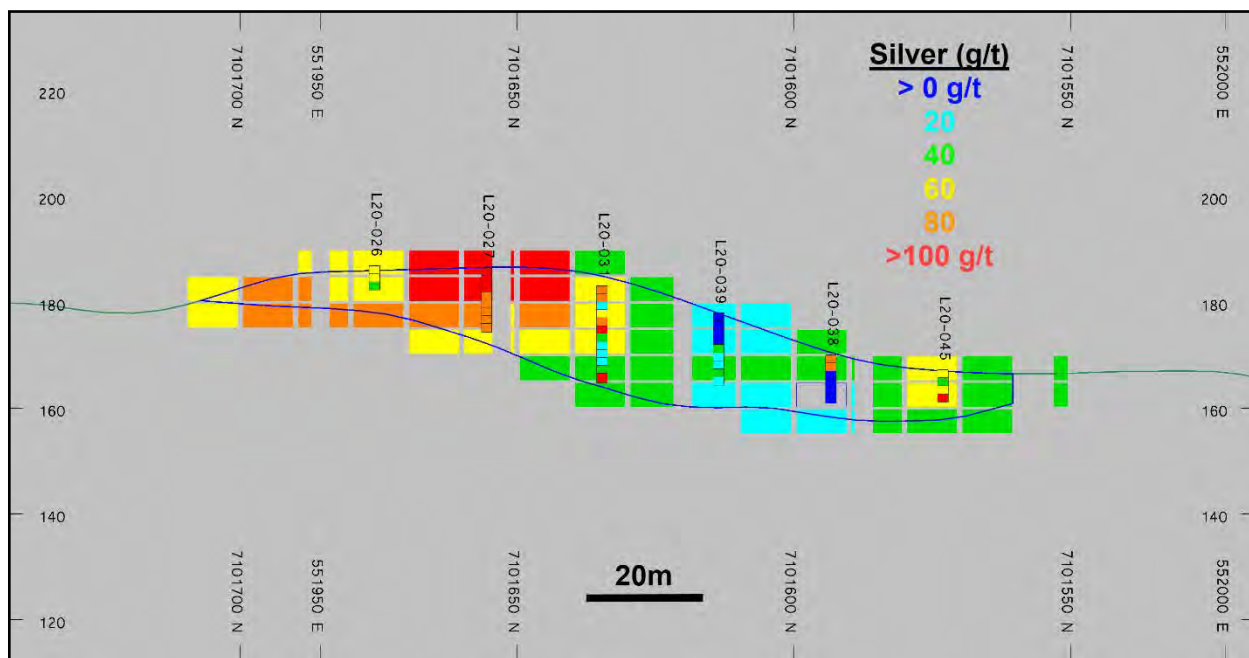


Figure 14-26: Silver Grades in Drilling and Block Model in the Leach Pad Area



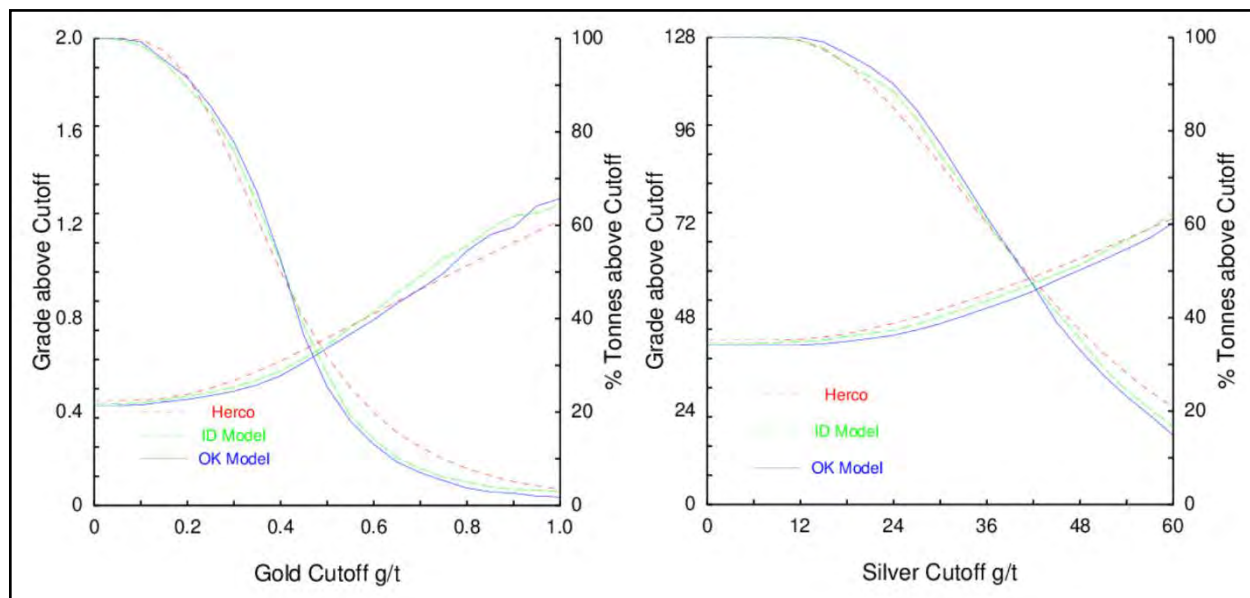
Model Checks for Change of Support

See Section 14.2.8 for the description of model checks for change of support.

The Herco analysis was conducted on the distribution of all five metals estimated in the block model and level of correspondence was achieved in all cases.

Examples showing the distributions of the gold and silver models are shown in Figure 14-27.

Figure 14-27: Herco Grade/Tonnage Plot for Gold and Silver Models in the Leach Pad Area



Swath Plots (Drift Analysis)

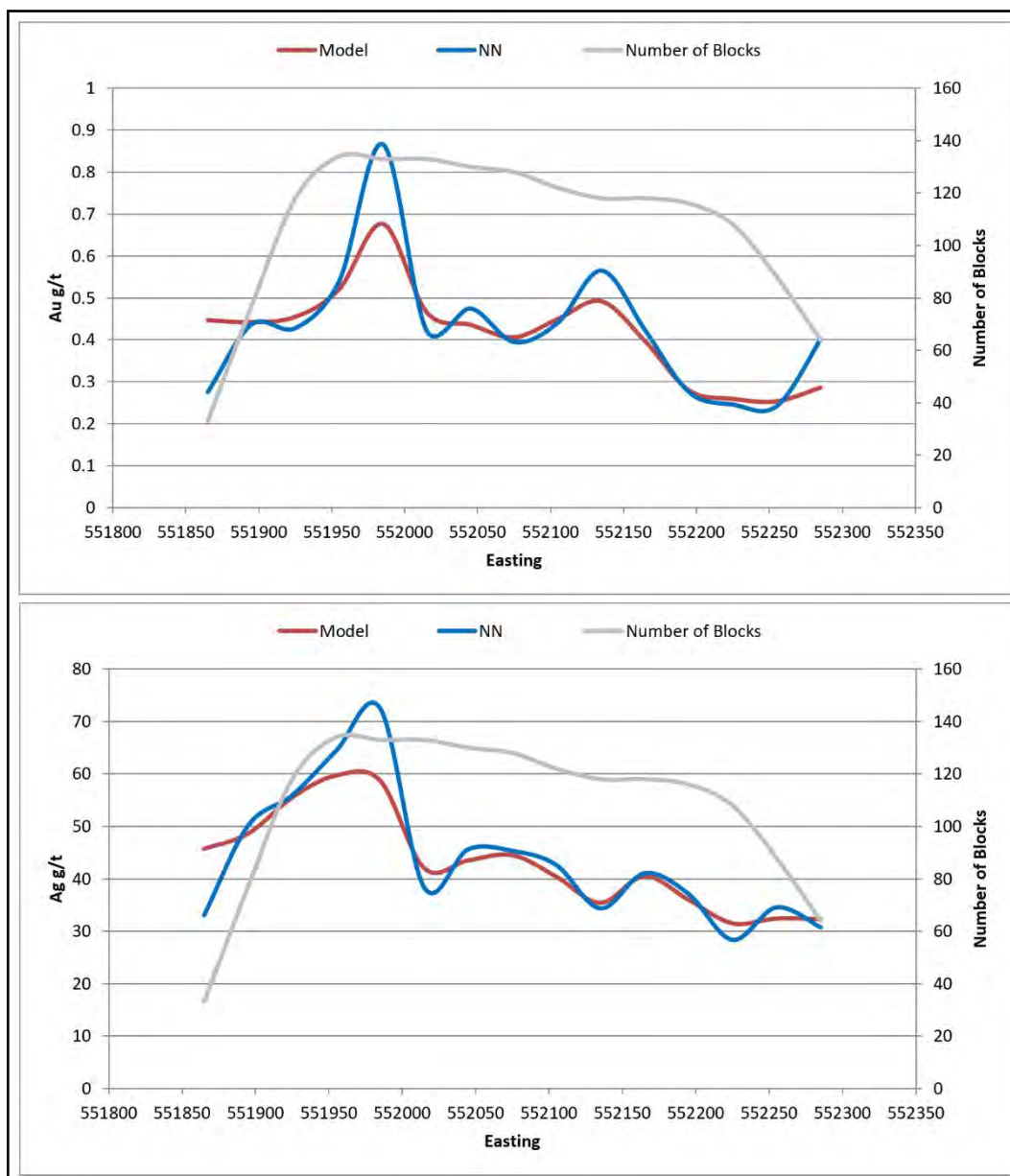
See Section 14.2.8 for the description of swath plots.

Swath plots were generated in three orthogonal directions for all models. An example of the gold and silver distributions in north-south swaths is shown in Figure 14-28.

There is good correspondence between the models in most areas. The degree of smoothing in the OK model is evident in the peaks and valleys shown in the swath plots.

The validation results indicate that the OK model is a reasonable reflection of the underlying sample data.

Figure 14-28: Swath Plot of Gold and Silver OK and NN Models by Easting in the Leach Pad Area



14.3.9 Mineral Resource Classification

The mineral resources located in the leach pad area at the Illinois Creek deposit were classified in accordance with the CIM *Definition Standards on Mineral Resources and Mineral Reserves* (May 2014). The classification parameters are defined relative to the distance between gold sample data and are intended to encompass zones of reasonably continuous mineralization that exhibit the desired degree of confidence. These parameters are based on visual observations and statistical studies. Classification parameters are based primarily on the nature of the distribution of gold data as it is the main contributor to the relative value of this polymetallic leach pile.

The following criteria were used to define leach pad mineral resources in the Indicated and Inferred categories.

Indicated Mineral Resources (Leach Pad)

Mineral resources in this category are areas of the leach pad where there is a consistent pattern or distribution of drill holes that are on a maximum nominal spacing of 30 m.

Inferred Mineral Resources (Leach Pad)

Mineral resources in this category include model blocks that are located within a maximum distance of 60 m from a drill hole.

A domain was interpreted that encompasses model blocks that are included in the Indicated category. This step ensures consistency of classification across the deposit. The remainder of the leach pile material that is not included in the Indicated category is included in the Inferred resource category.

At this stage of project evaluation, there are no mineral resources on the leach pad that can be included in the Measured category.

14.4 ESTIMATION OF IN-SITU AND LEACH PAD MINERAL RESOURCES

CIM Definition Standards on Mineral Resources and Mineral Reserves (May 2014) define a mineral resource as: “[A] concentration or occurrence of solid material of economic interest, in or on the Earth’s crust in such form, grade or quality and quantity, that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.”

The requirement with respect to “reasonable prospects for eventual economic extraction” generally implies that quantity and grade estimates meet certain economic thresholds and that mineral resources are reported at an appropriate cut-off grade that takes into account extraction scenarios and processing recovery. It is assumed that the in-situ mineral resources would be mined using open pit extraction methods. It is also assumed that there would be no selectivity (i.e., no cut-off grade threshold) of the material located in the leach pad area and that all of the material currently located on the leach would be treated with cyanide leaching solution.

The economic viability of the in-situ mineral resources was tested by constraining it within a floating cone pit shell with the following parameters (US\$):

- | | |
|---------------------------|-------------------------------------|
| • Mining (open pit) | \$2.50/t |
| • Processing | \$10/t |
| • G&A | \$4/t |
| • Gold price | \$1,600/oz |
| • Silver price | \$20/oz |
| • Gold process recovery | 92% |
| • Silver process recovery | 65% |
| • Copper process recovery | 0% (no CN-leach recovery of copper) |
| • Pit slope | 45 degrees |

Based on the metal prices and recoveries listed here, recoverable gold equivalent (AuEqR) grades are calculated using the following formula:

$$\text{AuEqR} = (\text{Au g/t} \times 0.92) + (\text{Ag g/t} \times 0.0125 \times 0.65)$$

The pit shell is generated using a floating cone algorithm based on the recoverable gold equivalent block grades. There are no adjustments for mining recoveries or dilution. This test indicates that some of the deeper mineralization may not be economic due to the increased waste-stripping requirements. It is important to recognize that discussions surrounding surface mining parameters are used solely to test the “reasonable prospects for eventual economic extraction,” and they do not represent an attempt to estimate mineral reserves. There are no mineral reserves calculated for this Project. These preliminary evaluations are used to prepare a Mineral Resource Statement and to select appropriate reporting assumptions.

The estimate of in-situ mineral resources, contained within the \$1,600/oz Au pit shell, is shown in Table 14.10. Based on the assumed metal prices, operating costs and projected metallurgical recoveries, the base case cut-off grade for mineral resources is estimated to be 0.35 g/t gold equivalent (AuEq). Note that the average SG of the in-situ mineral resources is 2.52. It is unknown at this stage of project evaluation whether copper contained in mineral resources is recoverable, but it is included in the estimate of mineral resources for information purposes.

The estimate of mineral resources located on the leach pad is shown in Table 14.11. It is assumed that all of the material currently located on the leach pad exhibits reasonable prospects for economic viability. It is also assumed that there will be no selective mining and that the whole volume of material on the pad will be processed using leaching solutions. Therefore, mineral resources located on the leach pad are presented at a zero cut-off grade. It is unsure at this stage whether the copper present in the leach pad could be recoverable, but it is included in the estimate of mineral resources for information purposes. It should also be noted that the leach pad also contains an average of 0.28% Pb and 0.16% Zn.

The combined mineral resources for the Illinois Creek Project are shown in Table 14.12.

There are no known factors related to environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors which could materially affect the mineral resource. Mineral resources in the Inferred category have a lower level of confidence than that applied to mineral resources in the Indicated category, and, although there is sufficient evidence to imply geologic grade and continuity, these characteristics cannot be verified based on the current data. It is reasonable to expect that the majority of Inferred mineral resources could be upgraded to Indicated mineral resources with continued exploration.

Table 14.10: Mineral Resource Estimate for In-Situ Mineral Resources

Class	Tonnes (M)	Average Grade				Contained Metal			
		AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	7.4	1.39	0.98	32.7	0.17	331	234	7.8	28
Inferred	3.1	1.47	1.02	35.9	0.20	148	102	3.6	14

In-Situ Mineral Resources are constrained within a pit shell developed using a metal prices of US\$1,600/oz Au and US\$20/oz Ag, mining costs of US\$2.50/t, processing costs of US\$10/t, G&A cost of US\$4.00/t, 92% metallurgical recovery Au, 65% metallurgical recovery Ag and an average pit slope of 45 degrees. The cut-off grade for resources considered amenable to open pit extraction methods is 0.35 g/t AuEq where $AuEq = Au_{g/t} + (Ag_{g/t} \times 0.0125)$.

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted into Mineral Reserves.

Mineral resources in the Inferred category have a lower level of confidence than that applied to Indicated mineral resources, and, although there is sufficient evidence to imply geologic grade and continuity, these characteristics cannot be verified based on the current data. It is reasonably expected that the majority of Inferred mineral resources could be upgraded to Indicated mineral resources with continued exploration.

Table 14.11: Mineral Resource Estimate for Leach Pad Mineral Resources

Class	Tonnes (000)	Average Grade				Contained Metal			
		AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	1,300	1.00	0.44	44.3	0.42	41.8	18.6	1.9	12
Inferred	152	0.90	0.37	42.6	0.33	4.4	1.8	0.2	1

It is assumed that the entire volume of the material on the leach pad will be processed and therefore, no selectivity is possible, and the Mineral Resources are presented at a zero-cut-off grade.

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted into Mineral Reserves.

Mineral resources in the Inferred category have a lower level of confidence than that applied to Indicated mineral resources, and, although there is sufficient evidence to imply geologic grade and continuity, these characteristics cannot be verified based on the current data. It is reasonably expected that the majority of Inferred mineral resources could be upgraded to Indicated mineral resources with continued exploration.

Table 14.12: Mineral Resource Estimate for Combined In-Situ and Leach Pad Mineral Resources

Class	Tonnes (M)	Average Grade				Contained Metal			
		AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	8.7	1.33	0.90	34.4	0.21	373	253	9.6	40
Inferred	3.3	1.44	0.99	36.2	0.21	152	104	3.8	15

In-Situ Mineral resources are stated as contained within a pit shell developed using a metal prices of US\$1,600/oz Au and US\$20/oz Ag, mining costs of US\$2.50/t, processing costs of US\$10/t, G&A cost of US\$4.00/t, 92% metallurgical recovery Au, 65% metallurgical recovery Ag and an average pit slope of 45 degrees. The cut-off grade for resources considered amenable to open pit extraction methods is 0.35 g/t AuEq where $AuEq = Au_{g/t} + (Ag_{g/t} \times 0.0125)$. It is assumed that the entire volume of the material on

The distribution of the in-situ base case mineral resource within the \$1,600/oz Au pit shell as well as the material in the leach pad area is shown from a series of isometric viewpoints in Figures 14-29 and 14-30.

Figure 14-29: Isometric View of Base Case Mineral Resources

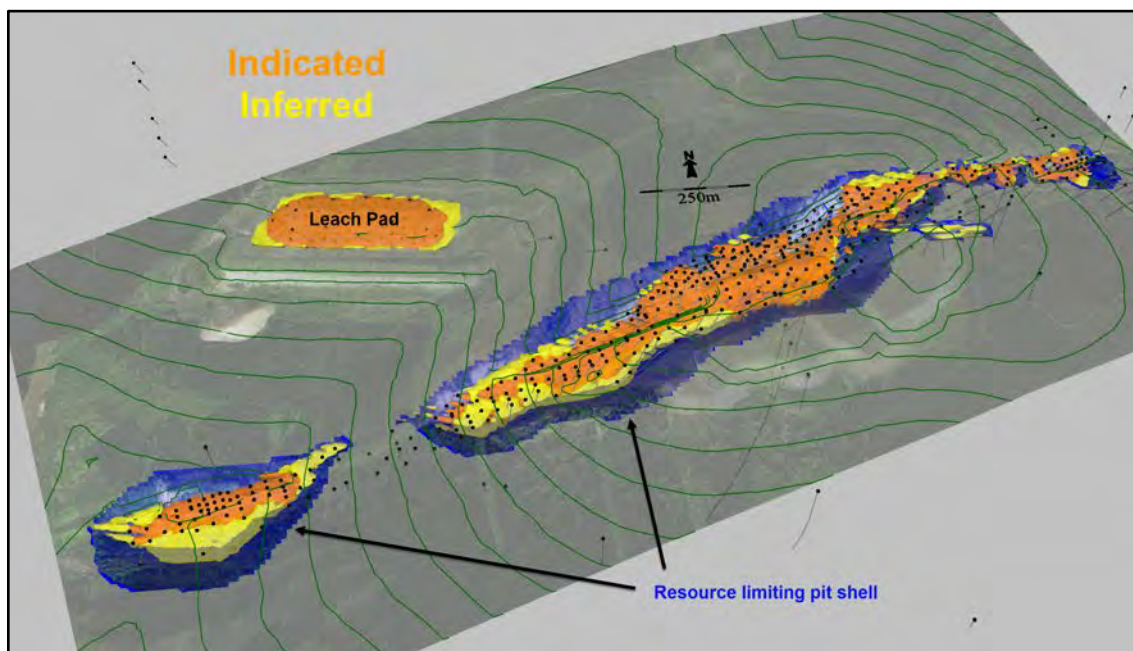
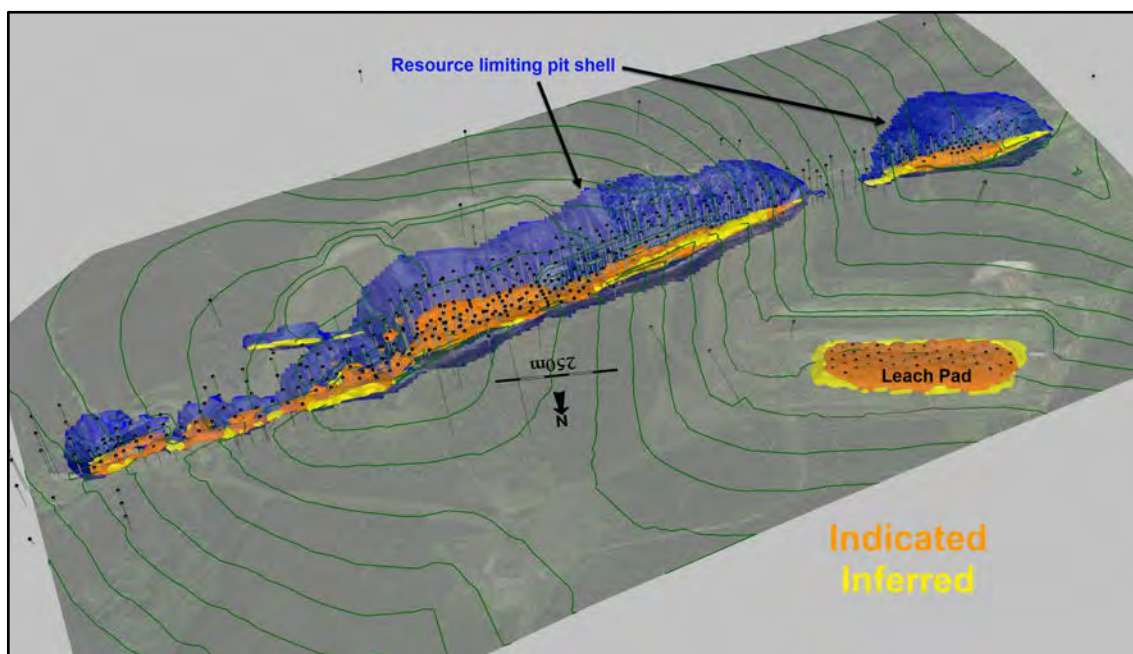


Figure 14-30: Isometric View of Base Case Mineral Resources



14.4.1 Sensitivity of In-Situ Mineral Resources to Gold Price

The sensitivity of the in-situ mineral resources to varying gold prices is demonstrated by listing mineral resources contained within pit shells generated at each defined metal price, and with cut-off grades that are determined based on the gold price and the operating costs and process recovery factors listed previously. The results are summarized in Table 14.13.

There is relatively little change in the volume of mineral resources in the Indicated category with changing gold price. This is because the majority of Indicated class model blocks occur within the base case pit shell, and there is little difference in the size of other pit shells generated using lower gold prices. The volume of mineral resources in the Inferred category is more variable, with a significant increase in the depth extent of the pit shell and the size of the mineral resource, when the gold price reaches \$1,900/oz.

Table 14.13: Sensitivity of In-Situ Mineral Resources to Gold Price

Gold Price (\$/oz)	Cut-off Grade AuEq (g/t)	Tonnes (M)	Average Grade				
			AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	
Indicated							
1,200	0.46	6.10	1.57	1.13	35.4	0.19	308
1,300	0.43	6.54	1.51	1.08	34.6	0.18	318
1,400	0.40	6.85	1.47	1.04	33.9	0.18	323
1,500	0.37	7.18	1.42	1.00	33.2	0.18	328
base case 1,600	0.35	7.40	1.39	0.98	32.7	0.17	331
1,700	0.33	7.60	1.37	0.96	32.2	0.17	334
1,800	0.31	7.81	1.34	0.94	31.7	0.17	336
1,900	0.29	8.08	1.31	0.92	31.1	0.16	339
2,000	0.28	8.21	1.29	0.91	30.8	0.16	340
Inferred							
1,200	0.46	1.53	1.65	1.16	39.1	0.22	81
1,300	0.43	2.11	1.61	1.13	38.3	0.22	109
1,400	0.40	2.44	1.54	1.07	38.2	0.21	127
1,500	0.37	2.74	1.50	1.04	36.9	0.21	132
base case 1,600	0.35	3.13	1.47	1.02	35.9	0.20	148
1,700	0.33	3.51	1.43	1.00	34.9	0.20	162
1,800	0.31	3.85	1.40	0.97	34.2	0.20	173
1,900	0.29	6.39	1.33	0.93	31.9	0.19	273
2,000	0.28	7.19	1.30	0.91	31.7	0.19	307

Note: The estimates in Table 14.13 are constrained within individual pit shells generated using the defined gold prices, and using cut-off grades that are calculated based on the projected operating costs of US\$1,000/oz increments, mining costs of US\$2.50/t, processing costs of US\$10/t, G&A cost of US\$4/t, 92% metallurgical recovery Au, 65% metallurgical recovery Ag and an average pit slope of 45 degrees. Mineral resources are not mineral reserves because the economic viability has not been demonstrated.

15 MINERAL RESERVE ESTIMATES

The Illinois Creek Project is an early exploration project; there are presently no mineral reserves at the Project.

16 MINING METHODS

The Illinois Creek Project is an early exploration project; no mining methods have been investigated for the Project.

17 RECOVERY METHODS

The Illinois Creek Project is an early exploration project; no recovery methods have been investigated for the Project.

18 PROJECT INFRASTRUCTURE

18.1 ROAD/BARGE

In 1993, during operation of the Illinois Creek mine, AIDEA conducted an engineering study of the Yukon access route from a laydown area south of Kaltag to the mine titled the *Illinois Creek Transportation Study*. That study proposed a 47.5 km (29.5 mile) access road that connected to a port located on the river with a greater than 40 ft draft and serviceable by deep-water barges for five months of the year from either upstream at Nenana or downstream at Saint Mary's/Emmonak deep-water port (NPMC, Hughes, R. and Smith, M., 1993).

The 1993 AIDEA Transportation Study outlined costs to build the access route, including laydown area, two 100-ft bridges, and a ferry at \$12.2M.

AIDEA is a public corporation of the State of Alaska, created in 1967 by the Alaska Legislature, whose mission is to promote, develop, and advance economic growth and diversification in Alaska by providing various means of financing and investment. AIDEA has the authority to own and operate facilities which advance this goal.

18.2 POWER

During the mine operation, diesel fuel was transported by DC-6 or C-130 aircraft from Galena to the mine site (fuel was barged down the Yukon River from Nenana near Fairbanks and then staged in Galena). The 1993 AIDEA Transportation Study also looked at the impact of direct shipping to the Kaltag laydown site and outlined a >26% cost savings for fuel. Capital costs (1993) for proposed tankage at the laydown area were \$650,000. Current exploration activities rely on the delivery of diesel fuel to the Illinois Creek airstrip by various aircraft; DC-6s are most cost effective.

19 MARKET STUDIES AND CONTRACTS

The Illinois Creek Project is an early exploration project; no market studies or contracts have been completed.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

This section summarizes the existing environmental information for the Illinois Creek Project area, describes the major permits that may be required to develop the Project into a mine, and summarizes the social and community considerations for the Project.

20.1 ENVIRONMENTAL STUDIES

There was a concerted effort to collect baseline data for a number of environmental resource categories in the Project area in the early to mid 1990s as part of the mine development efforts of USMX. The mine was eventually closed, and in 2005 it was fully reclaimed by American Reclamation Group (ARG). In 2019, WAC&G initiated surface water-quality sampling. And in 2020, WAC&G updated the wetlands mapping and initiated aquatic biomonitoring in the area. The environmental baseline work is briefly discussed in Sections 20.1.1 to 20.1.7 and includes surface water and groundwater quality, wetlands mapping, aquatic biomonitoring, groundwater hydrogeology, cultural resources, waste rock characterization, and meteorology.

20.1.1 Surface Water and Groundwater Quality

During historical mining operations in the 1990s, USMX monitored surface water and groundwater quality at nine stream sites, four springs, and six monitoring wells in the general mine area. Limited data from that effort are available.

In 2006, Alaska Department of Natural Resources (ADNR) assumed responsibility for monitoring surface water and groundwater quality at the site and conducted various sampling campaigns from 2006 through 2019.

Beginning in 2019, WAC&G initiated a renewed surface water quality sampling campaign at two additional surface sites. No water quality sampling was performed in 2020.

20.1.2 Wetlands Mapping

In 2020, WAC&G engaged Alaska Biological Research, Inc. (ABR) to prepare a desktop wetland delineation map for the Project to assess the current existence of wetlands in the Illinois Creek mine area. This was primarily an exercise to update the wetland delineation map that ABR generated in 1995 under contract with USMX.

If additional Project plans indicate unavoidable impacts to wetlands or waters, then a site-specific wetland map, supported by field wetland determinations, will be required to support the permitting process required under Section 404 of the Clean Water Act (CWA).

20.1.3 Aquatic Biomonitoring

Beginning in 1995, the Alaska Department of Fish and Game, Habitat Division (ADF&G) were engaged by the mine to conduct fish studies. Work was completed in 1995, 1996, and 1997 with an emphasis on juvenile Coho (silver) salmon. In summary, these earlier fish studies suggest that annual summer populations of Coho and Chum salmon vary significantly but that Illinois Creek provides a healthy habitat for salmon spawning and rearing.

In 2020, WAC&G engaged ADF&G to initiate biomonitoring in streams potentially impacted by a reopening of the Illinois Creek mine or development of the nearby Honker and Round Top prospects.

Biomonitoring efforts included surveys of periphyton (measured by chlorophyll-a) and aquatic macroinvertebrates in Illinois Creek. Juvenile fish were captured in minnow traps in Illinois Creek, as well as streams in the nearby Dome, Minnesota, Colorado, California, and Eddy Creek drainages. One unnamed tributary of the Little Mud River was also trapped. Juvenile Coho salmon from Illinois Creek were analyzed for whole-body concentrations of several metals, and their length frequencies were described. Juvenile Coho population characteristics and metal concentrations in 2020 were compared to historical data.

Baseline periphyton standing crop and aquatic macroinvertebrate population characteristics were described and can be used as an indicator of future environmental changes. Metal concentrations found in juvenile Coho salmon captured in Illinois Creek were generally comparable to those found in the 1990s. The exception was mercury, which was notably elevated compared to the previous collection, though they are still below FDA action levels. Other metal concentrations differed only slightly from those found in the 1990 samples. Catches and length-frequency distributions of juvenile Coho salmon in Illinois Creek were comparable to the historical data.

Fish communities vary depending on stream characteristics, consisting primarily of resident Dolly Varden and slimy sculpin in high-gradient headwater streams, and mixed communities of Alaska blackfish, slimy sculpin, Arctic grayling, and juvenile salmon in the lower reaches. Abundant large beaver dam complexes in these drainages alter fish distribution on a decades-long timescale.

20.1.4 Groundwater Hydrogeology

In 1995, SRK completed a hydrogeologic evaluation of the site for USMX. The study relied on the results of groundwater-level monitoring in six wells, falling-head and pump tests, and the site geology to conclude the presence of an aquifer (termed the Illinois Creek aquifer) which is roughly coincident with the geologic fold that trends east-west and envelopes the Illinois Creek gold deposit.

Between 1995 and 2004, during historical mine operations, USMX monitored water levels in monitoring wells.

In 2006, ADNR assumed responsibility for post-closure monitoring, and it monitored water levels periodically until 2019.

At this time, the volume of potential pit water and the potential need for water treatment and permitting, such as discharge permits, have not been evaluated for a new Illinois Creek mine. But these will be included, as necessary, in future mine planning.

20.1.5 Cultural Resource Surveys

Owen Mason and Howard Maxwell conducted cultural resource surveys for NPMC in 1991 and 1992, respectively, for a proposed laydown area on the Yukon River, the proposed transportation corridor, and the Illinois Creek mine area. In 1994, Northern Land Use Research (NLUR) conducted work in the Illinois Creek mine area at six specific sites that Maxwell had previously identified as having high archaeological potential. In addition, NLUR conducted work at the Macho

Grande prospect and along the route of the then-proposed new road connecting the mine site with the airstrip; all at the request of USMX. The survey combined a pedestrian survey, intensive and extensive surface examinations, and subsurface testing where appropriate (NLUR, 1995).

In 1994, NLUR identified one archaeological site on Quartzite Knob (NUL-076). NLUR evaluated this site through intensive surface survey, subsurface testing and monitoring of sediments removed in preparation of this locality for drilling. The site overlooks the Little Mud River and a broad open section of the Innoko River flood plain. No artifacts were recovered that were sufficient to confidently assess temporal or cultural affiliation nor can the artifacts be directly attributed to a possible historical Native group (either Holikachuk or Koyukon Athabaskan). Based on other interior Alaskan archaeological chronologies, the microblade technology could date anywhere between 8,000 and 12,000 years ago or as late as 1,500 years ago. NLUR determined the site was not eligible for the National Register of Historic Places (NLUR, 1995). At the time, NLUR recommended that mine development work be allowed to proceed, but it recommended that any additional areas within the Illinois Creek mining lease boundary be considered to have potential for the discovery of archaeological or historical resources and should be field examined at a reconnaissance level prior to any work in those areas.

WAC&G will likely be required to conduct additional cultural resource surveys depending on the footprint of any new mine and access road proposed for the Project.

20.1.6 Waste Rock Characterization

In 1995, SRK conducted waste rock characterization studies and assessed the potential for acid generation from these rocks. To characterize waste rock, SRK used both static and kinetic testing, including saturated paste, Acid-Base Accounting (ABA), and humidity cell tests. SRK (1995) concluded that the testing completed to date indicated that any waste rock produced at Illinois Creek (USMX mine plan) would have a very low potential for acid-generation.

WAC&G may need to complete additional waste rock characterization studies depending on any new mine plan proposed for the site.

20.1.7 Meteorology

In the early 1990s, USMX maintained an on-site meteorological monitoring station. Between August 19, 1992 and August 18, 1993, data were collected and used by consultant TRC Environmental Corporation for modeling to obtain the air quality control permits required for the historical mine.

WAC&G will likely need to collect additional meteorological data to support air permitting for any future mine development at Illinois Creek. New air dispersion modeling will be required to obtain new air permits for construction and operations that incorporate the meteorological data with WAC&G's updated mine plans and an inventory of all expected emission sources at the new mine.

20.1.8 Additional Baseline Data Requirements

As mentioned in each of the environmental resource categories shown here, WAC&G will likely need to continue and expand baseline environmental monitoring to support permitting for a new

mine at Illinois Creek. WAC&G has initiated formal engagement with the regulatory agencies and other Project staff to identify any additional data requirements as the Project design advances.

20.2 PERMITTING

20.2.1 Exploration Permits

WAC&G is presently authorized to explore at Illinois Creek under authority of ADNR Miscellaneous Land Use Permit #9831, also referred to as an “APMA” permit, which has an issue date of July 1, 2019 and expires on December 31, 2023. The permit has reclamation stipulations and includes requirements for filing an annual work plan and an Annual Exploration Report with ADNR, describing exploration and reclamation activities. To date, WAC&G has not disturbed any acreage for the purposes of exploration at Illinois Creek.

20.2.2 Major Mine Permits

The following discussion identifies the major permits and approvals that will likely be required for the Illinois Creek deposit to be redeveloped into an operating mine. “Major” mine permits are somewhat subjectively defined here, but these permits specifically authorize mining activities, including construction of facilities, mine operations, and mine closure. A significant number of other permits are also required for items such as camp operations and explosives handling that are not discussed here. A list of likely required major mine permits is shown in Table 20.1.

Table 20.1: Mine Permits

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Agency	Authorization
State of Alaska	
ADNR	Plan of Operations Approval (including Reclamation Plan and Financial Assurance)
	Upland Mining Lease
	Mill Site Lease
	Reclamation Financial Assurance
	Certificate of Approval to Construct a Dam
	Certificate of Approval to Operate a Dam
	Water Use Authorization to Appropriate Water
ADF&G	Title 16 Permits for Fish Passage (authorize stream crossings, if required)
ADEC	APDES Water Discharge Permit (if required)
	Alaska Multi-Sector General Permit (MSGP) for Stormwater
	Stormwater Discharge Pollution Prevention Plan (requirement of MSGP)
	Section 401 Water Quality Certification of the CWA Section 404 Permit (for CWA Section 404 permit)
	Integrated Waste Management Permit
	Air Quality Control – Construction Permit
	Air Quality Control – Title V Operating Permit
	Reclamation Financial Assurance (shared with ADNR)
Federal Government	
EPA	Spill Prevention, Control, and Countermeasure (SPCC) Plan (fuel transport and storage)
USACE	CWA Section 404 Dredge and Fill Permit (if required)

The types of major mine permits required are largely determined by the fact that the Project is entirely located on State of Alaska lands.

A Plan of Operation Approval (which includes the Reclamation Plan), an Upland Mining Lease, and a Millsite Lease from the ADNR will be required. The heap leach embankment meets the criteria of a jurisdictional dam, and a Certificate to Operate that dam will be required from ADNR for operations. Reconstructing the dam from its currently closed configuration will also require a Certificate to Construct a Dam, also obtainable from the ADNR. The Project will also require water-use authorizations, as well as several minor permits, including a right-of-way for any all-season access road and authorization to develop construction material sites; all these are obtainable from the ADNR.

ADEC would authorize waste management (waste rock, camp waste, and process waste) under an Integrated Waste Management Permit. Air emissions during construction and then during operations will require Air Quality Control Permits, starting with a Construction Air Permit followed by an Operations Air Permit, all obtainable from ADEC. Depending on the potential need to treat and discharge non-domestic wastewater to the environment, the Project may also require an Alaska Pollution Discharge Elimination System (APDES) Permit from ADEC. Stormwater management would be authorized under the Multi-Sector General Permit (MSGP) for stormwater issued by ADEC and require WAC&G to develop and implement a Storm Water Pollution Prevention Plan (SWPPP). If a Clean Water Act (CWA) Section 404 permit is required from the U.S. Army Corp of Engineers (USACE) for impacts to wetlands, then ADEC will also be required to confirm that the activities authorized under the Section 404 permit are protective of water quality by issuing a CWA Section 401 Certification.

ADFG would have to authorize any culverts or bridges that are required to cross fish-bearing streams or other impacts to fish-bearing streams that result in the loss of fish habitat. Permits are not generally required for winter ice-road crossings, but ADF&G generally requests that ice roads are “slotted” prior to spring freshet to facilitate fish passage and to minimize the accumulation of debris.

Construction of an all-season road from the Yukon River would likely include significant fill into jurisdictional wetlands and require a CWA Section 404 permit from the USACE. An application for a Section 404 permit will trigger a requirement to satisfy the requirements of the National Environmental Policy Act (NEPA) and, depending on the significance of the impacts to wetlands, the permit application would either trigger an Environmental Assessment (EA) concluding that the Project had no significant impact, or trigger the development of an Environmental Impact Statement (EIS) for the Project. Development of an EIS for the Project would be a longer process than an EA.

20.3 SOCIAL OR COMMUNITY CONSIDERATIONS

The Property lies roughly 85 km south-southwest of the regional service community of Galena (population 472; 2017 U.S. Census), 77 km southeast of Nulato (248; 2017 U.S. Census), and 52 km southeast of the village of Kaltag (population 177; 2017 U.S. Census). These communities provided a significant portion of the workforce at the mine in the mid 90s and early 2000s. During that time, up to 110 people were employed at the mine.

Residents in the local communities live a largely subsistence lifestyle with incomes supplemented by trapping, guiding, local development projects, government aid, and other work in and outside of the villages, including seasonal firefighting work.

The Illinois Creek Project has the potential to significantly improve work opportunities for village residents. WAC&G is already working directly with the villages to employ residents in the ongoing exploration program as geo-technicians and other camp-support positions. WAC&G has communicated that it will continue to develop good relationships with communities and develop a workforce for the Project moving forward.

In general terms, rural Alaskan residents are often concerned about potential mining impacts to wildlife and fish for any projects within their traditional-use areas. If any of WAC&G's formal permit applications trigger the NEPA process, then local community concerns will be formally recognized, particularly if an EIS is developed for the Project. Early in any EIS process, the lead federal permitting agency will hold scoping meetings in rural villages to hear and record the concerns of the local communities so that the more significant of these concerns can be addressed during the development of the EIS. In addition, the lead federal agency would have government-to-government consultations with the Tribal Councils in potentially affected villages, as part of the EIS process, to discuss the project and hear concerns.

WAC&G has communicated that its interactions with tribal and village representatives in the area have been positive so far.

20.4 MINE RECLAMATION AND FINANCIAL ASSURANCE

Mine reclamation requirements are largely driven by state regulations (11 AAC 86.150, 11 AAC 97.100-910, and 18 AAC 70) and statutes (AS 27.19) that specify that a mine must be reclaimed concurrent with mining operations to the greatest extent possible and then closed in a way that leaves the site stable in terms of erosion and avoids degradation of water quality from acid rock drainage or metal leaching on the site. No reclamation plan has been developed by WAC&G because it would be premature. A plan will be submitted to the state agencies for review and approval in the future, during the formal mine permitting process.

Ongoing reclamation of disturbance caused by mineral exploration activities at the Illinois Creek Project consists of minimal surface disturbance at drill sites and is completed under the terms of the State of Alaska in the Multi-Year Hardrock Exploration Permit #9831 issued by the ADNR Division of Mining, Land, and Water. WAC&G is up to date with its exploration reclamation obligations.

21 CAPITAL AND OPERATING COSTS

The Illinois Creek Project is an early exploration project; no capital or operating costs have been estimated.

22 ECONOMIC ANALYSIS

The Illinois Creek Project is an early exploration project; no economic analysis has been completed.

23 ADJACENT PROPERTIES

No information from any adjacent properties was used in the estimate of mineral resources at the Illinois Creek Property.

24 OTHER RELEVANT DATA AND INFORMATION

There are no other relevant data or information with respect to the Illinois Creek Project.

24.1 ROUND TOP PROPERTY

At Round Top, a high-level molybdenum- and silver-based porphyry copper deposit (PCD) has been identified with sheeted chalcopyrite/covellite and minor base metal veins with illite alteration in a high-level lithocap dominated by argillic alteration as kaolinite. Deep surficial oxidation has resulted in the development of an extensive chalcocite-enrichment blanket with several enriched horizons. An extremely complex diatreme brecciation event precedes primary mineralization. A total of 38 drill holes were completed at the Round Top porphyry copper deposit. Initial deeper drilling has recognized early higher temperature stockwork, molybdenum-enriched mineralization. Magnetic susceptibility modeling along with alteration and geochemical vectoring suggests primary biotite/magnetite/chalcopyrite/trace-bornite mineralization that lies north of current deep-drilling, which has reached depths of 750 m.

In addition to the Round Top porphyry mineralization, widespread carbonate replacement mineralization and attendant soil anomalies lie immediately west of the Round Top porphyry system in the Illinois Creek formation at the TG and TG North (TGN) occurrences. A total of 13 drill holes targeting the TG/TGN carbonate replacement mineralization were completed on this property.

25 INTERPRETATION AND CONCLUSIONS

Based on the evaluation of the data available from the Illinois Creek Project, the authors of this Technical Report conclude the following:

- At the effective date of this Technical Report (January 15, 2021), the Illinois Creek Property consists of 110 contiguous mining claims which are part of a larger mineral tenure package totaling 222 mining claims covering 14,374 ha. and WAC&G owns 100% of the Illinois Creek Property through the acquisition of PIEK, Inc.
- The Illinois Creek deposit is characterized as a carbonate replacement deposit (CRD) in which zones of predominantly massive sulfides have been pervasively oxidized to depths approaching 400 m below surface. The remaining iron-oxide gossans contain appreciable amounts of gold and silver, plus minor amounts of copper, lead and zinc.
- Exploration on the Property began in the early 1980s. In the late 90s and early 2000s, there was limited production, and exploration was halted due to falling metal prices and corporate financial difficulties for the operators at that time.
- The Illinois Creek deposit is estimated to contain 7.4M tonnes of mineral resources in the Indicated category at a grade of 0.98 g/t Au and 33 g/t Ag plus 3.1M tonnes mineral resources in the Inferred category at an average grade of 1.02 g/t Au and 36 g/t Ag. These mineral resources are constrained within a pit shell generated using a gold price of US\$1,600/oz and a silver price of US\$20/oz and summarized using a base case cut-off grade of 0.35 g/t AuEq.
- A leach pad area on the Property contains a volume of mineralized material that was stacked during previous mining activities and leached intermittently from 1979 through mine closure. Poor recoveries plagued the leach pad due to a variety of reasons, including pad construction, a change from crush/agglomeration stacking to run-of-mine (ROM) material, and high copper content. During the summer of 2020, WAC&G drilled and sampled the leach pile. It is estimated to contain 1.3M tonnes of mineral resources in the Indicated category at a grade of 0.44 g/t Au and 44 g/t Ag and 152k tonnes of mineral resources in the Inferred category at a grade of 0.37 g/t Au and 43 g/t Ag.
- Preliminary metallurgical work indicates that the highly oxidized rocks are amenable to relatively low-cost leaching extraction of gold and silver using cyanide solutions.
- There are no known factors related to metallurgical, environmental, permitting, legal, title, taxation, socio-economic, marketing or political issues which could materially affect the mineral resource estimates.
- Nearby high-grade mineralization occurs at both Honker Vein (gold) and Waterpump Creek (silver) targets on the Illinois Creek Property.

26 RECOMMENDATIONS

Based on the evaluation of the data available from the Illinois Creek Project, the authors of this Technical Report recommend the following:

1. Conduct a drilling program on the Illinois Creek deposit to test for extensions of the deposit both down dip and along strike. Budget is \$500,000 (2,000 m @ \$250/m).
2. Generate interpretations of lithology, alteration, mineralization and structural domains and evaluate the potential impact of these on the estimate of mineral resources. Budget is \$25,000.
3. Complete a PEA on the Illinois Creek project. Budget is \$100,000.
4. Conduct a drilling program to evaluate the nearby Honker deposit followed by the generation of a mineral resource estimate. Budget is \$500,000 (1,800 m @ \$250/m, plus resource estimate).
5. Conduct metallurgical studies to determine the most appropriate process for treating mineralized material from the Illinois Creek deposit. Budget is \$75,000.
6. Continue environmental baseline monitoring to support environmental and permitting activities. Budget is \$30,000.

The proposed drilling program is shown in Table 26.1 and Figures 26-1 to 26-3.

Total budget is \$1,230,000.

Table 26.1: Proposed Drilling Program

Targets	Holes	Meters
Extensions		
East IC	4 – 8	400 – 800
South IC	4 – 6	400 – 600
Waterpump Creek	5 – 10	500 – 1,000
Other		
Honker	8 – 12	800 – 1,800

Figure 26-1: Extension Drilling – East and South IC

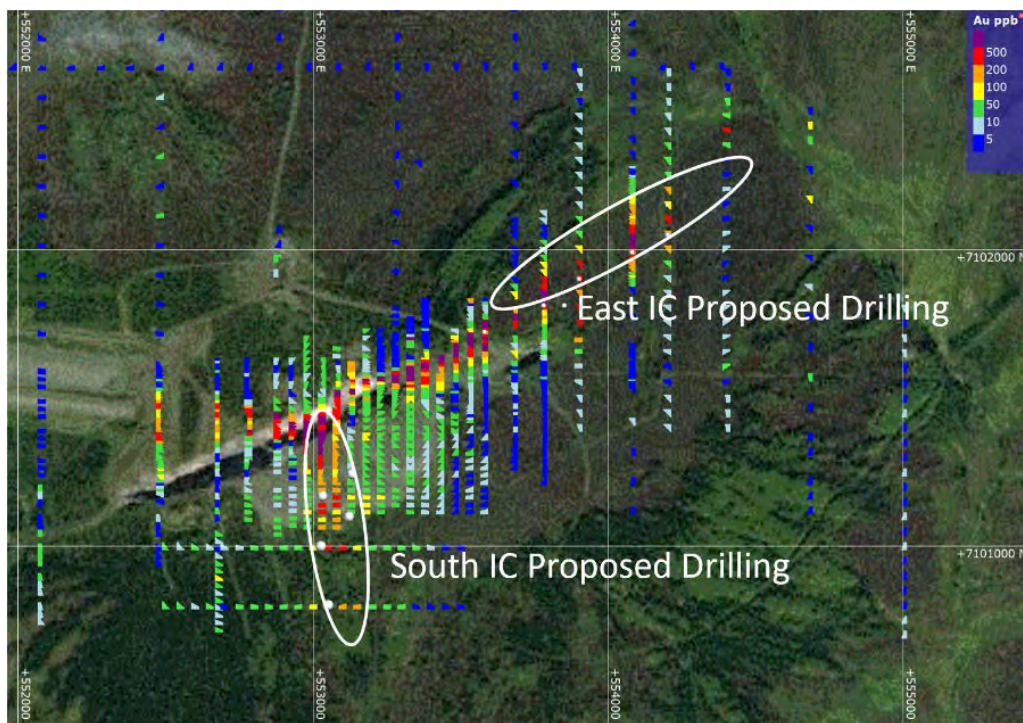


Figure 26-2: Extension Drilling – Waterpump Creek

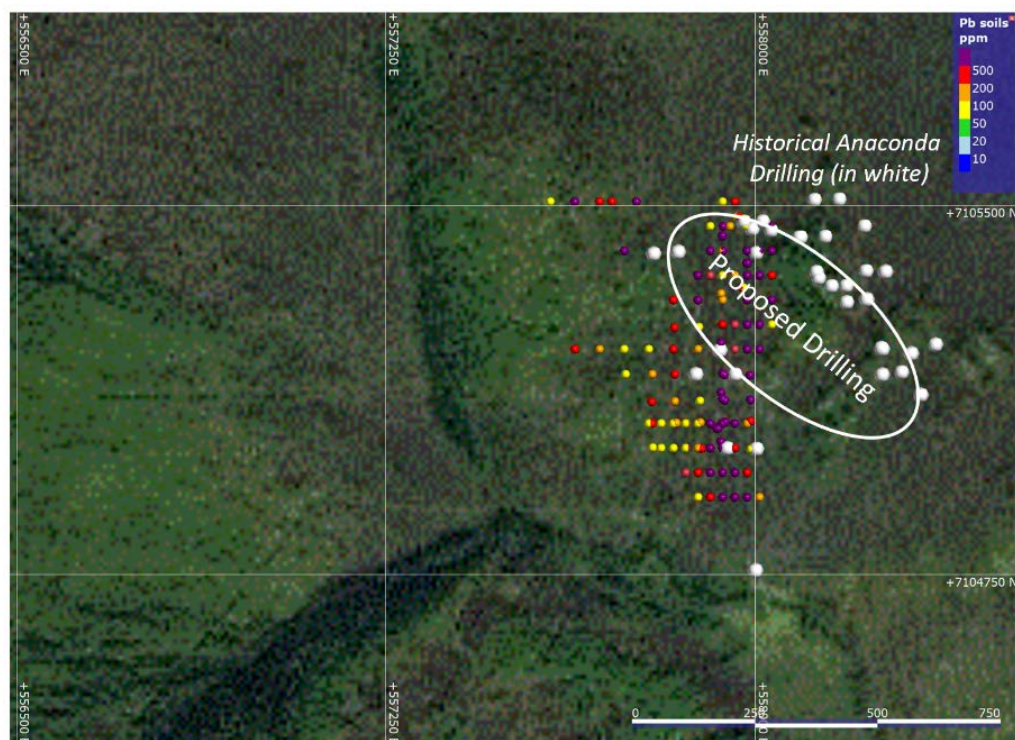
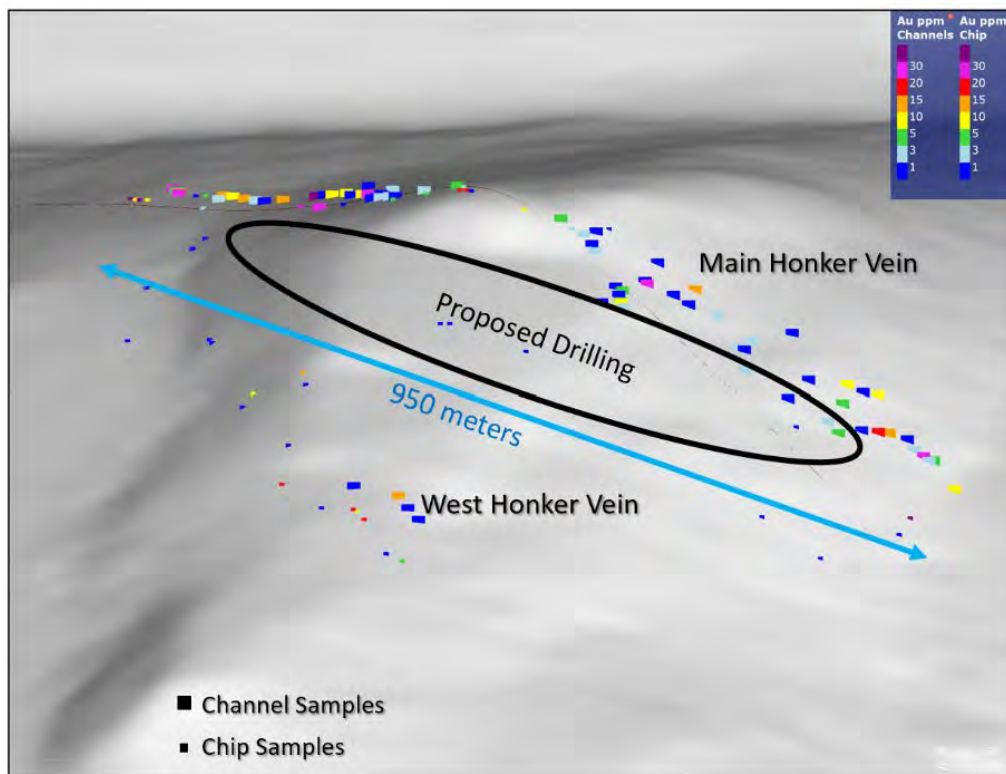


Figure 26-3: Other Targets – Honker



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28 DATE AND SIGNATURE PAGE

CERTIFICATE OF QUALIFIED PERSON Bruce M. Davis, FAusIMM, BD Resource Consulting, Inc.

I, Bruce M. Davis, FAusIMM, do hereby certify that:

1. I am an independent consultant of BD Resource Consulting Inc., and have an address at 4253 Cheyenne Drive, Larkspur, Colorado USA 80118.
2. I graduated from the University of Wyoming with a Doctor of Philosophy (Geostatistics) in 1978.
3. I am a Fellow of the Australasian Institute of Mining and Metallurgy, Number 211185.
4. I have practiced my profession continuously for 40 years and have been involved in mineral resource and reserve estimations and feasibility studies on numerous underground and open pit base metal and gold deposits in Canada, the United States, Central and South America, Europe, Asia, Africa and Australia.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 Standards of Disclosure for Mineral Projects (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I am responsible for the preparation of Sections 3, 4, 5, 6, 10, 11, 12, 18, 23 and 27, and portions of Sections 1, 2, 25 and 26 and assume overall responsibility for the technical report titled *NI 43-101 Technical Report, Western Alaska Copper & Gold Inc., Illinois Creek Project, Illinois Creek Mining District, Western Alaska, USA* dated July 21, 2021 with an effective date of January 15, 2021 (the “Technical Report”).
7. I visited the Illinois Creek Project June 12-14, 2018 and July 15-18, 2021.
8. I am independent of Western Alaska Copper & Gold, the Illinois Creek property, and the property vendor, PIEK, Inc. as defined by Section 1.5 of the Instrument.
9. I have had no prior involvement with the property that is the subject of the Technical Report.
10. I have read NI 43-101, Form 43-101F1 and the Technical Report, and confirm the portions of the Technical Report for which I am responsible have been prepared in compliance with that instrument and form.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21st day of July, 2021.



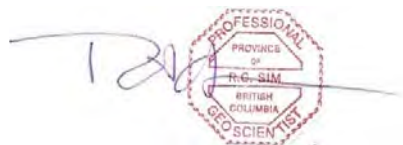
Bruce M. Davis, FAusIMM

CERTIFICATE OF QUALIFIED PERSON
Robert Sim, P.Geo, SIM Geological Inc.

I, Robert Sim, P. Geo, do hereby certify that:

1. I am an independent consultant of SIM Geological Inc. and have an address at 508–1950 Robson Street, Vancouver, British Columbia, Canada V6G 1E8.
2. I graduated from Lakehead University with an Honours Bachelor of Science (Geology) in 1984.
3. I am a member, in good standing, of the Association of Professional Engineers and Geoscientists of British Columbia, License Number 24076.
4. I have practiced my profession continuously for 35 years and have been involved in mineral exploration, mine site geology and operations, mineral resource and mineral reserve estimations and feasibility studies on numerous underground and open pit base metal and gold deposits in Canada, the United States, Central and South America, Europe, Asia, Africa and Australia.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I am responsible for the preparation of Sections 7, 8, 9 and 14 and portions of Sections 1, 2, 25 and 26 of the technical report titled *NI 43-101 Technical Report, Western Alaska Copper & Gold Inc., Illinois Creek Project, Illinois Creek Mining District, Western Alaska, USA*, dated July 21, 2021 with an effective date of January 15, 2021 (the “Technical Report”).
7. I have not visited the Illinois Creek Project property.
8. I am independent of Western Alaska Copper & Gold, the Illinois Creek property, and the property vendor, PIEK, Inc. as defined by Section 1.5 of the Instrument.
9. I have not had any prior involvement with the Illinois Creek Project property.
10. I have read NI 43-101, Form 43-101F1 and the Technical Report and confirm the Technical Report has been prepared in compliance with that instrument and form.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21st day of July, 2021.



Robert Sim, P. Geo

CERTIFICATE OF QUALIFIED PERSON
Jack DiMarchi, Certified Professional Geologist, Core Geoscience LLC

I, Jack DiMarchi, CPG, of Seattle, Washington, do hereby certify:

1. I am Owner and Principal Consultant with Core Geoscience LLC, with a business address of 5319 NE 62nd Avenue, Seattle, WA 98115.
2. This certificate applies to the technical report entitled *NI 43-101 Technical Report, Western Alaska Copper & Gold Inc., Illinois Creek Project, Illinois Creek Mining District, Western Alaska, USA* dated July 21, 2021 with an effective date of January 15, 2021 (the "Technical Report").
3. I am a graduate of Colorado State University, (BS Geology 1978). I am a member in good standing of the American Institute of Professional Geologists, Certification #9217. I am a Registered Professional Geologist in Alaska, Registration #403. My relevant experience is having served in several capacities in mine development, permitting and regulating mines including 10 years as Chief Geologist with Teck Resources on the Pogo Mine Project, 5 years as Large Mine Coordinator with the State of Alaska Department of Natural Resources Office of Permitting and Project Management, more than 4 years as a consultant responsible for authoring Environmental Chapters in other 43-101 reports including the Preliminary Economic Assessment of the Arctic Project, and Technical Reports for the Sun Project, Oracle Ridge Project and Rosemont Copper Project and other environmental permitting work on projects that include the Livengood Project. I am a "Qualified Person" for purposes of National Instrument 43-101 (the "Instrument").
4. I have not visited the Illinois Creek Property.
5. I am responsible for Section 20.
6. I am independent of Western Alaska Copper & Gold, the Illinois Creek property, and the property vendor, PIEK, Inc. as defined by Section 1.5 of the Instrument.
7. I have no prior involvement with the Property that is the subject of the Technical Report.
8. I have read the Instrument and the section of the Technical Report that I am responsible for has been prepared in compliance with the Instrument.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the sections of the Technical Report that I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed and dated this 21st day of July 2021 at Seattle, WA.



Jack DiMarchi, Principal Geologist
Core Geoscience, LLC

CERTIFICATE OF QUALIFIED PERSON
Deepak Malhotra, PhD, SME-RM

I, Deepak Malhotra, PhD, of Lakewood, Colorado, do hereby certify that:

1. I am currently employed as President of Pro Solv, LLC with an office at 15450 W. Asbury Avenue, Lakewood, Colorado 80228.
2. This certificate applies to the *NI 43-101 Technical Report, Western Alaska Copper & Gold Inc., Illinois Creek Project, Illinois Creek Mining District, Western Alaska, USA* prepared for Western Alaska Copper and Gold dated July 21, 2021.
3. I am a graduate of Colorado School of Mines in Colorado, USA (Masters of Metallurgical Engineering in 1973 and PhD in Mineral Economics in 1978). I am a registered member in a good standing of the Association of Society of Mining and Metallurgical Engineers (SME) and a member of the Canadian Institute of Mining and Metallurgy (CIM). I have 48 years of experience in the area of metallurgy and mineral economics.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I have not visited the Illinois Creek Project site.
6. I am responsible for Section 13 of the Technical Report.
7. I am independent of the Western Alaska Copper & Gold, the Illinois Creek property, and the property vendor, PIEK, Inc. as defined by Section 1.5 of the Instrument.
8. I have not had prior involvement with the Property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated: July 21, 2021



Deepak Malhotra, PhD, SME-RM