Idaho Mining and Exploration, 2019

- Virginia S. Gillerman
- Idaho Geological Survey (Boise)
  - www.idahogeology.org
Acknowledgements

- AEMA
- Idaho Dept. of Lands staff
- BLM and USFS minerals staff
- Industry geologists
- IGS and Claudio Berti (new IGS Director)
- Earl Bennett
2019 Trends and Highlights

- Phosphate Reigns in Idaho
- Lucky Friday strike?
- Gold Renaissance –
  - North, South and in between!
- Cobalt/Critical Minerals
- Price Matters
- Social License and Public Perception
- Exciting Development Projects
- Idaho-based Companies
Idaho Non-fuel Mineral Production

2018 Leading Commodities: Phosphate rock, Sand and Gravel, Crushed Stone, Pb and Ag

Dec. 2014: Thompson Creek Mo on care and maintenance; large resource remains.

March 2017: Lucky Friday miners go on strike.
Metal prices (5-years)

Mo: $9.70/lb. (LME, Platt’s, 11/20/2019) vs. >$11 at end of 2018.
Two World Class Mining Districts

- **Coeur d’Alene District:**
  - Over 1.24 billion troy ounces Ag (38,568 metric tons)
  - Pb, Zn, Cu, Sb
  - Quartz-Siderite-Sulfide veins in PC Belt metasedimentary rocks
  - Deep mines, ore extends vertically

- **SE Phosphate District:**
  - Also over 100 years production
  - Permian Phosphoria Formation
  - Sedimentary apatite-rich black shale of regional extent
2019

**Active:**
Lucky Friday
Galena Complex (inc. Coeur)

**Inactive, but resource in ground:**
Sunshine
Bunker Hill – Zn, renegotiated lease
Hecla Mining Company: Lucky Friday mine

2018 Sentinels of Safety Award by NMA

2019 production by salaried employees up (115,682 oz. in Q3 2019 vs. 169,041 oz. in 2018). 30 vein, Gold Hunter, 6400 level.

Nov. 2019:
Tentative settlement between Hecla and union. Ballots out to union members; count on Dec. 13, 2019.

3/13/2017:
USW Local 5114 out on strike. Major issue is control of miner’s work assignments.

RVM (Remote Vein Miner):
Testing in Sweden; Idaho in 2020

Lucky Friday mine, Mullan
Americas Gold and Silver Corporation

2019

- April: Acquired Pershing Gold
  - Name Change
  - Relief Canyon (NV) development
- September: JV with Eric Sprott on Galena Complex
  - $20 million investment in new equipment, upgrades, development and exploration
  - Sprott earns 40% interest in Galena
Galena Mine - 2019

- Jan. – Oct. 2019: 636,000 ounces Ag, 10 million lbs. Pb.; cons to Trail, BC.
- Conventional with jacklegs, slushers on 4 upper levels.
- Mechanized on lower (4900 and 5200 levels; 70%).
- Drilled 23,000 feet.
- Discovered 2 new production areas on 4900.
- 3D modelling and planning.
Recapitalization Plan (Sprott JV):
- New hoist to replace Galena hoist
- Repairs and develop 5500 level and others
- Increased exploration, production
- Reduce costs

Large resource:
New Jersey Mining: Golden Chest mine

- Murray Gold District
  - Open pit & Underground
    - Open Pit: 1003 down to 994 bench in 3\textsuperscript{rd} qtr.
    - UG: 848 South stope/836
  - Gold-quartz veins
  - Multiple ore shoots along Idaho fault
  - Grades of 3 to 6 gpt Au
    - Also W, sulfides
  - Orogenic System
  - Pritchard Fm. host rock
Golden Chest mine, Murray Au Belt

Kellogg Mill: ~ 5000 tonnes/month. Bulk sulfide con, shipped overseas. Also did column leach tests of lower grade material. 24 employees

Stope 836N: Idaho Fault and vein
Endomines: Friday mine (Elk City area)

- Finnish company – acquired TVL Gold LLC
- Orogrande and Petzsite shear zones; other deposits in area
- Development/Pre-production
  - Underground: 150 tpd; mine life 7 years, good grades
- Mill - SE of Elk City. Ramping up after tailings pond damaged last winter. Will produce sulfide concentrate.
Endomines: Friday mine (Orogrande Shear)

Friday mine portal

Phosphate Mining in Idaho: 2019

Permian Phosphoria Formation: Meade Peak Member (phosphatic black shale)

Apatite (P), + C, V, U, Mo, Se, REE
Phosphate Processing Plants

Simplot Don Fertilizer Plant, 2014

Monsanto Elemental P Plant, 2014

Itafos Conda Fertilizer Plant, 2019


3 Large Plants
Over 350 workers at each
Economic anchor to SE Idaho

75th anniversary of
Don Plant
J.R. Simplot Company: Smoky Canyon mine

- Mining in F and G panels

F2 panel

G1 pit, November: last ore mined
J. R. Simplot Co.: Smoky Canyon

- Mining Panels F and G
- Concurrently reclaiming F1 pit as F2 and F3 pits mined.
- Segregating waste rock to “lock up” more Se-rich contaminant shale into infiltration-limited covered area.
- Permitting new panel East Smoky.

New Mine Plan Approval:
- **Dairy Syncline mine**, plus reclamation, land exchange
  - 2,767-acres; 30-year mine life
- Final EIS released Nov. 8, 2019
  - Preferred Alternative – proposed action with modifications
  - Anticipate RODs in March 2020.
Bayer (P4), formerly Monsanto

- **Blackfoot Bridge mine**
  - Actively mining the Mid Pit
  - Backfilling North Pit and EOP
  - Working on cover design and construction

- **Exploration Drilling:**
  - Trail Creek Lease
  - 28 drill holes
  - 8,900 feet
  - Roads and sites reclaimed

- **New Mine Approved:**
  - Caldwell Canyon ROD issued August 2019
  - 40-year mine life
  - Initial overburden to Dry Valley mine
Blackfoot Bridge 2019: Phase 8 sequence

March

June

July - backfill

October - backfill
September 2019: Topsoil salvage, pit area pre-construction activities, roadwork
Itafos, formerly Agrium

- Agrium merged in Jan. 2018 with Potash Corp. of Saskatchewan to form Nutrien.
  - Nutrien (Nu-West) – retained ownership of mined out properties, legacy, reclamation etc.
  - Operating assets (inc. Conda plant, working mines (Ras. Valley and Lanes Creek), and exploration/development properties) divested – bought by Itafos in late 2018.

Reclamation: Backfilling North Rasmussen Ridge mine
October 30, 2019:

- **Itafos Conda Technical Report**
  - By Golder Assoc. Ltd.
  - Conda properties
  - Paris Hills (underground)
  - Husky1/North Dry Ridge deposits

- **Increased resource estimates**
  - H1/NDR: 38 M short tons, 24% $P_2O_5$
  - RV mine: 15 M short tons

- **Conda Plant**: 550 kt per year, MAP, SPA, specialty products

Mining at Rasmussen Valley mine, 2019

Also mining Lanes Creek mine
Itafos: Husky/North Dry Ridge Permitting Resumed

May, 2019: Restarted EIS process.

Itafos drilled Husky 1 in 2019

Aerial View of Husky 1 permitting vicinity (from south looking north)
Other Industrial Mineral Operations

- **Aggregate** $$
- Others – diverse commodities & uses
  - Industrial garnet and pumice
  - Dimension stone
  - Lime
  - Zeolites and Clays
  - Industrial sand
  - Landscaping rock
  - Gemstones
- **Stable, rural, smaller**
Aggregate: Construction Sand & Gravel, Crushed Stone

- IDL Surface mine reclamation plans: 100 + gravel pits and quarries
- State Royalty Revenue (FY19): Sand & Gravel
  - $1.1 million
  - State leases
- Roadwork, Concrete, Construction
- Urban Areas – construction/roadwork up
Industrials – north Idaho

**Emerald Creek Garnet**
- Opta Minerals Inc.
- Almandine garnet alluvial deposits
- Water filtration
- Abrasives
- Producing garnets from Emerald and Carpenter Creek basins near Fernwood since 1930.

**i-minerals Bovill Project**
- Reorient to lower CAPEX, focus on metakaolin and halloysite
- **Pilot plant testing:**
  - Pilot Plant Production at Ginn Mineral Technologies – halloysite and kaolin testing of 6 tons sample
  - Kaolin to FLSmidth – flash calcination to metakaolin
- New prefeasibility – Millcreek Engineering (halloysite, kaolin)
- **43-101 by SRK:** April, 2019 – ample resource of clay

USFS family-fun garnet collecting
Dimension Stone: Southern Idaho

- **Oakley Stone (Middle Mtn.)**
  - Northern Stone Supply
  - Sawtooth Stone
  - Scrivanich/Oakley Mtn. Corp.
  - American Stone

- **Table Rock Sandstone**

- **Idaho Travertine**

Oakley stone exported outside Idaho – high-end natural stone
Oakley Stone Quarries

Drill for “Rocky Mtn. Gneiss”
Northern Stone Supply

Also using diamond saws instead of explosives

Oakley Mtn. Corp.
Splitting and stockpile areas
Idaho State Activities

- **IDL – Regulatory Reform**
  HB-141 (IMA sponsor):
  - Surface impacts of underground mines
  - Actual cost estimation of reclamation
  - Update of financial assurance methods
  - Modest fees

- **Wilderness and Forest Plan Revision** – Mineral Assessments and Comments (IGS, OEMR)

- **100th Anniversary of Idaho Geological Survey** (aka Idaho Bureau of Mines and Geology since 1919)

- **Dr. Claudio Berti** – New IGS Director and State Geologist
IGS Mineral Deposit Research

- Geology and Temporal Evolution of Alteration and Au-Sb-W Mineralization, Stibnite Mining District, Idaho
- IGS Bulletin 31
- Online: February, 2019
  - 163 pages
  - 31 MB of digital appendices (7 appendices)
  - Free pdf download or print purchase
IGS Programs and Research - 2019

- **Geologic Mapping** -
  - Salmon, Weiser, Preston, Elk City (USGS Statemap)
  - Cobalt Belt (USGS MRI)

- **Data Preservation** –
  - New Geochem Database
  - Expanded Mines DB (DD-1), References

- **DeLamar/Swisher Mtn.** – regional geologic mapping (new project)
  - Near Integra’s Au-Ag deposit, Owyhee County
IGS Oil and Gas Program

Basin Analysis
- Goal is to establish a 3D stratigraphic-tectonic framework of the Western Snake River Plain and its evolution through time. Framework will define the petroleum system in terms of reservoirs, seals, and source rocks (SR).

Reservoir Characterization and Performance
- Work combines information from 2D seismic with drone imagery from outcrop analogs to document the facies architecture of reservoir analogs. Data will be integrated with field production to help risk and rank future subsurface targets.

Source Rock Evaluation
- Geochemical characterization of produced hydrocarbons and potential source rocks. Information will help identify the origins of oil and gas and hydrocarbon generating capabilities of SR.

Current focus is on the Western Snake River Plain, SW Idaho
More IGS Research

Geologic Hazards Projects:
- State landslide database
  - Landslide mapping, N. Idaho
- Bear Lake faults mapping
- Active faults database
  - Bear Lake fault mapping
  - New paleoseismic investigations
- Boise Foothills mapping
- Organizing earthquake working group meeting
- Multiple Collaborators/Sponsors

Hydrogeology Projects:
- **Big Lost River Basin** *(IDWR, USGS)*
  - Characterization, groundwater modeling for INL, EPA
  - Data to decision makers
- **Raft River Basin** *(IDWR, Phase 1)*
  - Hydrogeologic data compilation/GIS
  - Field reconnaissance
  - Future phases – instrumentation, monitoring, gw budget

www.idahogeology.org
Exploration 2019

- Multiple major drilling programs.
  - Advanced/development projects.
- Known districts; multiple commodities; diverse geology.
- Difficulty raising money?
- Less grass roots exploration.
- Gold is shining; silver too.
- Cobalt fever abated some, but claims kept. Critical mineral interest.
New group formed Liberty Silver – August 2017 agreement with owner of Bunker Hill to lease-purchase mine ($30 million).

Aim - to reopen Pb-Zn mine; working with EPA on water treatment issues.

Financing problems and defaulted on lease. Nov. 2018 – reinstatement of lease from owner (Placer Mining Corp.) to reduce lease payment in 1 year agreement.

October, 2019: Amended lease / option for additional 9 months with more favorable terms.

Large zinc resource.

1887–1981: 36 million tons @ 8.7% Pb, 3.7% Zn, 4.5 opt Ag
Idaho Champion, Baner Gold Project, Elk City/Orogrande: Drilled 1–9 g/t Au, got permits, need $.

- Very positive 2018 drill results over 500m strike; Good metallurgy; was planning program. Not implemented.
- Same shear zone as Endomines, Friday mine.
- Also Champagne mine, south ID.

Hecla – Mapping and sampling, Murray (Au).

NVH – New Vulcan Hill mine, Lakeview District

Recent drilling returned:
- ICG2018-1: 1.39 g/t over 18.00 metres (from 83m to 101m)
- ICG2018-8: 8.66 g/t over 6.30 metres (including 0.3 m of 146.75 g/t (from 115 m to 121.3 m)
- ICG2018-9: 1.32 g/t over 12.80 metres (from 47 m to 59.8 m)
- ICG2018-13: 5.76 g/t over 12.65 metres (from 8.65 m to 21.30 m) and 9.02 g/t over 2 metres (32.2 m to 34.2 m)
Midas Gold: Stibnite Project

  - Public Comment on PRO – 45 days?
  - Final EIS - late 2020 (mining + restoration)
- Successful financing ($30 million in bank at end Q3).
- Formed Stibnite Foundation
- Drilled wells for large volume pump tests, water quality studies, engineering, environmental work.
- August: Nez Perce Tribe lawsuit against Midas over water quality, alleging responsible for prior environmental damage of 100 years of mining (inc. WWII).

~ 5 million tr. ounces Au, + Sb

October, 2019 Pump Test Wells
Since well before the suit was filed, Midas Gold has been working closely with the Idaho Department of Environmental Quality and the United States Environmental Protection Agency to gain permission to take immediate action and learn more about the specific causes of degraded water quality in a number of locations. Midas Gold firmly believes that it is not legally responsible for cleanup of site legacy impacts caused by previous mining companies or directed by government agencies. However, the Company wants to be part of the solution. Subsequent to quarter end, in the normal progression of such litigation, Midas Gold filed a request for a stay of proceedings based on the progress in respect of ongoing discussions with Federal and State regulators on a path that would end the litigation as well as a request for a dismissal of the suit based on other considerations. Both motions have been consolidated for judicial review in mid-December and are expected to be ruled on as early as late Q4 2019.
Revival Gold: Beartrack gold project

Two Projects:
Beartrack and Arnett Creek, Lemhi County

Beartrack:
• 3 DDH for 1,230 meters (Joss area)
• Resource Estimate (Q1 2020)
• Metallurgical work on sulfide – optimize flotation results and recovery
• Historic placers at Leesburg on Napias Creek; former open pit mine of 600,000 oz. Au

Talk by Steve Priesmeyer on Thursday AM
Revival Gold: Arnett Creek

- **22 DDH totaling 3,830 meters**
- Working on prelim resource of leachable Au
- Soil sampling (12 km²) and mapping
- 404 line-kilometer airborne magnetics
- Expanded land position (Oct/Nov.)
Otis Gold: Kilgore Project

Clark County

- **Completed PEA:** 5-yr mine life at 112,000 ounces/yr. Attractive IRRs.
- **Still drilling** on 12-hole RC program with 2 rigs.
Idaho Cobalt Belt

- Mesoproterozoic banded siltite, Apple Creek Fm.
- NW-trending 30-km linear belt.
- Co price down: critical mineral
  Also Cu, Au, sniffs of REEs.
- Two large projects:
  - eCobalt/Jervois (Blackbird)
  - First Cobalt (Iron Creek)
- Others – compilation of 2018 work, permitted, not drilled.

Geologic Setting of The Idaho Cobalt Belt

- Regional geologic-map inset
  (after O’Neill & others, 2007), showing the Belt-Purcell basin, the Lemhi sub-basin, and the Idaho cobalt belt.
- Geologic Map of the Eastern Salmon River Mountains,
  (after Evans and Green, 2003), showing Co-Cu deposits and Cu-Co prospects of the Idaho cobalt belt. From SE to NW, prospects and deposits are:
  IC = Iron Creek prospect (p)
  BP = Black Pine deposit (d)
  CNC = CoNiCu (p)
  HS = Haynes-Stellite mine (d)
  B = Blackbird Deposit (D)
  SR = Sweet Repose (p)
  TP = Tinkers Pride (p)
  EHC = Elkhorn Cr. (p)
  SCC = Salmon Canyon Cu (p)
  Metamorphic grade increases from SE to NW (Nold, 1990).

Bookstrom, et al., 2016: GSA Special Paper 522
First Cobalt: Iron Creek

2019 Summary

Phase 2 drilling completed Feb. 2019
- 43 DDH, 44,000 feet
- Surface and mostly underground
- Co and Cu: Co-pyrite; chalcopyrite

Geologic model and lithogeochemical interpretation

Co-Cu resource update (NI 43-101; Q4 2019)

Water quality monitoring

Property exploration: Ruby Zone

Refinery at Cobalt, Ontario
Iron Creek: 2018-2019 DRILLING HIGHLIGHTS

- Post-Resource drilling (Fall/Winter 2018 – 2019)
- 43 diamond holes totalling 44,000 feet
- Infill and Extension drilling targets

Result

- Expanded the resource along strike to over 3000 feet and down-dip extensions to over 1000 feet

New resource estimate in Q4 2019

West Extension 0.22% Co, 3.90% Cu over 12 ft (ICS18-21)

Depth Extension 0.13% Co, 0.01% Cu over 59.5 ft (ICS18-14)

East Extension 0.20% Co, 0.10% Cu over 22.8 ft (ICS18-20)

Depth Extension 0.20% Co, 0.10% Cu over 39.4 ft (ICS18-28)
Jervois Mining (eCobalt Solutions): Idaho Cobalt Project

- **Idaho Cobalt Project**
  - 1997 Discovery of RAM deposit by Formation Capital (renamed eCobalt)
  - Outer Blackbird District ore zones
  - Permitted UG mine,
    - > $100 million spent to date
- **July, 2019:** eCobalt acquired by Jervois Mining, an Australian company.
- **Renamed Idaho Cobalt Operations (ICO)**
  - Complete construction, update Feasibility, Scoping study on Processing Facility
Jervois: Idaho Cobalt Operation

Initiated Bankable Feasibility Study:
- DRA Global, M3 Engineering
- Scoping Study for Co refinery (Wood)

Infill Drilling Footwall Drilling Program:
- 2 Deep DDH - intersected previously unknown Cu-Co mineralization below main RAM zone footwall - Blacktail North zone

Metallurgical Drill Holes (PQ)

Dec. 2, 2019 Release: Infill drilling intercepts
- 4.6 m @ 1.14 % Co and 2.75 % Cu, 1 g/t Au
- Co up to 2.8 % Co
New World Cobalt: Colson Creek Project

- Colson Creek Co-Cu
- 100% Salmon Canyon Cu
- 3 other blocks in belt
- Colson Creek 2018
  - Soils, IP Survey
  - Drilling: 12 holes, 4,953 m
  - Extend strike of SCC zones 1.1m @ 0.18% Co, 1.43% Cu, 0.74 g/t Au
- Permitted future drilling

Interesting targets at Long Tom and other anomalies of IP and soils

Phoenix Copper Ltd.: Empire Mine

- PG Mining/Konnex
- Empire mine, Mackay
  - Custer County
  - Polymetallic Skarn
  - (Cu, Pb, Zn + Au, Ag)
- May, 2019: NI 43-101 resource, SX-EW Cu
  - Zn, Au-Ag too
- Bankable Feasibility
- Environmental Baseline
- Drilling early 2020
Phoenix Copper: Empire mine

Red Star Prospect: outcrop peripheral to Empire mine area, high Ag-Pb. N-S fault of regional extent.

Silicified Fault, Navarre Prospect, 2019: Au

Land acreage increased.
BLACK PINE 2019 PROGRAM

New Plan of Operations (PoO) with USFS for 141 acres of disturbance in up to 370 drill sites and 49 km of new roads within 7.3 km² cleared boundary received February 2019

- Extensive ROW Grant with BLM for water well and property access
- Drilling commenced April 2019 with up to 2 RC rigs and 1 core rig running 24 hrs/day
- 65,000 feet/20,000 metres RC Drilled in ~90 holes
- 4,100 feet/1,250 metres Core Drilled in 6 holes
- 5 large-diameter core holes and 6 bulk samples for metallurgy, mineralogy and structural and stratigraphic information

Located in Idaho’s Basin and Range Province

Unmined Gold Mineralization

Gold in Soils >50 ppb

7.3 km² PoO Boundary

Leapfrog mineralization models showing modelled gold mineralisation >0.2 g/t Au are for illustrative purposes and are unconstrained by a robust geologic model. A 25m buffer around drillholes limits the model from gross overestimation. The intended purpose is to illustrate the relative position of gold mineralized zones to historic mining and topography to drive drill targeting. Models are subject to change with ongoing study and modelling.

There is no current mineral resource estimate as defined by NI 43-101 for the Black Pine Project and it is uncertain if further exploration will result in these targets being delineated as a mineral resource.
Here's to finding the sweet spot.

BLACK PINE SCHEMATIC FENCE SECTION

Looking West

Mined Head Grades

Looking Northwest

C/D Pit
0.58 g/t Au

E Pit
1.5 g/t Au

1.38 g/t Au

B Pit
A Pit
0.6 g/t Au

2019 Drill Focus Area

Leach Pads

SW Ex

SE Ex

Looking West

Leach Pads

HPX

M

Looking Northwest

Black Pine Stratigraphy

Upper Plate
Sandstone and Siltstones

Middle Plate
Low angle thrust fault

Limestone Member
Low angle thrust fault

Limestone & Dolomite Member
Low angle thrust fault

Limestone & Siltstone Member

Lower Plate
Detach fault

Shale & Limestones
BLACK PINE 2019 DRILL FOCUS – CROSS SECTION

Multiple subparallel high grade gold discoveries beneath historic drilling

Thursday AM TALK: Will Lepore

Two new discoveries in 2019

Ridgeline Focus Area with Au outcropping/mined on 3 sides of ridge:
Drill: 47.2m @ 1.78 g/t oxide Au
90 holes now

Lower unit (dk. Green) not drilled till 2019
Integra Resources: DeLamar Project

- Two Development Projects
  - DeLamar mine
  - Florida Mountain mine
- Exploration
- Owyhee County, SW Idaho
- Past-producer till 1998 (+ 1.5 M oz. Au and > 100 M oz. Ag)

- Resource: 3.9 Moz AuEq (M & I) plus 500 K oz AuEq (Inf.)
- October: NI 43-101 Report by MDA
- Nov. 25: Coeur invests $ 5.5 million
Fall 2019: Exploring entire district:
3 Centers of epithermal Au-Ag mineralization, plus regional targets
Fast-track
BeMetals: South Mountain

- Thunder Mountain Gold - owner
  - Idaho-based company
  - Private land
- 2019: 20 UG holes
  - Intercept: 12.2 m at 18% Zn, 122 g/t Ag, 4.4 g/t Au, and 1.5% Pb.
BeMetals: South Mountain

Resource (M & I): 170,000 short tons grading 17.66% Zn-eq.
Slide 1

Idaho Mining and Exploration, 2019

Virginia S. Gillerman
Idaho Geological Survey (Boise)
www.idahogeology.org

American Exploration and Mining Association
Reno, NV
December 4, 2019

Slide 2

Acknowledgements

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Slide 3

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**Idaho Non-fuel Mineral Production**

![Graph showing Idaho Non-fuel Mineral Production (USGS data)]

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Slide 5

**Metal prices (5-years)**

- **Mo:** $9.70/lb. (LME, Platt’s, 11/20/2019) vs. >$11 at end of 2018.
- **Au:** Precious metal prices stable and at reasonably high level the past 5 years. Base metals less so, Co volatile. Way off 2017-2018 peak at $16/lb. REE prices moved as well – concern over use as political weapon if there is potential China – US trade war.

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Slide 6

**Two World Class Mining Districts**

- **Coeur d’Alene District:**
  - Over 1.24 billion troy ounces Ag (38,568 metric tons)
  - Pb, Zn, Cu, Sb
  - Quartz-Siderite-Sulfide veins in PC Belt metasedimentary rocks
  - Deep mines, ore extends vertically
- **SE Phosphate District:**
  - Also over 100 years production
  - Permian Phosphoria Formation
  - Sedimentaryapatite-rich black shale of regional extent

Both districts active for past 120 years approximately. Definition of “world-class”
Coeur d’Alene district (Silver Valley)

2019
Active
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- Galena Complex (inc. Coeur)
- Sunshine
Inactive, but resource in ground:
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Americas Gold and Silver Corporation
- April: Acquired Pershing Gold
- Name Change
- Relief Canyon (NV) development
- September: JV with Eric Sprott on Galena Complex
- $20 million investment in new equipment, upgrades, development and exploration
- Sprott earns 40% interest in Galena
Operational difficulties related in part to downtime from hoist problems.

Galena Hoist problems for years have hampered production. 78 M ounce Ag resource

Open Pit production 1,185 metric tonnes per day (ore and waste) in 3rd quarter. NJMC had net income in 3-months of 3rd quarter.
First 6 months of 2019: revenue up and costs down. New CAT AD22 haul truck and loader helped efficiency in UG mining and backfilling stope. 3rd Quarter Au sales about 1,400 tr. ounces. So 4-5,000 ounces Au per year produced from Kellogg mill. 3rd quarter head grades 3.46 g/t Au.

Endomines: Friday mine (Elk City area) Finnish company – acquired TVL Gold LLC Orogrande and Potzoite shear zones; other deposits in area Development/Pre-production Underground: 150 tpd; mine life 7 years, good grades Mill - SE of Elk City. Ramping up after tailings pond damaged last winter. Will produce sulfide concentrate. Grades said to be in 0.2 opt Au range with some multi-ounce narrow intercepts. Instituting rigorous grade control methods to minimize dilution. Tried to open in early 2019 but winter problems, especially with tailings pond at mill site, which is about 25 mile haul from mine. Ore between Monday and Friday faults. Au up to 65 feet from hanging wall and footwall contacts of Monday fault (intruded by barren dacite dike). Au is disseminated and associated with pyrite. Mill – flotation of sulfides to concentrate plus gravity circuit.
Endomines also picked up Buffalo Gulch deposit near Elk City and the Deadwood project at Elk City/Orogrande. Plus Rescue mine (Warren district) and the Kimberly Gold Project in the Marshall Mtns. (Marshall Lake district, 20 miles east of Riggins.)

3 companies: Bayer, formerly Monsanto; Itafos, formerly Agrium, and J.R. Simplot Co., giant Idaho-based agribusiness company (private). Plants employ several hundred persons each.

FMC must pay Shoshone-Bannock Tribes $20 million in back fees plus $1.5 million annually in perpetuity. FMC had agreed to the annual payment but tried to argue that it was not obligated to pay it after plant closed. Plant operated, partly on tribal lands, for over 50 years till 2001. Left 22 million tons of hazardous waste stored onsite. EPA says would cost $4.7 billion to remove and is not technologically feasible.
Slide 18

J.R. Simplot Company: Smoky Canyon mine
- Mining in F and G panels
- Concurrently reclaiming F1 pit and F2, F3, pits mined
- Segregating waste rock to "lock up" more Se-rich contaminant shale into infiltration-limited covered area.
- Permitting new panel East Smoky.

Slide 19

J. R. Simplot Co.: Smoky Canyon
- Mining Panels F and G
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  - Initial overburden to Dry Valley mine
Slide 21

Blackfoot Bridge 2019: Phase 8 sequence

March

June

July - backfill

October - backfill

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Bayer – Caldwell Canyon

September 2019: Topsoil salvage, pit area pre-construction activities, roadwork

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Itafos, formerly Agrium

Agrium merged in Jan. 2018 with Potash Corp of Saskatchewan to form Nutrien.

- Nutrien (Nu-West) - retained ownership of mined out properties, legacy, reclamation etc.
- Operating assets (inc. Cania plant, working mines (Ras. Valley and Lanes Creek), and exploration/development properties) divested – bought by Itafos in late 2018.
- Reclamation: Backfilling North Rasmussen Ridge mine.
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- Itafos Conda Technical Report
- Conda properties
- Paris Hills (underground)
- Husky/North Dry Ridge deposits
- Increased resource estimates
  - H1/NDR: 38 M short tons, 24% P2O5
  - RV mine: 15 M short tons
- Conda Plant: 550 kt per year, MAP, SPA, specialty products

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- Itafos: Husky/North Dry Ridge Permitting Resumed

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- Other Industrial Mineral Operations
  - Aggregate
  - Others – diverse commodities & uses
  - Industrial garnet and dolomite
  - Dimension stone
  - Lime
  - Zeolites and Clays
  - Industrial sand
  - Landscaping rock
  - Gemstones
  - Stable, rural, smaller

Markets: Construction, Home and Landscaping, Abrasives, Filtration, Soil Amendments, Cattle Food Supplements, Glass-making

Aggregate: Construction Sand & Gravel, Crushed Stone

- IDL Surface mine reclamation plans: 100 + gravel pits and quarries
- State Royalty Revenue (FY19): Sand & Gravel
  - $1.1 million
- State leases
- Roadwork, Concrete, Construction
- Urban Areas – construction/roadwork up

Second most valuable commodity in Idaho

Industrials – north Idaho

- Emerald Creek Garnet
  - Opta Minerals Inc.
  - Almandine garnet alluvial deposits
  - Water filtration
  - Abrasives
  - Producing garnets from Emerald and Carpenter Creek basins near Fernwood since 1930.
- i-minerals Bovill Project
  - Reorient to lower CAPEX, focus on metakaolin and halloysite
  - Pilot plant testing:
    - Pilot Plant Production at Ginn Mineral Technologies – halloysite and kaolin testing of 6 tons sample
    - Kaolin to FLSmidth – flash calcination to metakaolin
    - New prefeasibility – Millcreek Engineering (halloysite, kaolin)
    - 43-101 by SRK: April, 2019 – ample resource of clay

Also USFS Emerald Creek Garnet dig. I-minerals clay-quartz-feldspar deposits in historic Bovill-Helman district in Latah County. State leases. Working on producing high value products – ex. Metakaolin and halloysite. Would be only metakaolin producer in western US. Leaving feldspar and quartz sand resource off plan for now. All very competitive markets. Main competition is in SE US.

Dimension Stone: Southern Idaho

- Oakley Stone (Middle Mtn.)
- Northern Stone Supply
- Sawtooth Stone
- American Stone
- Table Rock Sandstone
- Idaho Travertine

Oakley stone exported outside Idaho – high-end natural stone
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Oakley Stone Quarries

- Dig for "Rocky Mtn. Gneiss"
- Northern Stone Supply
- Also using diamond saws instead of explosives

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Idaho State Activities

- IDL - Regulatory Reform
- HB-141 (IMA sponsor):
  - Surface impacts of underground mines
  - Actual cost estimation of reclamation
  - Update of financial assurance methods
  - Mineral fees

- 100th Anniversary of Idaho Geological Survey (aka Idaho Bureau of Mines and Geology since 1919)
- Dr. Claudio Berti - New IGS Director and State Geologist

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IGS Mineral Deposit Research

- Geology and Temporal Evolution of Alteration and Au-Sb-W Mineralization, Stibnite Mining District, Idaho
- IGS Bulletin 31
- Online: February, 2019

- 163 pages
- 31 MB of digital appendices (7 appendices)
- Free PDF download or print purchase
IGS Programs and Research - 2019

- Geologic Mapping:
  - Salmon, Weiser, Preston, Elk City (USGS Statemap)
  - Cobalt Belt (USGS MRI)

- Data Preservation:
  - New Geochem Database
  - Expanded Mines DB (DD-1), References

- DeLamar/Swisher Mtn.:
  - Regional geologic mapping (new project)
  - Near Integra’s Au-Ag deposit, Owyhee County

IGS Oil and Gas Program

Willow Field
ML Investments 1-10
Payette Co. Idaho

Basin Analysis

- Goal is to establish a 3D stratigraphic-tectonic framework of the Western Snake River Plain and its evolution through time.
- Framework will define the petroleum system in terms of reservoirs, seals, and source rocks (SR).

Reservoir Characterization and Performance

- Work combines information from 2D seismic with drone imagery from outcrop analogs to document the facies architecture of reservoir analogs.
- Data will be integrated with field production to help risk and rank future subsurface targets.

Source Rock Evaluation

- Geochemical characterization of produced hydrocarbons and potential source rocks.
- Information will help identify the origins of oil and gas and hydrocarbon generating capabilities of SR.

Current focus is on the Western Snake River Plain, SW Idaho

More IGS Research

Hydrogeology Projects:
- Big Lost River Basin (IDWR, USGS)
  - Characterization, groundwater modeling for ID, EPA
  - Federal Services projects

- Raft River Basin (IDWR)
  - Hydrogeologic data compilation/CDI
  - Field reconnaissance
  - Future phases: characterization, monitoring, gw budget

Geologic Hazards Projects:
- State landslide database
  - Landslide mapping, N. Idaho
- Bear Lake faults mapping
- Active faults database
  - Bear Lake fault mapping
- New paleoseismic investigations

- Boise Foothills mapping
- Organizing earthquake working group meetings
- Multiple Collaborators/Sponsors

www.idahogeology.org
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Exploration 2019

- Multiple major drilling programs
- Advanced/development projects
- Known districts: multiple commodities, diverse geology
- Difficulty raising money
- Less grass roots exploration
- Gold is shining; silver too.
- Cobalt fever abated some, but claims kept. Critical mineral interest.

BLM: In 2018, 6,000 new mining claims filed in Idaho. About 5,000 of those in Idaho Cobalt Belt. In 2019, mining claims increased to 25,356 versus 23,205 claims in 2018. Not sure what date goes with those counts, but the interest in Idaho’s geology and ores is still there.

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Bunker Hill Mining Corporation

- New group formed Liberty Silver – August 2017 agreement with owner of Bunker Hill to lease-purchase mine ($30 million).
- Aim - to reopen Pb-Zn mine; working with EPA on water treatment issues.
- Financing problems and defaulted on lease. Nov. 2018 – reinstatement of lease from owner (Placer Mining Corp.) to reduce lease payment in 1 year agreement.
- October, 2019: Amended lease / option for additional 9 months with more favorable terms.
- Large zinc resource.


BH produced about 38 million tons of ore between 1885 and 1981. Mine and smelter closed in 1981 when owner Gulf Resources Corp. went bankrupt. 2200 workers lost jobs then. Site cleanup completed under CERCLA. New company is negotiating with EPA to resolve issues with water treatment at mine. On west side of Coeur d’Alene District. Great address. Working to upgrade resources to 43-101: Quill Zone, Newgard, UTZ (UTZ accessed via Russell Tunnel. 1500 tpd Mine Plan. Negotiating with EPA over assuming water treatment plant costs in return for permit. EPA working with Bunker Hill. Stay tuned. At its peak, The Bunker Hill Company operated the mine, lead smelter and
Idaho Champion – example of how had good results and discovery, good metallurgy, good property. Received permits to drill from Forest Service. But no work on ground in 2019. Most likely due to lack of funding. NVH – also interesting property. Polymetallic, maybe porphyry related.
Nez Perce lawsuit: Midas response

Since well before the suit was filed, Midas Gold has been working closely with the Idaho Department of Environmental Quality and the United States Environmental Protection Agency to gain permission to take immediate action and learn more about the specific causes of degraded water quality in a number of locations. Midas Gold firmly believes that it is not legally responsible for cleanup of the legacy impacts caused by previous mining companies or directed by government agencies. However, the Company wants to be part of the solution. Subsequent to quarter end, in the normal progression of such litigation, Midas Gold filed a request for a stay of proceedings based on the progress in respect to ongoing discussions with Federal and State regulators on a path that would end the litigation and a request for a dismissal of the suit based on other considerations. Both motions have been consolidated for judicial review in mid-December and are expected to be ruled on as early as late Q4 2019.

Revival Gold: Beartrack gold project

Beartrack: Meridian Gold, closed 2000 and produced 600,000 tr. ounces from heap leach

Beartrack and Arnett Creek, Lemhi County

Beartrack:
- 3 DDH for 1,230 meters (Joss area)
- Resource Estimate (Q1 2020)
- Metallurgical work on sulfide – optimize flotation results and recovery
- Historic placers at Leesburg on Napias Creek; former open pit mine of 600,000 oz. Au

Talk by Steve Priesmeyer on Thursday AM

Revival Gold: Arnett Creek

Results (Oct. 22 press release):
- Hole AC19-38D (Haidee) 10.7 meters of 0.56 g/t Au
- AC19-36D had 13.6 meters of 0.86 g/t Au (Haidee)
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Otis Gold:
Kilgore Project

- Completed PEA: 5-yr mine
- Attractive IRRs.
- Still drilling on 12-hole RC program with 2 rigs.

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Idaho Cobalt Belt

- Mesoproterozoic banded siltite, Apple Creek Fm.
- NW-trending 30-km linear belt.
- Co price down: critical mineral, Au, Cu, REEs.
- Two large projects:
  - eCobalt/Jervois (Blackbird)
  - First Cobalt (Iron Creek)
- Others – compilation of 2018 work, permitted, not drilled.

NW-trending belt of Co occurrences: ~30 miles long by 5 miles wide. Host is Mesoproterozoic “Yellowjacket” metaseds. Siltites, argillites with biotitites (possible exhalative stratabound zones).


Metamorphic grade increases to NW along belt, as get closer to Cretaceous intrusions and more regionally metamorphosed rocks. Not sure about origin of mineralization or trend. May reflect orientation of original Proterozoic rift???

Structurally complex. Blackbird District is largest. Noranda defined about 18 million ton reserve there in ~1970s before Co prices collapsed and it was never mined. Now patented district has permanent water treatment plant and old tailings reclaimed. See 2016 paper on district by Bookstrom and others in GSA Special Paper.
First Cobalt: Iron Creek

- 2019 Summary
  - Phase 2 drilling completed Feb. 2019
  - 43 DDH, 44,000 feet
  - Surface and mostly underground
  - Co and Cu, Co-pyrite, chalcopyrite
  - Geologic model and lithogeochemical interpretation
  - Co-Cu resource update (NI 43-101, Q4 2019)
  - Water quality monitoring
  - Property exploration, Ruby Zone
  - Refinery at Cobalt, Ontario

Iron Creek: 2018-2019 DRILLING HIGHLIGHTS

- Post-Resource drilling (Fall/Winter 2018 – 2019)
- 43 diamond holes totalling 44,000 feet
- Infill and Extension drilling targets

- Result
  - Expanded the resource along strike to over 3000 feet and down-dip extensions to over 1000 feet
  - New resource estimate in Q4 2019

- West Extension
  - 0.22% Co, 3.90% Cu over 12 ft (ICS18-21)

- Depth Extension
  - 0.13% Co, 0.01% Cu over 59.5 ft (ICS18-14)
  - 0.20% Co, 0.01% Cu over 39.4 ft (ICS18-28)

- East Extension
  - 0.20% Co, 0.10% Cu over 22.8 ft (ICS18-20)

Co is in cobaltian pyrite. Cu zone partly separate. Higher grade Co zone in east, higher Cu grad in west. For more details, see Frank’s talk on Thursday.
Jervois: Permitted 43-101 compliant M and I resource of 3.87 Mt at 0.59% Co and 0.85% Cu; plus 1.82 Mt inferred resources at 0.46% Co and 0.81% Cu plus healthy Au credit. Jervois has Co and NiCu properties in Australia and Africa. Deal valued at $44 million and was agreed by shareholders in spite of protests by First Cobalt.

Planning additional drilling next year. Hot off press – very nice assay returns from 2019 drill program. Increase confidence in economic viability of deposit. Also – no real exploration drilling for many years. Lots of potential to extend zones.

New World Cobalt: Colson Creek Project

Australian Company
Phoenix Copper Ltd.: Empire Mine

- PG Mining/Konnex
- Empire Mine, Mackay
- Polymetallic Skarn
- May, 2019: NI 43-101 resource, SX-EW Cu
- Bankable Feasibility
- Environmental Baseline
- Drilling early 2020

- Updated 'Measured & Indicated' open pit resource containing 73,872 tonnes copper, 29,813 tonnes zinc, 139,000 ounces gold and 6.038 million ounces silver
- New open pit economic model to produce 7,665 tons copper equivalent annually (7,000 tons copper and 1,600 tons zinc) over the life of mine (with initial production of 8,600 tons per annum)
- Bankable Feasibility Study ("BFS") on open pit heap leach SX-EW project underway
- Land acreage increased to 5,717 acres, including 2,420 acre Navarre Creek gold zone
- Maiden 'Inferred' sulphide resource at newly discovered Red Star lead / silver zone

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Here's to finding the sweet spot.

**BLACK PINE 2019 PROGRAM**

- New Plan of Operations (PoO) with USFS for 141 acres of disturbance in up to 370 drill sites and 49 km of new roads within 7.3 km² cleared boundary received February 2019.
- Extensive ROW Grant with BLM for water well and property access.
- Drilling commenced April 2019 with up to 2 RC rigs and 1 core rig running 24 hrs/day.
- 65,000 feet/20,000 metres RC Drilled in ~90 holes.
- 4,100 feet/1,250 metres Core Drilled in 6 holes.
- 5 large-diameter core holes and 6 bulk samples for metallurgy, mineralogy and structural and stratigraphic information.

**Unmined Gold Mineralization**

Mined in multiple pits by Pegasus Gold 1991 – 1998; heap leach, Produced about 435,000 tr. ounces at historical grade of 0.7 g/t. 7 shallow pits. Tallman pit old Hg producer. Classic Carlin-style alteration and geochemistry. Old district, originally rediscovered by Noranda in late 1980s. Mined by Pegasus. Acquired from Western Pacific by Liberty in mid-2016. Liberty has since tracked down and possesses old Pegasus drill data.

**Liberty will use new understanding of structure and stratigraphy to drill more in 2020.** Prior drilling by Pegasus was shallow and at time of low Au price.
Integra Resources: DeLamar Project

- Two Development Projects
- DeLamar mine
- Florida Mountain mine
- Exploration
- Owyhee County, SW Idaho
- Past producer to 1998 (~ 1.5 M oz. Au, > 100 M oz. Ag)
- Resource: 3.9 Moz AuEq (M & I)
  plus 500 K oz AuEq (Inf.)
- October: NI 43-101 Report by MDA
- Nov. 25: Cœur invests $ 5.5 million


Still drilling? One rig drilling since spring, but in late summer and fall, picked up pace. Added second rig. Focus Florida Mtn. Where Kinross permitted the Stone Cabin mine but only mined a small part of resource. Integra is starting with that but drilling extensions of mineralization at Florida. Also exploration drilling on claims at War Eagle Mountain to east. Third mineralized center in Silver City district. Airborne magnetics and hyperspectral survey. Extensive mapping and soil sampling. Engineering studies – Thursday AM session.
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BeMetals: South Mountain
- Thunder Mountain Gold - Operator
- Idaho-based company
- Private land
- 2019: 20 UG holes
  - Intercept: 12.2 m at 18% Zn, 132 g/t Ag, 4.4 g/t Au, and 1.5% Pb.

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BeMetals: South Mountain
Resource (M & I): 170,000 short tons grading 17.66% Zn-eq.

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IDAHO 2019: Brownfield to Minefield
www.idahoepology.org
Questions:
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THANKS

Many smaller projects and properties I did not have time to cover.