IDAHO MINING AND EXPLORATION, 2017

Virginia S. Gillerman, Ph.D.
Idaho Geological Survey, Boise

December 6, 2017
Acknowledgements

- Earl H. Bennett, IGS Emeritus
- Idaho Dept. of Lands Staff
- BLM and USFS Minerals Staff
- Industry Geologists & Managers
- Idaho Geological Survey
2017 – A year of reinvigoration

- Stable commodity prices.
- Stable and decent domestic economy.
- Hints of global growth?
- Hopes for less restrictive regulatory policies.
- New age metals – cobalt.
- Rediscovery of old districts and projects.
- Labor woes.
- Optimistic uncertainty.
Idaho Non-fuel Mineral Production

Data from USGS
2016 IDAHO LEADERS

- Phosphate Rock
- Sand and Gravel
- Silver
- Lead
- Crushed Stone

- In 2015, metals only 26% of value, due to loss of moly production at end of 2014.
Metal Prices: 5-year graphs

GOLD

Au ~ $1300/tr. ounce

SILVER

Ag ~ $17/tr. ounce
Base Metals and Alloy Metals

COBALT: 2005-2017

Co: $31/lb. on 28Nov 2017

Mo Oxide: $7.26/lb. on 28Nov 2017
NEW PROJECTS IN EACH

Will Cover Active Mines First, Exploration projects later in talk.
Over 1.24 billion tr. ounces Ag
(38,568 metric tons)
What a difference a year makes. 3.6 Moz. Ag in 2016. New #4 shaft operational.

3/13/2017: USW Local 5114 out on strike. Major issue is control of miner’s work assignments.
#4 Shaft Is Fully Operational
Waste being moved off 6500, ore later this year

<table>
<thead>
<tr>
<th>2017E Sustaining Capital</th>
<th>TBD</th>
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<tbody>
<tr>
<td>2P Reserves</td>
<td>77.8 Moz silver @ 16.1 oz/t Ag</td>
</tr>
<tr>
<td>M+I Resources</td>
<td>133 Moz silver @ 6.2 oz/t Ag</td>
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</tbody>
</table>
Americas Silver Corporation

- Galena mine complex
  - Galena mine
  - Coeur mine
  - Caladay
  - 2 mills

Mining on 2400 level and developing “lead zone” on 3200 level. 100% Ag-Pb production in 2017. 6 levels: Upper Country and deep on 4900 and 5200 (new 367 vein). Reduced costs by 50% since 2012.
Galena mine Ag-Pb zone veins

11 sub-parallel E-W veins over 800 feet, cut by higher grade N-S veins.
Galena mine Ag-Pb zone vein
New Jersey Mining Company
Golden Chest mine, Murray

Underground Production Start: Nov. 1, 2017

GOLD

Open Pit operated all year.

Grade ~ 4.5 to 5 g/t Au

Quartz veins with Au, Sch.
Mill: 360-tonne per day flotation mill and cyanide leach plant at Kellogg.

NJMC paid off balance – now 100% owner of Golden Chest.
Mining in Panel G in 2017

J.R. Simplot Company
Smoky Canyon mine

New Hitachi EX2600 shovel working with CAT haul trucks
Smoky Canyon mine

New Reutech slope monitoring radar unit.

Final 18’ lift to raise tailings dam.
Panel G in May, 2017

Environmental:

- Waste rock segregation – to minimize footprint of Se-bearing waste.
- Chert wedge - assist synthetic covers on slopes.
- Backfilling old pits and concurrent reclamation of waste dumps.
Monsanto
Blackfoot Bridge mine

2017 RECORD YEAR: ~ 2 million tons of ore

Blackfoot Bridge mine: Mid Pit, to North Pit. GCLL construction on overburden pile on right.
Ore to Soda Springs Elemental Phosphorus Plant

Blackfoot Bridge mine
Agrium
North Rasmussen Ridge mine

Mining Panel B

Reclamation, Panel A
November 7, 2017: Agreement for Itafos to purchase Agrium’s Conda phosphate operations for $100 million. Stay tuned.

New Load-out at Conda plant.

**Phosphate Exploration/New Mines**

- **Simplot:**
  - **East Smoky** Expansion 3-12 years. DEIS Spring 2018.
  - **Dairy Syncline** mine/land exchange. Will move all operations to 2133-acres project. Permitting, DEIS in winter 2018?
Monsanto

- Trail Creek Drilling, 7 holes.
Ash Grove Cement – plant demolition; shipping terminal only.

Economy good and markets stable though not stellar.
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
- Development Stage
  - Metakaolin Pilot Plant at FLSmidth - flash calcination for natural pozzolan.
  - Halloysite, Kaolin, Quartz, K-Feldspar testing and process optimization.
- 2016 Feasibility – 25% after tax IRR.
- Amended State operation and reclamation plan issued May, 2017.
- **Oakley Stone**
  - Northern Stone Supply
  - Sawtooth Stone – 2 new pit areas permitted, expanding to add rhyolite.
  - Scrivanich
  - Oakley Mtn. Corp.
  - Sold outside Idaho as high-end stone.

- **Table Rock Sandstone**
- **Idaho Travertine**
  - Three Rivers – inactive
  - Other small operations

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Yukon Gold Quarry
IDAHO COMPANIES:
Hess Pumice
Hess Perlite
Hess Pozz
US Grout
Bear River Zeolite

- Preston, Idaho
- Subsidiary of US Antimony
- Sales and production about same.
- Added new screening line
- Clinoptilolite – huge deposit
- Main markets
  - Water filtration
  - Agriculture
E and S Mining: Hwy. 20
Pumice Pit

CARCO: Benjel Clay mine,
Owyhee Co.

CARCO Supersack – bentonite clay
Aggregate Leases & Royalties
- Sand and Gravel
- Crushed Stone

Phosphate Leases & Royalties
- Decorative Stone

Oil and Gas

Precious Metals

Source: Idaho Department of Lands, 2017

Monsanto Quartzite Quarry, Caribou County: high-purity silica needed to process a million tons of phosphate rock.
- **Alta Mesa** – Western Snake River Plain
  - 7 producing wells with gas, oil, condensate
  - 1 well drilling
  - Willow and Hamilton fields
  - 2017 revision of hydrocarbon regulations

- **CPC Minerals** – exploration oil drilling near Grays Lake, SE Idaho

- **Geothermal**
Hydrocarbons

Production: ML 1-11 of Alta Mesa

CPC Fed 20-3 view, SE Idaho

CPC Fed 20-3 Surface Casing, October, 2017
2017 State Survey Activities

- Sage Grouse & SFA Withdrawal
- Stibnite Research
- Petroleum Models & Assessments
- Statemap Geologic Mapping
- Data Preservation and AML Mining Databases

Geologic Hazards:
- Boise Foothills Project – Geologic Hazard Mapping (Dr. Zach Lifton, New Geologist).
- Big Wood River - FEMA Project

www.idahogeology.org
Mines Web Application

Web Application Content: 8,871 properties

• Query by:
  - Mine name
  - Commodity
  - Location
  - Ownership (surface management)

• Choice of layers & base maps:
  - Geology
  - Geochem
  - Imagery
  - PLSS Grid
  - Etc.

Contact: Christopher Tate, IGS-Moscow: ctate@uidaho.edu
2017:

- Significant Upturn in Exploration
- Return of Grass-Roots
- Development and Advanced Projects
- Financing Returns
- US a Stable Political Haven?
- Election Influence?
- Good Metal Prices – mostly
- Multi-commodity: Au, Ag, Co, Cu, Zn
- Environmental Issues a Major Concern, but perhaps More Flexibility
- BLM No Action ROD on SFA withdrawals for sage grouse.
New group formed Liberty Silver – August 2017 agreement with owner of Bunker Hill to lease-purchase mine ($30 million).

Name Change: Nov. 28, 2017, to Bunker Hill

BH 1885-1981 Huge mine Pb-Zn-Ag

Plan to put it back in production.

Production from 1887 through 1981 - 35,944,000 tons grading 8.76 % Pb, 4.53 opt Ag, 3.67% Zn
• Known Zinc Resource in 3 zones.

• Spent year digitizing historic mine and drill hole data.

Negotiating with EPA over costs to resolve water treatment plant issues.

Quill Zone – 5 M tons P&P at 6% Zn + Pb, Ag
Bunker Hill Project Model

Website, videos, and interactive model by Curia GEO
Blanco Creek Property

- SE of Elk City
- NE-trending Shear Zone
- Historic UG mines: Alberta, Hercules, Pasadena
- Rock chip samples to 27 g/t Au and 290 g/t Ag. Base metals.
- Filed Plan to drill next year.

Other small N. Idaho projects:
Bayhorse Silver
Transatlantic
TVL? Premium project at Orogrande
Brundage Placer
- eCobalt (Formation Capital Corp.)
  - RAM at Blackbird District
- US Cobalt
  - Iron Creek
- Utah Mineral Resources
  - Iron Creek
  - Sweet Repose
- Codaho, LLC
  - Salmon Canyon Copper
- Others
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).
Cob-chlorite ore along $S_2$ layering in transposed banded siltite, hinge zone of the Sunshine $F_2$ syncline.

Chl after Bt (after argillite), mosaic Qtz (after siltite)

From Art Bookstrom

2017 Purchase Blackfoot industrial site for processing plant. Preconstruction ramp up.

### Mineral Resource

<table>
<thead>
<tr>
<th>Category</th>
<th>Resource (Tons)</th>
<th>Cu (%)</th>
<th>Co (%)</th>
<th>Au (ppm)</th>
<th>Ag (oz)</th>
<th>Cu (%)</th>
<th>Cu (%)</th>
</tr>
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<tbody>
<tr>
<td>Measured</td>
<td>1,728,000</td>
<td>0.84</td>
<td>18.899760</td>
<td>0.014</td>
<td>24.3800</td>
<td>0.76</td>
<td>26,334,900</td>
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<td>Indicated</td>
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<td>29.8900</td>
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<td>NI</td>
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<td>Inferred</td>
<td>1,542,000</td>
<td>0.51</td>
<td>18.993993</td>
<td>0.012</td>
<td>19.7600</td>
<td>0.68</td>
<td>21,012,200</td>
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RAM Portal Bench, 2011

2017 Fall drilling
Iron Creek
- SE end Co Belt
- No Name Adit
- Jackass Zone
- Historic 1.3 mt @ 0.59% Co

Surface Drilling
- 35,000’ core

Adit #1 Rehab

Channel sampling

WNW-trending zone
US Cobalt: Iron Creek

Cobalt in Historic Drilling
- Exceeds 0.5% Cobalt
- 0.3% to 0.5% Cobalt
- 0.1% to 0.29% Cobalt

Copper in Roadcut samples
- Exceeds 0.1%
- 500-1,000 ppm
- 100-500 ppm

No Name Zone - Historic Drilling
Utah Mineral Resources

- **CoAu Property/CAS**
  - N of US Cobalt Iron Creek
  - 1967 discovery, explored by several companies and geophysics
  - Drilling of IC03-04 hit 4.6 m of 0.334%Co and 8 g/t Au
  - Purchase agreement March 2017 with 1-yr work commitment.
  - Also acquired Sweet Repose prospect closer to Blackbird.

- **Codaho**
  - **Salmon Canyon Cu (NW end)**

- **Others**

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From Art Bookstrom

**Blackbird Mine area, above the garnet isograd:**
This garnet porphyroblast is in garnet-chlorite phyllite (after cobaltite-biotite ore). The garnet truncates phyllitic fabric of chloritized cobaltite-biotite ore, and it contains many inclusions of cobaltite. Thus, early cobaltite-biotite ore formed and was deformed before the growth of metamorphic garnets. Resulting metamorphic grade is lower amphibolite facies, garnet zone (Nold, 1990). Chlorite is retrograde after biotite and garnet.

**Salmon Canyon Copper prospect:** These porphyroblasts of cobaltian arsenopyrite (glaucochrysoberyl) and chalcopyrite occur in sillimanite-garnet-quartz-biotite gneiss (after banded siltite?). Thus, metamorphic grade is amphibolite-facies, sillimanite zone at this northwestern end of the Idaho cobalt belt (Nold, 1990).

Codaho: Salmon Canyon Copper – in high grade gneiss. Chalcopyrite and Co-arsenopyrite
Final heap leach cover installation, September, 2017
Arnett Creek

- Surface sampling and mapping
- Drill proposal - 2018

Haidee Placer

107 rock samples, 37 over 1 g/t Au
Beartrack mine – late August deal
Meridian Gold – open pit, heap leach
mine produced ~ 600,000 ounces Au

Beartrack mine - pit
12 holes
September, 2017
Permitting
- EIS, Public Scoping, Project Manager for USFS, Data Acquisition

Development/Engineering
- Feasibility Study
- Metallurgy work
- Geotech drilling for foundations, tailings impoundments, studies
- Updating geologic and resource models
- Powerline and road studies
Exploration/Infill Drilling: 20 holes, 3377 meters

Yellow Pine: 194 meters @ 2.5 g/t Au, 6 g/t Ag, 0.6% Sb.

Hangar Flats: 50 meters @ 3.2 g/t Au, 36 g/t Ag, 1.2% Sb

From intrusive-hosted Yellow Pine deposit
Public Relations and Outreach: Over 30 tours, 700 visitors

School group planting trees in riparian areas

Hayley Couture - Midas’ plan
CuMoCo

- **Cumo Deposit**
  - Boise County
  - Giant (2+ bt) Mo-Cu porphyry
  - Corporate financial and legal issues
  - Permitting SEA to re-evaluate endangered Sacajawea bitterroot.
  - Public Scoping – this week on SEA
  - 2016 fires

- **Calida Gold Project**
  - Mormon Canyon, Lemhi County
  - Old mines and shears – Cu, Ag, Cu in 10 veins.
  - Drill Program – 24 holes
  - Mineralization with visible chalcopyrite.
  - Past exploration – 1983 (29 holes)
Phoenix Global Mining
Mackay, Idaho
Alder Creek Mining District
Historic Mining in Polymetallic Skarns
Cambior and others open pit Cu oxide resource; also Zn, Au, Ag in skarns
Nov. 2017 JORC 19.3 Mt at 0.47% Cu with Ag, Au, Zn credits and exploration potential
2017 drilling (28 holes) increased resource 33%.

PFS underway (mid-2018).

Goal: Produce 7000 t/yr. from low capex leaching and SX-EW.
Atlanta Gold Inc.

- **Atlanta District** –
  - Clean Water Act violations and legal issues with As-bearing effluent from historic mine workings; water treatment works well except during runoff season. Compliance ordered by Court for end summer 2018.

- **Neal District** –

Liberty Gold

- Changed name from Pilot Gold
- **Black Pine district**, Cassia County
- Open pit, heap leach gold mine in ‘90s.
- Sediment-hosted “Carlin-type” Au

Submitted Drill Plan
Silver City District - Classic Epithermal
Owyhee County
Over 1.6 million ounces Au and 100M oz. Ag
Nov. 3, 2017: Integra Resources Corp. purchase from Kinross for C$7.5 million and stock. NSR retained by Kinross.
Integra Resources Corporation

- Unmined, drilled out mineralization remains.
- Patented claims
- PEA in 2 years?
- Ongoing water treatment, bonding in place.
- Untested high grade underground targets.
- Anticipate active drill program in 2018.
Otis Gold: Kilgore Project

- Kilgore Project
- Clark County
- Epithermal Au-Ag
- 24 DDH
- 8,000 meters
- Volcanics
  - Aspen Fm.
Thank You

Questions?
vgillerm@uidaho.edu
Slide 1

Slide 2

Slide 3
USGS estimate for 2016 is slightly over $600 million, up from last year, but large drop since Thompson Creek molybdenum mine ceased production. Note tracking of total and metals value – gap in between reflects relatively constant industrial minerals.

Some recent weakening in prices but still decent.
Cobalt the latest excitement due to its use in batteries and rise of rechargeable electric vehicles.

Thompson Creek Mo – on care and maintenance. Some 3rd party contract milling of imported concentrates.

Sunshine Mining – care and maintenance. Pumping water
Bunker Hill – in exploration section
Slide 10

What a difference a year makes. 3.6 Moz. Ag in 2016. New #4 shaft operational.

USW Local 5114 out on strike. Major issue is control of miner’s work assignments.

Slide 11

New shaft from 4900 to below 8300 L. Grade increasing with depth. But still on strike and no end in sight.

Slide 12

Lucky Friday mine

- Galena mine complex
  - Galena mine
  - Coeur mine
  - Calday
  - 2 mills

Mining on 2400 level and developing “lead zone” on 3200 level. 100% Ag-Pb production in 2017. 6 levels: Upper Country and deep on 4900 and 5200 (new 367 vein). Reduced costs by 50% since 2012.
2016 production: 1.4 million ounces Ag and 24 million lbs. Pb.
2017: 830 feet of development in zone and more work ahead to define mine plan.
Increase in reserves by 1.3 million ounces (18%). Mapping and digitizing geology, incorporating it into 3D block model and will be using the 3D model for mine planning.

Corporate presentation had 3400 level schematic map with 1,240 ft. defined strike at average of 4.8 opt silver and 7.1% lead. Conventional mining preserves high grade and cuts down dilution.
This box was high grade.
366FW vein on 4900 had 2.8 m at 347 g/t Ag and 14% lead. New mineralization intercepts on 3400 and 4000 levels as well. 20 hole drill program.

Modern Exploration: 30,000 m. of drilling, 7 NW-trending ore shoots along Idaho Fault. Folded and faulted Belt sediments. Quartz veins with gold and sporadic scheelite. Murray had rich placer gold deposits.
Operated open pit since fall, 2016 and all 2017. In 2nd quarter 2017 it produced and mill processed about 7425 dry metric tonnes at head grade of 4.78 g/t and with 86% recovery.
Spent most of year doing underground development work, backfill system etc. Also trenching, geologic modeling from old holes and
blastholes resulted in expansion of resource. Added personnel to corporate team.

NJMC is 100% owner of Golden Chest project. Has own mill. In October, New Jersey raised money to pay off balance owed on Golden Chest.

Permian Phosphoria Formation: Covered SE Idaho and parts of Utah, Wyoming and Montana. Black phosphatic shale. Idaho third largest phosphate producing state – after Florida and North Carolina. Squares = 3 large processing plants. Monsanto is only elemental phos plant in Western Hemisphere. Agrium and Simplot have fertilizer (phosphoric acid) plants. Global competitors are China and Morocco. Phosphate rock accounted for just over 50% of Idaho non-fuel production value in 2015. (since Thompson Creek Mo ceased ops.)
markets OK but prices down a bit for fertilizer.

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Upgraded mining fleet with 3 replacement haul trucks and new shovel. Large mine. Also mining Panel F and doing reclamation. Ore is crushed at mine and goes into 83-mile slurry line to Don fertilizer plant in Pocatello.

Slide 19

Also permitting East Smoky pit extension. Will add 2-3 years to life of mine and ore will be used for blending to maintain quality.
Slide 20

Panel G in May, 2017

Environmental:
- Waste rock segregation – to minimize footprint of Se-bearing waste.
- Chert wedge - assist synthetic covers on slopes.
- Backfilling old pits and concurrent reclamation of waste dumps.

Slide 21

Monsanto and mining subsidiary P4 operates the Blackfoot Bridge mine. Mining in Mid Pit. Shown here. North Pit in background. Photo looks north. Waste backfilled into portions of North Pit and external overburden pile (on right of photo). Constructing GCLL (geosynthetic clay liner laminate) cover for waste pile but had issues with faulty drainage layer and will be working on it next year. Record year of mining at about 2 million tons of ore, with about 25% of that (500,000 tons) sold to Agrium. Mined below water table in southeast section of North Pit for first time.

Agrium mining in Phase 2 and 3 of Panel B of North Rasmussen Ridge (finish about Feb. 2018). Backfilling in Phase 1 of Panel B and final reclamation in Panel A. Also working with State IDEQ on plan to address groundwater issues and remediation at South and Central Rasmussen Ridge mine areas.

Agrium also mining at Lanes Creek mine – which is all private surface and minerals.

Agrium’s ore goes to phosphoric acid fertilizer plant at Conda. New Load-out facility and scale at plant. Rasmussen Valley mine: Initial application to mine in 2010, Record of Decision for new Rasmussen Valley mine signed January 13, 2017 with Authorization to Proceed issued May 15, 2017. 500 acres disturbance on mix of federal, state and private. Agrium constructing haul roads, storm water management ponds, etc. Expect ore production early 2018. 6-year mine life to supply ore to Conda. Cooperative agreement with
Monsanto/P4 to place initial overburden into South Rasmussen mine just to north. Win-win for all. Avoid external overburden piles at Rasmussen Valley.

Itafos – integrated producer of phosphate-based fertilizers and operates one superphosphate project in central Brazil. Founded 1999 with headquarters in Cayman Islands. Stonegate Agricom is a subsidiary. Divestiture of Agrium’s assets due to regulatory concerns over Agrium’s proposed merger with PotashCorp. Subject to US FTC approval. Agrium is also selling a nitric acid facility in Ohio to Trammo Inc. Agrium will retain historical environmental obligations and most likely record a non-cash after tax $178 million impairment.
Slide 26

Monsanto
- Trail Creek Drilling 7 holes.
- Caldwell Canyon


Slide 27

Ash Grove Cement
- Plant demolition; shipping terminal only.

Economy good and markets stable though not stellar. Same operations as last year for most part. Stable, smaller, important to rural economies.

Note: Ash Grove Cement at Inkom – cement production stopped a few years ago. Company uses old plant as shipping terminal only. Since 2014? Going off list next year. Ash Grove cement bags mostly from Durkee Oregon plant.

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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
  - Development Stage
  - Metakaolin Pilot Plant at FLSmidth - flash calcination for natural pozzolan.
  - Halloysite, Kaolin, Quartz, K-Feldspar testing and process optimization.
  - 2016 Feasibility 25% after tax IRR.
  - Amended State operation and reclamation plan issued May, 2017.

Also USFS Emerald Creek Garnet dig. I-minerals clay-quartz-feldspar deposits in historic Bovill-Helmar district in Latah County. State leases. Working on producing high value products – ex. Would be only metakaolin producer in Pac NW. High K2O feldspar. All very competitive markets. Main competition is in SE US.
Micaceous quartzite that splits into thin slabs. Very durable. Facing stone, stacked rocks. Cut into tiles as well.

Hess Pumice operates several companies out of their facility in Malad. Based on high purity pumice at Wrights Creek mine north of town. Hess Pumice uses special screens to split out various sizes of highly pure pumice. Markets include lightweight aggregate and artificial stone, pozzolan for cement, abrasives, filtration, horticulture, paint fillers? Also operate Hess Perlite (formerly Idaho Minerals) that produces an expanded perlite product prized for horticulture and lightweight concrete use.
More efficient and down to single shift. About 14 employees including 2 in corporate office. Continue to research new markets.

Also zeolites, oolite, and gemstones. CARCO processing plant in Caldwell.

Monsanto’s quartzite quarry is on state ground. Very important to company and state. Idaho’s mineral income is primarily from industrial minerals – with aggregate and phosphate rock being by far the most more valuable (Over 85%) of just over $1 million in annual royalties to Idaho.
Early 2017 Idaho legislative session included extensive rewrite of oil and gas regulations. One of the results is quicker and more transparent reporting of production. Ex. Downloadable monthly production reports on new website of new Idaho Oil and Gas Conservation Commission: ogcc.idaho.gov

September, 2017: Alta Mesa produced about 5,000 barrels of oil/condensate and 248,515 MCF (million cubic feet) of natural gas from 8 wells in Payette County, mostly in the Willow Field.

Western SRP: Tertiary basin with lacustrine and fluvial sediments
SE Idaho: Paleozoic Sediments – fold and thrust belt
For more about IGS Data Preservation of mining files and databases, contact Reed Lewis or Christopher Tate in Moscow Office. Or myself. at cstate@uidaho.edu or 208-885-7540. Or myself.
Slide 39

Definitely a lot more to talk about this year. Exciting projects. Newcomers. As usual, will start in the north and highlight some of the projects. Already covered the industrials. Also – preserving historic data so don’t have to re-invent wheel and advantages of new computer software programs for 3D visualization of complex historic level plans and drill hole information.

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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 refinery, electrolytic zinc reduction plant, cadmium plant, zinc fuming plant, sulfuric acid plant and even a phosphoric acid plant at Kellogg. Check new website for more on current plans.

Screenshot of interactive 3D model the company and its consultants have been working on. Huge amount of historical data. Quill orebody, faults and workings only shown here. Great visualization tool.
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Blanco Creek Property
- SE of Elk City
- N-trending Shear Zone
- Historic UG mines: Alberta, Hercules, Pasadena
- Rock chip samples to 27 g/t Au and 280 g/t Ag near surface
- Filed Plan to drill next year


Slide 44

Cobalt prices have skyrocketed this year. Around $30 per pound. Use in batteries. Other companies staking claims as well.

Well-defined NW-trending belt of occurrences in Lemhi County. Trend cuts across geology and may be basement flaw.

Slide 45

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).

Minerals: cobaltite, chalcopyrite with gold, and minor pyrite, arsenopyrite, and pyrrhotite. Mineralogy changes on belt.

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.

A mess. Tightly folded Mesoproterozoic Belt metasediments, assigned to Yellowjacket, Apple Creek, or other formations. Probably on several thrust plates (Cretaceous) with varying metamorphic intensity but well into garnet facies in places. Debated origin. Stratabound but also along fold hinges. Multiple horizons and district zoning. Cobaltite (CoAsS2) with pyrite, chalcopyrite. Gold credit. Best age dates from recent USGS work suggest initial cobalt introduced early in system, possibly syngenetic or at 1370 Ma intrusive event. Clearly deformed, metamorphosed and remobilized in Cretaceous. Controversial.
2017 new life on RAM. Formation, now eCobalt Solutions, Inc., working on Feasibility Study including mine design, Cobalt Production facility, and purchase of industrial property in Blackfoot, Idaho, for construction of processing plant near labor and transportation infrastructure. Conducted pre-construction activities. Fall drilling to help mine development. Added personnel and mine operational expertise. Positive Feasibility Study (Sept. 2017) has 25% IRR at $26.65/lb. Co. 12 year mine life with ample exploration potential.

New Project: Very Aggressive program June to Dec. 40 core hole program. Nice results. 13 holes assayed to date. Labs very slow. IC17-08 hit zone grading 0.51% Co over 32 ft., incl. 4.5’ zone of 1.08% Co. Holes IC17-03, 17-05 and 17-06 hit Co zone as well.

IC17-10 hit 56 ft. zone grading 0.91% copper and a 29-foot wide zone at 1.37% copper. Also hit Co zone 56-foot thick. Still drilling? Earl Waite and Jeremy Waite contractors. Opened 3-4 old adits. Private and NF ground.
Quite a bit of data from 1980s vintage Noranda work. Already planning 2018 drill program of 20 underground holes from Adit #2 to explore zone to the west. Also metallurgical tests, mineralogic studies and resource calculations. Patented claims assists speed permitting along.

CAS property explored by several others. Good geophysics. Trenching, few DH 2002-2005. Not much outcrop on steep slope. Analysing SP

Revival Gold picked up Beartrack and nearby Arnett Creek – explored in 1990s by AGR RC holes.

Drilled 3,024 meters in 12 holes in Ward’s Gulch and South Pit areas. Sept. 23 to Nov. 12, 2017. Two deep holes in Ward’s Gulch to test deep good hole that Meridian drilled (BT12-175D). 71 g/t gold over 9.75 meter intercept.

Visit them at the core shack.
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Midas Gold: Stibnite

- Exploration/Infill Drilling: 20 holes, 3,377 meters
  - Yellow Pine: 194 meters @ 2.5 g/t Au, 6 g/t Ag, 16.8% Sb
  - Hangar Flats: 50 meters @ 3.2 g/t Au, 36 g/t Ag, 1.2% Sb

From intrusion-hosted Yellow Pine deposit

Complex, overprinted Tertiary mineralization.

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Midas Gold: Stibnite

Environmental Restoration

Public Relations and Outreach: Over 30 tours, 700 visitors
School group planting trees in riparian areas

Plan is PRO: Restoration and Operations
Serious commitment and planning to restore site and enhance environment post-mining. Restore fish passage through old pit. Environmental restoration of complex, historic site is key to public acceptance. Complex EIS underway through Forest Service.

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Cumo Deposit
- Boise County
- Giant (2+ Mo-Cu porphyry)
- Corporate financial and legal issues
- Permitting SEA to re-evaluate endangered Sacajawea bitterroot
- Public Scoping - this week
- 2016 fires

Calida Gold Project
- Mormon Canyon, Lemhi County
- Old mines and shears - Cu-Ag-Cu in veins
- Old Project: 65 holes, mineralization with visible chalcopyrite
- Past exploration - 1983 (29 holes)

Cumo deposit permitting saga continues with Supplemental Env. Assessment for more drilling. Huge deposit in headwaters of Grimes Creek – in water supply basin for Boise. Very controversial since open pit.
Empire mine is one of Idaho’s historic districts. Sits on Mine Hill above Mackay in Custer County. Copper skarn around Tertiary pluton. High grade Cu with other base and precious metals. Explored in 1990s and 2000s by Cambior and others who outlined recent oxide Cu resource. 2017 infill drilling upped copper resource (Nov. 2017) by 51% vs. April 2017.

Phase 1: Open pit oxide development and production. Phase 2: Sulfide exploration and development. Geologic modelling and systematic exploration of deep sulfides below AP pit. Drilled two deep holes, awaiting assays. Also staked a couple of properties in the Idaho Cobalt Belt.

Ernie Simmons retired from Atlanta Gold.

Liberty Gold (formerly Pilot Gold) acquired Black Pine (Pegasus mine produced 435,000 ounces Au at historical grade of 0.63 g/t from 7 shallow pits) from Western Pacific for stock and $ 800,000 plus 0.5% NSR. Over 1800 historic holes with many unmined intercepts. Au in soils over 12 km2 areas. Mineralization continues down dip. Data compilation to 3D model. Pegasus mine 1992-1997.
Submitted revised Plan of Operations to drill on 300 sites potentially.

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Discovered 1863 and in production ~ 100 years. Kinross DeLamar most recent modern operator. Also Nerco. Closed it at low Au prices in 1998. Stone Cabin Mine on Florida Mountain barely started. Initial NI 43-101 mineral resources of 2.7M ounces AuEq at 0.3 g/t AuEq cutoff. Historic and modern production of over 1.6 million ounces Au and 100 million ounces Ag. Selenides. Price was C$7.5 million and stock with variable NSR retained by Kinross.

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Planning for 2018 drilling – focused on DeLamar area. Excellent infrastructure remains. Historical database of 2000 drill holes plus old maps, sections, etc.

Not sure if sale of property includes all of Kinross’ holdings or just those in DeLamar. Florida Mountain?
Kilgore explored by Echo Bay and others several years ago and defined about ½ million ounces. Last year, test Cretaceous Aspen Fm. sediments which lie under volcanics and on faulted block to northeast. Good grade mineralization. Kilgore caldera. Young system. Alteration dated at around 5 million years old.

Aspen is slightly calcareous and carbonaceous sandstone, siltstone and shale. Good host. Slow turnaround from labs. Also did 465 line-km of ground magnetics and collected 2,500 new soil, rock-chip and stream sediment samples. Adding new claims.