Nevada Division of Minerals

2017 NEVADA MINERAL AND OGG PRODUCTION
LITHIUM EXPLORATION ACTIVITY
AML PUBLIC SAFETY PROGRAM
NEVADA’S PDAC PRESENCE

SME NORTHERN NEVADA SECTION MEETING
Reno, NV
MAY 14, 2018
Rich Perry, Administrator
Nevada Gold

2017 Production
5.64Moz, +3.2% vs. '16
27 mines, 17 operators

Production

Price

Gold price, $/troy ounce

Gold production, millions of troy ounces
PAN MINE PUT BACK INTO PRODUCTION BY FIORE GOLD

AFTER A FEASIBILITY STUDY WAS COMPLETED BY SRK WHICH RECOMMENDED CHANGES IN OPERATING AND SAMPLING PROCEDURES, AND A NEW RESOURCE-RESERVES ESTIMATE

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (000s)</th>
<th>Grade (g/t)</th>
<th>Contained Metal (Au oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>8,184</td>
<td>0.62</td>
<td>159,000</td>
</tr>
<tr>
<td>Indicated</td>
<td>19,091</td>
<td>0.45</td>
<td>275,000</td>
</tr>
<tr>
<td>Measured + Indicated</td>
<td>27,275</td>
<td>0.48</td>
<td>434,000</td>
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<tr>
<td>Inferred</td>
<td>5,144</td>
<td>0.45</td>
<td>72,000</td>
</tr>
</tbody>
</table>

15,652 OUNCES Au produced in 2017

From: NI 43-101 Updated Technical Report, SRK 7-7-2017
NEW OPERATION: TWIN CREEKS UNDERGROUND
HUMBOLDT COUNTY

Newmont and SMD team celebrating first round

Twin Underground portal and yard, March, 2018

PORTAL BETWEEN TWIN CREEKS VISTA SURFACE MINE
FIRST PRODUCTION AUGUST, 2017
EXPECTED AVG ANNUAL GOLD PRODUCTION OF 30,000 TO 40,000 ANNUALLY

SOURCE: Newmont annual report, 2017
Photos courtesy of Newmont
Nevada silver

2017 Production
8.48 Moz, -5.2% vs. '16
24 mines, 15 operators

Price

Production

Silver price, $/troy ounces

Silver production, millions of troy ounces

2017 Production
8.48 Moz, -5.2% vs. '16
24 mines, 15 operators

Price

Production

Silver price, $/troy ounces

Silver production, millions of troy ounces
Nevada’s only Primary Silver Mine: Coeur Rochester

Disseminated silver-gold deposit hosted in the Permian-Triassic Weaver and Rochester formations.

2017 Production:
4,713,574 troy ounces of silver and 51,051 troy ounces of gold.

Rochester celebrated 150 million ounces of silver production in 2017
Total District Production
1906 - 2014
>5 B lbs. Cu (avg. 1% Cu)
>3.5 M oz. Au

Remaining Reserves
2014 – 2020
112 Mt @ 0.43% Cu
0.006 opt Au
by-product Mo

2017 PRODUCTION:
118,411,099 lb Cu
37,897 ozs Au
NEWMONT’S FORTITUDE PIT, A GOLD-SILVER-COPPER SKARN-TYPE DEPOSIT

2017 Production:
- 41,806,950 lbs Cu
- 197,026 ozs Au
- 1,191,630 ozs Ag
Nevada Copper: Pumpkin Hollow

Located 8 miles southeast of Yerington, Nevada

Hybrid IOCG Chalcopyrite-Magnetite Skarn

• Located within the Yerington Copper District.
• 2 deposits with 5 billion contained pounds of Cu:
  • Deep, high-grade eastern deposit mineable underground
  • Shallower western deposit mineable open-pit
• Currently developing a 5000 tpd underground mine on the eastern deposit with a concentrator
• Main shaft being extended to 2,147 feet
• First copper production planned for @Q4 2019 - Q1 2020
• The mine should employ ~300 people
General Moly: Mt. Hope

Molybdenum Porphyry Deposit
Located 22 miles northwest of Eureka, Nevada

History and Facts: Supplemental EIS expected to be approved early 2019

• World-class Molybdenum Porphyry Deposit first discovered in 1978

• Will be mined using open-pit methods

• 40+ year mine; 400+ new jobs

• Project needs a higher moly price

• Also conducting exploration for copper, silver and zinc

<table>
<thead>
<tr>
<th>Mineral Reserves</th>
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</thead>
<tbody>
<tr>
<td>Classification</td>
</tr>
<tr>
<td>Proven</td>
</tr>
<tr>
<td>Probable</td>
</tr>
<tr>
<td>Proven + Probable</td>
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</tbody>
</table>

*Based on $12/lb moly price
Nevada Barite Production

2017
391,402 tons shipped
+ 70% vs. '16
4 producers

Average Annual Price per Barrel of Oil

Production (1,000 short tons)


2017
391,402 tons shipped
+ 70% vs. '16
4 producers
NEVADA’S BARITE PRODUCTION IS FROM STRATIFORM BEDDED DEPOSITS IN THE ORDOVICIAN-DEVONIAN.

- 3 MINES OPERATED IN 2017

- 3 PROCESSING PLANTS
Nevada Gypsum

2017 Production
3.5 M tons
+9% vs. '16
6 producers

Gypsum production, millions of short tons


19992000
20012002
2003 2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
PABCO GYPSUM LAS VEGAS QUARRY AND WALLBOARD PLANT

- Gypsum deposit in a Miocene-age gypsite blanket in the Horse Springs FM.
- 120 feet thick, near-flat, very little stripping required
- Pit run grades 85% gypsum
- 500-year reserve
- Low-cost mining: wheel loader and in-pit conveyor
- 2017 production > 1.4 M. tons
Nevada Limestone Production 1991-2017

Number of Mines Reporting

Amount Mined in Tons
APEX LIME - LHOIST NORTH AMERICA, CLARK COUNTY

20 Miles NE of Las Vegas

2 ORES MINED:

- High-Calcium lime from the Crystal Pass member of the Devonian Sultan Limestone

- Dolomitic lime from the Bullion dolomite member of the Mississippian Monte Cristo Limestone
LHOIST PRODUCES 3 PRODUCTS AT APEX:

- High purity lime (95-97% CaO) used in environmental & metallurgical applications
- Type-S hydrated dolomitic lime used in construction
- Crushed limestone used in gas scrubbing

- 100+ year ore reserve
- Expanded to four operating calcining kilns
- Rail and truck delivery from plant
- 2017: 1.25 M. tons
Nevada Diatomaceous Earth Production

Diatomite production, millions of short tons

- 1991 to 2017 years
- Bar graph showing production levels from 1991 to 2017
Other Industrial Minerals
Produced, 2017

• 10,233,000 lbs of lithium compounds
• 112,634 tons of magnesium oxide
• 727,088 tons of silica sand
• 24,855 tons of salt
• 2,530 tons of perlite
Active claims in Nevada

Number of claims

Change from Annual Assessment Work to Fees

Price of gold

Number of active claims on public lands in Nevada

Gold price, $/troy ounce

Active claims

Annual Assessment Work to Fees

Price of gold
194,348 Active Mining Claims in Nevada as of 2/22/2018 an increase of 9.1% from January, 2017

12,498 Inferred Lithium Placer Claims in Nevada as of 2/22/2018 a decrease of 5.7% from January, 2017
NEVADA GEOTHERMAL POWER PRODUCTION

2017 Production
3.3 Million megawatt hours sold
-0.6% vs. '16

2017 Production
3.3 Million megawatt hours sold
-0.6% vs. '16
Uses of Geothermal Energy in Nevada

• Heat and cool buildings
• Industrial drying processes
• Electrical generation
Air-Cooled Binary Geothermal Power Plant

- Hot Geothermal Fluid
- Motive Fluid
- Cooled Geothermal Fluid
Geothermal Production Well at Patua, Churchill County
NEW GEOTHERMAL FIELD AND PLANT: ORMAT TUNGSTEN MOUNTAIN
Churchill County

- 22 MW OUTPUT
- 4 PROD WELLS
- On-Line October, 2017
Ormat Technologies Inc: McGinness Hills

Located in Lander County northeast of Austin

_Largest Geothermal Field in Nevada_

**General**

- First explored for gold in the 1980’s due to exposure of high-sulfidation and low-sulfidation hydrothermal alteration products
- In 2004 Newcrest Resources encountered hot water during exploration drilling
- Each 300 meter exploration hole punctured the sinter cap and intercepted near-boiling waters

- Geysering action was observed in one hole
- Ormat leased the McGinness Hills Property in 2009
- Phase I at 30 MW (2012)
- Phase 2 increase to 72 MW (2015)
- Phase 3 increase to 120 MW (late 2018)
Geothermal Operators

There are currently seventeen geothermal fields in Nevada being operated by seven operators:

- **Ormat Nevada**: Steamboat, McGinness Hills, Brady, Desert Peak, Wild Rose (Don Campbell), Jersey Valley, Tuscarora, and Tungsten Mountain.
- **Terra-Gen**: Dixie Valley and Beowawe.
- **Cyrq Energy**: Soda Lake and Patua
- **Enel North America**: Stillwater and Salt Wells.
- **US Geothermal**: San Emidio.
- **Nevada Geothermal**: Blue Mountain.
- **Homestretch Geothermal / Star Peak Geothermal**: Wabuska

From: NBMG MI-2016
Nevada has produced oil since 1954 from Paleoozoic and Mesozoic host rocks. 64 wells pumped in 2016.

Oil production well, Railroad Valley, Nye County.

Foreland oil refinery, Railroad Valley, Nye County.
OIL FROM SHALE

DIRECTLY SOUTH OF THIS POINT AND ACROSS THE VALLEY FLOOR ARE THE REMAINS OF A SHORT-LIVED EXTRACTION PLANT, WHICH REACHED THE PEAK OF ITS PRODUCTIVE CAPACITY IN THE EARLY TWENTIES. DRIVING OF THE MAIN SHAFT BEGAN IN 1916. OF SEVERAL TRIES AT EXTRACTING OIL FROM SHALE, THIS WAS THE ONLY SUCCESSFUL OPERATION IN NEVADA.

ROBERT M. CATLIN, SR. SPENT MANY YEARS EXPERIMENTING ON THE EXTRACTION OF CRUDE OIL FROM THESE BEDS BEFORE BEGINNING THE COMMERCIAL PRODUCTION OF OIL. AFTER A PRODUCTION PERIOD OF LESS THAN TWO YEARS, THE PLANT WAS CLOSED IN THE FALL OF 1924. HI-POWER CATLIN OIL WAS TOO EXPENSIVE TO COMPETE WITH THE FOSSIL OILS OF THAT DAY.

EASILY 50 YEARS AHEAD OF HIS TIME, CATLIN DID, FOR A FEW YEARS LIVE ELOKANS AND NEVADANS, A DREAM AND THE COMMUNITY AN OIL BOOM IN THE ROARING TWENTIES.
Last Oil Play in Nevada was 2013-15 Noble Energy
Unconventional Oil Prospect in Tertiary Elko Formation

Exploration Stage Unconventional Oil Prospects

• Targeting Tertiary age lacustrine shale (Elko Formation) with play at depths between 6,000 – 12,000 ft
• Unconventional tight oil prospect
• 4 Wells drilled to date, 3 hydraulically fractured

Results:
• Hydrocarbon saturation up to 70%
• Thermal maturity in peak oil generation window
• Total organic content 1-24%
• 2 wells recorded oil production

Looking Forward:
• Complete Analysis of data from wells
• Design Completion and conduct production tests
• Evaluate horizontal vs. vertical approach
NOBLE ENERGY HUNTINGTON K1L-1V PRODUCTION WELL
NEAR JIGGS, NV. T.D. = 9,692’
NEVADA OIL PRODUCTION
1955 - 2017
CUMULATIVE PRODUCTION
53,945,378 BARRELS

2017
Production
286,619 Barrels
The Biggest Export From Every State in 2017

U.S. Exports by Origin (Values in Millions of Dollars)

[Map of the United States with individual states highlighted in different colors, each representing the biggest export for that state. Examples include:
- Airplanes: $41,848M
- Tobacco: $209M
- Crude Oil: $1,814M
- Distillery Dregs: $91M
- Corn: $1,190M
- Beef: $512M
- Gasoline: $2,946M
- Cars: $2,648M
- Trucks: $724M
- Airplanes: $842M
- Gold: $6,285M
- Iron & Steel Waste: $137M
- Petrol Oil: $2,072M
- Petroleum Oil: $5,561M
- Zinc: $1,231M

Categories:
- Distillery Dregs
- Food
- Other Ammunition
- Precious Stone/Metal
- Tobacco
- Electronics
- Machinery/Transportation
Not Just Gold: Worldwide Lithium Exploration Boom

Lithium exploration budgets, 2009-2017

Source: S&P Global Market Intelligence
LITHIUM EXPLORATION ACTIVITY IN NEVADA

- Lithium targets:
  - **Brines**: in playas, locatable on Federal land with placer claims
  - **Clays**: sediment-hosted, locatable on Federal lands with lode claims.
Lithium Brine Production and Exploration in NV

• Nevada has the only operating lithium mine in the U.S. – located in Clayton Valley, Esmeralda County
  – Operated since 1967, employs 85 people
  – Produces lithium carbonate
  – Uses surface evaporation ponds to concentrate lithium pumped from brine aquifers in valley

• Geologic Model for a lithium brine deposit:
  – Salar deposits – a salt flat that may represent the basin of a salt lake
  – Accumulations of saline groundwater that are enriched in dissolved lithium.
  – Exploration by drilling and sampling of brine aquifers
Dajin Resources: Brine Exploration Model

- Brines form in arid closed basins.
- Volcanism and geothermal waters important.
- Large diameters wells drilled.
- Brines with Lithium concentration pumped from the subsurface.
- Direct extraction technologies removes Lithium in under 24 hours.
- Spent brine is re-injected.

Courtesy of John Muntean, NBMG
FIRST DMRE WELL BEING DRILLED UNDER NEW REGULATIONS
SIERRA LITHIUM, COLUMBUS SALT MARSH, ESMERALDA COUNTY

Photo taken March, 2018
Lithium Americas: Kings Valley
100 km north-northwest of Winnemucca, NV and 40 km west-northwest of Orovada, NV

Lithium/Organoclay Drilling Additive Supplier

- Hectorite clay deposit in the moat deposits of the McDermitt Caldera
- It is a near surface clay exposure that is right next to a major highway
- Hectorite is an effective additive to drilling muds and has emerged as the enabling mineral with thermal stability superior to bentonite clays to perform in challenging environments i.e. High Pressure & High Temperature
- Developing process to remove the Li from clay.
Lithium in the 1872 Mining Law

• Is a locatable mineral on Federal land under the general Mining law
• Placer claims are used to locate potential lithium brine deposits
• Lode claims are used to locate potential lithium clay deposits
DISSOLVED MINERAL RESOURCE EXPLORATION REGULATIONS

- A.B. 52 from 2017 session
- Will be Chapter 534B
- Addresses sampling of brines in exploration boreholes and wells
- Replaces NDWR MM well waivers
- NDEP, NDWR and NDOM jointly developed regs.
- Statute became effective 1/1/2018
- Regulations approved by Commission on Mineral Resources 4/27/18
- 5 DMRE wells have been issued permits
NDOM Open Data Site

- Public interface data repository available for download or interactive viewing
- A practical response to high volumes of data requests and limited staff
NBMG
Nevada
Mineral Industry
2016 Report
John Muntean
Economic Geologist / Director of CREG
Nevada Bureau of Mines and Geology
University of Nevada Reno
Presentation at the:
Nevada Commission on Mineral Resources Meeting
February 20th, 2018
AML Program - 2018 Ranking
Hard Closure Projects - 210 closures in 2017

- Backfills
- Polyurethane Foam Plugs
- Bat Compatible Closures
2017 Emergency Closures

Carnation

- A Jeep was parked on the road when the back right tire collapsed into a “ballroom” style working below and almost took the Jeep with it
- Hazard was fenced and road closed the following day after being reported
- 14 hazards in the immediate area were closed, including five wildlife compatible closures, for $46,038.68

Monte Cristo

- A collapse of a “ballroom” style working along a the Virginia City Grand Prix race route.
- NDOM staff and County Firefighter constructed a fence the same day it was reported.
- Site was backfilled for $3,000
Arden Mine Closure Project – Clark County
Las Vegas 1984

Las Vegas 2017

Arden Mine Complex

Arden Mine Complex
Arden Mine Closure, East Knob area, April 2018
Arden Mine Closure, Ridge Area, April, 2018
Arden Mine Closure, East knob final slope, April 2018

Cooperative effort between Clark County and the NDOM
NEVADA PDAC REPRESENTATION
March 4-7, 2018
First time Nevada had a State-funded presence.

A Collaborative effort between GOED, NDOM, NBMG, BLM, NMA, NMEC, GSN
Public Workshop(s) and Hearings(s)
- Commission on Mineral Resources, May 17, 2018, 1:00pm
- Dissolved Mineral Resources Exploration (DMRE) - Response to Summary Comments on Proposed Regulations, April 25, 2018

Employment Announcement(s)
- Mining Industry Specialist, Governor's Office of Economic Development

Education Workshop(s)
- 34th Annual Northern Nevada Earth Science Education Workshop 2018
  - July 17 and 18, 2018
  - Tentative Location: Wooster High School, Reno, Nevada.
  - Register at:
    - Direct Link: (Website Registration URL Pending)