

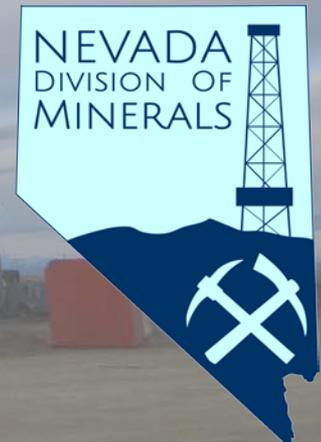
# Nevada Division of Minerals

*Nevada Mineral, Oil, and Geothermal Production Update*

## GSN SOUTHERN NEVADA CHAPTER

October 8, 2015

by: Richard Perry, Administrator



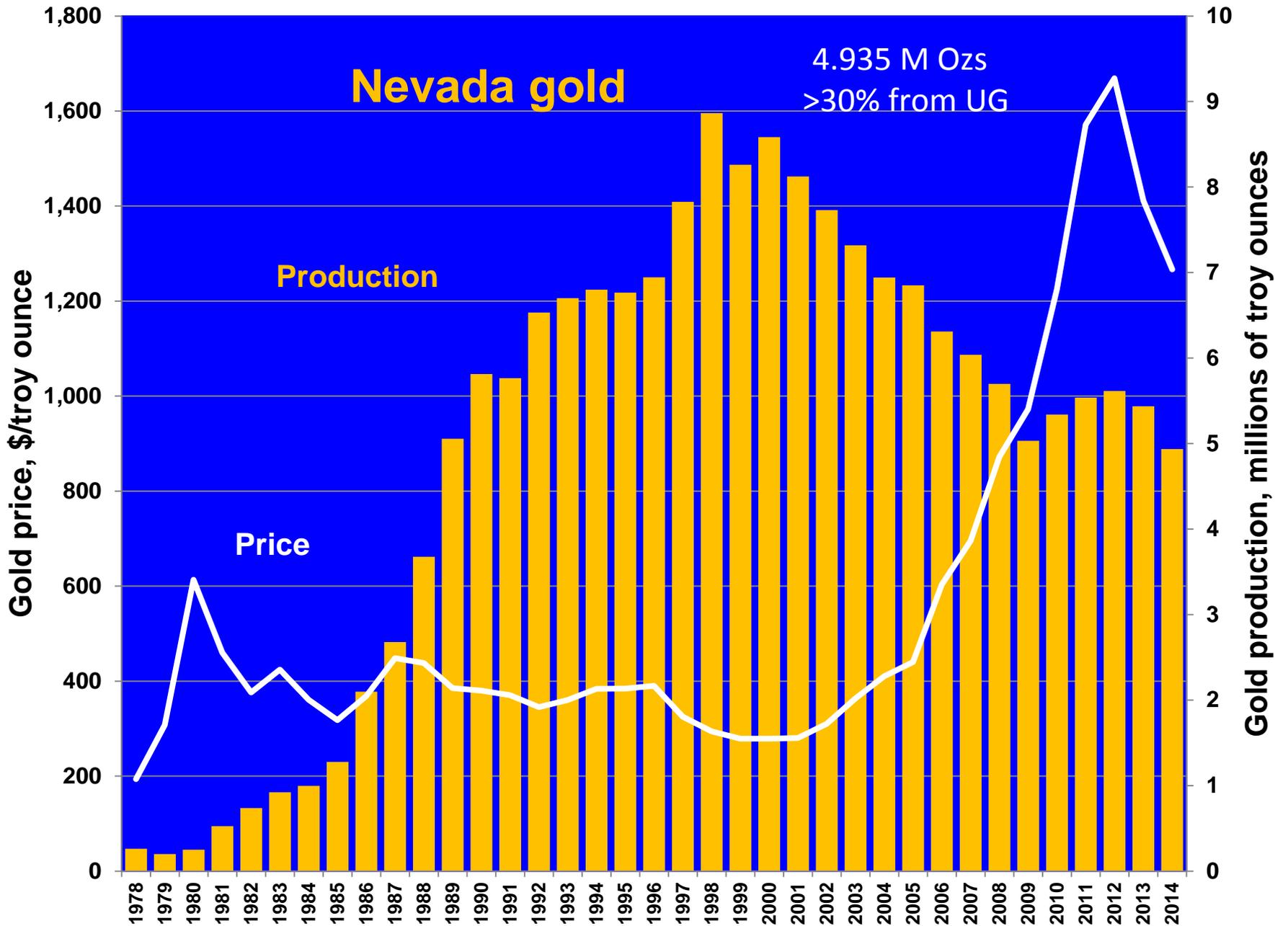
# NEVADA DIVISION OF MINERALS

- **State Agency and part of the Commission on Mineral Resources NRS 513**
- **CMR is 7 members appointed by the Governor from Minerals(5), OGG(2), Public(1)**
- **Offices in Carson City (8 employees) and Las Vegas (3 employees)**
- **All fee revenues, no General Fund**
  - **\$8.50 per claim fee on mining claims: 77 %**
  - **AML securing fees: 5%**
  - **OGG permitting/operating: 7 %**
  - **federal AML assistance: 6%**
  - **management of reclamation bond pool: 5 %**

# ACTIVITIES DEFINED BY STATUTES

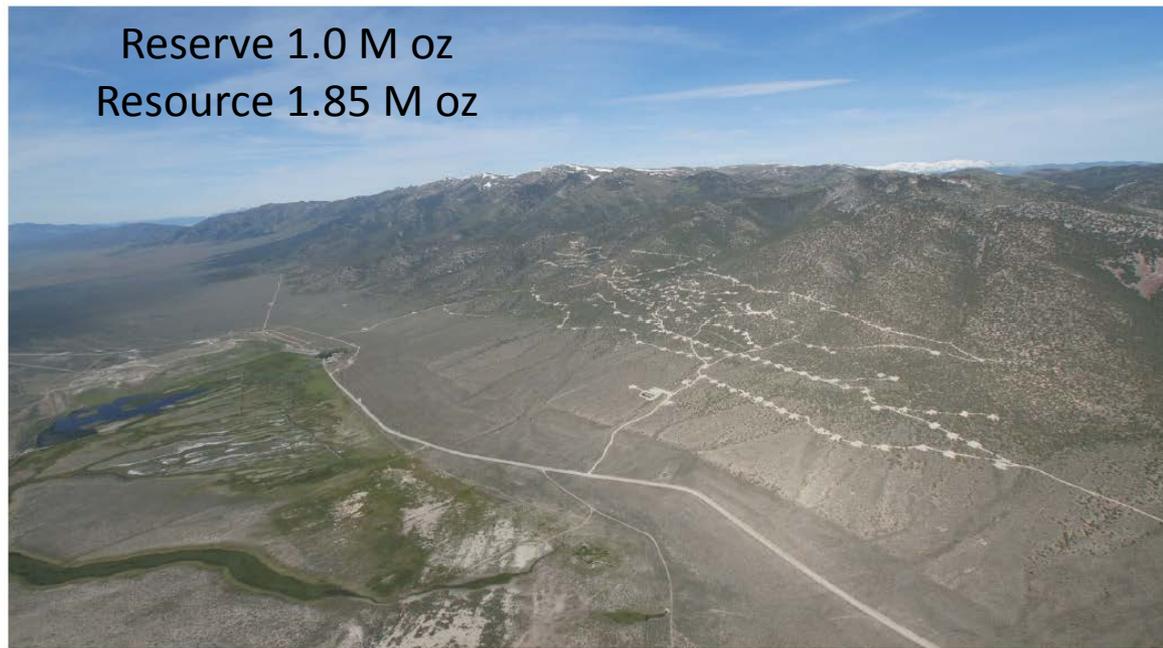
- **“Encourage and assist in the exploration for and production of oil, gas, geothermal energy and minerals within this state”  
– NRS 513**
  - **Minerals Education to public, schools, organizations**
  - **Supply information on the minerals industry**
  - **Abandoned Mine Lands Program – public safety**
  - **Record annual production of mines, oil & gas, and geothermal energy.**
- **Permit Oil and Gas drilling & production NRS 522**
- **Permit Geothermal drilling & production NRS 534A**
- **State Reclamation Bond Pool NRS 519A.290**
- **Mining Claims, Mill Sites and Tunnel Rights NRS 517**





## Current Activities

- Heap leach and facilities under construction
- Project funding \$293 M
- Pit development began in May, 2015
- Mining planned for Jan, 2016
- Production expected to begin in the 3<sup>rd</sup> quarter of 2016
- Average Annual grades will be roughly 0.05 opt with 2.5 to 3 million ore tones/year
- Total annual tons will begin at 20 million and ramp up to roughly 35 million tons
- Mine life is ~8 years
- 270 employees when in production



# Cortez Camp / Goldrush

## Cortez Camp

18 Moz production to date

11 Moz reserves<sup>(1)</sup>

4.9 Moz M&I resources<sup>(1)</sup>

0.9 Moz inferred resources<sup>(1)</sup>

## Cortez Hills

Portal

Conceptual  
Exploration  
Decline

Open and  
untested

## Goldrush

10 Moz M&I resources<sup>(1)</sup>

5.6 Moz inferred resources<sup>(1)</sup>

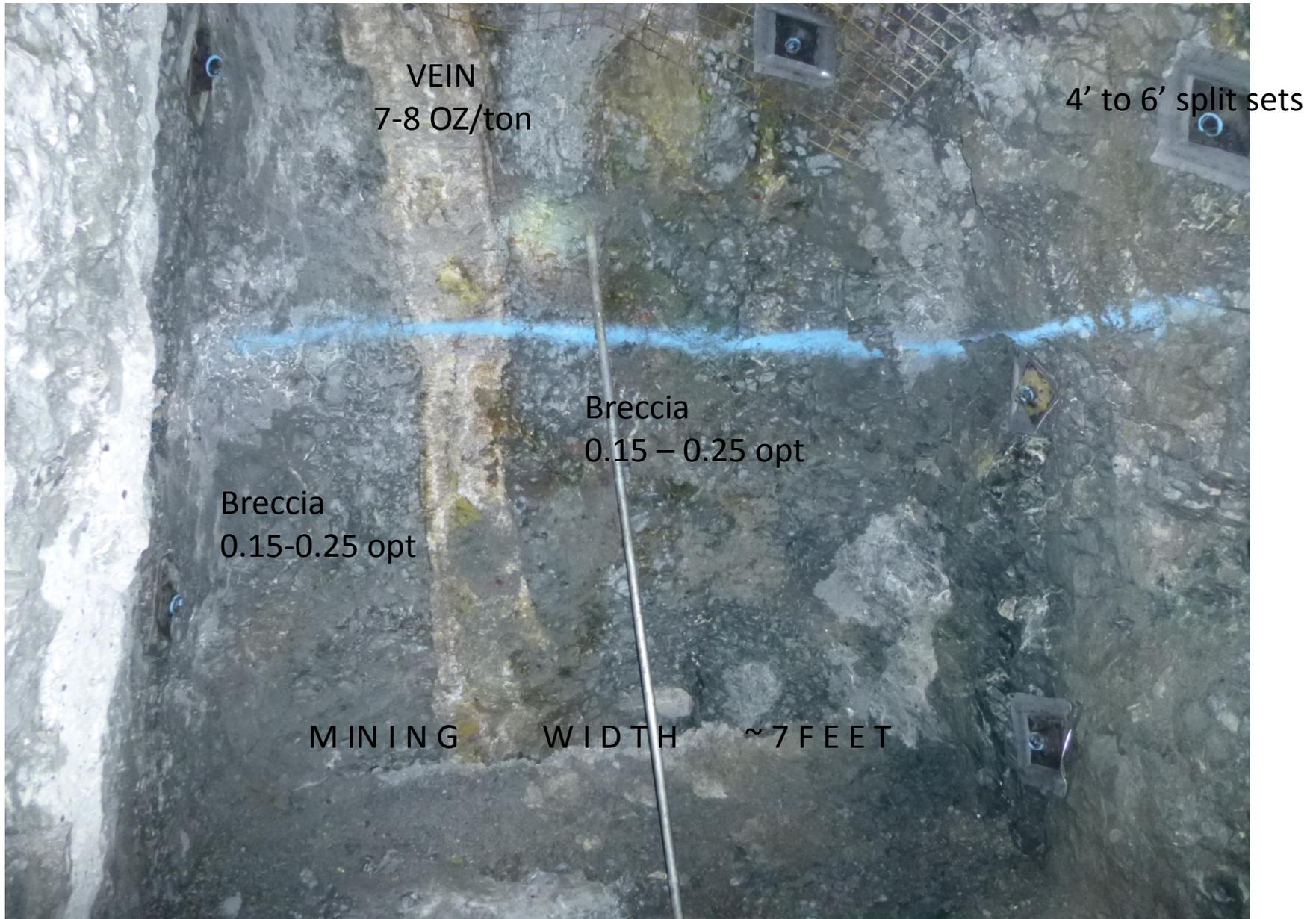


# KLONDEX FIRE CREEK MINE, Lander County, NV



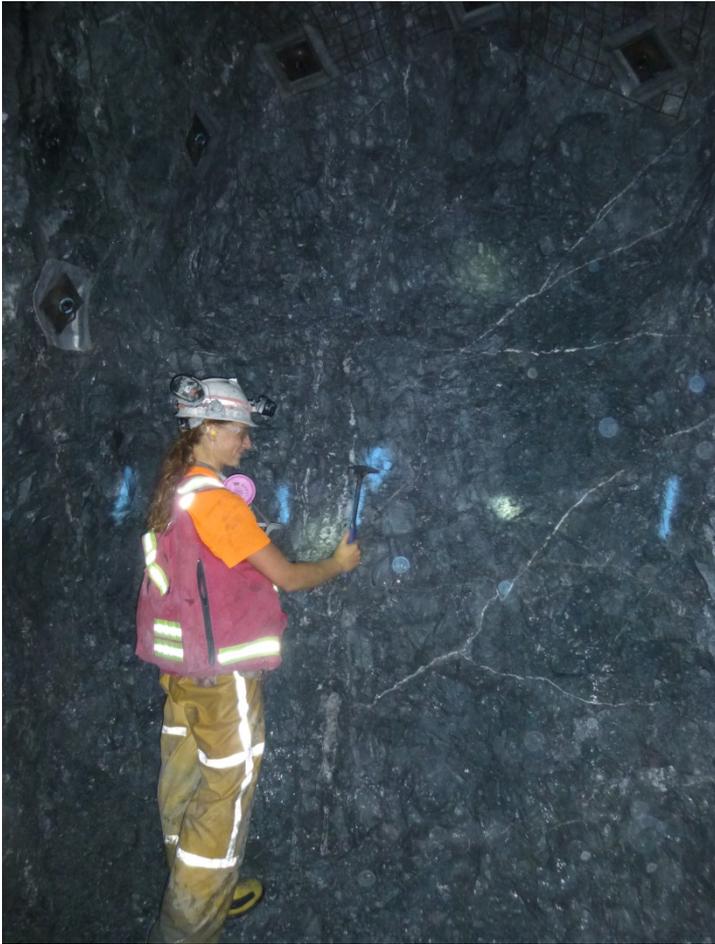
- Epithermal bonanza-type deposit in basalt
- 3 veins: Joyce, Karen and Bonnie. N-trending, near vertical. 3-6 ft widths
- Cut and fill, and longhole stoping methods
- 300 tpd @ ~ 1/oz/ton
- Visible electrum in veins
- 2-yd LHD's, 30-T trucks, single boom jumbos and bolter
- Trucked to and processed at Midas Mill
- ~95 % recovery

# KLONDEX FIRE CREEK – JOYCE





# Fire Creek ore control



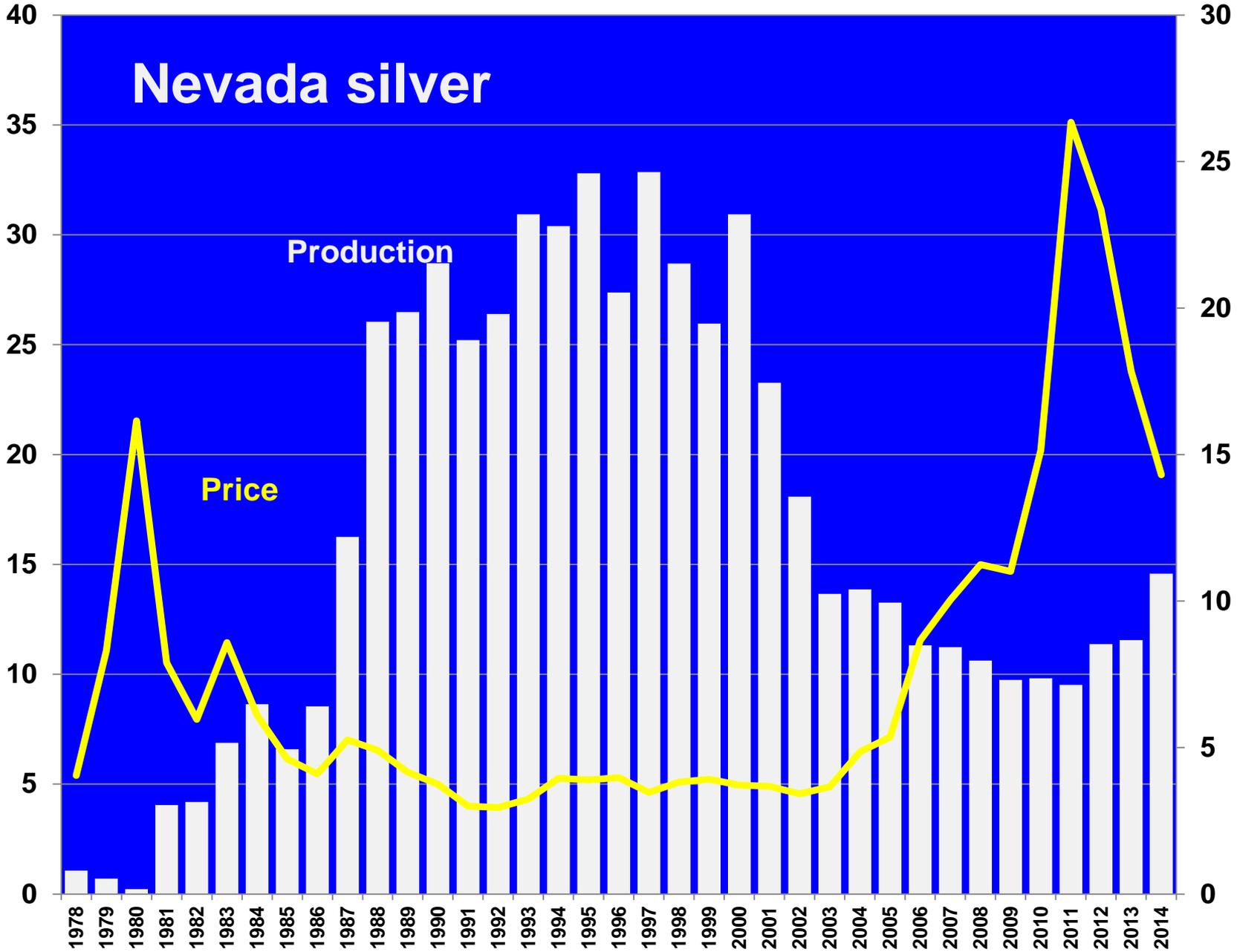
# Nevada silver

Silver price, \$/troy ounces

Production

Price

Silver production, millions of troy ounces



# Nevada copper

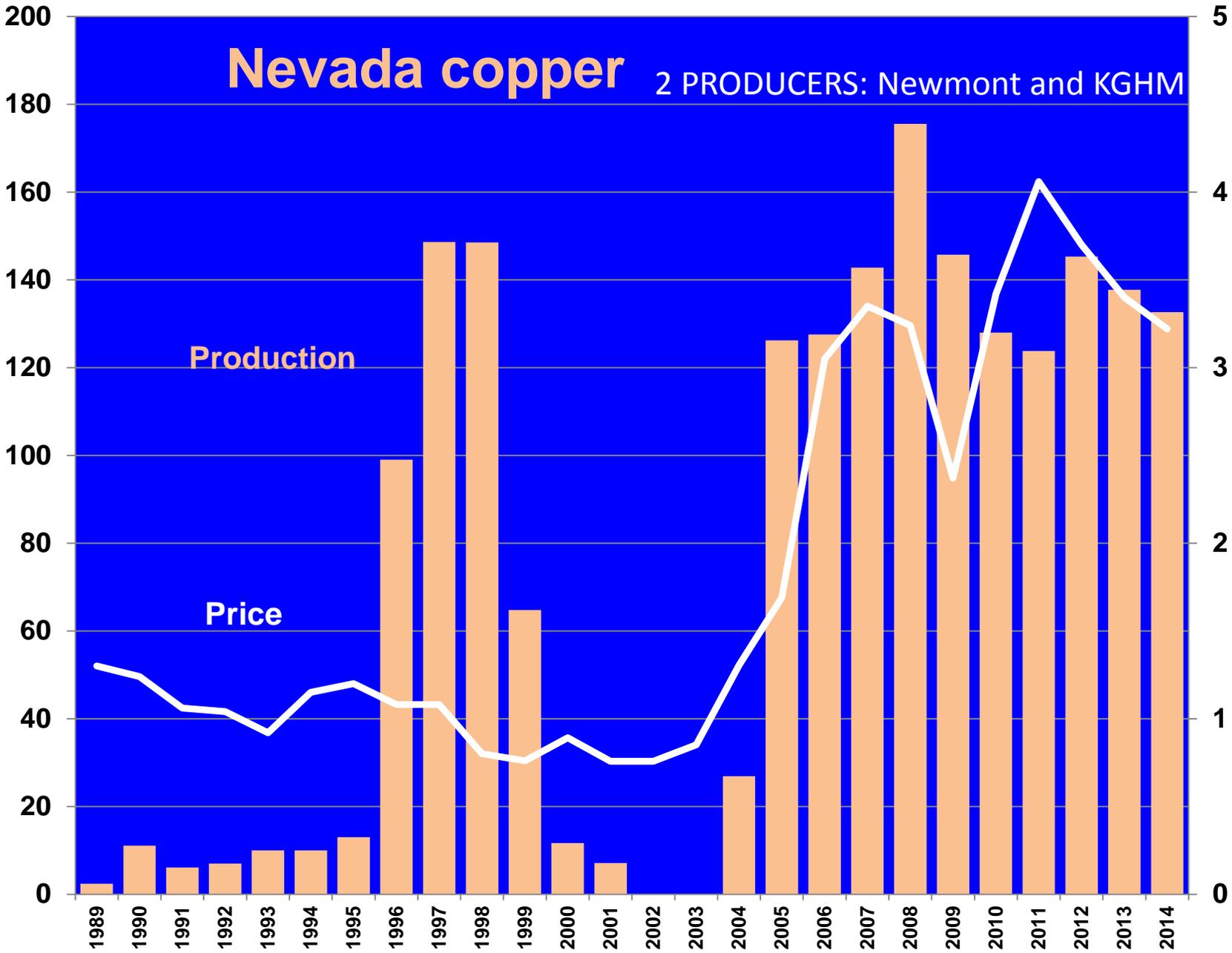
2 PRODUCERS: Newmont and KGHM

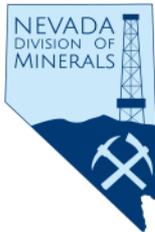
Copper production, millions of pounds

Copper price, \$/pound

Production

Price





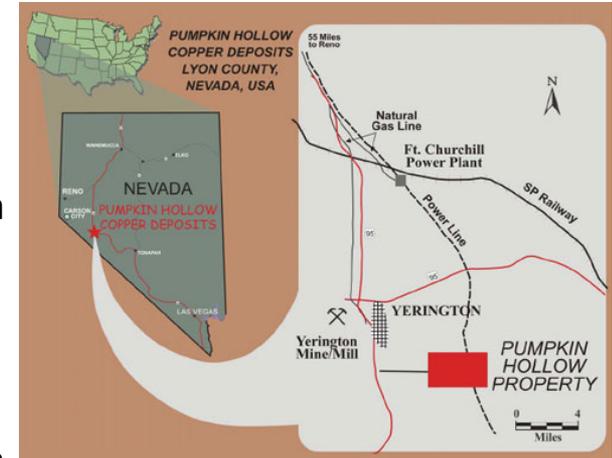
## 2014 NEVADA METAL PRODUCTION, BY PRODUCER

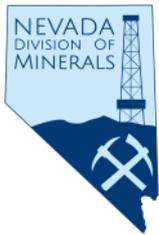
<b>Operator</b>	<b>Gold (ozs)</b>	<b>Silver (ozs)</b>	<b>Copper (lbs)</b>	<b>Moly (lbs)</b>
Barrick	2,357,391	758,848		
Newmont	1,571,847	2,170,978	46,014,331	
Allied Nevada Gold	214,345	1,818,637		
Kinross	165,036	290,343		
Silver Standard Resources	162,382	3,085		
Veris Gold	160,921	7,273		
Klondex	84,255	1,364,911		
Coeur Rochester	44,887	4,189,071		
Mineral Ridge Gold	40,814	18,182		
Jipangu International	40,311	79,231		
Rawhide Mining	28,446	256,138		
KGHM International	26,303	0	86,601,987	741,717
Comstock Mining	19,601	222,416		
Borealis Mining	10,859	35,133		
Sterling Gold Mining	5,700	0		
Atna Resources	3,780	0		
Waterton Global Mining/Carlin Resources	2,342	9,433		
A.U. Mines Inc.	1,230	419		
Sunrise Minerals	90	19		

# Nevada Copper: Pumpkin Hollow

Located 8 miles southeast of Yerington, Nevada  
*Hybrid IOCG Chalcopyrite-Magnetite Skarn*

- Located within the Yerington Copper Porphyry district
- Blind deposits originally discovered in 1959 by US steel Corp via airborne magnetics
- Currently the shaft at Pumpkin Hollow is at 1900'
- Excavating lateral developments before resuming sinking to 2161 feet (shaft bottom)
- The 1900' level will have two underground drill stations with an underground core rig beginning in May
- Plan is to produce 6,500 tons/day to feed an on-site concentrator
- Initial production to begin in 2016
- The mine should employ ~200 people

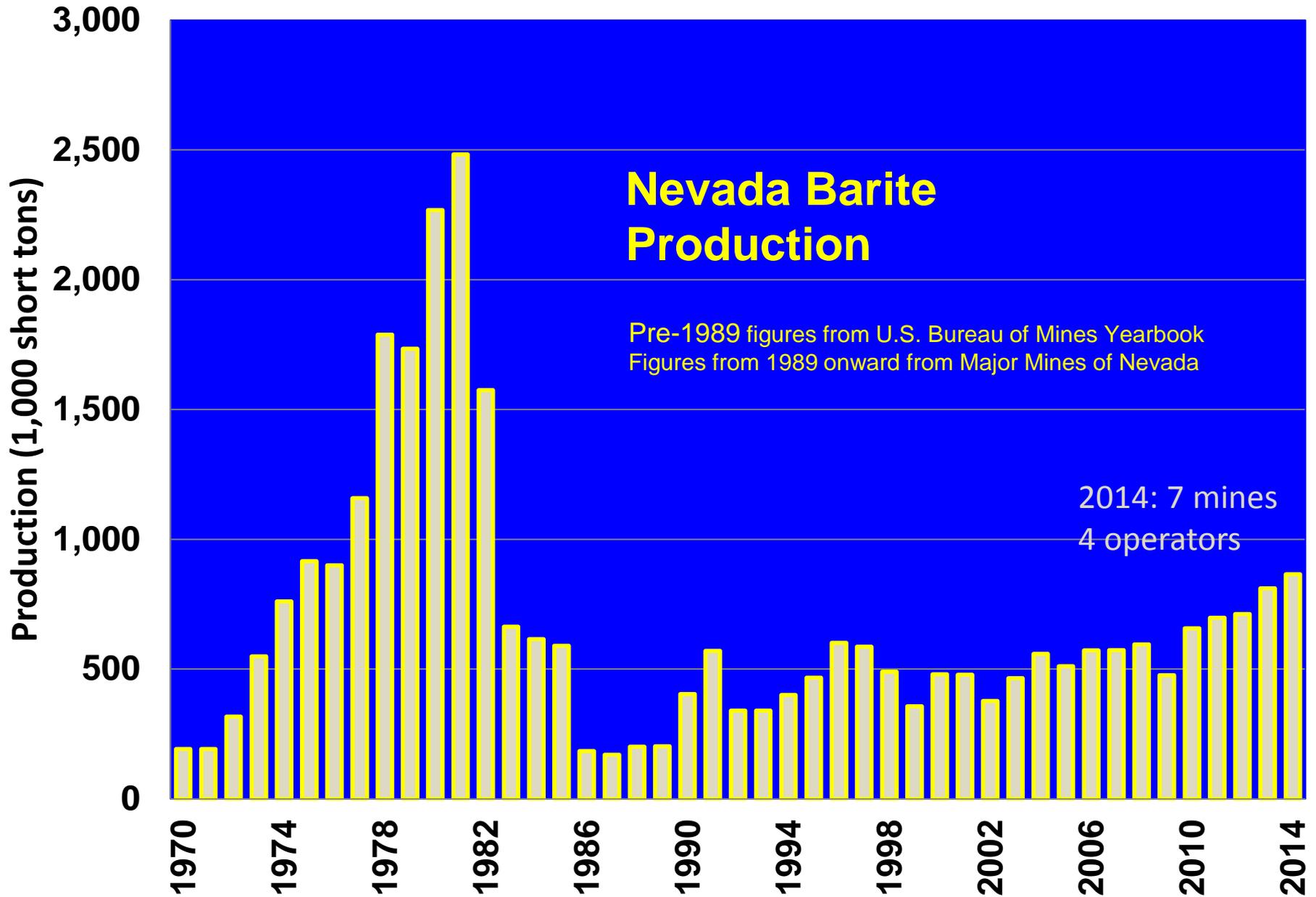




# INDUSTRIAL MINERALS

*Def: Rocks and mineral not produced as sources of the metals, but excluding mineral fuels*

- **NEVADA MINES PRODUCE THE FOLLOWING INDUSTRIALS:**
  - **Aggregates, for construction and landscaping**
  - **Barite, for oil and gas drilling mud**
  - **Diatomite, for filtering and adsorbents**
  - **Dolomite, for cement and livestock supplements**
  - **Gypsum, for wallboard and agricultural soil supplements**
  - **Limestone, for cement and lime**
  - **Lithium compounds, ceramics, batteries and pharmaceuticals**
  - **Magnesite, for light-weight cement and animal supplements**
  - **Perlite, for insulation and landscaping**
  - **Salt, for winter road treatment**
  - **Specialty clays, for drilling muds and low-permeability liners**
  - **Zeolites, for water treatment and waste clean-up**

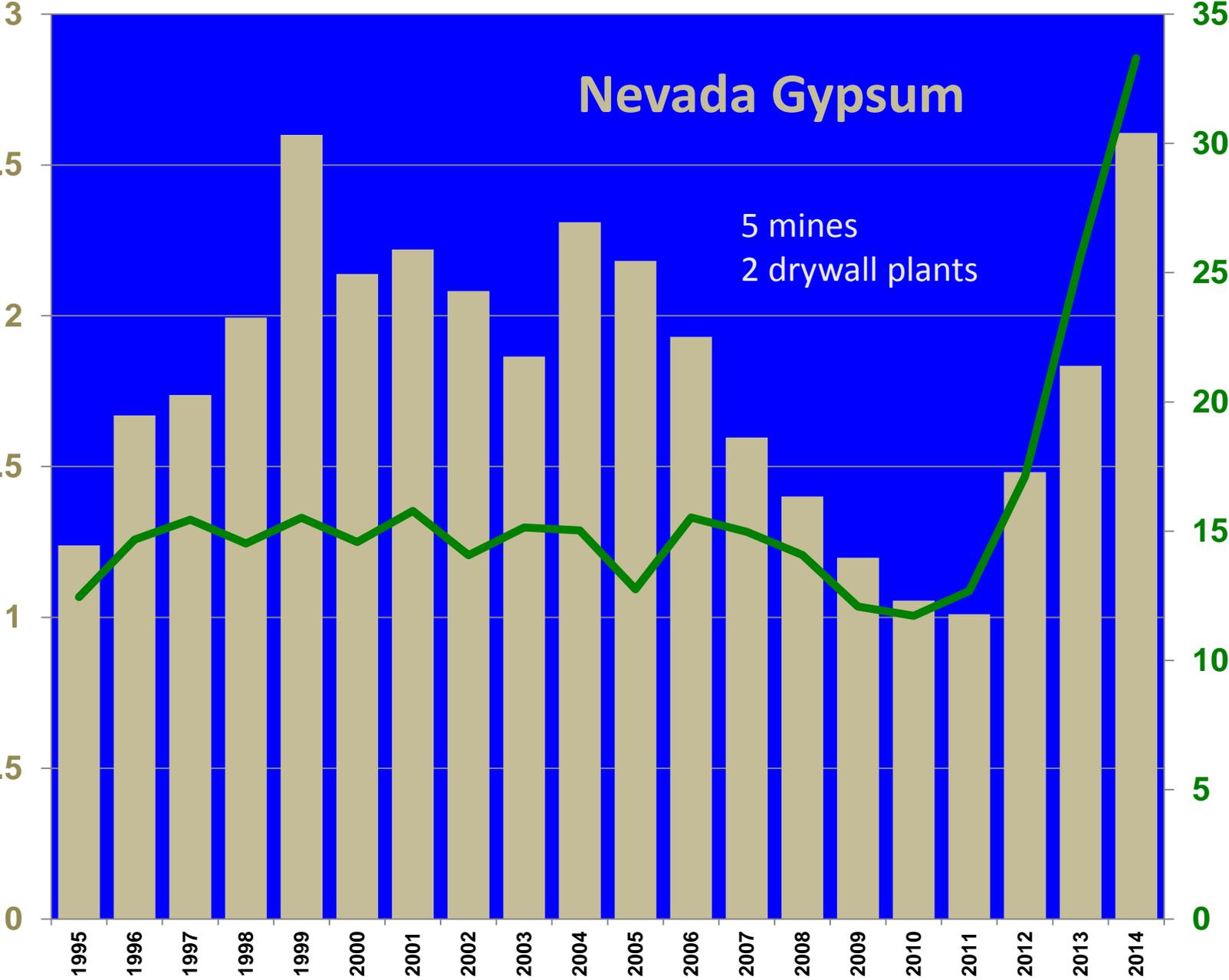


# Nevada Gypsum

Gypsum production, millions of short tons

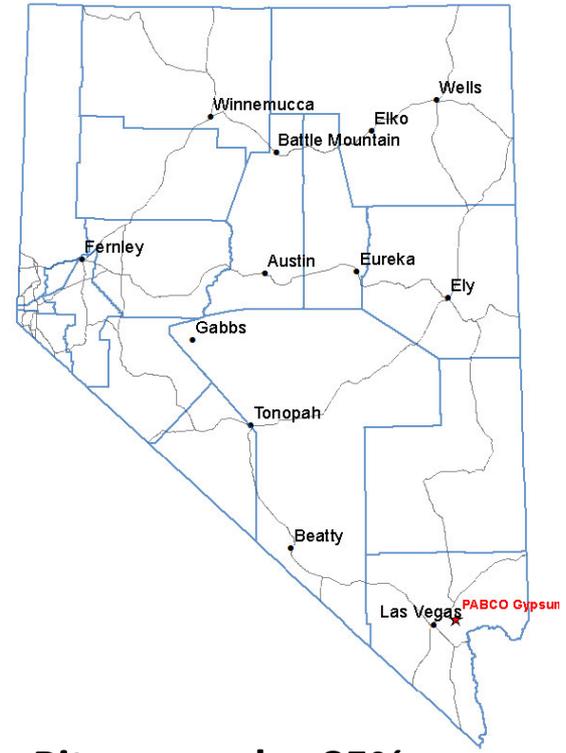
Value as reported to Taxatioon , millions of dollars

5 mines  
2 drywall plants



# 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**
- **2013 production > 1 M. tons**



# PABCO GYPSUM

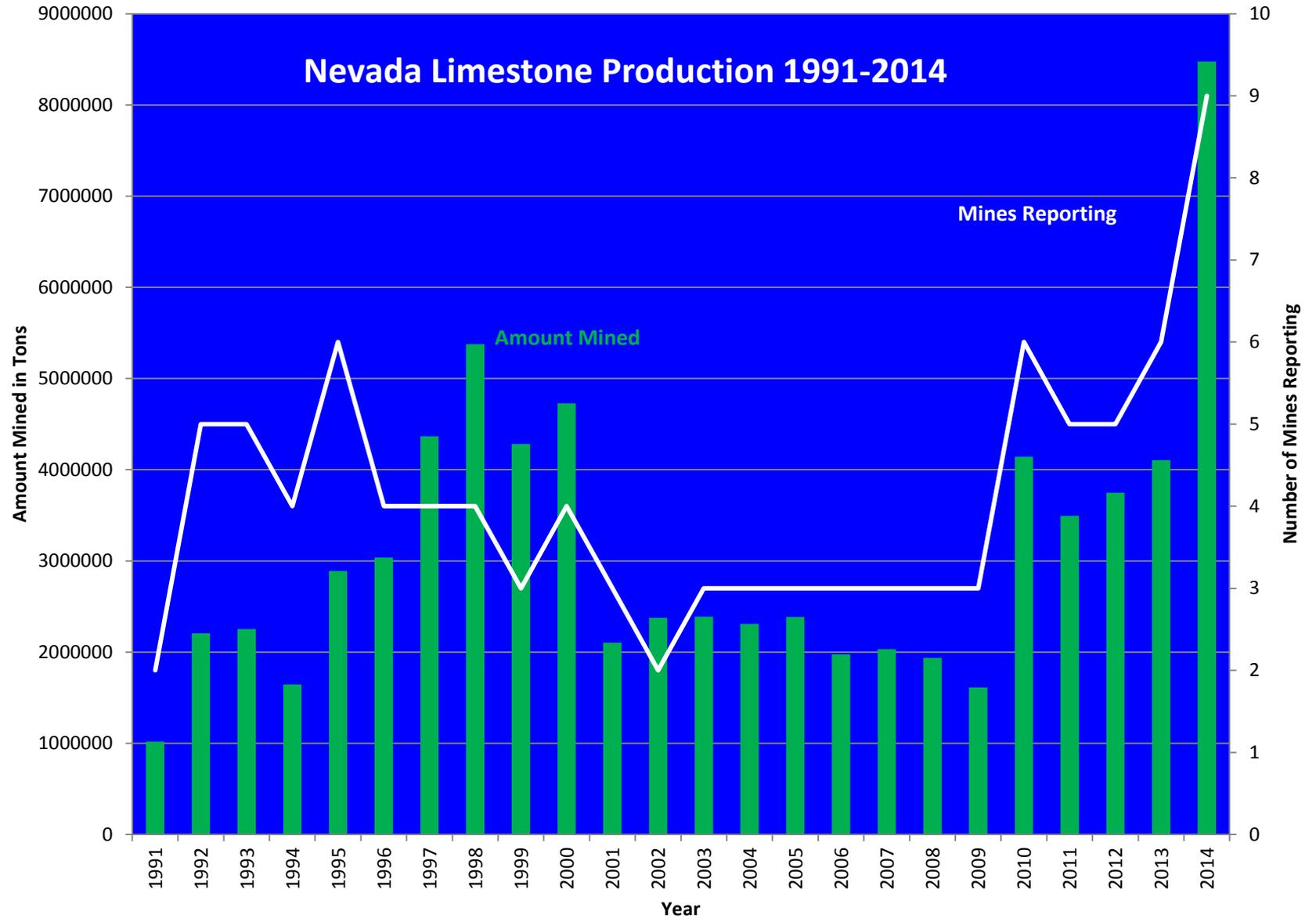
- Crushing and washing plant  
Removes clay to produce  
94% gypsum product

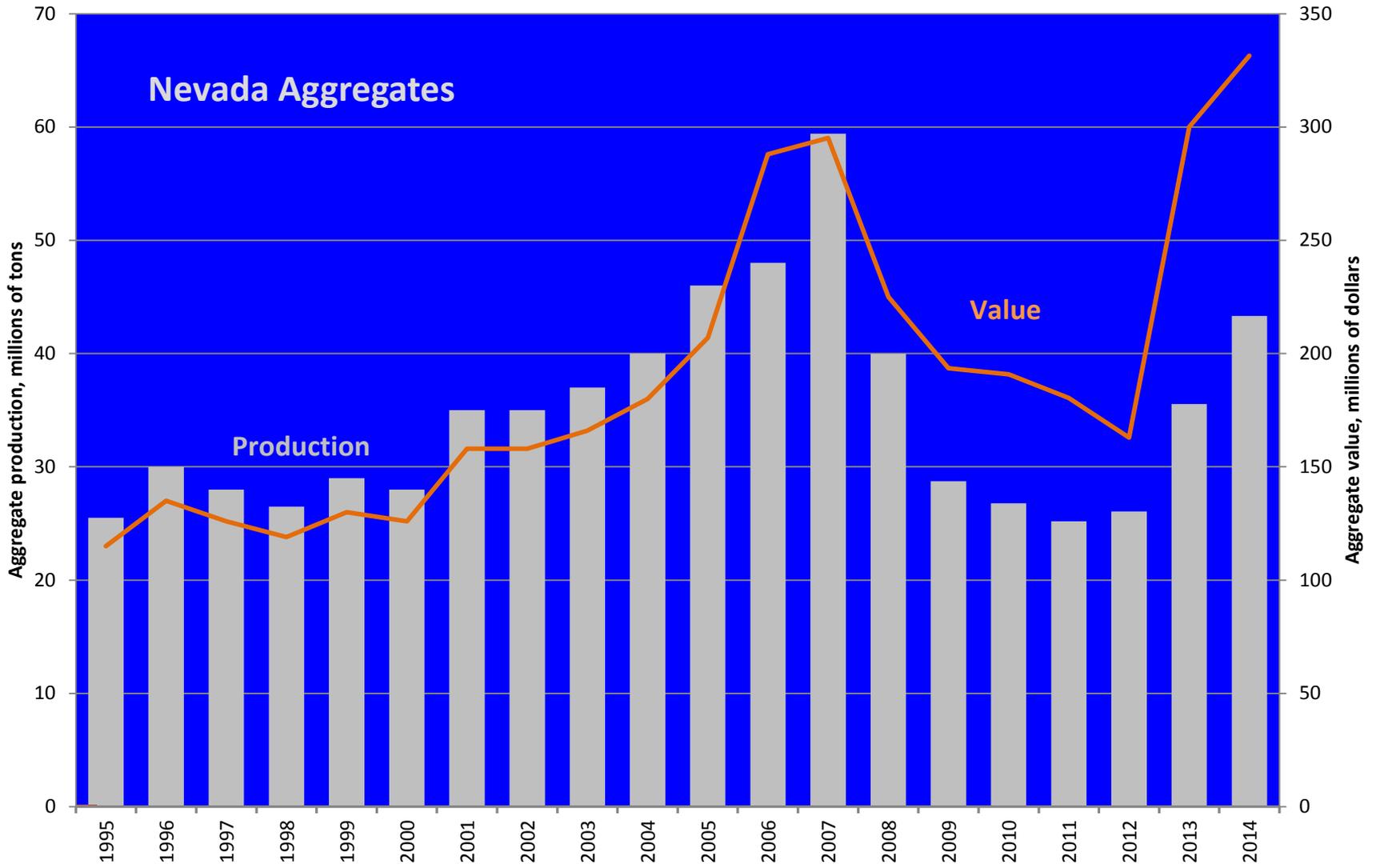
- Wallboard plant is one of  
the largest and most advanced  
In the world

- Wallboard is sold in CA, NV,  
UT, AZ, Canada
- Recently contracted with  
Home Depot as supplier



# Nevada Limestone Production 1991-2014





*From USGS annual mineral commodity summaries*

# Other Industrial Minerals Produced, 2014

- 8,830,000 lbs of lithium compounds
- 430,385 tons of  $MgCO_3$
- 276,819 tons of diatomaceous earth
- 17,000 tons of salt
- 6,371 tons of zeolites

ROCKWOOD LITHIUM INC.  
348 Holly Hill Rd.  
Kaysville, UT 84038  
Phone# 800-523-7616 or 704-735-2501

LOT NO.

410-440

LITHIUM HYDROXIDE

ANHYDROUS, PREMIUM GRADE

For Best Results Avoid Prolonged  
Exposure To The Atmosphere

**DANGER** IRRITANT TO  
EYES, SKIN, AND CLOTHING  
DO NOT TAKE INTERNALLY  
WHEN HANDLING, WEAR GOGGLES  
OR FACE SHIELD

In case of contact, immediately flush skin with plenty  
of water. For eyes, flush with plenty of water for at  
least 15 minutes and get medical attention.

**ATTENTION**

Quality warranted by manufacturer only if both  
inner and outer seals are intact.

Do not open this can until ready  
to use. Transfer contents under  
dry  $CO_2$ -free atmosphere only.

STORE IN DRY PLACE

Net Weight 11.34 Kgs. / 25 Lbs.

Mesh 4 X 12

# Rockwood Lithium: Silver Peak

Located in Silver Peak, NV  
*Lithium Brine Deposit*

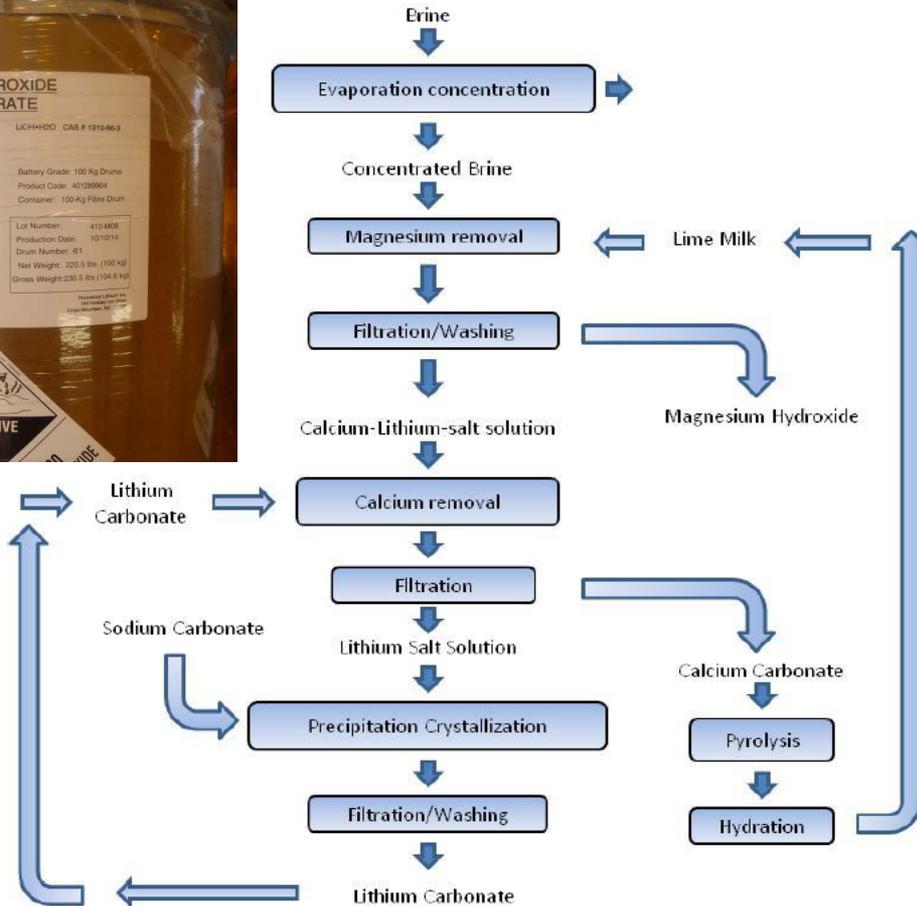


## General Overview:

- Only US Primary Lithium mine
- First lithium carbonate was produced in 1967
- Brine is pumped from 4 aquifers
- 1<sup>st</sup> ore body ran 300ppm Li in 200-300' aquifers (Main Ash Aquifer)
- By-product is NaCl
- Employs 75 directly + 10 contractors



# Rockwood Lithium Carbonate Production (2 Year Process from brine to Li Concentrate):

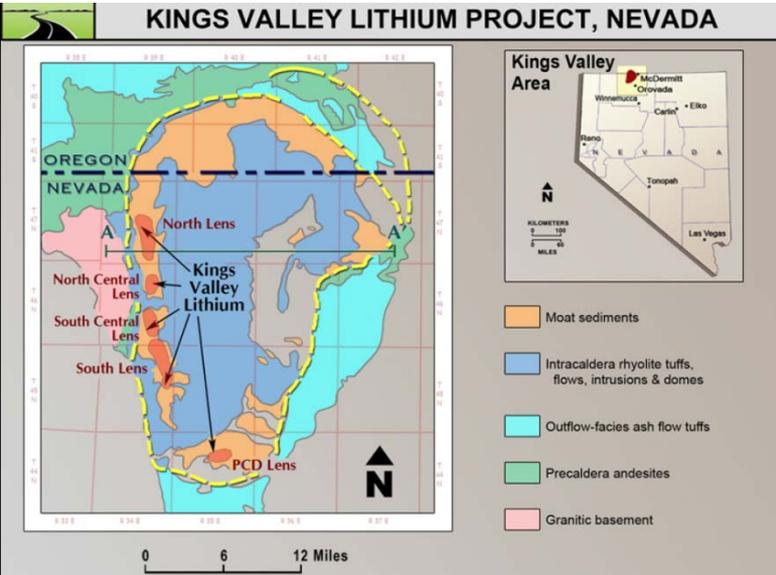


Primary product is Li-Carbonate

# Western Lithium: Kings Valley

100 km north-northwest of Winnemucca, NV and 40 km west-northwest of Orovada, NV

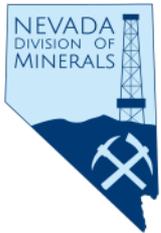
*Lithium/Organoclay Drilling Additive Supplier*



- 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
- This allows for the US to target deeper oil and natural gas sources in turn decreasing foreign oil imports and increasing our natural gas supply
- Plant went into production November, 2014

High Purity Hectorite Clay

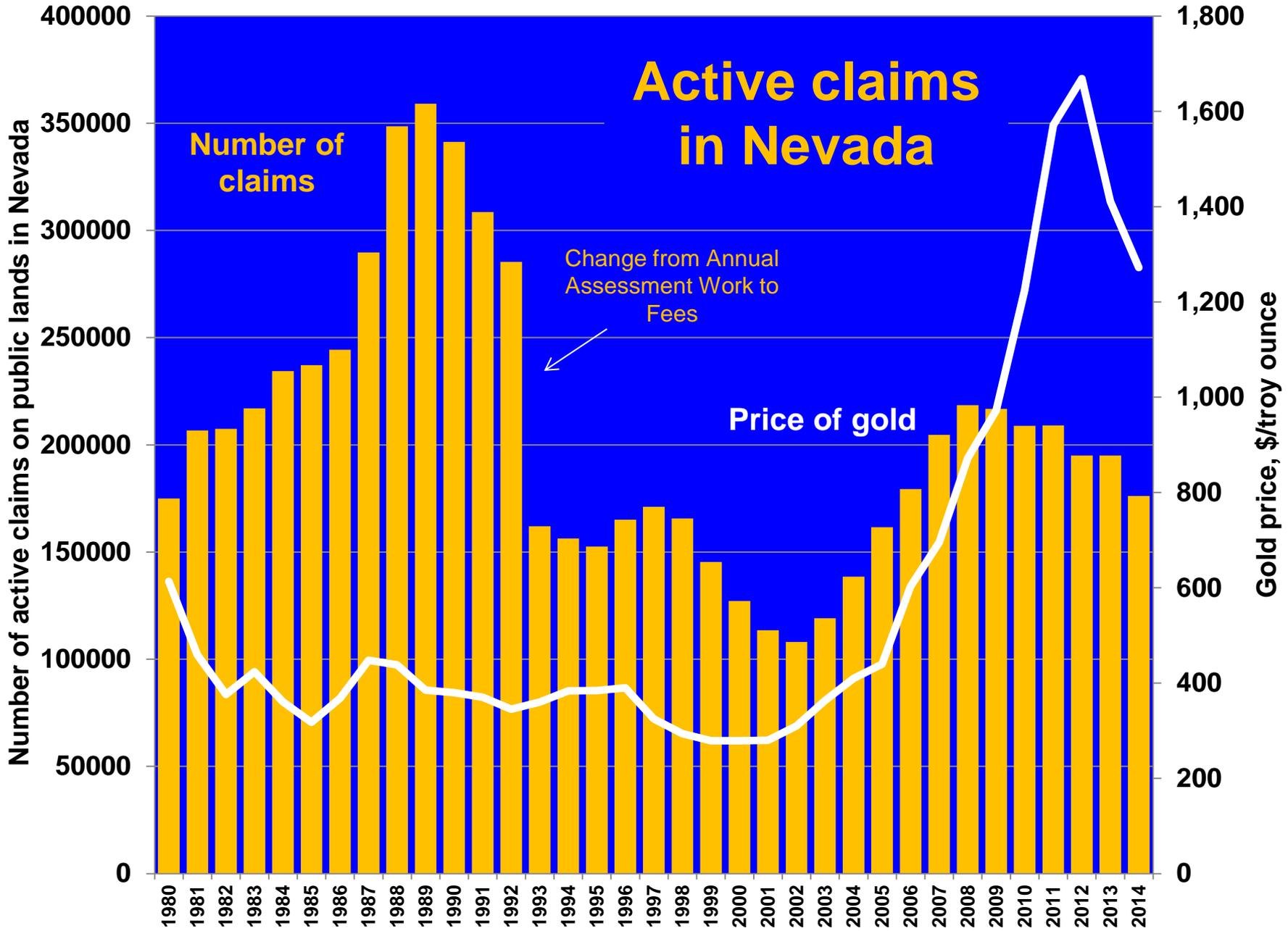




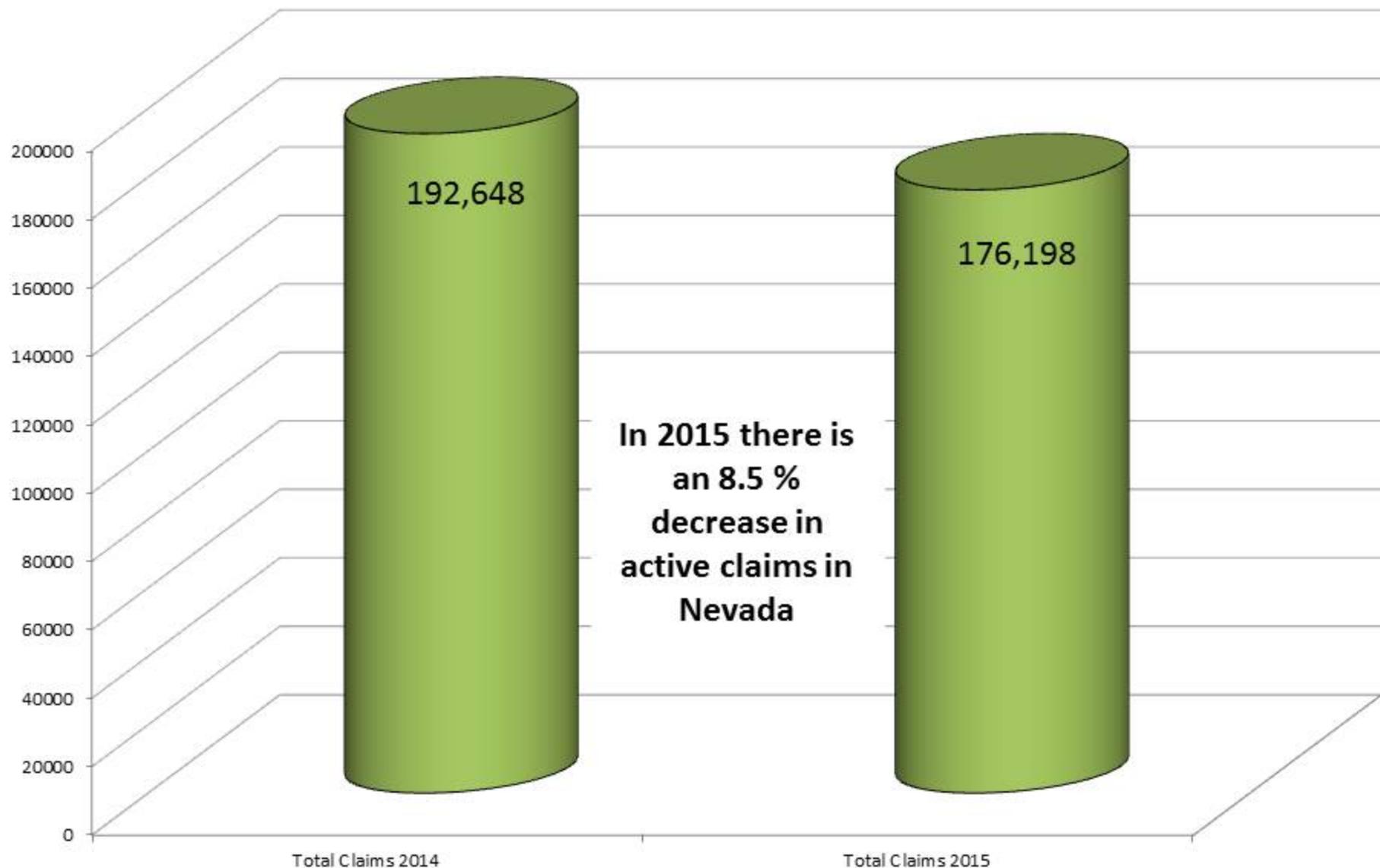
# Diatomaceous Earth: Eagle-Pitcher



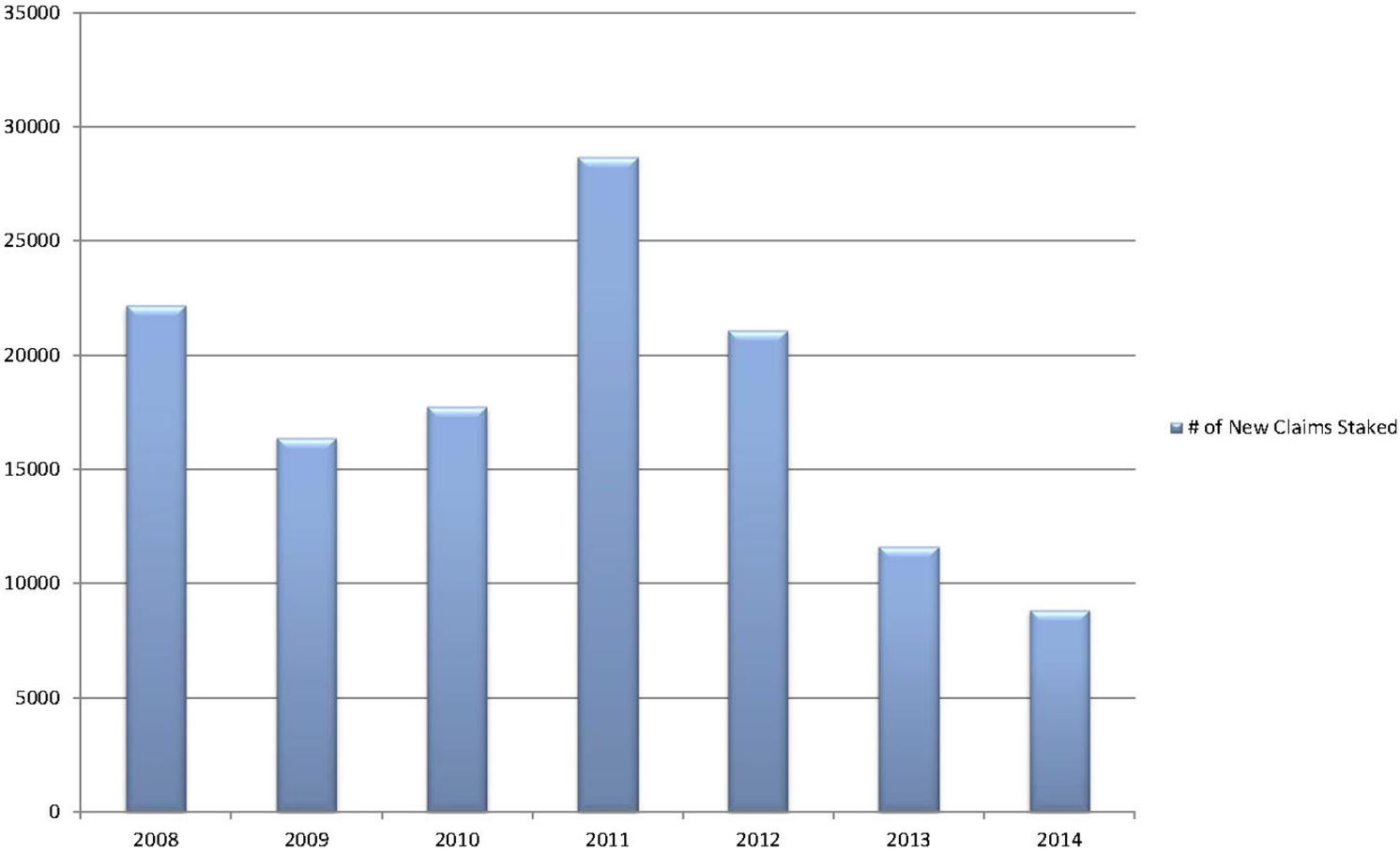
# Active claims in Nevada



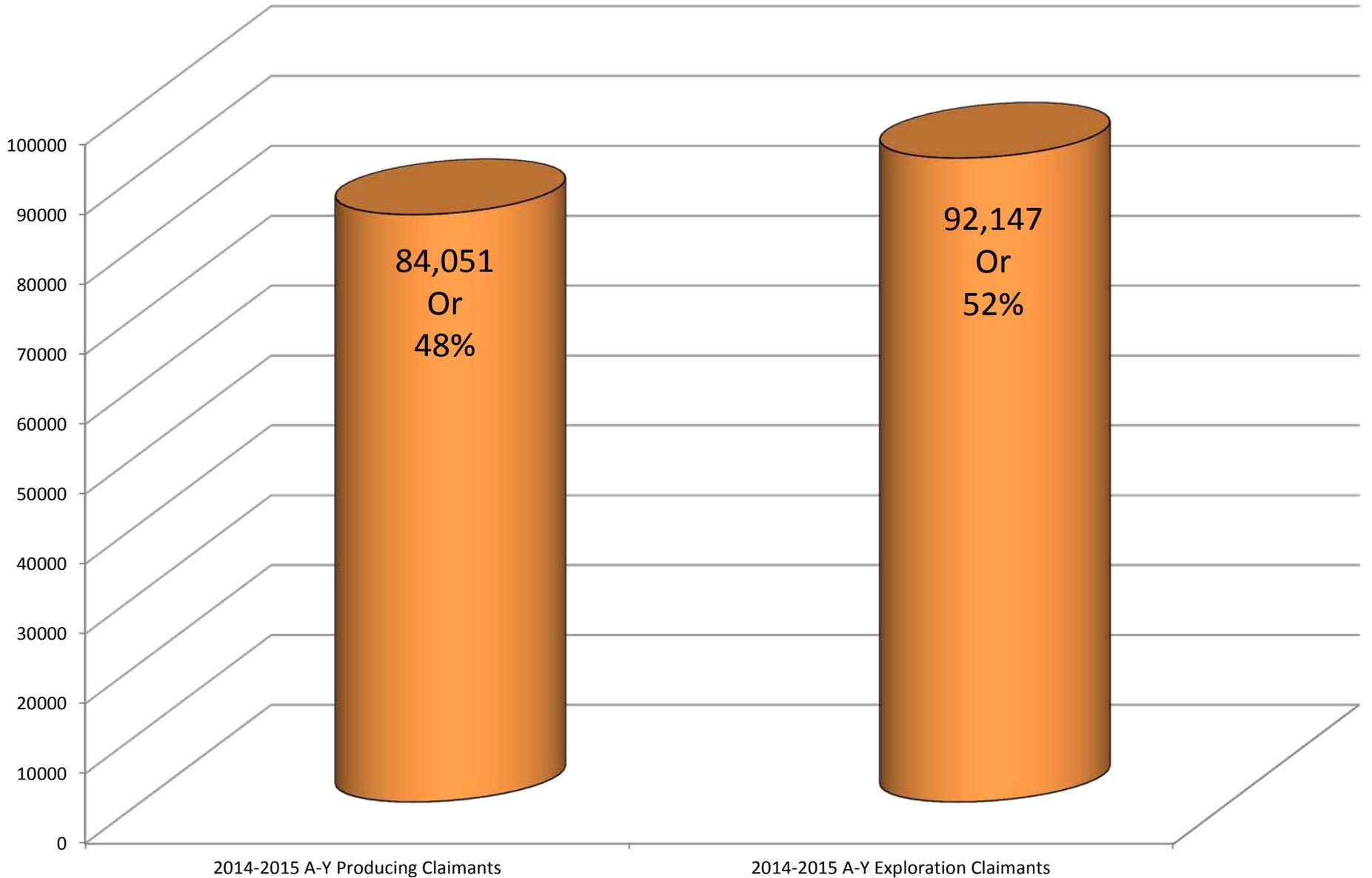
# 2014 vs 2015 Active Claims



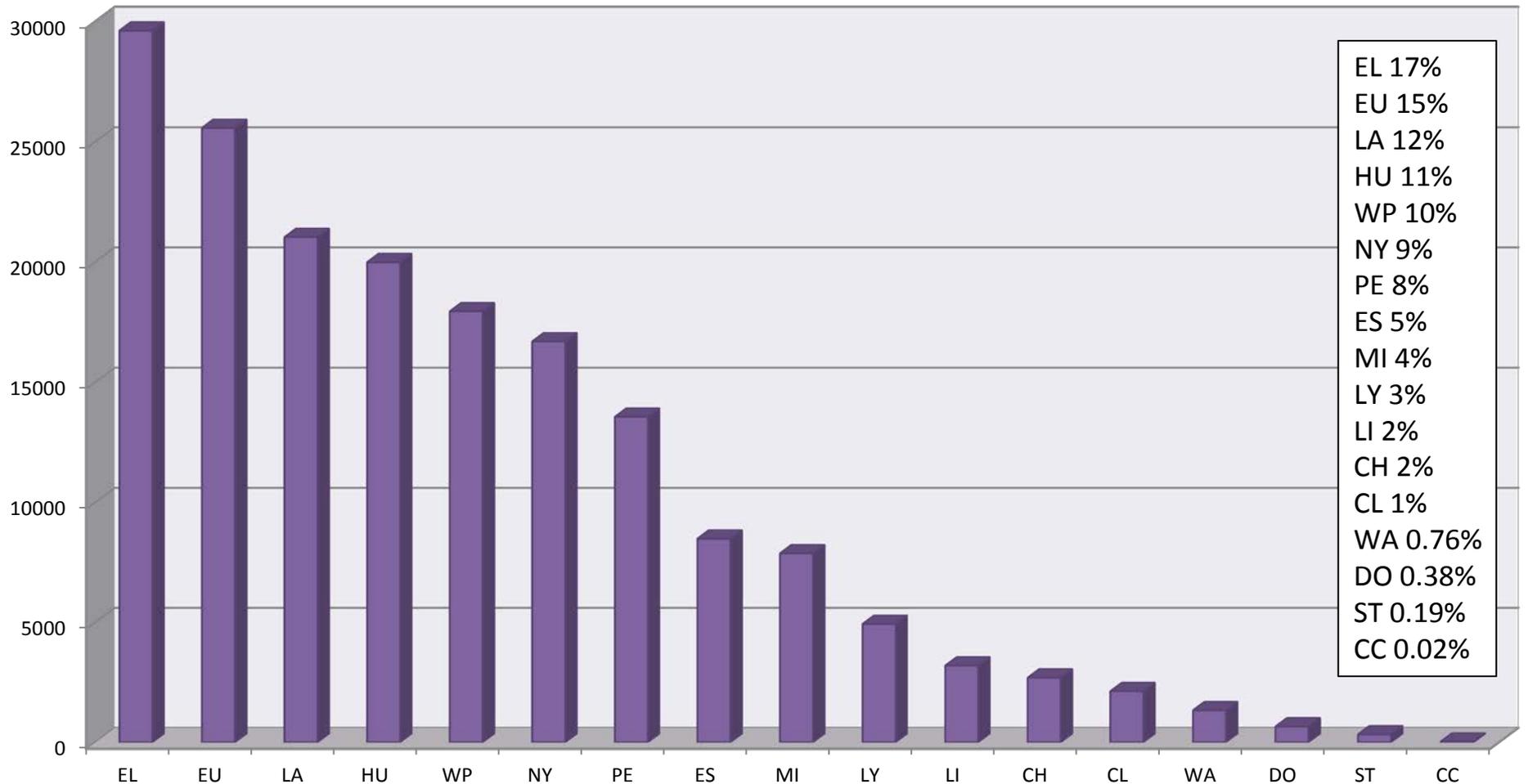
# # of New Claims Staked

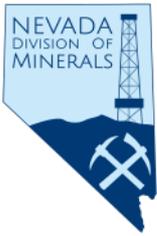


# 2014-2015 A-Y Claim Statistics



# NUMBER OF CLAIMS/COUNTY FOR THE 2014-2015 A-Y

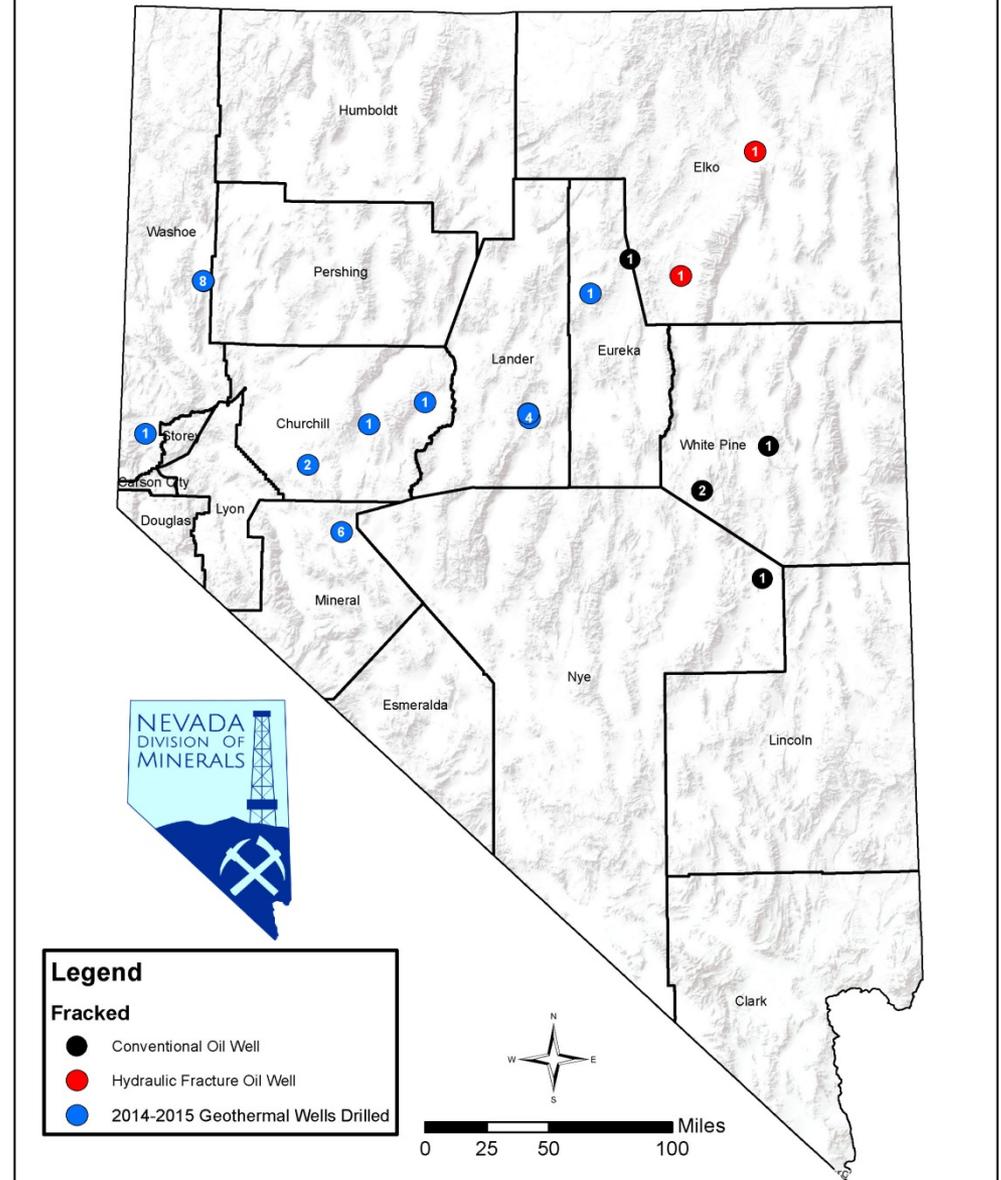




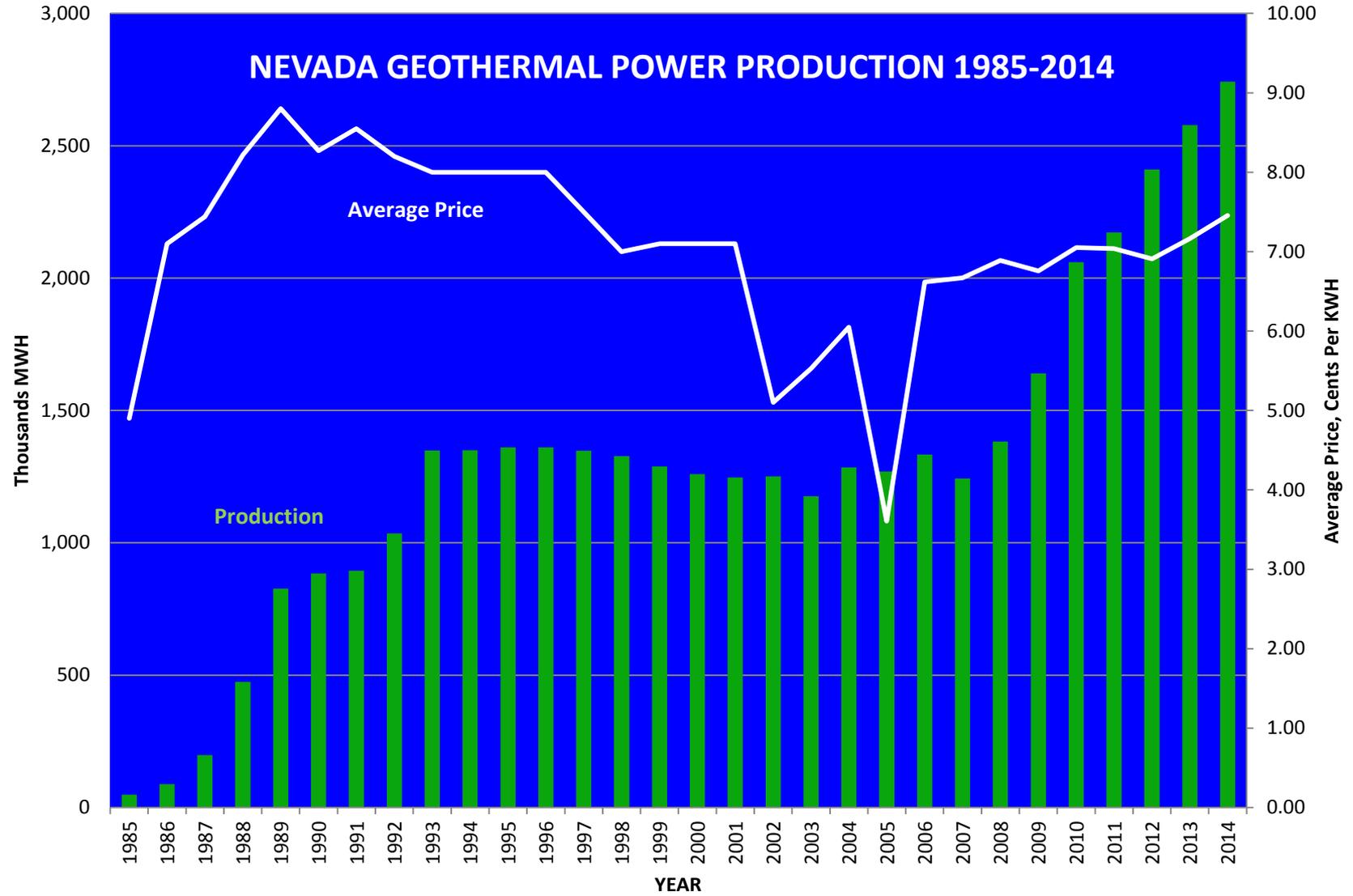
## FLUID MINERALS DRILLING ACTIVITY

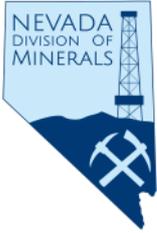
- 7 OIL EXPLORATION WELLS DRILLED
  - 2 unconventional
  - 5 conventional
- 23 GEOTHERMAL WELLS DRILLED
  - Production
  - Injection
  - Observation

### Oil and Geothermal Wells Drilled 2014-Present



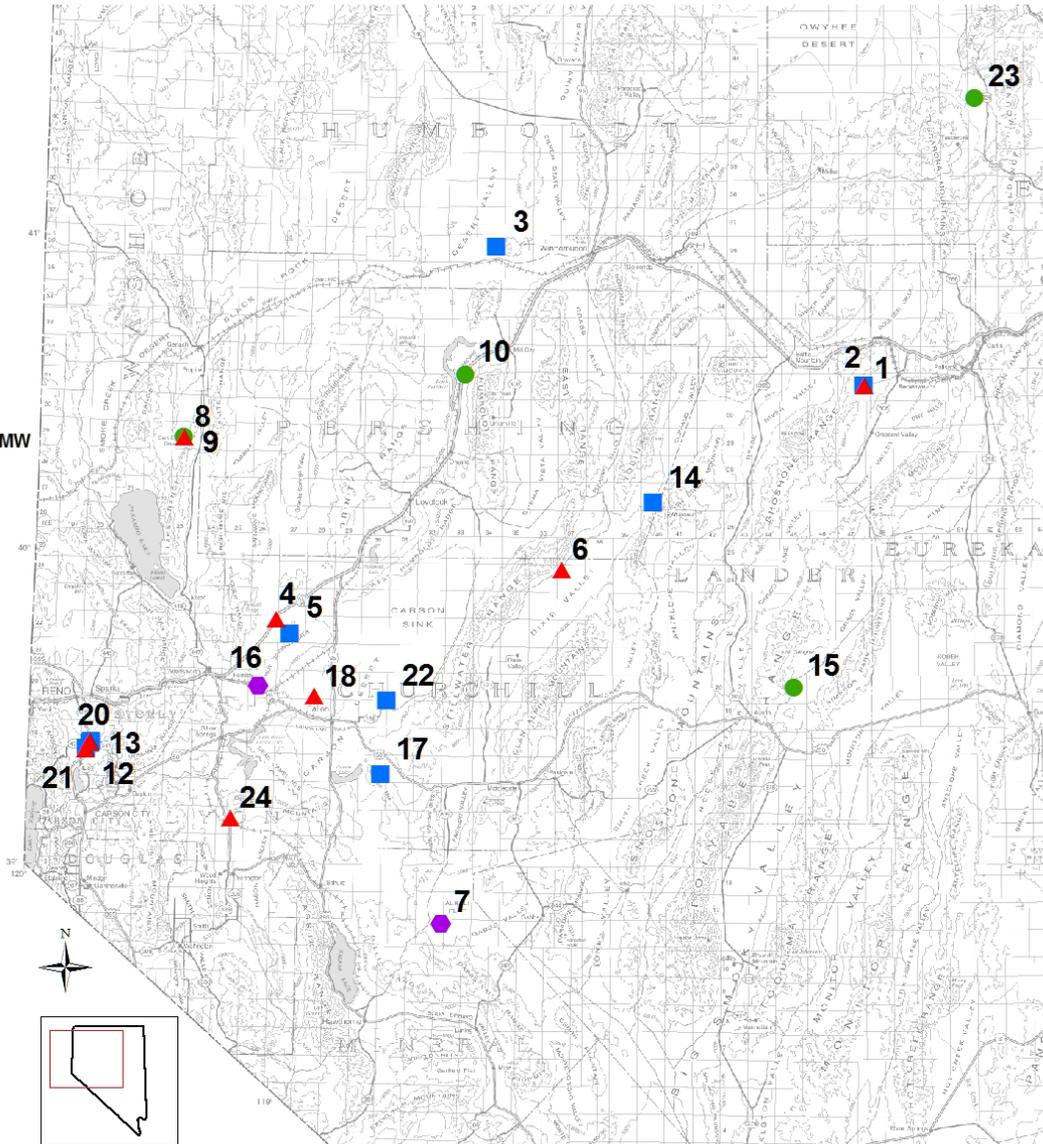
# NEVADA GEOTHERMAL POWER PRODUCTION 1985-2014





## Power Plants

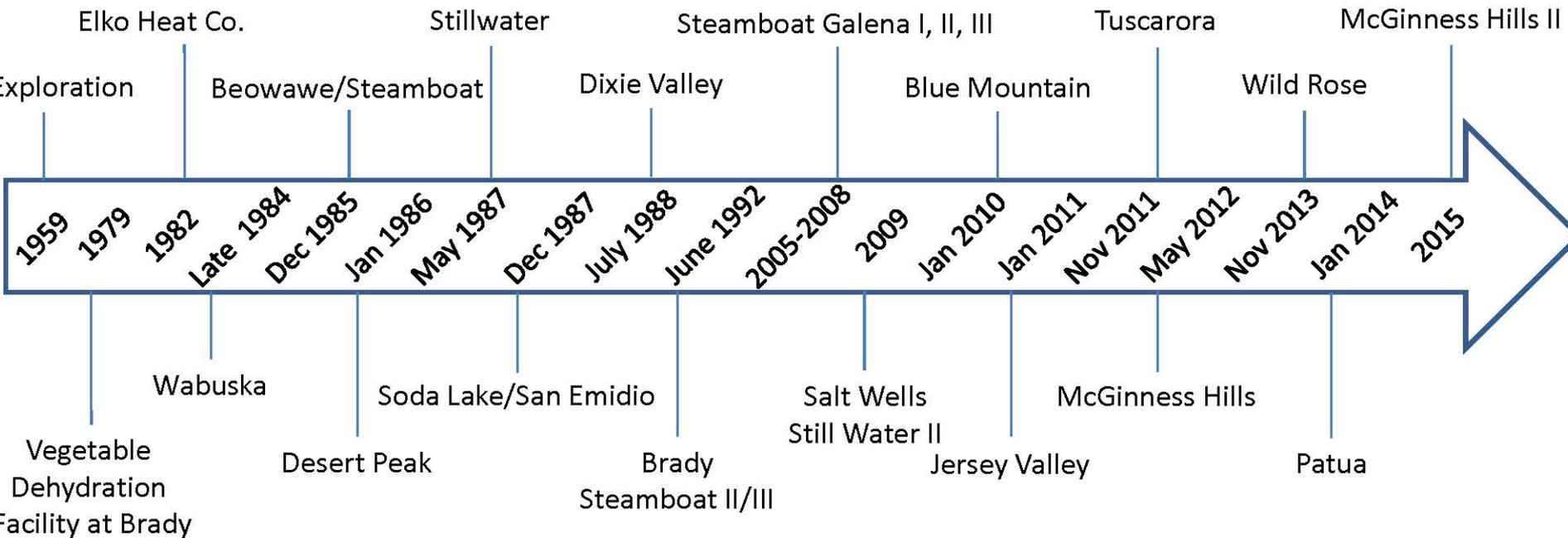
- ▲ Pre-2005
  - 2005-2011
  - 2012
  - ◆ 2013
- 
- ▲ 1. Beowawe I - 16.6 MW
  - 2. Beowawe Bottoming - 1.9 MW
  - 3. Blue Mountain - 49.5 MW
  - ▲ 4. Brady - 26.1 MW
  - 5. Desert Peak II - 23 MW
  - ▲ 6. Dixie Valley - 64.7 MW
  - ◆ 7. Don A. Campbell (Wild Rose) - 22.5 MW
  - ▲ 8. Empire/San Emidio - 4.8 MW
  - 9. San Emidio Repower - 11.8 MW
  - 10. Florida Canyon - 0.075 MW
  - 11. Burdette (Galena 1) - 30 MW
  - 12. Galena 2 - 13.5 MW
  - 13. Galena 3 - 30 MW
  - 14. Jersey Valley - 23.5 MW
  - 15. McGinness Hills - 52 MW
  - ◆ 16. Patua - 30 MW
  - 17. Salt Wells - 23.6 MW
  - ▲ 18. Soda Lake 1, 2 - 23.1 MW
  - ▲ 19. Steamboat 1, 1A - 10.8 MW
  - ▲ 20. Steamboat 2, 3 - 47.8 MW
  - ▲ 21. Steamboat Hills - 13.2 MW
  - 22. Stillwater 2 - 47.2 MW
  - 23. Tuscarora - 32 MW
  - ▲ 24. Wabuska - 5.6 MW



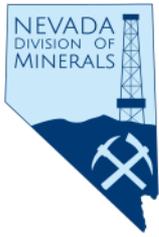
From: Lisa Shevenell, Atlas Geosciences, Inc.

# HISTORY OF GEOTHERMAL ACTIVITIES IN NEVADA

First large diameter exploration holes for geothermal



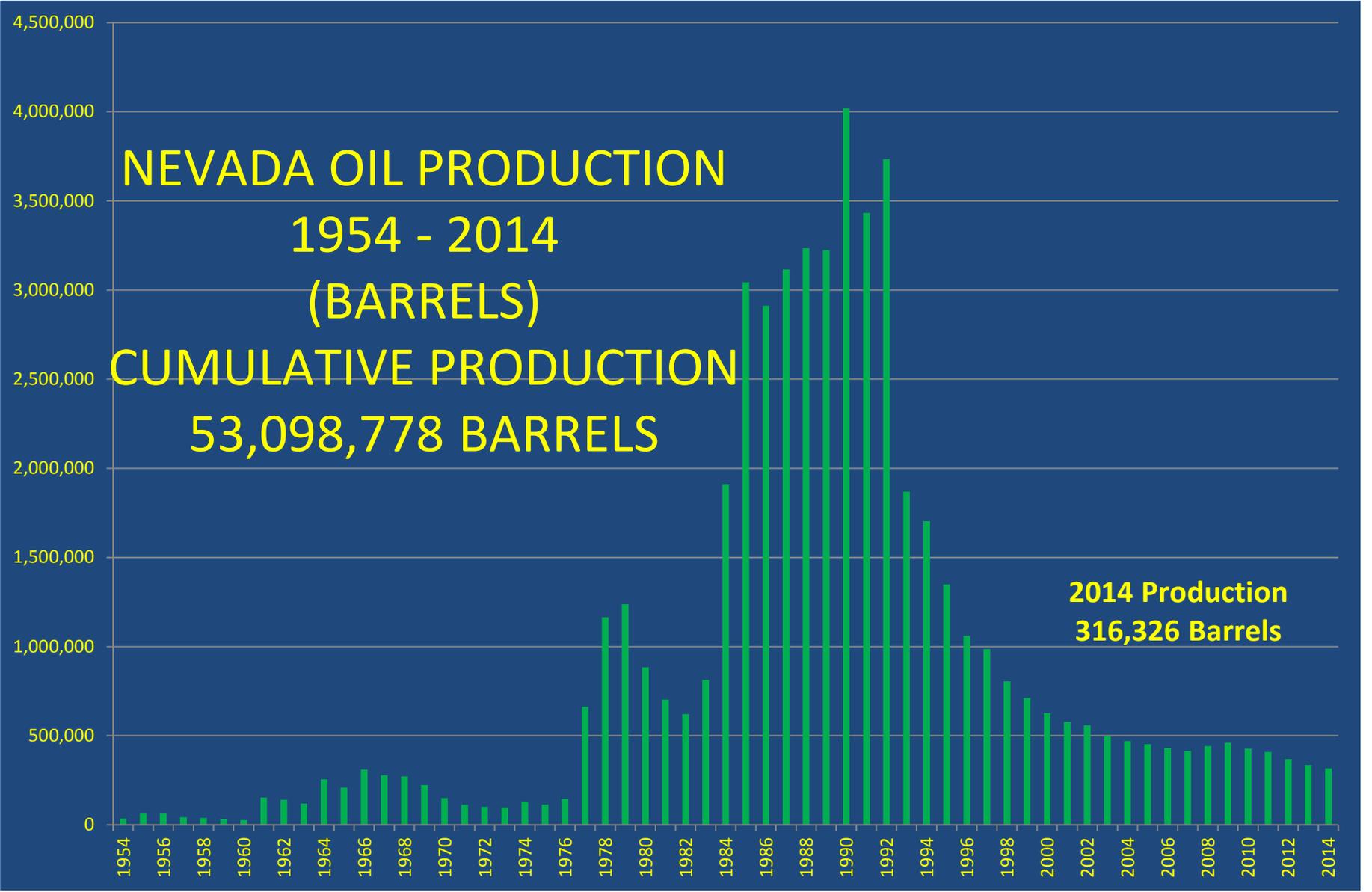
First Geothermal Power Plant



# Beowawe geothermal plant, Lander County – 30 years of geothermal production



# NEVADA OIL PRODUCTION 1954 - 2014 (BARRELS) CUMULATIVE PRODUCTION 53,098,778 BARRELS



**2014 Production  
316,326 Barrels**

# U.S. Onshore – NE Nevada

## Large-scale organic exploration opportunity

### ► NBL Operated

- ⌘ 372,000 gross acres, 66% fee

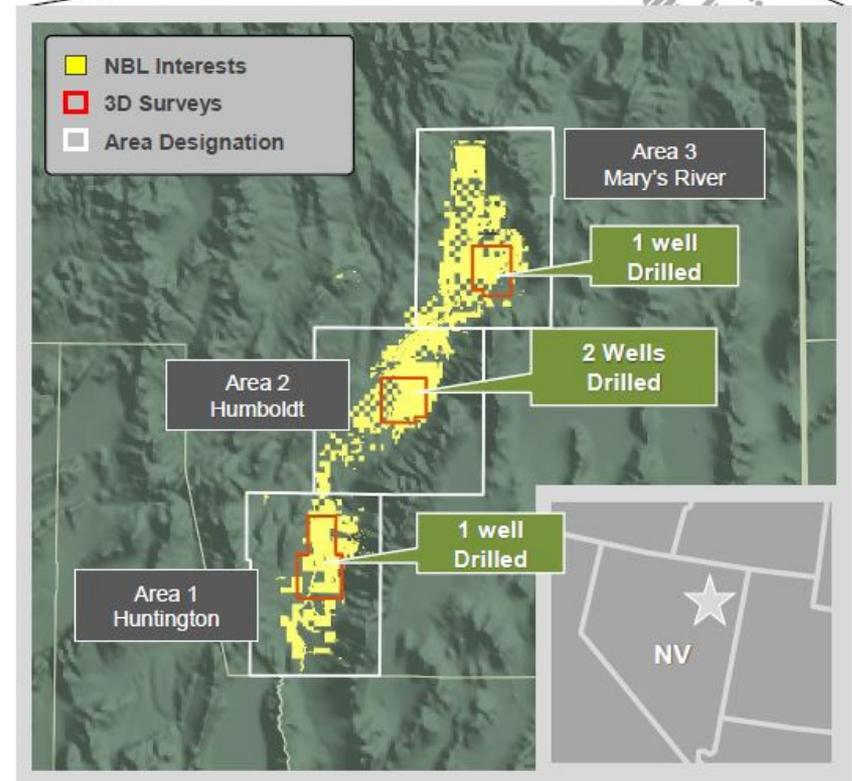
### ► Play Characteristics

- ⌘ Depth range 6,000 - 12,000 ft.
- ⌘ Unconventional tight oil prospect, similar deposition to Uinta Basin

### ► Initial Wells Proved Productive Nature of the Targeted Reservoir

- ⌘ Four wells drilled across acreage position
- ⌘ Initial vertical completion in Humboldt area currently producing
- ⌘ Initial completion in Mary's River awaiting long-term production facilities

### ► Assessing Next Steps for Appraisal



# NOBLE ENERGY HUNTINGTON K1L-1V PRODUCTION WELL NEAR JIGGS, NV. T.D. = 9,692'



# PRODUCTION SUMMARY 2014

- Gold and Silver were ~ 85 % of gross minerals revenue of \$7.578B USD in 2014
- Nevada fell to #2 in gross revenues behind Arizona
- Base metal (Cu, Mo) production growth has huge potential, financing and smelting capacity present challenges and opportunities.
- Industrial minerals and materials production up w/rebound of construction – aggregates, gypsum, limestone
- Geothermal production on a steady increase, consolidation in market occurring
- Oil production declined again in 2014, tight shale target in Elko County saw first hydraulic fracturing technology used in State; first unconventional oil production in Nevada.



State of Nevada  
Commission on Mineral Resources  
**Division of Minerals**



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Cortez open pit Barrick Gold Corp. - Lander County, NV



### Important Links

- [➤ State and Federal Permits Required Before Mining or Milling Can Begin - February 2015](#)
- [➤ 2014 Nevada Mineral, Oil and Geothermal Production Update - July 9, 2015](#)
- [➤ Mineral, Geothermal and Oil & Gas Potential Maps of Sagebrush Focal Areas](#)
- [➤ Final Approved Regulations for Hydraulic Fracturing - October 24, 2014](#)
- [➤ NDOM YouTube Channel](#)
- [➤ Nevada Bureau of Mines and Geology](#)

### Nevada Excellence in Mine Reclamation Awards for 2015

- [Invitation for Nominations](#) (Submissions are due by August 7, 2015)

### Employment Announcement(s)

- [Commission on Mineral Resources, Division of Minerals, Field Specialist/Abandoned Mine Lands Position Description](#) - Location: Carson City
- [Commission on Mineral Resources, Division of Minerals, Administrative Support/Public Service Intern 1 Position Description](#) - Location: Carson City; Part time Seasonal from Sept. 2015 through January 2016.

[How To Apply for a State Job](#)