

# Nevada Division of Minerals

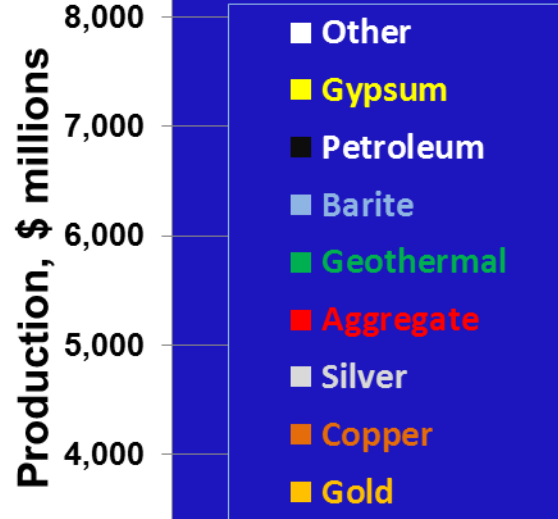
## *2013 Mineral and Energy Production and Selected Projects*



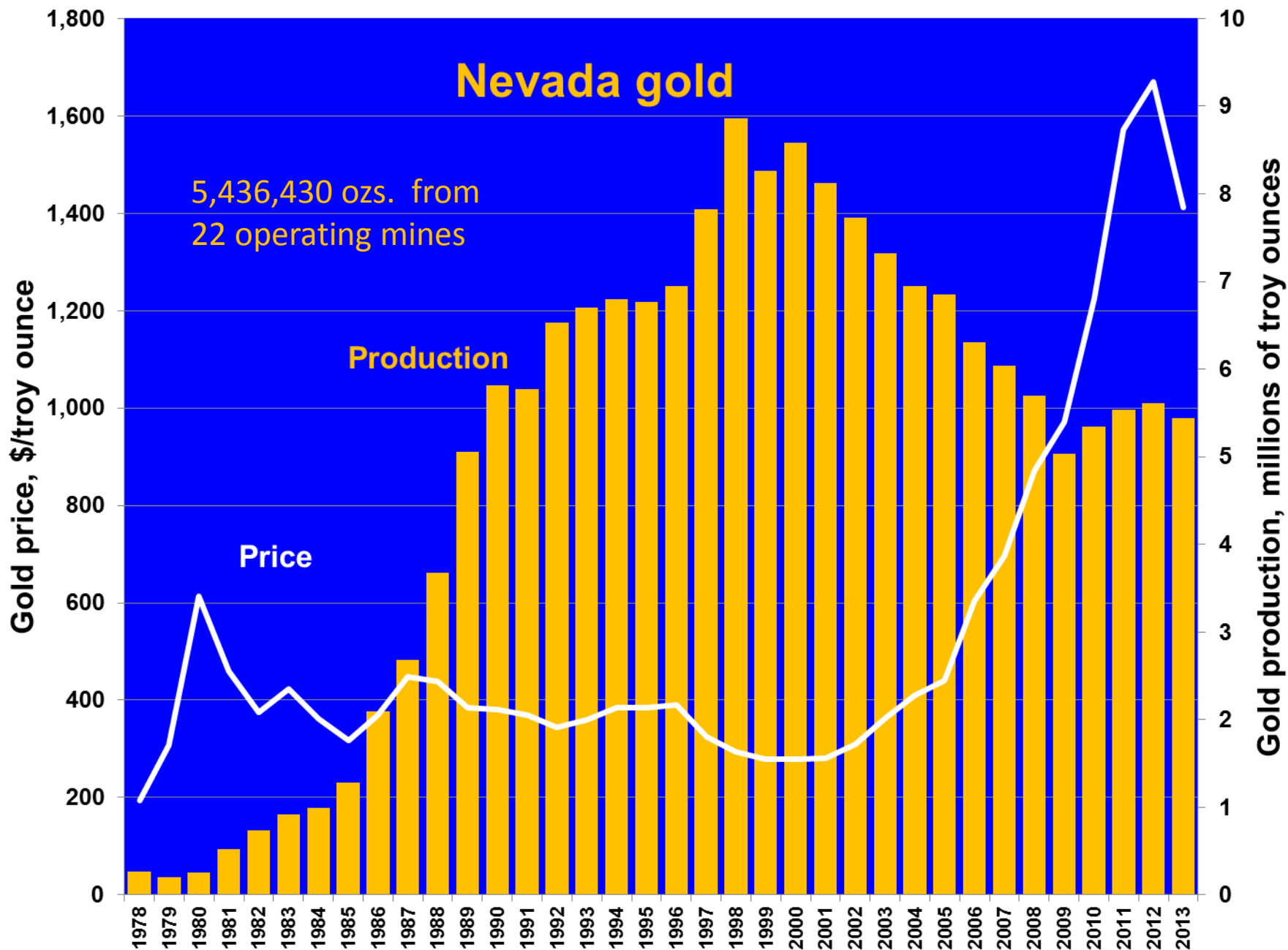
Prepared for: MOAC Quarterly meeting  
December 2, 2014

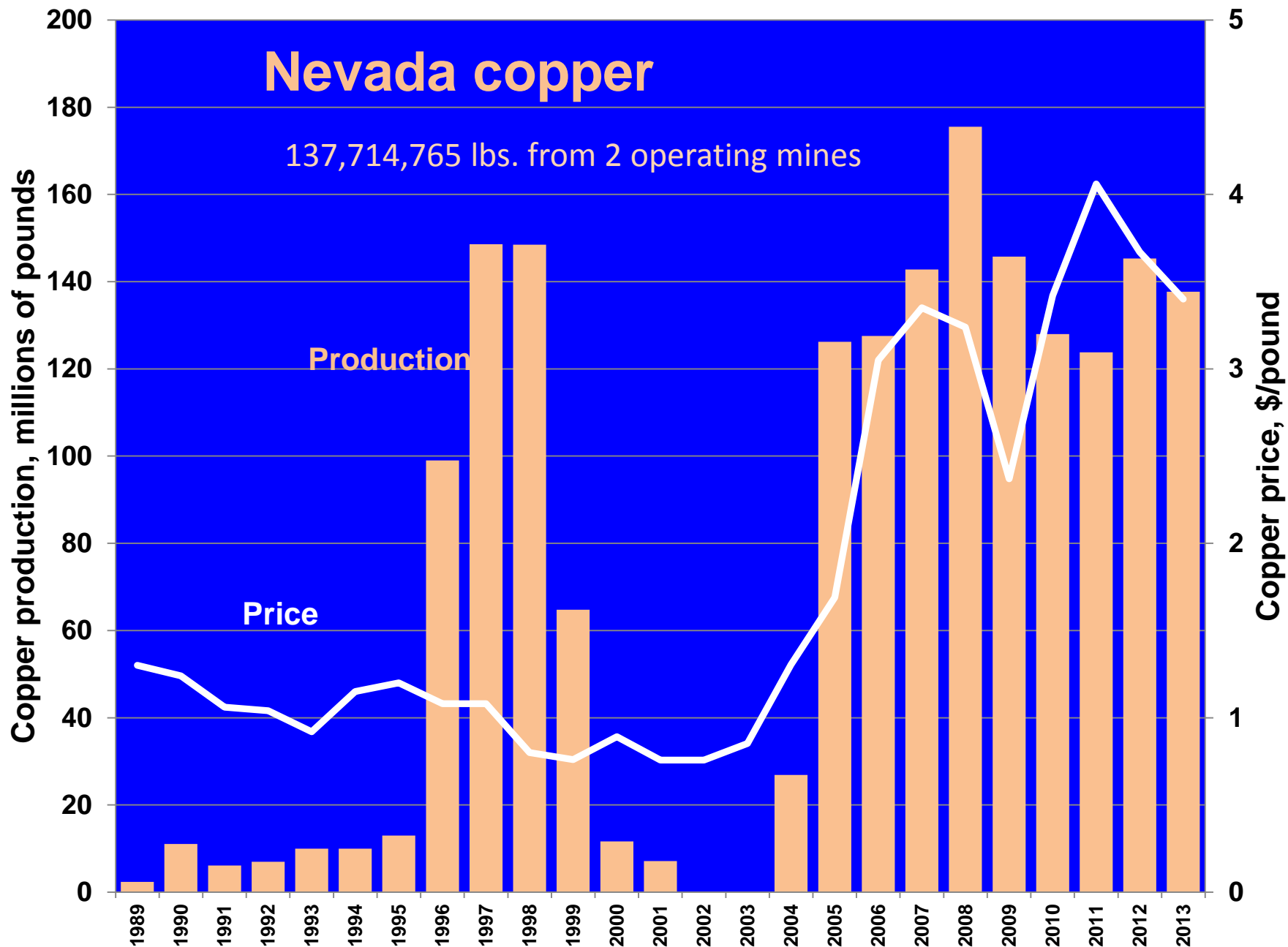
Presented by: Richard Perry - Nevada Division of  
Minerals

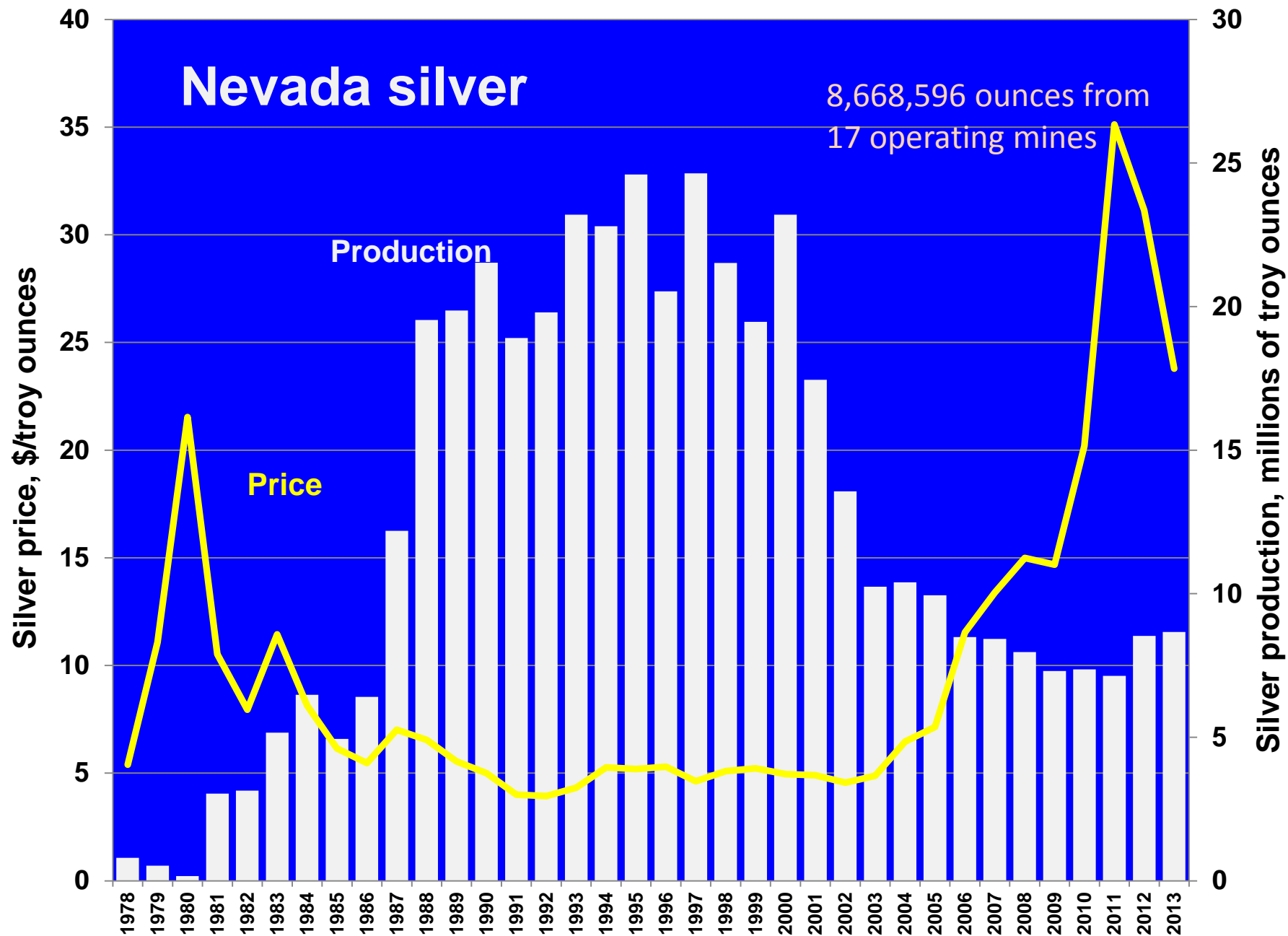
# Nevada mineral and energy production

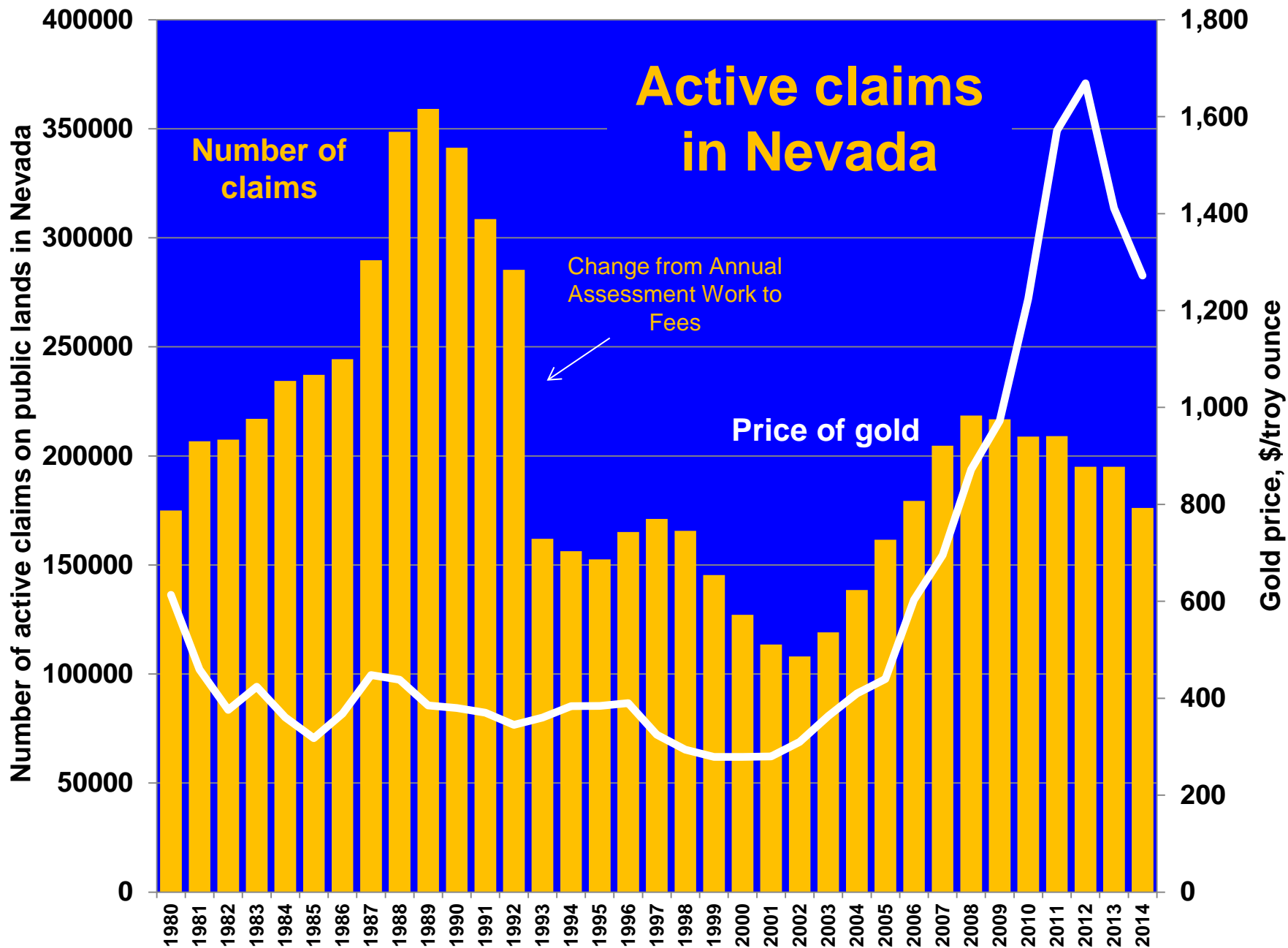


1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013









**NEVADA COMMISSION ON MINERAL RESOURCES**  
**DIVISION OF MINERALS**

<b>FY15</b>				<b>November 21, 2014</b>
			<b>Week:</b>	<b>11</b>
			<b>Year %:</b>	<b>21%</b>
<b>REVENUES</b>	<b>Work Program</b>	<b>Actual</b>	<b>% of Work Program</b>	<b>Balance Remaining</b>
Oil Assessment Fees (3654)	<b>39,336</b>	<b>8,439</b>	21%	30,897
Oil Permit Fees (3717)	<b>3,000</b>	<b>1,400</b>	47%	1,600
Mining Claim Fees (3718)	<b>1,312,892</b>	<b>901,248</b>	69%	411,644
Dangerous Mine Fees (3727)	<b>561,930</b>	<b>375,520</b>	67%	186,410
Geothermal Fees (3736)	<b>134,539</b>	<b>8,050</b>	6%	126,489
Abandoned Mine Securing Fees (3770)	<b>9,800</b>	<b>78,280</b>	799%	<b>(68,480)</b>
<b>TOTAL REVENUES</b>	<b>\$2,061,497</b>	<b>\$1,372,937</b>	<b>66.6%</b>	

DIVISION OF MINERALS IS 100% FEE FUNDED, NO GENERAL FUND MONIES

NRS 513 COMMISSION AND DIVISION (AML, MINES REGISTRY, EDUCATION AND PUBLIC OUTREACH)

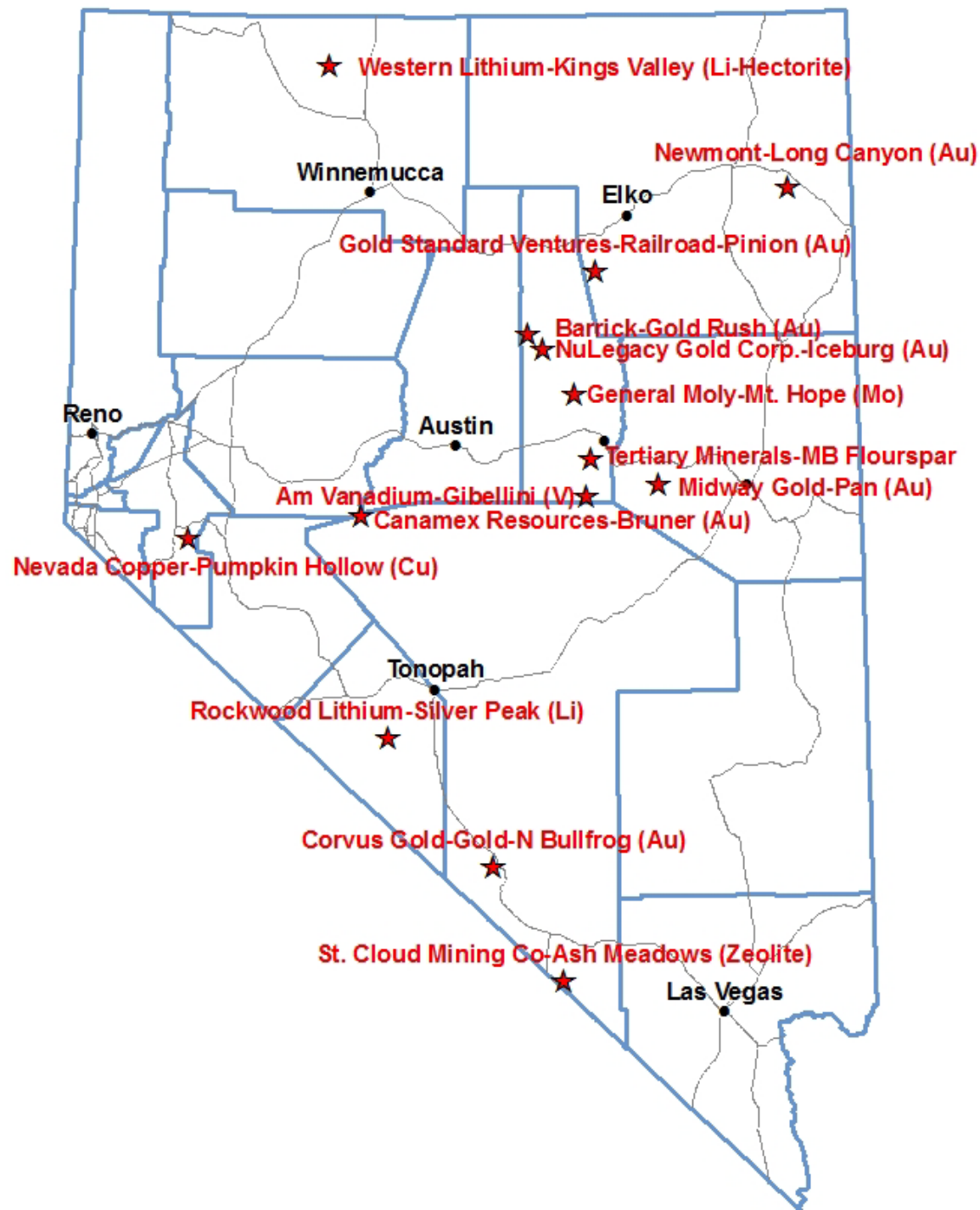
NRS 517 MINING CLAIMS, MILL SITES AND TUNNEL RIGHTS

NRS 519A RECLAMATION BOND POOL

NRS 522 OIL AND GAS

NRS 534A GEOTHERMAL RESOURCES

PROVIDED \$282K OF FUNDING TO THE SAGEBRUSH ECOSYSTEM COUNCIL IN FY 2014-15





# Midway Gold: Pan Project

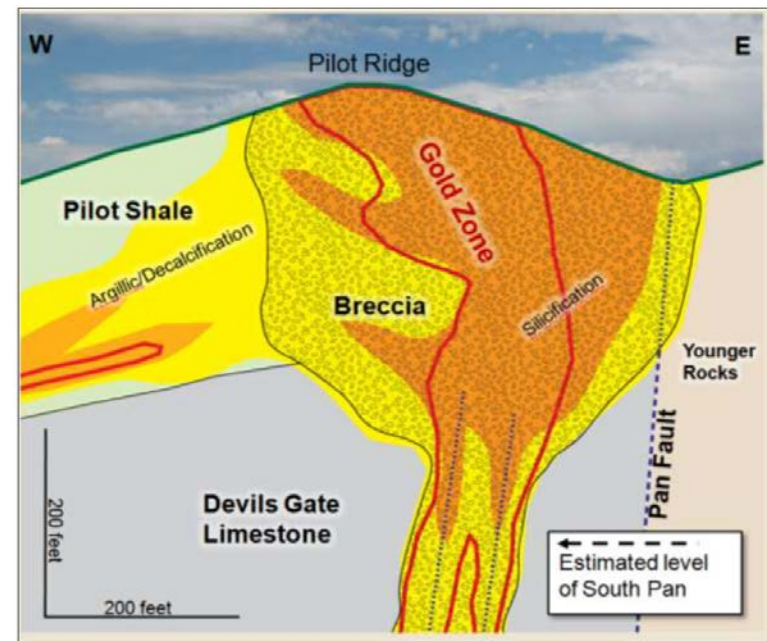
Located 22 miles southeast of Eureka, NV & 50 miles west of Ely, NV

*Carlin-type, epithermal, disseminated, sediment hosted gold system*

- Gold mineralization occurs in elongate breccia's along the Pan Fault
- Host rocks:
  - Dissolution/Collapse Breccias in the Pilot Shale and/or sometimes Devils Gate Limestone
- Entirely Oxide Mineralization

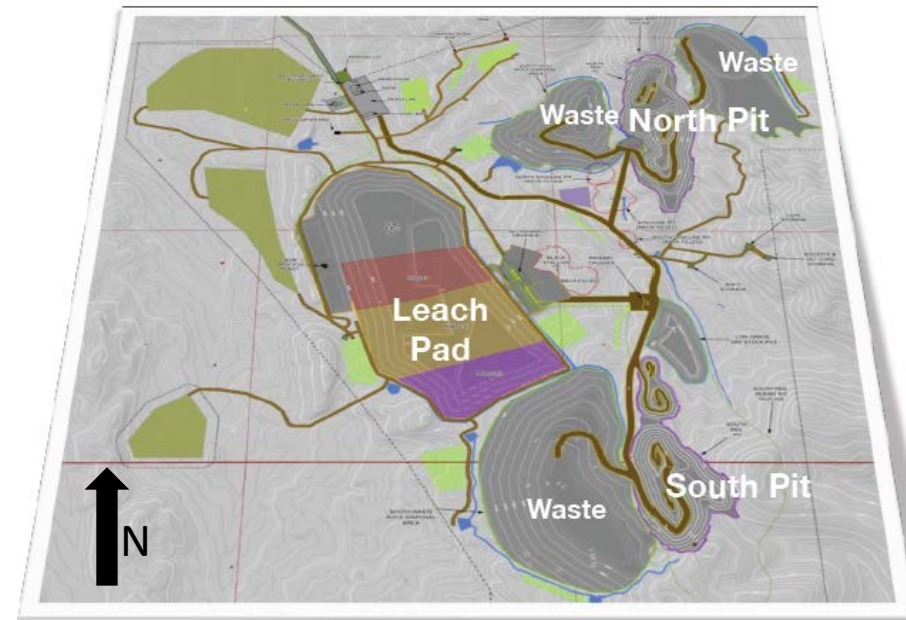
Resources	Tonnes	Grade	Contained
	('000s)	(g/t)	('000s oz)
Measured	36,920	0.49	579
Indicated	43,118	0.4	551
M & I	80,037	0.44	1,130
Inferred	3,928	0.36	45

Reserves	Tonnes	Grade	Contained
	('000s)	(g/t)	('000s oz)
Proven	25,245	0.6	487
Probable	23,067	0.51	377
P & P	48,311	0.56	864



## In Start-up. First production Q1, 2015

- Leach pad and solution ponds completed
- Carbon columns in place
- Midway is currently constructing it's 2<sup>nd</sup> bench in the South Pit
- Stacking of ore onto the leach pad began on September 15, 2014
- 500,000 tons of ore have been placed on the leach pad
- First gold pour in January 2015
- 150 new jobs, White Pine and Eureka Counties

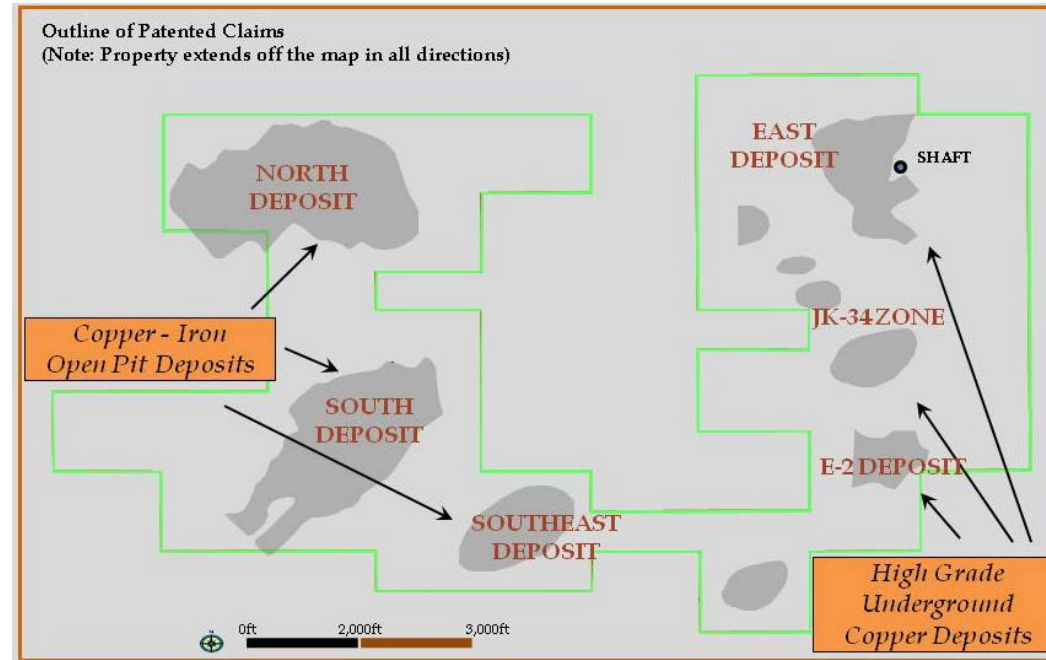
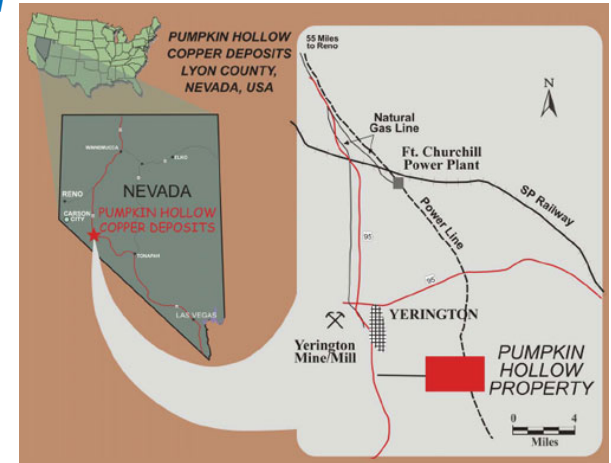




# Nevada Copper: Pumpkin Hollow

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
- Later work by Anaconda and other companies outlined Cu rich areas within the system where drilling intercepted grades up to 20% Cu
- Drilling data has defined manto-like ore bodies and breccia—hosted controls for high grade mineralization
- Ore hosts include the Gardnerville Formation and Mason Valley Limestone







### Current Activity:

- Currently the shaft at Pumpkin Hollow is at 1500'
- Next stop will be at 1,900' which will be the main haulage level
- Final depth of the shaft is 2,160' which should be reached by spring
- It is estimated that 6,500 tons/day will be feeding a 6,500 ton/day concentrator
- Initial production to begin in 2015
- The mine should employ ~200 people

### Proven and Probable Reserves (East Deposit):

- 823 million pounds of Cu
- 220,765 ounces of gold
- 4.7 million ounces of Silver



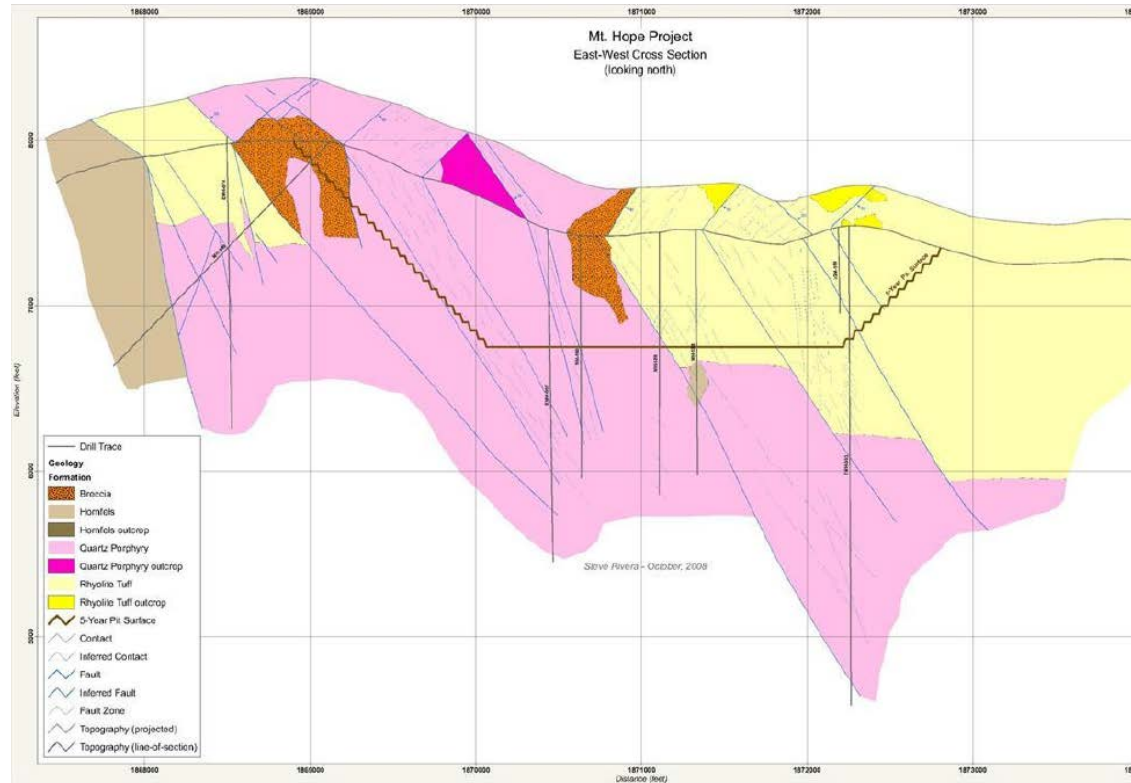
# General Moly: Mt. Hope

Located 22 miles northwest of Eureka, Nevada

*Molybdenum Porphyry Deposit*

## Geology:

- Classic Molybdenum Porphyry hosted within porphyritic igneous rocks and the Vinini hornfels
- Well zoned molybdenum mineralization where the grade zoning surrounds the central zone of the deposit
- Multiple mineral centers are adjacent horizontally rather than juxtaposed over the same porphyry center
- Mineral zones consist of porphyry rocks that have been veined by quartz stockwork containing molybdenite



## Mineral Reserves

Classification	Cutoff Sulfide Mo	Tons X 1000	Sulfide Mo %
Proven	0.034%	320,473	0.084
Probable	0.034%	664,129	0.063
Proven + Probable	0.034%	984,602	0.070





## General Moly - Project Highlights

	Mt. Hope <sup>2</sup>	Liberty <sup>3</sup>
Direct Operating Cost (First 5 Years of Operation)	\$6.28/lb	\$6.32/lb
Royalties @ \$15/lb Molybdenum	\$0.72/lb	N/A
Transportation, Roasting and Smelting Costs	N/A	\$1.47/lb
Total Cash Cost	\$7.00/lb	\$7.79/lb
NPV8, \$million with \$15/lb Price	\$734mm	\$325mm
IRR, % with \$15/lb Price	18.1%	17.4%
Capital Cost	\$834mm	\$366mm
NPV/Capital Ratio	0.88	0.89
Engineering Level	65%	N/A
Purchased Long Lead Equipment	\$74mm	N/A
Mill Capacity	66 ktpd	26.5 ktpd
1st 5-Year Molybdenum Grade	0.092%	0.090%
1st Five-Year Molybdenum Production (mm lbs)	32mm	14mm
1st Five-Year Copper Production (mm lbs)	N/A	7.5mm
Life of Mine	40+ Years	32 Years

1. Mt. Hope and Liberty Project NPV's estimated using 8% discount and \$15/lb moly. Estimates are after-tax and pre-finance.
2. Mt. Hope NPV reflects General Moly's 80% ownership in the project; For every \$1 change in the molybdenum price between \$10 and \$20 per pound, the after-tax NPV of General Moly's 80% interest in the Mt. Hope Project changes by approximately \$180 million.
3. Liberty NPV estimated using \$3.25/lb Cu byproduct credits. There is the potential to increase the Liberty Project's NPV and IRR by toll roasting Liberty molybdenum concentrates at the Mt. Hope Project, once constructed. This would decrease total cash costs to \$7.41 per pound for the first five full years of production.

**Filed updated NI 43-101 and are waiting to announce results to further demonstrate the attractive economics for the construction of the Mt. Hope and Liberty Projects**

# American Vanadium: Gibellini

Located 25 miles south of Eureka, Nevada  
*Low Grade Disseminated Heap Leach Vanadium Deposit*

## Overview:

- 100% controlled by American Vanadium
- 7,539 acres, comprising 435 contiguous active unpatented lode and placer claims on federal land
- Solidly tracking towards production which would make American Vanadium the only primary vanadium mine in the U.S.

## Geology/Mineralization:

- Ore is hosted in the Devonian Woodruff Formation which is in thrust contact with Mississippian Antler Clastics
- The ore body transitions from an upper oxidized zone to a lower unoxidized zone
- The transition zone between the two hosts the highest grades on the property

## Gibellini Hill Ore Body Characteristics



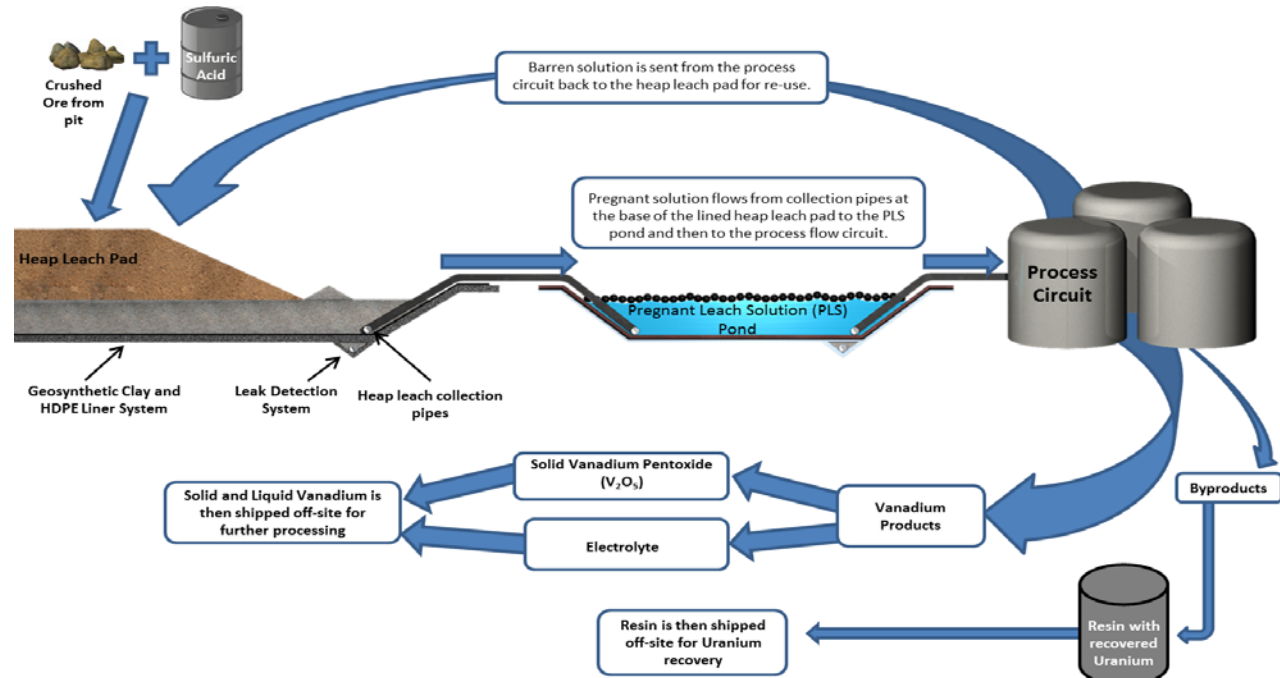
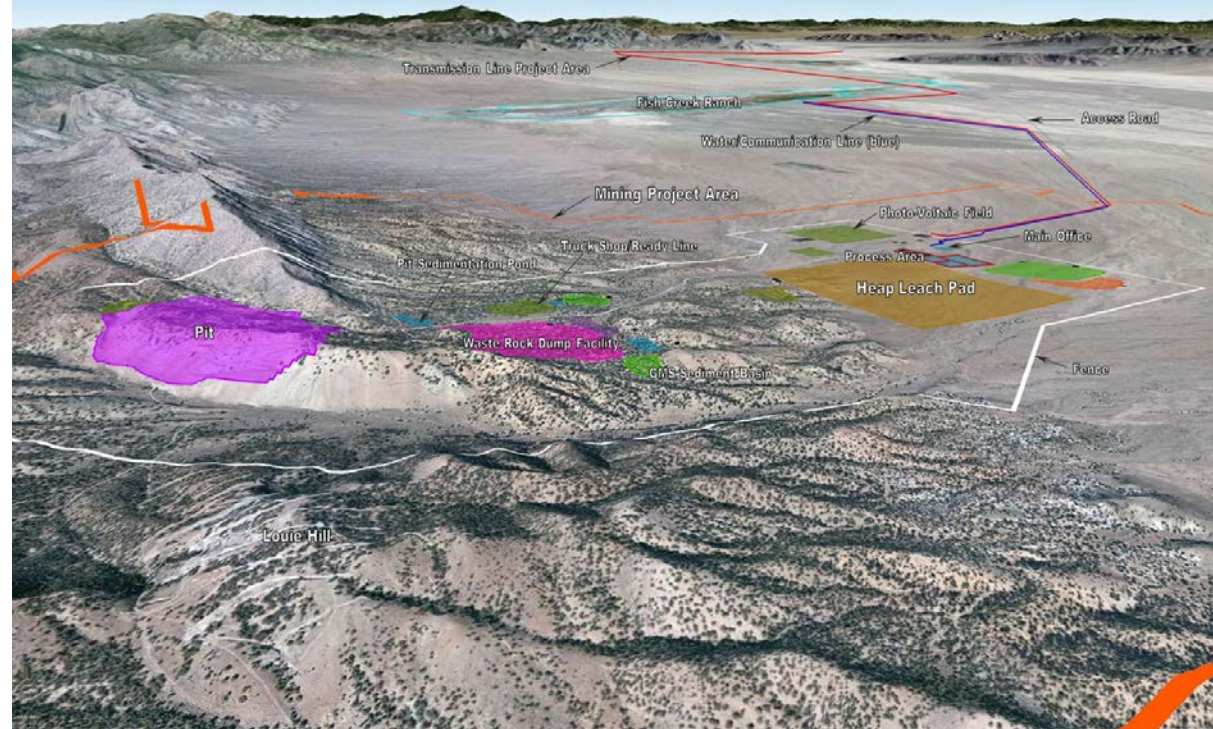
AMEC Feasibility Study Summary				
Class	Tons (1,000 lbs)	V <sub>2</sub> O <sub>5</sub> (%)	Cut-off Grade (V <sub>2</sub> O <sub>5</sub> %)	V <sub>2</sub> O <sub>5</sub> Contained (pounds)
RESOURCE				
Total Measured & Indicated (inclusive of Reserves)	23,050	0.285	0.066 – 0.077	131,369,000
Total Inferred	14,226	0.172	0.066 - 0.088	48,960,000
RESERVE				
Proven and Probable	19,969	0.302	0.131 – 0.153	120,510,000

## Mining/Production Facts:

- Mine will produce 2 products: Vanadium Pentoxide and Vanadium Electrolyte
- Will be an open pit-heap leach and shovel mining operation
- Mine will process 3.4 million Tons/year
- Annual production = 11.4 million pounds  $V_2O_5$
- Waste:Ore = 0.21:1
- Mine life is approximately 7 years, 90 new jobs

## Current Activity

- Actively working on baseline for EIS





# Rockwood Lithium: Silver Peak

Located in Silver Peak, NV

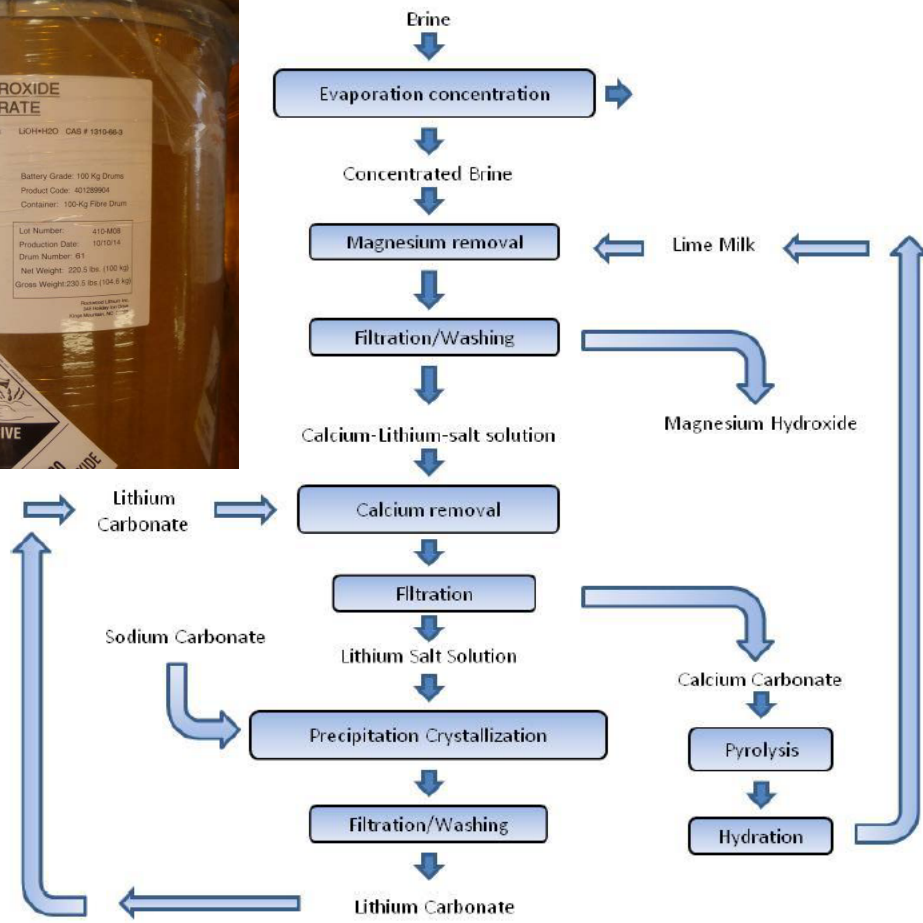
*Lithium Brine Deposit*

## General Overview:

- First lithium Carbonate was produced in 1967
- Brine is pumped from 4 aquifers which are bound in the Clayton Valley by high angle faults
- 1<sup>st</sup> ore body ran 300ppm Li in 200-300' aquifers (Main Ash Aquifer)
- Other aquifers include the Tufa, Silts-Gravel, and Halite aquifers
- Tufa Aquifer: Least amount of Li
- Employs 75 directly + 10 contractors



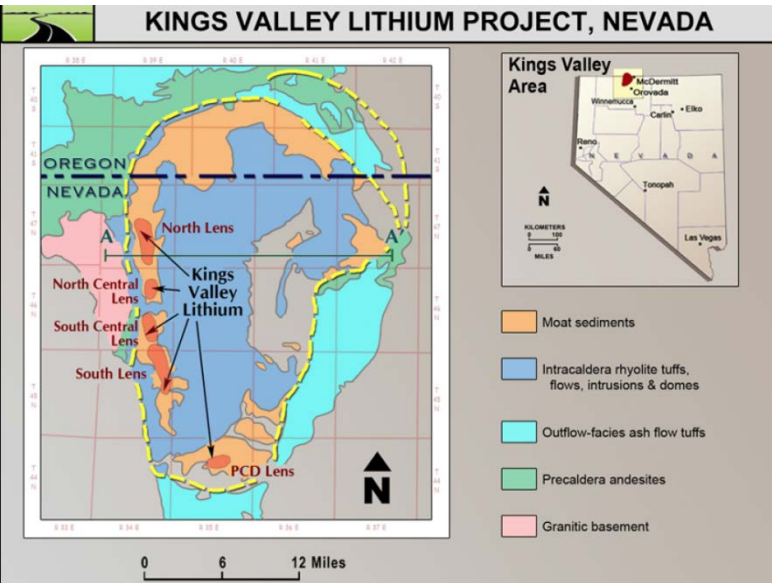
# General Lithium Carbonate Production (2 Year Process from brine to Li Concentrate):



# Western Lithium: Kings Valley

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

*Lithium/Organoclay Drilling Additive Supplier*



- Western Lithium has ownership of a rare 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
- 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
- Environmental approvals have been received for the extraction of the clay

High Purity Hectorite Clay





- Hectatone is a wholly owned subsidiary of Western Lithium and has completed the construction of the newest organoclay plant built in the US in decades
- The Hectatone plant is located in Fernley, NV
- Construction of the plant is complete and Hectatone products are currently being produced
- The first shipment of Hectatone products was anticipated for November to meet initial customer orders
- First trial production of lithium carbonate is also expected in November from a plant in Germany.



# Tertiary Minerals: MB Flourspar Project

Located 14km SW of Eureka, Eureka County, NV

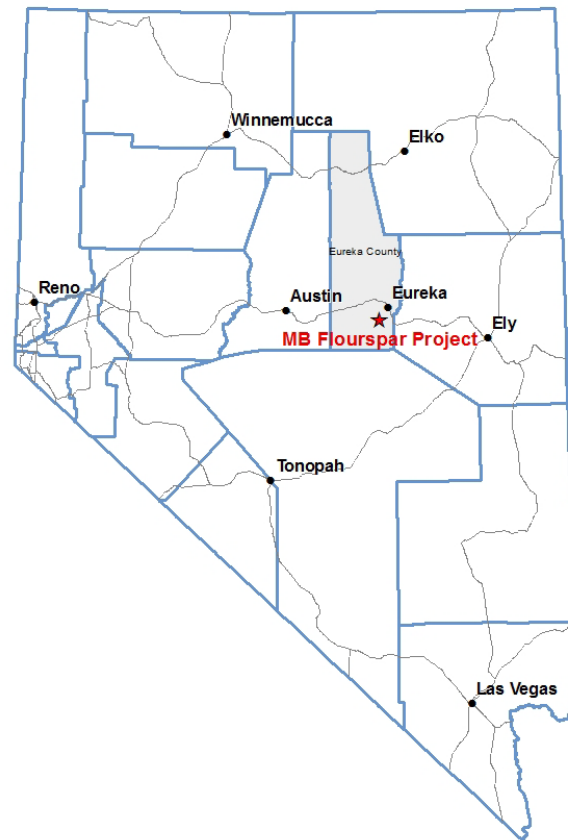
*Skarn-Flourspar deposit*

## 2013 Milestones:

- Completed 2 phases of drilling:
  - 26 Twin diamond and Percussion drill holes
  - Totaling 3,220 m
- Defined a JORC resource and potential mine starter pit
- Targeted potential higher grade zones
- Tested alternative site for mine starter pit

## 2014 Milestones:

- Maiden JORC Compliant Mineral Resource Estimate – Completed April 2014
- Scoping Study level Metallurgical Test work – to be completed by the end of 2014
- Phase 3: Has begun in order to target higher grade mineralization and increase the size of the Inferred mineral Resource



Classification	Million Tonnes (Mt)	Flourspar (CaF <sub>2</sub> %)
Indicated (8% CaF <sub>2</sub> cut-off)	8.9	10.3
Inferred (8% CaF <sub>2</sub> cut-off)	29.5	10.4



# 2014 Mineral Resource Estimate and Phase 3 Provisional Drilling

2014 Drill Target

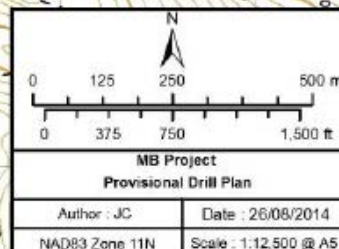
2014 Provisional Drill Collar

2013 Drill collar

Inferred Mineral Resource

Indicated Mineral Resource

2014 drill program is complete (2,516 m drilled in 9 holes). FI content in the skarn is difficult to analyze. Samples are sent to the UK, results should be back in the spring.

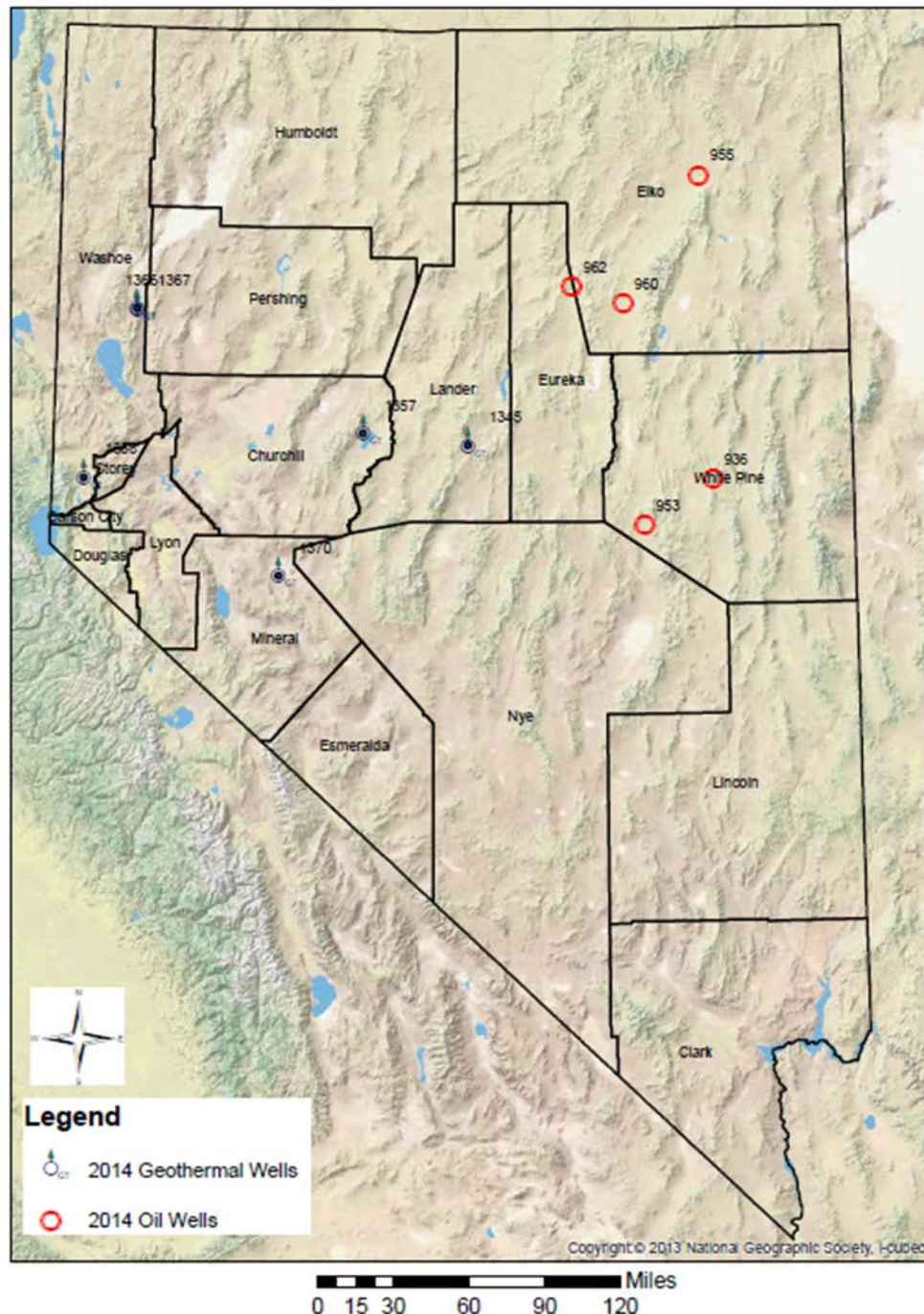




# Oil and Geothermal Wells Drilled in FY 2014

7 OIL EXPLORATION  
WELLS DRILLED

5 GEOTHERMAL  
EXPLORATION OR  
PRODUCTION  
WELLS DRILLED



# Nevada Geothermal Energy

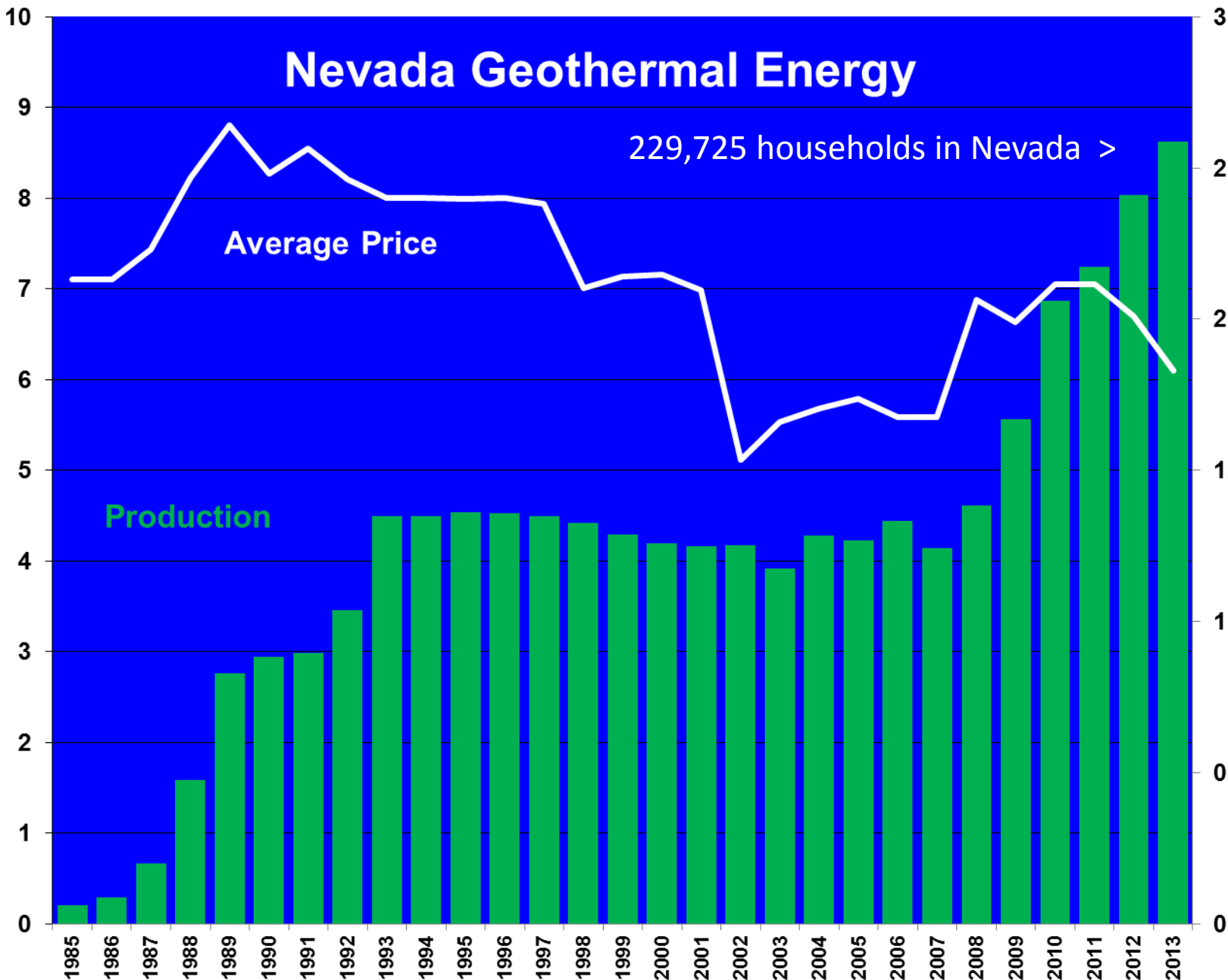
229,725 households in Nevada >

Average Price, cents per kilowatt-hour

Average Price

Production

Net Production, millions of megawatt-hours





# Ormat Technologies Inc: McGinness Hills

Located in Lander County northeast of Austin  
*Geothermal Power Plant*

## 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
- Began operations on June 15, 2012
- The plant currently has a 30 MW net capacity
- Phase 2 construction of the plant is underway and the expanded plant should come on line in the first half of 2015 and would bring the complex's total capacity to 70 MW



# Terra-Gen Power, LLC: Beowawe

Located 8 miles southwest of Beowawe, Nevada  
*Geothermal Power Plant*

## General

- The plant was put into production in 1985
- The plant produces 13 megawatts (Enough to power the town of Elko)

## Geology

- Geothermal Reservoir in the Valmy Formation
- The reservoir is bound by 2 N-S trending rift faults and the NE trending high angle Malpitas fault
- The temperature at the center of the reservoir is 300° at 200'

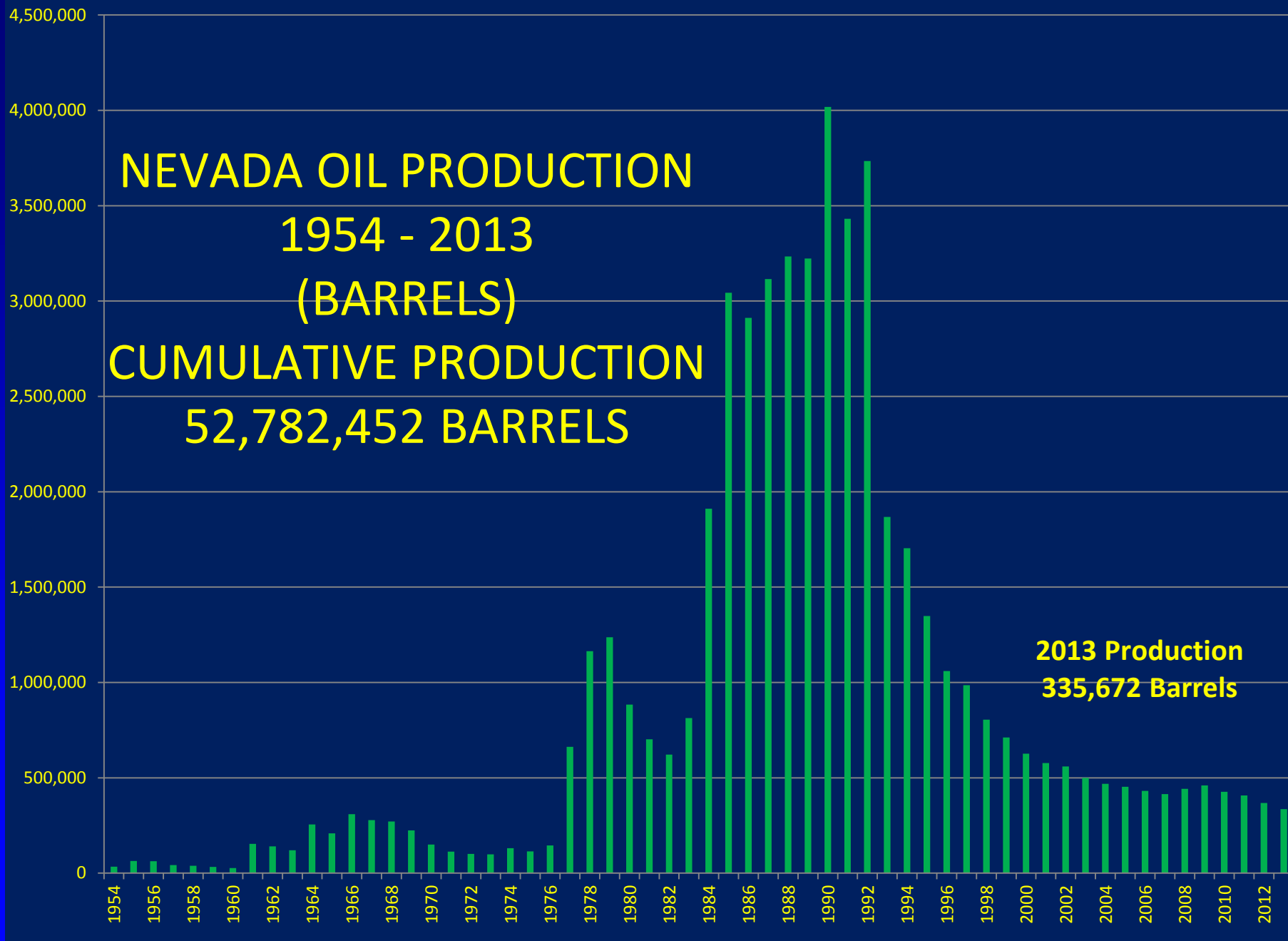
## Plant Specifics

- All geothermal fluids are pumped from 3 wells within the confines of the plant
- ~4,200 gpm are pumped on average
- The fluids are pumped from 8,000' below the surface
- The fluids are brought to the surface where they are sent to the flash plant or the binary plant
- After the heat is taken from the fluids they are re-injected into the reservoir at a depth of 1,600'
- It takes 6-9 days for the water return to the pumps and begin plant processing again



**NEVADA OIL PRODUCTION**  
**1954 - 2013**  
**(BARRELS)**  
**CUMULATIVE PRODUCTION**  
**52,782,452 BARRELS**

**2013 Production**  
**335,672 Barrels**



# Noble Energy: NE Nevada Oil Play

Unconventional Oil Prospect/Wilson Project

## Exploration Stage Unconventional Oil Prospects

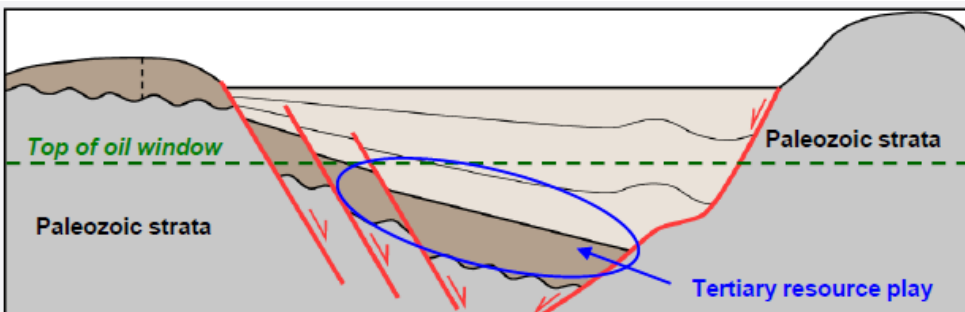
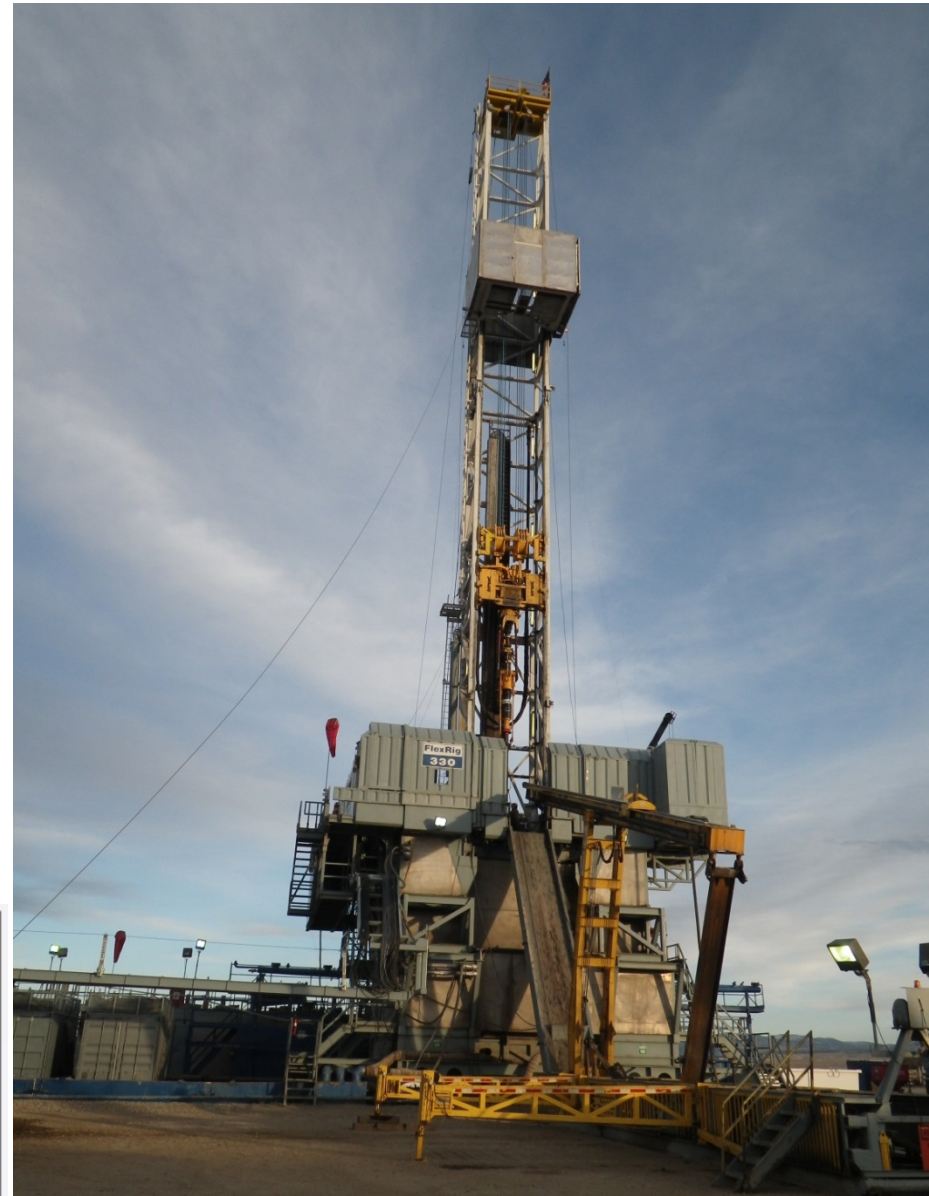
- Targeting Tertiary age lacustrine shale (Elko Formation) with play at depths between 6,000 – 12,000 ft
- Unconventional tight oil prospect
- 4 Wells drilled to date, 3 hydraulically fractured

## Encouraging results:

- Hydrocarbon saturation up to 70%
- Thermal maturity in peak oil generation window
- Total organic content 1-24%

## Looking Forward:

- Complete Analysis of data from wells
- Design Completion and conduct production tests
- Evaluate horizontal vs. vertical approach





# St. Cloud Mining: Ash Meadows

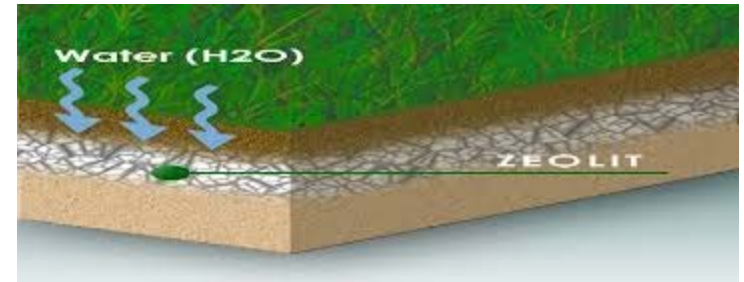
Located in Inyo County, Ca & Nye County Nevada 70 miles northwest of Las Vegas  
*Zeolite/Clinoptilolite Deposit*

## General Overview

- Clinoptilolite (Clino) has unique chemical and physical properties that allow for cation exchange, gas adsorption, and water absorption/desorption
- End-use applications include radioactive waste control, aquaculture, water filtration and purification, and animal feed (lowers rumen ammonia & maintains pH)

## Geology

- Formed through alteration of a Tertiary vitric (glassy) ash-flow tuff by alkaline ground water (possibly supplemented by hydrothermal solutions)
- The clino horizons strike north-south and have an average dip of 20° to the east
- Maximum thickness of the clino bearing horizons is 100'



## Reserves/Resources

- Area # 1 – occurs in Nevada and contains an estimated 18.9 million tons of proven reserves
- Area # 2 – Situated north of Area 3 and contains an estimated 11.7 million tons of inferred resources
- Area #3 – Encompasses the California Mine and contains an estimated 3.0 million tons of proven reserves

## Current Industrial Use for these Zeolites

### FUKUSHIMA DAIICHI NUCLEAR CLEAN UP

- Kurion Inc., (a company specializing in permanent disposal of nuclear and hazardous wastes) using St. Cloud Zeolite and their proprietary processing techniques, was responsible for 70% of the clean-up in the first 9 months after the disaster
- 220 lb bags filled with zeolite (clino) into the ocean near the power plant to absorb as much radioactive  $\text{Ce}^{137}$  as possible
- St. Cloud continues to be one of the largest suppliers of media to the Fukushima clean up effort

