

# Idaho Mining and Exploration, 2011

Virginia S. Gillerman  
Earl H. Bennett

Staff Report S-12-3  
November 2012

Idaho Geological Survey  
Morrill Hall, Third Floor  
University of Idaho  
Moscow, Idaho 83844-3014

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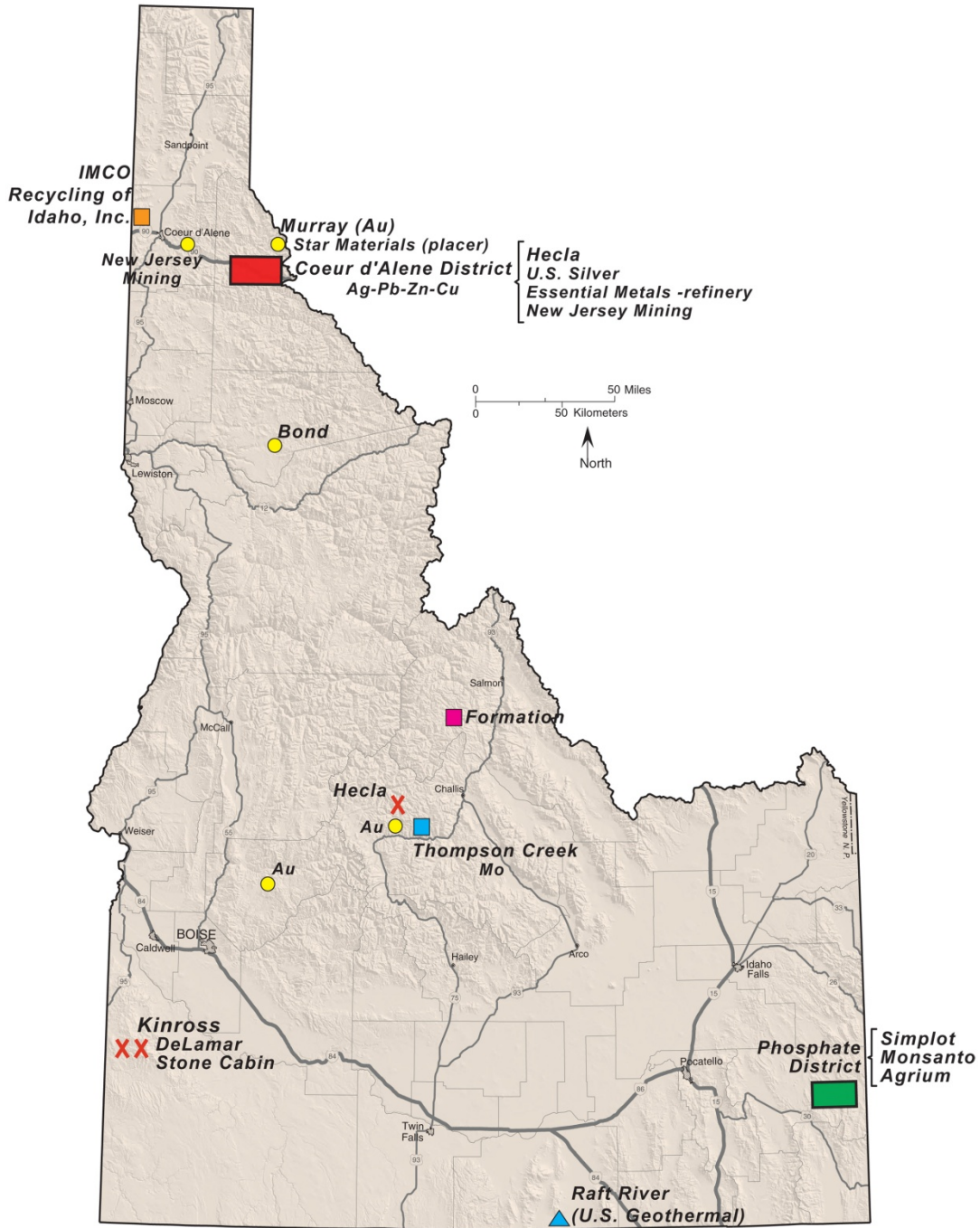
# Idaho Mining and Exploration, 2011

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## INTRODUCTION

Idaho mining and commodity prices continued to have a good year in 2011, but several disappointments loomed in the second half of the year. Metal prices, particularly for silver and gold continued to be strong in 2010, but prices of minor metals, such as molybdenum and cobalt, were up and down but ended the year lower than hoped for. Industrial commodities were more stable than the previous few years as the global economy – except for the domestic housing market – rebounded somewhat. Optimism in the overall mining industry was reflected by strong exploration activity for metals and phosphate, but shortages of investment funding and personnel in the minerals industry continued to impact exploration. Employment and budget woes were still present in other sectors of Idaho’s economy, including government and education, as well as the construction industry. Figure 1 shows the location of Idaho’s active major mining operations.

According to the Idaho Division of Financial Management, mining employment increased 11% in 2011, to 2,547 Idaho jobs, not including the mineral-related chemical plants. New mines and expansions are anticipated to add additional jobs through 2015 (DFM, Idaho Economic Forecast, January, 2012). Corporate earnings, were buoyed by gold prices which closed on December 31, 2010, over \$1400/troy ounce, but had risen to around \$ 1600/troy ounce by December, 2011. Silver ended 2010 at approximately \$30.90 per troy ounce, and spiked to over \$40 per ounce in mid-2011, but the metal ended the year priced at just under \$ 30 per ounce. Copper, partly an indicator of global industrial development, declined from approximately \$4.30/pound to close to



ACTIVE MINES AND PLANTS 2011

Figure 1. Location of current mining areas in Idaho.

\$ 3.75 per pound by the end of 2011. Rare earth prices and share prices in junior companies spiked in mid-2011, but declined in the second half of the year as manufacturers emphasized substitutions and global investors took profits. Idaho has undeveloped rare earth deposits.

According to the U.S. Geological Survey’s 2012 Mineral Commodity Summaries, the preliminary estimated value of non-fuel mineral production in Idaho in 2011 was \$ 1,287 million, which would be a new record for the state, surpassing the 2010 total of \$ 1,183 million, and significantly up from Idaho’s \$ 935 million total value in 2009 (Figure 2). The 2011 total raises Idaho’s ranking to 17<sup>th</sup> among the 50 states, and the leading commodities by value were molybdenum concentrates, phosphate rock, silver, construction sand and gravel, and lead (Figure 3). A major contributor was the sizeable output from Custer County’s Thompson Creek mine, which again produced over 20 million pounds of molybdenum in 2011, a slight decrease from the prior year, plus favorable silver and phosphate prices and output from Idaho mines.

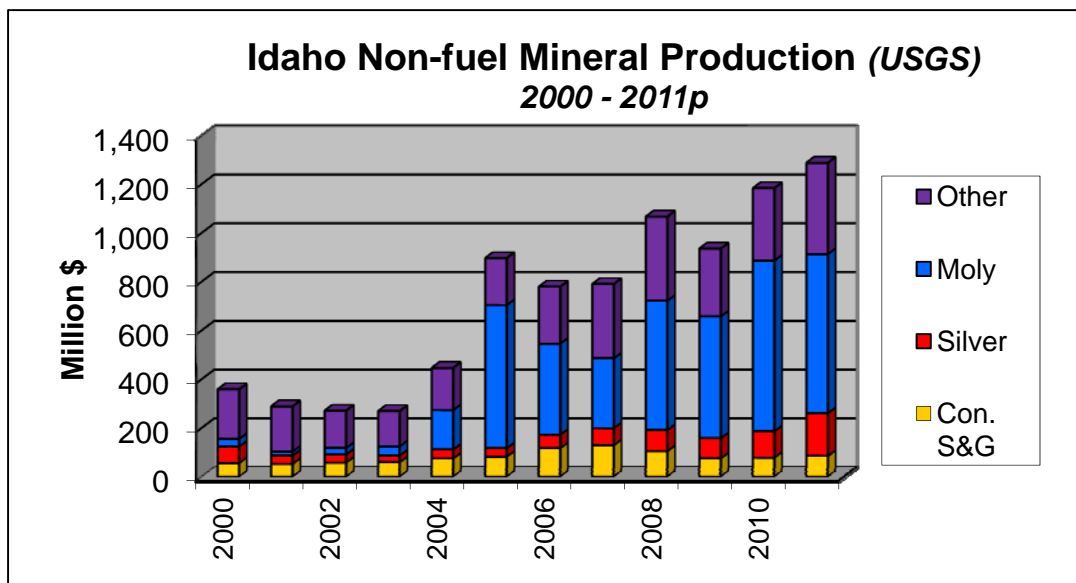


Figure 2. Yearly value of Idaho’s non-fuel mineral production.

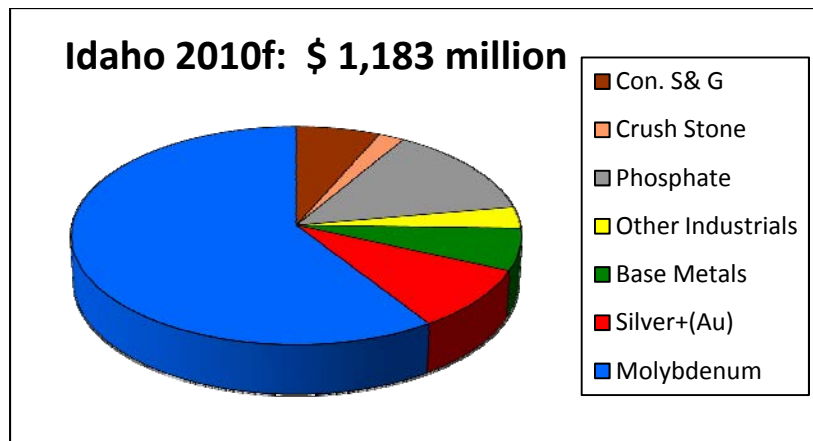


Figure 3. Idaho 2010 production by commodity.

## METAL MINING

### COEUR D'ALENE AREA

With the high silver and base metal prices, the Coeur d'Alene District in northern Idaho continued to be an especially busy place. Mining of the high grade quartz-siderite-sulfide veins was underway at two operating mines, Hecla's Lucky Friday mine near Mullan, and U.S. Silver's Galena mine. Both are underground mines with shafts extending over a mile deep. With historic production exceeding 1.22 billion troy ounces (approximately 38,000 metric tons) of silver, the Coeur d'Alene is one of the most productive silver mining areas in the world.

Hecla produced 2,985,339 troy ounces (92,854 kg) of silver in 2011, a decrease from the 3.36 million ounces (104,508 kg) in 2010. Short tons milled were 298,672, and reported cash costs were \$ 6.47 per ounce at the Friday in 2011. All production was from the Lucky Friday expansion in the Gold Hunter deposit, mined off the 4900 and 5900 levels.

Much of the decreased output was a result of several temporary shutdowns due to accidents in the mine during 2011. A rock fall in April resulted in the death of one miner, and an accident in November caused the death of a cementation contractor on the #4 shaft project. In December, an unrelated rock burst in a primary access way at the Lucky Friday injured seven employees. As a result, in January, 2012, MSHA ordered a halt to operations until loose material was cleaned out from the Silver Shaft, the main production shaft to the mine, effectively shutting it down for all of 2012. The area damaged by the December, 2011, rock burst will be bypassed to reduce the danger of future bursts in that area.

In August, the Board of Directors approved the entire #4 Shaft expansion project, which involves construction of an internal shaft from the 4900-foot level to the 8800-foot level, along with ancillary facilities, to access new discoveries in the deeper Gold Hunter vein system. The hoist is an 8-foot diameter, 1,100-ton-per-day capacity double drum hoist built in Wisconsin. The concrete was poured for the shaft collar in mid-year and approximately \$ 90 million of the estimated \$ 200 million, 3-year project had been expensed by the end of 2011 (Figure 4). Definition drilling continued to explore the 30 vein system between the 6000 and 6600 levels and to the west along the Silver Fault. Hecla approved a silver-based dividend for its shareholders and settled with the courts for its share of the Coeur d'Alene Basin environmental obligation, making a \$168 million payment.



Figure 4. Galloway at top of #4 shaft, Gold Hunter deposit, Lucky Friday mine.

U.S. Silver Corporation operated the Galena mine at full capacity and conducted a sizeable exploration program at the mine and on other portions of their property in the Silver Valley. The company once again increased reserves above production (Figure 5). The Galena produced 2,318,194 troy ounces (72,103 kg) of silver in 2011, slightly higher than the 2,275,817 troy ounces (70,785 kg) produced in 2010. Lead and copper production levels increased by over 9% in 2011. Cash costs also increased to \$ 17.75 per ounce, as reported in the company's annual report, and the increase reflected higher spending on labor, maintenance work, and impacts of increased safety regulation and procedures. Exploration drilling totaled a hefty 65,470 feet, versus 49,434 feet in 2010, and resulted in addition of over 1.2 million ounces of reserves, beyond the amount depleted by production.

Rehabilitation of the Galena shaft was complete in 2010, but work continued in 2011 on upgrading shaft pockets, utilities, etc., to improve hoisting and operations for the 5500-foot deep shaft. An additional 15,000 feet of underground workings had extensive maintenance and repair work done to improve safety and productivity in the future.

The Coeur mine is part of the U.S. Silver property and it is connected underground to the Galena, about a mile away. The U.S. Silver Board approved re-development of the Coeur, and exploration drilling and repair and development work at the Coeur took place in the second half of 2011.





Figure 5. Surface exploration drilling, U.S. Silver property, 2011.

The Sunshine mine remained closed but the new owner, Silver Opportunity Partners, formed a new company, Sunshine Silver Mines Corporation, to explore and re-develop the mine and property of approximately 2,408 hectares. An independent technical report done by Behre Dolbear & Company in July, 2011, estimated a resource of mineralized material in the mine at 1,991,169 tons at an average grade of 21.2 tr.oz/ton silver. The company repaired the hoists and Jewell shaft, dewatered the mine to below the 1,130 meter level, and re-established utilities. A small fire in February caused an evacuation of twelve people, but was quickly put out. Sunshine geologists continued work on exploration and development plans.

New Jersey Mining Company operated two active joint venture projects in northern Idaho, but a third one, the Toboggan exploration joint venture with Newmont, was terminated in April when the 8,000 acre package was quitclaimed to New Jersey. At Kellogg, New Jersey and United Silver Corporation were expanding capacity of New Jersey's precious metal and flotation mill to about 10,000 metric tonnes per month by adding a new ball mill, crusher, thickener, and larger building (Figure 6). In a separate 50-50 joint venture with Marathon Gold Corporation, New Jersey conducted a 10,000-meter diamond drill program at the Golden Chest underground gold mine near Murray to evaluate open pit potential of the deposit. Highlights included intercepts from GC 11-63 with 4.59 g/t gold over 18.1 m true thickness at 46.2 m down the hole. With very favorable results, the companies planned release of a resource estimate in early 2012 and additional drilling on the Golden Chest property. Scheelite, a calcium tungstate mineral, was intersected in some of the quartz veins, as well as visible gold. Veining is localized along the Idaho Fault.



Figure 6. New grinding mill for New Jersey's mill at Kellogg, Nov. 2011.

## OTHER METAL MINING

Thompson Creek Metals had another excellent year at their large, open pit molybdenum mine in Custer County, in spite of lower-grade ore and increased stripping of waste due to planned mine sequencing in the second half of 2011. Mining of the higher grade Phase 6 ore was completed in October, while stripping Phase 7 waste continued all year. The price of molybdenum declined slightly to the \$ 15.50 range, but the company's realized sales price actually rose from the 2010 average. Cash costs for the year averaged only \$ 6.66. Production in 2011 from the Thompson Creek mine was 21,368,000 pounds (9,692 metric tons) of molybdenum, reported by the company as molybdenum oxide plus HPM (high purity molybdenum disulfide), a decrease from the 2010 record 25 million pounds (11,340 metric tons). Concentrates were trucked to the roaster in Pennsylvania. The company also did exploration drilling and was working on an Environmental Impact Statement (EIS) for a Phase 8 expansion and pushback of both high walls in the pit.

## PHOSPHATE MINING

Southeastern Idaho's Phosphate District had a very good year of full production and strong prices for phosphate rock, a key ingredient in fertilizer. The ore is derived from the Permian age Meade Peak Member of the Phosphoria Formation, an organic-rich, phosphatic black shale. In addition to P, the stratigraphic sequence is variably enriched in trace elements such as C, V, U,

Mo, and Se. The selenium (Se) has been a particularly troublesome contaminant as it is concentrated in the center waste shale unit and can be leached by oxidizing ground or surface waters, then bio-accumulated by certain plants to toxic amounts. All three of the major producing companies are involved in researching and implementing better ways to manage historic legacies and current operations to minimize the effects of the natural selenium. The mines produce feedstock for two phosphoric acid fertilizer plants, Simplot's Don plant at Pocatello and Agrium's facility at Conda, and for Monsanto's elemental phosphorus plant at Soda Springs. All the operations, except the Don Plant, are located in Caribou County. Each plant employs approximately 400 people, while another 100 persons work at each mine.

Agrium is the only public company of the three Idaho producers. At Conda, it produces MAP (mono-ammonium phosphate) and super phosphoric acid products for sale primarily in the northwestern U.S. It reported 2011 gross margins from phosphate sales that were triple that of 2010, due in part to higher sales prices from strong agricultural demand. Agrium completed mining at the Dry Valley mine in August and began backfilling pits and conducting closure reclamation at the site. The company moved operations to the North Rasmussen Ridge mine, which was permitted in 2003. Agrium was also conducting exploration and collecting baseline data and scoping for a new mine plan at the Rasmussen Valley area.

Monsanto mined state and federal leases at the South Rasmussen mine, which is nearing the end of its mine-life, and conducted exploration drilling at N. Caldwell Canyon. In June, the Bureau of Land Management (in cooperation with the U.S. Forest Service) issued a positive Record of Decision (ROD) to approve the proposed mine plan for Monsanto's new Blackfoot Bridge mine. The Final EIS incorporated several improvements in response to comments on the Draft EIS. There were no legal challenges and construction began in late summer. An innovative feature of the mine design will be the first use of highly impermeable, laminated geosynthetic clay liner covers for the waste rock piles in order to avoid infiltration of water into the overburden piles. The company invested heavily in the large environmental project due to the closeness of the site to the Blackfoot River, which has been impaired by selenium releases from historic disturbances further up in the basin. Construction and site preparation included crushing 200,000 tons of 4-inch minus drain rock for oversized water management ponds, installation of geogrid liners and culverts, and clearing areas for overburden piles (Figure 7). Construction will continue in 2012 with initial production expected in 2013. Long-term monitoring of the site and cover systems is included in the plan.

J.R. Simplot had an excellent year mining at their Smoky Canyon mine near the Idaho-Wyoming border. With final clearance and approval in December, 2010, by the Ninth Circuit Court for the mine expansion onto Manning and Deer Creek leases, they concentrated on the operational details in 2011, including how to deal with a snowpack that was 200% of normal. They mined Pit B and Panel F (Manning Creek) with backfilling into Panel E, and worked on a quality control plan to use the Dinwoody Shale as a cover system (Figure 8). Simplot also drilled geotechnical and groundwater monitoring holes at their Dairy Syncline project, which will be the next proposed mine site.





Figure 7. Construction work at Monsanto's new Blackfoot Bridge phosphate mine.



Figure 8. Aerial view of Panel F at J.R. Simplot's Smoky Canyon phosphate mine.

Paris Hills Agricom, Inc., a subsidiary of Stonegate Agricom, a Canadian company, was drilling the Paris Hills phosphate deposit near Bloomington in Bear Lake County. The target was the same Phosphoria Formation which is mined further north, but the Paris Hills deposit would be an underground mine, as were several historic mines active in the early 1900's. The company drilled from late 2010 to late 2011, principally drilling RC pre-collars and coring through the Meade Peak member. The phosphorite beds are present on both limbs of the Paris Syncline, and two horizons are present. At least 60 holes have been drilled for 16,000 meters, with additional metallurgical studies and feasibility work underway in late 2011 at the Paris Hills project.

## OTHER INDUSTRIAL MINERALS

Overall, the non-phosphate industrial minerals continued to be affected by the economic recession, although markets had stabilized more than in 2010 with a few small upturns locally. The distribution of industrial mineral producers is shown in Figure 9; they are dominantly in rural areas. Construction sand and gravel operations (not shown in Figure 9) are widespread across the state and remained impacted negatively from the housing market downturn.



Figure 9. Location map of Idaho's industrial mineral operations.

Emerald Creek Garnet, Ltd., a subsidiary of WGI Heavy Minerals, mined alluvial garnets with two washing plants on Emerald and Carpenter Creek in Benewah County. The almandine garnets are very hard and durable, ideal for uses in abrasives, water jets, and filtration. Markets and production were flat, and the company was doing exploration as well as the standard, concurrent reclamation work. They have been mining there since the 1930's.

Idaho's decorative stone industry remained in a partial slowdown. The Three Rivers quarry in Custer County, known for its colorful flagstone, reportedly produced at less than half-capacity, and the Ramshorn quarry was inactive. Several producers in Cassia County supplied Oakley Stone, a durable micaceous quartzite, for flagstone and ledgestone. In Idaho Falls, Idaho Travertine was re-acquired by Ted Orchard and his family when the prior owners released their option. Orchard increased marketing for the tan travertine obtained from two quarries and processed at a custom cutting facility. Table Rock Sandstone was quarried and cut by Gerhard Borbonus Landscaping from the pit above Boise and used for trim on the new business building at Boise State University and a few private residences in the Treasure Valley.

Hess Pumice Products reported better markets in 2011 than the prior couple of years. Hess mines pumice from the Wrights Creek mine north of Malad and has a processing plant in town. The pumice is used in a variety of industrial applications, and the company has been successful in diversifying markets globally to replace lost demand for lightweight aggregate. An extensive list of uses was available on their website (<http://www.hesspumice.com/index.html>). It included pumice pozzolan, polishing and stonewashing, paint fillers, filtering, lightweight construction materials, and other uses. U.S. Grout, a division of Hess, manufactured an ultrafine, cementitious grout which incorporates pumice, cement and other materials. It has proved very successful for sealing fractures and joints in damp environments, including gold mines and leach field, and the company had a record year. Hess also owns Idaho Minerals, LLC, which mined, expanded and processed perlite for a variety of uses, including horticulture, insulation, and others.

Bear River Zeolite Company operated a zeolite mine seven miles east of Preston in the southeastern corner of the state. The company is a wholly owned subsidiary of U.S. Antimony Corporation, headquartered in Montana. The open pit mine worked a large deposit of high quality clinoptilolite from a standard open pit operation. The zeolite was processed using a variety of crushers, dryers, screens, and a Raymond mill into specifications for numerous markets. Major uses included animal feed, filtration, soil amendments, spill remediation, and others. Business was stable.

## ENERGY

### OIL AND GAS EXPLORATION

In 2010 a joint venture operated by Bridge Resources drilled eleven wells near the town of New Plymouth in Payette County. They announced commercial quantities of oil and gas in seven of



those, with four of the wells likely to require “mini-fracking” to achieve production (Figure 10). Idaho’s regulations for hydrocarbon production were decades old, and the State recognized the need for revising Idaho’s regulations to better incorporate modern technology, current administrative entities, improved environmental oversight, and other updates. Under the direction of the Idaho Department of Lands, new regulations and rules were written and approved as temporary in April, 2011. The new negotiated regulations were officially approved by the Idaho Land Board in November, and subsequently adopted by the Idaho Legislature during the 2012 session. They clarify that the State is the dominant regulator for oil and gas exploration and also include rules and requirements for drilling and hydrocarbon extraction, including the utilization and oversight of fracking technology.

However, during 2011, Bridge Resources encountered financial problems related to some of their business ventures in the North Sea. By late in the year, Bridge had decided to sell their assets in Idaho, including the leases which they had permitted for exploration work.

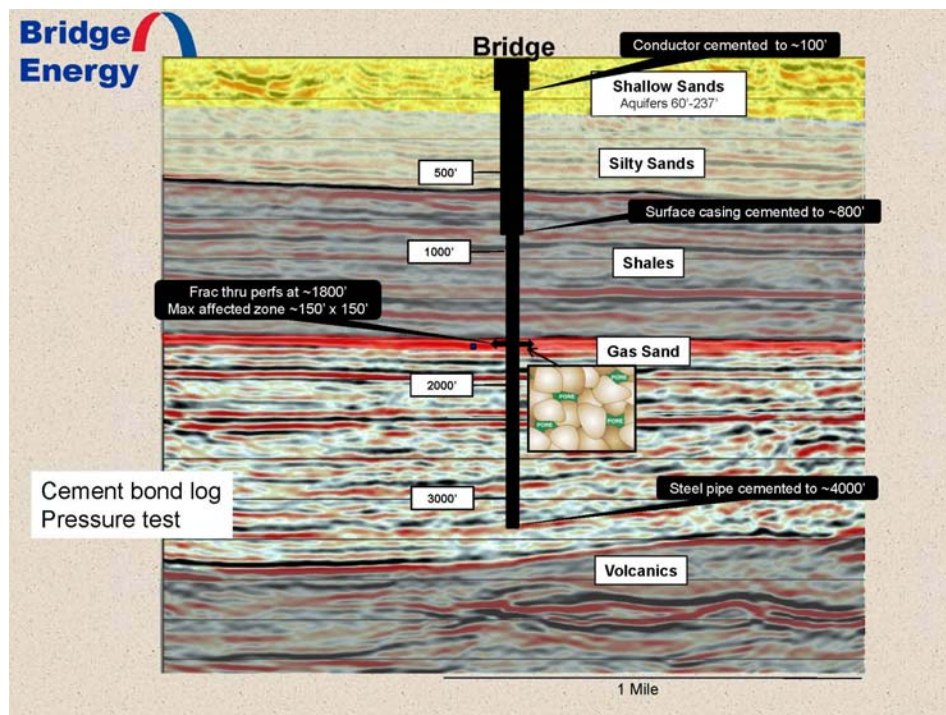
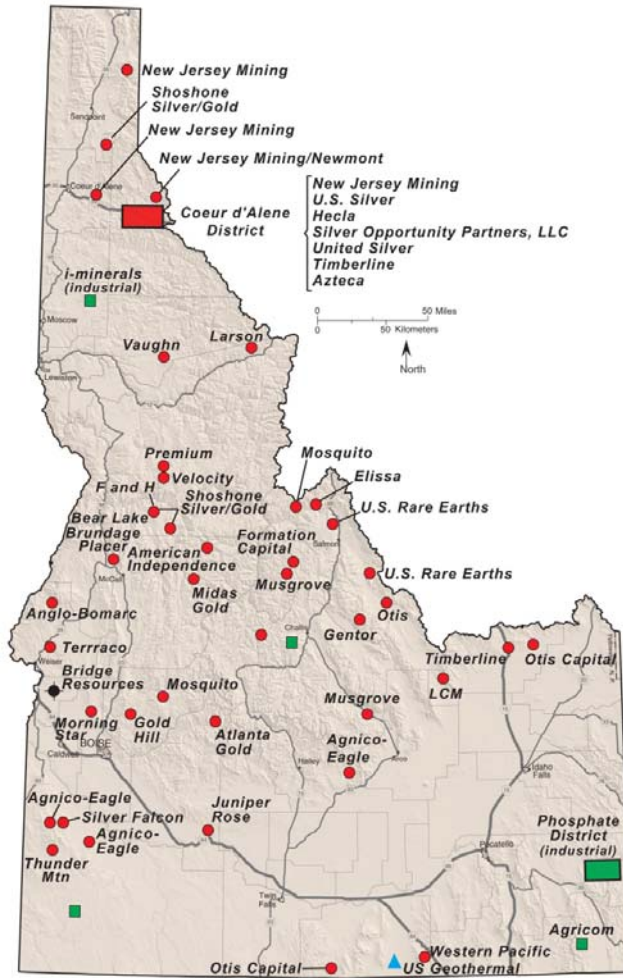


Figure 10. Schematic stratigraphic and seismic section through exploration well at New Plymouth discovery by Bridge Resources; from corporate presentation of Bridge Energy, February 15, 2011.

## EXPLORATION

Figure 11 shows the location of the many mineral exploration projects active in Idaho during 2011. The strong level of activity was an indication of high precious metal prices, Idaho's excellent geologic potential, and favorable results from exploration during the prior year. Gold and silver were the major target commodities, but there was also interest in molybdenum, cobalt, copper-lead-zinc, rare earths, clay, garnet, and phosphate (see above). In general, 2011 demonstrated an increase in both the number of active Idaho projects and the amount of drilling and other work done on the same project versus 2010. The mood was particularly optimistic during the summer months when much of the work is completed or committed to. However, financing difficulties and concern over future metal prices and global economic activity did restrain some work plans.



EXPLORATION 2011

Figure 11. Location of mineral and energy exploration projects in Idaho, 2011.



## NORTH IDAHO

One of the few industrial mineral projects was that of i-minerals at its Bovill kaolin-halloysite-quartz-feldspar property in Latah County. The company completed an additional 21 core holes at the WBL Pit area and 45 holes at Middle Ridge in a development program designed to move more clay tonnage into the indicated category at the historic clay producer. Metallurgical separation of the clay types is being done with techniques developed at the University of Idaho's Moscow campus, which is located a short distance from Bovill. The objective is identification of higher value, halloysite-rich sections of the deposit. An inferred resource of 38.4 million short tons and favorable results of a preliminary economic analysis, done by SRK Consulting (US) Inc., for the project were announced in December.

With silver prices going up, there was substantial interest and action in the Silver Valley. Hecla Mining Company owns approximately 25 square miles of land in the Silver Valley, north and east of Wallace. In addition to work at their Lucky Friday mine, Hecla started exploration of their additional holdings a few years ago by first digitizing all the old workings into a 3-D computer model. The result was an abundance of exploration targets, both adjacent to historic producers and district-wide. Exploration in 2011 focused on the Burke Canyon and Star mine areas (Figure 12). The Star-Morning mine produced ore from 1891 to 1982 and was over 7900 feet deep and nearly a mile long in extent from the zinc-rich Star mine on the west to the lead-silver-rich Morning mine to the east.

Hecla rehabilitated the 2000 level of the Star mine and drilled approximately 10,000 feet of core from underground to test several veins, intersecting mineralization on the Noonday, Noonday Split, As You Like It, and others (Figure 13). They also drilled from surface in the Star mine area. Multiple intercepts on the Noonday and others ran 1-10 feet of multiple ounces silver per ton and over 10% lead or zinc mineralization. With 16 holes on the Noonday veins, Hecla counted a resource of 3.8 million ounces silver, plus lead and zinc, based on the 2011 program. Additional surface sampling and mapping was also underway on Hecla's property. Work was continuing into 2012 on the Star.

United Silver Corporation, formerly the United Mining Group, was earning an 80% interest in the Crescent Silver Mine project. Gold Finder Explorations, Ltd., formerly known as SNS Precious Metals Inc., holds the remaining 20% of the property. The Crescent mine is located just across the gulch from the famous Sunshine silver mine. United Mining has spent about \$ 9 million on exploration to earn the 80%, principally in development of the Countess Portal and underground drifting and drilling to evaluate the Alhambra and South vein resources. A sizeable block of additional claims, extending towards the Bunker Hill mine to the west, and a block to the east, towards the Sunshine mine, was acquired in late 2010. In mid-2011, United Silver announced a temporary halt to pre-development activities for additional financial evaluation and analysis. An amended NI 43-101 technical report on Resources at the Crescent was completed by SRK Consulting in September, 2011. Based principally on earlier drilling, it identified about 10 million ounces of silver in the indicated plus inferred categories in high grade veins. In December, United announced a two-year agreement with Formation Metals U.S. to sell silver concentrates to Formation's precious metals refinery at Kellogg.

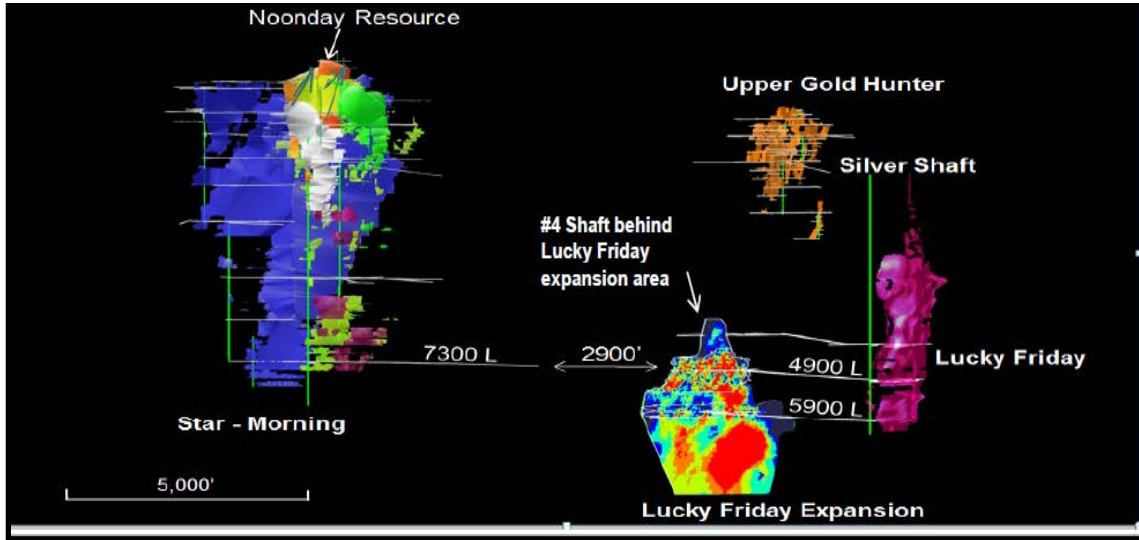
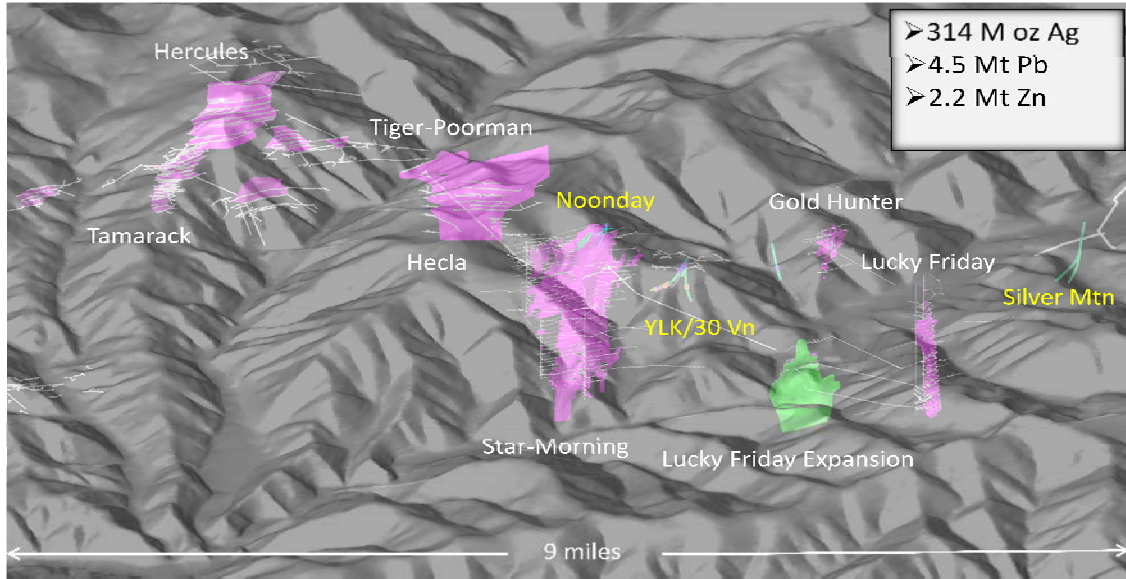


Figure 12. Map and longitudinal section (looking N) of Hecla's exploration properties; graphics from Hecla Mining Company presentations.

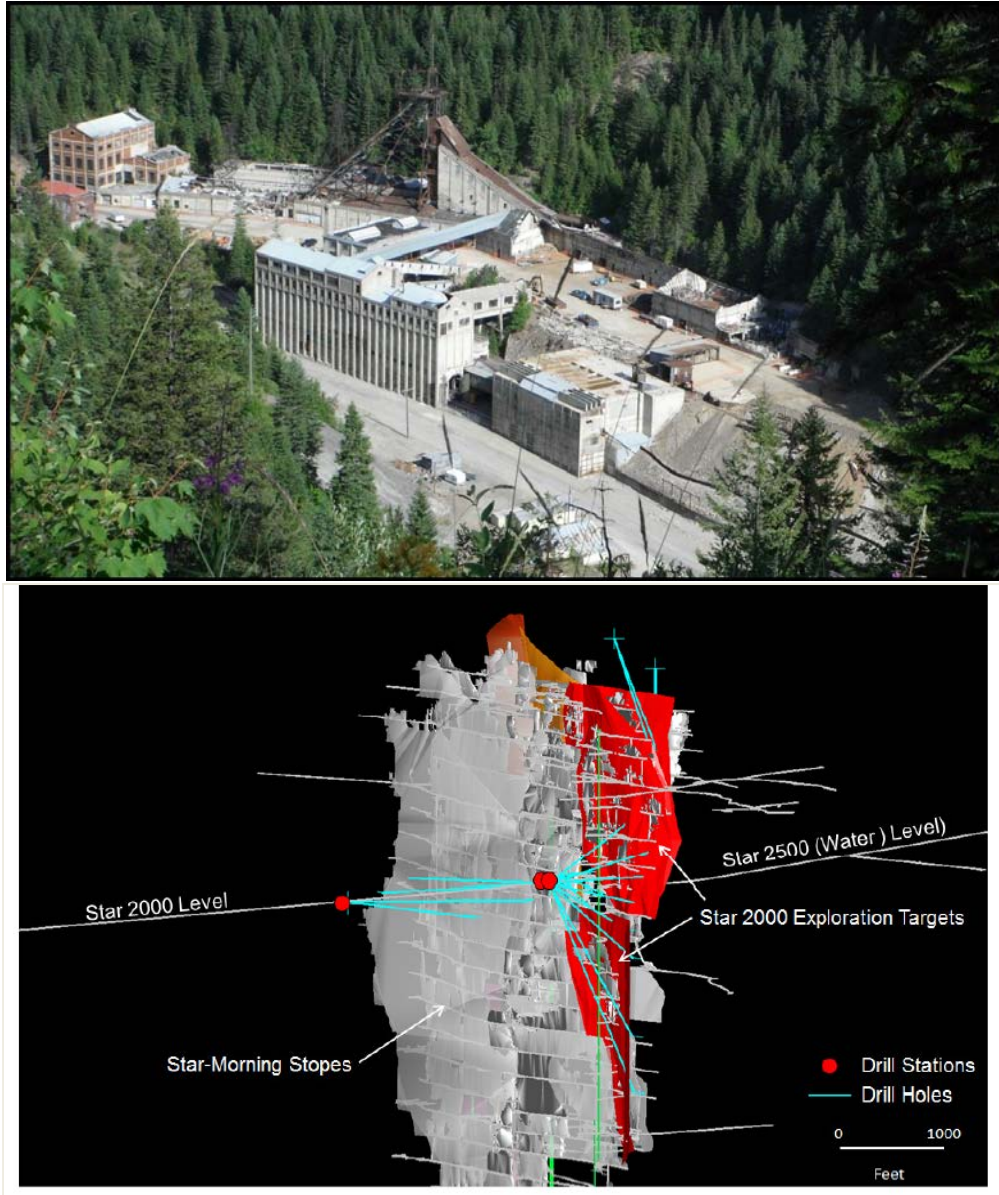


Figure 13. Hecla's Star mine in Burke Canyon and Star 2000 level drilling program, 2011; mine photo by E.H. Bennett and Star graphics by Hecla Mining Company.

Newmont has been exploring the Toboggan joint venture property near Murray since 2008 and drilled a few holes. They returned the large land package of several gold prospects to its owner, New Jersey Mining Company, during the year. New Jersey retained its interest in the Niagara silver-copper property.

The Elk City and Orogrande area in Idaho County is another one of the state's historic gold-producers, with over 800,000 ounces of placer and minor lode production. Modern exploration started in the 1970's and a small, open pit oxide resource was permitted in the 1990's before the gold price dropped. Premium Exploration acquired the Orogrande/Petsite property in 2008-9 after reviewing historic data and prior drill information from Cyprus Amax, Kinross and others. Historic mines and Premium's drilling are localized along the 30-km long Orogrande Shear Zone (Figure 14). In 2011, Premium drilled 10,888 meters of the 25,000 meter Phase Four program in addition to conducting surface geochemical sampling. Using a combination of detailed geophysics, surface geochemistry and geology for targeting, they have encountered significant gold mineralization at multiple zones and report eight discoveries at their Idaho Gold Project. Mineralization is structurally-controlled and associated with a low sulfidation system, principally hosted in sheared and sericitic-altered granitic rocks of the Idaho Batholith. A NI 43-101 compliant resource of over a million ounces, indicated and inferred, with grades close to 1 g/t has been reported, and drilling was continuing.

## CENTRAL AND EASTERN IDAHO

Formation Metals Inc. started construction on both parts of its Idaho Cobalt Project, composed of a new underground mine in Lemhi County and a hydrometallurgical plant at Kellogg in Shoshone County. Permits for the Cu-Co-Au mine in the historic Blackbird Mining District were received at the end of 2009, and the company spent 2011 working on financing and optimizing the mine plan and block model. Site preparation was delayed by the heavy winter snowfall, but the summer work included pads and excavations for the concentrator, crusher, stockpiles, tailings impoundment and other facilities (Figure 15). Improvement of the main access road from the town of Salmon was nearly complete, and three geotechnical holes were drilled at the portal location. Near Kellogg, the former Sunshine refinery, now owned by Formation and used as a precious metals refinery, was undergoing expansion and modification to be ready to process the cobalt concentrates. A Bank of Montreal Letter of Credit for \$ 43.6 million of bonds was secured in November. Announced reserves for the underground mine are sufficient for a ten-year mine life, but drilling results received in early 2011 expanded economic mineralization along strike. In addition, there is considerable potential to block out additional resources in the district.

Musgrove Minerals completed 24 infill RC holes and one core hole at the Empire mine project near Mackay in Custer County. The deposit is a Cu-Zn skarn with a silver credit. Musgrove also holds the Musgrove Creek gold deposit in Lemhi County. Elissa Resources drilled four holes at



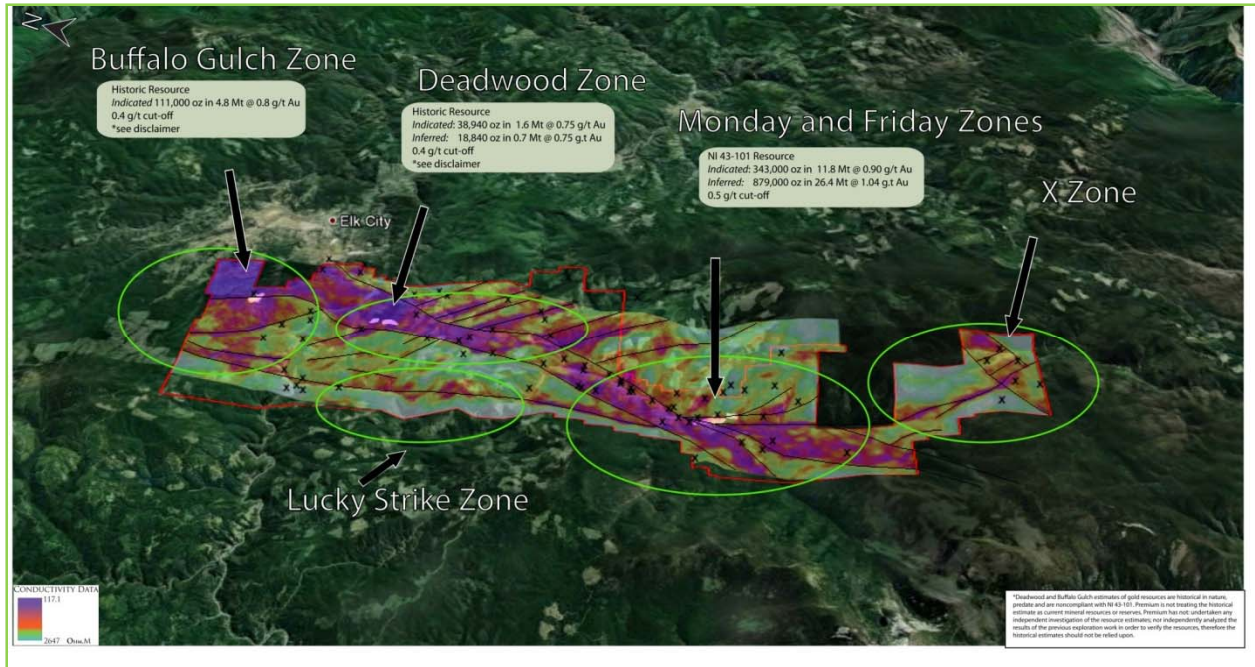


Figure 14. Orogrande Shear Zone, with Premium Exploration’s Mineralized Zones.



Figure 15. Idaho Cobalt Project under construction by Formation Metals, Lemhi County.

the Sage Creek stratabound gold prospect in Lemhi County and staked claims to explore rare earth mineralization in the vicinity. Shoshone Silver was working at the Rescue mine and mill located near Warren. Anglo-Bomarc Mines Ltd. was exploring the Hercules silver mine on Cuddy Mountain in Washington County. Morning Star was drilling the gold-bearing quartz veins of the Pearl District. U.S. Rare Earths maintained claims on their properties at Lemhi Pass and Diamond Creek in Lemhi County. Silver Falcon Mining was milling historic waste dumps from mines on War Eagle Mountain in Owyhee County. Several small placer operations were also working.

Otis Gold continued work on their Kilgore project in Clark County. Epithermal gold-silver mineralization is hosted in Tertiary rhyolites and tuffs. Otis drilled 40 core holes totaling about 9200 meters (30,246 feet), including two metallurgical holes. The program included soil sampling plus new in-fill drilling on the Mine Ridge deposit, but also much review and reinterpretation of the extensive library of past drill work into a new geologic model. Over 60,000 feet of drilling has been completed in the past three years.

Midas Gold Corporation became a public company in April, 2011; its major asset being the combined land holdings of the Yellow Pine property (recently of Vista Gold) and the formerly private Oberbillig property, thus consolidating the historic Stibnite-Yellow Pine Mining District in Valley County. Midas refers to the property as the Golden Meadows project. The Stibnite district supplied the nation's tungsten and antimony during World War II, with several seasonal, oxide gold mines also operating from 1984 to 1995. Midas has identified at least three major deposits in the district: Hangar Flats, Yellow Pine, and West End, plus several satellite deposits. The company had four core rigs and one RC drill rig working with helicopter support for most of the 2011 season. A total of 107 exploration holes totaling 23,860 meters were completed during the 2011 field season. That includes 13,327 meters of core. Gold intercepts were typically 1 to 4 g/t over tens of meters with a number of plus 100-meter zones of mineralization encountered (Figure 16). Mineralization is structurally controlled along the complex Meadow Creek Fault Zone in granodiorite and calc-silicate rocks. Total expenditures on exploration and drilling were just under \$ 20 million with approximately \$ 4 million spent on logistics, metallurgy, engineering, permitting and other necessary activities. A number of local people from Valley County were employed on the project.

Western Pacific Resources Corporation drilled 35 holes at their Mineral Gulch project in Cassia County. Mineral Gulch is the site of the former Black Pine mine which produced over 500,000 ounces of gold from several open pits. Pegasus mined the deposit after acquiring it from Noranda in 1990. Western Pacific tested soil anomalies in areas outside of the known pits. A number of holes encountered anomalous gold with some higher grades such as MGR11-017 intersecting 7.6 m of 3.59 g/t gold. The company applied for a permit to do additional drilling.

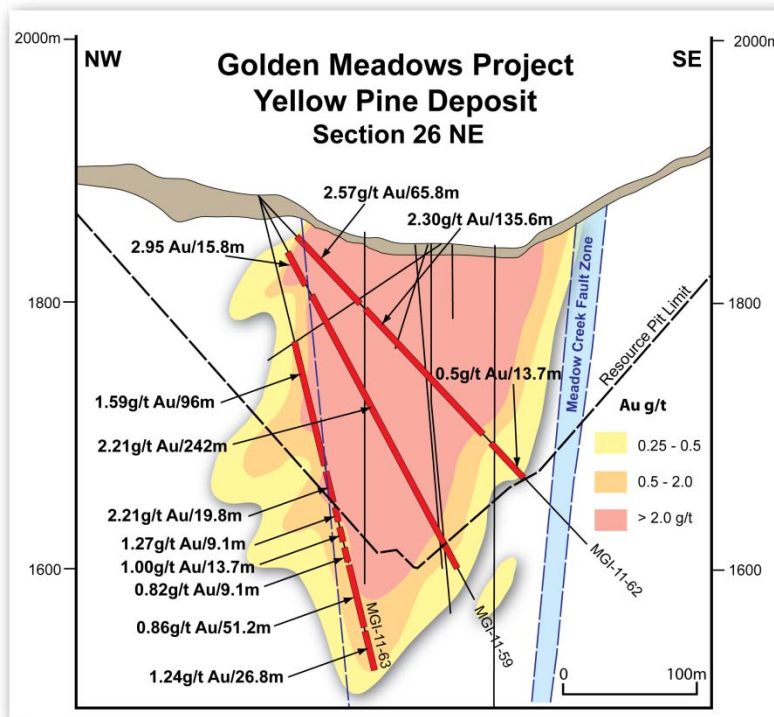
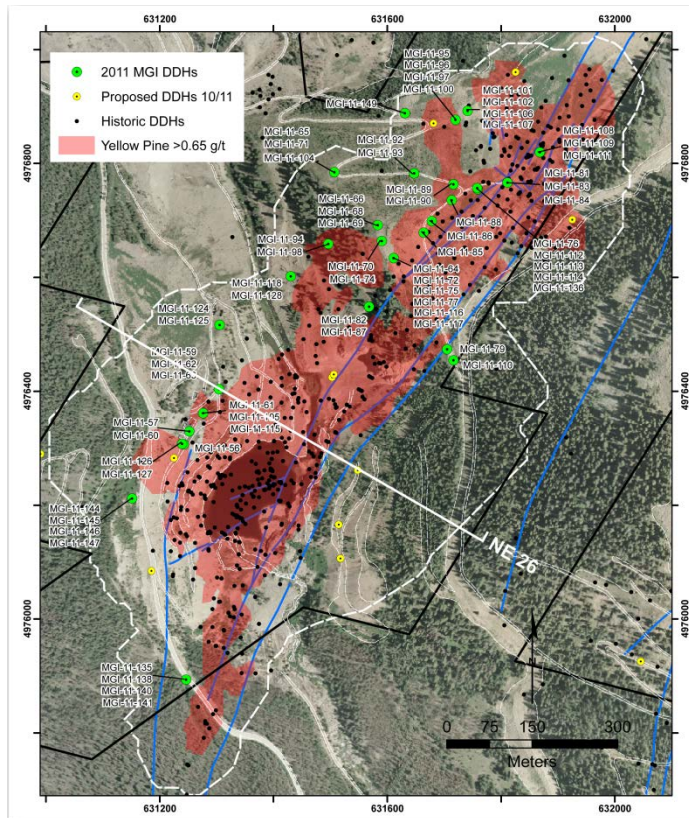


Figure 16. Yellow Pine deposit of Midas Gold, map with drill section, 2011.



## SOUTHWESTERN IDAHO

Atlanta Gold Inc. had a large drilling program at its precious metal deposit above the historic mining town of Atlanta in Elmore County. The company drilled approximately 57,000 feet (17,350 m.) in its 2011 core drilling program. The two-year total is 86,000 feet. Infill drilling of 16 holes extended mineralization down dip below the proposed Monarch pit and along strike to the east, suggesting potential to merge the Monarch Zone and the East Extension Zone into a single open pit. Results included several holes with intercepts of 1 to 12 meters true width assaying 1 to 5 g/t gold, with occasional intervals assaying over 15 g/t gold. Results will be used to update the resource estimate. The company was also in discussions with the agencies over plans to remediate arsenic-bearing mine discharge from old workings.

Thunder Mountain Gold was evaluating their 2010 drilling results on the intrusive breccias with anomalous gold at South Mountain, as well as the high grade polymetallic skarn mineralization in the Laxey underground zone. They were also seeking financing.

Terraco Gold Corp. was drilling on their 100% owned Almaden project on Nutmeg Mountain east of Weiser in Washington County. The advanced-stage project is located at the historic Idaho Almaden mercury mine, which also hosts gold mineralization deposited by a paleo hot spring system. Terraco drilled 16 HQ3 holes for a total of 5,492 m (18,020 feet) at the property (Figure 17). Several holes went to 610 m depth. Results from the core drilling showed locally improved average grade-thickness over previous rotary drilling and confirmed the significant gold values in the top 91 meters of a tabular deposit. The previous NI 43-101 compliant total resource has 948,000 ounces at an average grade of 0.020 opt gold (0.69 g/t). Terraco was updating the resource and planning for 2012. The company also drilled exploratory holes in Stinking Water Basin to the north, but mineralization encountered there is within landslide deposits.



Figure 17. Terraco drill rig at Almaden project, 2011.



Gold Hill Mining and Reclamation had leased the historic Gold Hill mine at Quartzburg in Boise County. The underground mine was the largest lode producer of the Boise Basin, Idaho's most prolific historic gold district. Mining at the Gold Hill stopped in 1938. The company has been looking at exploration options since 2009, as well as evaluating the large waste dumps at the property. Testing indicated the dumps contained significant gold (as well as pyrite) left over from the old milling. Gold Hill was constructing a custom-built, placer-type processing plant, utilizing essentially a large sluice to recover gold and sulfides.

Mosquito Consolidated Gold Mines started core drilling at the end of August at Cumo, a very large molybdenum-(copper) porphyry deposit located north of Boise in Boise County. Work was delayed by an appeal from environmental groups against the U.S. Forest Service's Environmental Assessment allowing additional exploratory drilling at the site. The company was also seeking financing to assist with development of the over 2 billion ton deposit. Drilling of two holes was completed during the fall before a hiatus. But in December, a dissident group, which included the former exploration manager, started a complicated shareholder battle with company management. The legal conflict continued into 2012.

## STATE ACTIVITIES

The Idaho Geological Survey's primary portal to the public was their website, [www.idahogeology.org](http://www.idahogeology.org), with almost all publications available as digital documents. Areas of past and current geologic mapping can be viewed on the website. Statemap, a joint federal/state program, continued to be the primary funding source, but a contract with the Idaho Department of Water Resources funded mapping and a hydrogeologic study of the Mayfield area east of Boise. A contract with the Idaho Department of Transportation to study aggregate and its susceptibility to alkali-silica reactivity was also underway. Multiple types of information on Idaho's geothermal resources were being put into a large database under the auspices of a DOE funded project, with drilling of a few thermal gradient wells also planned. Other activities included developing a searchable digital database of oil and gas wells, data preservation of minerals and energy records, mapping and mitigation of natural hazards, and reporting on Idaho's active mining and exploration industry.