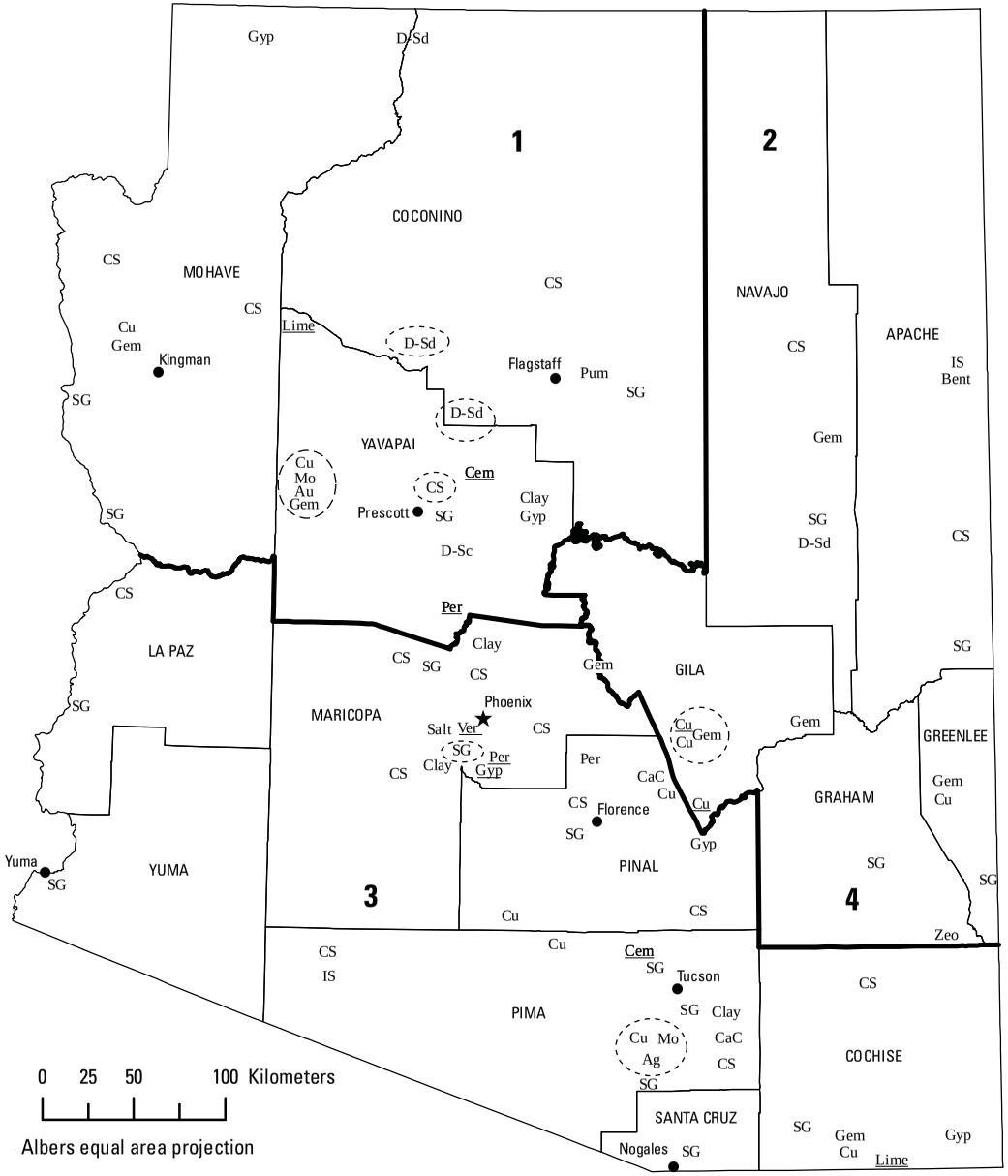
2006 Minerals Yearbook

ARIZONA

U.S. Department of the Interior
U.S. Geological Survey

July 2009

ARIZONA



LEGEND

County boundary

Capital

City

1 Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS
(Major producing areas)

Ag	Silver
Au	Gold
CaC	Calcium carbonate
Cem	Cement plant
Clay	Common clay
CS	Crushed stone
Cu	Copper
Cu	Copper plant
D-Sd	Dimension sandstone
D-Sc	Dimension schist/onyx
Gem	Gemstones
Gyp	Gypsum
Gyp	Gypsum plant
IS	Industrial sand
Lime	Lime plant
MgCp	Magnesium compounds plant
Mo	Molybdenum
Per	Perlite
Per	Perlite plant
Pum	Pumice and pumicite
Salt	Salt
SG	Construction sand and gravel
Ver	Vermiculite plant
Zeo	Zeolites

Concentration of mineral operations

Source: Arizona Department of Mines and Mineral Resources/U.S. Geological Survey (2006).

The Mineral Industry of Arizona

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Arizona Department of Mines and Mineral Resources for collecting information on all nonfuel minerals.

In 2006, Arizona's nonfuel raw mineral production[1] was valued at $6.74 billion, based upon annual U.S. Geological Survey (USGS) data. This was nearly $2.4 billion, or 55%, higher than the State's total nonfuel mineral value in 2005, and more than double, $3.4 billion higher, the value of production in 2004. In 2006, for the second consecutive year, Arizona led the Nation in total nonfuel mineral production value among the 50 States, accounting for more than 10% of the U.S. total.

Arizona continued to be the Nation's leading copper-producing State in 2006 and accounted for nearly 64% of total U.S. copper mine production. Copper was the State's foremost nonfuel mineral produced, accounting for about 73% of the total nonfuel mineral production value, followed in descending order of value by molybdenum, construction sand and gravel (with nearly 10% of the State's total value), cement (portland and masonry), crushed stone (more than 1.5% of the value), and lime (table 1). Arizona's substantial increase in value in 2006 primarily resulted from the increased values of copper, construction sand and gravel, and crushed stone. With only a 3% increase in copper production, the commodity's production value rose about 87%, or slightly more than $2.3 billion, owing to a sharp rise in copper prices. The value of construction sand and gravel production increased by $146 million, a 28% increase from that of 2005, resulting from a nearly 11% rise in production and a significant increase in unit value. Higher unit values and a 9% increase in the production of crushed stone resulted in a $30 million, or 41% rise in its value of production (table 1). Smaller yet significant increases also took place (in descending order of change), in silver (up by about $9 million), crude gypsum, lime, and cement, the unit values of each also rising. The largest decrease in value took place in the production value of molybdenum; with a minimal increase in production, its value decreased by more than $100 million.

In 2006, Arizona continued to lead the Nation in the quantity of copper produced and remained first in the production of pumice and pumicite, third in that of crude perlite, fourth in zeolites, and sixth in dimension stone (dimension sandstone). The State rose in rank in the production of two nonfuel mineral commodities—to 6th from 7th in silver and to 9th from 15th in crude gypsum—and was tied for 10th in the production of lime. Arizona decreased in rank to third from first in the production of molybdenum concentrates, to third from second in construction sand and gravel, and to third from second in gemstones (gemstones based upon value). Additionally, the State continued to be a significant producer of, in descending order of value, portland cement, crushed stone, and masonry cement.

The Arizona Department of Mines and Mineral Resources[2] (ADMMR) provided the following narrative information. Data presented in ADMMR reports may differ somewhat from data reported by the USGS in table 1.

Commodity Review

Industrial Minerals

Gypsum.—National Gypsum announced plans to build a state-of-the-art $140 million wallboard plant at Eloy, midway between Phoenix and Tucson (National Gypsum Corp. 2006). The plant was expected to be operational by mid-2008 and will create 100 jobs. The plant's capability was expected to produce 93 million square meters per year of wallboard, enough to complete 100,000 average-sized homes. The site chosen is close to the gypsum quarries located in the San Pedro Valley, near the junction of Interstate Highways 8 and 10 and has rail access. The Eloy plant will serve regional markets from Los Angeles to Albuquerque by truck and distant markets such as Boise and Seattle by rail. Georgia Pacific has opened new gypsum quarries on Arizona Strip State land in northern Arizona. The new quarries were expected to become the largest producers of mineral revenue on State trust lands. The gypsum mined from these quarries will be used in wallboard production for the Las Vegas market.

Limestone.—In November, Drake Cement LLC received a decision for Cedar Glade, a proposed limestone quarry near Drake, in north central Arizona. After reviewing its environmental assessment, the U.S.D.A. Forest Service Prescott National Forest staff found no significant impact. Drake Cement LLC plans to extract up to 907,000 metric tons per year (t/yr) of limestone for a proposed cement plant.

Metals

Copper.—Copper contributed significantly to the dramatic rise in the value of the State's mineral production. Increased production at Mission Mine in Pima County and the other major mines was enough to offset a large decline in production at Bagdad Mine in Yavapai County. Arizona's copper production rose for the first time since 1997.

Phelps Dodge's mines accounted for nearly three-fourths of Arizona's copper production. The Morenci Mine in Greenlee County is the leading copper-producing complex in the United States. In 2006, the mine produced 370,000 metric tons (t) [816

[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2006 USGS mineral production data published in this chapter are those available as of March 2008. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Nyal J. Niemuth, Mining Engineer, authored the text of the State mineral industry information provided by the Arizona Department of Mines and Mineral Resources.

million pounds (Mlbs)] of copper, more than one-half of the total copper production. After being an all leach operation since 2001, copper flotation concentration resumed in the second quarter. Phelps Dodge installed two pressure leach vessels at the world's first commercial scale concentrate-leach, direct electrowinning plant. The pressure leaching plant, which will use medium-temperature technology (160° C) was projected to begin operation in mid-2007 with a capacity of 68,000 t/yr (150 Mlbs). This process generates significantly less sulfuric acid than the high temperature process used at the Bagdad Mine, but requires less oxygen. Morenci's mining capacity was expected to reach 790,000 metric tons per day (t/day) by mid-2007 for the combined leach and mill operation.

Phelps Dodge also operated the State's third and fourth largest copper mines, which also recovered large amounts of byproduct molybdenum. In 2006, the Bagdad Mine recovered 50,000 t (10.3 Mlbs) of molybdenum, while the Sierrita Mine in Pima County being Arizona's largest mill with capacity of 102,000 t recovered 9,000 t (20 Mlbs) of molybdenum. The Sierrita Mine operates two molybdenum roasters, a rhenium processing facility, and a copper sulfate plant. That plant produced 3,800 t (8.3 Mlbs) of copper sulfate containing 25% copper. In addition to its proven and probable reserves of 907 Mt grading 0.26% copper and 0.03% molybdenum, Sierrita also has 2.4 billion metric tons (Gt) of mineralized material grading 0.21% copper and 0.02% molybdenum.

In July, the Safford project in Graham County received its final required permit, an air quality permit from the Arizona Department of Environmental Quality. Shortly thereafter, construction began on the first major open pit copper mine since the San Manual open pit mine and leach operation opened in 1986. In 2006, Phelps Dodge invested $550 million to build the two new open pits, Dos Pobres and San Juan, and a heap-leach extraction-electrowinning (SX-EW) facility. Production is anticipated to begin in mid-2008 and reach an annual rate of 110,000 t/yr electrowinning copper. An 18-year life was expected for the deposits' combined 488 Mt that contain an average of 0.37% copper. The planned crushing facility will have a design rate of 103,000 t/day of ore, while mining capacity will probably be 285,000 t/day. The development is expected to have a major positive impact on the local economy by generating approximately 500 construction and 500 permanent jobs. A major drilling program was conducted at the Lone Star deposit area about 6 kilometers (km) from the Dos Pobres Pit.

Asarco LLC benefited not only from higher prices, but continued operation under the protection of the U.S. Federal Bankruptcy Court. Asarco LLC's three mines produced 170,000 t of copper including Mitsui & Company's share of Silver Bell Mining, LLC in Pima County. Asarco LLC had a net income of $571 million and had cash assets of $497 million at yearend. The company received court approval to spend some of those assets on operating equipment. A new labor contract was negotiated that provided not only improved wages and benefits for the workers, but also required any buyer to honor the union contract in the event the company is sold.

In June, Asarco LLC ordered nine 363-metric-ton Liebherr T282B trucks for the Ray Mine in Pinal County that were scheduled for early 2007 delivery. These would be the largest capacity haul trucks in Arizona. The Ray Mine typically moves ore at a rate of 227,000 t/day. The Mission Mine in Pima County could benefit by getting surplus trucks from the Ray Mine in order to further increase its production. Asarco LLC Inc. purchased the Copper Basin Railway for $11.5 million. The railway connects the Ray Mine to the Hayden Mill and smelter complex and has 60 km of rail connecting to the mainline. Production at the Mission Mine increased by140%, reaching the highest level since 2001. Production of molybdenum resumed in December following a $775,000 expenditure for refurbishing the facility and hiring 17 new employees. The Mission Mine is expected to recover 204 t/yr (450,000 lbs) of molybdenum.

Resolution Copper Mining continued drilling on the deep, high-grade Resolution Copper deposit in Pinal County. By yearend, only about 50 drill holes had been completed owing to limited access and the required directional drilling that slows exploration. An aggressive drill campaign was planned for the next 3 years to prepare for a prefeasibility study. At the Mineral Park Mine, in Mohave County, Mercator Minerals Ltd.'s improvements to the SX-EW plant led to production of 4,300 t (9.5 Mlbs) of copper or a 48% increase from that of 2005. In December, Mercator published an updated preliminary feasibility study for a proposed milling operation at Mineral Park to produce copper and molybdenum concentrates. Mercator had planned to install a 33,600 t/day milling operation using Asarco's inactive Mission South Mill. Asarco LLC challenged that purchase in the Federal U.S. Bankruptcy Court, even though the purchase was made prior to Asarco's declaration of bankruptcy.

Mercator Minerals Ltd. decided to proceed with an even larger expansion. In December, it placed orders for two new 7,500-horsepower ball mills and three used 10-meter semiautogenous grinding mills with a projected capacity of 45,000 t/day. When the expansion is completed, annual mill recovery of more than 26,000 t (57 Mlbs) of copper and 5,700 t (13 Mlbs) of molybdenum is expected. A preliminary feasibility study reported proven and probable mill reserves of 396 Mt having a copper equivalent grade of 0.38%. In November, Quadra Mining Ltd.'s board approved raising money to construct the Carlota open pit, leach, SX-EW project. Initial capital costs were estimated to be $128 million. The solvent extraction plant (formerly used at the San Manuel Mine) acquired as part of the purchase from Cambior Inc. in 2005 was onsite, while the mining equipment were expected to arrive and be assembled. The estimated resources are 80 Mt grading 0.45% copper, enough for a 9-year mine life at a production rate of 30,000 t/yr (66 Mlbs).

Bell Resources Co. and Redhawk Resources, Inc. explored the Copper Creek District southeast of Phoenix. Redhawk Resources Inc. in Pinal County has acquired a large portion of this district consisting of high-level breccia pipes and lower level porphyry copper targets. The company conducted a relogging and sampling program of 24,000 meters (m) of core to complete a resource estimate for the Mammoth, Childs-Aldwinkle, Old Reliable, and Keel Zones. Redhawk Resources Inc. announced a 3,000-m core drilling program to begin at the Mammoth deposit. Goals were to expand the deposit, test the

deeper Keel Zone, and drill across the breccia structure to test contact zones. Bell Resources Corporation began a 10-hole, 1,400-m diamond drill program on the Sombrero Butte property including portions acquired from Silver Nickel Mining. Results included grades of 4.7% copper over more than a 20-m interval. These and other results encouraged the company to extend the drilling program into 2007. Bell Resources Corp. also conducted airborne and IP geophysics along with geochemistry studies to identify drill targets at its Kabba porphyry copper target in Mohave County. Based on these investigations from a database of 447 holes representing 34,500 m of previous drilling, there may be a resource of 57 Mt of 0.37% copper. The company decided to focus its efforts on the larger leach potential here rather than at the smaller Emerald Isle project.

General Minerals Corp. optioned the Monitor property, located near the Ray Mine, to Teck Cominco Ltd. that completed a six-hole, 1,160-m diamond drill program to test previously identified copper and silver targets. Teck Cominco Ltd. dropped its interest after releasing mixed drilling results. Big Bar Gold optioned the nearby Troy prospect from Silver Nickel Mining. Big Bar Gold Corp. completed a 19-hole diamond drill program at Yuma King that extended known mineralization in the small, but high-grade (3.0%), copper deposit. Aurelio Resources Corp. signed a purchase agreement to acquire Hope Mining Company Inc. and Milling's patented mining claims at Courtland Gleason and announced approximately 45 Mt of near-surface copper oxide resources. The company began a 2,300-m core-drilling program designed to confirm and expand prior work from 170 historic drill holes from the MAN and Courtland properties.

Lone Tree Exploration LLC acquired the Sheep Mountain property and assembled historic exploration and drill data. Effects of structural complexities and Miocene volcanism indicate areas of continued exploration. Lebon Gold Mines Limited optioned a second area of mineralization to the west from MinQuest Inc. A drill program of 3 to 8 holes was scheduled to begin in early 2007. In addition to Phelps Dodge, a number of other companies were active in the Safford District. Franconia Minerals Corp. started a core-drilling program at the Red Knoll property in Graham County as a followup on a 4-line, 17-km geophysical survey. Four drill holes totaling 3,000 m are planned. General Minerals Corp. optioned the Markham Wash property to Teck Cominco Ltd. Nord Resources Corp. will be doing initial planning work followed by drilling in 2007 on the Coyote Springs property. Southwest Exploration Services LLC completed work identifying three targets for additional exploration. They include the untested Mine Wash in the northwestern portion of the district, Safford West covering an IP anomaly buried by younger alluvium, and the Teague Springs prospect.

Gold and Silver.—American Bonanza Gold Corp. completed a 40,000-meter diamond drill program at the detachment-hosted Copperstone deposit in La Paz County in February 2006 and announced resources of 10,000 kilograms (kg) (330,000 troy ounces) of gold. There are plans to test 10 geophysical and structural step-out target zones that have the potential of adding significant mineralization. The initial drill phase planned an estimated 23,000 m in 50 holes. Six of the targets tested returned results that warrant followup drilling. On a parallel path with the exploration program, the company collected environmental, geotechnical, hydrological, and metallurgical baseline data to support mine permitting and project design.

Comcorp Ventures Inc. spent $10 million to acquire 80% of Arizona Minerals Inc., a private Nevada company, to gain control of the Hardshell Mine in Santa Cruz County. A previous resource assessment by Asarco Inc. identified 2,100 t (67 million troy ounces) of silver. The company, now called Wildcat Silver Corp., plans drilling to confirm this estimate.

Environmental Issues, Reclamation and Related Technological Activities

Augusta Resources continued with an aggressive schedule for exploration of the Rosemont project in Pima County. Although the project contains four deposits, work has focused on advancing the Rosemont porphyry skarn occurrence with 493 Mt and a 0.75% Cu equivalent grade. A 20,000-m diamond drill program was conducted by Augusta Resources to better define areas of oxide mineralization, provide information on gold and silver grades, and obtain geotechnical information to support open pit slope design. The company acquired the rights to use Central Arizona Project water for the project and plans to begin storing water underground in 2007. Dry tailings disposal was planned to conserve water, and high carbonate waste rock was to be used to eliminate dust and future acid mine drainage concerns. A preliminary plan of operations was submitted to the U.S. Forest Service Coronado National Forest for leach, mill, and waste facilities.

BHP Billiton worked toward reopening the Pinto Valley Mine, Gila County, in 2007 with plans to mine slice number 6. This portion of the mine is expected to provide 5 years of feed for the mill. BHP Billiton and Carlota Copper Co. (a subsidiary of Quadra Mining Ltd.) began cleanup of the Gibson Mine acid mine drainage located above the property. As part of the $2.5 million cleanup of Pinto Creek, about 109,000 t of sulfide material was moved from the Gibson Mine to Pinto Valley. The Franciscan Friars of California own the Gibson Mine, but BHP and Quadra provided funds for the project. Underground work was initiated to refurbish and extend the Neversweat Tunnel in preparation for the deepening of the number 9 shaft and sinking of the number 10 shaft.

The Arizona Legislature passed a bill that would create the Tam O'Shanter Park, a climbing area to compensate for the loss of climbing areas at Oak Flats. El Paso Natural Gas Co. (a subsidiary of El Paso Corp.) announced plans to construct an underground natural gas storage facility near Eloy (El Paso Natural Gas Company, 2006). The plans called for four underground salt caverns capable of storing 99 million cubic meters of natural gas. The facility will be designed to deliver 9.9 million cubic meters per day of natural gas, enough to meet the energy needs of 735,000 homes. El Paso Natural Gas Co. planned to file an application with the Federal Energy Regulatory Commission for permission to proceed. The first cavern could be in service by mid-2010 and the remaining three caverns by 2011–12. Engelhard Corporation broke ground on a multimillion dollar facility to produce hydro frac sand proppants in Sanders near its Cheto deposit. Proppants are used to enhance

production rates of oil and gas fields. The plant is expected to reach full production in 2007 (Engelhard Corporation, 2006).

Mineral Fuels and Related Materials

Uranium.—Uranium exploration in Arizona continued at a high level. Mining activity was concentrated in three areas, the collapse breccia pipes on the Colorado Plateau, central Arizona, and the Date Creek Basin in west central Arizona. Numerous companies were active acquiring prospective ground hosting high-grade (up to 1%) uranium mineralization in solution collapse breccia pipes. International Uranium Corp. (IUC) merged with Denison Mines Inc. in December. Denison Mines Inc. became a subsidiary of IUC. The new entity known as Denison Mines Corp. IUC anticipated that the developed Arizona One property containing ore grading 0.65% uranium would be in production in the summer 2007. The ore was to be trucked to its White Mesa mill located in southeastern Utah. Denison Mines Inc. IUC controlled the developed Pine Nut and partially developed Canyon Pipe properties that produce ore grading 0.95% uranium. Tournigan Gold Corporation announced results from soil geochemical surveys of more than 65 suspected pipes; positive anomalies were found in more than17 pipes on the north rim (Tournigan Energy Ltd., 2006). Further geophysical investigations are planned. The company acquired additional ground and now controls 84 potential pipe targets.

Liberty Star Uranium and Metals Corp. continued exploration on its extensive holdings with drilling on three of its most appealing targets. Vane Resources has four confirmed breccia pipes and received approval for drilling at its Miller and Red Dike properties on the Coconino Plateau in Coconico County. Quaterra Resources Inc. began a geophysical survey coupled with helicopter-assisted blanket staking of more than 5,000 new claims. The claims have been selectively chosen to cover most of the high priority anomalies in the center of the uranium district. Quaterra Resources Inc. is the first company to extensively test its airborne time domain electromagnetic system in the district. The survey was designed to identify new targets with geophysical signatures that are similar to previously recognized breccia pipes. U.S. Energy has 27 targets to be evaluated. Drilling in early 2006 confirmed two breccia pipes. Quincy Energy Corp. (acquired by Energy Metals Corp.) completed exploratory drilling on the Rose pipe property and is evaluating core samples and logging results.

In central Arizona, several corporations were active in uranium exploration. Golden Patriot Corp. exercised its option to acquire a 60% interest in the Lucky Boy Mine in Gila County after drilling on the property. The company analyzed more than 1.8 t (4,000 lbs) of samples with results showing uranium grades ranging from 0.12% to 0.13%. In the 1950s, the Lucky Boy Mine was one of the first uranium properties to go into production in central Arizona and produced more than 1,800 t of 0.16% ore. The Lucky Boy Mine was one of the last mines to produce in the late 1970s, 4.5 t of U_3O_8 from heap-leach operations. Rodinia Minerals Inc. obtained the rights to explore 40% of the Lucky Boy Mine from Golden Patriot Corp. and also has a joint venture with Patriot on the Mormon Lake Property in Gila County. The company conducted drilling in the Pennsylvanian sediments below Promontory Butte and acquired properties in the Sierra Ancha Mountains. Previous production in this area was from the Workman Creek and Red Bluff Mines totaling more than 52 t (115,000 lbs) of U_3O_8. Uranium Core Company agreed to acquire a 75% interest in Rodinia's Suckerite, Pendleton Mesa, Coon Creek, and Oak Creek properties in the same district. In August 2006, Yukon Resources acquired 69 claims contiguous to Rodinia's Workman Creek project and will evaluate and conduct fieldwork.

Exploration in west central Arizona's Date Creek Basin focused on past-producing mines and previously drilled properties. These properties are situated within Miocene lacustrine/paludal sedimentary rocks contained within a disrupted caldera. The uranium mineralization occurs as stratabound units in carbonaceous siltstones and mudstones. Concentric Energy Corp. evaluated extensive historic data from the past-producing Anderson Mine in Yavapai County. The company drilled 23 holes to confirm resources defined during the 1970s. The work completed in late 2006 verified 43% of the historic resource estimates. Universal Uranium Ltd. acquired properties to the west in the Artillery Peak range. The uranium mineralization and stratigraphy is similar to that at the Anderson Uranium Mine (Brooks, 1984).

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TABLE 1

NONFUEL RAW MINERAL PRODUCTION IN ARIZONA[1, 2]

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2004		2005		2006	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, bentonite	W	W	33	1670	34	1710
Copper[3]	723	2,130,000	690	2,640,000	712	4,950,000
Gemstones, natural	NA	1,450	NA	1,370	NA	1,560
Sand and gravel:						
Construction	79,600	430,000	84,900	516,000	94,000	662,000
Industrial	W	792	W	W	W	W
Stone, crushed	14,100	75,900	12,100 r, 4	72,400 r, 4	13,200	102,000
Combined values of cement, clays (common), gold, gypsum (crude), lime, molybdenum concentrates, perlite (crude), pumice and pumicite, salt, silver, stone [crushed traprock (2005), dimension sandstone], zeolites, and values indicated by the symbol W	XX	709,000	XX	1,120,000	XX	1,020,000
Total	XX	3,350,000	XX	4,350,000	XX	6,740,000

[r]Revised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined value" data.
XX Not applicable.

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2]Data are rounded to no more than three significant digits; may not add to totals shown.

[3]Recoverable content of ores, etc.

[4]Excludes certain stones; kind and value included with "Combined values" data.

TABLE 2

ARIZONA: CRUSHED STONE SOLD OR USED, BY KIND[1]

Kind	2005			2006		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone[2]	7	6,340	$34,100 r	7	6,230	$46,400
Marble	1 r	233 r	1,440 r	1	174	1,360
Granite	17	3,440 r	22,700 r	24	3,800	35,000
Traprock	2	W	W	4	436	3,420
Sandstone and quartzite	4 r	582 r	6,790	4	421	3,190
Volcanic cinder and scoria	5	151	827 r	7	86	676
Miscellaneous stone	5 r	1,300 r	6,520 r	16	2,010	12,400
Total	XX	12,100 r	72,400 r	XX	13,200	102,000

[r]Revised. W Withheld to avoid disclosing company proprietary data. XX Not applicable.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes limestone-dolomite reported with no distinction between the two.

TABLE 3

ARIZONA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE[1]

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	23	288
Filter stone	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	(2)	(2)
Bituminous aggregate, coarse	(2)	(2)
Railroad ballast	(2)	(2)
Total	1,010	8,880
Fine aggregate (-⅜ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Coarse and fine aggregates:		
Graded road base or subbase	(2)	(2)
Terrazzo and exposed aggregate	(2)	(2)
Crusher run or fill or waste	(2)	(2)
Other coarse and fine aggregates	553	5,580
Total	1,080	12,400
Other construction materials	10	106
Chemical and metallurgical, cement manufacture	W	W
Unspecified:[3]		
Reported	1,930	11,600
Estimated	5,000	37,000
Total	6,920	48,200
Grand total	13,200	102,000

W Withheld to avoid disclosing company proprietary data; included in "Grand total."

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Withheld to avoid disclosing company proprietary data; included in "Total."

[3]Reported and estimated production without a breakdown by end use.

TABLE 4

ARIZONA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

	District 1		District 2		District 3		Unspecified districts	
Use	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch)[2]	W	W	W	W	--	--	--	--
Coarse aggregate, graded[3]	W	W	W	W	W	W	--	--
Fine aggregate (-⅜ inch)[4]	--	--	W	W	--	--	--	--
Coarse and fine aggregates[5]	W	W	W	W	W	W	--	--
Other construction materials	10	106	--	--	--	--	--	--
Chemical and metallurgical[6]	W	W	--	--	W	W	--	--
Unspecified:[7]								
Reported	65	509	176	1,380	7	57	1,680	9,690
Estimated	2,200	14,000	90	720	2,700	22,000	--	--
Total	5,010	37,100	614	4,710	5,860	50,900	1,680	9,690

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes riprap and jetty stone and filter stone.

[3]Includes concrete aggregate (coarse), bituminous aggregate (coarse), and railroad ballast.

[4]Includes stone sand (concrete) and stone sand (bituminous mix or seal).

[5]Includes graded road base or subbase, terrazzo and exposed aggregate, crusher run or fill or waste, and other coarse and fine aggregates.

[6]Includes cement manufacture.

[7]Reported and estimated production without a breakdown by end use.

TABLE 5

ARIZONA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006, BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products	15,800	$119,000	$7.52
Plaster and gunite sands	582	6,550	11.26
Asphaltic concrete aggregates and other bituminous mixtures	4,690	41,000	8.75
Road base and coverings	9,070	56,100	6.18
Fill	1,580	7,790	4.92
Other miscellaneous uses[2]	48	349	7.22
Unspecified:[3]			
Reported	32,700	228,000	6.97
Estimated	28,500	196,000	6.87
Total or average	94,000	662,000	7.05

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Includes snow and ice control, railroad ballast, and filtration.

[3]Reported and estimated production without a breakdown by end use.

TABLE 6

ARIZONA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products[2]	990	12,600	663	5,080	14,800	108,000
Asphaltic concrete aggregates and road base materials	1,460	9,630	773	6,770	9,640	65,100
Fill	236	1,310	510	1,910	837	4,570
Other miscellaneous uses[3]	395	3,080	10	113	624	4,780
Unspecified:[4]						
Reported	4,920	35,100	1,080	5,980	25,900	185,000
Estimated	3,380	23,300	1,170	8,060	23,900	164,000
Total	11,400	85,000	4,200	27,900	75,700	532,000

	Unspecified district	
	Quantity	Value
Concrete aggregate and concrete products[2]	5	36
Asphaltic concrete aggregates and road base materials	1,900	15,700
Fill	--	--
Other miscellaneous uses[3]	818	1,580
Unspecified:[4]		
Reported	--	--
Estimated	--	--
Total	2,720	17,300

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes plaster and gunite sands.

[3]Includes snow and ice control, railroad ballast, and filtration.

[4]Reported and estimated production without a breakdown by end use.