Oklahoma’s mineral resources, produced in all 77 counties, include: nonfuel minerals such as limestone, gypsum, salt, clays, iodine, and sand and gravel; coal; and petroleum (crude oil and natural gas). In recent years, the mineral industry has been the State’s greatest source of revenue. In 2004, the combined value of petroleum, coal, and nonfuel minerals produced in Oklahoma was about $12 billion; it reached a high of nearly $13 billion in 1982 and 1984. Total production of all minerals since statehood (1907) is valued at $231 billion.

Although Oklahoma petroleum production accounts for about 95% of Oklahoma’s annual mineral output, nonfuel minerals and coal represent a significant part of the State’s current economy and an important source of future wealth. The total estimated value of nonfuel-mineral and coal production in Oklahoma during 2004 was $558 million. Leading commodities produced during 2004 were crushed stone (valued at $195 million), portland cement (production data withheld), construction sand and gravel ($54 million), coal ($51 million), industrial sand and gravel ($32 million), gypsum ($21 million), and iodine ($16 million). Other commodities now produced in Oklahoma, or for which there are current mining permits, include clays and shale, salt, lime, granite, rhyolite, dolomite, sandstone, volcanic ash, and tripoli. Deposits and resources that are not mined now, or with no current mining permits, include asphalt, lead, zinc, copper, iron, manganese, titanium, and uranium. Oklahoma ranked first in U.S. production of gypsum and iodine (Oklahoma is the only producer of iodine in the U.S.); second in tripoli production; fourth in common clays produced; and eighth in industrial sand and gravel.

MINERAL DEPOSITS AND RESOURCES OF OKLAHOMA
(Exclusive of Oil and Gas)

Kenneth S. Johnson, Oklahoma Geological Survey

Oklahoma’s mineral deposits and resources are described in this report. The report includes a description of the mineral deposit types, their distribution, and their economic importance. The report also includes a discussion of the methods used to assess the potential of mineral resources in Oklahoma.

The report is divided into two parts. The first part describes the geology of Oklahoma and provides an overview of the state’s mineral resources. The second part describes the specific mineral deposits and resources in detail.

The report is intended for use by mineral industry professionals, government agencies, and the general public. It is available from the Oklahoma Geological Survey for $25.00.

MINERAL DEPOSITS AND RESOURCES OF OKLAHOMA
(Exclusive of Oil and Gas)

Kenneth S. Johnson, Oklahoma Geological Survey
Oil and gas are organic compounds dominantly composed of hydrogen and carbon, hence the name “hydrocarbons.” They form from microscopic organisms, deposited with sediments that later become sedimentary rocks after deep burial in a geologic basin. Temperature and pressure increase with depth of burial, and over geologic time the organic remains convert to oil and gas through thermal alteration. The oil and gas migrate from fine-grained source rocks into higher permeable rocks. Because oil and gas are buoyant, they migrate upward until impermeable rocks block the path of movement. Such a barrier (seal) blocks further migration; but, if unblocked, the buoyant mixture of gas and oil forms a hydrocarbon trap in which oil and gas accumulate. Most Oklahoma oil occurs in such traps that produce chemicals derived from petroleum, and those are commonly associated with refineries. The 17 plants in the State that employed at least 10 workers at the end of 2000 are shown on the map. These produce a variety of products, including lubricants, fertilizer, plastics, petroleum coke, and carbon black.

**Explanatory Note:**
- **Area of significant oil and/or gas production.**
- **Area of no significant oil and/or gas production.**
- **Major Oil Field** (Ultimate recovery of more than 100 million barrels of oil)
- **Major Gas Field** (Ultimate recovery of more than one trillion cubic feet of gas)
- **Major Oil and Gas Field**

**Gas-Processing Plant**
At the end of 2000, Oklahoma had 70 gas-processing plants concentrated in the gas-producing western half of the State. The largest, at Cimarron, can produce an average of 7.85 million gallons of liquid products per day, which on an annualized basis is about 68 million barrels. The 17 plants in the State that employed at least 10 workers at the end of 2000 are shown on the map. These produce a variety of products, including lubricants, fertilizer, plastics, petroleum coke, and carbon black.

**Petrochemical Plant**
There are many facilities in Oklahoma that produce chemicals derived from petroleum, and those are commonly associated with refineries. The 17 plants in the State that employed at least 10 workers at the end of 2000 are shown on the map. These produce a variety of products, including lubricants, fertilizer, plastics, petroleum coke, and carbon black.

**Oil Refinery**
There were five major petroleum refineries operating in Oklahoma at the end of 2000, each with a daily capacity of over 45,000 barrels. An additional five, much smaller facilities, are present that employ as few as 8 workers. These refineries produce a wide range of products including propane, gasoline, diesel, jet fuel, fuel oil, lubricants, petroleum coke, sulfur, and asphalt. They have a combined crude-oil capacity of about 400,000 barrels (18,900,000 gallons) per day.

**Oil and Gas Production and Facilities of Oklahoma**
Dan T. Boyd, Oklahoma Geological Survey

Oil and gas are organic compounds dominantly composed of hydrogen and carbon, hence the name “hydrocarbons.” They form from microscopic organisms, deposited with sediments that later become sedimentary rocks after deep burial in a geologic basin. Temperature and pressure increase with depth of burial, and over geologic time the organic remains convert to oil and gas through thermal alteration. The oil and gas migrate from fine-grained source rocks into higher permeable rocks. Because oil and gas are buoyant, they migrate upward until impermeable rocks block the path of movement. Such a barrier (seal) blocks further migration; but, if unblocked, the buoyant mixture of gas and oil forms a hydrocarbon trap in which oil and gas accumulate. Most Oklahoma oil occurs in such traps that produce chemicals derived from petroleum, and those are commonly associated with refineries. The 17 plants in the State that employed at least 10 workers at the end of 2000 are shown on the map. These produce a variety of products, including lubricants, fertilizer, plastics, petroleum coke, and carbon black.

An average price of $50 per barrel, annual production has a value of more than $3.0 billion. At the end of 2005, the U.S. Department of Energy placed Oklahoma’s proved oil reserves at $88 million barrels.

Natural gas, almost always associated with oil, was considered a nuisance or drilling hazard in the early days. Exploration did not target natural gas widely in Oklahoma until the second half of the twentieth century. Cumulative gas production through 2005 is 95.6 trillion cubic feet; annual production peaked in 1990 at about 6.2 trillion cubic feet, the 2005 volume has a value of nearly $8 billion. At the end of 2005, the U.S. Department of Energy reported proved gas reserves in Oklahoma at 17.1 trillion cubic feet. Statewide gas production is about three times consumption.

Data cited here are from records compiled and maintained by the Oklahoma Corporation Commission, the Oklahoma Department of Commerce, and the Energy Information Administration of the U.S. Department of Energy.