4.14 MINERAL AND ENERGY RESOURCES

The purpose of this Section is to describe the mineral and energy resources which exist in the Metropolitan Bakersfield area, identify the Plan's potential to result in the loss of a known mineral or energy resource, reference General Plan goals and policies and recommend mitigation measures to reduce the significance of such impacts.

ENVIRONMENTAL SETTING

MINERAL RESOURCES

There are four principal mineral resources in the Planning area: oil, natural gas, sand and gravel. Oil, which is the primary mineral resource presently being extracted, is found throughout the Planning area. To a lesser degree, natural gas, sand and gravel are also extracted in the Planning area, although, sand and gravel extraction is limited to the northern areas. Figure V-3 of the 1990 General Plan, *Mineral Resources*, illustrates the locations of sand/gravel excavation, oil fields/boundaries, and field map coverage.

Oil

To locate oil (and natural gas), companies drill through the earth to the deposits deep below the surface. The oil is then pumped from below the ground ~~by oil rigs~~. Typically, oil then travels through pipelines and is stored in large tanks until it is sent to various places to be used for the production of thousands of products. Oil must be changed or refined into other products before it can be used. At oil refineries, crude oil is split into various types of products by heating the ~~thick black~~ oil. Some of the products include gasoline, diesel fuel, aviation fuel, home heating oil, oil for ships and oil to burn in power plants to make electricity. In California, 74 percent of our oil is used for transportation -- cars, planes, trucks, etc.. Oil is found in 18 of the 58 counties in California. Kern County, the County in which the Planning area is located, is one of the largest oil producers in the country.

The history of the oil industry in Kern County dates back to the 19th century. The Lakeview Gusher (of the Midway-Sunset Oil Field) near Taft was literally a lake of oil held back by check dams. When the well blew in, nine million barrels of oil accumulated on the ground. The Kern River Oil Field was established in 1899 when a 43-foot well dug by hand resulted in another gusher of oil.

The vast majority of the state's oil activity occurs in Kern County where four of the nation's seven most productive oil fields are located. Also, several of the County's "giant" oil fields[1] are located entirely or partially in the Planning area (refer to Table 4.14-1, *Giant Oil Fields of Kern County.* According to the Bureau of Land Management, if Kern County were a state, it would be the fourth most productive state in the Union with respect to oil. If it were a country, its production figures would qualify it for membership in OPEC.

TABLE 4.14-1

[1] "Giant" oil fields are defined as those oil fields that have produced over 10 million barrels of oil each.

GIANT OIL FIELDS OF KERN COUNTY

Rank	Field	Date Field Established	Total Production Through 1999
2	Kern River	1899	1,715 million barrels of oil
10	Kern Front	1912	197 million barrels of oil
12	Edison	1928	143 million barrels of oil
13	Fruitvale	1928	121 million barrels of oil
14	Rio Bravo	1937	117 million barrels of oil
15	Greeley	1936	115 million barrels of oil
18	Round Mountain	1927	99 million barrels of oil
*Partial Listing.			

Most Kern County crude oil is known as "heavy" oil. It is very thick and is difficult to pump from the ground. One of the innovations by the industry is to inject steam into the ~~well~~ subsurface oil reservoir, heating up the crude and making it flow into wells from which it is pumped to the surface. ~~easier to pump.~~ This extends the life of the oil field, but is also expensive. Drilling activity in some areas of Kern County hit its peak in the 1950's, and the total number of wells drilled and total footage reached its peak in 1984. Overall, oil production in Kern County peaked in 1985. The number of wells plugged and abandoned has typically lagged behind the number of wells drilled. Recently, wells plugged and abandoned have been about 55 percent of the number of wells drilled. ~~and has now stabilized with the number of wells going out of production about matching the number of new wells being drilled.~~

In the past, oil production activities have been concentrated in the outskirts of the City's developed area. However, with urbanization, urban areas have converged with existing oil producing fields. ~~have converged with urban areas.~~ Figure V-3 of the 1990 General Plan illustrates the boundaries of the ~~14~~ 22 oil fields located in the Planning area. Of these, 22 are currently productive. As is evidenced in Figure V-3 of the 1990 General Plan, the Project region is currently a major oil-producing area. Kern County produced approximately 208.9 million barrels of oil, representing approximately 68 percent of the total oil produced statewide (307.4 million barrels [including Outer Continental Shelf]) in the year 2000.[2, 3] The Planning area is a contributor to Kern County's status as the nation's leading petroleum-producing county.

Natural Gas

Natural gas is lighter than air and is mostly made up of a highly flammable gas called methane. Natural gas is produced in two basic forms. Associated gas is produced along with crude oil while non-associated gas is produced from gas fields which do not produce any crude oil. Natural gas is found underground and then ~~is pumped~~ flows from ~~below ground and sent in large~~ wells to pipelines. Because natural gas

[2] It should be noted that County of Kern totals were provided as opposed to Planning area totals since this data is not readily available.

[3] Annual Report of the State Oil & Gas Supervisor, 2000.

usually has no odor and can't be seen, it is mixed with a chemical that gives a strong odor prior to sending it to the pipelines and storage tanks. The odor makes it easy to detect a smell in the event of an accidental leak. From the storage tanks, natural gas is sent through underground pipes to its destination (consumer) to be used for cooking, heating, manufacturing, and to power plants to make electricity.

California's net natural gas production in the year 2000 totaled 379.1 billion cubic feet [including Outer Continental Shelf])[4], ranking it tenth in the nation. However, California uses more than six times the amount it produces. Elk Hills oil field continued as the largest field producing associated natural gas in California, and Rio Vista Gas field remained the largest field producing non-associated natural gas. ~~Both the Rio Vista Gas and t~~The Elk Hills fields are located in Kern County, however, outside of the Planning area. Kern County produced approximately 219.8 billion cubic feet of natural gas, representing approximately 58 percent of the total natural gas produced statewide.[5] The Planning area is a contributor to Kern County's status as the state's leading natural gas-producing county, yielding over one-half of the total California output of oil.

Sand and Gravel

Sand and gravel areas are concentrated primarily along the floodplain and alluvial fan of the Kern River, where clean, coarse deposits have been left by major floods over the past several thousand years. Sand and gravel are an important resource for construction, development, and physical maintenance. The State of California has statutorily required the protection of sand and gravel operations.

The Surface Mining and Reclamation Act of 1975 (SMARA) mandated the initiation by the State Geologist of mineral land classification in order to help identify and protect mineral resources in areas within the State subject to urban expansion and other irreversible land uses which would preclude mineral extraction. SMARA also allowed the designation of lands containing mineral deposits of regional or statewide significance. SMARA was amended (1980) to provide for the classification of non-urban areas subject to land-use threats incompatible with mining. Currently, the State Geologist's SMARA classification activities are carried out under a single program for urban and non-urban areas of the state. Mineral lands are mapped using the California Mineral Land Classification System according to jurisdictional boundaries, mapping all mineral commodities at one time in the area, including aggregate, common clay, and dimension stone. Priority is given to areas where future mineral resource extraction could be precluded by incompatible land use or to mineral resources likely to be mined during the 50-year period following their classification. Detailed mineral land classification and designation reports provided by the State Mining and Geology Board are on file at the City of Bakersfield and County of Kern.

Mineral Resource Zones (MRZ) are established based upon a geologic appraisal of the mineral resource potential of the land. A "resource" is a concentration of naturally occurring solid, liquid, or gaseous material in such form and amount that economic extraction of a commodity from the concentrations is currently potentially

[4] Ibid.

[5] It should be noted that County of Kern totals were provided as opposed to Planning area totals since this data is not readily available.

feasible. A "reserve" is that part of the resource base which could be economically extracted or produced within the foreseeable future.

Within the Planning area, lands have been classified within the MRZ-2a and MRZ-2b categories. The land designated as MRZ-2a includes areas underlain by mineral deposits where geologic data show that significant measured or indicated resources are present. Land in this category is of prime importance since it contains known economic mineral deposits. The land designated as MRZ-2b includes areas underlain by mineral deposits where geologic information indicates that significant inferred resources are present. Areas classified MRZ-2b contain discovered deposits that are either inferred reserves or deposits that are presently sub-economic.

Other Minerals

It should be noted that the foothills of the Sierra Nevada have some potential as fossil and gemstone sites. These resources, although possessing scientific and cultural value, are not considered a major economic resource.

STANDARDS OF SIGNIFICANCE

SIGNIFICANCE CRITERIA

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in a significant adverse impact on the environment. An EIR is required to focus on these effects and offer mitigation measures to reduce or avoid any significant impacts that are identified. The criteria, or standards, used to determine the significance of impacts may vary depending on the nature of the project. Mineral and Energy Resource impacts resulting from the implementation of the General Plan Update could be considered significant if they cause any of the following results:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; and

- Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

Based on these standards, the effects of the General Plan Update have been categorized as either a "less than significant impact" or a "potentially significant impact." If a potentially significant impact cannot be reduced to a less than significant level through the application of goals, policies, standards or mitigation, it is categorized as a significant and unavoidable impact.

IMPACTS AND MITIGATION MEASURES

- **GENERAL PLAN BUILDOUT MAY RESULT IN THE LOSS OF AVAILABILITY OF PETROLEUM, NATURAL GAS, SAND, AND/OR GRAVEL RESOURCES THAT WOULD BE OF VALUE TO THE METROPOLITAN BAKERSFIELD AREA AND CALIFORNIA RESIDENTS.**

Level of Significance Before Policies/Mitigation: Potentially Significant Impact.

Impact Analysis: The General Plan Land Use Map designates a total of 24,168 acres within the Planning area as Mineral Petroleum (R-MP). Areas within this land use designation are minimum five-acre parcels that contain producing, or potentially productive, petroleum fields and mineral deposits. Also, this land use designation may be used in combination with other designations.[6]

The majority of the land within the R-MP category is located on the periphery of the developed areas. However, a comparative analysis of Figure V-3 of the 1990 General Plan and the Land Use Map indicates that ~~certain oil fields extend into areas designated for other land uses~~ other land use designations have been extended into previously established oil fields including industrial in the northern portion of the Planning area (i.e., Fruitvale Oil Field), and residential in the western portion of the Planning area (i.e., Rosedale, Bellevue and Canfield Ranch Oil Fields).

Implementation of the proposed General Plan Update is anticipated to result in both direct and indirect impacts upon continued resource recovery operations throughout the Planning area. A mineral resource of local and/or statewide value located in areas of current and potential resource extraction may be lost due to direct removal for development. The construction of buildings and infrastructure would permanently commit these sites to urbanization and potentially result in the creation of incompatible development on the property and ultimately the loss of access to oil/gas fields and sand/gravel extraction areas. As previously noted, the Planning area is a contributor to Kern County's ranking as the nation's leading petroleum- producing county. The Planning area also contributes to Kern County's status as the state's leading natural gas-producing county and the state's second largest sand/gravel producing county. Therefore, future development associated with Project implementation has the potential to result in the loss of valuable mineral resources possessing local and statewide importance.

The General Plan Update provides goals and policies that serve to mitigate the potential impacts to mineral resources as a result of buildout of Metropolitan Bakersfield. The General Plan also provides programs that serve to implement the goals and policies affecting mineral resources. These programs include: resource maps within and adjacent to the Planning Area which are to be utilized in the review of discretionary permits; mineral resource zoning areas are to be designated, acceptable interim land uses be determined and compatible land uses be planned around mineral extraction areas; and local zoning ordinances amended to accommodate mineral extraction uses outside of mineral resource zones be reviewed and updated periodically.

The Goals and Policies, as stated below, would reduce potentially significant mineral resources impacts to less than significant levels.

Goals and Policies in the General Plan Update: The Conservation Element contains the following goals and policies:

CON/MR-G-1 Protect areas of significant resource potential for future use.

[6] Metropolitan Bakersfield General Plan Update, Land Use Element, page II-17.

CON/MR-G-2 Document areas of current mineral and energy resource extraction, as a basis for land use and conservation policies and programs.

CON/MR-G-3 Avoid conflicts between the productive use of mineral and energy resource lands and urban growth.

CON/MR-G-4 Protect land, water, air quality and visual resources from environmental damage resulting from mineral and energy resource development.

CON/MR-P-1 Maintain maps and descriptions of potential mineral and energy resources as a basis for policy and program implementation.

CON/MR-P-2 Document the location, status, and long-term viability of sand and gravel quarries and petroleum drilling sites for purposes of avoiding near and long-term land use conflicts and provide a basis for compliance monitoring.

CON/MR-P-3 Encourage and support the exchange of information on mineral and energy resources between private industry, City of Bakersfield and Kern County.

CON/MR-P-4 Land use decisions shall recognize the importance of identified mineral resources and need for conservation of resources identified by the State Mining and Geology Board.

CON/MR-P-5 Protect significant mineral and petroleum resource areas, including potential sand and gravel extraction areas.

CON/MR-P-6 Continue implementation of the Kern River Channel Maintenance Program for extraction of river sand and gravel.

CON/MR-P-7 Promote development of compatible uses adjacent to mineral extraction areas.

CON/MR-P-8 Allow development of resource extraction sites subject to the conditional use permit procedure in zones where such uses are not permitted by right and where it can be shown that proposed extraction uses are compatible with surrounding uses.

CON/MR-P-9 Encourage preservation of any known deposits of gemstones and fossils.

CON/MR-P-10 Implement as appropriate the California Environmental Quality Act to minimize land use conflicts and reduce environmental impacts of all proposed resource extraction operations.

CON/MR-P-11 Prohibit incompatible development in areas which have a significant potential for harm to public health, safety and welfare due to mineral and petroleum extraction and processing.

CON/MR-P-12 Design resource extraction operations subject to discretionary permits to maintain the integrity of areas of “high environmental

quality" and unique scenic value.

CON/MR-P-13 Require surface mineral resource extraction sites to have plans and procedures for land reclamation, conforming with the requirements of the State Mining and Geology Board, to be implemented upon completion of extraction operations at each site or portion thereof.

CON/MR-P-14 Review all discretionary mineral or petroleum development including renewal of existing authorizations, under the policies and procedures of the California Environmental Quality Act.

CON/MR-P-15 Require petroleum production sites in urban areas which are subject to discretionary permits, to install peripheral landscaping to help reduce the noise, dust and visual impacts to adjacent sensitive receptors and public ways.

CON/MR-P-16 Require all mineral development to be predicated on appropriate reclamation plans that meet the standards of the State Surface Mining and Reclamation Act and the implementing guidelines of the State Mines and Geology Board, and (or) the standards of the State Division of Oil and Gas. Reclamation/restoration of the sites shall be done as each phase of development or extraction is completed.

Mitigation Measures: No mitigation measures beyond the goals, policies and implementation identified are proposed.

Level of Significance After Policies/Mitigation: Less Than Significant Impact.

UNAVOIDABLE SIGNIFICANT IMPACTS

Impacts to mineral and energy resources associated with implementation of the General Plan Update would be less than significant by adherence to/compliance with goals and policies in the General Plan Update and standard City and County conditions of approval.