

## SECTION 4

### SUMMARY FACILITY DESCRIPTION

A block flow diagram of the POGO process base case is shown in Figure 4-1 (Dwg R-01-FS-1). The complex includes a captive coal mine with the capacity to produce approximately 20 million TPY for 20 years. Units are included that will clean, wash, crush, and size the coal and feed it to the process units.

Facilities for the production of oxygen and all required utilities as well as for the treatment and disposal of solid, liquid, and gaseous effluent streams are included in the design. The design is based on a site location capable of providing nearly 45,000 acre-feet of water per year for process requirements and utilities makeup. Well water is used for all potable and sanitary water requirements.

The land area required for the life of the project for mining the required coal is estimated to approximate 70 square miles. Close to 640 acres or one square mile should be allotted for the plant complex. Figure 4-2 is a plot plan of the process, power plant, and general facilities area.

#### 4.1 PROCESS UNITS

The processes include the liquefaction of coal at elevated temperature and pressure, the pyrolysis of coal and heavy oils at intermediate temperature and pressure, and the reaction of resultant chars with oxygen and steam at elevated temperature and intermediate pressure. These operations produce synthesis gas and crude hydrocarbon liquids. Further processing includes catalytic reactions of gases and liquids and separation by distillation to form final upgraded salable products.

A second oxygen-blown entrainment gasifier is included that produces an intermediate Btu fuel gas. Following particulates and sulfur removal, the fuel gas is used in the plant fired heaters and in a large steam and power generation plant. Electric power is supplied to operate the plant and mine; in addition, significant power is produced for sale.

#### 4.2 PLANT CAPACITY

The design feed rates of prepared coal to the coal consuming processes are as follows:

SRC Reactors	20,000 TPD
Pyrolyzer	7,000
Fuel Gas Gasifier	<u>16,700</u>
Total	<u>45,700</u> TPD

A total of 566 billion Btu per stream day of SNG and liquid fuel products is produced. Other products include approximately 1000 MW of electrical power for sale, a special crystalline coke, sulfur, and anhydrous ammonia.

Table 4-1 summarizes product quantities; heating values are also given. The overall thermal efficiency is predicted to be about 74%.



Table 4-1 - POGO Products  
Projected Quantities and Heating Values

Product	Production Rate			Product Unit HHV	Total Heating Value <sup>a</sup> (Billion Btu/Day)	% of Coal HHV
	Common Units	as BPSD	as TPSD			
<b>Fuels</b>						
SNG	149.24 MM SCFD	26,312 <sup>b</sup>	3,760	1,031 Btu/scf (20,462 Btu/lb)	153.87	14.69
C <sub>3</sub> -LPG		13,040	1,152	21,628 Btu/lb	49.83	4.75
C <sub>4</sub> -LPG		2,114	212	21,306 Btu/lb	9.05	0.86
Gasoline		34,822	4,471	20,268 Btu/lb	181.24	17.30
Fuel Oil		27,020	4,430	19,416 Btu/lb	172.01	16.42
Subtotal		103,308	14,025		566.00	54.02
Power	970 MW	24,242 <sup>b</sup>			145.45 <sup>c</sup>	13.88
Total Energy Products		127,550			711.45	67.90
<b>Byproducts</b>						
Coke		7,818 <sup>b</sup>	1,625	14,433 Btu/lb	46.91	4.48
Sulfur		2,275 <sup>b</sup>	1,710	3,990 Btu/lb	13.65	1.30
Ammonia		590 <sup>b</sup>	183	9,760 Btu/lb	3.54	0.34
Subtotal		10,683	3,518		64.10	6.12
<b>Total</b>		138,233	17,543		775.55	74.02

<sup>a</sup>Values are per stream day. The process plant operates 330 days per year; the power plant operates 365 days per year.

<sup>b</sup>Barrels of Oil Equivalent (BOE) at 6,000,000 Btu/bbl.

<sup>c</sup>Heat rate of 7,810 Btu/kWh, based on fuel gas and 0.8 load factor.