

CHAPTER VI. SUMMARY OF ENVIRONMENTAL IMPACTS

A preliminary draft environmental impact statement has been prepared for the Synthetic Fuels Commercialization Program. This statement, which comprises Volume IV of the program documentation, is a comprehensive analysis of the environmental impacts that may result from the development of operations of various synthetic fuels technologies, mining operations, community expansions, and other conjunctive developments. Uncertainties and gaps in our understanding of environmental impacts are explicitly noted and indications are provided of research needs and opportunities whereby the commercialization program can provide the missing information.

The present chapter summarizes the key findings which are discussed at length in the preliminary draft environmental impact statement.

A. LAND USES AND SOCIOECONOMIC VALUES

1. Land Use

The attainment of goals for synthetic fuels production by 1985 will require roads, mining, plant sites, waste disposal areas, utility and pipeline corridors, and other associated services, all of which would permanently alter land use.

Development unavoidably destroys vegetation, removing land from its current use. In the Appalachian and Eastern Interior Regions, agricultural and forest lands would be removed from their productive uses. Even many years after reclamation, the highest level of use will probably be only for pasture.

Land in the Powder River and Fort Union Regions is used predominantly for grazing and hunting. The destruction of soil profiles and depletion of water sources would make it difficult to restore land to

its previous uses. The further loss of water rights will mean a permanent loss of irrigated cropland. Increased population would intensify recreational demand, causing deterioration of recreational land in the region. The loss of vegetation on development sites in combination with the introduction of many humans and heavy equipment will disrupt natural habitats, decreasing land available for wildlife communities.

Reclamation in the Four Corners Region would require many years due to the low rainfall. Development would result in some loss of natural habitat. Mining operations would have an adverse effect on fertility resulting from soil removal, mixing and replacement with other materials.

Oil shale development would permanently alter the landscape. Many natural features would be destroyed. Existing vegetation and topsoils would be unavoidably lost, affecting agriculture and animal habitats. Many acres would not be available for grazing during oil shale development.

2. Socioeconomic Values

The Appalachian and Eastern Interior Regions will experience only moderate population increases since there are existing labor pools. Mining has existed in these regions for decades, so workers skilled in mining techniques should be readily available. The Fort Union, Powder River, Four Corners, and Oil Shale Regions are characterized by less densely populated areas and the influx of construction and mining workers will be more pronounced. These population increases, accompanied by the urbanization process, will result in increased social problems in the small towns surrounding mining sites.

The economic conditions of regions affected by development would change. During the construction phase, "boom town" conditions could create inflation and a shortage of necessary social services. Those not involved in the development-related expansion could be severely affected by inflation. The lack of social services would affect all.

Health facilities and personnel probably would be overtaxed. Overburdening of water and sewage systems would adversely affect the quality of streams for recreational uses, particularly contact sports, and drinking water. If the police departments were not expanded, increased crime could result. Fire departments may not be able to respond quickly enough or have the proper equipment to adequately deal with fires. Schools may be overcrowded, with high student-to-teacher ratios and inadequate classrooms. The large population influx into the Western regions may also create tension between newcomers and locals.

B. ENVIRONMENTAL COMPONENTS

1. Non-Living Components

a. Air

Although ambient air quality concentrations should be in compliance with state and Federal standards, degradation of local air quality would occur in all regions.

Some damage to plants, animals and humans from air pollutants may be unavoidable. Adverse human health effects, including cancer, might result from long-term exposure to polycyclic aromatic hydrocarbons and trace elements emitted from synthetic fuel plants in the form of or adsorbed on fine particulates. Some increase in sulfur dioxide, nitrogen oxides, trace elements, hydrocarbons and respirable particulates will occur even though emission controls are employed and air quality standards are enforced.

b. Water

Synthetic fuels commercialization would create a potential for the degradation of local and regional water quality. The quality of water downstream from coal or shale mining sites could be severely deteriorated by mine drainage and erosion runoff. Construction and use of synthetic fuel processing plants can cause reduction in water quality resulting from increased erosion, sedimentation, overtaxed sewage facilities, release of toxic waste to streams, and return of production water to stream channels. Even with controls, some releases would occur,

particularly of acid waters from Eastern mines.

The synthetic fuels commercialization program would require large volumes of water to be used for coal conversions and for oil shale processing; additional water would be required at the mine sites. In the Western regions, the large volumes of water allocated to synthetic fuels production would not be available for other uses and could affect agricultural, industrial, commercial and residential uses.

The adverse impact resulting from the interruption of aquifers during mining cannot be avoided. Lowering of water levels of wells, drying up of springs and seeps, and reduction in streamflow would occur in an area around the mines where aquifers were disrupted. The location and extent of this cone of depression around mined areas would vary, depending on various aquifer properties. Replacement of aquifers with unclassified overburden would alter groundwater flow patterns and could reduce aquifer storage capacity. If large quantities of groundwater are withdrawn from thick sand and shale aquifers, some subsidence may result. Increasing use of groundwater may affect water well levels and discharge of groundwater to streamflow.

Development of lakes and ponds, at the completion of mining would be unavoidable where thick coal beds with thin overburden levels were mined. Water use in the area could be adversely affected to the extent that it depleted streamflows and added to evaporation loss of water, which then would not be available for other uses.

c. Geology

Reduction in reserves of coal and oil shale, which are non-renewable mineral resources, is an unavoidable adverse effect of the synthetic fuels commercialization program.

Mining and reclamation of the surface mine area would alter the geology from the ground surface to the base of the coal or shale. It is an unavoidable adverse impact that is permanent and irreversible, but as a geological impact, is negligible.

d. Soils

The disturbance of topsoil would, to some degree, lower the natural soil productivity of the area by compaction, mixing natural soils, and causing accelerated soil erosion. This disturbance of topsoil and the accompanying loss of productivity is unavoidable on the acreage which would be occupied by roads, railroads, surface mines, mine buildings, power plants and synthetic fuel conversion plants.

On the areas to be strip-mined, complete destruction of all soil horizons, parent material, and soil characteristics that developed over long periods of geologic time could not be avoided. The present soil biota would be destroyed and soil forming processes would be terminated. Once mining is completed and the area reclaimed, soil development would start again. As an end result of mining, new soils would be formed with characteristics totally unlike the ones existing prior to mining. During their early geologic life, these new soils are likely to be less suitable for support of vegetation.

Reduction of soil productivity, permeability and infiltration rates would be unavoidable. Increase in erosion and sedimentation rates would occur; however, the amount of soil that would be lost in these ways is not known.

e. Topography

Topography would be unavoidably altered by construction and mining activities. Construction activities would result in the filling of areas of low relief, the leveling of rolling terrain, the creation of steep slopes where no slopes previously existed, the removal of prominent points of land, the erosion of surface areas and alterations to stream channels and drainage patterns. In addition, construction of impoundments would result in inundation of large areas of land.

Mining activities, especially surface mining, would result in the disturbance of large surface areas. Reclamation activities would reduce the impact but would not completely eliminate it. In addition, subsidence of land would result from mining activities.

Disposal of solid wastes, including mine spoil and spent shale, would also result in changes in the topography. This could include the filling of canyons in the West and the building of spoil banks in the East.

2. Living Components

a. Flora

Existing vegetation would be destroyed on the mined areas, plant sites, housing sites for increased population, transmission line and pipeline rights-of-way. The immediate effects of the loss of terrestrial habitat cannot be mitigated. During the lifetime of mines and fuel processing plants, vegetation in those areas would be lost.

Some aquatic vegetation would be destroyed by road, pipeline and transmission line construction across streams. The density, diversity, and composition of aquatic vegetation in the Appalachian and Eastern Interior Regions could be reduced as a result of acid mine drainage.

Adverse impact of stack emissions, especially sulfur dioxide, on vegetation is unknown. The impact, particularly on ponderosa pine, would be unavoidable. Increased population would intensify recreation use which would destroy or decrease the vegetative cover depending on the amount of use an area receives.

Reclamation efforts are not likely to be completely successful, especially in severely disturbed mine areas. After reclamation, some settling would occur and limit use of newly reclaimed land. Revegetation would proceed extremely slowly and with difficulty in semi-arid and arid western regions. In areas where low precipitation is coupled with infertile soil, revegetation might not occur at all. In other areas, less desirable weed species may colonize in former natural areas.

All plant succession is unavoidably destroyed at the time of disturbance. Fifty years or more of plant succession would be required for parts of the Western region to return to their present state.

Vegetation could also be unavoidably affected by salt deposition from cooling tower drift as well as by air pollutants such as nitrogen oxides.

b. Fauna

Loss of habitat and reductions in population would occur as unavoidable consequences of the mining and utilization of coal and oil shale. Some mortality and displacement of animals would occur in all regions. These losses will primarily involve birds, small mammals, reptiles and invertebrates; some game species would also be affected.

Mining, transportation and processing of coal and shale would expose wildlife to various hazards and disturbances. Blasting, construction, and other noises associated with the mining activity are unavoidable and would frighten away some wildlife species.

Destruction of aquatic habitat and faunal species would occur where streams were altered to allow mining. Reduction of water quality would also affect aquatic life. Trout, salmon, and many other fish require clean spawning gravels for reproduction. In certain waters of most coal provinces, existing conditions are already marginal for some of the cold-water game-fish and anadromous species. Heavy sedimentation of these waters would result in their permanent elimination.

Change and elimination of ponds, streams, and reservoirs would adversely affect waterfowl. The temporary loss of this water base during mining operations is unavoidable.

In many areas, wildlife would return following reclamation efforts. The diversity, density and composition of the new populations would, in most cases, be altered from previous conditions.

3. Human Interest Values

a. Esthetics

The major unavoidable impacts would be the transformation of rural areas into urbanized areas and the development of previously undisturbed areas. Buildings, roads, utility corridors, waste disposal areas, etc.

would displace or intrude upon the natural landscape.

b. Special Interest Points

Construction activities would inadvertently disturb or destroy sites of archeological, historical or paleontological value. Increased population would result in increased visitation and vandalism of sites. Visual impacts resulting from construction of rail lines, transmission lines, mine facilities, and industrial plants would also be unavoidable.