CHAPTER 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT

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3.1. PHYSICAL ENVIRONMENT

3.1.1. Air Quality

The Clean Air Act established NAAQS; the primary standards are to protect public health and the secondary standards are to protect public welfare. New NAAQS for ozone and particulate matter took effect on September 16, 1997. The current NAAQS (40 CFR 50.12 and 62 FR 138, July 18, 1997) are shown in Table 3-1. The Clean Air Act Amendments of 1990 established classification designations based on regional monitored levels of ambient air quality. These designations impose mandated timetables and other requirements necessary for attaining and maintaining healthful air quality in the U.S based on the seriousness of the regional air quality problem.

When measured concentrations of regulated pollutants exceed standards established by the NAAQS, an area may be designated as nonattainment area for a regulated pollutant. The number of exceedances and the concentrations determine the nonattainment classification of an area. There are five classifications of nonattainment status: marginal, moderate, serious, severe, and extreme (Clean Air Act Amendments, 1990).

The Federal OCS waters attainment status is unclassified. The OCS areas are not classified because there is no provision for any classification in the Clean Air Act for waters outside the boundaries of State waters. Only areas within State boundaries are to be classified either attainment, nonattainment, or unclassifiable. Operations west of 87.5° W longitude fall under MMS jurisdiction for enforcement of the Clean Air Act. The OCS waters east of 87.5° W longitude are under the jurisdiction of USEPA. Figure 3-1 presents the air quality status in the Gulf Coast as of August 2001. All air-quality nonattainment areas reported in Figure 3-1 are for ozone nonattainment. No graphics depicting the boundaries (projected from historical data) of ozone areas of influence, areas at risk, or areas of violation along the Gulf Coast were available at the time of publishing this EIS. It is expected that the number of areas of violation will increase under the new 8-hour (ozone NAAQS (157 micrograms (µg) per m^3) as compared to the number of areas under the old 1-hr standard (235 µg/m^3). The Gulf Coast Ozone Study group is currently using an air quality model to simulate the ozone concentrations in the Eastern Gulf Coast area; they will provide technical information on 1-hr as well as 8-hr ozone levels in this area. The Offshore Operator Committee also has monitored air quality in the Breton area, including the ozone concentrations. To date, the new 8-hr ozone standard had not been fully implemented because of pending court action. However, on February 27, 2001, the U.S Supreme Court unanimously upheld the constitutionality of the Clean Air Act as USEPA had interpreted it in setting these health-protective, air quality standards. Recently, the U.S. Court of Appeals for the District of Columbia Circuit Court also upheld the 1997 Clean Air Act.

Measurements of pollutant concentrations in Louisiana are presented in the Air Quality Data Annual Report, 1996 (Louisiana Dept. of Environmental Quality, 1996). Louisiana is considered to be in attainment of the NAAQS for CO, SO_2, nitrogen dioxide (NO_2), and PM_{10} (also see USEPA, 2001). As of August 2001, six Louisiana coastal zone parishes have been tentatively designated nonattainment for ozone: Iberville, Ascension, Lafourche, East Baton Rouge, West Baton Rouge, and Livingston (USEPA, 2001). Ozone measurements (Louisiana Dept. of Environmental Quality, written communication, 1997) between 1989 and 1997 show that the number of days exceeding the national standards are declining.

There are three coastal counties in Mississippi. None of the coastal counties are designated as nonattainment for ozone.

Air quality data for 1993 were obtained from the Alabama Department of Environmental Management for PM_{10}, NO_2, and ozone (O_3). The data show that Mobile County is in attainment of the NAAQS for all criteria pollutants. There have been no exceedances of the NAAQS for O_3, SO_x, CO, and PM_{10} in the State of Alabama (USEPA, 2001).

The USEPA's Aerometric Information Retrieval System (AIRS) data are available through the year 2001. The State of Florida has no nonattainment areas in its coastal counties (USEPA, 2001). Relative to onshore air quality in Escambia County, AIRS was accessed for ambient air monitoring data of SO_2, O_3, and PM_{10} for the years 1995 through 2001. During the 1995-1997 period, the following exceedances of applicable standards were recorded: no measurements of SO_2 (the number of measurements refers to the

number of stations with exceedances); three measurements of O_3 (one in 1995 and two in 1996); and no measurements of PM_{10}. If the proposed, new, 8-hr ozone standard is imposed using the 1996-1998 data, Escambia County would be in violation. Indeed, during the 1998 summer season, there were a number of ozone alerts. There were additional O_3 exceedances in 1998 and 2000.

The 8-hour ozone standard is based on the average fourth-highest value over a 3-year period. For the 1999-2001 averaging period, two monitoring sites in Escambia County exceeded the 8-hour ozone standard of 85 parts per billion (ppb). The 1-hour ozone standard is based on the number of exceedances over 3-year period. The concentration can vary significantly from one year to the next. While there was one exceedance in Florida in 1997, there were 17 exceedances at various stations in 1998, and three in 1999. In 1997, there was one exceedance of the 1-hour ozone standard, in Duval County on Florida's Atlantic Coast; it did not result in a violation. While Florida's ambient air quality standards are at least as stringent as the national standards, the State standards for sulfur dioxide are stricter than the national standards. Florida has an annual standard of 60 µg/m^3, a 24-hr standard of 260 µg/m^3, and a 3-hour standard of 1,300 µg/m^3. According to the Florida Air Quality Report for 1996 (Florida Dept. of Environmental Protection et al., 1997), sulfur dioxide concentrations are generally well within both State and National ambient air quality standards throughout the State.

The PSD Class I air quality areas, designated under the Clean Air Act, are afforded the greatest degree of air quality protection and are protected by stringent air quality standards that allow for very little deterioration of their air quality. The PSD maximum allowable pollutant increase for Class I areas are as follows: 2.5 µg/m^3 annual increment for NO_2, 25 µg/m^3 3-hr increment, 5 µg/m^3 24-hr increment, and 2 µg/m^3 annual increment for SO_2, and 8 µg/m^3 24-hr increment and 5 µg/m^3 annual increment for PM_{10}.

The proposed lease sale area includes several wilderness areas designated by the Clean Air Act as PSD Class I air quality areas: the Breton National Wildlife Refuge and National Wilderness Area off Mississippi, and the Saint Marks, Bradwell Bay, and Chassahowitzka Class I air quality areas in Florida (Figure 3-2). The FWS has responsibility for protecting wildlife, vegetation, visibility, and other sensitive resources called air quality related values in these areas. Class I areas are afforded the greatest degree of air quality protection and are protected by stringent air quality standards that allow for very little deterioration of their air quality. The PSD maximum allowable pollutant increase for Class I areas are as follows: 2.5 µg/m^3 annual increment for NO_2, 25 µg/m^3 3-hr increment, 5 µg/m^3 24-hr increment, and 2 µg/m^3 annual increment for SO_2, and 8 µg/m^3 24-hr increment and 5 µg/m^3 annual increment for PM_{10}. The FWS has expressed concern that the NO_2 and SO_2 increments for the Breton National Wilderness Area have been consumed.

Ambient air quality is a function of the size, distribution, and activities directly related with population in association with the resulting economic development, transportation, and energy policies of the region. Meteorological conditions and topography may confine, disperse, or distribute air pollutants. Assessments of air quality depend on multiple variables such as the quantity of emissions, dispersion rates, distances from receptors, and local meteorology. Due to the variable nature of these independent factors, ambient air quality is an ever-changing dynamic process.

3.1.2. Water Quality

For the purposes of this EIS, water quality is the ability of a waterbody to maintain the ecosystems it supports or influences. In the case of coastal and marine environments, the quality of the water is influenced by the rivers that drain into the area, the quantity and composition of wet and dry atmospheric deposition, and the influx of constituents from sediments. Besides the natural inputs, human activity can contribute to water quality through discharges, run-off, boating, dumping, air emissions, and spills. Also, mixing or circulation of the water can either improve the water through flushing or be the source of factors contributing to the decline of water quality.

Evaluation of water quality is done by direct measurement of factors that are considered important to the health of an ecosystem. The primary factors influencing coastal and marine environments are temperature, salinity, oxygen, nutrients, potential of hydrogen (pH), oxidation reduction potential (Eh), pathogens, and turbidity or suspended load. Trace constituents such as metals and organic compounds can affect water quality. The water quality and sediment quality may be closely linked. Contaminants,

which are associated with the suspended load, may ultimately reside in the sediments rather than the water column.

The region under consideration is divided into coastal and marine waters for the following discussion. Coastal waters, as defined by MMS, include all the bays and estuaries from the Rio Grande River to the Florida Bay (Figure 3-3). Marine water as defined in this document includes both State offshore water and Federal OCS waters, which includes everything outside any barrier islands to the Exclusive Economic Zone. The inland extent is defined by the Coastal Zone Management Act.

3.1.2.1. Coastal Waters

Along the Gulf Coast lies one of the most extensive estuary systems in the world, which extends from the Rio Grande River to Florida Bay (Figure 3-3). Estuaries represent a transition zone between the freshwater of rivers and the higher salinity waters offshore. These bodies of water are influenced by freshwater and sediment influx from rivers and the tidal actions of the oceans. The primary variables that influence coastal water quality are water temperature, total dissolved solids (salinity), suspended solids (turbidity), and nutrients. An estuary's salinity and temperature structure is determined by hydrodynamic mechanisms governed by the interaction of marine and terrestrial influences, including tides, nearshore circulation, freshwater discharges from rivers, and local precipitation. Gulf Coast estuaries exhibit a general east to west trend in selected attributes of water quality associated with changes in regional geology, sediment loading, and freshwater inflow.

Estuaries provide habitat for plants, animals, and humans. Marshes, mangroves, and seagrasses surround the Gulf Coast estuaries, providing food and shelter for shorebirds, migratory waterfowl, fish, invertebrates (e.g., shrimp, crabs, and oysters), reptiles, and mammals. Estuarine-dependent species constitute more than 95 percent of the commercial fishery harvests from the GOM. Several major cities are located along the coast, including Houston, New Orleans, Mobile, and Tampa. Tourism supplies an estimated $20 billion to the economy each year (USEPA, 1999). Shipping and marine transport is an important industry, with 7 of the top 10 busiest ports in the U.S., in terms of total tonnage, located in GOM estuaries.

Estuarine ecosystems are impacted by humans, primarily via upstream withdrawals of water for agricultural, industrial, and domestic purposes; contamination by industrial and sewage discharges and agricultural runoff carrying pesticides and herbicides; and habitat alteration (e.g., construction and dredge and fill operations). Drainage from more than 55 percent of the conterminous U.S. enters the GOM, primarily from the Mississippi River. Louisiana, and Alabama ranked second and fourth, respectively in the nation in 1995 in terms of discharging the greatest amount of toxic chemicals (USEPA, 1999). The GOM region ranks highest of all coastal regions in the U.S. in the number of wastewater treatment plants (1,300), number of industrial point sources (2,000), percent of land use devoted to agriculture (31%), and application of fertilizer to agricultural lands (62,000 tons of phosphorus and 758,000 tons of nitrogen) (USDOC, NOAA, 1990).

A recent assessment of the ecological condition of GOM estuaries was published by the USEPA (1999). The assessment describes the general ecology and summarizes the "health" of all the GOM estuarine systems. Sources of the data include the USEPA's Environmental Monitoring and Assessment Program for Estuaries (EMAP-E), the NOAA Estuarine Eutrophication Survey (USDOC, NOAA, 1997a), and 305(b) reports from each state. A classification scheme based on 10 indicators was developed. The indicators were water quality, harmful algal blooms, sediment contaminants, habitat change, biological integrity, and public health (pathogens in shellfish and contaminants, mainly mercury, in fish).

Many Gulf Coast States now sample the edible tissue of estuarine and marine fish for total mercury. The USEPA merged both State and Federal mercury data into the Gulfwide Mercury in Tissue Database to characterize the occurrence of mercury in GOM fishery resources (Ache, 2000). The report found that all Gulf Coast States have published fish consumption advisories for large king mackerel. The report recommends testing of additional species through a Gulfwide coordinated approach.

3.1.2.2. Marine Waters

The marine water, within the area of interest, can be divided into three regions: the continental shelf west of the Mississippi River, the continental shelf east of the Mississippi River, and deep water (> 400 m). For this discussion, the continental shelf includes the upper slope to a water depth of 400 m. While

the various parameters measured to evaluate water quality do vary in marine waters, one parameter, pH, does not. The buffering capacity of the marine system is controlled by carbonate and bicarbonate, which maintain the pH at 8.2.

Continental Shelf West of the Mississippi River

The Mississippi and Atchafalaya Rivers are the primary sources of freshwater, sediment, and pollutants to the continental shelf west of the Mississippi (Murray, 1997). The drainage basin that feeds the rivers covers 55 percent of the contiguous U.S. While the average river discharge from the Mississippi River exceeds the input of all other rivers along the Texas-Louisiana coast by a factor of 10, during low-flow periods, the Mississippi River can have a flow less than all the other rivers combined (Nowlin et al., 1998). This area is highly influenced by input of sediment and nutrients from the Mississippi and Atchafalaya Rivers. A turbid surface layer of suspended particles is associated with the freshwater plume from these rivers. A nepheloid layer composed of suspended clay material from the underlying sediment is always present on the shelf. The river system supplies nitrate, phosphate, and silicate to the shelf. During summer months, low-salinity water from the Mississippi River spreads out over the shelf, resulting in a stratified water column. While surface oxygen concentrations are at or near saturation, hypoxia, defined as oxygen (O_2) concentrations less than 2 milligrams (mg) per liter (l) O_2, is observed in bottom waters during the summer months.

The zone of hypoxia on the Louisiana-Texas shelf is one of the largest areas of low oxygen in the world's coastal waters (Murray, 1997). The oxygen-depleted bottom waters occur seasonally and are affected by the timing of the Mississippi and Atchafalaya Rivers' discharges carrying nutrients to the surface waters. This, in turn, increases the carbon flux to the bottom, which, under stratified conditions, results in oxygen depletion to the point of hypoxia (<2 mg/l O_2). The hypoxic conditions last until local wind-driven circulation mixes the water again. The area of hypoxia stretched over 17,000 km^2 at its peak and was observed as far away as Freeport, Texas. Increased nutrient loading since the turn of the 19th century correlates with the increased extent of hypoxic events (Eadie, 1992), supporting the theory that hypoxia is related to the nutrient input from the Mississippi and Atchafalaya River systems.

Shelf waters or sediments off the coast of Louisiana are contaminated with trace organic pollutants including polynuclear aromatic hydrocarbons (PAH), herbicides such as Atrazine, chlorinated pesticides, and polychlorinated biphenyls (PCB), and trace inorganic (metals) pollutants, for example, mercury. The concentrations of chlorinated pesticides and PCB's, which are associated with suspended particulates and sediment, continue to decline since their use has been discontinued. The source of these contaminants is the river water that feeds into the area.

Continental Shelf East of the Mississippi River

Water quality on the continental shelf from the Mississippi River Delta to Tampa Bay is influenced by river discharge, run-off from the coast, and eddies from the Loop Current. The Mississippi River accounts for 72 percent of the total discharge onto the shelf (SUSIO, 1975). The outflow of the Mississippi River generally extends only 75 kilometers (km) (45 mi) to the east of the river mouth (Vittor and Associates, Inc., 1985) except under extreme flow conditions. The Loop current intrudes in irregular intervals onto the shelf, and the water column can change from well mixed to highly stratified very rapidly. Discharges from the Mississippi River can be easily entrained in the Loop Current. The flood of 1993 provided an infusion of fresh water to the entire northeastern GOM shelf with some Mississippi River water transported to the Atlantic Ocean through the Florida Straits (Dowgiallo, 1994). Hypoxia is rarely observed on the Mississippi-Alabama shelf, although low dissolved oxygen values of 2.93-2.99 mg/l were observed during the MAMES cruises (Brooks, 1991).

The Mississippi-Alabama shelf sediments are strongly influenced by fine sediments discharged from the Mississippi River. The shelf area is characterized by a bottom nepheloid layer and surface lenses of suspended particulates that originate from river outflow. The West Florida Shelf has very little sediment input with primarily high-carbonate sands offshore and quartz sands nearshore. The water clarity is higher towards Florida, where the influence of Mississippi River outflow is rarely observed.

A three-year, large-scale marine environmental baseline study conducted from 1974 to 1977 in the