ACCESS NUMBER: 30720

STUDY TITLE: Effects of Offshore Emissions on Ambient Levels of Atmospheric SO2 at Breton Sound, LA**Error! Bookmark not defined.**

REPORT TITLE: Measurements of SO_2 Concentration And Atmospheric Structure In Delta And Breton Wildlife Refuges, Louisiana In The Summer, 1993

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SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Northeastern

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KEY WORDS: Northeast Gulf of Mexico; Delta Wildlife Refuge; Breton Wildlife Refuge; air pollution; ambient SO_2; energy production; radiosondes; mixing height; NAAQS; Class I; Class II.

BACKGROUND: Considerable offshore energy production is in existence in the Outer Continental Shelf (OCS) region of the Gulf of Mexico. Portions of the coastlines of Louisiana, Mississippi, and Alabama and their associated barrier islands serve as National Seashores and Wildlife Refuges, and have been designated as Class I and II by the EPA. Since emissions of sulphur compounds and nitrous oxides are a by-product of the OCS production, it seems inevitable that some of these pollutants will affect these protected areas. This report presents the results of a pilot study to determine the current ambient concentration of SO_2 in these areas as well as some aspects of the local meteorology which may influence pollution transport.

OBJECTIVES: (1) Measurements of atmospheric SO_2 concentrations and local meteorological conditions in the Breton and Delta Wildlife Refuges; and (2) analysis of the structure of the marine atmosphere over these areas.

DESCRIPTION: During the summer months, high pressure systems typically prevail over the northeast Gulf of Mexico, creating air stagnation and the likelihood of high ambient pollution concentrations. Three stations were established during July - September 1993 to monitor atmospheric SO_2 concentrations and meteorological conditions: two in the Class I Breton Wildlife Refuge at Gosier Island (29°29.34'N 89°10.45'W), and the third in the Delta Wildlife Refuge at Pass-A-Loutre. SO_2 concentration was measured at all sites by a Thermo-Electron Model 43A Pulsed Fluorescence SO_2 Analyzer. Measured meteorological parameters included surface air temperature and wind speed and direction. Data was recorded on site by dataloggers which were downloaded several times during the deployment when the stations were serviced and calibrated.

SIGNIFICANT CONCLUSIONS: Maximum 24 hour average SO_2 concentration (3 ppb) measured during the study period was only 2% of the NAAQS (140 ppb) allowable once per year. Average SO_2 concentrations appear higher in the Breton Wildlife Refuge than at the Delta Wildlife Refuge. Large scale weather events (fronts, low pressure centers, tropical storms, etc.) appear to directly affect pollution concentrations in our study area. Average mixing heights over the area were approximately 670 m.

STUDY RESULTS: Harsh environmental conditions and the necessary use of battery power caused much of the air quality records from Breton and Gosier Islands to be excluded from this analysis. Good instrument calibrations were achieved during the final three weeks of the deployment at all sites. Comparison of the meteorological data records shows excellent agreement amongst the sites, which suggests that weather conditions were nearly homogeneous over the area. During these weeks, an early season frontal passage occurred on 11 September 1993. Averaged 3-hour and 24-hour SO_2 concentrations at each site were at least twice as high after the frontal passage (when wind blew from land to sea) as pre-frontal (from sea to land), with concentrations at the Breton Wildlife Refuge 2 to 3 time higher than at the Delta Wildlife Refuge. However, it should be noted that the majority of all hourly concentrations recorded after calibration was less than 10 ppb.

As part of a separate air quality study conducted during the summer of 1993 (Gulf of Mexico Air Quality Study), radiosondes were launched a minimum of twice daily from the Chevron platform GB 236A (located at 27.8°N 93.1°W). This data set was analyzed to determine the mixing height to be about 670 m over GB 236A. Since there is little variation in air and sea surface temperatures over the shelf in the summer, these height statistics should approximate conditions over our area as well.

STUDY PRODUCT(S): Hsu, S.A. 1995. Measurement of SO_2 concentration and atmospheric structure in Delta and Breton Wildlife Refuges, Louisiana in the summer 1993. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 95-0019. 74 pp.