

STUDY TITLE: The Environmental and Safety Risks of Increasing Activity by Independents on the Federal Outer Continental Shelf (OCS)

REPORT TITLE: Environmental and Safety Risks of Expanding Role for Independents on the Gulf of Mexico OCS

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PROJECT MANAGER: Allan G. Pulsipher

AFFILIATION: Louisiana State University Center for Energy Studies

ADDRESS: One East Fraternity Circle, Baton Rouge, LA 70803-0301

PRINCIPAL INVESTIGATORS*: A.G. Pulsipher, O.O. Iledare and R.H. Baumann, D.E. Dismukes, and D.V. Mesyanzhinov.

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BACKGROUND: The apparent refocusing of E&P activities and investments abroad by majors and larger independents in the early 1990s and the resulting larger relative role for smaller independents in domestic E&P activity led to pessimism about the prospects of the Gulf of Mexico OCS maintaining its role as an important domestic source of petroleum supply (Gachet, 1993 and Trent, 1994). Similarly, these concerns also led to fear--evident in both industry and regulatory circles--that an expanded role for smaller independents on the OCS would pose greater risks to worker safety and the marine environment. The premise underlying such apprehension was that as major oil companies shifted their E&P investments abroad, relatively more domestic E&P would fall to smaller independent companies, which do not have the majors' technical, scientific, or regulatory skills.

OBJECTIVES: Our objective was to determine if these concerns about the expanded role for smaller independents on the OCS rest on objective facts or subjective impressions. Is there persuasive evidence that an expanded role for smaller independents on the OCS would:

- 1) hinder the pace or effectiveness of petroleum resource development and
- 2) pose greater environmental and safety risks?

As the study progressed it also seemed appropriate and efficient to use our data to determine if the Minerals Management Service's (MMS) safety and platform inspection programs have reduced the frequency or severity of accidents or spills in the Gulf. A final objective of the study was to test the "bad actor" hypothesis. This hypothesis postulates that a few "bad actors" with poor safety and environmental performance dominate and distort the offshore industry's safety and environmental record.

DESCRIPTION: For analytical purposes, oil and gas operators operating in the U.S. have been classified into three groups--the majors, large independents and smaller independents. Definitions of these groups vary among different sources of information, but we used the following definitions: Majors are integrated companies with more than 1 billion BOE in petroleum reserves worldwide. Large independents are those firms cited in the *Oil and Gas Journal (OGJ)* list of the largest 100 firms that are not majors, but have assets of at least \$500 million. Smaller independent firms are those appearing on the OGJ list of the largest 300 firms but do not have assets of \$500 million or more.

The primary sources of information used in this study are the MMS events and platform inspection files. The events file contains narrative and numerical information on unplanned or unexpected incidents relating to: 1) environmental damage or upset; 2) workplace accidents resulting in bodily injury, illness, disease, or death. Accidents are also characterized by cause, e.g., loss of well control, spills, fires, explosions, loss of structure, and collision. Comparable data on violations of operating orders (recorded as instances of noncompliance of "INCs") are available from MMS' platform inspection data system. These data were organized on an operator-by-operator basis.

We used descriptive statistics to compare environmental and safety records of OCS operators by reviewing the types and causes of safety and environmental events and analyzing measurable effects of each event in terms of deaths and injuries sustained, lost time, pollution spills, and property damage. We also defined measurable indicators of operator performance such as nominal, weighted and relative accident and spill rates. These rates were used to measure trends in safety and environmental performance of majors and independents in OCS E&P operations.

Regression models were then used to examine the association between the accidents and spills and several hypothesized explanatory variables, such as: the average age of platforms operated, the distribution of platforms by type of operation and/or product (i.e., production, drilling/oil or gas), the effectiveness of regulation and its enforcement as captured by the number of inspections and instances of noncompliance, and firm-size. The effects of these factors on accidents and spills in oil and gas E&P operations were evaluated using a panel data set of firms classified as majors, large and small independents over the period 1987 - 1993. Using this data, we estimated a Tobit specification of accidents and spill rates. The study also attempt to use weighted least

squares regression analysis to evaluate the impact of "bad actors" (firms with significantly worse than average accident and spill records) on the industry-wide statistics.

SIGNIFICANT CONCLUSIONS: Our analysis is relevant to MMS policy and program planning only insofar as proposals for new policies or changes in policies are driven by the premise that a larger role for smaller, independent firms poses new or heightened risks to worker safety or the environment. Statistical and descriptive analyses of recorded accidents and oil spills in the MMS event file provide little evidence to support this premise. In fact, simple comparisons indicate that independents have performed better than the majors, and if this performance were to be maintained, the independents should not pose additional risks to workers or the environment. Further, it is evident from our econometric results that the aging of operating platforms, firm-specific effects, year-specific effects and safety and inspection programs of the Minerals Management Services (MMS) significantly, in a statistical sense, affect accidents or oil spills during E&P operation. This finding may be relevant for MMS's ongoing efforts to develop standards for "re-qualifying" older platforms.

STUDY RESULTS: Descriptive statistics show that the nominal or un-weighted accident rate, measured as the number of accidents per million platform-hours, was 3.34 for majors, 3.01 for large independents, and 2.08 for small independents. Similarly, a weighted accident rate which attempts to distinguish among accidents according to their severity--by weighting accidents without injuries as one, accidents with injuries as five and accidents with fatalities as twenty-five--was 8.00 for majors 5.35 for large independents, and 3.85 for small independents.

We also calculated each operator-category's weighted accident rate as the category's share of the industry's total accidents or spills divided by their share of total platform years. Thus, a value smaller than one means that the operator had a smaller share of weighted accidents than of platform years and *vice versa*. According to this measure, the ratio for majors was 1.22 compared with a ratio for independents of approximately 0.6.

The differences among majors and independents measured in spills rather than accidents were similar but more extreme. For example, relating reported spills to platform hours, we found majors reported 255 barrels spilled per million platform hours, and Independents reported 24 barrels spilled per million platform hours. Using production as the basis for comparison, we found majors reported 15 barrels spilled for each million barrels produced, while independents reported four barrels spilled per million barrels produced.

Regression results confirm that holding all other, intervening; factors constant, large and small independents are less likely to have an accident or oil spill during E&P operations than the majors. Our regression equations indicated that the age of platforms is an important intervening variable, as are our measures of MMS's platform inspection program. Other influences that we hypothesized as important, such as the proportion of

drilling compared to production taking place on the platform, did not turn out to be statistically significant.

A final objective of the study was to test the "bad actor" hypothesis. This hypothesis postulates that a few "bad actors" with poor safety and environmental records dominate and distort the safety and environmental statistics. We found a relatively small number of firms that were significantly different from the average according to traditional statistical criteria, but the pattern of our results were not affected when these "bad actors" were excluded from our analysis.

STUDY PRODUCTS: Pulsipher A. G., Iledare, O. O., Baumann, R. H., and D. Mesyanzhinov. 1995. Operating Performance and Environmental and Safety Risks: A Preliminary Comparison of Majors and Independents. Offshore and Arctic Operations 1995, PD-Vol. 68, pp. 219-228.

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