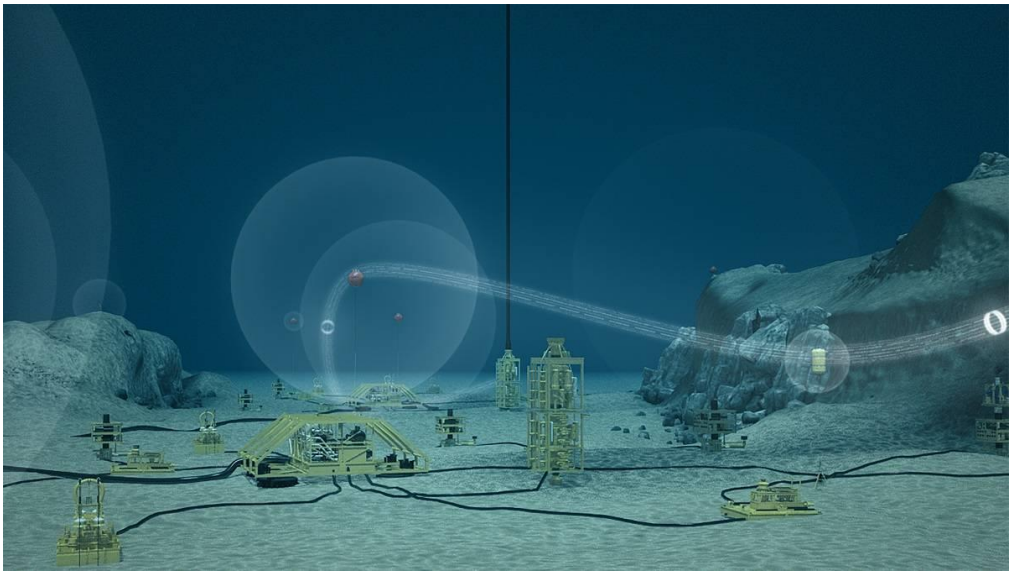

**Deepwater Oil and Gas Production Facilities**
**Noise Evaluation Program Overview**

As the era of "easy oil" is sun-setting the fossil fuel industry is increasingly developing offshore deepwater fossil fuel Extraction and Production (E&P) operations. This is occurring in water as deep as 3000 meters (10,000 ft.) and due to the depth the technologies used involve deployment of a lot of processing equipment on the seafloor. This equipment is operating under extreme pressures, and often processing materials from the wells also at extreme production pressures. It is an environment where all mechanical and technical equipment management is done remotely by way of Remotely Operated Vessels (ROVs), or Autonomous Underwater Vessels (AUVs) served by underwater acoustic communication networks.

There has been little assessment of the offshore impacts, particularly in regards to the noise pollution. Given the extreme pressures and the nature of the physical infrastructure of these operations they are most likely generating pretty loud noise fields. There is increasing evidence of this, but heretofore there has been no calibrated assessment of these noises. We have been concerned about this for some time because we are beginning to see the impacts of marine industrial noise on whales, dolphins, and fish.

We are currently developing a program to evaluate the acoustical impacts of seafloor hydrocarbon processing. The program involves dropping a drifting acoustical profiler in the proximity of some of these installations to get a calibrated read on the range of equipment and acoustical conditions found in these operations. The data can be used to determine the impacts of the noise on marine animals, and hopefully inform policy and practice to mitigate the impacts (if required).

In assessing the best way to accomplish this we are working with JASCO Marine Sciences and have come up with a program that involves a boat with an onboard acoustic lab, and a drift buoy fitted with broad band hydrophones attached to a radio transmitter buoy by way of a catenary umbilical. This surface buoy would communicate with the boat for real-time evaluation/analysis. We plan of

deploying this over the course of a month to drift across a number of working seafloor (subsea) fields.

There are a number of good subject study sites: The Congo Canyon off Angola, the Brazilian Outer Continental Shelf, and the Gulf of Mexico are all possibilities. There are a number a factors that need to be considered in the selection of a proper site. The physical concerns include well-head pressure, equipment compliment, characteristic composition of the deposit (gas, oil, water, solids), prevailing currents, and prevailing weather conditions. There are also security concerns as there is often an exclusion zone around these operations for various reasons, and in the case of Angola (for example), there is a security issue with pirates and opportunistic fishermen.

The first phase of this project then would be an assessment of global deepwater operations to come up with the site that would yield the best data for the least cost and security risk. This assessment would likely cost $20,000. Once the best site is selected the program costs would be around $225,000.

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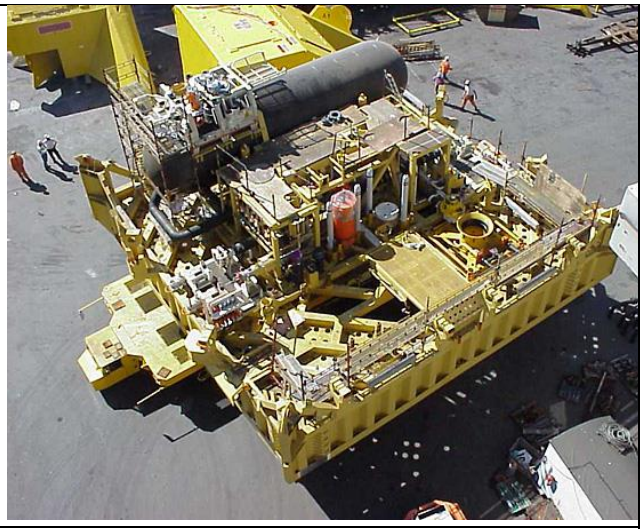
Semi-Submersibe Rig



Seafloor Seperator