MOBILE PRODUCTION UNITS

INTRODUCTION
Mobile production units have been utilized in offshore producing operations since the late 1950's and early 1960's. The earliest forms were specially rigged moored barges to test wells and to receive, store and load out oil which was produced from conventional platforms. During this period a specially built submersible producing unit (Fig. 1) was utilized in the gulf of Mexico as a combination Oil-Gas and water processing station and an oil storage and loading facility. Such early facilities were usually designed for rather low producing, storage and loading rates: ie. 2,000 to 5,000 BPD producing rates and 15,000-20,000 bbl liquid storage capacity.

SUBSEA PRODUCTION SYSTEMS
By the early 1970's mobil producing facilities had grown substantially in both thruput and depth of water and were servicing subsea wells as well as platform wells. Figure 2 shows such a unit serving platform wells in the gulf of Mexico. Units serving subsea wells are characterized by the Ekofisk early production system which was located in about 250' of water in the north sea, Figure 3. The Ekofisk system started producing in June 1971 with four subsea satellite wells producing into a jack-up drilling rig which had been modified for use as a mobile production platform. The subsea wells produced at rates up to 40,000 BPD with 50 MMCF gas/day. The gas was flared and the oil was loaded into shuttle tankers moored to a typical SPM type storage and loading terminal. Over 35,000,000 BBLS of oil were processed through the Ekofisk system before it was replaced with permanent drilling and production platforms and pipelines in mid 1975.

The next major development in mobil production units occurred in June, 1975 when the Argyll field, which is located in 250' of water in the north sea went on production, Figure 4. Initially the Argyll system utilized a modified semi-submersible drilling unit as a production station for four subsea satellite wells with wet trees. Argyll is currently producing at an average rate of 18,000 BPD from 8 subsea wells and has produced over 40,000,000 BBLS of oil to date. The gas is flared from the semi and the oil is pumped by pipeline to an SPM type oil storage and loading terminal. Shuttle tankers are used to store and transport the oil.

Argyll was the world's first oil field to be produced on other than a test basis with a subsea production system which can store, load and ship crude without the use of any fixed platform facilities. The heart of this system is a subsea manifold-riser base and the production and shipping risers connecting the subsea wells with the floating semi-submersible production unit. Each well is produced via a 4½" flowline through the riser to the separators on the semi. The separated gas is then flared from a flare boom located on the semi and the oil is pumped back down a 10-3/4" riser to the subsea manifold and thence via subsea pipeline approximately 1-1/2 miles to a tanker moored to an SPM. With this system the wells must be shut