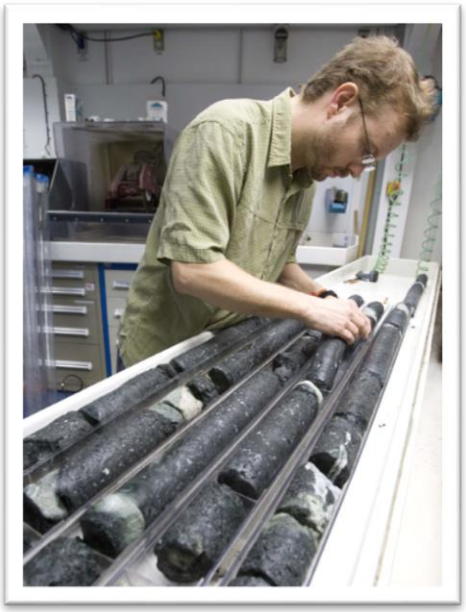
Industry Applications of the Scientific Drilling Vessel *JOIDES Resolution*

The *JOIDES Resolution* is the world's most successful ocean going coring research vessel, whose sole mission has been to explore the Earth below the oceans of the world through coring, laboratory analyses, logging, and downhole measurement activities, virtually continuously since 1985. The *JOIDES Resolution* is a dynamically positioned non-riser drilling/coring vessel capable of operating in water depths in excess of 7 km, with holes cored to depths in excess of 2 km below the seafloor.

Besides its deep coring capabilities, the *JOIDES Resolution* includes a fully equipped scientific laboratory, an underway geophysics laboratory, a suite of slim line heave compensated downhole logging tools, and a range of coring tools for collecting pristine cores in soft sediments or in hard rocks. The Vessel can also be equipped with downhole sampling tools that allow the retrieval of microbiological samples as well as samples at *in situ* pressures, like the frozen methane gas in gas hydrate deposits.

Although the *JOIDES Resolution* is under a long-term contract with the Integrated Ocean Drilling Program, which is primarily funded by the US National Science Foundation (NSF), the ship is available for lease during windows of opportunity, when IODP has no science activities scheduled. NSF's current operation model is to make the ship available for lease for up to four months each year. Leasing is possible for both short-term operations or for ventures extending weeks or months. The *JOIDES Resolution* operates on a world-wide basis and has endurance capabilities to operate

continuously for up to 70 days at sea without re-provisioning or crew changing.



Data collected by the *JOIDES Resolution* provide insights into the Earth system for a range of studies including those of purely academic or industry interest, as well as collaborative ventures, which have the advantage of shared funding, while still providing the leasing client with unique data that can be applied directly to their interests. The ship can also be leased fully for proprietary ventures.
With the *JOIDES Resolution*'s unique capabilities, such ventures include evaluating exploration prospects, geological hazards, geochemical properties, and geotechnical characteristics. Although the riserless drilling vessel is not used to target hydrocarbon traps directly, the ship is ideal for exploring stratigraphic and physical properties of undeveloped prospects or for improved characterization of mature prospects via calibration of stratigraphic, seismic, chemical, and physical properties from boreholes to potential hydrocarbon traps.

Special scientific capabilities of the *JOIDES Resolution* include:

- Stratigraphic coring of soft to hard formations
- Complete analysis of recovered core materials
- Lithologic description, biostratigraphy analysis, ultra-high resolution digital photography, and an array of continuous high-resolution chemical, magnetic, and physical properties data collected along all cores
- Detailed chronostratigraphic analysis using biostratigraphic, magneto-stratigraphic, and cyclostratigraphic methods
- Source rock maturity evaluation
- Pore-water and pore-space gas evaluation
- Pressure sampling of hydrates and other pressure-sensitive materials
- Geotechnical properties: density, porosity, mechanical strength, seismic velocity, thermal conductivity, and downhole thermal gradient
- Downhole Logging: A large array of tools is available through a subcontract with Schlumberger, as well as the unique tools developed by IODP
- Vertical seismic profiling
- Stratigraphic correlation between boreholes
- Core and logging data integration
- Refrigerated core storage for up to 7000 km of core

In addition to scientific stratigraphic coring the JOIDES Resolution is equipped perform batch drilling and setting of surface casing. The Vessel can also be fitted with mud circulation systems to allow for zero discharge in areas requiring same. Being dynamically positioned and capable of operating in either very deep or very shallow water depths, the Vessel can also be equipped with special equipment to recover items on the sea bed from manganese nodules, structures, etc.

JOIDES Resolution Highlights:
Conducting research since 1985
> 500,000 meters cored/drilled
> 250,000 meters of core recovered

> 40,000 cores recovered
> 2,100 holes drilled/cored
> 2,110 meters deepest penetration
> 8,000 meters most core on an expedition
> 5,980 meters deepest water depth
> 140 separate scientific expeditions
< 100 meters shallowest water depth

The JOIDES Resolution is owned and operated by Overseas Drilling Limited, a wholly owned subsidiary of Siem Offshore. The Vessel is 470 feet long, can transit the Panama Canal, and is self-sufficient for extended periods of time at sea. The Vessel is Ice Class 1B and has operated in both Arctic and Antarctic waters.

The Vessel can carry up to 130 persons, and is manned by an experienced personnel consisting of a full marine crew, drilling crew, maintenance crew and laboratory technicians. A team of dedicated scientists can be provided on an as need basis.

The Vessel has an excellent safety records and an excellent track record.

To Summarize: We can provide the World's most successful Scientific Coring Vessel

- Experienced & dedicated crews (Marine, Drilling, Coring, Scientific, Logging)
- Coring capabilities second to none
- World Class scientific laboratories
- Logging and down hole measurement capabilities
- World Class team of scientists
- Ability to run surface casing
- Project Management
- The ability to arrive with innovative means of addressing a clients needs

For leasing information, contact:

Overseas Drilling Limited Westerkade 15-2, 9718 AS te Groningen The Netherlands Tel: +31 508200160 Email: Sjoerd.Berends@siemoffshore.com	Siem Offshore Chartering Department Nodeviga 14 4610 Kristiansand Norway Tel: +47 38 60 04 00 Email: siemoffshore@siemoffshore.com	Siem Offshore Management (USA) Inc. 3833 Texas Avenue South, # 118 Bryan, Texas USA 77802 Tel: +1 979 846 1890 Email: Sjoerd.Berends@siemoffshore.com

Additional information about the *JOIDES Resolution* is available at:

http://www.iodp-usio.org/	http://iodp.tamu.edu/publicinfo/drillship.html