

**PROJECT FACT SHEET**

**CONTRACT TITLE:** Development of a Membrane-Based Process for the Treatment of Oily Waste Waters

**DATE REVIEWED:** 01/28/93

**DATE REVISED:** 11/17/92

**OBJECTIVE:** To develop improved, more economical hollow-fiber membranes from high-strength, chemically resistant polyimides to ultimately develop an oily-water treatment system based on reverse osmosis.

**ID NUMBER:** DE-AC22-92MT92005

**CONTRACTOR:** Bend Research, Inc.

**B & R CODE:** AC1510100

**ADDR:** 64550 Research Road

Bend, OR 97701

**CONTRACT PERFORMANCE PERIOD:**  
03/04/92 to 05/04/93

**PROGRAM:** Lt Oil

**RESEARCH AREA:** Environmental

**CONTRACT PROJECT MANAGER:**

**NAME:** Dr. Scott B. McCray

**ADDR:** Bend Research, Inc.

64550 Research Road

Bend, OR 97701

**PHONE:** (503) 382-4100

**FAX:** (503) 392-2713

**DOE PROGRAM MANAGER:**

**NAME:** Nancy Johnson

**COMMERCIAL:** (202) 586-6458

**DOE PROJECT MANAGER:**

**NAME:** Gene. Pauling

**LOCATION:** MSO

**COMMERCIAL:** (504) 734-4131

**PROJECT SITE:**

Bend, OR

**SCHEDULED MILESTONES:**

Total Project Duration - 14 months.  
 Prepare and Deliver Documentation - 5 months.  
 Development of Hollow Fibers - 6 months.  
 Evaluate Hollow Fibers - 6 months.  
 Make Small-Scale Modules - 7 months.  
 Test Small-Scale Modules - 9 months.  
 Construct Large-Scale Modules - 4 months.

FUNDING (1000'S)	DOE	OTHER	CONTRACTOR	TOTAL
PRIOR FISCAL YRS	48	0	0	48
FISCAL YR 1993	0	0	0	0
FUTURE FUNDS	122	0	0	122
<b>TOTAL EST'D FUNDS</b>	<b>170</b>	<b>0</b>	<b>0</b>	<b>170</b>

**PROJECT DESCRIPTION:** The project will first develop a number of hollow fibers from high-strength chemically resistant polyimides. These fibers will then be evaluated for a number of physical and chemical properties. This will include the use of a scanning electron microscope (SEM), water permeability determination, strength determination and chemical resistance determination. Small scale modules will then be made and tested. Large scale modules will then be constructed and operated to test the effectiveness of this technology on oily waters. Results of this analysis will then be transferred to the oil and gas industry and the scientific community.

**PRESENT STATUS:** The contractor continues to make and evaluate hollow fibers from polymers which are coated to reject oil and grease, test small-scale modules and large-scale modules (1 ft squared) with synthetic oily water obtaining excellent results and preparing a demonstration unit for testing in actual oil production operations in the Harris County, Texas area.

**ACCOMPLISHMENTS:** The results of this study will further the goals of DOE's Oil and Gas Environmental Research Program. These include improving the cost effectiveness of environmental protection, managing drilling and production wastes and emissions, determining the environmental impacts of advanced recovery processes and developing technologies to minimize those impacts, developing data management systems, and transferring technology to oil and gas operators, Federal and State agencies, and the scientific community.

**BACKGROUND:** The goal of this project is to develop an economical oily-water treatment system based on reverse osmosis (RO). This system relies on a first-stage tube-side-feed hollow-fiber membrane module designed to function as a fouling-resistant, "loose-RO" unit. The loose-RO modules selectively remove oil and grease from water. A second-stage, conventional RO module can be used to remove any remaining contaminants.

Previous work in this area through field-testing, indicated that an additional key innovation is required before this technology becomes commercially viable: the development of hollow fibers that are resistant to the organic chemicals present in oily waste waters. Development of these chemically resistant hollow fibers are the focus of this project.