

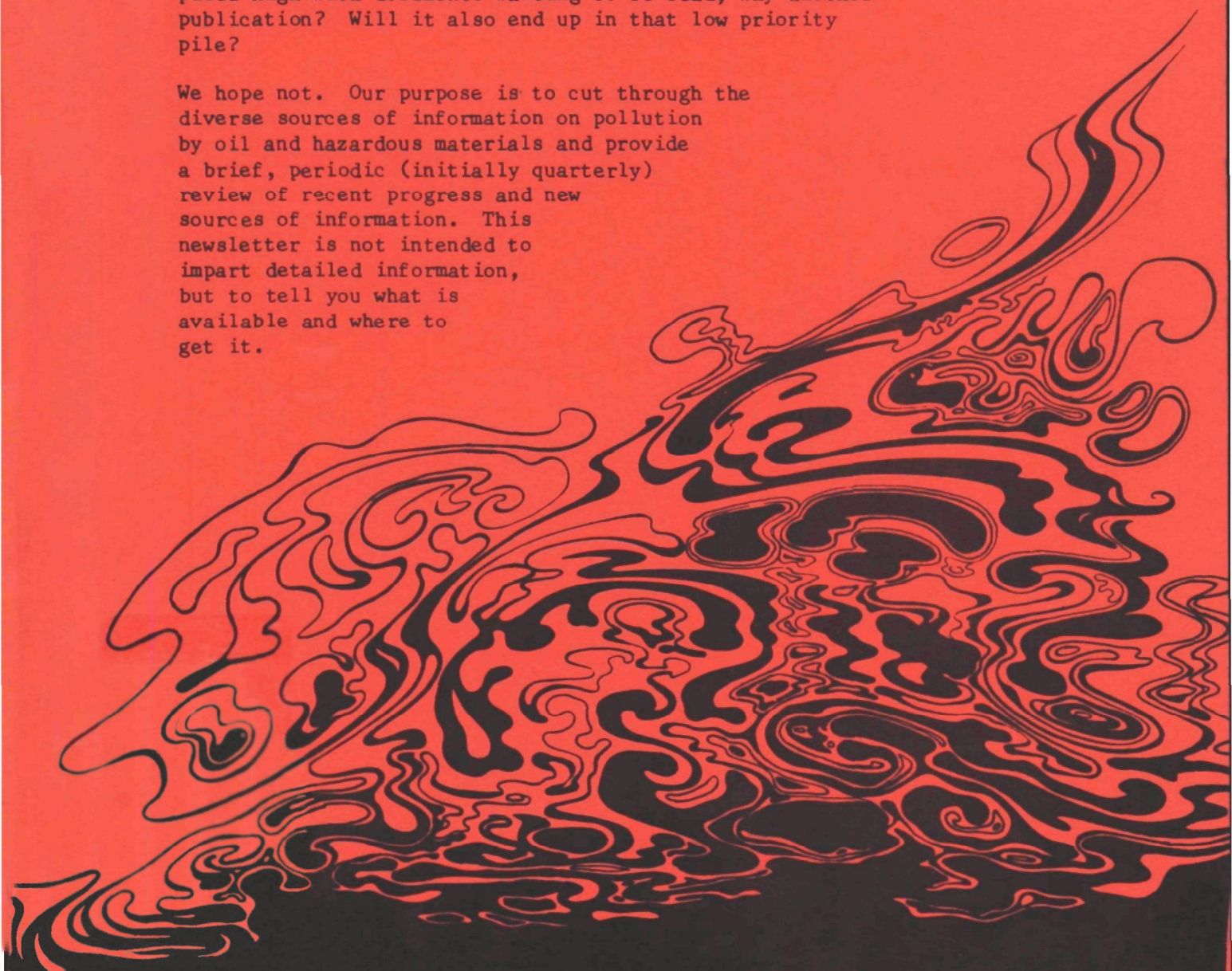


OIL & HAZARDOUS MATERIALS RESEARCH NEWSLETTER

WHY THIS NEWSLETTER?

In this age of the information explosion, when we all have desks piled high with documents waiting to be read, why another publication? Will it also end up in that low priority pile?

We hope not. Our purpose is to cut through the diverse sources of information on pollution by oil and hazardous materials and provide a brief, periodic (initially quarterly) review of recent progress and new sources of information. This newsletter is not intended to impart detailed information, but to tell you what is available and where to get it.



This activity falls within the assigned duties of the Oil and Hazardous Materials Research Section of the Edison Water Quality Laboratory, Edison, New Jersey, since 1968 the center for FWPCA research on the control of pollution from oil and hazardous materials. By this means we hope to provide the latest information on: 1) Progress of research and development projects funded by FWPCA; 2) availability of reports; 3) new products or materials; and 4) important literature references.

API/FWPCA CONFERENCE DRAWS LARGE CROWD

The Joint American Petroleum Institute and Federal Water Pollution Control Administration Conference on the Prevention and Control of Oil Spills held in New York City on December 15-17, 1969, drew an attendance of over 1100 persons, far exceeding the expected 350 attendees.

Forty-three speakers, including representatives from Great Britain, Holland, and Canada, discussed a wide range of topics from boom performance to remote sensing of oil slicks. Ken Biglane's oft quoted comment that "oil pollution is the program with sex appeal" was amply confirmed by Dr. Dale Straughan's domination of the audio-visual displays.

Over forty manufacturers were on hand to display their wares to the potential market, the first organized display of oil pollution control equipment and products to be held in this country.

The conference succeeded in underlining the growing interest in oil pollution and in defining some of the complex problems involved in its control. No simple solutions were revealed. There was a general feeling that oil pollution has been a neglected problem which only recently has received much serious attention, and which requires considerable research. To quote Hal Bernard, in his closing comments at the conference, "No one technique, system, or piece of equipment is entirely adequate. Consequently, we need to develop a whole array of methods to control oil and hazardous materials pollution".

Proceedings of the conference are in print and will be mailed to all registrants. Additional copies can be obtained for a nominal cost from:

Mr. W. A. Burhouse, Secretary
American Petroleum Institute
1271 Avenue of the Americas
New York, New York 10020

NEW REPORTS AVAILABLE ON OIL POLLUTION

Several reports concerning oil pollution have been completed under the direction of the Edison Water Quality Laboratory in the past several months and are now available to interested parties. These reports are:

1. "Oil Dispersing Chemicals" by Melvin Z. Poliakoff.
2. "Biological Effects of Oil Pollution - Bibliography".
3. "Chemical Treatment of Oil Slicks" - A Status Report prepared by the Edison Water Quality Laboratory.
4. "Cleaning Oil Contaminated Beaches With Chemicals" (Available in February 1970).
5. "Oil and Hazardous Materials - Emergency Procedures in the Water Environment".

Requests for Reports #1 to #4 should be made to:

Planning and Resources Office
Office of Research and Development
Federal Water Pollution Control Administration
U. S. Department of the Interior
Washington, D. C. 20242

Report #5 can be obtained by writing to:

Oil & Hazardous Materials Research Section
Federal Water Pollution Control Administration
Edison, New Jersey 08817

FEATURE: BOOMS AND OIL CONTAINMENT DEVICES

Oil retention barriers have been developed to prevent the spread of oil slicks over wide areas. Oil booms may be deployed to encircle oil slicks attempting to reduce the area of coverage and increase the thickness of an oil slick in order to provide feasible recovery, collection and disposal of the oil. Oil booms may also be installed as a barrier to close off prescribed zones where spills may occur or where oils should not enter. For example these areas may include marinas, harbors, oil loading docks, power plant water intakes, etc.

There is a great scarcity of information on oil barrier performance and results obtained from particular boom systems when used in actual spills or field demonstrations have been poorly documented. It is generally concluded the oil booms are unable to withstand strong forces of wind, current, and they can not be towed without losing a portion of the contained oil. No boom system so far has been shown to be successful under all conditions of all spills.

Oil spill containment systems may be broadly generalized into the following types: inflatable booms, plastic-filled or plastic-float booms; thin-wall mounted on bouyant chambers; absorbing type booms; cork booms; wooden booms; straw booms; and other systems including pneumatic or air barriers. To our knowledge there are at least 37 different approaches to the problem of corralling and holding oil spills although many more are presently being developed. It must be recognized that boom systems represent only one set of tools, although it is an important one, to effectively aid in combating oil spills. Oil spill booms should almost always be deployed in conjunction with other equipment and methods for effective control and clean-up. In a simple case, this will mean a skimming or pickup device, whereas, for the serious spill it may mean any number of methods and techniques must be used concurrently to combat the situation.

At the present time there are specific grants and contracts examining oil containment systems. In April 1969, the U. S. Coast Guard issued a research contract to Hydronautics, Inc. to study various physical loadings imposed on an oil spill boom at sea, so as to judiciously design a boom of necessary strength for efficient containment. On July 18, 1969, the U. S. Coast Guard issued a Request for Proposal for concept development of both a prototype light-weight and prototype heavy-weight oil containment system for use on the high seas. One contract was awarded to Wilson Industries of Houston, Texas. In January 1970, the FWPCA awarded a research grant to the Massachusetts Institute of Technology to study environmental factors affecting oil movement, and to develop commensurate design criteria for oil spill booms. This research will include motion and spreading of oil slicks, localized boom motion, associated fluids movement, and forces and flexibility in booms.

In conclusion, we feel that the majority of existing booms and oil containment systems have only limited use, for they generally fail to operate effectively under open sea conditions. It is hoped that new designs and approaches will be stimulated by ongoing research to expand the operational capabilities of booms, which in turn will lead to desirable commercial development of oil spill boom systems.

RECENT OIL SPILLS

I. Hess Oil Spill, Sewaren, New Jersey:

On October 30, 1969 a 218,000 barrel tank at the Hess Oil and Refining Company Terminal in Sewaren, New Jersey collapsed and released its entire contents of crude oil into holding dikes and adjacent marsh area. An undetermined amount of oil, but probably more than 5,000 barrels, reached the Arthur Kill (a strait separating New Jersey and Staten Island) through a drainage pipe from the marsh area. Before the drain pipe could be secured, an oil slick was formed in the Arthur Kill approximately 1 1/2 miles long up to 1/4" thick and extending from shore to shore.

After the drain pipe was secured, some of the diverted oil, in quantities up to six inches deep, flowed into Smith Creek, a small tributary to the Arthur Kill. Three booms obtained from a local aid group of oil companies were placed at the mouth of Smith Creek. Most of the oil was removed by eight vacuum trucks pumping oil from Smith Creek. The Hess Company was advised not to use chemicals since no fire hazard existed, but instead used physical means or sorbent material to remove the oil.

Other action taken included erecting three screen fences containing Sorbent Type C on Smith Creek. The Worthington Corporation's oil recovery catamaran, "Mop Cat" was briefly used along pier areas of the Arthur Kill. Both these methods aided in the clean-up operations, but no impartial documentation was made to measure their overall effectiveness. Natural phenomena apparently dissipated most of the oil slick formed in the Arthur Kill. This phenomena has been previously observed in the New York Harbor area. Clean-up operations of Smith Creek and surrounding marsh areas were completed by December 1969.

II. Grounding of the Barge FLORIDA, Buzzard's Bay, Massachusetts:

On September 16, 1969 the coastal oil barge FLORIDA, carrying 14,000 barrels of #2 diesel fuel, went aground off Chappaquoint Point, Falmouth, Massachusetts. About 4,000 barrels of cargo was lost, much of it blowing into Wild Harbor and Wild Harbor River. Onshore winds kept the oil in the harbor for about three days, before shifting winds dispersed the remaining oil.

Biologists from Woods Hole Oceanographic Institution surveyed the area in the following days. They observed massive initial mortality of marine life. Windrows of dead and dying invertebrates littered the shoreline. Over forty species of animals were affected. Subsequent to the shift of wind and dispersion of the remaining oil, oil was detected in the bottom sediments at depths to 35 feet. Preliminary indications are that this oil is causing death of bottom organisms.

This incident provides a striking illustration of the toxicity of oil - especially the lower boiling point fractions, and a refutation of the commonly accepted assumption that oil itself causes little damage to the environment. Apparently a similarly massive kill of marine life occurred off the coast of New Hampshire last year after a spill of #2 diesel fuel oil, although this has not been generally publicized.

RECENT PUBLICATIONS

1. International Conference on Oil Pollution of the Sea, Report of proceedings, Rome, October 1968. Available from the Secretary, British Advisory Committee on Oil Pollution of the Sea, Natural History Museum, London. Cost is 40 shillings.
2. Oil on the Sea, Proceeding of Symposium held at Cambridge, Massachusetts, May 16, 1969. Editor, D. P. Hoult, Plenum, New York City, \$8.75.
3. Blumer, M. (1969) "Oil Pollution of the Ocean" *Oceanus* 15 (2) 2. (Publication of the Woods Hole Oceanographic Institution, Woods Hole, Mass.) - a good summary of the biological effects of oil.
4. Holcomb, R. W. (1969) "Oil in the Ecosystem" *Science* 166:204 - a short assessment of current knowledge and research needs.
5. Study of Equipment and Methods for Removing Oil from Harbor Waters, August 25, 1969, by Battelle Northwest, for Naval Civil Engineering Laboratory, Point Hueneme, California, under Contract N62399-69-C-0028.
6. Carter, L. J. (1969) "North Slope: Oil Rush" *Science* 165:85.

In addition to these recent publications, several sources provide continuing coverage of oil pollution problems. One of the best, which reports on spill incidents and on research activities is:

Marine Pollution Bulletin, as of January, 1970 to be published monthly by Macmillan, Ltd., London, \$6/yr.

Useful news notes also appear regularly in:

Oil and Gas Journal, a weekly publication of the Petroleum Publishing Company, 211 South Cheyenne, Tulsa, Oklahoma

For those not yet regularly using them, two general bibliographies on oil pollution are available:

1. Oil Spillage Study: Literature Search and Critical Evaluation for Selection of Promising Techniques to Control and Prevent Damage, Battelle Memorial Institute, Richland, Washington. Distribution by Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Document #AD666 289.
2. "A Classified Bibliography of Oil Pollution" by A. Nelson Smith, in Biological Effects of Oil Pollution on Littoral Communities, by J. D. Carthy and D. R. Arthur (eds), Supplement to Volume 2 of Field Studies, Field Studies Council, London.

FWPCA OIL POLLUTION R&D PROJECTS:

Following is a list of grant and contract projects awarded by the Federal Water Pollution Control Administration dealing with oil pollution control:

<u>Grantee or Contractor</u>	<u>Subject</u>	<u>Project Director</u> <u>Expected Comp. Date</u>
University of California, San Diego La Jolla, Calif. 92037	Oil-coated birds: Determine factors contributing to death, develop means of cleaning, determine means for keeping alive in captivity	Lynn A. Griner 12/30/69
University of Michigan Willow Run Branch Ann Arbor, Michigan	Determine multi-spectrum radiation characteristics of crude oil for slick detection	Kenneth P. Burns 9/27/70
Aerojet General Corp. Environmental Systems Div. 9200 East Flair Drive El Monte, Calif. 91734	Feasibility of incinerator systems for removal of oil contamination from beach materials	R. M. Roberts 12/30/69
University of California, Santa Barbara Dept. of Biological Sci. Santa Barbara, Calif.	Santa Barbara and Ventura Counties: Study of oil spill damage - intertidal regions*	Michael Neushal 7/28/69
University of California, Santa Barbara Dept. of Biological Sci. Santa Barbara, Calif.	Santa Barbara Channel: Study abundance and composition of plankton and fish*	A. W. Ebling 12/16/69

<u>Grantee or Contractor</u>	<u>Subject</u>	<u>Project Director</u> <u>Expected Comp. Date</u>
Virginia Institute of Marine Science Gloucester Pt., Va. 23062	Chesapeake Bay entrance: Investigation of surface films to determine influ- ence of wind, wave, and currents	Wyman Harrison 6/1/70
New York University School of Engr. & Sci. University Heights Bronx, New York 10453	Determine and correlate factors influencing spread of oil slicks	Henry C. Schwartzberg 8/22/70
Melpar, Inc. 7700 Arlington Blvd. Falls Church, Va. 22046	Oil tagging system study	Thomas Meloy 9/28/69
Maine Port Authority Portland, Maine 04111	Test and Evaluate: Contain- ment and means of removal of oil in harbors and adjacent waters	Edward Langolis 1/19/70
Garrett Corporation Airsearch Mfg. Co. Los Angeles, Calif.	Centrifuge system development	John L. Mason 5/18/69
Florida State Univ. Dept. of Oceanography Tallahassee, Fla. 32306	Microbiological seeding to accelerate oil degradation	Carl Oppenheimer 4/11/71
Columbia University Lamont-Doherty Geological Observatory Palisades, N.Y. 10964	Molecular interactions at oil- water interface - formation of microemulsions	D. O. Shah 7/1/70
City of Cleveland 601 Lakeside Avenue Cleveland, Ohio 44114	Collection of oil with aid of foam	Edward J. Martin 6/23/70
Battelle Memorial Inst. Pacific N.W. Labs Richland, Washington	Santa Barbara - documentation and assessment of clean-up measures*	Ward H. Swift 7/18/69
Battelle Memorial Inst. Pacific N.W. Labs Richland, Washington	Investigate recovery system utilizing a vortex generator system to be capable of being airlifted	Paul C. Walkup 5/23/69

*Reports concerning Santa Barbara spill are being held for legal review before release, because of pending litigation involving U. S. Government.

<u>Grantee or Contractor</u>	<u>Subject</u>	<u>Project Director</u> <u>Expected Comp. Date</u>
Sonics International Inc. 7101 Carpenter Freeway P. O. Box 47088 Dallas, Texas 75247	Feasibility of transporting oil in emulsion state formed by ultrasonics and additives	C. B. Easley 9/13/69
National Oil Recovery Corporation Hook and Constable Road Bayonne, N. J. 07002	Conversion of waste crankcase oil to useful product without polluting	Solfred Maizus 1/28/70
Western Company 2201 Waterview Parkway Richardson, Texas	Develop system to rapidly gel oil in leaking tanker compart- ments	Jerry Overfield 10/20/70
URS Systems Corp. 1811 Trousdale Drive Burlingame, Ca. 94010	Evaluation of selected earth moving equipment for use in beach cleaning operations	Myron B. Hawkins 6/29/70
City of Buffalo 65 N. Vargara Street Buffalo, New York	Program to prevent and elim- inate oil pollution in the Buffalo River	John Downing 1/28/70
Woods Hole Oceanographic Institution Woods Hole, Mass.	Interaction between marine organisms and oil pollution	Max Blumer 5/18/72
Melvin Z. Poliakoff 24 Knoll Road Tenafly, N. J.	Composition Properties and User of Oil Dispersants	Melvin Z. Poliakoff Report Available
Mass. Inst. of Tech- nology Dept. of Mechanical Engr. Cambridge, Mass.	Seven individual studies directed toward development of design data containment and harvesting systems	David P. Hoult 1/5/71
Melpar, Inc. 7700 Arlington Blvd. Falls Church, Va. 22046	Application of froth flota- tion separation for beach restoration	Thomas Meloy 12/15/70

For further information on individual projects, please contact the Oil and Hazardous Materials Research Section, Federal Water Pollution Control Administration, Edison, New Jersey 08817.

SERVICES AVAILABLE

The Oil and Hazardous Materials Research Section has accumulated considerable information which is available on request. Included are:

1. A quick reference file on commercial and natural chemical additives for oil pollution control and their properties.
2. A general file of commercial devices for operational control, such as booms, skimmers, etc.
3. A collection of articles and reprints on oil pollution control.
4. A museum of common commercially available products.
5. Analytical data on more than 8,000 crude oils.

CAN YOU HELP US?

We wish to keep our information system current. Please let us know of any new products, systems or reports you feel may be pertinent and we will spread the word.

Address all correspondence to:

Oil and Hazardous Materials Research Section
Federal Water Pollution Control Administration
U. S. Department of the Interior
Edison, New Jersey 08817

Our Commercial Telephone Number: (201) 548-3347, Ext. 25

Our FTS Telephone Number : (201) 846-4625.

WHO'S WHO IN OIL POLLUTION RESEARCH AND DEVELOPMENT

HEADQUARTERS, WASHINGTON, D. C.

Dr. David Stephan - Assistant Commissioner for R&D
Allen Cywin - Director, Div. of Applied Science & Technology
Harold Bernard - Chief, Agricultural & Marine Pollution Control Br.
Ralph Rhodes - Chief, Oil Pollution Control Section

EDISON WATER QUALITY LABORATORY

Kenneth H. Walker - Director, Edison Water Quality Laboratory
Richard T. Dewling - Acting Chief, Research & Development Branch
Dr. Thomas A. Murphy - Acting Chief, Oil & Hazardous Materials Research Sect.
Leo T. McCarthy, Jr. - Chemist, Oil & Hazardous Materials Research Section
Patrick M. Tobin - Engineer, Oil & Hazardous Materials Research Section
John F. Vining, III - Physical Scientist, Oil & Haz. Materials Research Sect.
Howard Lamp'l - Oil Spill Control Coordinator (Operations Consultant)
Richard R. Keppler - Oil Pollution "Consultant" (Boston, Mass. Office)