



Project Summary

Coal-Waste Artificial Reef Program

P. M. J. Woodhead, J. H. Parker, H. R. Carleton, and I. W. Duedall

For utilities in coastal urban areas, converting coal ash and scrubber sludge into artificial ocean reefs can be an economically attractive, environmentally acceptable means of coal-waste disposal. This innovation in coal-waste management has an added benefit—the reefs create a sheltered habitat for fauna and fish.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

In urban areas such as the industrial Northeast, disposal of coal combustion by-products poses serious economic and environmental problems. Because few land disposal sites are close to power plants, utilities usually transport wastes to remote facilities. Consolidating wastes with additives and curing the mixture into blocks to construct artificial ocean reefs may be an economical alternative.

Approach

After analyzing several combinations of coal-waste materials, the research team selected stabilized blocks of coal ash and scrubber sludge for further study. In field and laboratory investigations, they measured how blocks exposed to seawater changed in mineral content, chemical composition, and characteristics such as strength, porosity, and permeability. Bioassays determined whether leachates from the blocks were harmful to marine organisms. Cement block machinery converted wastes from

plants operated by Columbus and Southern Ohio Electric Company and Indianapolis Power and Light Company into 15,000 blocks. In September 1980, the blocks were placed in a reef in the Atlantic Ocean off Long Island. For 3 years, researchers monitored the structural integrity of the blocks, tested for possible trace metal leaching, and observed local marine life.

Results

Despite 3 years of seawater exposure, the physical integrity of the reef remained intact. In fact, the coal-waste blocks showed compressive strengths and densities either the same or greater than when they were fabricated. The reef had no adverse effect on local fish populations because elements in the reef that might harm sensitive marine organisms proved to have very slow or negligible leaching rates. The study also demonstrated that the organisms on which these fish populations feed will colonize on the blocks. Engineering and economic evaluations indicate that, for utilities in the urban Northeast, the production, transportation, and construction costs associated with coal-waste reefs are competitive with comparable expenses for other disposal methods. These evaluations also emphasize the importance of locating the reefs away from commercial trawler routes and in sufficiently deep water to prevent obstruction to navigation.

P. Woodhead, J. Parker, H. Carleton, and I. Duedall are with the Marine Sciences Research Center, State University of New York, Stony Brook, NY 11794.

Julian W. Jones is the EPA Project Officer (see below).

The complete report, entitled "Coal-Waste Artificial Reef Program," (Order No. DE 85-010 837/AS; Cost: \$16.95, subject to change) will be available only from:

National Technical Information Service

5285 Port Royal Road

Springfield, VA 22161

Telephone: 703-487-4650

The EPA Project Officer can be contacted at:

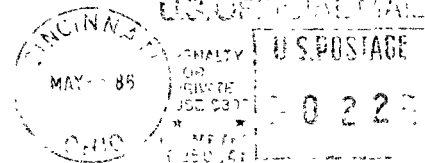
Air and Energy Engineering Research Laboratory

U.S. Environmental Protection Agency

Research Triangle Park, NC 27711

United States
Environmental Protection
Agency

Center for Environmental Research
Information
Cincinnati OH 45268



Official Business
Penalty for Private Use \$300

EPA/600/S7-86/008

0000329 PS

U S ENVIR PROTECTION AGENCY
REGION 5 LIBRARY
230 S DEARBORN STREET
CHICAGO IL 60604