



A water jetting worksite in a burning Kuwaiti oil field.

Water jetting in burning Kuwaiti oil fields

Equipment designed and manufactured by Minnesota-based Jet Edge, Inc., played a major role in the control and capping of oil wells set on fire during the Gulf War.

Once the oil well fire was extinguished, Jet Edge's ultra-high water-pressure equipment was put to work, cutting damaged pipes and valves away from the still flowing well. In this highly-flammable environment, it was impossible to perform these cutting tasks using convention methods. According to experts in the field, this is the most dangerous and difficult time in the capping of the well. Many times the well and

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(303)273-3653

Association Manager

Mark S. Birenbaum, Ph.D.
(314)241-1445

Association Office

Water Jet Technology Association
ATTN: Dr. George Savanick
818 Olive Street - Suite 918
St. Louis, MO 63101, USA
(314)241-1445 FAX: (314)241-1449

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Water jetting in Kuwait, from page 1



Abrasive jet cutting through orifice well head casing on an extinguished well in Kuwait.

surrounding oil-soaked ground was still boiling hot when the waterjet began cutting through the sabotaged control valves, so new valves could be installed. Able to cut through the several layers of steel and concrete in the 2-foot-diameter well pipe string in a single pass, the waterjet method is much faster and safer than previous methods. The Jet Edge method cut the time to under an hour from several days for other methods, greatly increasing the number of oil wells brought under control each week.

In the Gulf Region, an international consortium, including Bechtel (U.S.), and Harben (U.K.), under contract to Kuwait Oil Co. (KOC) continues to purchase additional pumps and cutting systems to expand their current fleet of Jet Edge machines for this and other applications. These pump units use a 250-horsepower diesel engine to power the 36,000-lb/in² generating intensifier pump unit. Using special hose, this pressurized water is delivered to a special remote-controlled cutting device, also manufactured in Minneapolis, MN, by Jet Edge. At this point, garnet abrasive is fed into the waterjet stream to enable cutting virtually any material. The small amount of water used (3 gallons/minute) is of great significance in a situation, such as Kuwait, where every gallon must be trucked in. After the wells were under control, this same equipment went to work cleaning and reconditioning refineries shut down or damaged during the war.

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Water jetting on former anthracite coal mining lands

Congressman Paul E. Kanjorski (D-PA) announced the creation of the Earth Conservancy, a new Northeastern Pennsylvania-based institution that plans to form an Applied Research Center with a consortium of universities and colleges, obtain the assets of the bankrupt Blue Coal Corp., and conduct extensive environmental restoration of the mine-scarred land.

The Earth Conservancy, in cooperation with a consortium of Wilkes University, King's College, and the University of Missouri, will be the recipient of a \$20 million Federal appropriation secured by Kanjorski to take promising environmental and energy-related technologies from the laboratory to the marketplace.

Joining Kanjorski at the announcement were Dr. Christopher Breiseth, President of Wilkes University and Chairman of the Earth Conservancy Board of Directors, Rev. James Lackenmier, President of King's College, and Dr. Don Warner, Dean of the School of Mines and Metallurgy at the University of Missouri. Also present was Attorney John Doran, representing the Trustee for the bankrupt Blue Coal Co., Frank McDonnell.

"The Applied Research Center will identify promising, innovative technologies, develop and demonstrate their economic feasibility, and then help move these technologies to commercialization," explained Kanjorski.

The Applied Research Center is working in conjunction with the newly expanded environmental technology development program of the Department of Defense. The Earth Conservancy has been involved in environmentally benign methods of recycling, alternative energy technologies, and restoring environmentally damaged land.

An initial project of the Applied Research Center will be to further develop the waterjet technology pioneered by the University of Missouri. One of the many potential uses of the waterjet technology is the demilitarization of ammunition and other types of military hardware. While the equipment would be designed and built by the Applied Research Center, the machines will be taken to the military bases where these materials are stored and the demilitarization would be performed on that site.

Another potential use of the waterjet technology is the robotic mining of anthracite coal to create a slurry that would serve as a substitute for diesel fuel.

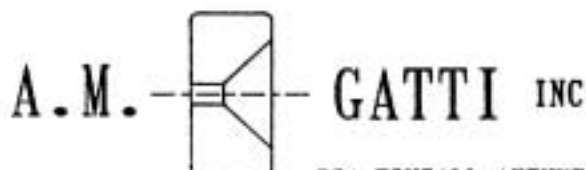
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From the President's Desk

Seattle, Washington, has been chosen as the site of the 7th American Water Jet Conference to be held in August 1993. Mohamed Hashish, of Quest Integrated Inc., will be the conference chairman. These decisions were made at a meeting of the Board of Directors held in Chicago on January 18, 1992. The Board also decided that the 8th American Water Jet Conference will be held in Houston, Texas, in August, 1995.

The 7th American Water Jet Conference will continue the practice begun at the 6th Conference of holding parallel sessions of research papers concurrent with special interest sessions. Special sessions on manufacturing applications and on issues of interest to contractors will be offered.

In another action, the Board decided to offer certificates of membership to members and annual membership plaques to corporate members.

The Board will also seek help from manufacturers and distributors of equipment in recruiting new members, and seek contractors to stand as candidates for election to the Board of Directors.

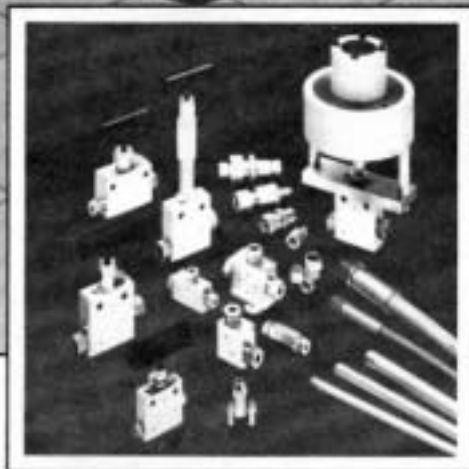
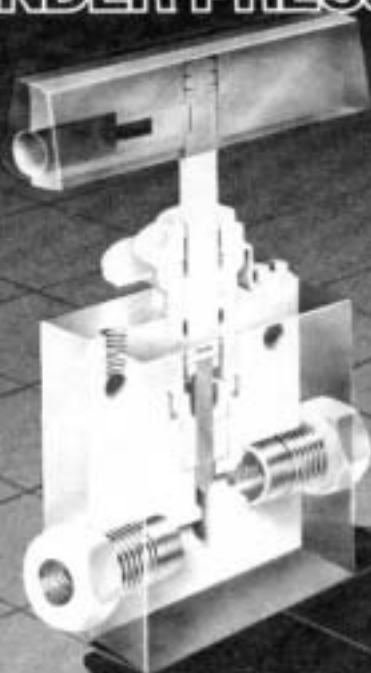
- George A. Savanick, Ph.D.

Water jet automatic clothes washing machine

The April 1986 issue of *Appliance* magazine describes the Jetsystem automatic clothes washing machine manufactured by Zanussi of Italy. In this machine, the laundry does not lie in a detergent-water mixture, but is constantly sprayed by water and detergent solution as it is agitated in a stainless steel tub.

Water is collected in a reservoir beneath the drum. It is then reheated, recirculated, and resprayed over the clothes. The clothes are tumbled back and forth under the spray. The tub is spun periodically to remove water and dirt.

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Water jetting in the airline industry

Delta Airlines has become the first airline to procure a new, environmentally safe and economical system for the high-pressure waterjet stripping and cleaning of jet engine components. Delta is purchasing the Automated Robotic Maintenance System (ARMS) for engine components from United Technologies Corp.'s USBI Co. of Huntsville, AL, with subcontractor Jet Edge, a subsidiary of Possis Corp. providing the ultra-pressure pumps and select components.

ARMS, for engine refurbishment, is contained in an integrated, enclosed workcell that includes a 6° of freedom robot, a variety of nozzles, end effectors, a controller, a turntable, a waterjet pump, software, training, and product support. Jet Edge, a division of Possis Corp. has been selected as the prime subcontractor supplying the ultra-high water-pressure pump and accessories. The system will be delivered by the end of June 1992 to Delta's technical operations center at Hartsfield Atlanta International Airport.

The conventional process for stripping jet engine parts is labor intensive, time consuming and creates unwanted waste materials. The engine ARMS will improve efficiency and virtually eliminate waste by-products.

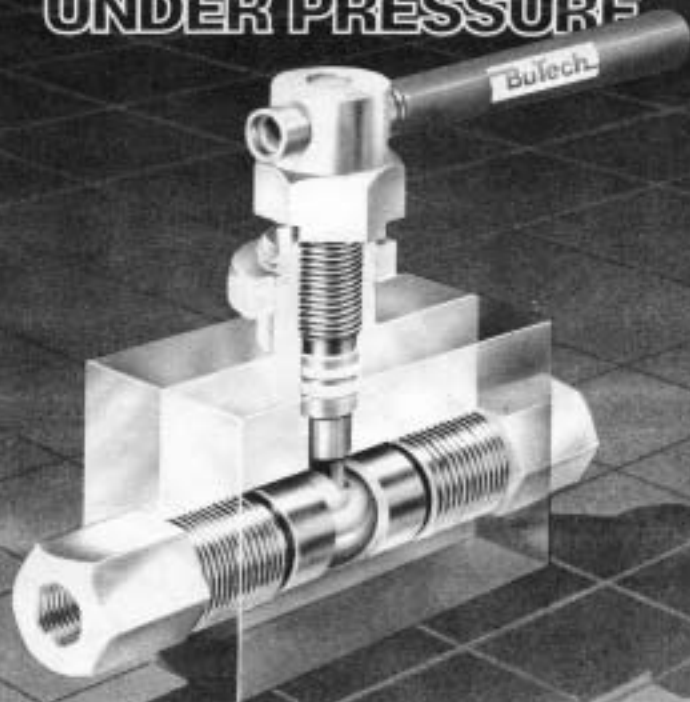
The engine ARMS replaces the acid bath and grit blasting engine part cleaning process with a totally water-based technology. Computers direct the robot, equipped with unique end effectors and patented nozzles, to the engine part that is placed on a turntable. The ultra-high pressure water is directed at specific stand-off distances and angles of attack. The water strips coatings and seals without damaging base metal or substrate.

"We're delighted with Delta's decision to lead the way in this first purchase of our system. We're confident it will meet the challenges of refurbishing jet engines in an environmentally sound and cost-effective way," said Joe Zimons, USBI Executive Vice-President and General Manager.

"USBI engineers have demonstrated significant time savings on several engine components," he said. "One example is the PW 2037 High Pressure Compressor (HPC) front assembly cases where the average cycle time of 16 hours for manual removal of abradable or rubber system seals with acidic baths and grit blasting was reduced to just 1½ hours with ultra-high pressure waterjet," Zimons added.

(continued on page 10)

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To illustrate a point, Butech ball valves are the ultimate in design and performance. Our 316 cold drawn stainless steel construction assures long lasting pressure performance. The blow-out proof stem and ball design, with 1/4 turn positive shut-off, guarantees precise control of liquid or gas flow up to 20,000 psi. A variety of configurations and end connections are readily available.

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- Novel Jets and Applications;
- Direct Pumping of Abrasive Suspension Jets; and
- Water Jetting Contractors Section that covers high pressure flow control valves, a rotary water jet concrete demolition method, a hydro-demolition system, practical applications of portable ultra-high water pressure jet cutting and blasting, self-rotating nozzle heads, recent developments in the high pressure water blast gun, and how to avoid negligence lawsuits.

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The companion handbook for the Water Jet Technology Association's Water Jet Short Course. This handy reference book includes nine chapters written by leading experts in the field. Hardcover, three-ring binding, 225 pages.

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Water jetting in the airline industry, from page 8

USBI's development of high-pressure waterjet systems for jet engines and aircraft is a direct spin-off from its Space Shuttle work under contract to NASA's Marshall Space Flight Center. As the prime contractor for the system engineering, design, processing and refurbishing of the non-motor components of the Space Shuttle's solid rocket boosters (SRBs), USBI has 15 years experience in developing, integrating and operating automated robotic systems for refurbishment of SRBs.

"We're bringing state-of-the-art refurbishment technology to the aviation industry. Technology transfer is a specific USBI goal and Delta is the first commercial entity to benefit from this technology. Several other airlines and aircraft maintenance operators, domestic and international, have also expressed a great deal of interest in our systems, Zimons said.

USBI is also under contract with the U.S. Air Force to provide a Large Aircraft Robotic Paint Stripping (LARPS) system for the service's Aeronautical Systems Division/Wright Laboratory-Manufacturing Technology Directorate. The system is scheduled for a 1995 installation at the Air Force's Oklahoma City-Air Logistics Center, Tinker Air Force Base, OK.

USBI is part of Pratt & Whitney's Government Engine and Space Propulsion unit headquarters in West Palm Beach, FL.

United Technologies Corp. provides a broad range of high-technology products and services to aerospace, building systems and automotive industries. The Hartford, CT, based corporation's best known products include Pratt & Whitney aircraft engines, Carrier heating and air-conditioning systems, Otis elevators and escalators, Sikorsky helicopters Hamilton Standard aerospace systems, Norden defense systems and UT Automotive components and systems.

Jet Edge is a wholly-owned subsidiary of Possis Corp., a publically-held company, based in Minneapolis, MN. In addition to designing and building state-of-the-art ultra-high pressure waterjet pumps and accessories, Possis Corp. also manufactures advanced medical devices focusing in the cardiovascular area.

In the news

WOMA Corporation has opened a new west coast facility in Everett, Washington that features a complete spare parts and accessories warehouse and offers repair services and rental equipment. The new facility is in addition to WOMA's east coast location in Edison, New Jersey. Jim Park has been named the customer support manager for WOMA's new west coast facility.

For more information, contact WOMA toll-free at (800)258-5530.

D&G Industries, Inc. is now the distributor of Spir Star high pressure hoses. Hoses are available with burst pressure up to 105,125 PSI, and working pressure up to 52,560 PSI. Examples of applications include waterblasting, tube cleaning, waterjet cutting, and high pressure hydraulics. For more information, contact D&G Industries, Inc., P.O. Box 487, 21 Charles Avenue, Holbrook, NY 11741, (516)585-8912.

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For more information, contact NLB Corporation, 29830 Beck Road, Wixom, MI 48393-2824 or phone (313)624-5555.

Dr. William A. Lees succeeds Dr. John Rogan as president of **Rogan & Shanley, Inc.**, which is now part of the international Polyflex group.

The changes will allow Rogan & Shanley to offer a broader range of products, and be more responsive to customers special needs. Several new products will be available, including a range of very high pressure hose with eight layers of reinforcement. Contact Rogan & Shanley at 4263 Dacoma, Houston, TX 77092, telephone: (713)686-5236, fax: (713)686-1292.