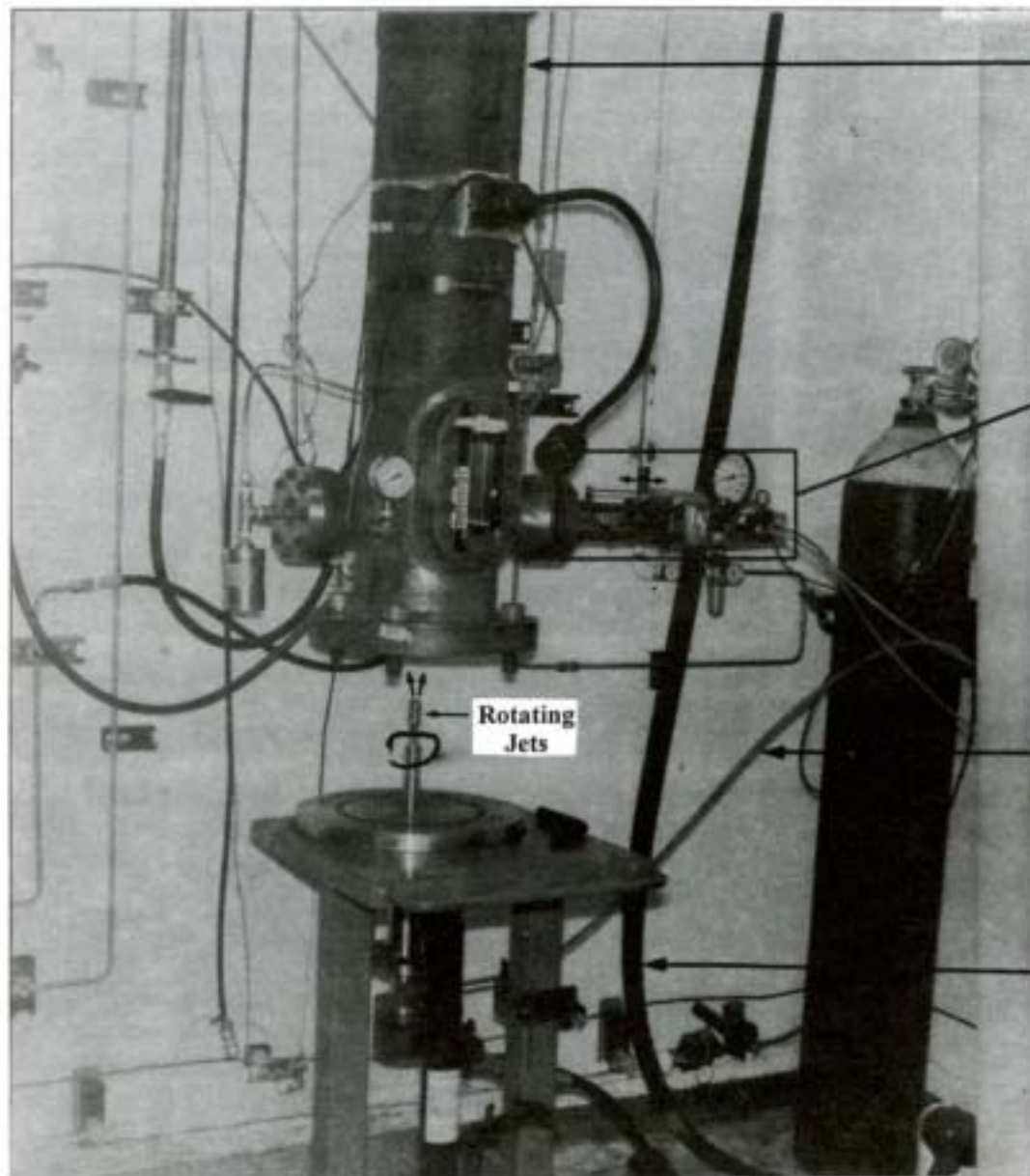




Liquid Ammonia Jets



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Sample Translation

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Jets

High Pressure
Supply Line

Hydraulic Supply
Lines — To
Rotate Jets

Liquid ammonia jetting apparatus used in the Hercules Laboratory

Hercules Inc. is investigating a process to demilitarize large rocket motors and recover energetic ingredients. High pressure liquid ammonia jets are used to fragment the propellant and remove it from the rocket motors.

(continued on page 2)

Jet Edge Introduces New UHP Waterjet Intensifier Pump

Jet Edge, Inc., Minneapolis, Minnesota, now has available the new Model 36-250D ultra-high pressure waterjet intensifier pump. The new 250 hp diesel pump generates up to 7.2 gpm at pressures up to 36,000 psi. The equipment is used for industrial paint stripping at automotive plants, coating removal at chemical/oil refineries, and general plant cleaning applications. It is also used in construction markets for hydro-demolition and nonspark abrasive cutting.

The unit can be operated with a wide variety of cutting and cleaning tools.

For more information, contact Jet Edge at (612)545-1477, fax: (612)545-5670.

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Liquid Ammonia Jets, from page 1

Advantages of liquid ammonia are:

1. AP, HMX, and RDX - energetic ingredients - are soluble in ammonia.
2. Ammonia evaporates from the slurry.
3. Ammonia, although with a slight exothermic reaction, destroys the nitroglycerin which is in some propellants.

Ammonia is volatile and toxic and some method was needed to combine the propellant and ammonia without releasing ammonia vapors. High pressure ammonia jets will be used to fragment the propellant into chips which fall from the motors into process vessels for leaching. An intensifier and lance were modified by and purchased from Jet Edge for this investigation.

Two propellant types were tested to evaluate the hazard of ignition due to impinging propellant with ammonia jets. Propellant samples from MLRS and Chaparral rockets were tested to evaluate impact, vibration, and electrostatic charging hazards. Chaparral propellant was also tested to evaluate the exothermic reaction of nitroglycerin with ammonia.

Samples of these propellants were also used in tests to study the interaction of variables on removal rate and fluid efficiency (mass of propellant removed ÷ mass of fluid used × 100). Variables were jet reservoir pressure (15,000-psi to 36,000-psi), orifice diameter (6-mils to 12-mils), standoff distance (0-inch to 2-inches), manifold rotation rate (200-rpm to 1000-rpm), and translation rate (0.5-in/sec to 2-in/sec). Several manifold types were used.

Results show that on both types of propellant, the highest removal rate is 29.5 gram/sec (over 200 lb/hr) and the jet fluid efficiency is 64%. This efficiency is nearly ten times that reported at 7,000-psi to 10,000-psi and linear jets. For the ranges tested, the most favorable conditions found are: a small standoff distance, high jet fluid reservoir pressure, small orifice diameter, and a high area sweep rate.

From these tests, Hercules concluded that ammonia jetting is a feasible technology for solid rocket propellant removal. Rust International is subcontracted to construct a pilot plant. Jet Edge will provide modifications to the lance so it can be used in the pilot plant. The first operation, expected to begin next month, will be a demonstration trial to wash out an MLRS motor. Initial operating conditions will be based on the results of the lab scale tests. Flow rate will be 1.2 gpm and reservoir pressure will be 35,000-psi. Multiple

(continued on page 7)

Training Water Blast Laborers

Part 2: Completing The Course

By: Larry Moers, Manager of Training,
MPW Industrial Services

In our article in the May 1994 *Jet News*, we discussed the basic strategy for training of water blast laborers. The emphasis was on strong interaction between trainer and trainee to promote long-term material retention. We discussed presentation media and techniques. We saw how different portions of the training required different approaches. In that article we looked at the structure of the class room presentation; this article will look at the setup of the hands-on portion of training, and final course completion documentation.

The hands-on portion of water blast training has many instructional objectives. (An instructional objective is a statement of what the trainee should be able to do as a result of the training.) At MPW those objectives include the ability to recognize selected pieces of water blast equipment, ability to properly prepare an area and/or piece of equipment for water blasting, ability to demonstrate selected safety procedures (such as emergency shut down of the blast pump), and of course, the ability to blast and lance properly and safely.

Under supervision, the trainee prepares the work area by placing barricades and appropriate signage, connects fill and delivery hoses to the pump, flushes lines, secures nozzles to working equipment, and finally, operates a blast gun and lance to clean the equipment.

At MPW, the trainees actually blast a structure that we fabricated specifically for that purpose. This structure has mounted vertical plates for blasting and horizontal tube bundles for lancing. Preparation includes covering the plates with paint, and plugging the tubes with a sand-saturated concrete mix.

Needless to say, the role the trainer plays is crucial to the success of this module. The trainees, especially if inexperienced, are eager to perform, but don't have any idea what acceptable performance is. The trainer not only gives directions, but establishes standards of performance for the trainees to achieve. Why is the barricade tape placed where it is? How much flushing of the lines is adequate? What pressure to blast? To lance? Why...Why...Why. It is important that the trainees be given the chance to think about the task ahead and be given the resources to **make decisions**, for that is truly the aim of this course. No one wants an employee who is capable of carrying out directives, but is unable to think for themselves and use sound judgement.

Proper documentation for this course is straight forward. As instructional objectives are realized, the instructor checks them off on forms that are specifically created for that purpose. When all of the instructional objectives are realized the instructor **and the trainee** both sign and date the form. The form becomes a part of the employee's permanent record signifying that as of this date, the employee has proven competency in the selected areas. Both signatures attest to that accomplishment and the implied obligation that it signifies — that from this point on, the employee can be expected to perform effectively and safely on the job site.

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Report On WJTA Board Meeting

The WJTA Board of Directors met on Saturday, June 11, 1994, at the Hyatt Hotel in Dearborn, Michigan. The Board took the following action:

1. Decided to hold the Ninth American Water Jet Conference at the Hyatt Hotel in Dearborn, Michigan, August 24-26, 1997, along with a short course on water jet technology at the Hyatt on August 23.
2. Approved a new version of *Recommended Practices For The Use Of Manually Operated High Pressure Water Jetting Equipment* and directed that this version be distributed as soon as possible.
3. Decided to provide each member with a complimentary copy of *Recommended Practices* along with a request for suggestions on ways to improve future versions of the document.
4. Decided to offer to present a seminar on water jetting at the National Liquid Waste Industries Trade show in Nashville in 1995.
5. Directed that the Contractor's program at the Eighth Water Jet Conference to be held in Houston in August of 1995 include at least one seminar on specialized subjects such as marketing or pricing.
6. Decided to determine if contractors are interested in a hands-on pump maintenance school to be run concurrently with the short course in Houston in 1995.
7. Authorized the issuance of a "Call For Papers" for the Eighth Water Jet Conference.
8. The next board meeting was scheduled for January 14, 1995, at the JW Marriott Hotel in Houston, Texas.



8th American Water Jet Conference

August 25-30, 1995

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Hydro-Services And Dowell Industrial Acquired By HydroChem Industrial Services

Hydro-Services, based in Missouri City, Texas, has been merged into HydroChem Industrial Services, a newly incorporated company based in Houston, Texas. HydroChem also acquired the North American operations of the Dowell Industrial Services Division of Dowell Schlumberger located in Sugarland, Texas.

HydroChem's wholly-owned subsidiary, HydroChem International, acquired the international operations of the Dowell Industrial Services Division.

Butterworth Offers Water Jetting Training

Butterworth Jetting Systems, Inc., Houston, Texas, has developed a new water jetting and operational training presentation for owners and operators of water jetting equipment. The program covers safety procedures for general water jetting and high pressure equipment used in the industry. Also covered are the basic operating components of a high pressure water jetting unit.

The training classes can be conducted at Butterworth's headquarters in Houston or a Butterworth representative will be sent to the customer's plant or location of choice.

For more information, contact Butterworth Jetting Systems toll free at (800)231-3628.

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W axis - +/- 45 degree (tilt axis)
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Adjustable height X frame for table support and vibration dampening.

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Liquid Ammonia Jets, from page 2

orifices of 7 to 10 mil diameter, each cutting a different circle will rotate on the end of a lance. The lance will follow a helical path through the motor.

This work was initiated by William S. Melvin, Ph.D., U.S. Army Missile Command, Redstone Arsenal, Huntsville, Alabama. The contract is administered by the U.S. Army Corps of Engineers. Hercules Aerospace is prime contractor, and Global Environmental Solutions Inc. provides technical and administrative support. The work is being performed on the Hercules' Bacchus Plant in Magna, Utah. The task leader is R.A. Patterson who can be reached at (801)251-2133.



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Model: EPM-1031-01-03.
Intensifier: Single Intensifier, 1.34 gallons/minute (Same intensifier as triples and quads) remanufactured intensifier with new components. Less than 15 hours use since.
Electrical: 460/3 phase 25hp.
Other: Self contained hydraulic heat exchanger with electric cooling fan, integrated replaceable water filters. Entire unit self contained on heavy duty roller carriage. Excellent condition throughout. Owned by WATER-JET Technologies since 1988.

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DUAL INTENSIFIER 55,000 PSI MAX



Specifications

Manufactured by: Flow International 1985.
Model: 106A 75hp.
Intensifier: Dual Intensifier, 1.13 gallons/minute (.565 gpm per intensifier) Dual controls and manifolds; each intensifier can be operated separately or together. Total time since new: 285 hours.
Electrical: Solid state controls, 460/3 phase 75 hp. 95 AMP Max.
Other: Like new condition. Can be viewed under power. All manuals.
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8th American Water Jet Conference

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First Announcement And Call For Papers

Impressive progress and a fast-growing understanding of the diversified applications of water jet technology is generating a growing excitement in the industry. New techniques and applications are being developed and current ones are being improved upon. Water jet technology, now being used in nearly all types of industry — manufacturing, mining, construction, concrete, stone, aerospace, engineering, process, and medical industries — continues to expand at a rapid pace.

The 8th American Water Jet Conference will focus, from a practical and scientific viewpoint, on the most up-to-date industry advances in water jetting equipment, techniques, and applications. Some of the areas to be addressed include but are not limited to:

- Contractor Applications and Processes
- Jet Mechanics
- Jet-Material Interaction
- Safety and Environmental Protection
- Process Modeling and Control Studies
- Excavation, Tunneling, and Mining Applications
- Drilling Applications
- Rock Cutting
- Cleaning and Coating Removal
- Construction and Non-Manufacturing Applications
- Manufacturing Processes
- Advanced Industrial Applications
- Components and Systems
- Novel Jets and Applications
- High Pressure Equipment and Systems
- Abrasives, Water, and the Environment
- Advances in High Pressure Technology
- Market and Future Needs

Commercial and academic authors are encouraged to submit titles and abstracts for consideration. To submit an abstract(s), please complete the Abstract Submission form on the back of this sheet and forward to the attention of the Conference Coordinator at the Water Jet Technology Association. The deadline date for submission of abstracts is November 1, 1994.

An Abstract Review Committee consisting of six referees, chosen from the Organizing Committee and the International Advisors, will review the abstracts. Authors will be advised by January 31, 1995, regarding the decision of the Abstract Review Committee.

The 8th American Water Jet Conference is organized by the Water Jet Technology Association and is endorsed by the International Society of Water Jet Technology. The Water Jet Technology Association looks forward to providing this forum and to your involvement and participation.

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8th American Water Jet Conference

August 27*-30, 1995

JW Marriott Hotel Houston, Texas

Abstract Submission Form

To submit your abstract(s) for consideration, please complete this form. Abstracts are to be submitted **NO LATER THAN NOVEMBER 1, 1994**, to ensure consideration. Authors will be advised by January 15, 1995, regarding the decision of the Abstract Review Committee.

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Extended abstract (500-1,000 words. Use separate sheet as needed.)

*August 27 is reserved for a Waterjet "Short Course" and Conference Reception.

Mail completed form and abstract, **NO LATER THAN NOVEMBER 1, 1994**, to: **Conference Coordinator, 8th American Water Jet Conference, Water Jet Technology Association, 818 Olive Street, Suite 918, St. Louis, MO 63101-1598, USA, telephone: (314)241-1445, fax: (314)241-1449.**

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URI College Of Engineering

Cherry Semiconductor Corporation, a manufacturer of integrated circuits in Greenwich, Rhode Island, has pledged \$120,000 to the University of Rhode Island's (URI's) Capital Campaign for engineering scholarships and has also given \$5,000 to directly support the University's first-ever Capital Campaign. The scholarship fund will provide scholarship opportunities for Rhode Island students who plan to pursue a bachelor's degree in engineering at URI.

Dean Thomas Kim of the URI College of Engineering said, "This generous gift from Cherry Semiconductor underscores the company's commitment to Rhode Island's citizens and to providing access to an excellent engineering education."

URI's College of Engineering is one of the oldest and most highly regarded accredited engineering schools on the East Coast.

General Pump Announces Appointments, Promotions

Robert Heiland has been appointed sales and marketing manager for General Pump. His responsibilities will include all sales and marketing efforts for high pressure pumps, related accessories, and for the Eagle Power Products line of private label cleaning equipment. Heiland has over 30 years in the pressure cleaning industry and has served in a number of sales management positions.

Thomas Hunt was appointed operations manager to oversee the expansion of General Pump's manufacturing operations. Hunt has years of manufacturing experience in the hydraulics industry.

Dallas Simonette was appointed design engineer. Simonette is knowledgeable in the high pressure pump industry, familiar with UL Standard 1776 (Standard for Safety for High Pressure Cleaning Machines), and the intricacies of the UL approval process.

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