

TECHNOLOGY SAFETY DATA SHEET ULTRA-HIGH PRESSURE WATER JET

SECTION 1: TECHNOLOGY IDENTITY

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	Date Prepared:
Other Names: High Pressure Water	Signature of Preparer:

SECTION 2: PROCESS DESCRIPTION

The Husky™ is an ultra-high pressure water jet cutting tool. The pump is mounted on a steel tube frame which includes slots for transport by a forklift. Utility interface connections are located on the rear bulkhead. The Husky™ also features an automatic shutdown for low oil pressure, high oil temperature, or low inlet pressure, an in-line filter to remove particles larger than 5 microns, a safety valve to relieve system pressure when over-pressure conditions occur, a triplex high pressure pump, and red or amber sensor lights that illuminate for a shutdown condition.

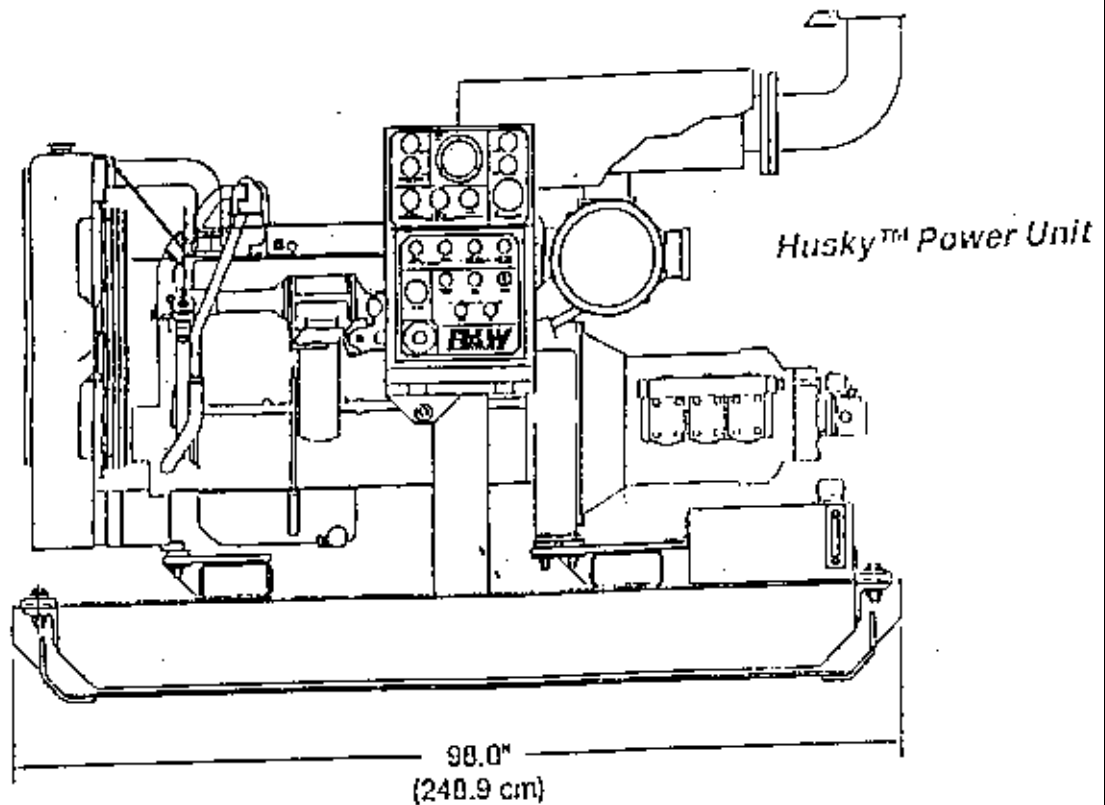
The system requires a water supply of 6 gallons per minute. The pump inlet water is routed through a 5 micron water filter to the pump inlet check valves. During the intake stroke of the pump, water enters the cylinder. At the end of this stroke the inlet check valve closes. On the pressure stroke, the plunger pressurizes

the water until the outlet check valve opens. At the end of the pressure stroke, the outlet valve closes and the cycle is repeated.

Placement of the Husky™ must allow for a three foot clearance on all sides for operation and service access. At maximum continuous operation, the output volume is 7.2 gallons per minute with an output pressure of 40,000 psi. A diesel engine provides power for the system.

SECTION 3: PROCESS DIAGRAM

The diagram illustrates the Husky™ pump. A complete process diagram to include the water jet was not available from the manufacturer.



SECTION 4: CONTAMINANTS AND MEDIA

The technology has the potential to cause concrete associated contaminants to be sprayed up to fifty feet from the point of contact by the water jet. Specific contaminants need to be evaluated on a site by site, job by job basis to determine the potential for exposure.

SECTION 5: ASSOCIATED SAFETY HAZARDS

Probability of Occurrence of Hazard:

- 1 Hazard may be present but not expected over background level
- 2 Some level of hazard above background level known to be present
- 3 High hazard potential
- 4 Potential for imminent danger to life and health

A. ELECTRICAL (LOCKOUT/TAGOUT)

RISK RATING: 3

Technology has the potential to present electrical hazards. Assure proper grounding of all equipment. Compliance with applicable electrical standards and codes and lockout/tagout procedures must be followed to assure the safety of personnel.

B. FIRE AND EXPLOSION

RISK RATING: 1

The water jet does not pose a fire and explosive hazard. The Husky™ pump is powered by a diesel engine which does have the potential to become a fire and explosive hazard.

C. CONFINED SPACE ENTRY

RISK RATING: 1

Not part of this technology unless the specific location where water jet is being used is a confined space. In this case, confined space procedures would need to be followed. This technology would be difficult to use in a confined space due to the spray of water and contaminant and the use of a diesel-powered pump.

D. MECHANICAL HAZARDS

RISK RATING: 3

Use of the Husky™ pump may pose the following: pinch points, struck by, and caught between hazards and fall from above.

E. PRESSURE HAZARDS

RISK RATING: 4

Technology presents a serious hazard from high-pressure water and air. There is potential for severe injury from the water, which could lacerate or amputate parts of the human body.

SECTION 5: ASSOCIATED SAFETY HAZARDS	
F. TRIPPING AND FALLING	RISK RATING: 3
Air lines and water lines present tripping hazards	
G. LADDERS AND PLATFORMS	RISK RATING: 2
The platform the pump resides on presents a fall hazard if it is elevated without railings. Ladders to an elevated platform present a fall hazard if they do not have handrails in order to maintain 3 points of contact while climbing.	
H. MOVING VEHICLES	RISK RATING: 3
The presence of multiple pieces of mobile equipment (which may be needed to unload and load the technology) in relationship to a small area of operation may pose a significant danger. Sufficient warning devices such as horns, bells, lights and back up alarms should be utilized. Personnel should be trained to work with and around moving equipment.	
I. BURIED UTILITIES, DRUMS, AND TANKS	RISK RATING: N/A
Not part of this technology.	
J. PROTRUDING OBJECTS	RISK RATING: N/A
Not part of this technology.	
K. GAS CYLINDERS	RISK RATING: N/A
Not part of this technology.	
L. TRENCHING AND EXCAVATIONS	RISK RATING: N/A
Not part of this technology.	
M. OVERHEAD LIFTS	RISK RATING: 4
Unloading and loading of technology may require overhead lifts or the use of a forklift. Proper precautions indicated.	
N. OVERHEAD HAZARDS	RISK RATING: 2
Would only be present if a crane or forklift were required to unload or load equipment.	

SECTION 6: ASSOCIATED HEALTH HAZARDS	
A. INHALATION HAZARD	RISK RATING: 3
Technology did not produce dust from the concrete and concrete contamination due to the wet operational environment. After the water dries dust could be left on the surface which may become an inhalation hazard if disturbed. Specific hazards will be identified from the site characterization. Diesel fumes from the Husky™ could present a hazard.	
B. SKIN ABSORPTION	RISK RATING: 2
This would be dependent on the contaminants at the site and would be identified by the site characterization. Hydraulic fluid could present a hazard.	
C. HEAT STRESS	RISK RATING: 4
Ambient atmospheric conditions correlated with PPE levels must be considered.	
D. NOISE	RISK RATING: 3
The water jet and the pump present a high noise hazard.	
E. NON-IONIZING RADIATION	RISK RATING: N/A
None associated with this technology.	
F. IONIZING RADIATION	RISK RATING: 1-3
None associated with this technology but the contaminated concrete may present a significant radiation exposure. This will be identified by the site characterization.	
G. COLD STRESS	RISK RATING: 1
Technology does not produce a hazard, but ambient conditions need to be considered.	
H. ERGONOMIC HAZARDS	RISK RATING: 3
Poses ergonomic hazards associated with lifting, bending, twisting, stooping, kneeling, and static posturing. These may cause injury/strain to the back, knees, hips, and/or legs.	
I. OTHER ARM-HAND AND WHOLE BODY VIBRATION	RISK RATING:
Operation of the water jet lance poses a hazard due to arm-hand vibration. This may lead to associated problems such as Raynaud's Syndrome. Additionally, the pump	

SECTION 6: ASSOCIATED HEALTH HAZARDS

operator may be exposed to whole-body vibration depending on the platform where the pump is located.

SECTION 7: PHASE ANALYSIS

A. CONSTRUCTION/START-UP

The set-up/start-up phase presents several hazards including pinch points, slips/trips/falls, struck by/caught between, falling from above, fall to below, muscular/back injury, and electrical.

B. OPERATION

The operational phase presents several hazards including exposure to contaminant (airborne and from the surface), exposure to diesel fumes, hazards associated with high pressure water and air lines, arm-hand vibration, whole-body vibration, muscular/back injury, and exposure to noise. Fall hazards may also be associated with operation of Husky™ depending on what type of surface it is mounted.

C. MAINTENANCE

The maintenance phase presents several hazards including pinch points, slips/trips/falls, struck by/caught between, muscular/back injury, electrical, exposure to contaminants (airborne and from the surface), exposure to hydraulic fluids and diesel fumes, and accidental activation of moving parts.

D. DECOMMISSIONING

The decommissioning phase presents several hazards including exposure to the contaminant, pinch points, slips/trips/falls, and muscular/back injury.

SECTION 8: HEALTH AND SAFETY PLAN REQUIRED ELEMENTS

A. AIR MONITORING

When concrete is removed using a high pressure water jet, dust is not a problem but the spraying of pieces of concrete and possibly other contaminants is highly probable. There may be dust left after the water dries and if disturbed it may become a hazard. Specific needs must be assessed for each job to determine what monitoring needs to be conducted. Monitoring also needs to be done for specific concrete contaminants and may need to be conducted for specific constituents of the concrete such as silica. In addition, noise monitoring is essential.

SECTION 8: HEALTH AND SAFETY PLAN REQUIRED ELEMENTS

B. WORKER TRAINING

Trainings that would apply in this case may include but not be limited to: HAZWOPER (Hazardous Waste Operations and Emergency Response), HAZCOM (Hazard Communication), Respiratory Protection, Hearing Conservation, Ergonomics (proper lifting, bending, stooping, kneeling, arm-hand vibration), Heat stress (learning to recognize signs and symptoms), Personal Protective Equipment, Job specific training for equipment operation, CPR/First Aid/Emergency Response/Blood borne Pathogens, Electrical Safety, Lockout/Tagout, Radiation Safety, Working with high pressure water systems, Hand Signal Communication, Construction Safety (OSHA 500) and or General Industry Safety (OSHA 501)

C. EMERGENCY RESPONSE

Emergency response planning for a site needs to assure adequate coverage for hazards described in the TSDS. Having as many workers as possible trained in CPR and first aid is recommended.

D. MEDICAL SURVEILLANCE

Evaluation of personnel's general health with emphasis on the cardiovascular and respiratory system, back, and peripheral nervous system. Annual audiograms.

E. INFORMATIONAL PROGRAM

Workers must be trained in specific operation of equipment before use.

SECTION 9: COMMENTS AND SPECIAL CONSIDERATIONS

Due to the high levels of noise produced, communication may become difficult. Personnel working in the area should be familiar with and use hand signals as necessary.

Only personnel who have been adequately trained in the operation of this technology should be permitted to operate and/or work with the equipment.