TECHNOLOGY SAFETY DATA SHEET
FRAMATOME TECHNOLOGIES
Victor® Oxy-acetylene Torch
(Equipment Dismantlement)

SECTION 1: TECHNOLOGY IDENTITY	
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	Date Prepared:
Other Names: Oxy-fuel gas Torch	Signature of Preparer: Operating Engineers National Hazmat Program 1293 Airport Road, Beaver, WV 25813, phone 304-253-8674, fax 304-253-7758 Under cooperative agreement DE-FC21-95 MC 32260

SECTION 2: PROCESS DESCRIPTION

The oxy-acetylene torch provides a thermal cutting technique to cut metal pieces. The torch burns the metal and coatings, producing smoke and fumes. The torch can be manipulated manually or it can be placed on a motorized track. The system consists of an oxygen and fuel supply (acetylene), regulators, hose, torch handle, and cutting attachment and tip.

The torch handle is a set of gas tubes with control valves. One tube and valve controls the fuel supply and one tube and valve controls the oxygen supply. The handle is a means of control for the gas supply and the cutting apparatus attached to the handle mixes the oxygen and fuel gas. The elements of the torch handle are the control valves with internal reverse flow check valves, the body “Y”, the barrel and tubes, and the torch head. The control valves are installed in the body “Y” and the valve bodies are marked to distinguish between the two valves. The body of one valve has left-hand threads to accept the fuel gas hose and the other has right-hand threads to accept the oxygen hose. The barrel and inner oxygen tube unit is designed to keep the oxygen and fuel gases separated. A tube-within-a-tube design is used to allow the oxygen to flow through the inner tube and the fuel supply to travel through the interior barrel cavity. The torch head is threaded onto the barrel, creating a metal-to-metal seal. The oxygen is directed through the center hole in the head while the fuel supply passes through drilled orifices around the centered oxygen port. When the cutting attachment is connected, a gas-tight seal is made.

The torch handle has internal reverse flow check valves to reduce the possibility of explosion or fire which may occur as a result of fuel gases and oxygen becoming mixed inside the hoses or regulators. Flashback arrestors are designed to prevent a flashback from reaching upstream equipment.

The cutting attachment functions as a cutting torch. The cutting attachment consists of the cone end and coupling nut, the preheat oxygen control valve, the mixing chamber, the cutting oxygen lever and tube, and the cutting attachment head. The cone end and coupling nut permit easy attachment to the torch handle. O-rings allow continued separation of the oxygen and fuel gases. The center orifice of the cone end allows the passage of oxygen supply and the orifices around the oxygen port allow the fuel gas to travel to the mixing chamber in the lower tube of the cutting attachment. The preheat oxygen control valve controls the preheat oxygen supply from the regulator. The mixing chamber tube is where the oxygen and fuel gas are brought together to produce the desired preheating flame. The cutting oxygen lever and tube allows cutting oxygen to flow through the upper tube of the cutting attachment and the center port of the cutting attachment head. The cutting attachment head allows the oxygen and the mixed preheat gas to stay separated in the cutting operation and the cutting tip keeps the preheat gas mixture and cutting oxygen stream separated to provide flame characteristics needed for a particular cutting application.

Cylinders of oxygen and acetylene are used to supply the gases for cutting. Oxygen and fuel pressure regulators are attached to the cylinder manifold outlets to reduce

SECTION 2: PROCESS DESCRIPTION

high cylinder or supply pressures for cutting applications. The regulator consists of the inlet connection with filter, pressure adjusting screw, high pressure gauge, low pressure gauge, outlet connection, and relief valve. The high pressure gauge indicates the cylinder or supply pressure entering the regulator and the low pressure gauge indicates the delivery pressure from the regulator to the hose. The hose transports low pressure gas (maximum 200 psig) from the regulators to the cutting torch. Hoses are usually color-coded for gas service identification. Oxygen hose is usually green and the fuel hose is usually red. The hoses are flame retardant.

SECTION 3: PROCESS DIAGRAMS

Process diagram not available.

SECTION 4: CONTAMINANTS AND MEDIA

Smoke and fume are generated during thermal cutting with the oxy-acetylene torch. Consideration needs to be given to the contaminants of the metal being cut, any contaminants of coatings on the metal, and contamination in the area where the torch is being used for D&D activities. An air sampling plan will need to be developed, as appropriate for the site where the torch is used.

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: N/A

Not part of this technology.

B. FIRE AND EXPLOSION	RISK RATING: 4

Heat, sparks, and flame present during thermal cutting have the potential to cause fire or explosion. When fire hazards present in the area cannot be moved, guards must be set up to contain heat, sparks, and slag.

Acetylene used as the fuel gas for the cutting operation is a very dangerous fire hazard when exposed to heat, flame, or oxidizers. It is a moderate explosion hazard when exposed to heat or flame or by spontaneous chemical reaction.

Oxygen itself is not flammable but it supports the burning process. Pure oxygen will drastically increase the speed and force with which burning takes place.

C. CONFINED SPACE ENTRY	RISK RATING: 1-4

Not part of this technology unless the specific location where the torch is being used is a confined space. Thermal cutting operations can present additional hazards in a confined space. Confined space entry and rescue procedures must be followed and

SECTION 5: ASSOCIATED SAFETY HAZARDS	
additional consideration given to the limited work space, hazardous atmosphere, slipping hazards, flammability, combustibility, and toxic fumes in relation to their ability to be caused by the thermal cutting process itself.	
D. MECHANICAL HAZARDS	RISK RATING: 1
Assembling the cylinders and the cutting torch poses pinch points.	
E. PRESSURE HAZARDS	RISK RATING: 4
The compressed gas cylinder presents a hazard and is discussed under "K" of this section.	
F. TRIPPING AND FALLING	RISK RATING: 2
Hoses present potential hazards.	
G. LADDERS AND PLATFORM	RISK RATING: 2
Not part of this technology but may be required for D&D activities. All regulations for working from ladders and platforms, including the OSHA scaffolding standard must be followed.	
H. MOVING VEHICLE	RISK RATING: 2
Not part of this technology but may be required for D&D activities. All precautions and safety requirements for large pieces of equipment will need to be followed. For example, all moving vehicles should have working back-up alarms, warning lights, etc.	
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: 4
The compressed gas cylinders of oxygen and acetylene account for one of the primary hazards associated with the oxy-acetylene torch. If the compressed gas cylinders are damaged, gas can escape with great force and the cylinder itself can explode causing injury to workers and possibly damaging property. One example of this type of hazard is called “rocketing”. The cylinder acts as a “rocket” if damaged or ruptured. The “rocket” (cylinder) can break through concrete walls or travel through open spaces.	
L. TRENCHING AND EXCAVATIONS	RISK RATING: N/A
Not part of this technology.	
M. OVERHEAD LIFTS	RISK RATING: 2
Not part of this technology but may be required during D&D activities. All applicable standards and precautions must be followed for the type of equipment used. At a minimum, anyone in the work area should be wearing a hard hat.	
N. OVERHEAD HAZARDS	RISK RATING: 2
May be part of this technology if the piece being cut is overhead. At a minimum, anyone working in the area should be wearing a hard hat. It needs to be assured that all workers in the area are aware of the overhead work being done and avoid the area when possible.	

SECTION 6: ASSOCIATED HEALTH HAZARDS	
A. INHALATION HAZARD	RISK RATING: 3
Fumes and gases produced by the thermal cutting process vary widely and are relative to the metal being worked, coatings on the metal, and contaminants inherent in the environment where the metal is located.	
B. SKIN ABSORPTION	RISK RATING: 1
This would be dependent on the contaminants at the site and would be identified by the site characterization.	
C. HEAT STRESS	RISK RATING: 1-4
Ambient conditions, work rates, and PPE levels must be considered. The worker may be subjected to an increase in heat stress due to the heat generated during thermal cutting operations. The sparking, flame, slag, and hot metal will add to the heat load.	
D. NOISE	RISK RATING: 2
The technology presents a potential noise hazard.	
E. NON-IONIZING RADIATION	RISK RATING: 4
The ultraviolet light produced by the thermal cutting process can damage the eyes. This can be in the form of a “flash” burn or after long term exposure, cataracts. Proper protection for eyes when performing cutting operations using the oxy-acetylene torch is the welding helmet with the correct filter in place. The filter lenses and plates must meet the test for transmission of radiant energy as prescribed in ANSI Z87.1, *Practice for Occupational and Educational Eye and Face Protection*. Filter darkness needs to be chosen in compliance with OSHA 29 CFR Subpart Q Welding, Cutting, Brazing. Other workers in the area must wear safety glasses with an appropriate darkness rating. It is also recommended that dark clothing be worn to reduce reflection under the welding helmet.	
F. IONIZING RADIATION	RISK RATING: 1-4
Not part of this technology, but may be associated with the area where D&D activities are taking place.	
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
During cutting operations, many ergonomic stressors can be placed on the body from working in awkward and static postures. There is also concern for the manual force and repetitive motions that may be required. In order to make a cut, workers may have to get into tight places by twisting themselves into place or by propping their bodies into awkward positions. Stresses occur from holding the head and arms in unnatural, fixed positions for long amounts of time. This often results in stiffness and soreness in the body. Overhead work can result in a condition know as shoulder tendonitis (inflammation of the tendons of the shoulder) and there is concern for the stress placed on the back from bending to cut pieces located on ground level.	
I. OTHER	RISK RATING: N/A
None noted at this time.	

SECTION 7: PHASE ANALYSIS
A. CONSTRUCTION/START-UP
The set-up/start-up phase presents several hazards including pinch points, struck by hazards slips/trips/falls, muscular/back injury, and exposure to gases (oxygen and acetylene).
B. OPERATION
The operational phase presents several hazards including exposure to contaminant, muscular/back injury, pinch points, laceration hazards, slips/trips/falls, struck by hazards, exposure to noise, eye hazards (ultraviolet and infrared light), burn hazards, fire/explosion hazards, heat stress, and exposure to contaminants.
C. MAINTENANCE
The maintenance phase presents several hazards including pinch points, slips/trips/falls, muscular/back injury, and exposure to contaminants.
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
Fumes and gases produced by the thermal cutting process vary widely and are relative to the metal being worked, coatings on the metal, and contaminants inherent in the environment where the metal is located. Iron oxide, nickel, cadmium, zinc, lead, oxides of nitrogen, and carbon dioxide are examples of the types of inhalation hazards that may be present during thermal cutting operations. A sampling plan specific for the site and the pieces being cut will need to be developed. Noise monitoring will need to be conducted.
B. WORKER TRAINING
Training that may apply in this case may include but not be limited to: HAZWOPER (Hazardous Waste Operations and Emergency Response), HAZCOM (Hazard Communication), Respiratory Protection, PPE (Personal Protective Equipment) Training, Hearing Conservation, Fire Extinguisher, Heat Stress, Working with Compressed Gases, non-ionizing radiation training, Ergonomics (proper lifting, bending, stooping, kneeling), specific training for equipment operation, CPR/First Aid/Emergency Response/Bloodborne Pathogens, Lockout/Tagout, Hand Signal Communication, and Construction Safety (OSHA 500) and/or General Industry Safety (OSHA 501).

SECTION 8: HEALTH AND SAFETY PLAN REQUIRED ELEMENTS (CONTINUED)
C. EMERGENCY RESPONSE
Emergency response planning for a site needs to assure adequate coverage for hazards described in the TSDS. Having at least one person per shift 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 and the back. In addition, medical surveillance as required by OSHA standards must be conducted. Initial and annual audiograms may be required.
E. INFORMATIONAL PROGRAM
Workers must be trained in specific operation of equipment before use.

SECTION 9: COMMENTS AND SPECIAL CONSIDERATIONS
Only personnel who have been adequately trained in the operation of this technology should be permitted to operate and/or work with the equipment.