Line Breaks

MSC-PRAC-30499

Revision 0

Effective Date: January 15, 2010

Topic: Safety and Health

Line Breaks

PURPOSE

This practice identifies a key aspect of the Safety and Health (S&H) Program and establishes the requirements for breaking into established (used) piping systems and related equipment.

SCOPE

This practice includes the following major sections:

- General Requirements
- Preparation
- Execution
- Acid Suits
- Hot Suits

The requirements of this practice are consistent with the requirements published in the Hanford Mission Support Contract (MSC) Safety and Health virtual manual.

APPLICATION

This practice applies to Mission Support Alliance (MSA) construction personnel.

GENERAL REQUIREMENTS

Records generated during the performance of this activity are to be included in the Construction Work Package and will be managed in accordance with MSC-PRAC-30374, *Construction Work Package* and MSC-PRAC-30376, *Construction Document Control*.

No one can guarantee that all piping systems or equipment are completely drained, contain no plugs, or are free of pressure even after the first connection has been broken.

WARNING

When cooling occurs, a vacuum, which may be holding liquids in packets, could break without warning and liquid may be released and flow to the lowest point. Plugs (particularly solidified process materials) can move and release materials after the first connection has been broken.

All systems have the potential to discharge hazardous liquid from open ends of lines or broken flanges. This can occur at any time, even after the line has been drained and vented.

The need for line or system breaks is determined by the client. The client, in coordination with MSA construction and (as applicable) subcontractor/lower-tier contractor personnel, physically marks each break point.

The client prepares the system for safe opening by de-pressurizing, draining, flushing, and venting the system.

All efforts are made to ensure that no unknown substances, chemicals, or processes are in the system.

A detailed Task-Specific Job Safety Analysis (K-3 JSA), form A-6004-279, is prepared for each line break or series of "like" line breaks (refer to practiceMSC-PRAC-30462, *Prejob Safety Planning*).

Isolation barriers, safety zones, etc., are established as appropriate in accordance with practice MSC-PRAC-30479, *Signs, Signals, and Barriers* around the component or system upon which a line break is being performed. The volume and pressure of the system are considered when placing barricades.

NOTE: *A minimum of a 3.05-meter (10-foot) barricade is required around all hot suit jobs. A Line Break Permit, form A-6004-321, is completed for each line break or series of "like" line breaks; all chemicals previously contained in the line are specified on the permit. Employees assigned to this task attend a prejob meeting, and sign the Prejob Safety Planning Signoff, form A-6004-285, indicating they understand the job requirements and potential hazards.*

The client and MSA construction or subcontractor/lower-tier contractor personnel lock, tag, and test isolation valves, pump, electrical systems, etc., in accordance with practice DOE_0336, *Hanford Site Lockout/Tagout*.

If a plugged condition is discovered or suspected, **stop work immediately** and develop a plan to dislodge the plug.

A process (annotated on the JSA) is in place for collecting and/or containing and disposing of spilled materials.

Employees who make line breaks are appropriately trained and designated to perform this type of work.

MSA line management is present when the first break is made; client personnel also should be present.

Required forms generated during the performance of this activity are to be included in the Construction Work Package.

PREPARATION

Each employee who will be inside the barricade is shown the location of the nearest exit, safety shower, and eyewash station prior to starting work. The shower(s) and eyewash station(s) are manually tested to ensure they are operational.

Only authorized personnel remain inside barricades during line break activities. Personnel who enter the barricaded area are protected by the same clothing and equipment as the person(s) making the line break.

Personal protective equipment (PPE) and clothing are selected based on the hazard(s) anticipated [refer to practice MSC-PRAC-30471, *Personal Protective Equipment*] and indicated on the line break permit. Employees are trained in the use of special protective equipment such as air-supplied respirators, self-contained breathing apparatus (SCBA), and respirators. PPE is worn until the line is broken and the system is cleared.

Respirators are worn where the concentration of a toxic substance may exceed allowable exposure limits.

A standby worker is required for all first line breaks. A standby worker is recommended for all line breaks.

Employees are instructed in emergency first-aid procedures (such as washing, applying cold packs, etc.) based on the material safety data sheet (MSDS) for the hazardous material(s). Employees seek immediate first aid if any hazardous process or other toxic substance(s) comes in contact with eyes, skin, clothing, shoes, or if they inhale a hazardous or other toxic substance [refer to practice MSC-PRAC-30467, *Event Investigation and Reporting*].

EXECUTION

Bolts on the lower and opposite side from the employee(s) are loosened, keeping the bolts nearest the employee tight and allowing the line to separate in a manner that causes any spillage to flow away from the employee; the flange is then spread apart. The employee is positioned on the upwind side of the flange being broken.

When a valve bonnet is removed, the line is drained and the valve placed in the open position before the bonnet bolts are loosened. Ball and plug valves that are to be removed from the system are opened, closed, and reopened to relieve pressure only after the line is drained.

NOTE: *Ball and plug valves may have pressure in the cavity under the stem packing and bonnet, regardless of the position of the valve and the pressure in adjacent lines.*

ACID SUITS

Acid suits consist of chemical resistant rubber boots, pants, jacket, long gauntlet gloves, and hood. Suits are constructed of materials designed for the service intended.

A complete acid suit is worn when disconnecting and removing lines or equipment pieces that have contained acid or base (caustic).

Prior to wearing the acid suit, each employee inspects the suit components as follows:

- A physical inspection is completed by hand.
- The employee stands under an operating safety shower. (If the suit leaks, it is defective or was put on improperly.)

A defective suit is tagged out of service [using a Danger — Don't Use It — Unsafe tag, form A-6004-317 or equal] and destroyed.

NOTE: *Never tuck pant legs of acid suits inside rubber boots.*

- After performing work and with the suit still on, employees decontaminate the suit in designated areas to ensure that any hazardous material(s) is removed. The procedure to decontaminate/sanitize the suit is annotated on the JSA.
- After thorough decontamination, the suit is properly stored in the appropriate place to make sure it is not contaminated or physically damaged.

HOT SUITS

Hot suits consist of boots, gloves, hood, one-piece coverall, jacket, and pants.

Hot suits are stored on hangers so they are not creased; this reduces the possibility of physical damage.

The procedure to decontaminate/sanitize the suit is annotated on the JSA.

Prior to wearing a hot suit, each employee:

- Inspects the hot suit for physical defects (face piece must be clear) prior to wearing.

Keeps the complete hot suit on until the job is finished. If sprayed with hot liquid, take measures to cool liquid before removing hot suit.

FORMS

Task-Specific Job Safety Analysis (K-3 JSA) A-6004-279
Prejob Safety Planning Signoff A-6004-285
Line Break Permit A-6004-321

Tag
Danger — Don't Use It —Unsafe (tag) A-6004-317

RECORDS IDENTIFICATION

Records Capture Table

Name of Document	Submittal Responsibility	Retention Responsibility
FormA-6004-279, *Task-Specific Job Safety Analysis (K-3 JSA)*	Construction Supervisor/Superintendent	Project Document Control
Form A-6004-285, *Prejob Safety Planning Signoff*	Construction Supervisor/Superintendent	Project Document Control
Form A-6004-321, *Line Break Permit*	Construction Supervisor/Superintendent	Project Document Control

REFERENCES

MSC-PRAC-30462, *Prejob Safety Planning*
MSC-PRAC-30467, *Event Investigation and Reporting*
MSC-PRAC-30471, *Personal Protective Equipment*
MSC-PRAC-30479, *Signs, Signals, and Barriers*

DOE-0336, *Hanford Site Lockout/Tagout*