

UTILITIES DEPARTMENT  
NAVY PUBLIC WORKS CENTER  
SAN DIEGO, CA 92136-5294

STANDARD OPERATING PROCEDURE(SOP)#600-22

TITLE: RESTORATION OF REPAIRED OR COLD STEAM SYSTEMS

Ref: (a) OPNAVINST 5100.23

SCOPE. This SOP applies to all Utilities Department personnel.

PURPOSE. To identify requirements and establish procedures for restoring repaired or cold steam systems. For the purposes of this SOP, the term "Steam System" includes the condensate system.

BACKGROUND.

1. Improper restoration of repaired, or cold, steam systems can lead to dangerous condensate-induced water hammer. Serious injury or death, and major damage to our steam distribution system, can result from the dramatic failure of valves, and piping systems when subjected to the water hammer. In 1993, an investigation of a steam system incident was conducted at the US Department of Energy, Hanford Site, in Southeastern Washington. It was determined that during system warmup, after being inactive for eight months, a 120 PSI steam system had failed when subjected to 2,300 PSI created by a condensate-induced water hammer. One employee died of serious burns and lung damage as a result of the incident.

ACTION.

1. Two Man Rule. Historically, it has been PWC Utilities Department policy that the "two man rule" shall be followed when working on High Voltage Electrical Distribution Systems, unless the supervisor specifically excludes certain types of actions from the requirement. That policy is now in effect when working on or around energized steam systems, or when a cold or repaired system is being placed back in operation. Any exceptions shall be identified via a memorandum from the work center Supervisor to the employees, specifically indicating those actions which are exempt from the "two man rule".

2. Only those employees specifically trained in the hazards of working on, or around, steam distribution systems will maintain steam/condensate equipment. The supervisor will maintain a master list of those personnel.

3. Training in the proper use of Personal Protective Equipment is essential for personnel safety. The use of all appropriate personal protective equipment, safety devices, Lockout/Tagout requirements, and associated procedures, is absolutely essential.

TITLE: RESTORATION OF REPAIRED OR COLD STEAM SYSTEMS

4. In addition to this SOP, the requirements of Utilities Department SOPs 600-15, TWO VALVE PROTECTION and 600-16, LOCKOUT/TAGOUT ENERGY CONTROL PROGRAM will also be strictly adhered to, when opening, troubleshooting, maintaining, repairing or restoring steam distribution systems.

OPERATIONS.

1. In the event our employees must effect repairs to a steam system component which is located in a closed or confined space, steam to that particular system must be controlled from a point outside that space. The controlling valves must be closed, locked and tagged out, and all residual pressure bled from the system, prior to the beginning of any work. Once the work is complete, and immediately prior to restoration, any remaining condensate must be drained or purged from the steam system. No employees will be permitted in the space during the restoration process.

2. The following preliminary checks must be made prior to the restoration of any repaired or cold steam system:

- a. All condensate is purged from the steam system.
- b. System components are installed correctly and checked.
- c. All tools are accounted for.
- d. All personnel are in the clear.
- e. The word is passed to all hands that the system will be restored.
- f. All locks/tags are removed.

3. Utilities Department is ultimately responsible for the safe operation of the steam distribution system. We are also responsible for providing a safe and healthful workplace for our employees. We will not jeopardize the safety of our employees, or the integrity of the steam system, in order to meet an ETR, or perceived deadline. If during restoration, any situation develops where you are encouraged, instructed, or requested to restore service immediately, and condensate still remains in the steam system, calmly explain the reason for the delay, while you continue to bring the system on line in accordance with established procedures.

Submitted: \_\_\_\_\_ Date: \_\_\_\_\_  
W.P. HUTCHISON  
Code 600A

Approved: \_\_\_\_\_ Date: \_\_\_\_\_  
DAVID P. TYER

Utilities Department Head