CONDENSATE INDUCED WATER HAMMER

SAFETY PRINCIPLE

STEAM AND WATER CANNOT BE SAFELY MIXED IN A PIPING SYSTEM WITHOUT RISKING CONDENSATE INDUCED WATER HAMMER. DO NOT MIX STEAM WITH WATER EITHER BY INJECTING WATER INTO A STEAM SYSTEM OR STEAM INTO A SYSTEM THAT INCLUDES WATER (CONDENSATE). CONDENSATE SHOULD BE ASSUMED TO BE IN ALL LOW POINTS AND DEAD LEGS UNTIL PROVEN OTHERWISE.

RECOMMENDATIONS

1. Review and inspect all steam systems to ensure proper distribution and sizing of cold traps for startup, and operation, and that all low points have steam traps. Give maintenance the highest priority.

2. Frequently inspect all steam traps to ensure that they operate properly and that no condensate accumulates. Immediately repair or replace erratic steam traps. Use thermocouples where feasible to locate condensate accumulation.

3. Do not use the method of "CRACKING OPEN" the valve to avoid condensation induced water hammer. This will not guarantee safe operation. The formation of a condensation induced water slug can occur at very low condensate flow conditions.

4. Valves in pipe lines which lack properly positioned steam traps should remain open at all times or preferably should be removed from the piping system.

5. Before opening valves in steam lines, check for adequate placement of steam traps. Verify that the steam traps can operate properly, and fully open the bleed valves, using a reduced system pressure to remove any remaining condensates.

6. Where feasible, operate the valves remotely using mechanical extension linkage, reach rods, or adequately controllable power operated valves.

7. Inspect the piping system for sagging, and where necessary, install steam traps or repair the sagging.

8. Check and repair the piping insulation, it will save energy and reduce the accumulation of condensate in the piping system.

9. Activation of cold steam piping should be performed slowly at reduced pressure and with trap bleed valves continuously open.

10. The above list of recommendations should be followed regardless of piping size. Do not exclude small pipe sizes without an appropriate analysis.

11. All isolation valves are to have bypass systems. However, bypass operation will not prevent water hammer if condensate is present.

12. Placement of blowdown valves before and after a vertical rise (such as over-the-road) is required to prevent possible condensate accumulation.

13. Improperly designed steam/water systems should not have the incorrect features overcome by operational methods. The systems must have the incorrect features corrected.