

APPENDICES
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TABLE OF CONTENTS

- 1. Testing Procedure for PSH and PSL**
- 2. Testing Procedure for LSH and LSL**
- 3. Testing Procedure for TSH and TSL**
- 4. Testing Procedure for PSV**
- 5. Testing Procedure for FSV**
- 6. Testing Procedure for BSL**
- 7. Testing Procedure for SDV**
- 8. Testing Procedure for SSV/USV**
- 9. Testing Procedure for SCSSV, Tubing Plug, and Injection Valve**
- 10. Testing Procedure for ESD Station and Fire Loop Systems**
- 14. Testing Procedure for FSL**
- 16. Testing Procedure for Motor Starter Interlock**
- 17. Testing Procedure for Flame Arrester**
- 19. Testing Procedure for Water-Feeding Device**
- 20. Electrical Installation Requirements**
- 21. Area Classification**
- 22. Well-Control Drill Requirements**
- 23. BOP and Auxiliary Equipment**
- 24. Crane Use Categories and Inspections**
- 25. Pit Volume Totalizer Test Procedure**

APPENDIX 1

TESTING PROCEDURE FOR PSH AND PSL 1.

Close isolating valve on pressure sensing connection.

2. Apply pressure to sensor with hydraulic pump, high pressure gas or nitrogen, and record high sensor trip pressure.
3. If sensor is installed in series with the high sensor upstream from the low sensor, bleed pressure to reset the high sensor. Bleed pressure from sensors and record low sensor trip pressure.
4. Adjust sensor, if required, to provide proper set pressure. 5.

Open sensor isolating valve.

APPENDIX 2

TESTING PROCEDURE FOR LSH AND LSL

INSTALLED INTERNALLY

1. Manually control vessel dump valve to raise liquid level to high level trip point while observing liquid level in gage glass.
2. Manually control vessel dump valve to lower liquid level to low level trip point while observing liquid level in gage glass.

INSTALLED IN OUTSIDE CAGES

1. Close isolating valve(s) on float cage(s).
2. Fill cage(s) with liquid to high level trip point.
3. Drain cage(s) to low level trip point.
4. Open isolating valve(s) on cage(s).

APPENDIX 3

TESTING PROCEDURE FOR TSH AND TSL

TEMPERATURE BATH METHOD

1. Remove temperature sensing probe.
2. Place a thermometer in the hot bath.
3. Insert temperature sensing probe in the bath and raise temperature of bath until the controller trips.
4. Verify that this temperature is no higher than the operator specified maximum temperature for the process.
5. Insert temperature sensing probe in the bath and lower temperature of bath until the controller trips.
6. Verify that this temperature is no lower than the operator specified minimum temperature for the process.
7. Reinstall temperature sensing probe.

OPERATION TEST METHOD

Test in accordance with the manufacturer's operating manual.

Note: Because of the destructive tendencies, Eutectic type temperature devices are not to be tested.

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APPENDIX 4

TESTING PROCEDURE FOR PSV

1. Remove lock or seal and close inlet isolating block valve. (Not required for PSV's isolated by reverse buckling rupture disc or check valve or pilot operated PSV's.)
2. Apply pressure through test connection with nitrogen, high pressure gas or hydraulic pump, and record pressure at which the relief valve or pilot starts to relieve.
3. The safety valve or pilot should continue relieving down to reset pressure. Hold test connection intact until the pressure stops dropping to ensure that valve has reset.
4. Open inlet isolating block valve and lock or seal.

APPENDIX 5

TESTING PROCEDURE FOR FSV

1. Close upstream valve and associated header valves.
2. Open bleeder valve and bleed pressure from flowline between closed valves.
3. Close bleeder valves.
4. Open appropriate header valve.
5. Open bleeder valve.
6. Check bleed valve for backflow. If there is any continuous backflow, measure the leakage rate.
7. Close bleeder valve and open upstream valve.

MAXIMUM ALLOWABLE LEAKAGE

Gas - 5 cubic feet per minute

Liquid - 200 cubic centimeters per minute



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APPENDIX 6

TESTING PROCEDURE FOR BSL

PILOT FLAME-OUT CONTROL

1. Light pilot
2. Block fuel supply to main burner.
3. Shut off fuel supply to pilot and check BSL for detection.

BURNER FLAME-OUT CONTROL

1. Light main burner.
2. Block fuel supply to pilot.
3. Shut off fuel supply to main burner and check BSL for detection.

APPENDIX 7

TESTING PROCEDURE FOR SDV

1. Bleed pressure off of the actuator and allow valve to reach the 3/4 closed position.
2. Return supply pressure to the actuator.

APPENDIX 8

TESTING PROCEDURE FOR SSV/USV

1. Close valve to be tested.
2. Position valve(s) as required to permit pressure to be bleed off downstream of the SSV/USV.
3. With pressure on upstream side of SSV/USV, open bleed valve downstream of test valve and check for flow.
4. Close bleed valve.
5. Return SSV/USV to service.

MAXIMUM ALLOWABLE LEAKAGE

No fluid flow allowed.



APPENDIX 9

TESTING PROCEDURE FOR SCSSV, TUBING PLUG, AND INJECTION VALVE

Note: All these test methods shall meet or exceed the requirements set forth in the current incorporated edition of API RP 14B, Recommended Practice for Design, Installation, Repair and Operation of Subsurface Safety Valve Systems. The leakage rates are those set forth in Subpart H or in the approved DWOPs.

SURFACE MAXIMUM ALLOWABLE LEAKAGE RATE

Gas - 5 cubic feet per minute
Liquid - 200 cubic centimeters per minute

SUBSEA MAXIMUM ALLOWABLE LEAKAGE RATE

Gas - 15 cubic feet per minute
Liquid - 400 cubic centimeters per minute

Note:

1. The listed testing procedures are for wells that **do not produce H₂S**. For wells that produce H₂S, pressure must be bled into a closed system, such as pressure vessels or a flare system, using H₂S resistant material.
2. For SCSSV testing:
 - A. Use either Method A for normal wells for gas.

Method A:

1. Shut-in the well at the wellhead.
2. Wait an appropriate period of time and record SITP.
3. Bleed SCSSV hydraulic control line pressure to zero to shut-in SCSSV. Then observe pressure for build up. (Not applicable for subsea wells).
4. Bleed surface pressure sufficiently to establish a differential pressure across SCSSV.
5. Wait an appropriate period of time and record surface pressure.
6. Surface pressure recorded in Step 5 confirms SCSSV holding integrity or the need to determine leakage rate addressed in Step 7.
7. Determine gas leakage rate using the following formula:

$$\text{Leakage rate (SCF/min)} = \frac{C d^2 h (p_2 - p_1)}{T_{\text{TEST}}}$$

Where: C = 0.000363

d = Inside diameter of tubing in inches
 h = Distance between valve and tree in feet p_1
 = Initial pressure reading in psi p_2 = Final
 pressure reading in psi T_{TEST} = Time lapsed
 during test in minutes

Method B: PUMP THROUGH PLUGS

1. Record SITP.
2. Bleed surface pressure sufficiently to establish a pressure differential across pump-through plug or injection valve of approximately 20 percent of the SITP recorded in Step 1.
3. Wait an appropriate amount of time and record surface pressure.
4. Surface pressure recorded in Step 3 confirms pump-through or injection valve holding integrity, or the need to determine leakage rate addressed in Step 5.
5. Determine gas leakage with the following formula:

$$\text{Leakage rate (SCF/min)} = \frac{Cd^2h(p_2-p_1)}{T_{TEST}}$$

Where: $C = 0.000363$

d = Inside diameter of tubing in inches
 h = Distance between valve and tree in feet p_1
 = Initial pressure reading in psi p_2 = Final
 pressure reading in psi T_{TEST} = Time lapsed
 during test in minutes

NOTE:

For wells that contain no gas, determine leakage rate by capturing the leaking liquid in a measuring device.

APPENDIX 10

TESTING PROCEDURE FOR ESD AND FIRE LOOP SYSTEM

Testing Procedure for ESD System

1. Select well(s) or component(s) to be shut-in.
2. Bypass all SSVs and SCSSVs on wells not intended to be shut-in.
3. Bypass all component SSVs or pipeline SDVs not intended to be shut-in.
4. Activate ESD station
 - A. Mechanical Control
 1. Move valve handle to the shutdown position (full open).
 2. Observe for free valve movement and unobstructed gas bleed.
 - B. Electrical Control
 1. Push/trip electrical ESD control.
5. Verify that shut-in actuation of selected well(s) and component(s) has been achieved.
 - A. Within 45 seconds for SSVs on well(s) and other selected surface components.
 - B. Within 2 minutes thereafter for SCSSVs on selected well(s).
6. Return system to service.

Testing Procedure for Fire Loop System

Note: If possible, consideration shall be given to avoid total platform shut-in, as well as those wells which have a history of problems returning to flow after extended periods of being shut-in.

1. Select well(s) or component(s) to be shut-in.
2. Bypass all SSVs and SCSSVs on wells not intended to be shut-in.
3. Bypass all component SSVs or pipeline SDVs not intended to be shut-in.
4. Randomly select an area that is protected by the fire loop system.
 1. Direct the Operator to conduct an actuation test of the fire loop system in accordance with the Operator's test procedure.
5. Verify that shut-in actuation of selected well(s) and component(s) has been achieved.
 - A. Within 45 seconds for SSVs on well(s) and other selected surface components.
 - B. Within 2 minutes thereafter for SCSSVs on selected well(s).
6. Return system to service.

APPENDIX 14

TESTING PROCEDURE FOR FSL

1. Slowly close the valve on the media circulation pump discharge.
2. Watch a pressure drops with decrease inflow. The surge tank must be at significantly lower pump pressure than pump discharge pressure.
3. FSL should trip before the flow rate drops to 0 and before the discharge pressure drops below 50 percent of full discharge pressure.