

HYDROGEN SULFIDE

(Last update February 2004)

This Section Pertains to Areas Classified as H₂S *Present* and H₂S *Unknown*.

Definitions:

H₂S *present* means that drilling, logging, coring, testing, or producing operations have confirmed the presence of H₂S in concentrations and volumes that could potentially result in atmospheric concentrations of 20 ppm or more of H₂S.

H₂S *unknown* means the designation of a zone or geological formation where neither the presence nor absence of H₂S has been confirmed.

H-100 **IS A COPY OF THE APPROVED H₂S CONTINGENCY PLAN AVAILABLE IN THE FIELD AREA, AND IS THAT PLAN BEING FOLLOWED?**

Authority: 490(f)

Enforcement Action: W/S

INSPECTION PROCEDURE:

Verify that an approved plan is available and being followed at the facility at the commencement of and throughout all operations during which the H₂S Contingency Plan is in effect.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if an H₂S Contingency Plan is not available.

Issue a facility shut-in (S) INC if there is not an approved plan or the plan is not being followed.

H-101 **ARE AT LEAST TWO SAFE BRIEFING AREAS ESTABLISHED?**

Authority: 490(f)(6)

Enforcement Action: S

INSPECTION PROCEDURE:

1. Verify that designated safe briefing areas at the facility are as designated in the approved H₂S Contingency Plan.

2. Verify that designated safe briefing area during the inspection period is upwind of operations.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if safe briefing areas:

1. Are not as approved,
 2. Have not been established, or
 3. During inspection, is not upwind of operations.
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H-102 **ARE ALL PERSONNEL INFORMED OF THE HAZARDS OF H₂S AND OF SO₂ RESULTING FROM BURNING H₂S, AND INSTRUCTED IN THE PROVISIONS FOR PERSONNEL SAFETY CONTAINED IN THE H₂S CONTINGENCY PLAN?**

Authority: 490(g)(4)(i)

Enforcement Action: C

490(j)(11)(iii)

INSPECTION PROCEDURE:

Inspect training session records to verify that personnel were instructed and informed as required.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC to remove any person from the facility that has not received the required instructions.

H-103 **ARE ALL PERSONNEL INSTRUCTED IN THE USE OF SAFETY EQUIPMENT WHICH THEY MAY BE REQUIRED TO USE?**

Authority: 490(g)(4)(ii)

Enforcement Action: C

INSPECTION PROCEDURE:

Inspect training session records to verify that all personnel were instructed and informed as required.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC to remove any personnel from the facility that have not received the required instructions.

H-115

IS THERE AT LEAST ONE LITTER OR AN EQUIVALENT DEVICE ON THE FACILITY AND READILY AVAILABLE FOR USE?

Authority: 490(k)(3)(ii)

Enforcement Action: W

INSPECTION PROCEDURE:

Visually inspect the facility to verify that there is at least one litter or an equivalent device readily available on the facility.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if there is not at least one litter or an equivalent device readily available.

H-117

IS WIND-DIRECTION EQUIPMENT INSTALLED IN LOCATIONS VISIBLE AT ALL TIMES TO INDIVIDUALS ON OR IN THE IMMEDIATE VICINITY OF THE FACILITY?

Authority: 490(i)(1)

Enforcement Action: S

INSPECTION PROCEDURE:

Visually verify that visible wind-direction equipment has been installed at prominent locations. Wind direction equipment includes windsocks, flags, and streamers.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if wind-direction equipment is not visible or has not been installed in prominent locations.

H-118

ARE OPERATIONAL DANGER SIGNS DISPLAYED AT ALL TIMES ON FACILITIES WITH WELLS CAPABLE OF PRODUCING H₂S GAS IN CONCENTRATIONS OF 20 PPM OR MORE?

Authority: 490(i)(2)(i)

Enforcement Action: W

INSPECTION PROCEDURE:

Inspect the signs and flags to verify that installation is as required.

Signs shall:

1. Be installed on each side of the facility.
2. Be a minimum width of 8 feet and a minimum height of 4 feet.
3. Be a high visibility yellow color with black lettering a minimum of 12 inches in height.
4. Read "DANGER - HYDROGEN SULFIDE - H₂S".
5. Be illuminated at night and under conditions of poor visibility.
6. Be displayed when concentrations of H₂S reach 20 ppm.

Red Flags shall:

1. Be visible to aircraft and watercraft when hoisted.
2. Be a minimum width of 3 feet and a minimum height of 2 feet.
3. Be illuminated at night and under conditions of poor visibility, and
4. Be displayed when concentrations of H₂S reach 50 ppm.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if:

1. Signs or flags are not displayed as required.
 2. Signs or flags are not available for use.
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H-120

DOES THE FACILITY HAVE AN H₂S-DETECTION AND H₂S-MONITORING SYSTEM WHICH IS CAPABLE OF SENSING A MINIMUM OF 10 PPM H₂S AND WHICH ACTIVATES AUDIBLE AND VISUAL ALARMS WHEN THE ATMOSPHERIC CONCENTRATION REACHES 20 PPM AND ARE THESE SENSING DEVICES LOCATED AT THE BELL NIPPLE, MUD RETURN LINE RECEIVER TANK (POSSUM BELLY), PIPE TRIP TANK, SHALE SHAKER, WELL-CONTROL FLUID PIT AREA, DRILLER'S STATION, LIVING QUARTERS, AND OTHER AREAS WHERE H₂S MIGHT ACCUMULATE?

Authority: 490(j)(1)(i)

Enforcement Action: S

490(j)(2)(i)

490(j)(2)(ii)

490(j)(2)(iii)

490(j)(2)(iv)

490(j)(2)(v)

490(j)(2)(vi)

490(j)(2)(vii)

490(j)(2)(viii)

INSPECTION PROCEDURE:

1. Visually verify that detection and monitoring equipment (sensors) is installed at:
 - A. Bell nipple.
 - B. Mud return line receiver tank (possum belly).
 - C. Pipe trip tank.
 - D. Shale shaker.
 - E. Well-control fluid pit area.
 - F. Driller's station.
 - G. Living quarters (drilling personnel).
 - H. Other areas where H₂S may accumulate.
2. Have operator test equipment for operation.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if H₂S detection and monitoring equipment is not:

1. Installed at the required locations.
 2. Operable.
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H-121

ARE SENSORS LOCATED IN ROOMS, BUILDINGS, DECK AREAS, OR LOW-LAYING DECK AREAS NOT OTHERWISE COVERED BY 30 CFR 250.490(j)?

Authority: 490(j)(5)(i)

Enforcement Action: S

INSPECTION PROCEDURE:

Verify that sensors are located in rooms, buildings, deck areas, or low-laying deck areas not otherwise covered by 30 CFR 250.490(j).

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if sensors are not located in rooms, buildings, deck areas, or low-laying deck areas not otherwise covered by 30 CFR 250.490(j).

H-122

IS AT LEAST ONE SENSOR INSTALLED PER 400 SQUARE FEET OF DECK AREA OR FRACTIONAL PART THEREOF (OR AS OTHERWISE APPROVED BY THE DISTRICT MANAGER)?

Authority: 490(j)(5)(i)

Enforcement Action: S

INSPECTION PROCEDURE:

Verify that there is at least one sensor installed per 400 square feet of deck area or fractional part thereof (or as otherwise approved by the District Manager).

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if there is not at least one sensor installed per 400 square feet of deck area or a fractional part thereof (or as otherwise approved by the District Manager).

H-123 **IS A SENSOR LOCATED IN BUILDINGS WHERE PERSONNEL HAVE THEIR LIVING QUARTERS?**
Authority: 490(j)(5)(ii) **Enforcement Action:** S
INSPECTION PROCEDURE:
Verify that a sensor is located in buildings where personnel have their living quarters.
IF NONCOMPLIANCE EXISTS:
Issue a facility shut-in (S) INC if there is not a sensor located in buildings where personnel have their living quarters.

H-124 **IS ONE SENSOR LOCATED WITHIN 10 FEET OF EACH VESSEL, COMPRESSOR, WELLHEAD, MANIFOLD, OR PUMP (OR AS OTHERWISE APPROVED BY THE DISTRICT MANAGER)?**
Authority: 490(j)(5)(iii) **Enforcement Action:** C
INSPECTION PROCEDURE:
Inspect to verify that there is one sensor located within 10 feet of each vessel, compressor, wellhead, manifold, or pump (or as otherwise approved by the District Manager).
IF NONCOMPLIANCE EXISTS:
Issue a component shut-in (C) INC if a sensor is not located within 10 feet of each vessel, compressor, wellhead, manifold, or pump (or as otherwise approved by the District Manager).

H-125 **IF ONE SENSOR IS USED TO COVER MULTIPLE PIECES OF EQUIPMENT, IS EACH PIECE OF EQUIPMENT NO MORE THAN 10 FEET FROM THE SENSOR (OR AS OTHERWISE APPROVED BY THE DISTRICT MANAGER)?**
Authority: 490(j)(5)(iv) **Enforcement Action:** C
INSPECTION PROCEDURE:
Verify that if one sensor is used to cover multiple pieces of equipment, each piece of equipment is no more than 10 feet from the sensor (or as otherwise approved by the District Manager).
IF NONCOMPLIANCE EXISTS:
Issue a component shut-in (C) INC if pieces of the equipment are more than 10 feet from the sensor (or as otherwise approved by the District Manager).

H-126 **IS THE H₂S-DETECTION SYSTEM RECALIBRATED WHEN FUNCTIONAL TESTS ARE NOT WITHIN 2 PPM OR 10 PERCENT, WHICHEVER IS GREATER, OF THE APPLIED CONCENTRATIONS (OR AS OTHERWISE APPROVED BY THE DISTRICT MANAGER)?**
Authority: 490(j)(6)(ii) **Enforcement Action:** C
INSPECTION PROCEDURE:
Check operator's records to verify that the H₂S-detection and H₂S-monitoring equipment is recalibrated as required (or as otherwise approved by the District Manager).
IF NONCOMPLIANCE EXISTS:
Issue a component shut-in (C) INC on the monitored area if the H₂S-detection and H₂S-monitoring equipment has not been recalibrated as required (or as otherwise approved by the District Manager).

H-127 **ARE PORTABLE H₂S DETECTORS CAPABLE OF DETECTING 10 PPM CONCENTRATIONS OF H₂S GAS IN AIR AND AVAILABLE FOR USE BY ALL PERSONNEL?**
Authority: 490(k)(1)(i) **Enforcement Action:** W
INSPECTION PROCEDURE:
Verify that portable H₂S detectors capable of detecting 10 ppm concentrations of H₂S gas in air are available for use by all personnel.
IF NONCOMPLIANCE EXISTS:
Issue a warning (W) INC if portable H₂S detectors are not capable of detecting 10 ppm concentrations of H₂S gas in air and available for use by all personnel.

H-128

ARE PRESSURE-DEMAND TYPE RESPIRATORS WITH HOSELINE CAPABILITY AND BREATHING TIME OF AT LEAST 15 MINUTES IMMEDIATELY AVAILABLE AND EASILY ACCESSIBLE TO ALL PERSONNEL ON THE FACILITY INCONFORMANCE WITH ANSI Z88.2?

Authority: 490(j)(13)(i)

Enforcement Action: S

490(j)(13)(ii)

490(j)(13)(v)

INSPECTION PROCEDURE:

1. Inspect the facility to verify that all pressure-demand type respirators with hose-line capability and breathing time of at least 15 minutes are available and easily accessible to all personnel on the facility and in conformance with ANSI Z88.2.
2. Visually inspect gauges to verify that the air tanks are full.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if all pressure-demand type respirators with hose-line capability of at least 15 minutes of breathing time are not accessible to all personnel on the facility and in conformance with ANSI Z88.2.

H-129

ARE AT LEAST TWO VOICE TRANSMISSION DEVICES, WHICH CAN BE USED WHILE WEARING A RESPIRATOR, AVAILABLE FOR USE BY DESIGNATED PERSONNEL?

Authority: 490(j)(13)(iii)

Enforcement Action: W

INSPECTION PROCEDURE:

Verify that at least two voice transmission devices, which can be used while wearing a respirator, are available for use by designated personnel.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if there are not at least two voice transmission devices on the facility.

H-131

IS EACH BREATHING-AIR BOTTLE LABELED AS CONTAINING BREATHING-QUALITY AIR FOR HUMAN USE?

Authority: 490(j)(13)(vi)

Enforcement Action: C/S

INSPECTION PROCEDURE:

Visually inspect the breathing-air bottles to verify that they are labeled as containing breathing-quality air for human use.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC if a few of the breathing-air bottles are not labeled as containing breathing-quality air for human use but have ample supply of bottles that are labeled.

Issue a facility shut-in (S) INC if none of the breathing-air bottles are labeled as containing breathing-quality air for human use.

H-132

DO VESSELS ATTENDANT TO FACILITIES CARRY APPROPRIATE PROTECTIVE-BREATHING EQUIPMENT FOR EACH CREW MEMBER?

Authority: 490(j)(13)(vii)

Enforcement Action: C

INSPECTION PROCEDURE:

1. If conditions permit, inspect each attendant vessel to verify that it carries sufficient protective-breathing equipment for each crew member.
2. If the District Manager has required additional protective-breathing equipment for vessels, verify that the additional equipment is on board.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC to remove the vessel if:

1. The vessel does not carry sufficient protective-breathing equipment for each crew member.
 2. The vessel does not carry the additional equipment required by the District Manager.
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H-133 **FOR AUTHORIZED FLIGHTS DURING H₂S ALERTS, ARE HELICOPTER FLIGHTS TO AND FROM THE FACILITY LIMITED TO THE CONDITIONS SPECIFIED IN THE H₂S CONTINGENCY PLAN?**

Authority: 490(j)(13)(viii)

Enforcement Action: C

INSPECTION PROCEDURE:

Review contingency plans to determine when a flight is considered an authorized flight.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC if unauthorized flights are witnessed during an H₂S alert.

Enter one item checked for each unauthorized flight.

H-134 **DURING AUTHORIZED H₂S ALERT FLIGHTS, DO THE FLIGHT CREW AND PASSENGERS USE PRESSURE-DEMAND TYPE RESPIRATORS?**

Authority: 490(j)(13)(viii)

Enforcement Action: C

INSPECTION PROCEDURE:

During an authorized H₂S alert flight, observe if the flight crew and passengers use pressure-demand type respirators.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC if the crew and passengers are not using pressure-demand type respirators during H₂S alert flights.

H-135 **ARE ALL MEMBERS OF THE FLIGHT CREW TRAINED IN THE USE OF THE PARTICULAR TYPE(S) OF RESPIRATOR EQUIPMENT MADE AVAILABLE DURING H₂S ALERT FLIGHTS?**

Authority: 490(j)(13)(viii)

Enforcement Action: C

INSPECTION PROCEDURE:

Verify that all members of the flight crew have been trained in the use of the particular type(s) of respirator equipment aboard the aircraft or stored at the heliport for H₂S alert flights.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC to remove the helicopter if all members of the flight crew have not been trained in the use of the respirator equipment during H₂S alert flights.

H-136 **AS APPROPRIATE TO THE PARTICULAR OPERATION(S), (PRODUCTION, DRILLING, WELL-COMPLETION/WORKOVER, OR ANY COMBINATION THEREOF), IS A SYSTEM OF BREATHING-AIR MANIFOLDS, HOSES, AND MASKS PROVIDED ON THE FACILITY AND IN THE BRIEFING AREAS?**

Authority: 490(j)(13)(ix)

Enforcement Action: S

INSPECTION PROCEDURE:

Visually inspect the facility, including the briefing areas, to verify that a system of breathing-air manifolds, hoses, and masks has been installed as approved in the H₂S Contingency Plan.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if a system of breathing-air manifolds, hoses, and masks has not been installed as approved in the H₂S Contingency Plan.

H-137 **IS A CASCADE AIR-BOTTLE SYSTEM PROVIDED FOR THE BREATHING-AIR MANIFOLDS AND TO REFILL INDIVIDUAL PROTECTIVE-BREATHING APPARATUS BOTTLES?**

Authority: 490(j)(13)(ix)

Enforcement Action: S

INSPECTION PROCEDURE:

Visually inspect the facility to verify that the cascade air-bottle system has been installed as approved in the H₂S Contingency Plan.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if a cascade air-bottle system has not been installed as approved in the H₂S Contingency Plan.

H-138

IF THE CASCADE AIR-BOTTLE SYSTEM IS RECHARGED BY A HIGH-PRESSURE COMPRESSOR SUITABLE FOR PROVIDING BREATHING-QUALITY AIR, IS THE COMPRESSOR SUCTION LOCATED IN AN UNCONTAMINATED ATMOSPHERE?

Authority: 490(j)(13)(ix)

Enforcement Action: S

INSPECTION PROCEDURE:

Visually inspect the compressor to verify that:

1. It is suitable for providing breathing-quality air.
2. The compressor suction is located in an uncontaminated atmosphere.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if:

1. The high-pressure compressor is not suitable for providing breathing-quality air, or
 2. The compressor suction is located in a contaminated atmosphere.
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H-140

ARE RETRIEVAL ROPES WITH SAFETY HARNESES AVAILABLE TO RETRIEVE INCAPACITATED PERSONNEL FROM CONTAMINATED AREAS?

Authority: 490(k)(1)(ii)

Enforcement Action: W

INSPECTION PROCEDURE:

Visually inspect the facility to verify that retrieval ropes with safety harnesses are available as approved in the H₂S Contingency Plan.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if retrieval ropes with safety harnesses are not available.

H-141

ARE CHALKBOARDS AND/OR NOTE PADS AVAILABLE FOR COMMUNICATION PURPOSES LOCATED ON THE RIG FLOOR, SHALE-SHAKER AREA, THE CEMENT-PUMP ROOMS, WELL-BAY AREAS, PRODUCTION PROCESSING EQUIPMENT AREA, GAS COMPRESSOR AREA, AND PIPELINE-PUMP AREA?

Authority: 490(k)(1)(iii)

Enforcement Action: W

INSPECTION PROCEDURE:

Visually inspect to verify that chalkboards and/or note pads are available at the following locations as approved in the H₂S Contingency Plan:

1. Rig floor.
2. Shale-shaker area.
3. Cement-pump rooms.
4. Well-bay areas.
5. Production processing equipment area.
6. Gas compressor area.
7. Pipeline-pump area.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if chalkboards and/or note pads are not available at the required locations.

H-142

ARE BULL HORNS AND FLASHING LIGHTS AVAILABLE?

Authority: 490(k)(1)(iv)

Enforcement Action: S

INSPECTION PROCEDURE:

Visually inspect the facility to verify that the following equipment is available and operable as approved in the H₂S Contingency Plan:

Bull horns.
Flashing lights.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if operable bull horns and flashing lights are not available.

H-143 **ARE AUDIBLE ALARMS AND DISPLAY FLAGS OR FLASHING RED LIGHTS AVAILABLE FOR USE ON FACILITIES WHEN ATMOSPHERIC CONCENTRATIONS OF H₂S REACH 20 PPM AND ARE SIGNS AND FLAGS CAPABLE OF BEING ILLUMINATED AT NIGHT AND UNDER CONDITIONS OF POOR VISIBILITY?**

Authority: 490(i)(2)(ii)
 490(i)(5)
 490(i)(7)(i)

Enforcement Action: S

INSPECTION PROCEDURE:

Test and visually inspect:

1. Audible alarms
2. Display flags or flashing red lights
3. Signs and flags capable of being illuminated at night and under conditions of poor visibility.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if the above items are not available for use on the facility.

H-144 **ARE ALL VENTILATION DEVICES EXPLOSION-PROOF AND SITUATED IN AREAS WHERE H₂S OR SO₂ MAY ACCUMULATE?**

Authority: 490(k)(2)(i)
 490(k)(2)(ii)

Enforcement Action: C/S

INSPECTION PROCEDURE:

1. Visually inspect all ventilation devices to verify that they are explosion-proof.
2. Visually inspect the facility to verify that ventilation devices are situated in areas where H₂S and SO₂ may accumulate as approved in the H₂S Contingency Plan.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC for the ventilation device if it is not explosion-proof.

Issue a facility shut-in (S) INC if ventilation devices are not situated as approved in the H₂S Contingency Plan in areas where H₂S and SO₂ may accumulate.

H-145 **ARE MOVABLE, MULTIDIRECTIONAL VENTILATION DEVICES CAPABLE OF DISPERSING H₂S OR SO₂ VAPORS AWAY FROM WORKING PERSONNEL PROVIDED IN WORK AREAS?**

Authority: 490(k)(2)(iii)

Enforcement Action: C

INSPECTION PROCEDURE:

Visually inspect work areas to verify that movable, multidirectional ventilation devices capable of dispersing H₂S and SO₂ vapors are provided.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC for the work area if movable, multidirectional ventilation devices capable of dispersing H₂S and SO₂ vapors are not provided.

H-146 **IF WATER-BASED, WELL-CONTROL FLUIDS ARE USED, AND IF H₂S IS DETECTED BY AIR SENSORS, HAS THE GARRETT-GAS-TRAIN TEST OR COMPARABLE TEST TECHNIQUES FOR SOLUBLE SULFIDES BEEN CONDUCTED?**

Authority: 490(m)(2)

Enforcement Action: W

INSPECTION PROCEDURE:

1. Check operator's records to verify that the Garrett-Gas-Train test or comparable test for soluble sulfides has been conducted if H₂S was detected when using water-base well-control fluids.
2. If the concentration detected by air sensors is in excess of 20 ppm, personnel conducting the tests shall don protective-breathing equipment.

Note: The Garrett-Gas-Train test is described in API RP 13B, Appendix A.16.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if the Garrett-Gas-Train test or comparable test for soluble sulfides has not been conducted when H₂S was detected.

H-147 ARE SUFFICIENT QUANTITIES OF ADDITIVES (SCAVENGERS, pH, AND CORROSION CONTROL) MAINTAINED ON THE FACILITY?

Authority: 490(m)(4)(i)

Enforcement Action: S

490(m)(4)(ii)

490(m)(4)(iii)

INSPECTION PROCEDURE:

Visually inspect the facility to verify that sufficient quantities of additives as approved in the H₂S Contingency Plan are available for the:

1. Control of H₂S (scavengers).
2. Control of well-control fluid pH.
3. Control for corrosion of equipment.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if sufficient quantities of additives are not available to control:

1. H₂S.
 2. Well-control fluid pH.
 3. Corrosion of equipment.
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H-148 WHEN H₂S IS DETECTED, IS DRILLING SUSPENDED UNTIL SCAVENGER IS CIRCULATED THROUGHOUT THE SYSTEM?

Authority: 490(m)(4)(i)

Enforcement Action: S

INSPECTION PROCEDURE:

If present on the facility during the detection of H₂S, observe to see if drilling is suspended until scavenger is circulated throughout system.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if drilling is not suspended and scavenger is not circulated throughout the system.

H-149 IS THE pH OF WATER-BASED WELL-CONTROL FLUIDS MAINTAINED AT A MINIMUM OF 10.0?

Authority: 490(m)(4)(ii)

Enforcement Action: S

INSPECTION PROCEDURE:

Check the operator's records to verify that the pH of water-based well-control fluids is maintained at a minimum of 10.0.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if the pH of well-control fluids is not maintained at a minimum of 10.0.

H-150 ARE WELL-CONTROL FLUIDS CONTAINING H₂S DEGASSED AT THE OPTIMUM LOCATION FOR THE PARTICULAR FACILITY AND ARE THE GASSES REMOVED BURNED IN A CLOSED FLARE SYSTEM?

Authority: 490(m)(5)

Enforcement Action: S

INSPECTION PROCEDURE:

1. Review H₂S Contingency Plan to ascertain optimum location for degasser.
2. Visually inspect the facility to confirm the presence of the degasser and that it is operative.
3. Visually inspect the flare system to verify that it is a closed system.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if the degasser is not operative or if flare system is not a closed system.

H-156

ARE ALL VENTS USED FOR H₂S PRODUCTION PROCESS EQUIPMENT, TANKS, RELIEF VALVES, BURST PLATES, AND SIMILAR DEVICES PIPED TO THE FLARE SYSTEM?

Authority: 490(q)(6)

Enforcement Action: C/S

INSPECTION PROCEDURE:

Visually inspect the facility to verify that all vents are piped to the flare system used for H₂S for:

1. Production process equipment.
2. Tanks.
3. Relief valves.
4. Burst plates.
5. Similar devices.

IF NONCOMPLIANCE EXISTS:

Issue a component shut-in (C) INC if certain components are not vented properly.

Issue a facility shut-in (S) INC if all components on the facility are not vented properly.

H-157

IS GAS CONTAINING H₂S NOT USED FOR INSTRUMENT GAS, AND IF H₂S IS BEING USED AS FUEL GAS, DOES THE OPERATOR HAVE APPROVAL FROM THE DISTRICT MANAGER?

Authority: 490(q)(9)

Enforcement Action: S

INSPECTION PROCEDURE:

1. Check operator's records and inspect all instruments for any indication that gas containing H₂S may be being used for instruments.
2. Check operator's records and all combustion devices for indications that gas containing H₂S may be used for fuel. The District Manager may approve the use of gas containing H₂S for fuel. If no approval has been given and indications are present, operator must prove that gas used for fuel does not contain H₂S.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if gas containing H₂S is used for instruments or if gas containing H₂S is used for fuel without the prior approval of the District Manager.

H-158

HAS THE DISTRICT MANAGER BEEN NOTIFIED IF PRODUCED WATER IS DISPOSED OF BY MEANS OTHER THAN SUBSURFACE INJECTION?

Authority: 490(q)(12)

Enforcement Action: S

INSPECTION PROCEDURE:

Inspect the production process system to verify that produced water to be disposed of by means other than subsurface injection is treated for removal of H₂S.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if the produced water to be disposed of by means other than subsurface injection is not treated for removal of H₂S and does not have approval by the District Manager.

H-159

ARE H₂S LEVELS CONTINUOUSLY MONITORED IN THE WORK AREAS DURING DRILLING, WELL-COMPLETION, AND WELL-WORKOVER OPERATIONS?

Authority: 490(j)(4)(i)

Enforcement Action: W/S

490(j)(4)(ii)

490(j)(4)(iii)

490(j)(4)(iv)

490(j)(4)(v)

INSPECTION PROCEDURE:

1. Check operator's records to verify that H₂S levels were monitored in the work area when:
 - A. Pulling a wet string of drill pipe;
 - B. Pulling a workover string;
 - C. Circulating bottoms-up after a drilling break;
 - D. Cementing;
 - E. Logging; and
 - F. Circulating to condition mud or other well-control fluids.
2. If present during such operations, verify that the required monitoring is being conducted.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that monitoring was not conducted during such operations.

Issue a facility shut-in (S) INC if such monitoring is not being conducted when present during such operations.

H-160

WHEN CONDUCTING CORING OPERATIONS, IS PROTECTIVE BREATHING EQUIPMENT WORN BY ALL PERSONNEL IN THE WORK AREA AT LEAST 10 STANDS IN ADVANCE OF RETRIEVING THE CORE BARREL?

Authority: 490(q)(1)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that protective breathing equipment was worn by personnel in the work area at least 10 stands in advance of retrieving the core barrel during conventional coring operations.
2. If present during such operations, verify that protective breathing equipment is worn by personnel in the work area at least 10 stands in advance of retrieving the core barrel during conventional coring operations.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that protective breathing equipment was not worn by personnel in the work area at least 10 stands in advance of retrieving the core barrel during conventional coring operations.

Issue a facility shut-in (S) INC if protective breathing equipment is not worn by personnel in the work area at least 10 stands in advance of retrieving the core barrel during conventional coring operations, if present during such operations.

H-161

ARE ALL CORES TO BE TRANSPORTED SEALED AND MARKED FOR THE PRESENCE OF H₂S?

Authority: 490(q)(1)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that all cores to be transported were sealed and marked for the presence of H₂S.
2. If present on the facility, inspect all cores to verify that they have been sealed and marked for the presence of H₂S.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that cores were not sealed and marked for the presence of H₂S.

Issue a facility shut-in (S) INC if cores are not sealed and marked for the presence of H₂S if present on the facility during inspection.

H-162

IS WELL-CONTROL FLUID IN USE FOR LOGGING OPERATIONS CONDITIONED AND TREATED TO MINIMIZE THE EFFECT OF H₂S ON THE LOGGING EQUIPMENT?

Authority: 490(q)(2)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Inspect operator's records to verify that well-control fluids in use during logging operations were conditioned and treated to minimize the effect of H₂S on the logging equipment.
2. If present during logging operations, observe well-control fluid handling operations and check records to verify that the well-control fluids have been conditioned and treated to minimize the effect of H₂S on the logging equipment.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that the well-control fluids in use during logging operations were not conditioned and treated to minimize the effect of H₂S on the logging equipment.

Issue a facility shut-in (S) INC if present during logging operations and the well-control fluids have not been conditioned and treated to minimize the effect of H₂S on the logging equipment.

H-163

DURING STRIPPING OPERATIONS, ARE DISPLACED WELL-CONTROL FLUID RETURNS MONITORED BY PERSONNEL?

Authority: 490(q)(3)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that well-control fluid returns were monitored by personnel during stripping operations.
2. If present during stripping operations, observe well-control fluid returns for the presence of monitoring personnel.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that well-control fluid returns were not monitored by personnel during stripping operations.

Issue a facility shut-in (S) INC if present during stripping operations and well-control fluid returns are not monitored by personnel.

H-164

DURING STRIPPING OPERATIONS, IS PROTECTIVE BREATHING EQUIPMENT WORN BY PERSONNEL IN THE WORK AREA WHEN THE ATMOSPHERIC CONCENTRATION OF H₂S REACHES OR EXCEEDS 20 PPM OR IF THE WELL IS UNDER PRESSURE?

Authority: 490(q)(3)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that protective breathing equipment was worn by personnel in the work area during stripping operations when the concentration of H₂S reached or exceeded 20 ppm, or if the well was under pressure.
2. If present during stripping operations and the concentration of H₂S equals or exceeds 20 ppm, or if the well is under pressure, observe the work area to verify that personnel are wearing protective breathing equipment.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that personnel did not wear protective breathing equipment during stripping operations when the concentration of H₂S reached or exceeded 20 ppm, or if the well was under pressure.

Issue a facility shut-in (S) INC if present during stripping operations and protective breathing equipment is not worn by personnel in the work area if the concentration of H₂S reaches or exceeds 20 ppm, or if the well is under pressure.

H-165

IS PROTECTIVE BREATHING EQUIPMENT WORN BY PERSONNEL IN THE WORK AREA DURING BOTTOMS-UP WHEN CIRCULATING OUT A KICK AND DURING EXTENDED KILL OPERATIONS?

Authority: 490(q)(4)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that protective breathing equipment was worn by personnel in the work area during bottoms-up when circulating out a kick and during extended kill operations.
2. If present during bottoms-up when circulating out a kick and during extended kill operations, observe the work area to verify that personnel are wearing protective breathing equipment.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that personnel did not wear protective breathing equipment during bottoms-up when circulating out a kick and during extended kill operations.

Issue a facility shut-in (S) INC for the facility if present during bottoms-up when circulating out a kick and during extended kill operations if personnel in the work area are not wearing protective breathing equipment.

H-166

IS AN EFFECTIVE MEANS OF MONITORING AND CONTROLLING CORROSION CAUSED BY ACID GASES USED IN BOTH THE DOWNHOLE AND SURFACE PORTIONS OF A PRODUCTION SYSTEM?

Authority: 490(q)(7)

Enforcement Action: S

INSPECTION PROCEDURE:

Check operator's records and observe production system for indications of corrosion monitoring and control equipment. The operator must prove that such means for monitoring and controlling corrosion exist.

IF NONCOMPLIANCE EXISTS:

Issue a facility shut-in (S) INC if records and observations indicate that an effective means of monitoring and controlling corrosion in both the downhole and surface portions of the production system does not exist.

H-167

ARE LUBRICATORS WHICH MAY BE EXPOSED TO FLUIDS CONTAINING H₂S MADE OF H₂S-RESISTANT MATERIALS?

Authority: 490(q)(8)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that lubricators exposed to fluids containing H₂S were made of H₂S resistant materials.
2. If present when lubricators are installed, visually inspect the lubricator for make and model and verify with records that they are made of H₂S resistant material.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if operator's records indicate that lubricators exposed to fluids containing H₂S were not made of H₂S resistant material.

Issue a facility shut-in (S) INC if the lubricators which may be exposed to fluids containing H₂S and in use during the inspection are not made of H₂S resistant materials.

H-168

ARE METALS USED FOR SENSING LINES AND SAFETY-CONTROL DEVICES WHICH ARE EXPOSED TO H₂S BEARING FLUIDS CONSTRUCTED OF H₂S CORROSION RESISTANT MATERIALS OR COATED WITH APPROPRIATE MATERIALS SO AS TO RESIST CORROSION?

Authority: 490(q)(10)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Check operator's records to verify that metals used in sensing lines and safety-control devices which were exposed to H₂S bearing fluids were constructed with H₂S corrosion resistant materials or coated with appropriate materials so as to resist corrosion.
2. If present on the facility during operations in a known H₂S zone, verify that the metals and safety-control devices are properly constructed or coated.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if the metals were not properly constructed or coated so as to resist H₂S corrosion. Issue a facility shut-in (S) INC if present on the facility during operations in a known H₂S bearing zone and the metals and safety-control devices are not properly constructed or coated.

H-169

ARE ALL SEALS WHICH MAY BE EXPOSED TO FLUIDS CONTAINING H₂S MADE OF H₂S-RESISTANT MATERIAL?

Authority: 490(q)(11)

Enforcement Action: W/S

INSPECTION PROCEDURE:

1. Inspect records to verify that all seals, which were in service while operating in a known H₂S zone and which may have been exposed to fluids containing H₂S, were made of H₂S-resistant material.
2. If present while operations are conducted in a known H₂S zone, verify that all seals, which may be exposed to fluids containing H₂S, are made of H₂S-resistant material by visual observation and records checks.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if records indicate that seals, which may have been exposed to fluids containing H₂S, were not made of H₂S-resistant material. Issue a facility shut-in (S) INC if seals which may be exposed to fluids containing H₂S are not constructed of H₂S resistant material, if witnessed during operations in a known H₂S zone.

H-170

DO TRAINED EMPLOYEES OR CONTRACTORS TRANSFERRED FROM ANOTHER FACILITY RECEIVE A SUPPLEMENTAL BRIEFING ON H₂S EQUIPMENT AND PROCEDURES BEFORE BEGINNING DUTY?

Authority: 490(g)(3)(i)

Enforcement Action: W

INSPECTION PROCEDURE:

Verify that all operator and contract personnel from other facilities have received a supplemental briefing on H₂S equipment and procedures for this facility.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if any operator or contract personnel have not received a supplemental briefing for this facility.

H-171

DO VISITORS WHO REMAIN AT THE FACILITY FOR MORE THAN 24 HOURS RECEIVE THE TRAINING REQUIRED FOR EMPLOYEES AND CONTRACTORS?

Authority: 490(g)(3)(ii)

Enforcement Action: W

INSPECTION PROCEDURE:

Verify that all visitors that will be on the facility for more than 24 hours have received the same training as required for the operators and contractors.

IF NONCOMPLIANCE EXISTS:

Issue a warning (W) INC if any visitors are on the facility more than 24 hours without receiving the same required training as the operators and contractors.
