

OUTLINE OF RULE 36

RULE 36 & H₂S SAFETY

RULE 36 IS A SAFETY RULE DESIGNED TO PROTECT THE GENERAL PUBLIC FROM THE HAZARDS OF H₂S RESULTING FROM INTENTIONAL AND ACCIDENTAL RELEASES.

PROPERTIES OF H₂S

1. Rotten Egg Odor - Odor threshold 0.13 PPM.
2. Colorless
3. Heavier than air - S.G. 1.19
4. Dissolves in water to form acid - PH OF 3
5. Very corrosive on certain metals - Causes Hydrogen Sulfide Stress Cracking.
6. Will kill sense of smell at high concentrations and at low concentrations over a period of time.
7. Sweet tasting gas
8. Very Deadly - At concentrations above 500 PPM, can kill within minutes. Can also kill at lower concentration if exposed long enough.
9. Kill by respiratory paralysis - Can't hold breath
10. H₂S converts to SO₂ (Sulfur Dioxide) when burned.

Rule 36 is a progressive rule relative to compliance. The level of compliance required is determined by 100 PPM & 500 PPM R.O.E.

RADIUS OF EXPOSURE - Distance from release to where H₂S concentration in air will dilute to below 100 PPM or 500 PPM. R.O.E. for pipeline will be parallel lines.

LEVELS OF COMPLIANCE

1. If concentration is less than 100 PPM - EXEMPT from rule. $100 \text{ PPM} = .01\% \text{ or Percent} \times 10,000 = \text{PPM}$.
2. If 100 PPM R.O.E. is less than 50 feet, EXEMPT from all but the training provisions unless facility is a lease storage tank. if vapors in tank are 500 PPM or greater, tanks will require signs and maybe fence even if R.O.E. is less than 50 feet.
3. If 100 PPM R.O.E. is greater than 50 feet, and less than 3,000 feet, but does not include a public area & 500 PPM R.O.E. does not include a public road.
 - A. SIGNS -- Facilities & buried pipelines.
 - B. SECURITY PROVISION -- If located within 1/4 mile of a public area or inside city limits, fencing, etc. required to deter and protect public.
 - C. MATERIALS & EQUIPMENT PROVISION:
 - (1) This provision applies only to the parts of a system used for the containment of pressure.
 - (2) After 9/1/76, new or modified operations must use material that satisfies the requirements of NACE MR-01-75. Metals specified by this are not susceptible to H₂S stress cracking under specified conditions.
 - (3) Fiberglass & plastics may be used, but metals not covered by MR-0-75 may not be used unless authorized by RRC.
 - (4) Equipment in use prior to 9/1/76 may be used in same area if no history of failure.
 - (5) General observation
 - (A) Higher grades of metals are more susceptible to H₂S stress cracking.
 - (B) Higher temperatures reduce corrosive effect.
 - (C) Higher pressures increase corrosive effect.
 - (D) H₂S Stress cracking normally does not occur at pressures below 65 PSI.
 - (E) Metals with a Rockwell hardness of 22 or less are normally not susceptible to H₂S stress cracking. J-55
 - (F) Drill pipe with a yield strength of 95,000 PSI or less are normally not susceptible to H₂S stress cracking.

- D. For drilling & workover operations and gas plants, the following are required:
- (1) Minimum of 2 air packs
 - (2) Wind socks
 - (3) Monitor
4. If 100 PPM R.O.E. is greater than 50 feet and includes any part of a public area except a public road or if 100 PPM R.O.E. is greater than 3000 feet regardless of public area; or the 500 PPM R.O.E. is greater than 50' and includes any part of public road.
- A. Signs, Security, Material Provisions
 - B. Safety Controls, Equipment and/or Procedures to prevent a continued, undetected H₂S leak. Flaring of a potentially hazardous volume of H₂S gas is required, unless venting permission is obtained from the Commission and conducted in a manner that will not pose an unreasonable risk of harm to the public.
 - C. Contingency Plan - Conventional and Reactive - An organized plan of action for alerting & protecting the public prior to an intentional release, or following an accidental release of a potentially hazardous volume of H₂S gas.
 - D. For Drilling and Workover operations
 - (1) Protective breathing equipment adequate to allow for well control.
 - (2) Method for igniting gas.
 - (3) H₂S Detection and Alarm Equipment
 - (4) Choke Manifold, Flareline
 - (5) Remote control for BOP & Chokes.
 - (6) DST Permitted only in daylight hours
 - (A) RRC must be notified
 - (B) Test string must be of acceptable material
 - (7) Must be in compliance within 1000 feet of H₂S zone.
 - (8) API RP-49 is referenced as a suggested guideline. Covers mud systems, locations, etc. Beyond the scope of Rule 36 such as:
 - (A) Maintain mud weight.
 - (B) Maintain mud PH at 11 or greater to neutralize and decompose H₂S in mud stream.
 - (C) Use of H₂S scavengers in mud system.

- (9) B.O.P. and Well Control System must be tested at or near compliance depth and RRC must be notified.

INJECTION PROVISIONS

1. Injection of fluids containing H₂S shall not be allowed without a public hearing if:
 - A. The 100 PPM R.O.E. is greater than 50 feet and includes a public area.
 - B. The 500 PPM R.O.E. is greater than 50 feet and includes a public road.
 - C. The 100 PPM R.O.E. is 3,000 feet or greater.
 - D. The H₂S content of the gas to be injected has been increased by a processing plant operation.
2. If a public hearing is not required, must still comply with all applicable provisions of Rule 36.

TRAINING PROVISIONS

1. Operator shall train its employees working in H₂S areas.
2. Operator shall require service companies to utilize trained personnel actually working on H₂S system or well and where such work could allow the escape of H₂S gas.
3. TRAIN ALL PERSONNEL IN:
 - A. Hazards and Characteristics of H₂S.
 - B. Safety Precautions
 - C. Equipment - Safety and Support
4. Train on-site supervisory personnel in:
 - A. Effects of H₂S on metals
 - B. Corrective actions and shutdown procedures.
 - C. Well control - If a drilling operation
 - D. Knowledge of contingency plan.

NOTIFICATION

1. Requires immediate notification to RRC of any accidental release of H₂S of sufficient volume to present a hazard and of any H₂S related accident. Twelve hour advance notice of intentional releases, or as soon as possible of unplanned intentional releases, should the contingency plan be activated.
2. Whether resulting from accidental or intentional release, notification shall be followed by a written report within 10 days.

REPORTS REQUIRED

1. File H-9 at least 30 days prior to the commencement of drilling or workover operations.
2. The H-9 certifies that the operation is in compliance or will be in compliance with the provisions of Rule 36.
3. An Amended H-9 is required if there is a change in public exposure caused by public infringement that will result in a change to the compliance provisions under the existing H-9.
4. H-9'S are not transferable.
5. A "Lease Operation H-9" will cover all work on a lease including workovers and the drilling of new wells, unless the 100 PPM R.O.E. of the well is 3,000 FEET or greater.

ANALYSIS

1. Must normally be "4" complementing conditions to cause a tragedy.
 - A. Must be an undetected, continuous release.
 - B. Release must be of sufficient volume and concentration.
 - C. Must be weather conditions that retard dispersion.
 - D. Must be uninformed public in area of exposure.
2. Probability of all these conditions occurring at the same time is remote under the provisions of Rule 36, but it could happen.