3.E.4 a. (cont'd) risk to personnel, vessels, or the marine environment. Non-vital hazardous systems are subject to most regulations, but not to those specifically limited to "vital" systems.]

b. Hydraulic System.

(1) General. If a hydraulic system is of fail-safe design and is not identified in any subparagraphs of 46 CFR 58.30-1(a), it is not subject to all of the detailed requirements of subpart 58.30, but must meet the requirements of subpart 58.30-50. A hydraulic system is regarded as fail-safe under 58.30-1(a)(2) or (11) if it is equipped with features that prevent damage or injury upon failure of the power source or the system itself.

(2) Fail Safe Designs. The most common form of fail-safe feature is a spring-loaded brake that requires hydraulic pressure to release it before the system can operate. Such brakes can stop a crane load or boom in place when either the hydraulic system develops a severe leak or the power to the pump fails. This is the preferred (and typically employed) method. A second type of fail-safe feature such as slow and controlled release of the load for hatch covers is sometimes acceptable.

This variation has two potential problem areas. Normally, there will be one part, often a cylinder, that must remain intact for the fail-safe feature to remain operational. Also, slow lowering is not truly a safe failure if the system operates a crane used to hoist a diving bell or transfer personnel to and from a drill rig, so that it passes over water, over a rack of loose pipes, or through any other area where slow lowering would not actually be safe.

c. Low-Temperature Systems.

(1) Introduction. Low temperature or "cryogenic" systems are those containing a fluid, usually a liquefied gas, at a temperature below 0°F. These systems share several common hazards:

(a) Leakage of cold liquid can cause instant frostbite injuries;
(b) The cold makes many materials, including system piping and most grades of deck and hull steels, brittle and prone to sudden and severe cracking;
(c) The quantities of stored energy are enormous. Liquefied natural gas, for example, occupies only one six-hundredth of the space the same weight of gas occupies at normal pressures and temperatures;
(d) Many of the fluids are flammable, fire-reactive, or toxic, and vaporize rapidly upon release.

Therefore, in addition to the normal requirements of Part 56, specific requirements are found in 46 CFR 38, 56.50-105, 56.70, 57, 98.25, 151, and 154. These requirements deal mainly with material selection, avoidance of notches and crevices, welding qualification, containment, and vapor handling.

(2) Cryogenic Welding. In particular, the review of cryogenic welding procedures requires special consideration. The