CERTIFYING ENTITY GUIDELINES FOR CONDUCTING A REVIEW, CERTIFICATION AND INITIAL INSPECTION OF WATERSIDE FACILITY VAPOR CONTROL SYSTEMS

4 OCTOBER 1991

CHANGE (1)

These guidelines were prepared by the U. S. Coast Guard Marine Technical and Hazardous Materials Division (Commandant (G-MTH-1)) to serve as guidelines during certification of waterside facility vapor recover systems under Title 33 Code of Federal Regulations (CFR) Part 154 Subpart E by Certifying Entities as defined in 33 CFR 154.802. These guidelines are not meant to supersede, increase, or decrease, the facility vapor control system requirements as found in the Code of Federal Regulations. These guidelines revise and supersede the guidelines dated 10 September 1990.

20 April 1992 - Pages 1, 3, 4 and 12 revised (Change 1)

GUIDELINES FOR CONDUCTING A REVIEW, CERTIFICATION AND INITIAL INSPECTION OF FACILITY VAPOR CONTROL SYSTEMS

The requirements for the design of a facility vapor control system are contained in 33 CFR Part 154, Subpart E. These guidelines are intended to establish the minimum standards for conducting the review of a facility vapor control system by a certifying entity, and provide some general clarification of the regulations. Distribution of these guidelines is encouraged, including the distribution to vapor control system designers. Commandant (G-MTH-1) may be contacted if questions arise on interpretation of regulations (telephone: (202) 267-1217). Under 33 CFR 154.108, the Chief, Office of Marine Safety, Security, and Environmental Protection can grant exemptions to requirements if satisfied that an adequate level of safety is attained. This authority has been delegated to G-MTH. Requests for exemptions must be forwarded by the cognizant Coast Guard Captain of the Port (COTP) to G-MTH:

Commandant (G-MTH-1)
United States Coast Guard
2100 Second Street, SW
Washington, DC 20593-0001

In addition, requests for exemptions should be prepared by the facility designers, rather than the certifying entity. Also note that where state or local rules are different from the regulations in 33 CFR Part 154, Subpart E, the discrepancies should be related to G-MTH-1.

I. Failure Analysis

1. The requirements for conducting a failure analysis are contained in 33 CFR 154.804(d). The failure analysis is used to demonstrate that the system's controls, safety systems, alarms, and shutdowns operate as intended, and to uncover hazards that are not specifically addressed by the regulations. Any hazard uncovered by the hazards analysis should be addressed in the protection system design or by operational requirements (see 33 CFR 154.808(a)). Vapor control systems can be very complex, and the regulations are not able to anticipate all design configurations and possible hazards which may arise.

2. The requirements in 33 CFR 154.804(d) are sufficiently flexible to allow a number of different methods of failure analysis. Some methods which are well suited for vapor control systems are the Failure Modes, Effects, and Criticality Analysis (FMECA) (similar to Failure Modes and Effects Analysis (FMEA)), Hazard and Operability Study (HazOp), Fault Tree Analysis (FTA), and Event Tree Analysis (ETA). Guidelines for conducting these analyses are contained in the American Institute of Chemical Engineers publication "Guidelines for Hazard Evaluation Procedures."

3. As required by 33 CFR 154.804(d)(4), if a quantitative failure analysis is conducted, it must be supplemental to a qualitative failure analysis and must demonstrate that the level of safety attained is at least one order of magnitude greater than that calculated for operating without a vapor control system. The one order of magnitude difference in safety is needed because of the error inherent in conducting such an analysis. This type of analysis is particularly useful if an equivalency determination is desired.

4. When reviewing a failure analysis, it is important to ensure that all reasonable scenarios are considered. This would include equipment failures and personnel failures. If unsure whether or not an event is reasonable, it probably should be considered. Acts of God or deliberate sabotage do not need to be considered. The analysis should demonstrate the criteria given in 33 CFR 154.804(d).

5. As required by 33 CFR 154.808(a), hazard sources which are not eliminated must be specifically addressed in the protection system design and operational requirements.

6. It is not permissible for a certifying entity to conduct the failure analysis on a facility it is certifying. (55 FR 25405) The certifying entity must only point out shortcomings shown by the failure analysis, and not propose design changes to correct these shortcomings.

II. General Requirements

1. 33 CFR 154.808(b) requires piping and fittings to be in accordance with ANSI B31.3 with a maximum allowable working pressure of at least 150 psig, and valves (including quick closing valves) and flanges to be in accordance with ANSI B16.5 or B16.24, 150 pound class. Components which are to be in compliance with an ANSI standard can be verified by material specification sheets. Other components will be required to have the design reviewed to verify the 150 psig working pressure. Materials should be confirmed by on site inspection.

2. The following components and their associated equipment do not have a minimum specified maximum allowable pressure: knockout drums, liquid seals, blowers/compressors, flare stacks/incinerators, and vapor processing units. Although a minimum MAWP is not specified, these components should be constructed to acceptable engineering standards and have the appropriate mechanical strength to serve the intended purpose. The connecting piping and flanges for these components should have maximum allowable working pressures of at least 150 psig and meet applicable ANSI standards.

3. All components of the vapor control system should have the mechanical strength and materials of construction appropriate for the intended use and location. All components should be capable

of meeting the rigors of the qualitative failure analysis required by 33 CFR 154.804 taking into account such factors as fire risk, isolation from vibrations, protection from external impacts and protection from corrosion due to contact with salt water and the marine atmosphere.

4. 33 CFR 154.808(c) requires electrical equipment to comply with NFPA 70 (National Electrical Code). Most of the information needed to verify this will probably not be available on plans, but will need to be verified by on site inspection of the electrical installation.

5. 33 CFR 154.808(d) requires that any pressure, flow, or concentration indication required by the regulations provides a remote indicator on the facility where the cargo transfer and vapor control systems are controlled (operator's control station). This should be verified on piping and instrumentation diagrams (P&ID) and confirmed by on site inspection. Any indicator, which is completely visible from and can be clearly read from the operator's control station, does not need a remote indicator as long as the operator can read it without moving. (Examples of unacceptable situations: if the operator needs to turn around, or if the operator needs to change his angle of sight out of a window.)

6. 33 CFR 154.808(e) requires that any alarm condition required by the regulations activate an audible and visible alarm where the cargo transfer and vapor control systems are controlled. This should be verified on P&ID drawings and confirmed by on site inspection testing (Section XIII). Each visible alarm should indicate the location and cause of the alarm. For example, a vacuum alarm at the shore connection should provide a distinct visual alarm from the pressure alarms at the shore connection; a temperature alarm on the shore connection type II detonation arrester should have a visual alarm that is distinct from the visual temperature alarm for a type II detonation arrester at an incinerator.

7. 33 CFR 154.808(f) requires that the vapor control system must be separated or insulated from external heat sources to limit vapor control system piping surface temperature to not more than 350°F. The purpose of this requirement is to prevent ignition from an external heat source. Problems due to heating may not be apparent from arrangement drawings. Therefore, careful on site inspection must be conducted.

8. 33 CFR 154.808(g) requires that a means must be provided to eliminate any liquid condensate from the vapor collection system which carries over from the vessel or condenses in the line. This will normally be done with a knockout vessel. However, it may also be done by heating the vapor line, provided precautions are taken to prevent overheating. If the vapor line is not heated and there is a low point in the line prior to the first knockout drum, some means of collection at the low point should be provided. However, the alarm and shutdown required by 33 CFR

154.808(h) is not required. The means to eliminate liquid condensate should be indicated on P&ID drawings and confirmed by on site inspection.

9. 33 CFR 154.808(h) requires liquid level indicator, high level alarm, and overfill shutdown on liquid knockout vessels. The high level alarm does not have to be independent of the overfill shutdown. These should be verified on P&ID drawings and confirmed by on site inspection and operational tests.

III. Vapor Line Connections

1. 33 CFR 154.810(a) contains requirements for a remotely operated cargo vapor shutoff valve. The location of the valve should be verified on drawings. The requirement regarding resilient material on the valve seat should be verified by material specification sheets. The other requirements in the paragraph should be verified by on site inspection and operational tests.

2. 33 CFR 154.810(a)(3) requires that an alarm be activated when the remotely operated cargo vapor shutoff valve receives a signal to shut down. This does not require a separate alarm to sound when the valve closes, provided that every condition which would cause the valve to close activates an alarm.

3. The requirements of 33 CFR 154.810(b) and (c) should be verified by on site inspection. As a point of clarification, the end of a vapor arm is treated like the end of a vapor hose. Therefore, it does not need to have the 0.5 inch stud, but should have the 0.625 inch hole.

4. The requirements for design strength and conductivity for vapor hoses and fixed vapor collection arms in 33 CFR 154.810(d), (e) and (f) should be verified by material specification sheets. The remainder of the requirements of these paragraphs should be verified by on site inspection.

5. An on site inspection should verify that the facility has either an insulating flange or an insulating vapor hose available as required by 33 CFR 154.810(g). It does not need to be permanently attached to the facility vapor connection. During the on site inspection, careful attention should be given to ensure that there is nothing which could cause the insulating flange or hose to be bypassed, such as a steel support cable.

6. 33 CFR 154.810(h) requires a manual isolation valve and a means to prevent backflow of vapors to the vessel when a vapor collection system fitted with an enriching system operates at a positive gauge pressure at the facility vapor connection. This should be verified on drawings and by on site inspection. The means to prevent backflow could be a passive means such as a water seal or check valve, or could be an active means such as sensing a negative pressure differential and automatically closing the remotely operated cargo vapor shutoff valve.

IV. Facility Requirements for Vessel Liquid Overfill Protection

1. 33 CFR 154.812(a) contains requirements for a 120 volt shore tie connection for facilities which receive vapor from barges fitted with overfill protection in accordance with 46 CFR 39.20-9(a). If this connection is provided, the installation should be verified as meeting the standards listed in this paragraph.

2. 33 CFR 154.812(b) contains requirements for an overfill control system for facilities which receive vapor from barges fitted with overfill protection complying with 46 CFR 39.20-9(b). The installation should be verified as meeting the requirements of this paragraph by on site inspection. The operation of the alarm and shutdown should be verified by operational tests. The receptacle should be checked for proper labelling as required by subparagraphs (b)(5) and (6) of this section.

3. If a facility never collects vapors while loading a tank barge which has only a means of overfill protection in accordance with 46 CFR 39.20-9(b), the facility does not have to install a means of overfill protection in accordance with 33 CFR 154.812(b). However, the facility must understand that it must turn away a tank barge that comes to load if the barge only has a means of overfill protection in accordance with 46 CFR 39.20-9(b).

4. 33 CFR 154.812(b)(6) does not specifically address the location of the ground pin in the connector for the overfill control system. API Recommended Practice No. 1125 calls for the ground pin on the terminal connector to be installed at the one O'clock position when facing it. The connectors should meet this arrangement for consistency within the industry.

V. Facility Requirements for Vessel Vapor Overpressure and Vacuum Protection

1. 33 CFR 154.814 contains facility requirements for vessel vapor overpressure and vacuum protection. The location of the pressure sensors as required by this section should be verified on P&ID drawings and confirmed by on site inspection. The operation of alarms and shutdowns, along with the pressure set points should be verified by operational tests.

2. 33 CFR 154.814(a) requires the vapor control system to have a capacity of not less than 1.25 times the facility's maximum liquid cargo transfer rate plus any inerting, diluting, or enriching gas which may be added to the system. Unless the facility has some means of storing vapors for later processing, this capacity should also apply to the vapor processing unit.

3. The criteria to be used to determine acceptable capacity is not directly specified. Except for certain components of the system, such as PV valves, vapor movers, incinerators, and carbon

beds which have a nominal capacity given, the criteria will basically be whether the pressure drop at the maximum vapor flow will result in an unacceptable pressure drop in the system. Too high of a pressure drop could make it impossible for the system to maintain the pressure range required by 33 CFR 154.814(b).

4. Once the maximum liquid cargo transfer rate is established, there must be some means to ensure this rate is not exceeded. This means could be a liquid loading rate meter with an indicator at the operator's control station, or a clearly specified limitation on the number of cargo pumps which could be on-line. If the facility limits the loading rate by the capacity of on-line pumps, means, such as a liquid loading meter, must be provided to accommodate vessels which have a lower maximum allowable loading rate. A facility, which limits rates solely on the basis of pump capacity, may not load vessels which have a maximum allowable loading rate less than the facility's pump capacity.

5. The certifying entity should verify the designer's flow calculations and ensure the vapor control system can accommodate both the vapor flow at the maximum liquid cargo transfer rate and the no flow condition. The vessel will have information in its oil transfer procedures on the maximum pressure drop across the vessel's vapor collection system for various liquid transfer rates. The facility operator must be able to utilize this vessel information plus information on the pressure drop across any vapor hoses or arms and any piping between the facility vapor connection and the pressure sensors to determine that the cargo transfer rate will allow the pressure range required by 33 CFR 154.814(b) to be maintained. The operator may be able to adjust the pressure alarm settings and the vapor compressor settings in order to maintain this range.

6. The following should help illustrate the method of finding the maximum pressure at the facility: the operator should take 80% of the lowest pressure relief valve setting of a vessel's tanks, subtract the absolute value of the pressure drop across the vessel's vapor collection system as determined by the information in the vessel's oil transfer procedures at a maximum loading rate, and then subtract the absolute value of the pressure drop across any vapor hoses or arms and any piping between the facility vapor connection and the pressure sensors. This figure, provided it does not exceed 2.0 psig, will be the highest allowable setting for the high pressure alarm required by 33 CFR 154.814(d). Unless the facility can measure the actual vapor flow rate, the highest vacuum for the high vacuum alarm, required by 33 CFR 154.814(e), will be 80% of the vacuum relief valve setting, to be able to account for the no flow condition.

7. 33 CFR 154.814(a) allows a vapor growth rate of less than 25% to be used if the vapor growth rate of the most volatile liquid handled by the facility is less than 25%. This is only acceptable if reliable test data exists showing the actual maximum vapor growth for turbulent loading.

8. 33 CFR 154.814(h) requires the pressure sensing devices required by 33 CFR 154.814(e) and (f) to be located between the facility vapor connection and the manual isolation valve. This is a mistake in the regulations, it should refer to the pressure sensing devices required by 33 CFR 154.814(d) and (f).

9. 33 CFR 154.814(j) and (l) require a vacuum relief valve if the vapor mover has the capability of drawing more than 1.0 psi vacuum, and a pressure relief valve if the inerting, enriching, or diluting system can cause the pressure in the vapor collection line to exceed 2.0 psig, respectively. In other words, the relief valves are required if a malfunction in the controls or controlling valves can cause the given pressure values to be exceeded. There would have to be some physical restraints inherent in the system which would prevent the given pressure values from being exceeded to be able to dispense with the relief valves.

10. Manufacturer's information for pressure and vacuum relief valves should be reviewed to verify that the valves meet the requirements of 33 CFR 154.814(j), (l), and (m). The location of the valves, as required by these same paragraphs, should be verified on drawings and by on site inspection.

11. Flame arresters may be installed on pressure and vacuum relief valves in lieu of the flame screens required by 33 CFR 154.814(j) and (l). If this is done, the flow tests for the valves do not need to be conducted with the flame screens installed, but the valves' flow capacity must be adjusted for the pressure drop across the flame arresters.

12. 33 CFR 154.814(k) allows the vacuum relief valve to be set at a vacuum greater than 1.0 psi vacuum when the facility has an undersea pipeline provided the pressure controls take into account the pressure drop across the vessel's vapor collection system, any vapor collection hoses, and the undersea pipeline as a function of the actual transfer rate. This acknowledges that the compressor and pressure control equipment will likely be located a fair distance from the facility vapor connection, which will require the vacuum at the compressor to exceed 1.0 psi vacuum to overcome the pressure drop from the vapor connection. This will require the pressure at the compressor or pressure control equipment to vary with the actual vapor flow rate in order to prevent excessive vacuum at the vessel in a no flow condition. This will likely entail directly tying the pressure at the compressor or pressure control equipment to actual vapor flow rate.

VI. Fire, Explosion, and Detonation Protection

1. 33 CFR 154.820 basically specifies when detonation arresters and inerting, enriching, or diluting systems are required, and where detonation arresters are to be located. The arrangements should be verified on drawings and confirmed by on site inspection.

2. The flame arrester requirement in 33 CFR 154.810(m) is meant for openings that could vent from the vapor control system during normal operation, such as the outlet of a vapor recovery unit. It was not meant to include items which would not be venting under normal operating conditions, such as: purge lines which are only open during a pre- or post-transfer purging operation; and drain lines which are only opened to drain out liquid and then immediately closed. Note: while a pressure/vacuum relief valve normally only needs a flame screen at the valve's outlet, if the valve's outlet goes into a vent pipe which discharges at a remote location, the vent outlet should have a flame arrester.

VII. Detonation Arresters, Flame Arresters, and Flame Screens

1. 33 CFR 154.822(a) gives the requirements that detonation arresters and flame arresters, respectively, required by this part must meet. They must be accepted by the Commandant (G-MTH). Each manufacturer must test arresters in accordance with the test standards in Appendix A or Appendix B, as appropriate, of 33 CFR 154, and submit the test information to the Commandant (G-MTH). Commandant (G-MTH) will send a letter to the manufacturer stating that the successfully tested arresters may be used in vapor control systems.

2. Appendix B has been adopted as ASTM Standard F1273. As an alternative to the previously described procedures, it is acceptable for a manufacturer to certify that its flame arresters meet ASTM F1273. When an ASTM standard is developed for detonation arresters, this self-certification may also be accepted for detonation arresters. At that time, the regulations can be modified to only require the detonation arrester or flame arrester to meet the appropriate standard. The certifying entity should verify from the manufacturer's information that the requirements of this and the previous paragraph are met. One particular condition that should be verified is the location of Type II (in-line) flame arresters. Type II flame arresters will be tested for a maximum distance from the possible source of ignition, and it must be verified that the arrester's position in the line does not exceed this distance from the source of ignition it is protecting against.

3. Appendix A refers to a type I detonation arrester (one which has passed the full endurance burn test) and a type II detonation arrester (one which has passed a shortened endurance burn test). Paragraph 5.1.2 of Appendix A says that further methods are to be provided to prevent flame passage when a stationary flame occurs.

The regulations do not detail what these further methods entail. A type II detonation arrester should have a means of detecting a flame on the arrester, such as a temperature sensor, which will cause closure of all remotely operated cargo vapor shutoff valves required by 33 CFR 154.810(a), and any quick closing valves installed in accordance with 33 CFR 154.828(a) or (b). Arresters installed close to the facility vapor connection in accordance with 33 CFR 154.820 should have temperature sensors on both sides of the arrester. Arresters installed at the inlet and outlet to a compressor or blower in accordance with 33 CFR 154.820(a) should have the temperature sensor on the compressor or blower side of the arrester. Arresters installed at the vapor recovery or vapor destruction unit in accordance with 33 CFR 154.828(a) or (b) should have the temperature sensor located on the side of the arrester toward the vapor recovery or destruction unit.

4. The flame screen requirements of 33 CFR 154.822(c) should be verified by on site inspection.

VIII. Inerting, Enriching, and Diluting Systems

1. 33 CFR 154.824(a) requires a vapor control system which uses inerting, enriching, or diluting gas to be capable of inerting, enriching, or diluting the vapor collection line and the vapor collection hose or arm prior to receiving cargo vapor. This was not intended to require inerting, enriching, or diluting of the vapor collection hose or arm. A correction document was published in the Federal Register on September 26, 1990, which removed the reference to the vapor collection hose or arm from this paragraph. The intention of this paragraph was to ensure that the vapor line could be inerted, enriched, or diluted from the point of injection of the appropriate gas downstream to the vapor processing unit prior to receiving cargo vapor. It was not intended to require inerting, enriching, or diluting of the section of line between the point of gas injection and the facility vapor connection. The capability of inerting, enriching, or diluting the vapor collection line prior to receiving cargo vapor (or purging) should be verified by on site inspection.

2. 33 CFR 154.824(b) requires the point of injection of inerting, enriching, or diluting gas to be not more that 10 meters from the facility vapor connection. This should be verified on arrangement drawings and confirmed by on site inspection. It is difficult to know during the design review stage whether complete mixing will be achieved within 20 pipe diameters of the point of gas injection. The proof will come during the operational testing. If complete mixing has not occurred, large deviations in oxygen or hydrocarbon concentration will occur. This "mixing" portion of the system will need to be redesigned and retested.

3. 33 CFR 154.824(c) gives requirements for a vapor control system which uses an inerting or enriching system and operates at

a vacuum after the injection point. These requirements should be verified on P&ID drawings and confirmed by on site inspection.

4. The requirements for oxygen and hydrocarbon analyzers in 33 CFR 154.824(d) and (e) should be verified on P&ID drawings and confirmed by on site inspection and operational tests.

5. The requirements for oxygen and hydrocarbon analyzers in 33 CFR 154.824(f) and (g) should be verified by material specification sheets and confirmed by on site inspection.

6. The certifying entity should verify the flow calculations performed by the designer that the inerting, enriching, or diluting system can supply sufficient gas to the system at the maximum vapor flow rate in accordance with 33 CFR 154.824(h)(1), (i)(1), and (l)(1), respectively. As an alternative to flow calculations, operational tests can demonstrate the adequacy of supply gas at the maximum vapor flow rate.

7. Except as mentioned in the previous paragraph, the requirements of 33 CFR 154.824(h), (i), (j), (k), and (l) should be verified by operational tests.

8. The requirement in 33 CFR 154.824(k)(2) points out a problem which arises when receiving vapors from an inerted vessel and the facility controls enrichment of the vapors by using oxygen analyzers. The inert gas can make it appear, for the oxygen analyzers, that the vapors are enriched properly when they are not. This is not a problem if the vapors are properly inerted on the vessel. But if the vapors coming from the vessel are not properly inerted, they could be in the flammable range when the oxygen analyzers think that the vapors are enriched. Therefore, the oxygen analyzers must be set to alarm and shut down at the same levels as for an inerting system.

IX. Vapor Compressors and Blowers

1. The requirements of 33 CFR 154.826(a)(1) and (2) should be verified on arrangement drawings and confirmed by on site inspection.

2. 33 CFR 154.826(a)(3) allows an explosion suppression system acceptable to Commandant (G-MTH) in lieu of a detonation arrester or a flame arrester. Commandant (G-MTH) will allow an explosion suppression system in this application when the manufacturer is able to demonstrate by appropriate testing that the system will provide adequate protection. The certifying entity should verify from the manufacturer's information that the Coast Guard has accepted the system for the application. The installation of the system should be determined to be acceptable by on site inspection.

3. 33 CFR 154.826(b), (c), and (d) give requirements to address hazards known to be typical of most types of vapor movers which

are expected to be used in vapor control systems. The requirements should be verified on P&ID drawings and confirmed by on site inspection. If a particular type of vapor mover is not addressed in these paragraphs, it does not mean that it is prohibited. The requirements, for the vapor mover to which it is most similar, should be used. If the vapor mover does not have a system which is required to be alarmed, the alarms do not have to be provided (i.e. low lube oil pressure alarm does not need to be provided if there is not a pressure lubrication system). The Commandant (G-MTH) may be consulted as to which requirements should apply.

X. Vapor Recovery and Vapor Destruction Units

1. Paragraphs 1 and 2 of Section IX above apply to the requirements in 33 CFR 154.828(a).

2. The requirements of 33 CFR 154.828(b) and (c) should be verified on arrangement drawings and confirmed by on site inspection.

3. 33 CFR 154.828(b)(2) does not specify the maximum closing time for the quick closing valves. They should close in not more than 30 seconds from when the signal to shut down is received.

4. The requirements of 33 CFR 154.828(c)(3) and (d) should be verified on P&ID drawings and confirmed by operational testing.

5. 33 CFR 154.828(b) and (c) do not specify the order of the components. At least one of the quick closing valves should be upstream of the flame/detonation arrester so that if a flame is detected on the flame/detonation arrester and the quick closing valves are actuated, the upstream quick closing valve will cut off the fuel supply to the flame front.

XI. Pre-Transfer tests

1. 33 CFR 154.850(b) requires all alarms and automatic shutdown systems required by this part to be tested not more than 24 hours prior to each transfer operation. The automatic closing valves required by 33 CFR 154.810(a) and 154.828(b)(2) should be tested and exercised by at least one of the automatic shutdown signals. For other shutdowns, it is sufficient to verify that the signal to shutdown is received.

2. Pressure sensors required by 33 CFR 154.814 should be tested at their appropriate set pressures, i.e. they should be checked to verify that they send the appropriate alarm or shutdown signal at their set pressures. This can be done by closing off the vapor collection line and pressurizing it.

3. Other sensors required by 33 CFR 154, Subpart E, such as temperature sensors, vacuum pump low lube oil pressure sensors, and liquid ring compressor lack of flow of liquid sealing medium sensors, do not have to have alarm or shutdown conditions induced. It is sufficient to perform a circuit check up to the sensor, and simulate an alarm or shutdown signal from the sensor to verify that the appropriate result occurs. For these sensors, a routine schedule for periodic calibration and testing should be established and incorporated in the facility's operations manual. Note that 33 CFR 156.170(g) establishes periodic testing and inspection requirements for certain items.

4. For a facility which has multiple berths and has been in continuous operation, it is acceptable, when bringing another berth on-line, to isolate this berth from the main system and perform checks only on that berth. When testing a shutdown system that would affect components already on-line, it is acceptable to only verify that the appropriate signals are coming from the berth under test, without shutting down on-line components.

XII. Limit of Applicability

1. 33 CFR 154.800(e) limits applicability of Subpart E when the vapor control system serves tank storage areas and other refinery processes. However, the regulations do not address what is needed when the marine vapor control system connects to the facility's main vapor control system. If the applicability is being limited, the marine vapor control system should have a detonation arrester and two quick closing valves in accordance with 33 CFR 154.828(b)(2) where it connects to the facility's main vapor control system. The quick closing valves would automatically close to isolate the marine vapor control system when a problem is detected in the marine vapor control system or when a problem is detected in the facility's main vapor control system. As an alternative, the facility may choose to follow Subpart E throughout the facility's main vapor control system.

XIII. Testing

1. The certifying entity should witness operational tests of the vapor control system to verify the satisfactory operation of the system and all safety devices. The tests should simulate as much as possible the full range of operating conditions and should be coordinated with the cognizant COTP.

2. The initial tests should occur before any vessel (other than a gas-freed vessel, when use of one is requested by the facility or the facility designer) is hooked up to the vapor control system. In this first set of tests, proper operation of all components, analyzers, alarms, and automatic shutdowns should be verified.

3. After as much testing of components and simulation as possible and the certifying entity is assured that the system is capable of proper operation, an actual operational test with the system receiving vapors should be conducted to verify that the overall system operates properly. This may be accomplished by connecting a vessel to the system and transferring product. This step should be coordinated in advance with the cognizant COTP by notifying him of the location, time, procedures, and scope of the operational tests. For port safety reasons, the COTP may specify additional requirements or conditions as he sees fit.

4. When a facility is designed with excess capacity, testing it over the full range of operations may be limited by the loading rate that a vessel can safely accept. For such cases, the facility should be tested with a typical vessel, and the loading should be done at a rate equivalent to that expected during normal operation. When there is more than one loading berth served by the same vapor processing unit and the berths are of substantially the same design (varying only in length and layout of piping between the facility vapor connection and the facility vapor processing unit), only one berth need be tested for operation, but the preliminary checks for proper operation of sensors, alarms, etc. (paragraph 2 of this section) should be performed. Extensive testing for multiple berth operations, especially those which may take extended periods of time, are to be made at the request of the operator or the COTP only after all the preliminary checks have been made and all documentation - including any exemptions and determinations concerning any alternative - are in order.

5. After completion of the operational testing, the COTP is to promptly receive a letter for his endorsement from the certifying entity. (See Section XVI, below.) Unless exempted or affected by a determination concerning an alternative, the facility may not begin loading any other vessel until it has had its Letter of Adequacy endorsed for vapor recovery.

XIV. Training

1. 33 CFR 154.840 requires the facility to have its operating personnel trained. The certifying entity should confirm that the facility has a training program in place which addresses the areas noted in Section 154.840. This verification can be accomplished by citing a course outline or course material.

XV. Operations Manual

1. 33 CFR 154.310(b) requires that the facility operations manual contain a description of the facility's vapor control system. The certifying entity should review the vapor control portion of the facility's operations manual, and verify it contains the information required by paragraph 154.310(b) and that this information is accurate.

2. The operations manual should include a list of all cargoes that have been approved by the certifying entity for recovery by a vapor control system.

3. The operations manual should indicate whether the facility is certified to collect vapors from tank barges that are required to have a shoreside explosion proof receptacle or an overfill control panel under 33 CFR 154.812 (a) and (b).

XVI. Administration

1. After the certifying entity is satisfied that all the requirements of 33 CFR 154.310(b) and 154 Subpart E have been met, including a satisfactory plan review, on site inspection, and operational tests, and is assured the vapor control system will operate properly and safely, the certifying entity will issue a letter certifying that the facility's vapor control system complies with the requirements of 33 CFR 154.310(b) and 154 Subpart E. The certification letter should include:

(a) A report of the tests conducted during the certification process;

(b) A list of all plans that were reviewed by the certifying entity;

(c) Any exemptions to the regulations approved by the Commandant (G-MTH);

(d) A reference to the Coast Guard letter authorizing the certifying entity to serve in that capacity;

(e) A list of all cargoes that have been approved by the certifying entity for recovery by a vapor control system; and

(f) An indication whether the facility is certified to collect vapors from tank barges that are required to have a shoreside explosion proof receptacle or an overfill control panel under 33 CFR 154.812 (a) and (b).

The certification letter should be signed by the president or senior partner of the certifying entity, or a person specifically authorized in writing by the president or senior partner to sign certification letters.

2. A copy of the certification letter should be sent to the cognizant COTP. Upon approval of the certifying entity's certification of a facility's vapor control system, the COTP will endorse the facility's Letter of Adequacy authorizing the facility to collect vapors (33 CFR 154.804 (f)).

3. A set of vapor control system plans does not need to be submitted to the COTP, unless he requests one. However, the facility should keep a set of plans available for COTP personnel

to refer to when they visit the facility, as required by 33 CFR 154.740(i).

4. When a certifying entity reviews and certifies, in accordance with 33 CFR 154.804(g), an alteration to an already certified vapor control system, or approves an addition to the vapor control cargoes list, the certifying entity should issue a letter to the facility fully describing the alteration including the information described in paragraph 1 of this section, and certifying the acceptability of the alteration. A copy of the letter should be sent to the cognizant COTP. This letter will become part of the initial certification letter.

XVII. Recertification

1. The extent of review by the certifying entity after an alteration will depend upon the alteration. The review may need to be as comprehensive as the review for the initial certification or no review may be necessary. The following examples illustrate the amount of review required for alterations. They are not intended to affect the policy of a certifying entity.

a. Alterations, where equipment is replaced in kind, are not required to be reviewed by the certifying entity. For example, if one temperature sensor is replaced with another of the same model, no certifying entity involvement is necessary.

b. Alterations, where equipment is replaced by equipment that has the same purpose but is not identical to the equipment it replaces, need to be recertified by the certifying entity. To ensure the replacement equipment does not adversely affect the performance of the vapor control system, the certifying entity may need to witness an operational test, conforming to the initial test requirements. An example of this situation is replacing a detonation arrester of one manufacturer with another in order to reduce the pressure drop in the line. Since the effects of this change could influence the pressure at the facility vapor connection, an operational test would be in order. Another example is replacing one pressure/vacuum valve with one that has improved flow characteristics. In normal operations this change should have no demonstrable effect upon the system, and under conditions which open the valve, there would be no adverse change in the system. In this second case, no operational test would be necessary. In both cases there is no need to reexamine plans for the vapor processing unit, sensor installation, control instrumentation, etc.

c. Alterations to non-regulated equipment require recertification by a certifying entity only if the changes affect certified equipment. When a structure that houses the facility loading controls is replaced, but no change is made to the vapor control system, a recertification is necessary and should include checking that the equipment is hooked back up in its original

manner. An operational test may not be necessary, and t
would be no need to examine any equipment other than the
instrumentation.

d. Fundamental changes in a vapor control system require complete recertification by a certifying entity. For example, vapor balancing system which is redesigned to be an enriching system, should be treated as a new vapor control system.

2. Unless deemed unnecessary by Commandant (G-MTH), cargoes, not previously approved in a certification letter, must be approved by a certifying entity before being recovered by a vapor control system. The certifying entity must ensure the vapor control system can safely recover the vapors of the new cargo in compliance with the regulations. The modification to the facility necessary for it to be used for the new cargo should be used to determine the amount of inspection and the testing needed for recertification.

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