



A Subsidiary of Union Pacific Corporation

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PLAINTIFF'S EXHIBIT

UPRC-183

PREPARATION TO CLEAN AND ENTER TANK FOR REPAIRS

PROCEDURE NO. 30

I. PURPOSE

Entry and repairs within enclosures such as a tank or vessel must be coordinated to ensure that adequate preparation has been made to control hazards as they relate to each other and the worker's safety.

II. SCOPE

This procedure is to be applied to all confined areas in the refinery, vessels and tanks whether or not in active service. It shall be extended to any type of hot work performed under such circumstances.

III. GENERAL

Those who assign and supervise such work, whether contract or refinery personnel, are accountable for the necessary safeguards while those who enter such enclosures are responsible for following safe procedures.

IV. PROCEDURES

1. Safe work permits are required to cover the work to be accomplished. The hazards that are present and their degree of concentration must be determined. Safety precautions shall be consistent with the exposures that may be encountered. Generally, petroleum vapors are flammable from 1% at the lower level (LEL) to 7% at the upper (UEL). An enclosed space is safe for entry and hot work without respiratory equipment under the following conditions:
 - a. Ventilation is adequate using explosive proof equipment and the interior is clean.
 - b. The ambient atmosphere has been vapor freed to less than 5% of the lower explosive limit.
 - c. H₂S concentration is found to be no more than 10 ppm.
 - d. Lead-in-air is found to be no more than 2 Ug/ft³ (0.075 mg/m³).
 - e. Oxygen content is at least 19.5%.
 - f. Blinding has been completed.
 - g. Any iron polysulfide deposits which are pyrophoric are kept wet down.
 - h. That the tank is effectively grounded.

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- i. Added safety precautions for the particular work to be performed have been taken.
- j. Assignments within an enclosure are limited to 8 hours a day.
2. Consideration shall be given to personal protective equipment and clothing relative to the possible hazards that may exist in commencing and completing the work.
3. Blinding of tank definitely requires caution in that gas fumes and product are always present. Be extremely cautious that you do not create a spark.
4. After tank is blinded, water wash all lines leading into tank. Steam the tank if steam is available. Initial cleaning is to be performed from outside a confined space.
5. Set stroke-type pump to strip all products from tank.
6. Dig hole approximately 8' x 8' at base of water draw. Remove water draw connection.
7. For floating roof tanks, remove man-way plate on up wind side of tank and use 1-1/2" fire hose to wash excess product from the floor of the tank into the hole and pump to slop line or tank.
8. Remove opposite man-way and insert a steam jet to remove the fumes from the tank.
9. When all clear water comes through the water draw, check tank with explosive meter. When you have the tank clear of gas, you may enter the tank wearing fresh air breathing equipment, rain suit, boots, and gloves. Wash the floor of the tank. After the floor and sides of the tank are clean, the floor should be mopped to remove water from the floor.
10. The tank should be allowed to dry. At least 60% of the floor must be dry and then a lead-in-air analysis must be taken. If results are within allowable limits the tank may then be entered without personal protective equipment.
11. A confined space may be entered for inspection with positive pressure air supplied respirator using dry-cell safety lamps for light; provided the space is drained to the lowest possible level, blinding has been accomplished and general ventilation is sufficient to maintain the vapor concentration below 20% of the lower explosive limit. No work shall be performed until the internal area is vapor free.



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12. No artificial lights shall be used within a confined space until it is vapor free. Portable seal beam explosion proof lights with connectors or switches approved for hazardous locations may be used upwind outside an enclosure.
13. Check all piping as well as the entire tank for explosive atmosphere and follow hot work procedure. Tank must have a non-explosive atmosphere and proper forced air ventilation before starting to weld.
14. For welding on tank floor you must:
 - a. Build dyke approximately 18" high around outside of tank and fill with water.
 - b. Inject water under tank floor with water connection near the center of the tank.
 - c. Have four vents equally spaced with vent lines running outside to atmosphere.
 - d. When water is present in all four vent holes you may proceed to weld on floor.
 - e. The electric welding machine's ground lead affixed to the exterior must be securely clamped. Hooks create unnecessary arcing and this should be controlled to the minimum.
15. In case of lightning tank should NOT be opened. If you are working in a tank and lightning occurs, shut down welding and remove all personnel until lightning ceases.
16. It is preferable that tank cleaning operations be performed during the daylight hours. Visibility presents problems at night which may prompt the creation of ignition sources of any vapors present.

This procedure should be reviewed on an annual basis with all contractors and those refinery personnel who are associated with arranging for this type work to be performed.

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