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Kansas
Department of Health and Environment

PROCEDURE FOR INTERNAL CASING REPAIR

Procedure #: UICLPG-12
(6/11)

Narrative:

The operator shall submit a plan for casing repair to the Kansas Department of Health and Environment (KDHE) prior to repairing any casing in any underground hydrocarbon storage well. The operator shall not commence any repair operations until the plan is approved by KDHE.

The casing shall be repaired in a manner that will ensure the integrity of the well is maintained.

The plan for casing repair shall include the following information:

- A schematic of the well configuration, including casing size and weight
- The condition of the well, including any restrictions in the casing, hole deviation, and condition of the cement
- The external and internal pressure rating of the casing patch
- A description of the leak, including the depth, type, size, diameter, length, and width
- A description of the method and equipment used to locate the leak
- A description of the hole preparation before running the casing patch
- A description of the casing patch and installation method
- A description of safety precautions to be used while running the casing patch and the procedure to be used if the casing patch becomes stuck
- A description of the method to be used to pressure test the casing patch.

Procedure:

1. Depressure the cavern by removing all product that can feasibly be removed. Describe the procedure for removing product from the cavern, including any product trapped behind the casing.

2. Fill the cavern with brine.

3. Remove all tubing string(s) from the well.

4. Conduct a casing evaluation to determine the condition of the entire casing string. The operator should determine the following:

   a. The type of leak
   b. The internal diameter of the casing to determine if it is oversized
   c. The position of the hold down.
   d. The location of the leak.

5. Additionally, a gamma ray log shall be run to correlate the depth of the leak and the patch position.

6. Initiate any hole preparations and procedures required for the type of leak identified and approved by KDHE for repair.

7. Run a casing scraper to clean the casing in the patch area.

8. Make a gage or drift run to identify any restrictions in the casing. Describe tentative procedures for removing any restrictions.

9. Run a casing caliper log if the internal diameter of the casing is not known or is questionable. Determine the amount of reduction to the inside diameter of the casing after the patch is applied.

10. Determine the pressure requirements for the patch and confirm that the patch is designed for the size and weight of the casing. Refer to any charts provided by the patch manufacturer.

11. Follow manufacturer's recommended safety precautions while running the patch.

12. When setting the patch, overlap the leak by 6 to 8 feet on each end. When patching corroded casing, cover the full joint of casing with a 6 to 8 foot overlap at each end.

13. Pressure test the patch. Allow the patch to set at lest 24 hours before testing. Do not exceed differential pressure ratings provided by the manufacturer.

14. Submit a casing repair report, including description of field work, to KDHE.