INTRODUCTION:

A fire incident occurred in one of the MDPE (Medium-Density Polyethylene) Natural Gas pipeline of 6 inch NB which has been laid parallel to another Natural Gas Pipeline of 12 inch NB. Both the pipelines belong to different operators.

In 12 inch NB pipeline was to expose for some maintenance work. One JCB was mobilized at site, which had started excavation by JCB. By mistake JCB operator punctured other buried MDPE 6 inch NB pipeline of other operator and incidentally fire occurred.

OBSERVATIONS:

- Both the Natural Gas Pipelines 6 inch NB MDPE pipeline & 12 inch NB pipeline are going parallel in a narrow corridor, which is adjacent to State Highway.

- The incident occurred near a road culvert. At this location the 12 inch NB pipeline was fully exposed. This line was having concrete coating and about 7-8 M of the concrete coated pipe was exposed. The 12 inch NB pipeline was provided with a concrete pedestal support at one end only.

- The other 6 inch NB pipeline, was running parallel and was buried at a depth of about one feet below field ground level. Subsequently, about 3-4 meter of 12 inch NB pipeline without concrete coating got exposed.

- There was no additional protection or casing on 6 inch NB pipeline.

- The State Highway at site has been widened and culvert built after the pipeline has been laid. Initially, there was no culvert at this point. This culvert was made when the State Highway widening was carried out. Since the pipeline level was already high. Around 7-8 M length in 12 inch NB pipeline along the culvert was concrete coated to avoid any direct damage to the coating/pipe.

- The 6 inch NB pipeline, which is approx. 1.5 meters away from 12 inch NB pipeline. This pipeline is about one feet below the ground level.

- Site persons were not aware about the exact depth of the 6 inch NB pipeline.
• No Hot work permit/ work order was issued to the contractor.

• The site was very dirty with foul smell.

• Sufficient numbers of markers for both 6 inch NB pipeline & 12 inch NB pipeline were not present at the site, particularly, keeping in view the fact that it was a vulnerable location.

• Location class is 1.

• Pipeline Operator of 6 inch NB pipeline was not informed about the execution of the job at site for 12 inch NB pipeline.

• CCOE approval of 12 inch NB pipeline is available.

• When fire broke out, Due to the intense heat of the fire the existing concrete sheathing of pipe of 12 inch NB pipeline got broken. As such hardness readings of the pipe were taken after the incident to review the change in the hardness/ grain structure. But cold tape was applied on the 12 inch NB pipeline without comparing the results with the maximum hardness values as specified in the technical specifications, which is not technically correct.

• Pipe thickness readings were taken and found to be within acceptable limits.

**ANALYSIS**

- The reason for the major fire was due to the leakage from the natural gas 6 inch NB pipeline, which was punctured by the JCB bucket, while the excavation work was in progress for 12 inch NB pipeline.

- Since the source of ignition was present at the site, fire took place immediately. The ignition could be either from JCB, as no spark arrestor was used in the vehicle, or from the garbage heap or due to friction of JCB bucket with some hard concrete.

**REASONS OF FAILURE/ ROOT CAUSE:**

The investigating team concluded that the pipeline fire occurred primarily due to:

1. The excavation work was being carried out without any hot work permit or any formal work order.

2. The JCB used for excavation/ cleaning was not having any spark arrestor.
3. There was no co-ordination and supervision by pipeline operators of both 6 inch NB pipeline & 12 inch NB pipeline.

4. The earth cover was only one foot for the 6 inch NB pipeline and moreover, there was no additional protection for this pipeline.

**LEARNINGS:**

1. Work permit system should be followed strictly in line with OISD-STD-105.

2. While such jobs are executed, pipeline owner/operator personnel to be present at the site during the execution of the job with all relevant documents viz., work permit, drawings, work order copy etc., required for safe execution of the job.

3. Contractor should obtain written permission from pipeline operator/owner before commencement of any job.

4. The 12 inch NB pipeline should be laid underground at a suitable depth at this site.

5. 6 inch NB pipeline should also be laid at a suitable depth and or proper casing / additional protection should be provided.

6. Additional Pipeline markers and caution boards should be put at all the vulnerable locations.

7. The site should be cleaned of all the garbage and the wild grass and boulder pitching of the area may be carried out at both the banks of the drain/ culvert.

8. Proper PPEs to be used by all the persons working at the site.

9. Fire & Safety Training needs to be enhanced to all the contractors/ workers.

10. Technical specifications of the pipe should be made available and the hardness readings taken after the incident should be collated with the minimum acceptance criteria as per the technical specifications before carrying out the refurbishment of coating.
ANNEXURE-I

VIEW OF THE JCB IN ACTION & THE SUPERVISOR CAN BE SEEN STANDING ON THE 12” NB NATURAL GAS PIPELINE

VIEW OF THE SITE AFTER FIRE - ONLY ONE PIPE SUPPORT CAN BE SEEN AT THE FAR END
ANOTHER VIEW OF THE INCIDENT SITE

DAMAGED 6” NB MDPE PIPE