

The following procedures are to be used when a pig gets stuck and the line is shut in due to high back pressure. Often pigs can get hung up or stall due to bypass which is different than a pig plugging a line. If a pig is simply experiencing bypass it can often be pushed out with another pig. However, When a pipeline pig gets stuck, and the pipeline is shut in due to high back pressure, it's crucial to follow a methodical approach to safely and efficiently resolve the issue. Here's a best practices procedure for handling this situation:

1. **Stop Operations and Assess the Situation**

Stop Pumping: Immediately halt any pipeline operations (e.g., flow or pressure) to prevent further damage or worsening of the situation.

Gather Data: Analyze recent pipeline data, such as pressure trends and pig location trackers, to determine where the pig may be stuck.

Notify Relevant Personnel: Inform supervisors, operations teams, and safety personnel of the situation.

2. **Verify Pig Location**

Check Monitoring Devices: If possible, utilize pig tracking systems, such as electromagnetic pig trackers, to pinpoint the pig's last known location.

Pressure Monitoring: Examine pressure gauges along the pipeline. A significant pressure drop before the stuck location or a rise after can help confirm the pig's position.

3. **Relieve Pressure Gradually**

Controlled Depressurization: If safe and feasible, gradually relieve pressure in the pipeline upstream and downstream of the pig's location to reduce stress on the pipe and the pig.

4. **Evaluate Pipeline Conditions**

Check for Blockages: Review records or perform diagnostics (e.g., pigging history or flow analysis) to identify any pipeline obstructions, such as debris, scaling, or deposits.

Assess Flow Rates and Product Properties: Analyze the properties of the transported product (e.g., viscosity, temperature, or solid content) to understand why the pig may be stuck.

5. **Choose the Appropriate Recovery Method**

Depending on the situation, consider the following options:

Reverse Flow: In some cases, reversing the flow of the pipeline may help dislodge the pig. Use this method with caution and only if the pipeline design allows.

Increase or Decrease Pressure: Gently increase or decrease the flow pressure in a controlled manner to push or release the stuck pig.

Send a Bypass Pig: If feasible, deploy a smaller or more flexible pig behind the stuck pig to push it forward or dislodge it.

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6. **Mechanical Retrieval (If Necessary)**

Prepare for Pig Retrieval: If the pig remains stuck and cannot be dislodged through flow changes, plan for a mechanical intervention.

Isolate Pipeline Sections: Shut off and isolate the affected section of the pipeline.

Open Pipeline: Safely open the pipeline at an appropriate location (such as a pig trap or access point) near the stuck pig for manual retrieval.

Use Specialized Tools: Consider using specialized retrieval tools, such as pig removal wrenches or pig retrieval hooks, depending on the pipeline design and pig location.

7. **Ensure Safety Precautions**

Follow Safety Protocols: Implement all necessary safety precautions, including depressurizing the pipeline, using personal protective equipment (PPE), and adhering to proper lockout/tagout (LOTO) procedures.

Engage Emergency Services: If the situation escalates (e.g., risk of pipeline rupture), involve emergency response teams immediately.

8. **Post-Recovery Inspection**

Inspect the Pig and Pipeline: After the pig is removed or dislodged, inspect it for damage, and assess the pipeline for any potential damage or blockages.

Analyze Root Cause: Determine why the pig became stuck—whether due to pipeline design, product buildup, improper pig selection, or other factors—and take corrective action.

9. **Report and Document**

Record the Incident: Document the entire process, including the pig's location, how it was freed, and any damage or issues discovered.

Review Procedures: Analyze the incident and update pipeline pigging procedures as necessary to prevent future occurrences.

Best Practices Summary

Regular Monitoring: Use pig tracking systems to monitor pig progress during runs.

Routine Maintenance: Keep the pipeline clean and free of obstructions, and perform regular inspections to avoid buildup.

Choose the Right Pig: Ensure the pig's design and material are suitable for the pipeline conditions.

Operator Training: Train personnel on handling stuck pigs and emergency protocols.

By following these best practices, operators can handle stuck pipeline pigs efficiently while minimizing safety risks and potential damage to the pipeline system.