Kansas Corporation Commission
Utilities Division

Pipeline Safety

Section

Static Electricity and the Prevention of Accidental Ignition

- Static electricity is generated by friction.
- Static electricity can accumulate on BOTH the inner and outer surfaces of plastic pipe.
- Static charges are not uniform and are found in varying amounts and located at different spots on the pipe.

Potential “Live-Gas” Work Areas

- Blow-down or purging of pipeline facilities.
- Repair/Replacement activities.
  - Leak repair; tapping; tie-ins.
- Working in an enclosed area.
  - Vault; regulator station; meter building.

Sources of Static Electricity on Pipe

- Handling of pipe.
- Scale and dust in the gas flowing through the pipe.
- Gas turbulence at breaks, elbows, squeeze off points
- Gas blowing on dry soil.

Sources of Static Electricity on Pipe

- Wiping the pipe with a rag, paper towel, or glove can generate a local charge of several thousand volts!!

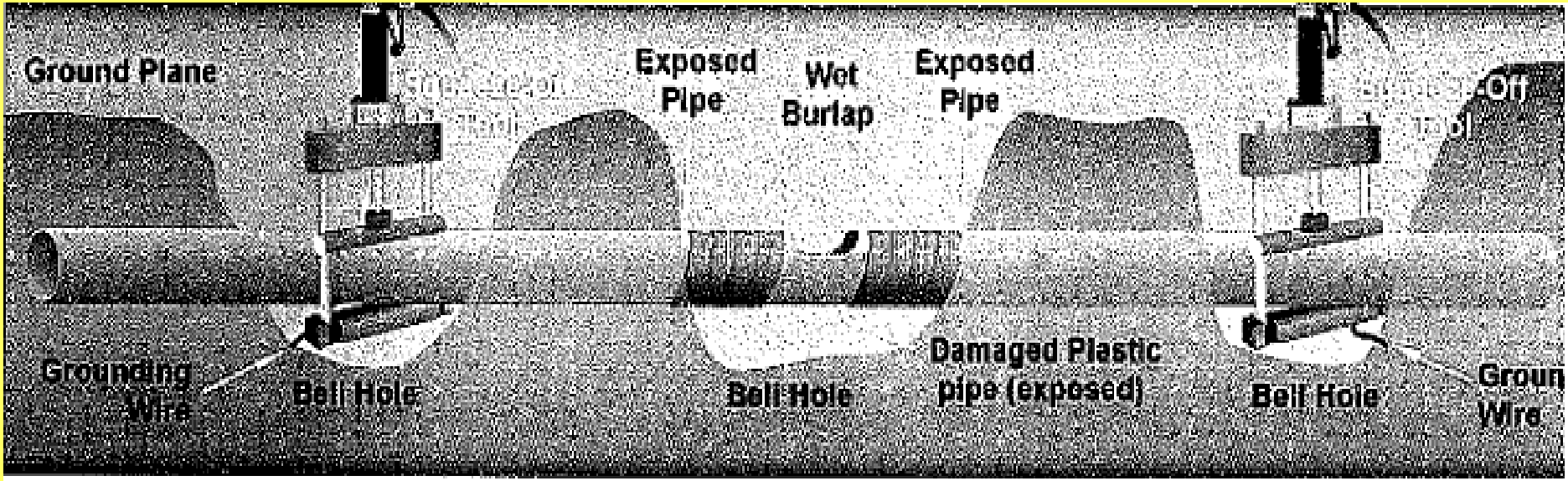
BLOWING GAS LEAK ON ANY PIPING

- Stop gas flow from a remote by area
  - Squeeze-off in separate bell hole.
  - Shut valves.
- **<u>ALWAYS THE FIRST CHOICE!!</u>**

Precautions when working in a Live Gas Situation

- **Secure area from general public.**
- **Use proper personal protective equipment and fresh-air breathing equipment as necessary.**
- **Man a 20 lb. fire extinguisher at the job site.**

Plastic Pipe Remote Squeeze off

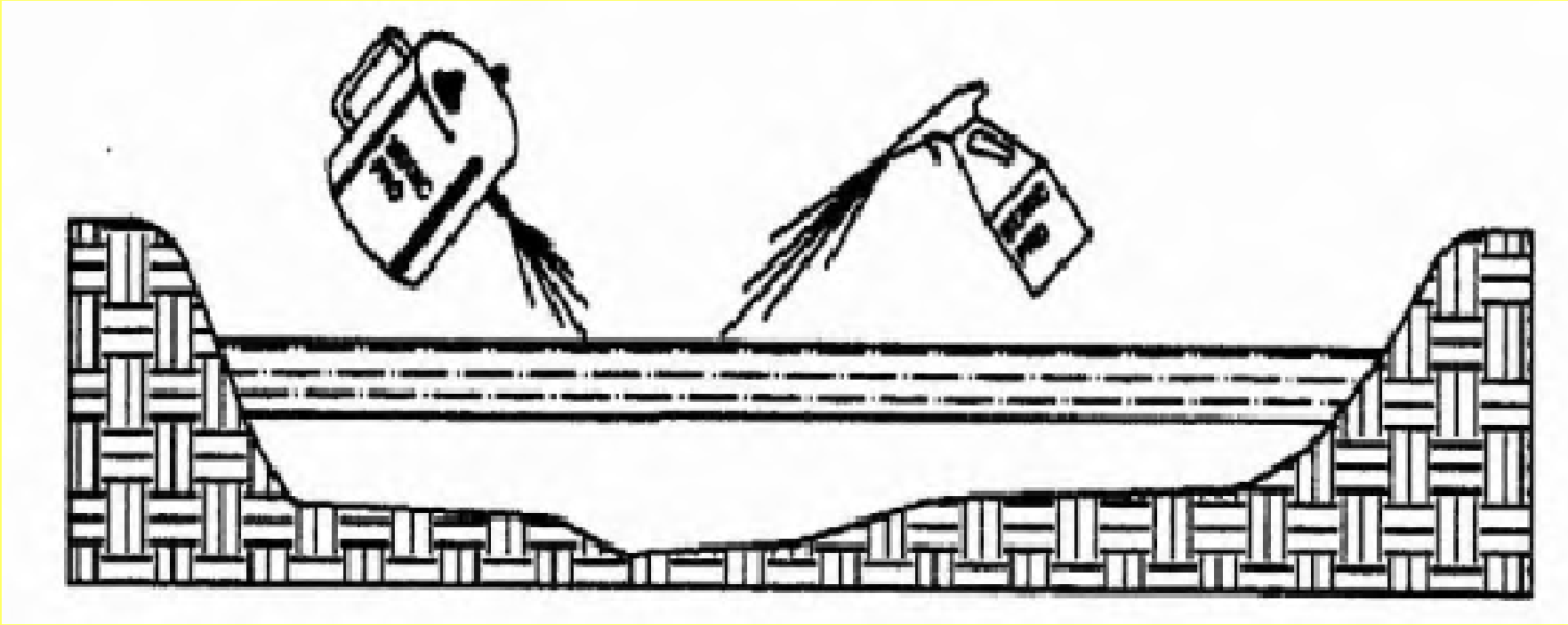


Wet Burlap must be touching ground (both sides)

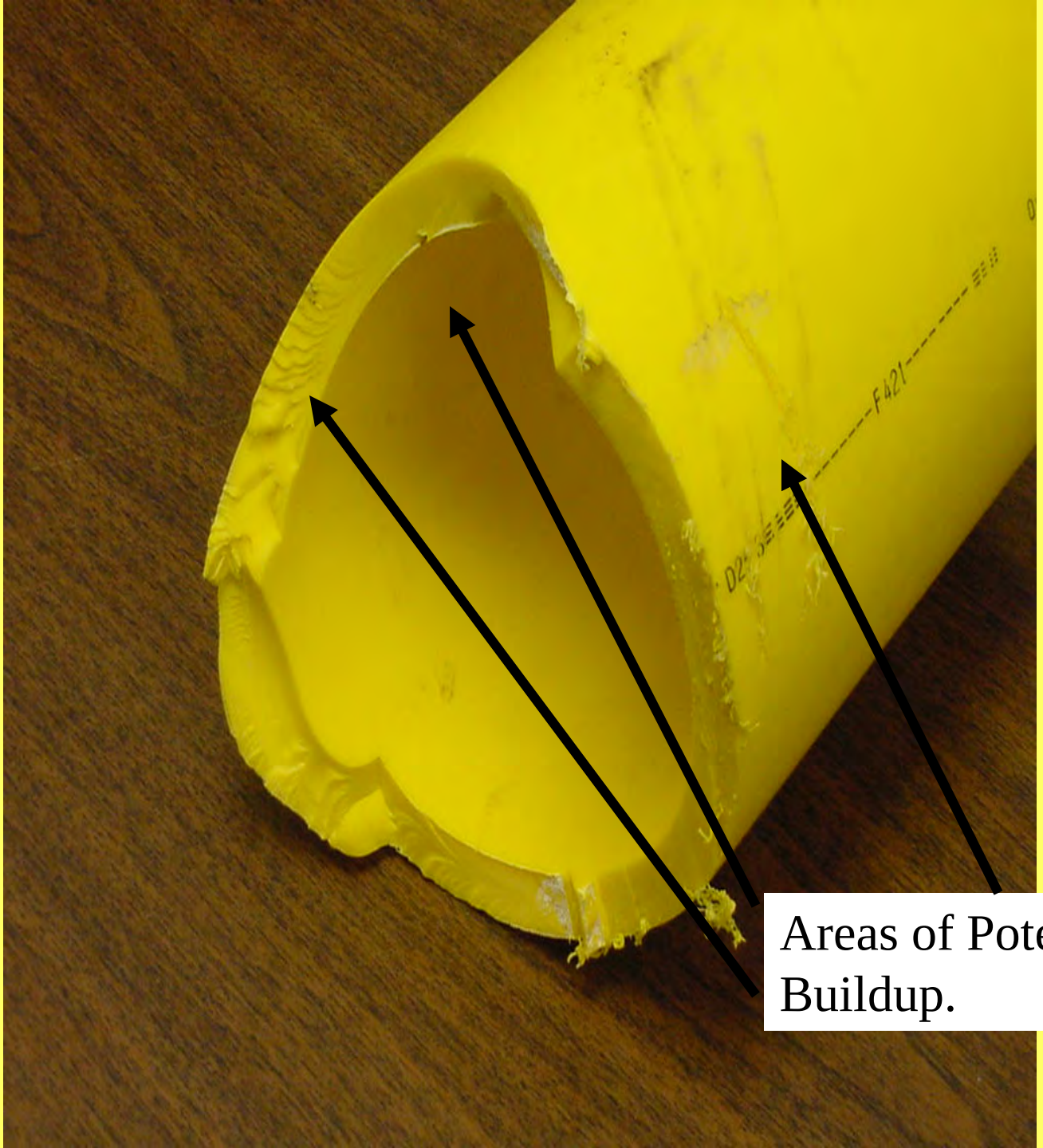
A method used to control static electricity on plastic pipe in a gaseous atmosphere is to wet the pipe with an anti-static solution.

Minimizing Potential for Static Discharge

- **BEFORE ENTERING THE HOLE!!**
- Apply anti-static solution or soapy water solution the entire length of the exposed piping with a natural fiber cloth.
- Use the spray nozzle to squirt fluid into and around the hole in the piping .

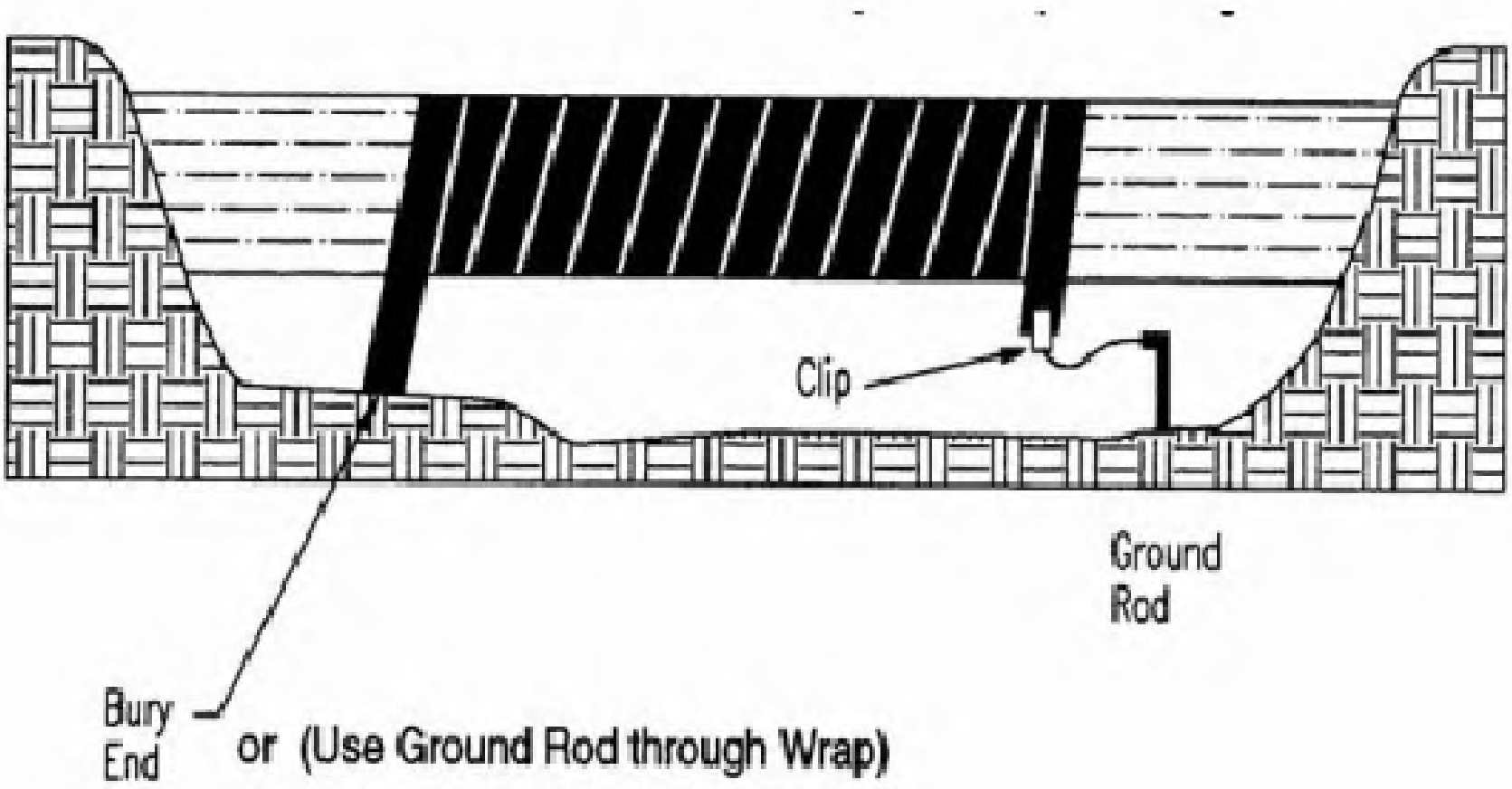


Anti-Static Solution provides path for Static Electricity to go to ground. Exposed pipe needs to wetted thoroughly!


Areas of Potential Static Buildup.

Minimizing Potential for Static Discharge

- Ground one end of anti-static wrap by burying one end in dirt or attach ground clip.
- Wet the wrap as it is being installed.



Wrap is a means for keeping conductive solution in contact with the Pipeline. No bare spots!

Minimizing Potential for Static Discharge

- All tools (including squeeze off tools) must be grounded.
- Squeeze off pipeline using proper squeeze-off tool and techniques.

Other Considerations to Prevent Accidental Ignition

- Ground Steel blow-down stacks when purging plastic piping.
- Do not carry a welder's friction striker in an area where gas is present.
- Operate engine driven equipment only up-wind of source of gas.
  - (truck, backhoe, generator, light plant, etc..

Other Considerations to Prevent Accidental Ignition

- Turn off rectifiers.
- Bond across steel piping before cutting to remove section from service.
- Locate underground facilities.
  - Telecom carries 90volts.
- Avoid equipment contact with overhead cables and wires.
- NO SMOKING OR OPEN FLAMES.

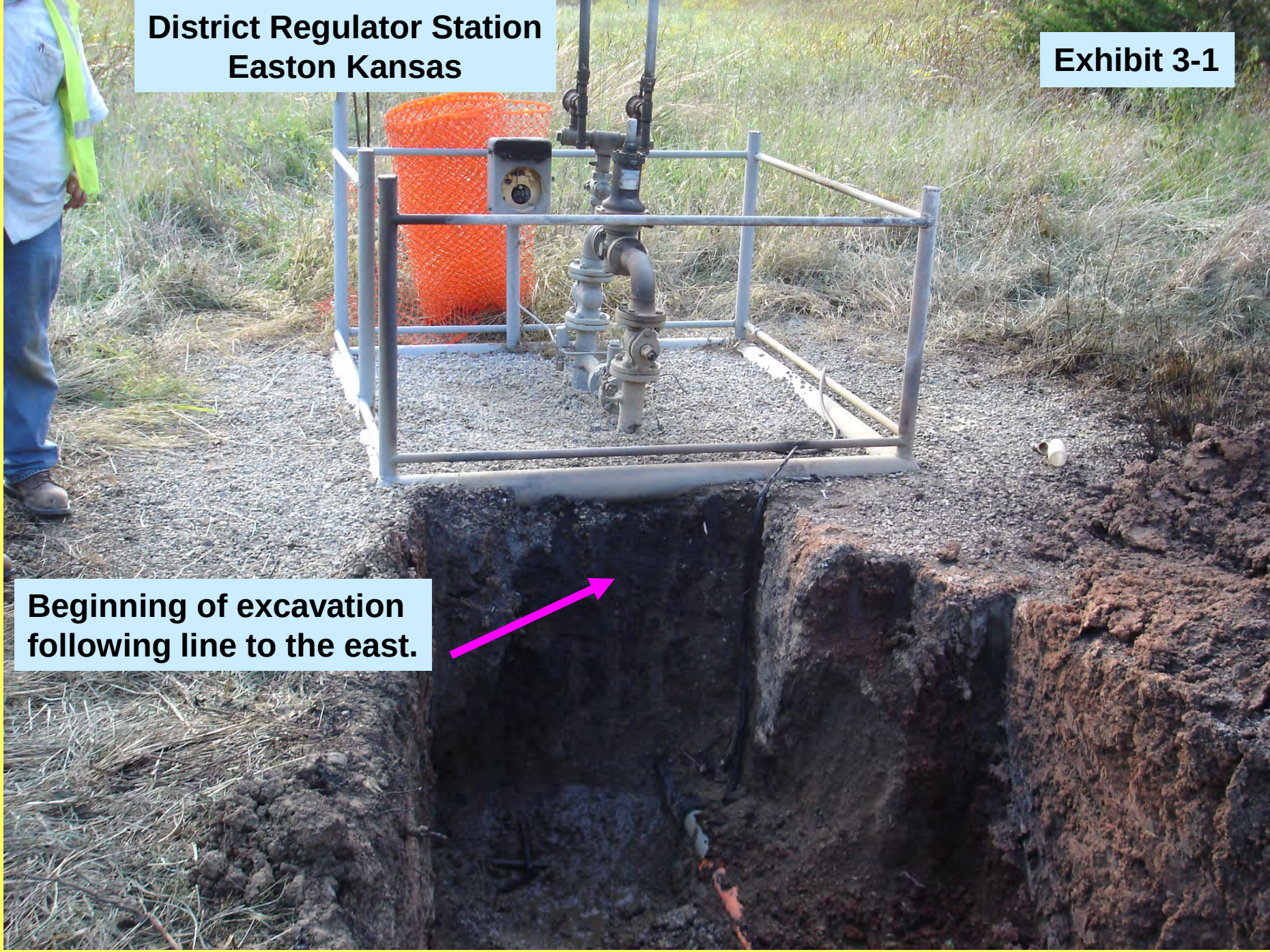

District Regulator Station
Easton Kansas
Exhibit 3-1
Beginning of excavation
following line to the east.


Exhibit 3-2
Excavation showing damaged pipeline

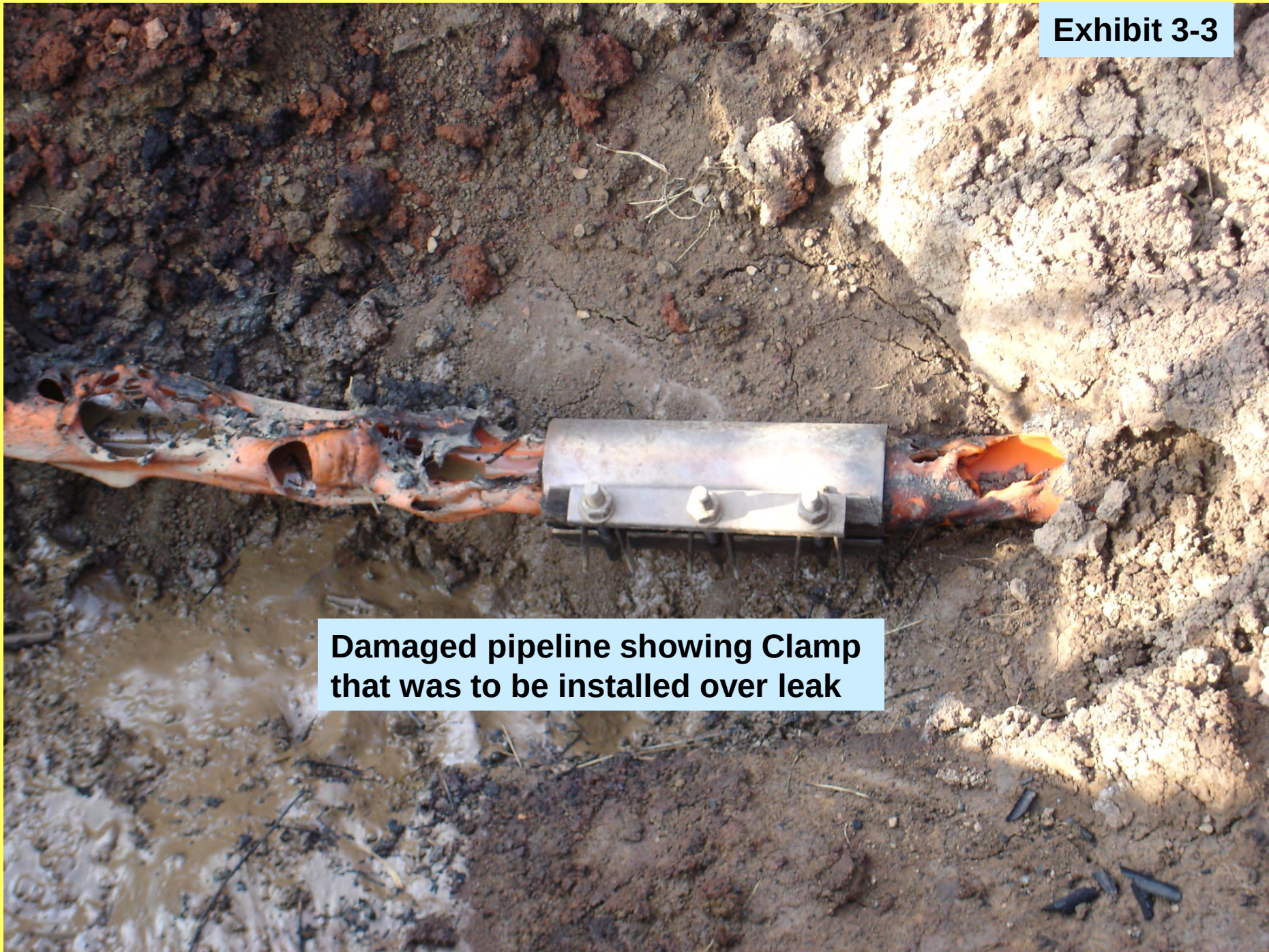


Exhibit 3-3
Damaged pipeline showing Clamp that was to be installed over leak

Exhibit 3-4

Damaged pipeline showing Clamp that was to be installed over leak


Exhibit 3-6
310J
Backhoe damaged
By fire.


Exhibit 3-7
Personal Protective Equipment
Worn by Atmos crew during incident


Saline
Wound
Flush
OSCEOLA, IOWA

Air mask; some scorching on flame arrestor and regulator


Exhibit 3-8
New pipeline installed after incident

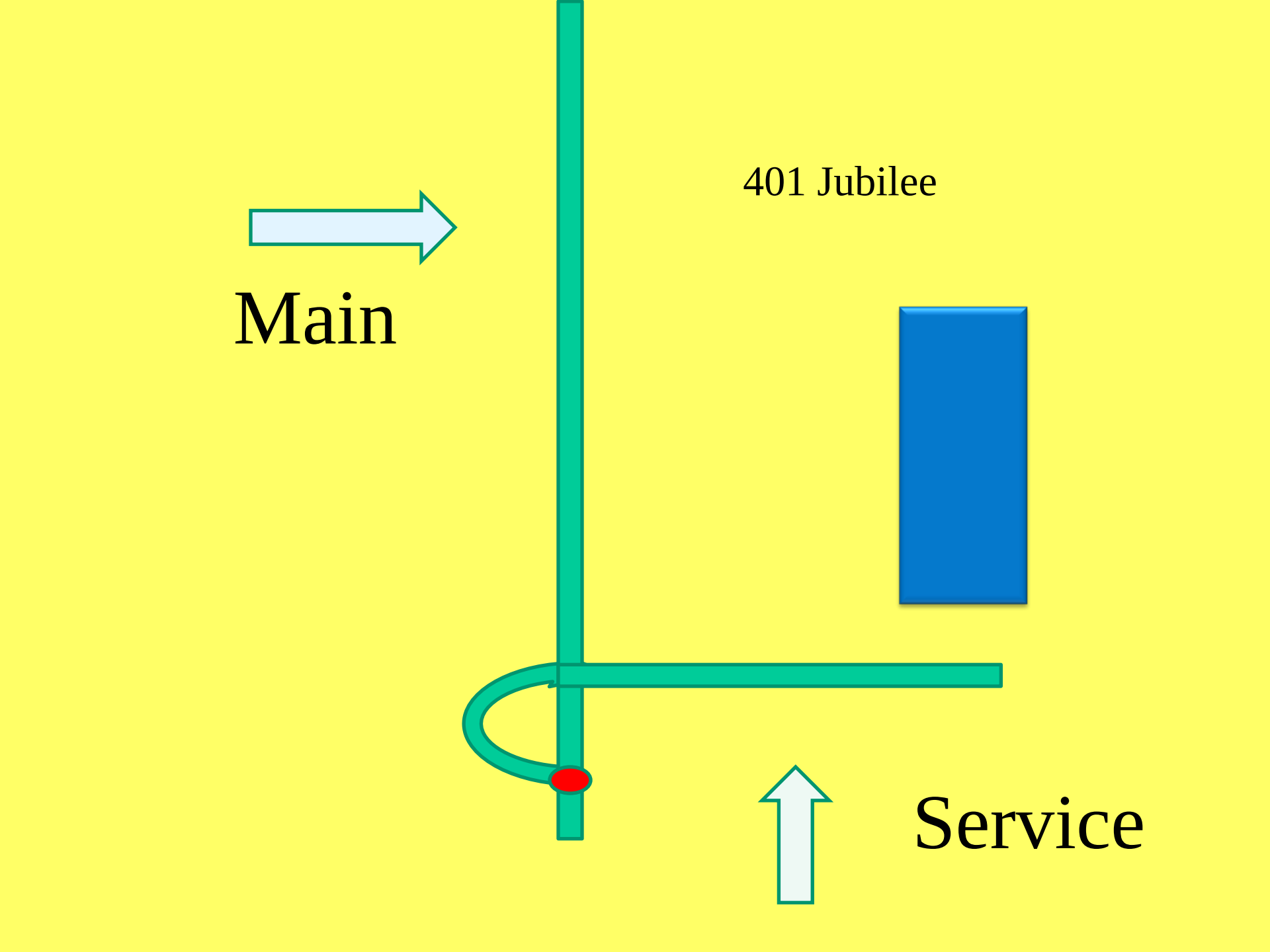

Exhibit 3-9
KCTV
5
KCTV 5 Aerial Photo of Scene
Prior to fire being extinguished

Andale Kansas
Gas Main Extension Project

Exhibit 3-1

Exhibit 3-2

401 Jubilee, Andale Kansas
Excavation site to tie-in to existing gas main.


401 Jubilee
Main
Service

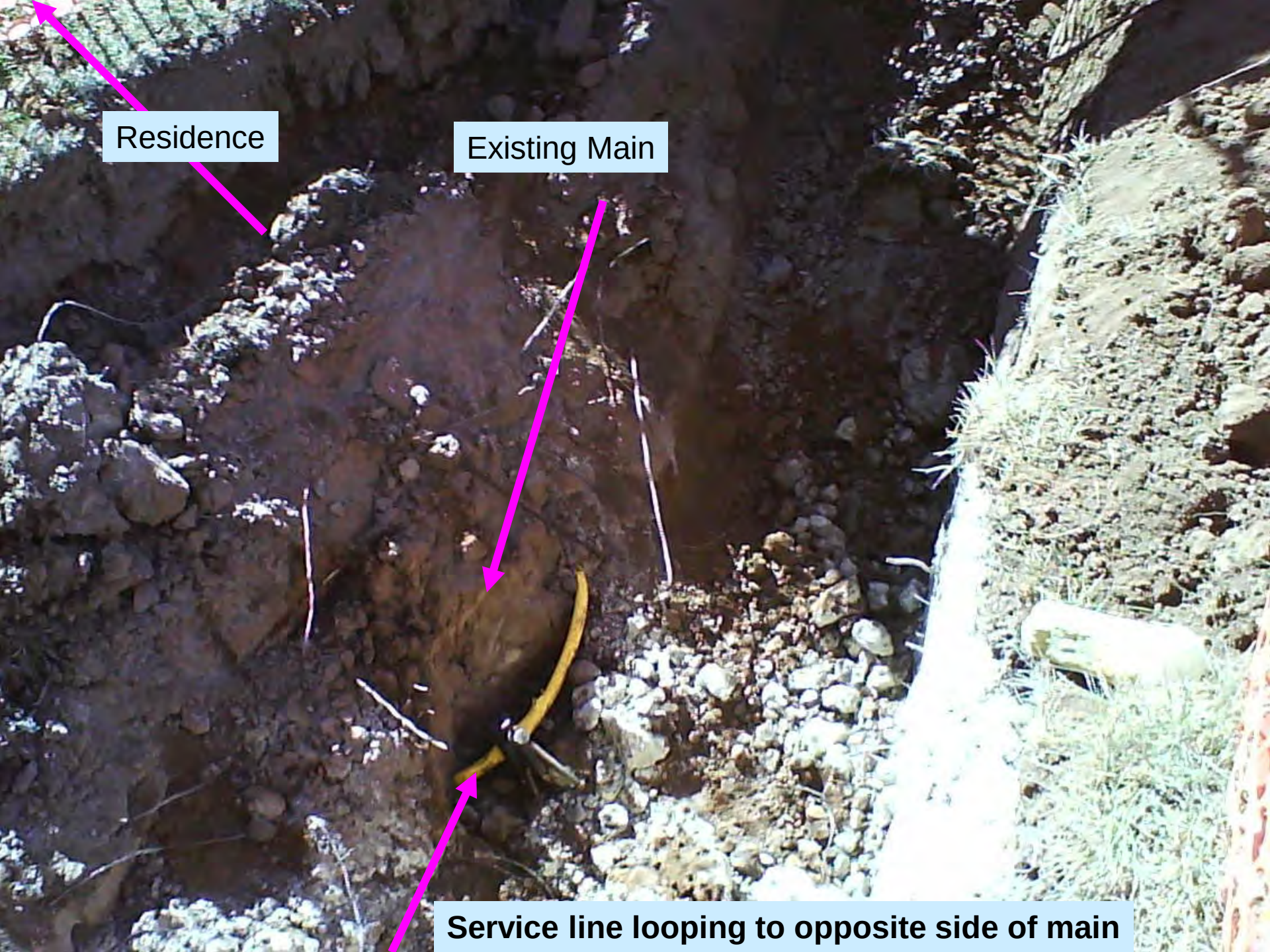

Residence
Existing Main
Service line looping to opposite side of main

Exhibit 3-4

Service Line Damage


Exhibit 3-5
Foliage Damage from fire.
Tree is adjacent to excavation site.

REVIEW

1. **If possible, control gas using valves or squeeze off from separate bell holes.**

2. **When working in a gaseous atmosphere, use proper P.P.E. and fresh-air breathing equipment as necessary.**

3. **Man a 20 lb. fire extinguisher at the job site.**

4. **When venting gas, remove all potential sources of ignition from the area.**

REVIEW

5. **Static electricity can build up on outside and inside of pipe surfaces.**

6. **Edges of hole in pipe where blowing gas is exiting are vulnerable to static buildup.**

7. **Static electricity is not uniform and can buildup in varying amounts at different spots on the pipe surfaces.**

REVIEW

8. **Always apply anti-static solution to plastic pipe before entering a hole with a hazardous gas atmosphere.**

9. **Anti-static solution must thoroughly wet the outside of the pipe back to the edges of the excavation on both sides of the leak.**

10. **The exposed ends of the plastic piping is the area with the greatest potential of internal static electricity.**

REVIEW

1. **If possible, control gas using valves or squeeze off from separate bell holes.**

2. **When working in a gaseous atmosphere, use proper P.P.E. and fresh-air breathing equipment as necessary.**

3. **Man a 20 lb. fire extinguisher at the job site.**

4. **When venting gas, remove all potential sources of ignition from the area.**

Developing Procedure for Response ~~Consider Your Options~~

- Is it safe?
- Do you have the proper equipment?
- Do you have the expertise?
  - Have you practiced the procedure enough?
- How do you make the best decision?

Emergency Valves

Plus

- Usually quicker.
- Possibly eliminate secondary leak.
- Safer working conditions for responder to leak.
- Probable 100% shut off.

Minus

Customer service.

Manpower implications.

Water in main.

Time to blow down.

Convenience / Isolation Valves

Plus

- Fewer customers off.
- Could be quicker.
- Safer working conditions for field responder to leak.
- Less outage and effect on customers.

Minus

- Valve may not have 100% shut off, double feed.
- Difficulty in accessing valves; (ice pavement).

-Could cause time constraints.

Installation of expansion plug

Plus

- **Immediate shut down.**
- **Limited customer impact.**

Minus

- **Hazardous atmosphere conditions.**
- **Additional time need to don PPE.**
- **Process used as a last resort.**

Should have procedure for each response scenario worked out before emergency occurs!

- Emergency Valves
- Convenience Valves
- Expansion Plugs