

# Foodland

## Anatomy of an Incident

# Foodland

- Excavation damage incident.
- Excavator strikes previously abandoned pipeline?
- Operator responds with service personnel, supervisors.
- Occupants report smelling gas.
- Building explodes approximately 2-1/2 hours after gas serviceman arrives.

# Events preceding the accident

- 1981 – Gas company to abandon 420 feet of 3 inch gas main due to new highway construction.
- Line is to be abandoned 50 feet south of existing highway near Foodland.

FORM C 242-1 CDD 12-001

COLUMBIA GAS DISTRIBUTION COMPANIES/  
WORK ORDER

CKY    CMD    CPA    CWV  
 CON    CNT    CVA    CMC

REBURSABLE  
 VERBAL  
 REVISED WORK ORDER

DATE ISSUED/REVISED 08-24-81	DISTRICT Charleston	DIVISION Charleston	AREA Chas. 2	GEN. LEO.	BUD. NO. AUX.	LOC. S'BJD.	W.O. NO. OTHER
JOB LOCATION R/W OFF Nottingham Rd.		KNOWN AS None		108 562	8621	6613	
PROPOSED WORK Abandon 420' of 3" MP Main and 227' of 4" MP Main				RATE NO. (OHIO ONLY)		PLANT ACCT NO.	
PURPOSE AND NECESSITY Abandon main due to relocating regulator station				RET. CODE 17		L.E.A. NUMBER	
COMMUNITY-TOWNSHIP-DISTRICT Charleston		TAXING DISTRICT NAME AND NUMBER Louden Dist. 0391755		COUNTY Kanawha		STATE W.Va.	

# Abandonment

- Line abandoned at short stop tee.

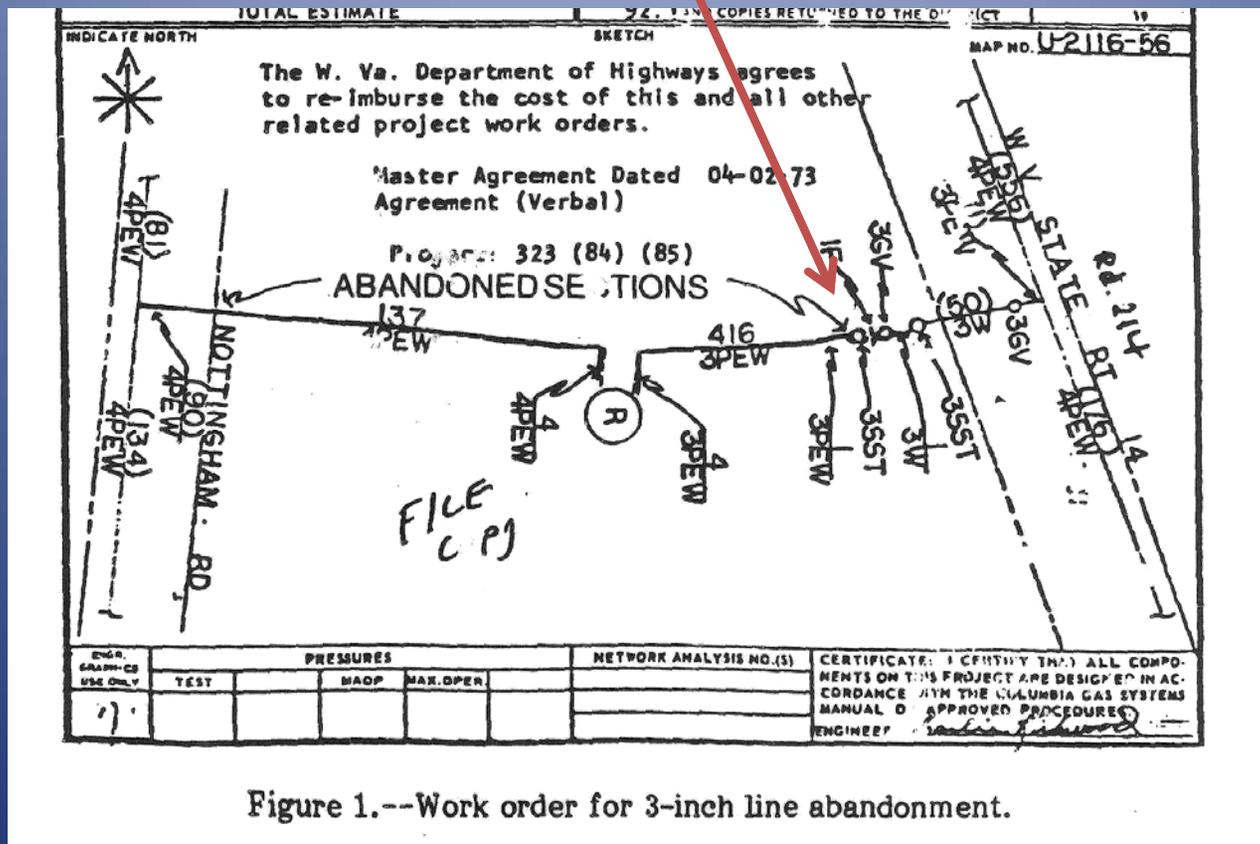


Figure 1.--Work order for 3-inch line abandonment.



# Reconnection

- To solve the pressure problems the operator reconnects previously abandoned pipeline.
- No work order is prepared.

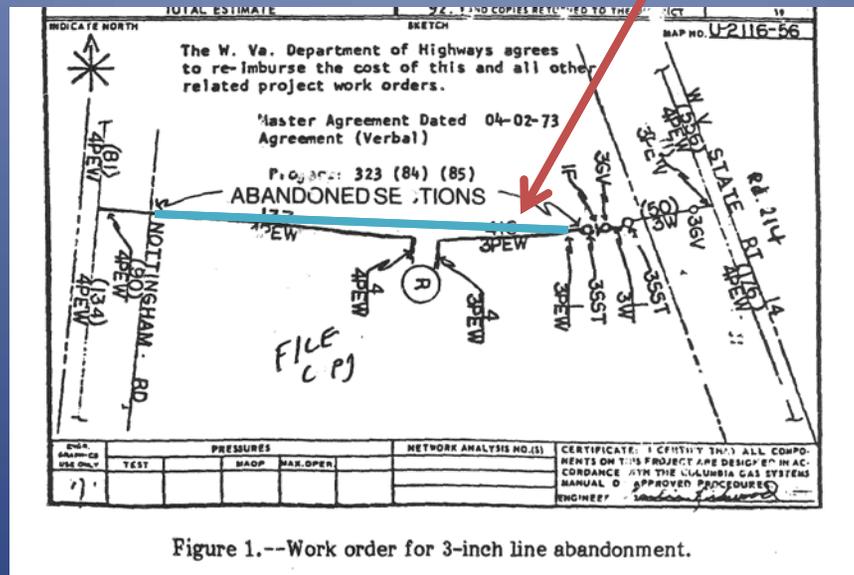


Figure 1.--Work order for 3-inch line abandonment.

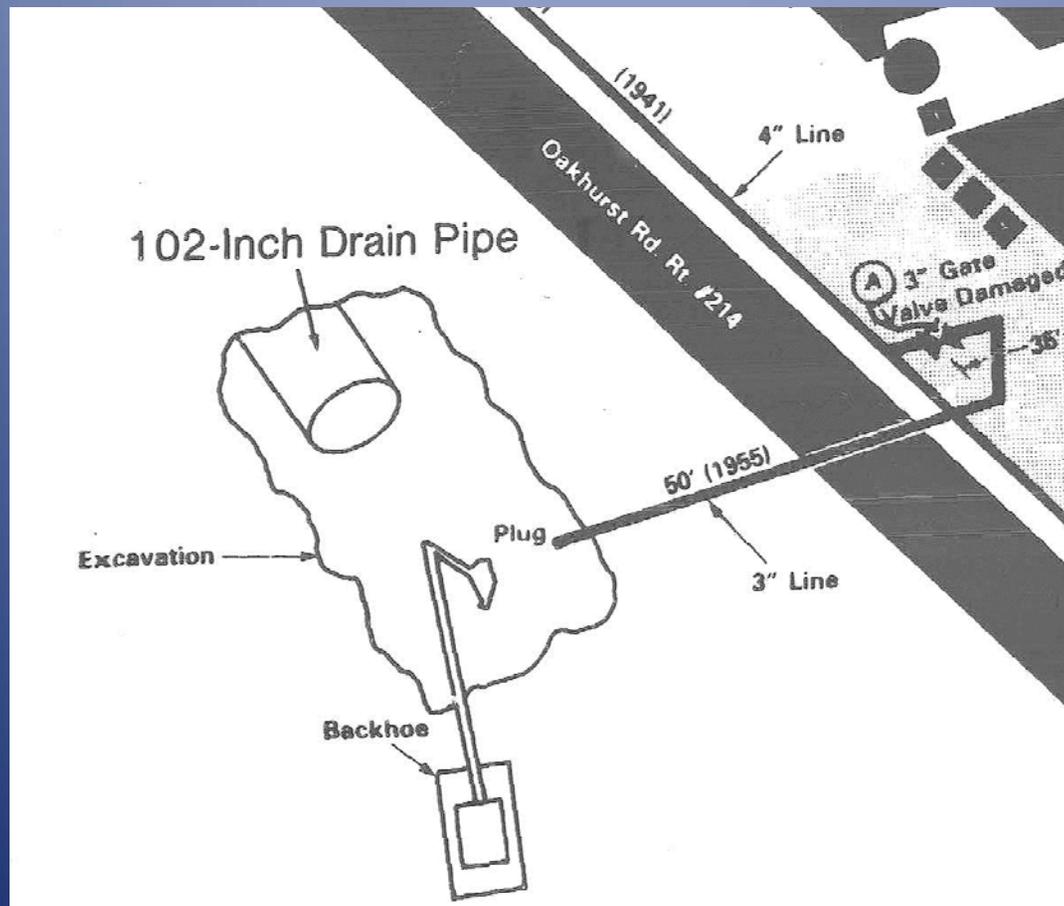






# The damage

- 11:15 am backhoe hits the 50 foot stub.



# Contractor map

- Contractor had information the line was abandoned.

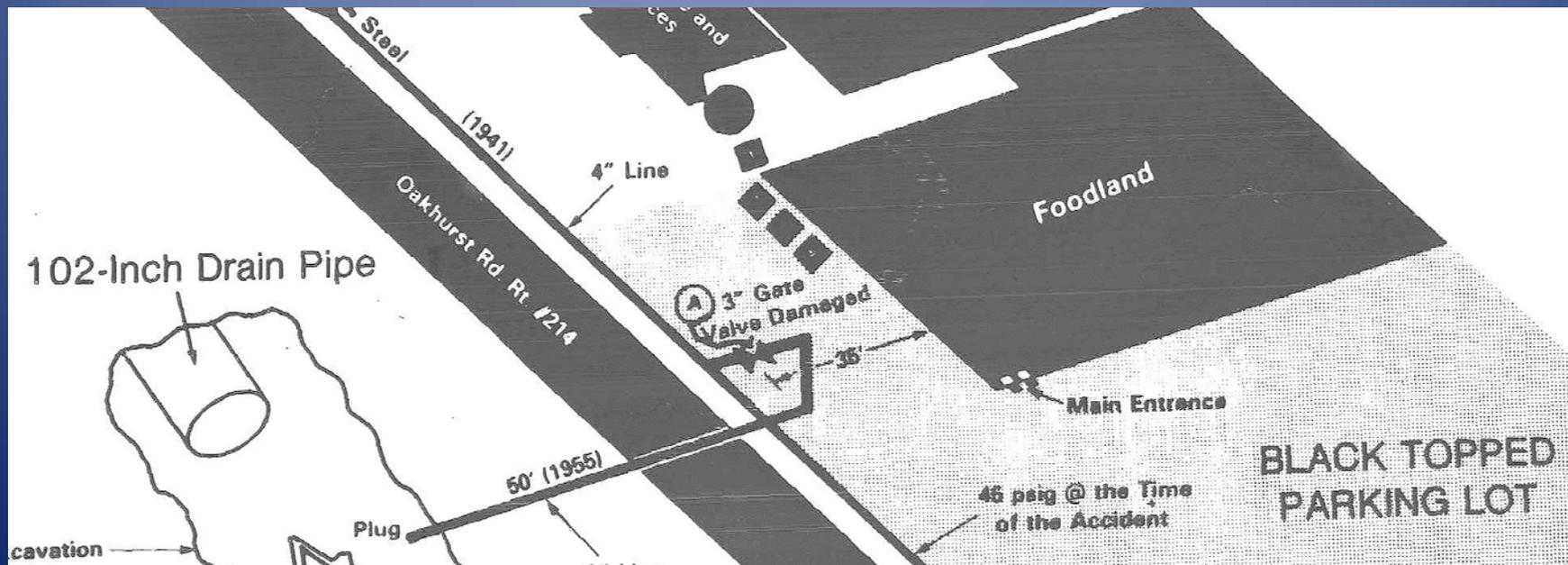


# Contractor actions

- Backhoe operator smells gas and can hear it escaping.
- Shuts off backhoe and tells foreman.
- Foreman radios construction office.
- Construction office calls gas company.

# Broken gate valve

- Backhoe operator is unaware that the line has pulled and broken a cast iron gate valve in parking lot.



# Damaged pipe



# Damaged pipe

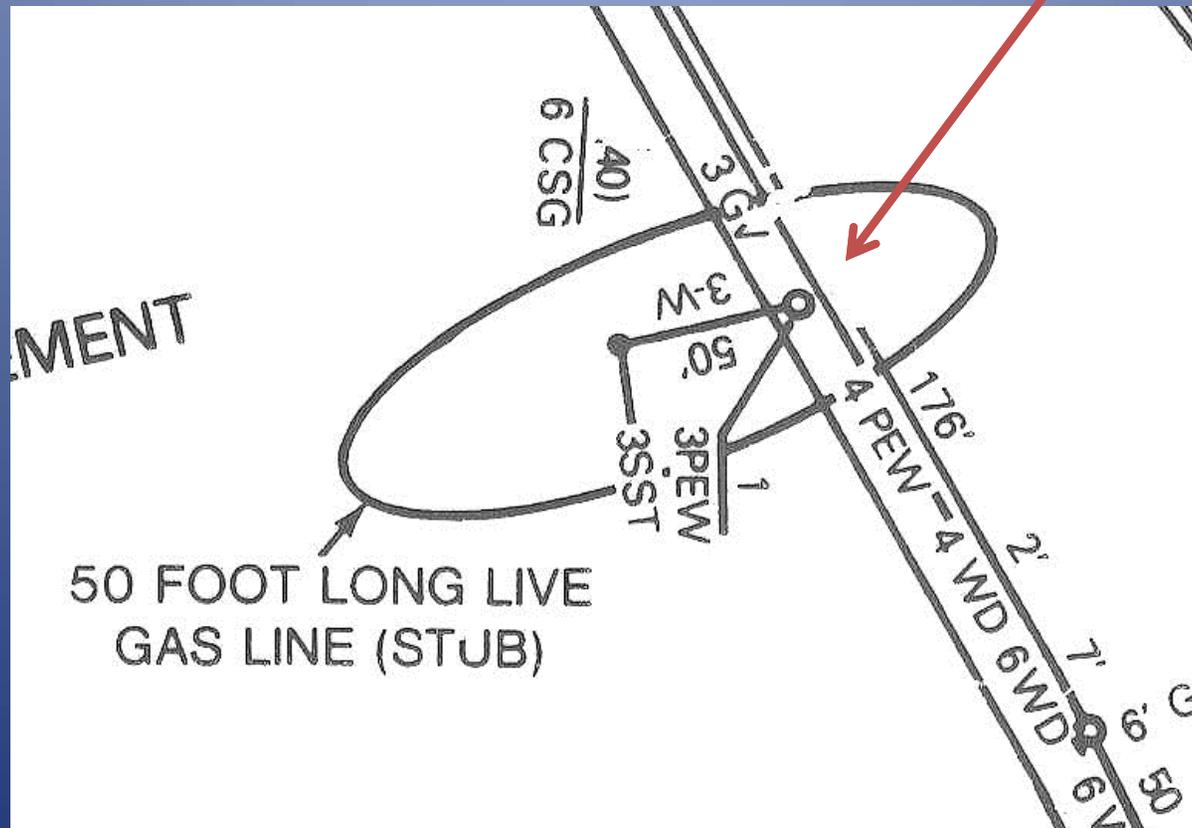


# Gas company response

- Serviceman arrives at 11:20 am, just a few minutes after damage occurs.
- Has been told the backhoe may have hit a 1-inch gas line.
- Smells gas before pulling into parking lot.
- Notices gas blowing from valve boxes in parking lot, 35 feet from store.

# Gas at valve boxes

- Valve boxes are over or near the gate valve.

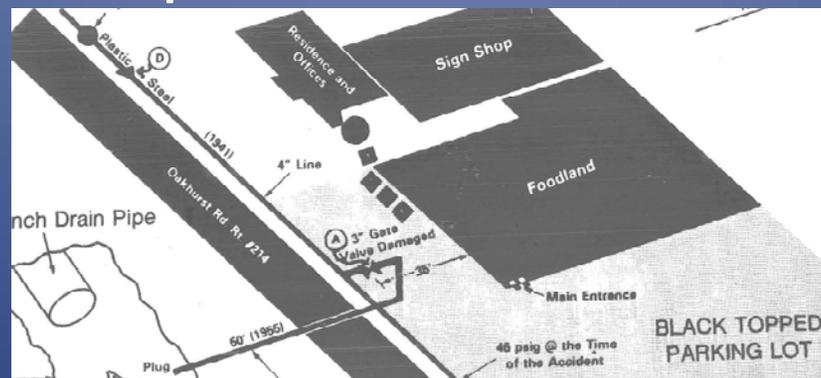


# Initial leak investigation

- Serviceman asks customers leaving the store if they noticed anything unusual or smelled anything.
- “No”, they replied.
- Radios for supervisor, crew and maps. Advises a 2 or 3 inch line may have been hit.

# Initial leak investigation

- Proceeds to check meters at adjacent buildings.
- Reports smelling gas as far as 200 feet away.
- No checks with gas detector from 11:20 to 12:15 when supervisor arrives.

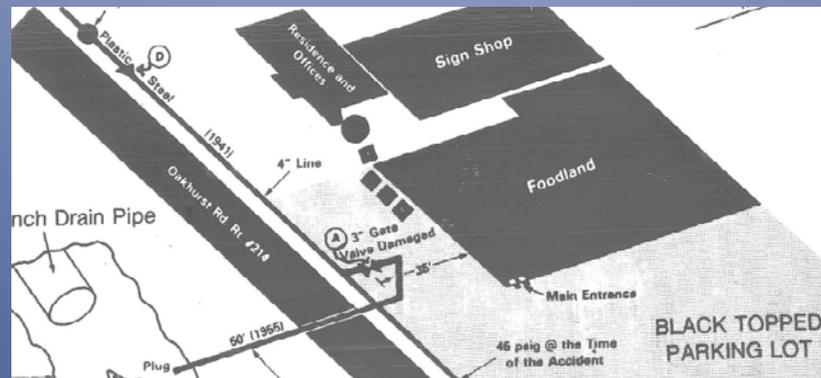


# Supervisor actions

- 12:10 Supervisor arrives
- Looks at rupture by backhoe.
- Checks maps for line location.
- Street crew arrives.
- Supervisor tells serviceman he can leave and go about normal duties.

# Crew actions

- Crew begins to excavate near the valves in the parking lot.



- Valve is uncovered and attempted to close.
- Valve is already closed. Later it is learned that this is a water valve.

# Water valve



# Water valve



# Gas Valve details

- Depth is not indicated on maps.
- Valve is actually laying on its side.
- When finally excavated valve is 7 feet deep.

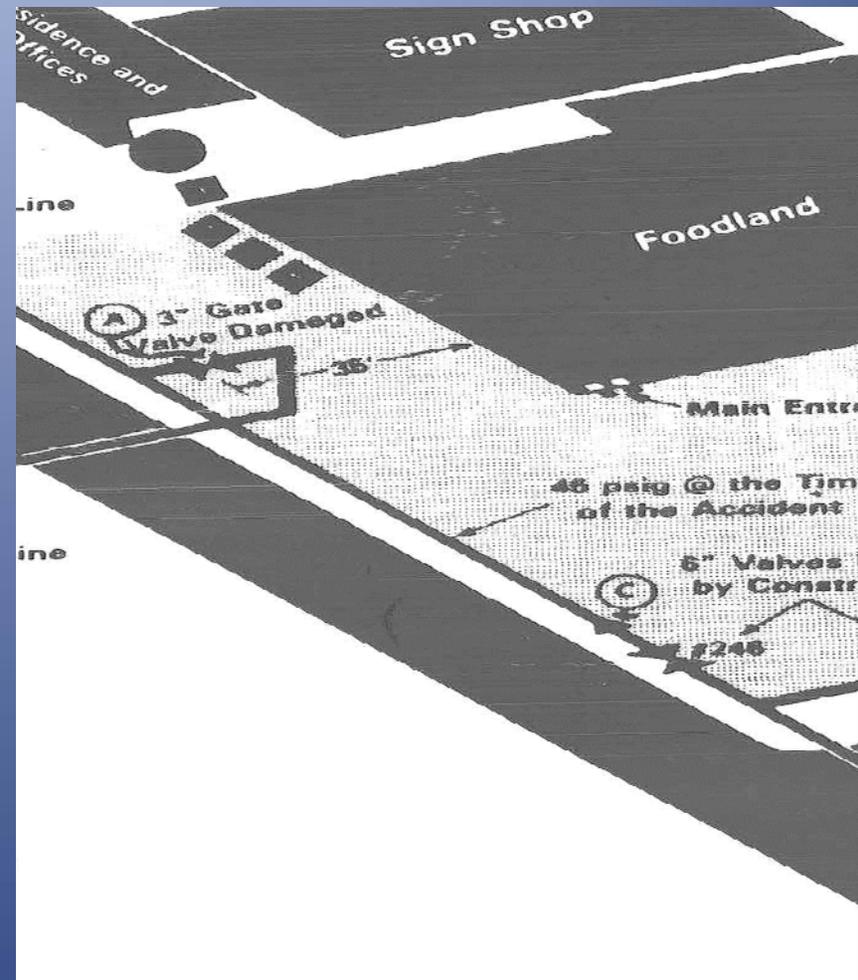


# The sideways gas valve



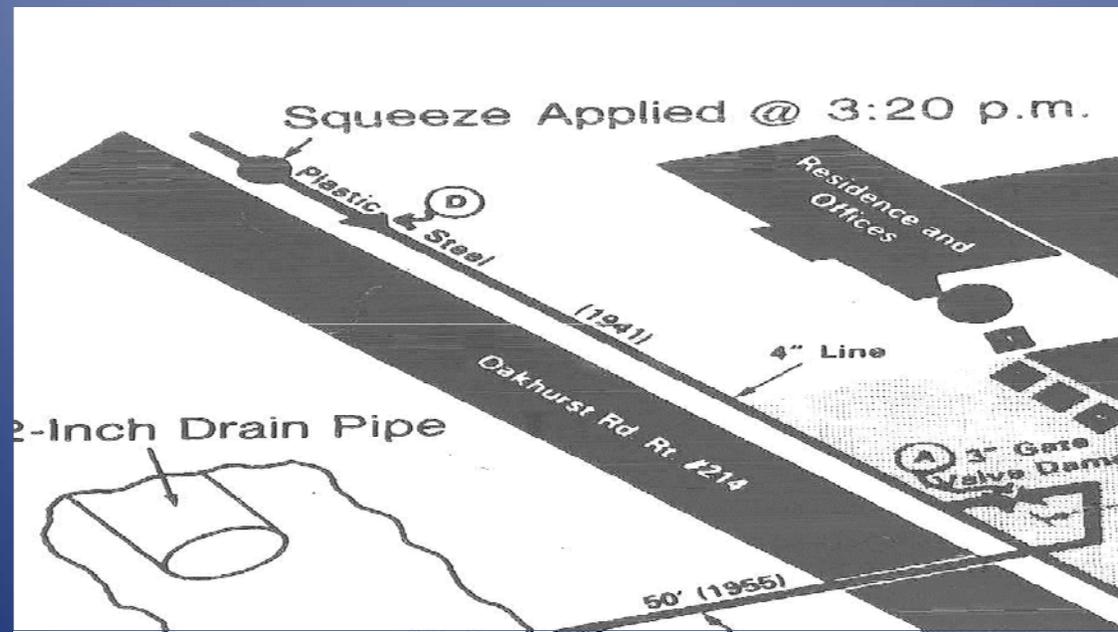
# Continuing crew actions

- Crew decides leak is on the 4-inch main.
- Attempt to find valve 246.
- Valve is buried under construction supplies.
- Crew uses metal detector to try and locate.



# More help requested

- 1:00 pm supervisor calls for additional help.
- 1:45 pm second supervisor arrives and requests backhoe to dig up PE line for squeeze off.



# Where is the gas?

- No gas company employees have yet been inside any buildings.
- Serviceman could smell gas up to 200 feet away.
- Customers told serviceman no leaks or odors inside.
- No gas company personnel used gas detectors.

# Foodland activities

- 11:30 am - a Foodland employee informs the manager of a broken gas line outside.
- 12:30 to 12:45 – Employees and customers complain to manager about throat and eye irritation.
- Manager does not communicate with gas company.

# Foodland activities

- 12:45 pm – Store treasurer arrives for work. Sees gas company vehicles and people working.
- Talks with supervisor, told that since gas is blowing into the air and not confined there is no hazard.
- Treasurer enters store and does not talk with anyone.

1:52 pm – Foodland explodes.



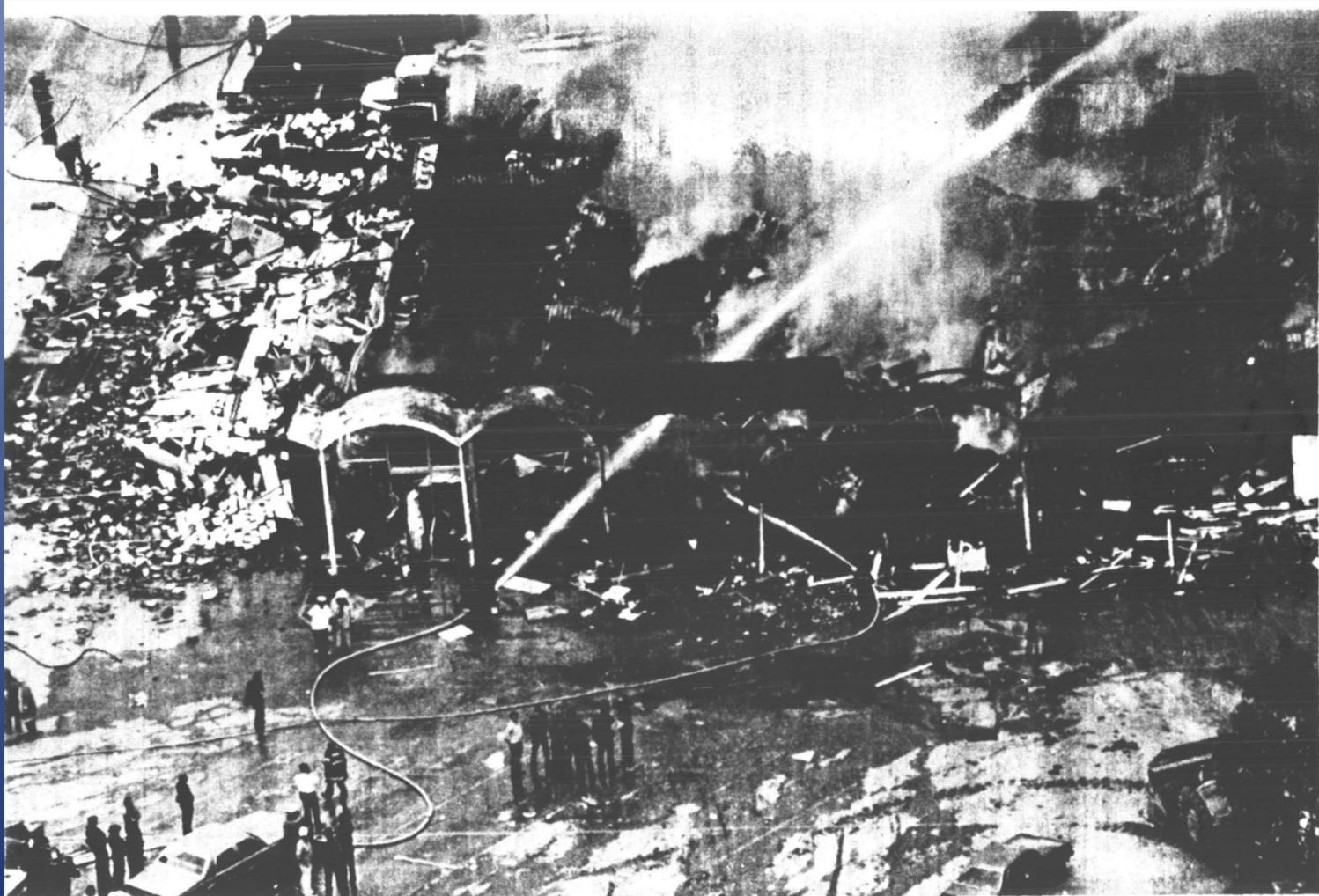


Figure 14.--Photograph of Foodland Supermarket showing roof partially supported from beneath.



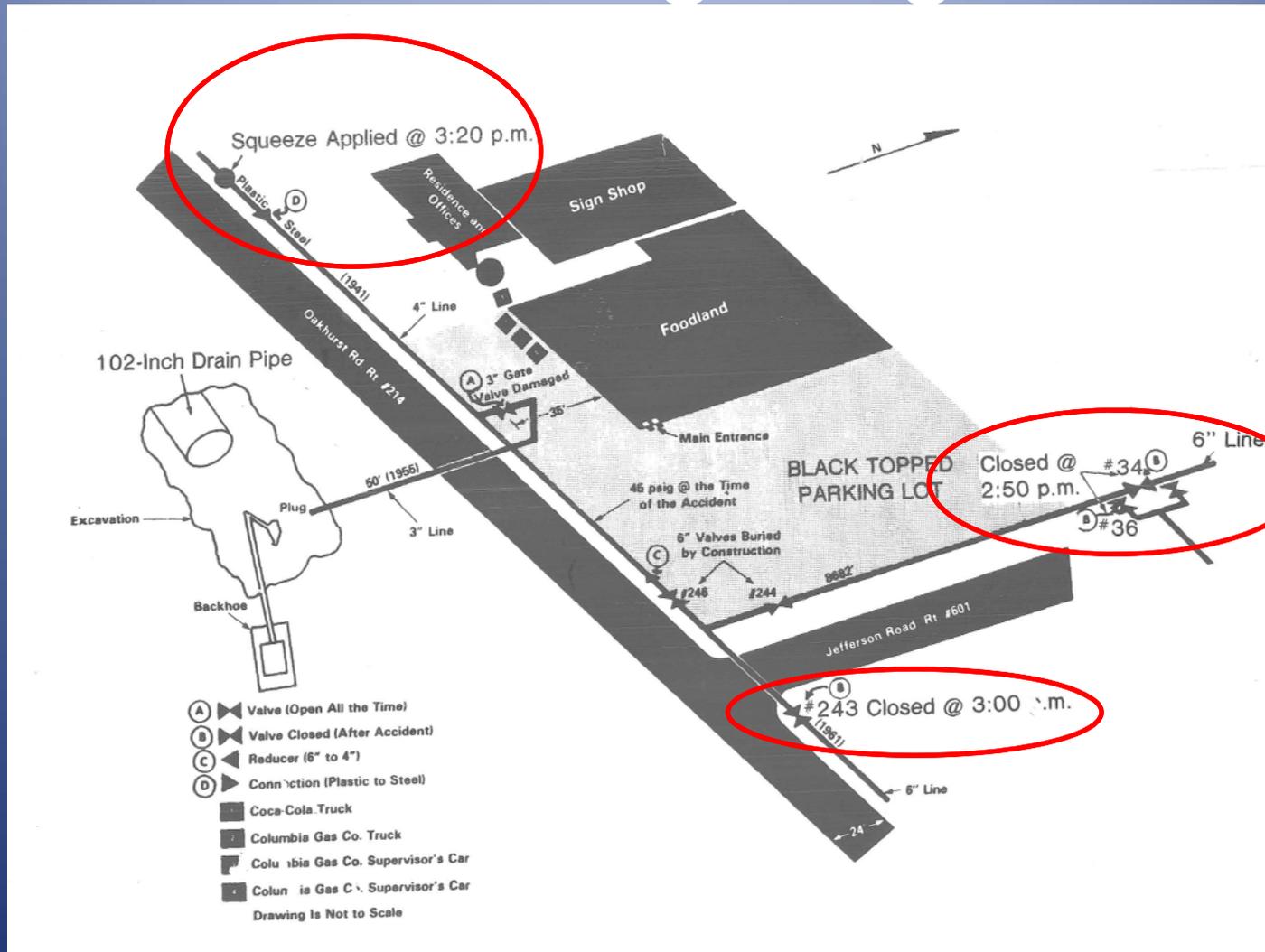
# The incident

- 18 people are in the store at the time of the explosion.
- Roof is blown up into the air and falls back on the store area.
- It is partially supported by the shelving units, allowing people inside to crawl to safety.
- Fires start in Foodland.
- Gas ignites at the valve, flames burn across road and parking lot.

# The incident

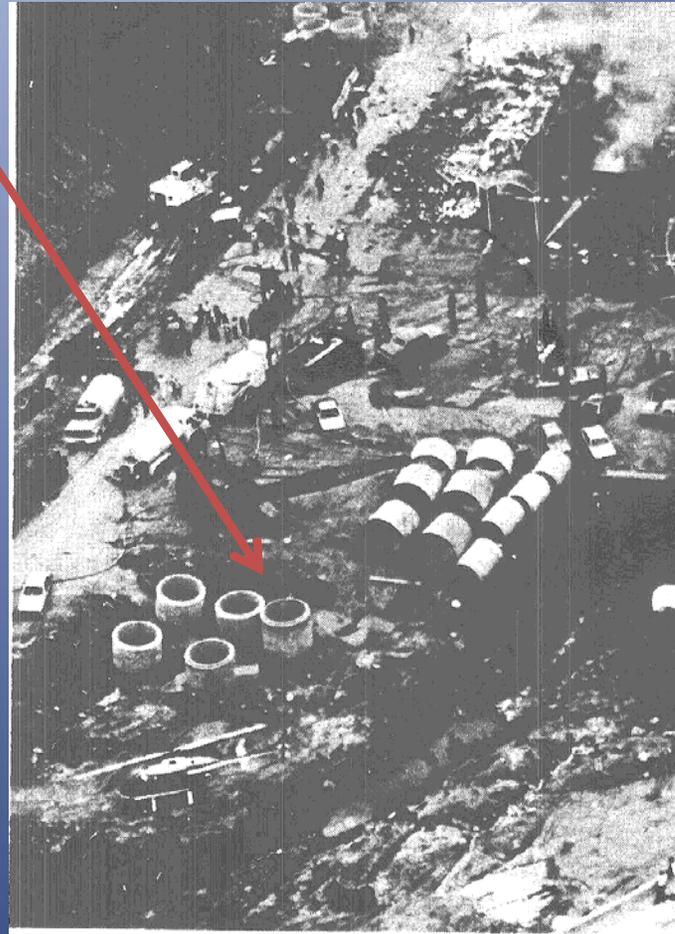
- Flames burn 30 to 40 feet high.
- More small explosions occur inside the store (gas or aerosol cans?).
- Police and fire arrive.
- 19 people treated and taken to hospital. 15 treated and released, 4 admitted.

# Controlling the gas



# Valve 246

- Buried and inaccessible
- Marker over valve had been knocked down and along a dirt road made by the construction company.



# Pipeline damage

- Gate valve buried 7 feet deep.
- Valve was fully open.
- Flange was fractured and separated from the valve body.
- Gas at 45 psi was blowing straight up from the valve.
- Gas vented around 2 water valve boxes in the same area.

# Broken flange



# Broken flange



# Valve



# Observations – shut down

- If valve 246 and the squeeze off could have been accomplished, only 15 customers would be turned off.
- Closing the three valves and the squeeze off put 91 customers out of gas.
- Fire was extinguished around 4 pm.
- No other persons were found in the debris.

# Observations - personnel

- Gas personnel on the scene had 17, 16 14, and 9 years experience respectfully.
- Field and classroom training were provided on a regular basis.
- Company procedures specifically mention migration of gas from leaks.
- Procedures include information on checking inside buildings.
- No one recognized gas could migrate under blacktop and into the building.
- Gas company personnel did not conduct any tests with gas detection equipment.

# Observations – maps and records

- Maps were confusing.
- The foreman who left the stub did so because it was easier than digging up the 7 foot deep valve in the parking lot.
- He felt it would be out of the way of the construction. The engineering office was not told.

# NTSB Probable Causes

- Failure to provide accurate maps.
- Failure to monitor for migrating gas.
- Assumption that all gas was escaping to the open atmosphere.
- Delay in shutting down system.
- Failure to evacuate supermarket.