



# Contact Information

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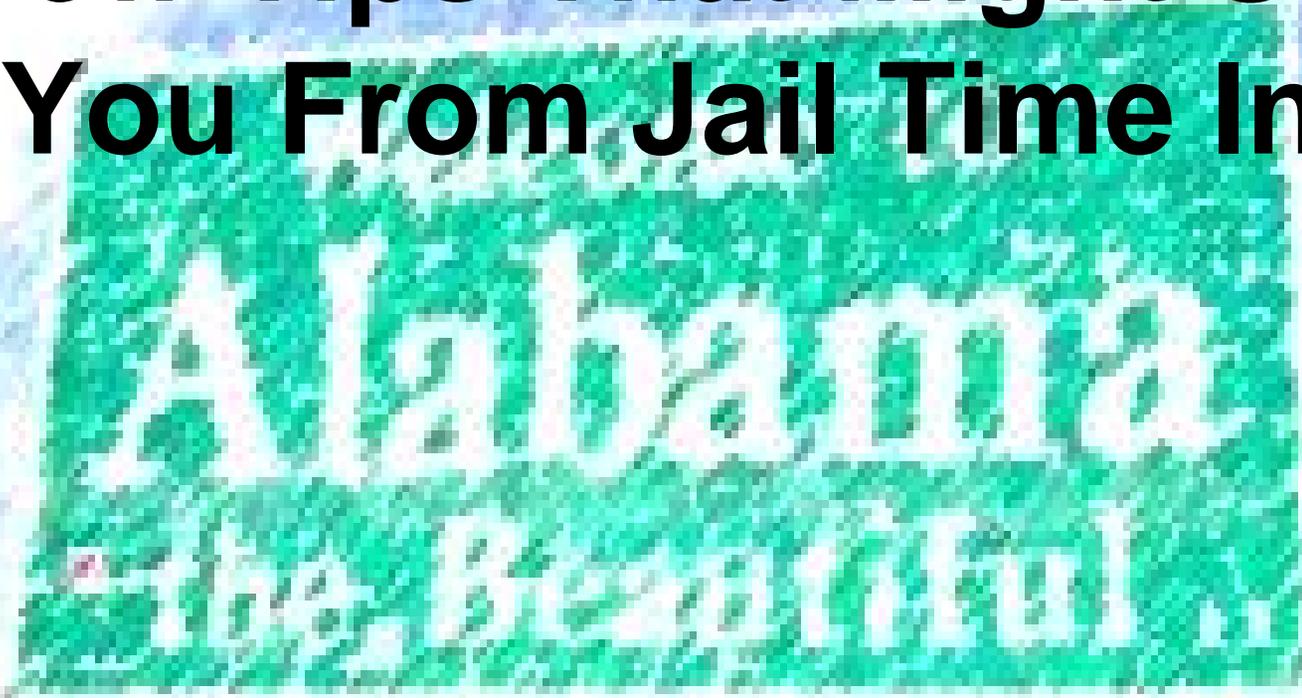
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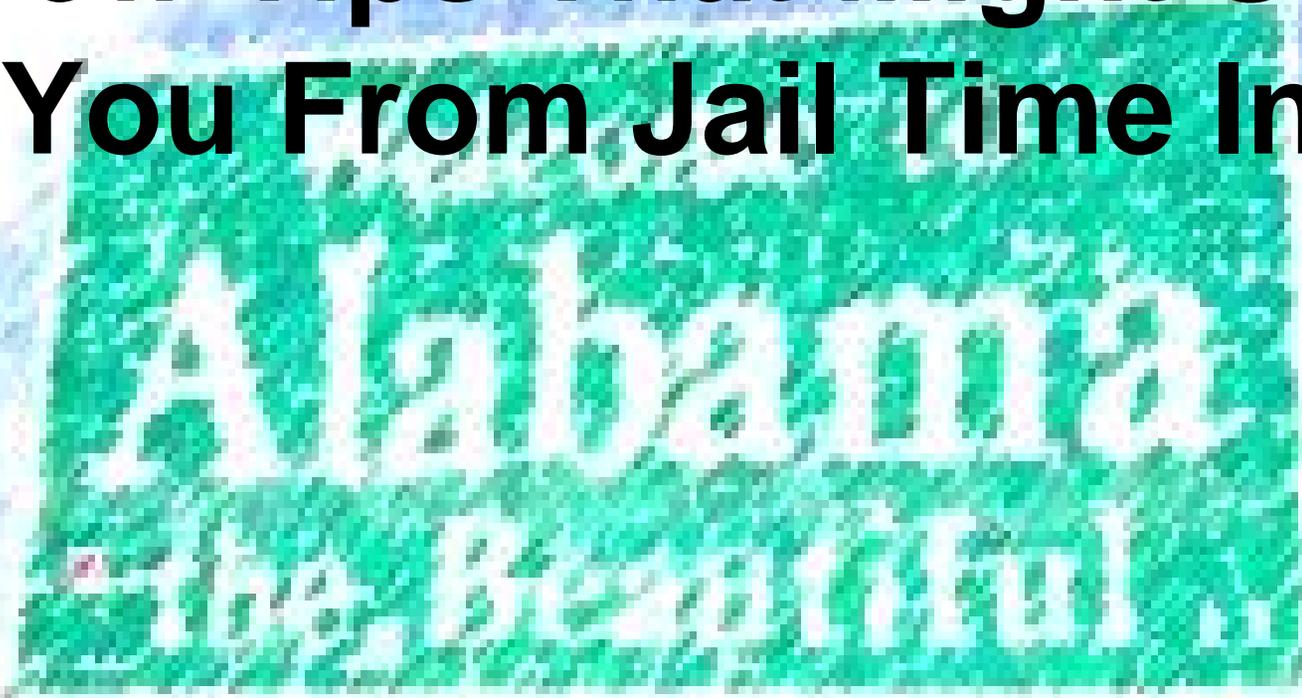


**Pipeline and  
Hazardous Materials  
Safety Administration**

# A Few Tips That Might Save You From Jail Time In

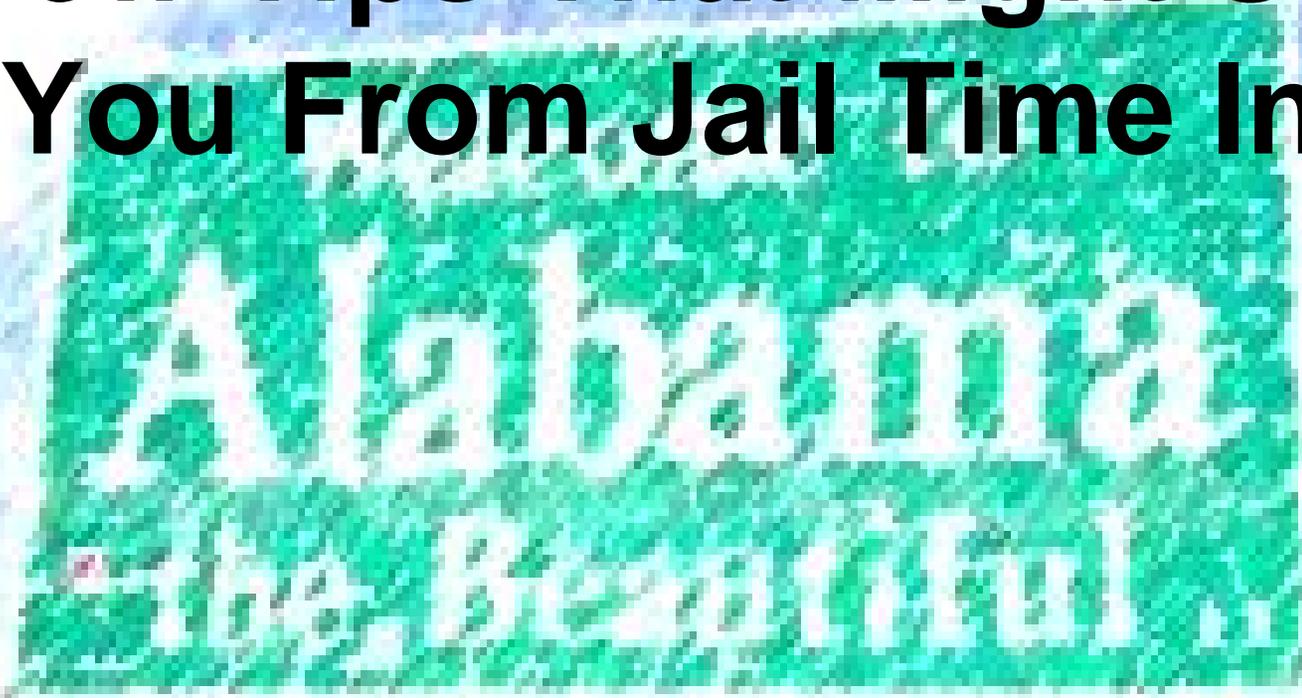


# **A Few Tips That Might Save You From Jail Time In**



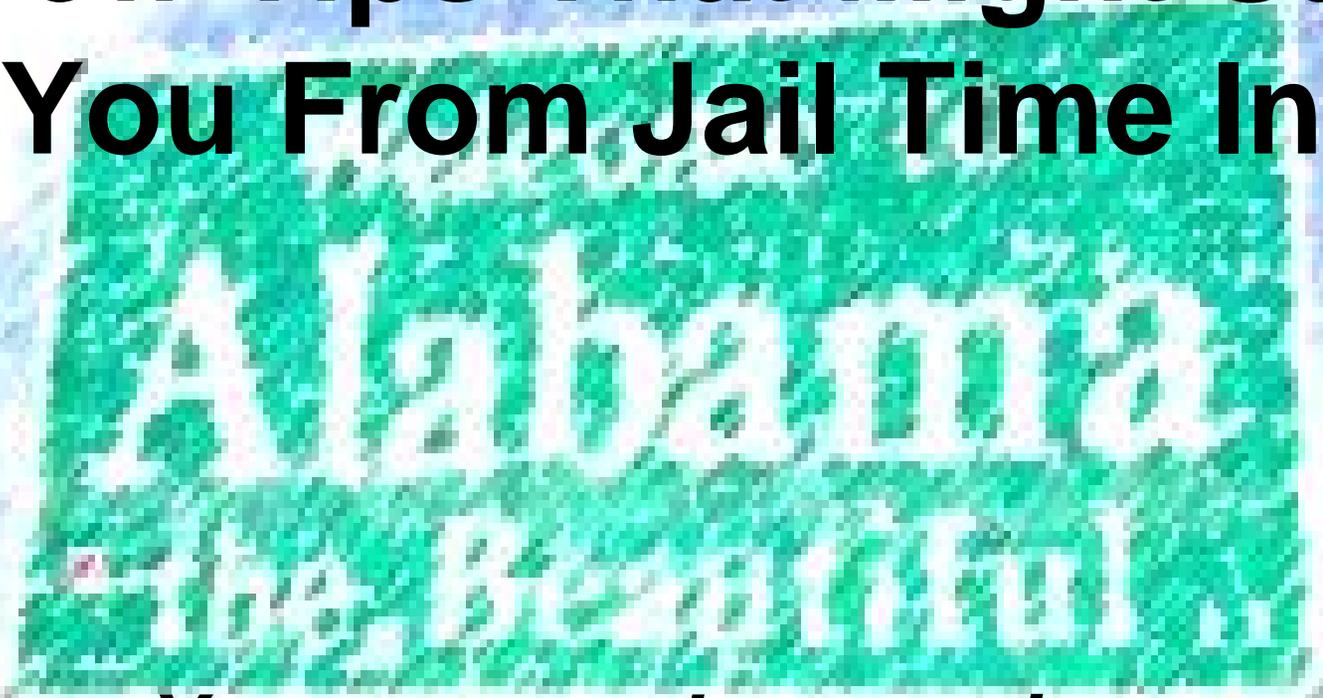
***Bear wrestling matches  
are prohibited.***

# **A Few Tips That Might Save You From Jail Time In**



***It is illegal to maim  
oneself to escape duty.***

# **A Few Tips That Might Save You From Jail Time In**

A green rectangular road sign with white text. The word "Alabama" is written in a large, serif font. Below it, in a smaller font, is the phrase "The Heart of Dixie". The sign is mounted on two metal posts. The background of the image is a blurred landscape with trees and a blue sky.

**Alabama**  
**The Heart of Dixie**

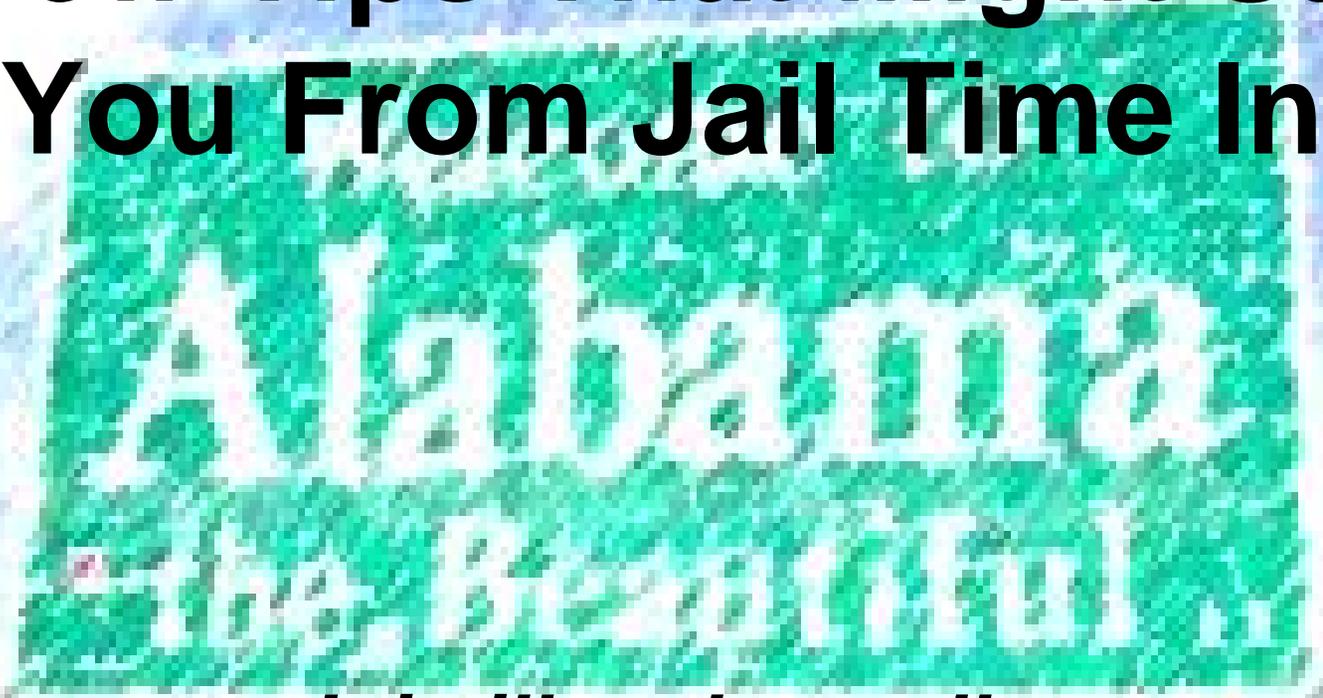
***You may not have an ice  
cream cone in your back  
pocket at any time.***

# **A Few Tips That Might Save You From Jail Time In**



***It is considered an offense to  
open an umbrella on a street, for  
fear of spooking horses.***

# **A Few Tips That Might Save You From Jail Time In**



**Alabama**  
**Birmingham**

***It is illegal to sell  
peanuts in Lee County  
after sundown on  
Wednesday.***

# **A Few Tips That Might Save You From Jail Time In**



***It is illegal for a driver to  
be blindfolded while  
operating a vehicle.***

# **A Few Tips That Might Save You From Jail Time In**

**Alabama**  
**Continued**

***It is illegal to wear a fake  
moustache that causes  
laughter in church.***

# **A Few Tips That Might Save You From Jail Time In**

**Alabama**

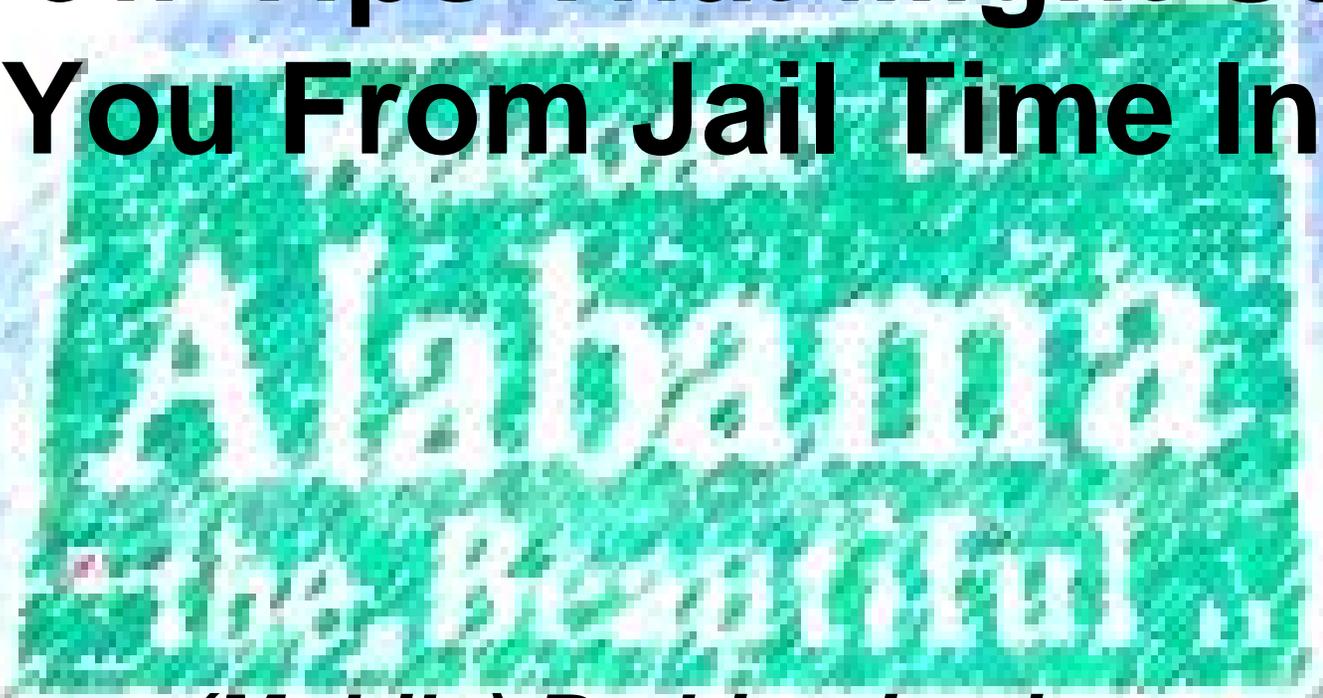
***(Huntsville) If an animal control officer is  
in uniform, it signifies to the public that  
he is an animal control officer.***

# **A Few Tips That Might Save You From Jail Time In**



***(Mobile) No one may  
use a 'funk ball' within  
the city limits.***

# **A Few Tips That Might Save You From Jail Time In**



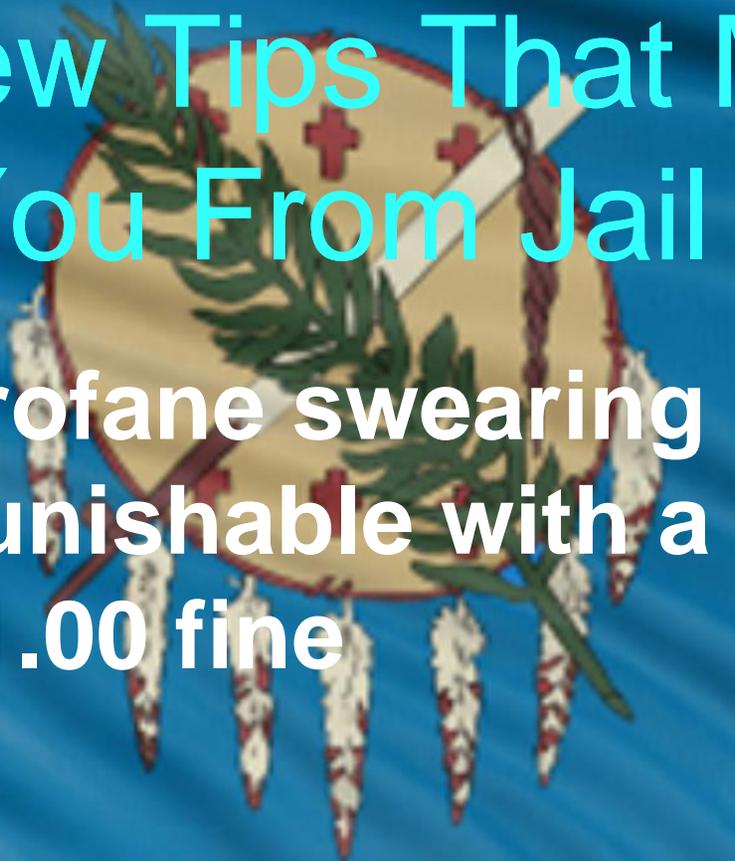
**Alabama**  
**The Heart of Dixie**

***(Mobile) Bathing in city  
fountains is prohibited.***

The seal of the State of Oklahoma is centered on the page. It features a yellow shield with a red cross in the center, a green olive branch on the left, and a white scroll on the right. The shield is surrounded by a red border and has several white and red tassels hanging from the bottom. The background of the entire image is a blue, wavy fabric texture.

A Few Tips That Might  
Save You From Jail Time In

**OKLAHOMA**



# A Few Tips That Might Save You From Jail Time In

**Profane swearing is  
punishable with a  
\$1.00 fine**

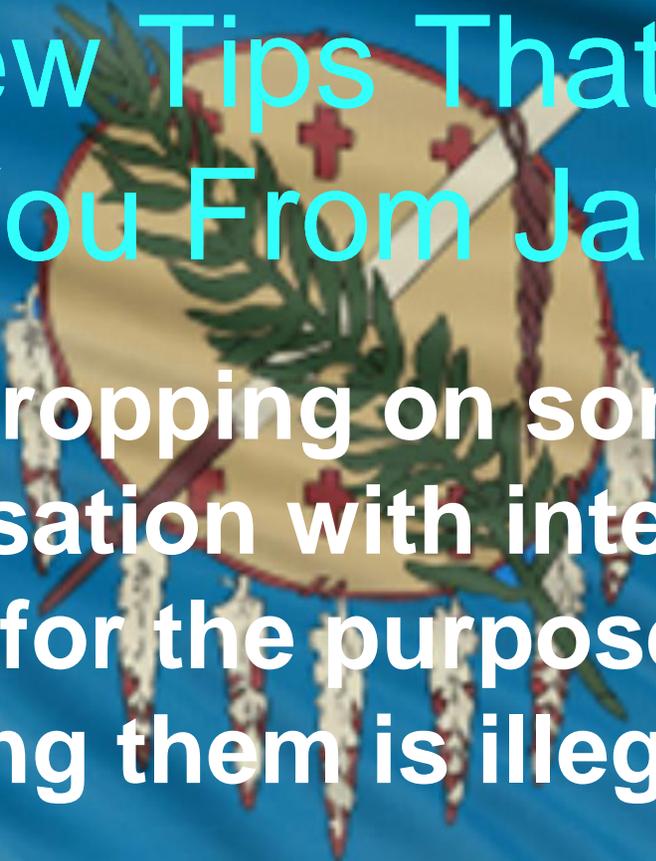
**OKLAHOMA**

The background of the slide is the Oklahoma state flag, which features a blue field with a central yellow shield. The shield contains a red cross, a green fern, and a white arrow. The shield is surrounded by a wreath of green ferns and red berries. The word "OKLAHOMA" is written in white, bold, capital letters at the bottom of the flag.

# A Few Tips That Might Save You From Jail Time In

**Obscene swearing  
in front of a woman  
or young boy can  
mean 30 days in jail**

**OKLAHOMA**

The Oklahoma State Seal is centered in the background. It features a yellow shield with a red cross, a green olive branch, and a red arrow. The shield is surrounded by a wreath of green leaves and red berries. The seal is set against a blue background that resembles a waving flag.

# A Few Tips That Might Save You From Jail Time In

**Eavesdropping on someone's  
conversation with intent to  
gossip for the purpose of  
annoying them is illegal**

**OKLAHOMA**

The background of the image is the Oklahoma state flag, which is a solid blue field with a large, circular, yellow sunburst in the center. The sunburst contains a red cross and a white banner with the word "GREAT" written on it. A green dreamcatcher with white and red beads is superimposed over the sunburst. The text "A Few Tips That Might Save You From Jail Time In" is written in a light blue, sans-serif font across the top half of the image.

# A Few Tips That Might Save You From Jail Time In

**Recklessly racing horses through town is punishable with a \$50 fine**

**OKLAHOMA**

# A Few Tips That Might Save You From Jail Time In

Injuring someone's fruit  
can get you 30 days in jail

**OKLAHOMA**

# A Few Tips That Might Save You From Jail Time In

The state's official meal is chicken-fried-steak, barbecued pork, sausage, biscuits and gravy, fried okra, fried squash and pecan pie

**OKLAHOMA**

# A Few Tips That Might Save You From Jail Time In

**It is illegal to wear your  
boots to bed**

**OKLAHOMA**

**Thanks for Inviting Us!**



# **Introduction to Failure Investigation**



# Investigation of What?

- Incidents
- Failures
- Accidents



# So why investigate?

- **§192.617** – Investigation of failures  
.....procedures for analyzing accidents  
and failures
- **§192.605 (e)**  
The procedures required by ..... and  
§192.617 must be included in the manual  
required by paragraph (a) of this section

# §195.402 ACCIDENT INVESTIGATION

Operator shall prepare & follow a manual of written procedures...

§195.402 (c)(5) Analyzing pipeline accidents to determine cause

§195.402 (c)(6) ...and the possibility of recurrence of accidents analyzed under paragraph (c)(5) of this section.

# Investigate

To observe or study by close examination and systematic inquiry

- examination:
  - to inspect closely,
  - to test the condition of,
  - to inquire carefully

# What to Investigate

- Do all failures, accidents, leaks or other events need to be investigated?
- Operator should specify in written procedures when investigations are needed as well as how detailed the investigation needs to be.

# Who investigates?

- DOT - PHMSA/State regulators
  - Pipeline hazards to public
- EPA
  - Environmental contamination
- OSHA
  - Workplace accidents
- NTSB
  - Any transportation accident



# Role of Pipeline Inspectors

- Ensure Public Safety
- Compliance with regulatory requirements
- Review procedures and emergency response for violations
- Help direct the investigation
- Safe operation of the facility



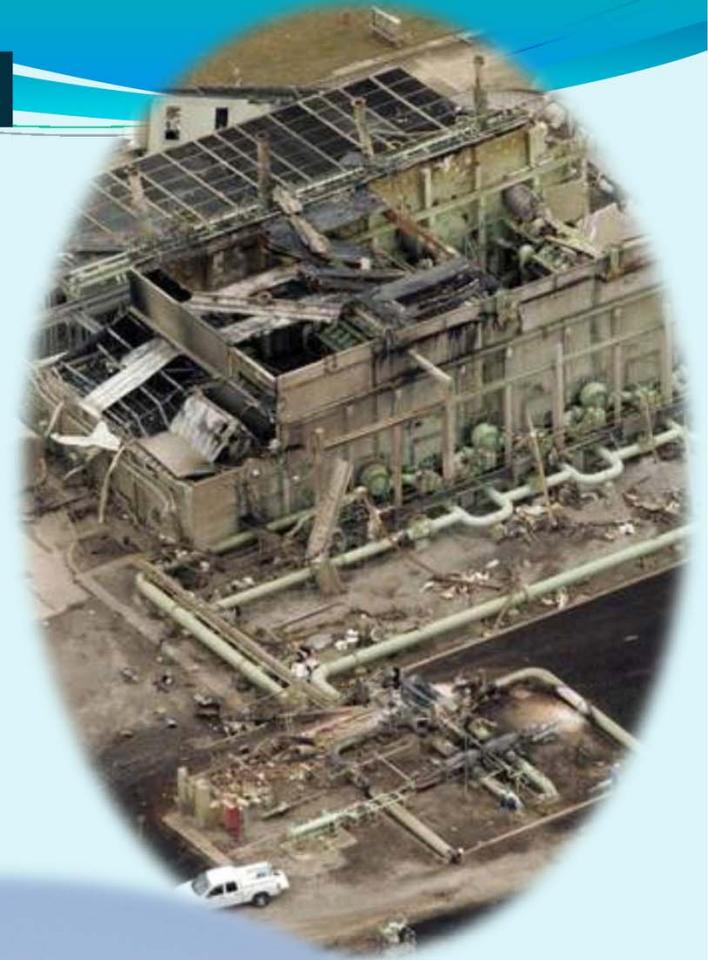
# Role of Pipeline Operators

- Search for the probable cause
- Repair and restore service
- Prepare for litigation
- Prevent the possibility of a recurrence



# Not all failures need investigation

- Some failures are obvious
  - Weather related events such as hurricanes, tornados
  - Automobile accidents
  - Other obvious events





Bullet hole in pipeline



Vehicle accident

# Operators Procedures

- Written procedures
  - Detailed in types of failures or events to investigate
  - Who, what, when where, and how
  - Disposition of report

PROCEDURE NUMBER: 220.004.002  
PROCESS OWNERSHIP: Field Services

VERSION NUMBER: 3  
RELATED PLAN:

## Incident / Near Miss Investigation and Root Cause Analysis Process

### 1.0 Scope

This procedure describes the process for documenting and performing an incident investigation and analysis.

This procedure should be used to investigate all DOT Reportable Incidents (even if later rescinded). This procedure may be used when investigating the events pertaining to a Safety Related Condition or Abnormal Operation. Refer to Plans 220.05.01 DOT Incidents – Reporting and Investigating Requirements, 220.05.02 Safety Related Conditions - Reporting and Investigating Requirements, or 220.05.03 Abnormal Operations for additional information.

Depending on the nature and extent of a Facility Failure, as defined in Section 8, these procedures may be used during the investigation.

The Incident/Near Miss Investigation and Root Cause Analysis process applies to health and safety, vehicle, or equipment failure investigation and analysis. This procedure describes the steps that may be followed to document the incident, the history leading up to the incident, and identifying the root cause(s). Following this procedure will help to ensure consistency in investigations and to help in determining root causes. Understanding the true root cause or causes of an incident is necessary to help prevent incidents from reoccurring and may be used to improve operational practices, maintenance procedures, designs, and equipment & material specifications.



**WARNING:** Use caution when performing inspections or investigations where slip, trip and fall, hazards exist or when bending, striking against objects, contacting sharp edges, touching electrical fences or coming in contact with pinch points.

### 2.0 Procedures

2.1 Any incident or near miss will be reported by the employee to their team leader.

2.2 Employee and/or team leader must notify the Monitoring Center of all vehicle accidents, safety incidents, and other incidents, as appropriate.

2.3 **Employee and Team Leader Perform Initial Investigation within 24 to 48 Hours**  
The team leader will create a Maximo work order, and associate the Incident Investigation and Root Cause Analysis Job Plan.

PROCEDURE NO: 220.004.002

EFFECTIVE DATE: 07/18/2009

DOCUMENT CONTACT: Codes and Standards

Page 1 of 9

# Typical Operator Response to Leaking Gas

- CORRECT UNSAFE CONDITION;
- RESTORE SERVICE;
- DOCUMENT NEW INSTALLATION;

***Oh, and.....***

- Determine cause of failure.

Failure investigation is often secondary  
to the top three goals.

# What to Investigate

- The events and actions that lead to the failure
- When did the failure occur
- Why did the failure occur
- How did the failure occur
- Where did the failure occur
- Who was involved/identified the failure
- How much could have been prevented
- What else was affected?

# Pipeline Scene Investigation (PSI instead of CSI)

Take a forensic approach to investigating a failure, accident, or incident and follow basic root cause investigation techniques and rules

# Follow the Basic Rules

- Use an investigation form to help prompt and remind you what to collect
- Document only the facts and never opinions
  - Don't jump to conclusions
  - Allow the evidence to direct the investigation
- Construct a time line of the events
- Document surface conditions at point of failure
- Document weather and environmental conditions at time of failure, 24 hours before and after as available

# How to Investigate

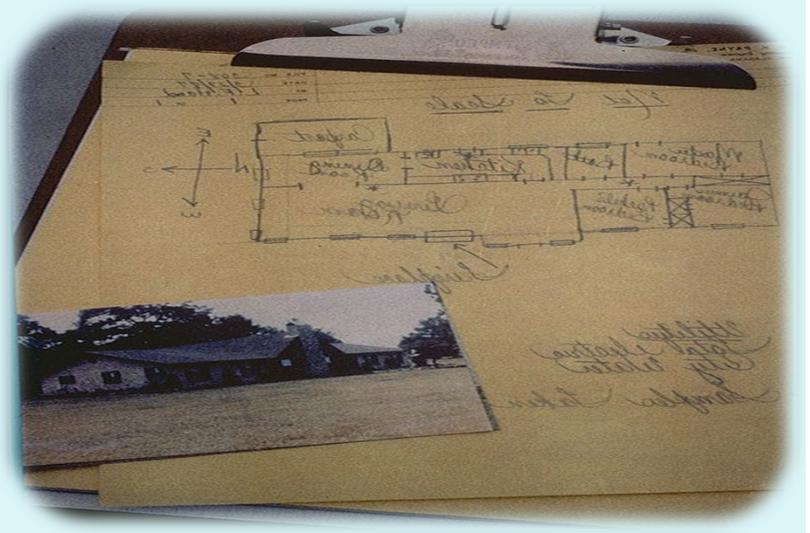
**Always make sure the  
location is safe**

# Pipeline Scene Investigation

1. Photograph and Diagram the Scene
2. Interview Witnesses
3. Conduct a Migration Survey
4. Retrieve or Dig up the Facility, preserving failed equipment
5. Make Repairs
6. Test the Facility in Place
7. Run tests on failed equipment as needed
8. Additional system tests

# Photos and Diagrams of the Scene

- Photos are important throughout the procedure
  - Used to identify as found conditions
  - Location of debris, damage conditions
  - Preserve a chronology of actions
  - May be needed during repair process or as additional conditions uncovered
- Identify as left conditions



# Pipeline Rupture

Appomattox Co, VA 9/28/08





# Photos and Diagrams of the Scene

- Photographs from all angles, sides or views of the area
  - Keep running list of photographs and locations for future reference
  - Establish scale or perspective and dimension

## *Pipeline Failure Investigation Report*

<i>Photo Documentation</i> <sup>(1)</sup>			
Overall Area from best possible view. Pictures from the four points of the compass. Failed Component, Operator Action, Damages in Area, Address Markings, etc.			
Photo No.	Description	Photo No.	Description
1		31	
2		32	
3		33	
4		34	
5		35	
6		36	
7		37	

# Photographs without scale



# Photographs showing scale



# CREATIVE PHOTOGRAPHY



# Photos and Diagrams of the Scene

## Video

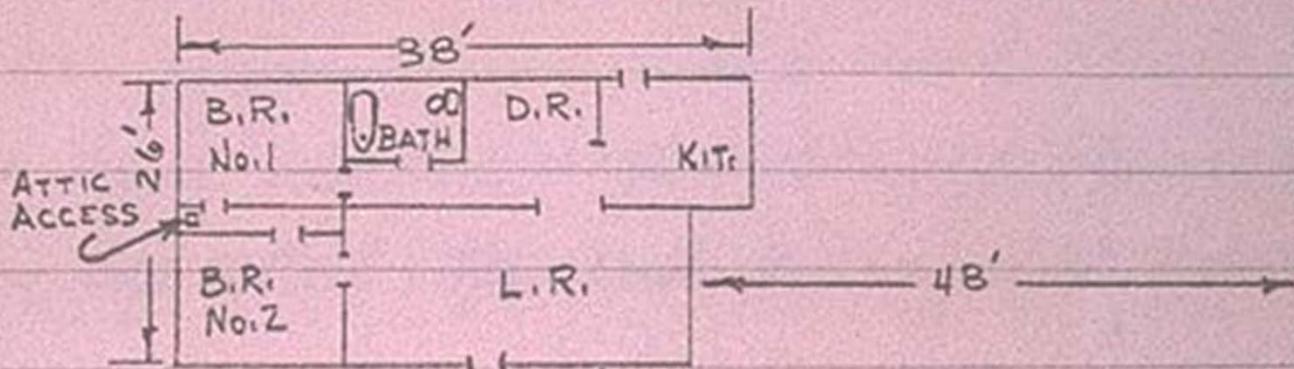
- Video may be useful tool
  - Video without the microphone on
- Helps document actions taken by all parties



# Photos and Diagrams of the Scene

- Diagram location with measurements as possible
  - Location of debris may help investigation and timeline of events
  - GPS locations instead of measurements still allow mapping
  - Witness can use copies of diagrams during interviews

1301 LESSMAN RD.



CLEVELAND ST. S.W.

CURB

COVERED  
PROPERTY  
LINE VENT

9'  
10'

2 1/4" C.S. GAS MAIN

CURB

BREAK

LESSMAN RD. S.W. SEWER MAIN FLOW →

# Evidence of Material Removed From Site

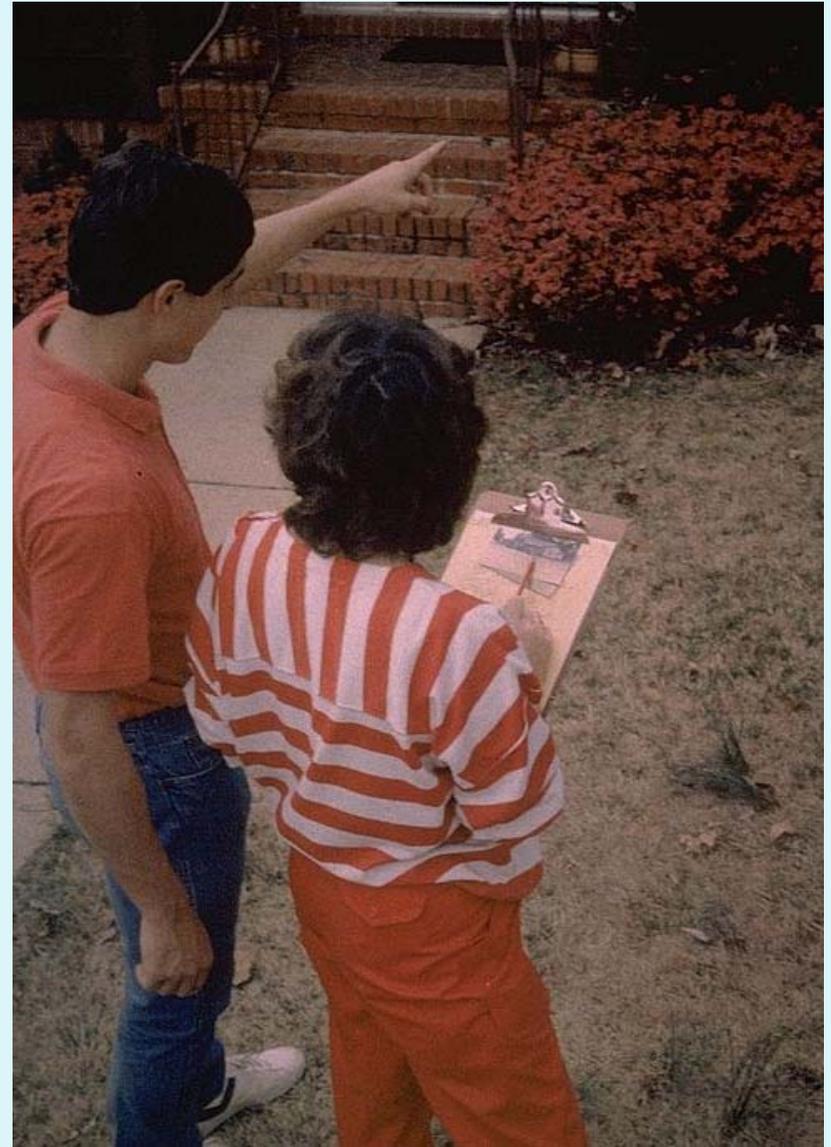


POINT NUMBER	GPS LOCATION	DESCRIPTION OF MATERIAL
1	32 26.3141	Casing on north side of service road
	91 28.1300	
2	32 26.3200	Pipe on south side of I-20 east bound lane next to bridge railings
	91 28.1346	
3	32 26.3143	Casing removed from I-20 east bound lane. The readings are at the location after casing was removed from I-20 east bound lane.
	91 28.1396	
4	32 26.2712	Pipe located on west side of slough
	91 28.1035	
5	32 26.2367	Field joint form
	91 28.1291	
6	32 26.2635	Field joint form
	91 28.1305	
7	32 26.2635	Field joint form
	91 28.1305	
8	32 26.2905	Field joint form
	91 28.1117	
9	32 26.2887	Field joint form
	91 28.1071	
10	32 26.2933	Pipe coating
	91 28.1003	
11	32 26.2969	Pipe coating
	91 28.0994	
12	32 26.2948	Pipe coating
	91 28.0998	
13	32 26.2992	Pipe south end of rupture
	91 28.1227	
14	32 26.3086	Pipe north end of rupture
	91 28.1163	
15	32 26.3555	Pipe north side of I-20 west bound lane
	91 28.1195	
16	32 26.2898	Small piece of pipe south of crater approximately 10 ft. west of Line 100
	91 28.1305	
17	32 26.2755	Metal strap
	91 28.1221	
18	32 26.2473	Metal strap
	91 28.1126	
19	32 26.2910	Pipe coating
	91 28.1037	
20	32 26.2815	Pipe coating
	91 28.1174	
21	32 26.2929	Metal strap
	91 28.1279	
22	32 26.3086	Casing on north side of rupture
	91 28.1163	
23	32 26.3150	Vent piping
	91 28.1268	
24	32 26.3493	Small piece of pipe located on north side of I-20 west bound lane
	91 28.1190	
25	32 26.2875	Field joint form
	91 28.1126	

GPS readings were taken with a Trimble Pro XR

# Interviews

- Interview witnesses
  - May need multiple interviews
  - Use diagrams
  - Develop list of question before interview



# Witness Interviews

- Company personnel
  - On site personnel
  - First responders
  - Control room
- Contractor personnel
- Public
- Media
- Emergency response personnel

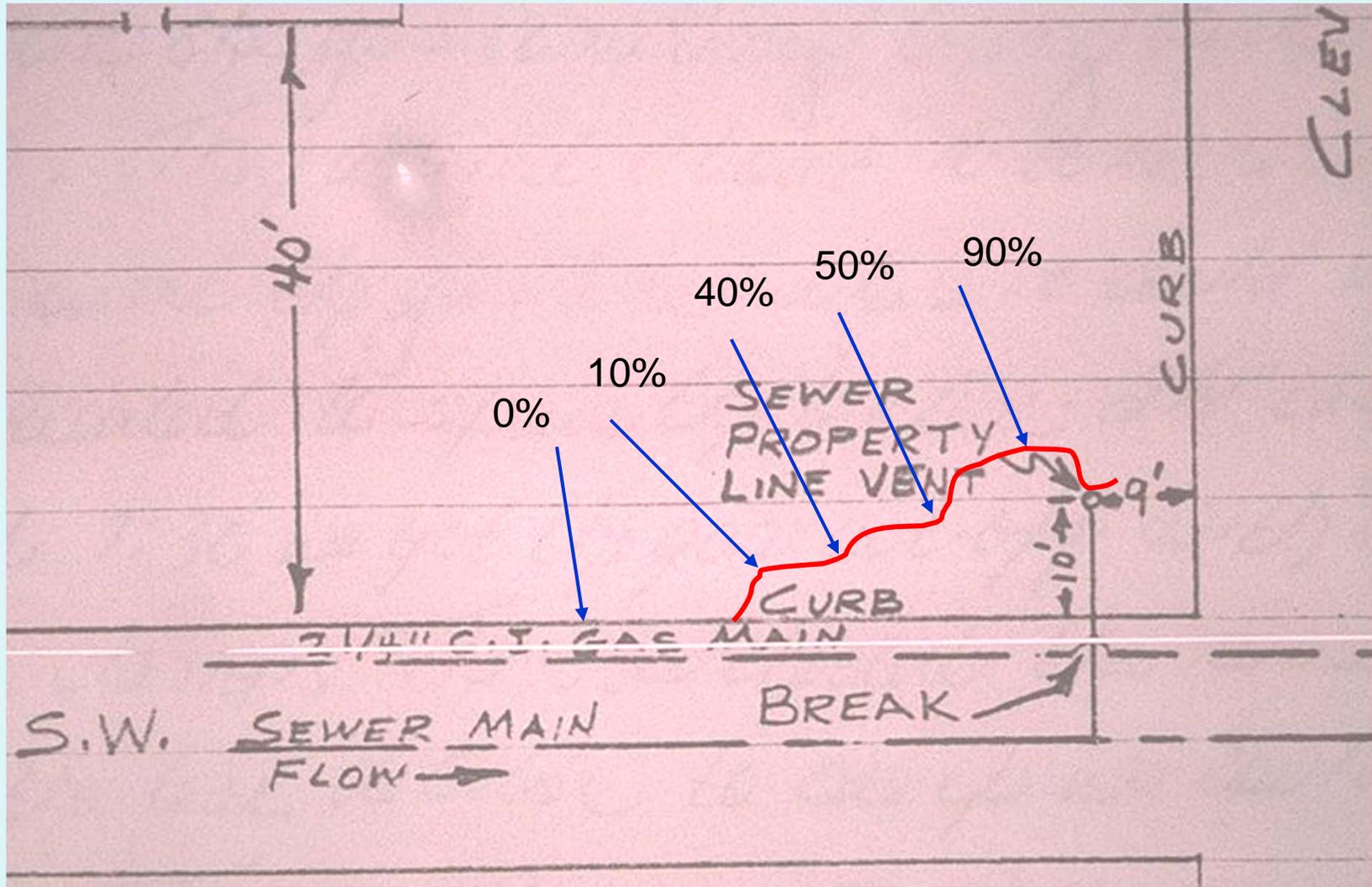




# Migration Survey

- Determines where the gas came from and where it went.
- Confirms that there are no additional hazardous areas (i.e. gas up against an adjacent house)
- Checks for collateral damage

# Plot Gas Migration



# Recover Damaged Facility

- Treat digging and recovery of equipment as archeological dig
- Take pictures and make diagrams as needed



# Recover Damaged Facility

- Recover all pieces of failed equipment
  - Label all pieces
    - Include equipment orientation
    - Direction of gas flow
  - Follow a chain of custody for all pieces.
    - Maintains integrity of evidence
    - Protects company



# Recover Damaged Facility



- DON'T TOUCH FRACTURE SURFACES
- Don't clean fracture surfaces or pieces
- Wrap in bubble-wrap or similar product
- Secure in shipping container



# Depending on Material

- Indicate if there is evidence of external corrosion
- Take and record CP readings at grade and at pipe elevation before and after repairs
- Other sampling such as soil pH, water, solid samples
- Visually indicate the type and condition of any coating
- Indicate if the pipe and components are above or below ground/water/surface
- Follow O&M Procedures

# Repairs

- Document repairs
  - Why that particular repair was used
  - Repairs suitable for MAOP
  - Testing was done to ensure the integrity of the system before returning it to service
  - Identify other areas of the facilities that may be affected by the conditions of this failure/incident/accident

# Pressure Testing



# Pressure Testing

- Pressure test only to the operating pressure at the time of the failure.
- Ensure that the test equipment is calibrated.
- Ensure test is done in accordance with O&M procedures
- Notifications

# Basic Information

- **Historical data**

- Pipe or equipment information
- Date of installation and installation method
- Normal operating pressure and test records
- Operating pressure at time of failure
- Copies of photos of excavation
- Soil samples
- Cathodic protection data
- Gas samples
- Pipe inspection information



# Other Information

- Emergency Plan
- O&M Plans and Records
- Operator Qualification
- Integrity Plans
- Maps, diagrams, GIS information
- Pressure data
  - Charts, SCADA
- Other incidents/abnormal operation information

*Are they correct?*

*Were they followed?*

# Additional System Tests

- Check System for additional problems or collateral damage
  - Pull outs, leaks, and other damage
  - May also need investigation

# Additional Considerations

- Don't forget to consider:
  - Drug and alcohol testing
  - Operator Qualification

# Prevent Recurrence

**§192.617** – Investigation of failures  
.....procedures for analyzing  
accidents and failures..... to  
minimize the possibility of a  
recurrence

# Prevent Recurrence

- Information circulated to appropriate personnel
- Procedure Review
- Data storage for future reference
  - May be months to years before another type failure
  - Allows comparisons to previous failures

# Procedure Review

- Emergency response procedures
- O&M Procedures
- Operator Qualification
- Integrity Management
- Construction
- Purchasing



# Root Cause Analysis

Proper Investigations take time

Rarely is there only one Root Cause  
to a Failure!!

May be failures where the cause  
cannot be determined

# Additional Information

- PHMSA Form 11 –  
Pipeline Failure Investigation Report

*[www.phmsa.dot.gov/pipeline/library/forms](http://www.phmsa.dot.gov/pipeline/library/forms)*



QUESTIONS?