
CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD
SALUS POPULI
EST LEX SUPREMA

# U. S. Chemical Safety Board

# SONAT INVESTIGATION

## Presentation Of Findings to the Board

**Public Board Meeting**

**September 15, 2000**

## Sonat Investigation

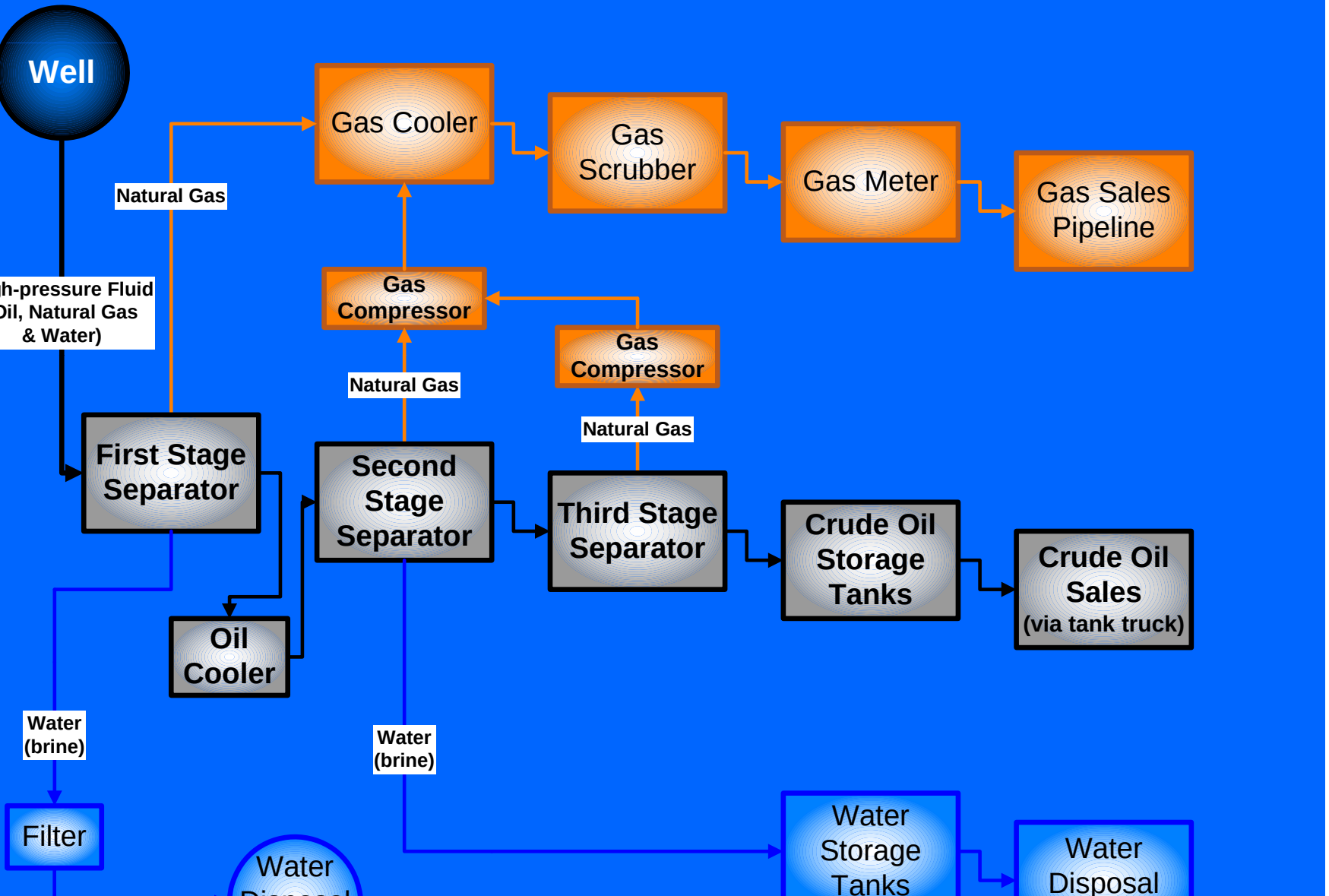
# INTRODUCTION

- March 4, 1998, near Pitkin, LA
- Startup of Oil / Gas Separation Equipment
- Natural Gas Purge of Vessels and Pipeline
- Oil / Gas Separator Overpressurized
- Catastrophic Vessel Failure
- Four Operators Killed

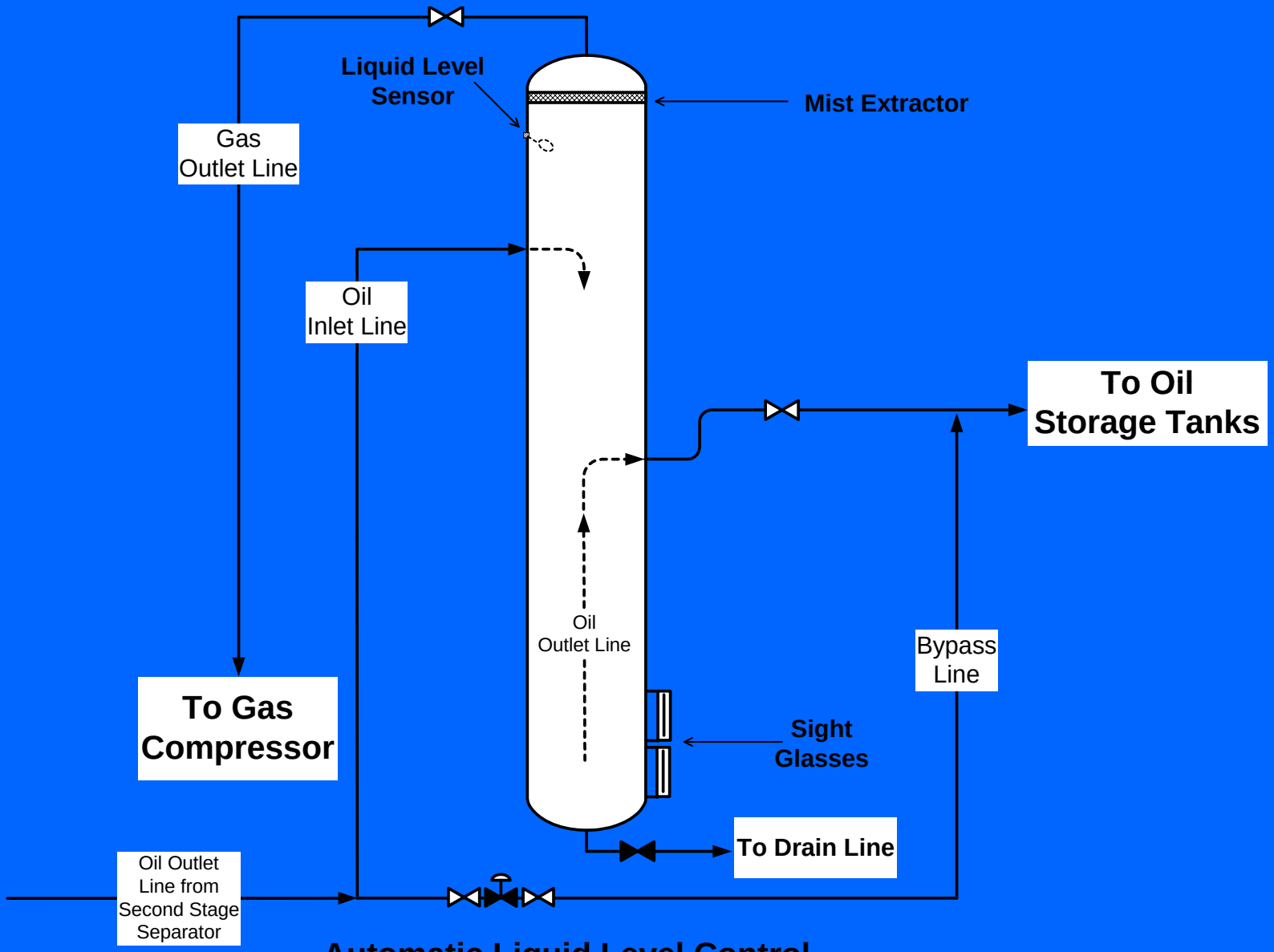
# Aerial View of Sonat's Temple 22-1 Common Point Separation Facility

# Aerial View of Sonat's Temple 22-1 Common Point Separation Facility

# lock Flow Diagram of the Separation Process



# Third Stage Separator Schematic



## Sonat Investigation

# TERMINOLOGY

onat referred to the failed vessel as a
Vapor Recovery Tower" or storage tank

SB determined that the vessel actually fit
he definition of an oil and gas separator

Sonat Investigation

# TERMINOLOGY

eparator had a single inlet line for oil/gas
ixture but two separate outlet lines

eparator was not designed for permanent
il storage

eparator was positioned upstream of the
torage tanks in series with the 1st and 2nd

Sonat Investigation

# INCIDENT TIMELINE

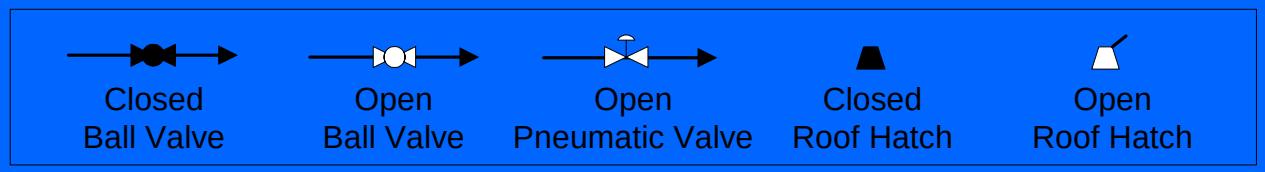
**ARLY AFTERNOON**

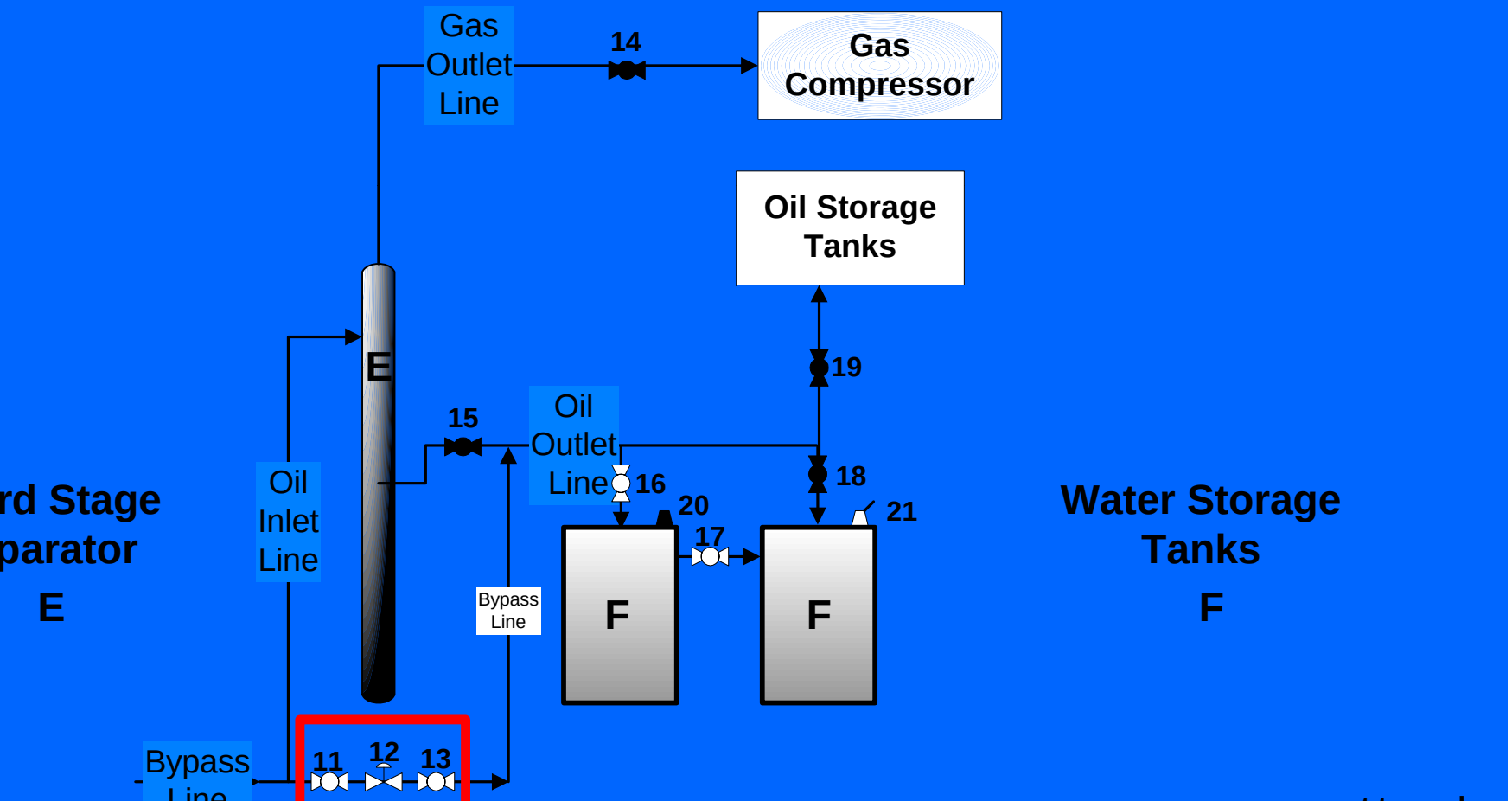
- Separation vessels purged using well fluids

**ATE AFTERNOON**

- Valves realigned to purge pipeline, through a bypass line and two water storage tanks, out a tank roof hatch to the atmosphere

# ended Valve Positions after the Final Alignment



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# INCIDENT TIMELINE

**10 PM** - Pipeline purge initiated using well fluids

**15 PM** - Supervisor initiated monitoring oxygen content in pipeline near header

**35 PM** - Pressure into pipeline increased for the third and final time

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# INCIDENT TIMELINE

**00 PM** - Pressure reading downstream of well and flow control valve was recorded as 800 psig

**10 PM** - Final oxygen reading taken indicating purge nearly completed

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# INCIDENT TIMELINE

**15 PM -** Bulk Train third stage separator failed, natural gas released and ignited producing large fireball

- Four operators killed instantly

- Damaged tanks and piping leak oil and gas which ignites

# Damaged Vehicles and Storage Tanks

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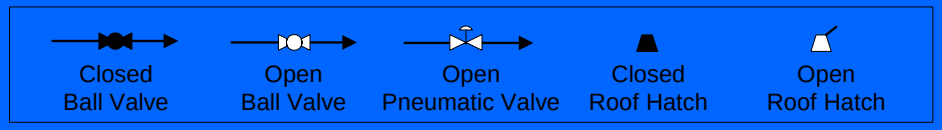
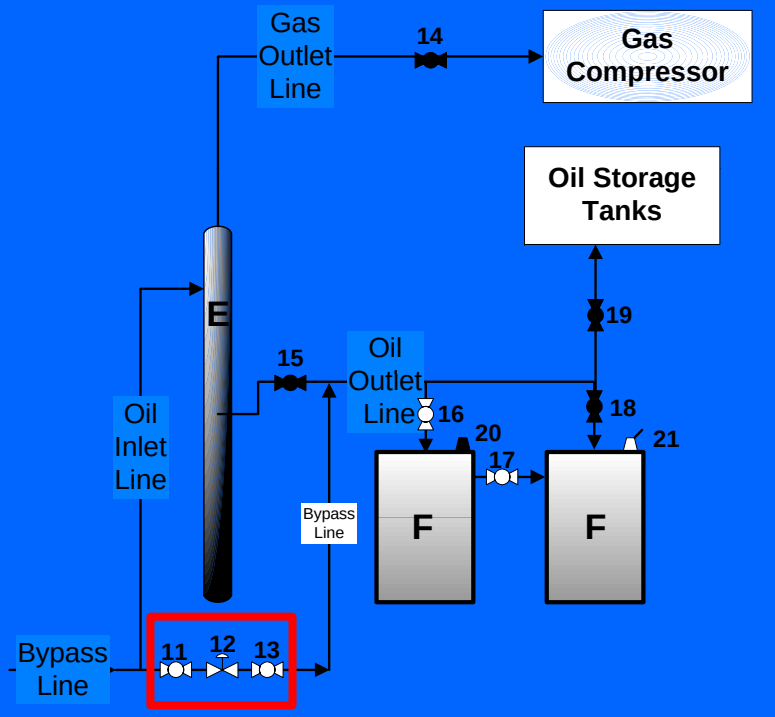
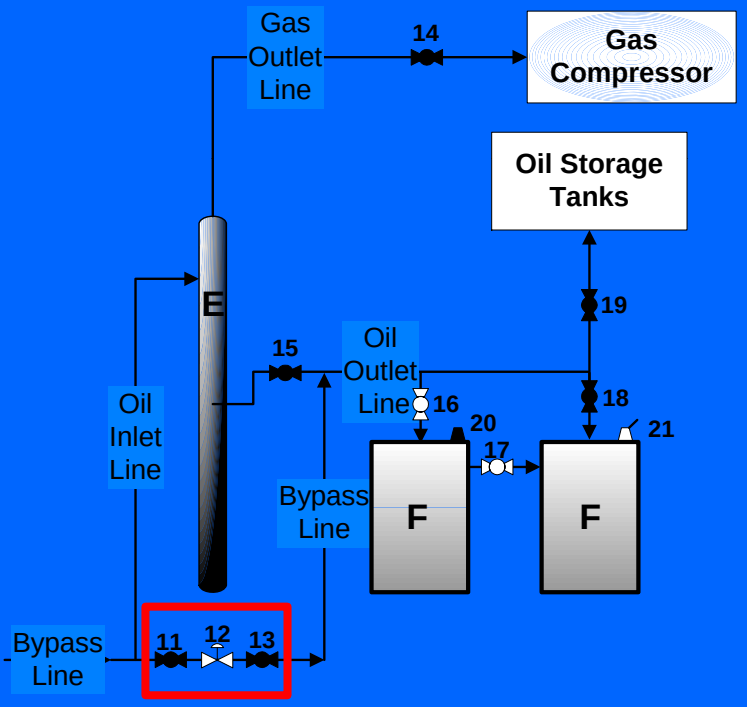
# INCIDENT TIMELINE

**:05 PM** - Sonat supervisors and LA State Police investigated incident site and discovered two bypass valves for the failed third stage separator in the closed position, which should have been open

# Comparison of Valve Alignments as “Planned” and as “Found”



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# KEY FINDINGS

**1:**

The third stage separator that failed could not be isolated from an adjacent bypass line, because there was no inlet valve. Two valves on the bypass line and all other outlet valves were closed allowing high-pressure purge gases to overpressurize and rupture the separator.

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# KEY FINDINGS

## 2:

The third-stage separator was only rated for atmospheric pressure service (0 psig).

The purge gas stream to which the separator was exposed to had a pressure potentially as high as 800 psig.

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# KEY FINDINGS

## # 3:

The third stage separator was not equipped with any pressure-relief devices as specified by API Specification 12J which states “all separators, regardless of size or pressure, shall be provided with pressure protective devices”. The vessel that failed falls within the scope of this specification.

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# KEY FINDINGS

## 4:

Why the bypass valves were closed or when they were closed could not be conclusively established

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# KEY FINDINGS

## 5:

Management did not perform effective engineering design reviews or hazard analyses prior to or during the construction of the facility.

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# KEY FINDINGS

## # 6:

Workers at the facility were not provided with written operating procedures addressing the proper alignment of valves for purging operations.

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# KEY FINDINGS

## 7:

Sonat operated similar third-stage separators that lacked pressure-relief systems at other oil and gas production facilities for over a year prior to the incident.

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