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
Block Flow Diagram of the Separation Process

Well

Natural Gas

First Stage Separator

Oil Cooler

Water (brine)

Second Stage Separator

Third Stage Separator

Gas Cooler

Gas Scrubber

Gas Meter

Gas Sales Pipeline

Gas Sales (via tank truck)

Crude Oil Storage Tanks

Water Storage Tanks

Water Disposal

Filter

Water (brine)

Oil, Natural Gas & Water

High-pressure Fluid
Sonat referred to the failed vessel as a "Vapor Recovery Tower" or storage tank. SB determined that the vessel actually fit the definition of an oil and gas separator.
Sonat Investigation

TERMINOLOGY

Separator had a single inlet line for oil/gas mixture but two separate outlet lines.

Separator was not designed for permanent oil storage.

Separator was positioned upstream of the storage tanks in series with the 1st and 2nd.
INCIDENT TIMELINE

EARLY AFTERNOON
- Separation vessels purged using well fluids

LATE AFTERNOON
- Valves realigned to purge pipeline, through a bypass line and two water storage tanks, out a tank roof hatch to the atmosphere
Extended Valve Positions after the Final Alignment

- Closed Ball Valve
- Open Ball Valve
- Open Pneumatic Valve
- Closed Roof Hatch
- Open Roof Hatch

Gas Compressor

Oil Storage Tanks

Water Storage Tanks

Diagram includes lines and labels for Gas Outlet Line, Oil Inlet Line, Oil Outlet Line, and Bypass Line.
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
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
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
0:05 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”
KEY FINDINGS

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.
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.
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.
# 4:
Why the bypass valves were closed or when they were closed could not be conclusively established
Management did not perform effective engineering design reviews or hazard analyses prior to or during the construction of the facility.
Workers at the facility were not provided with written operating procedures addressing the proper alignment of valves for purging operations.
Sonat Investigation

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.
U. S. Chemical Safety Board

SONAT INVESTIGATION

Presentation Of Findings to the Board

Public Board Meeting