



'Integrert fartøyssystem for behandling mot avleiring'

'Vessel integrated Scale Squeeze system'

Agenda

- Introduction
- Scale Treatment
- Main System
- Tank Systems
- Support systems
- RFO



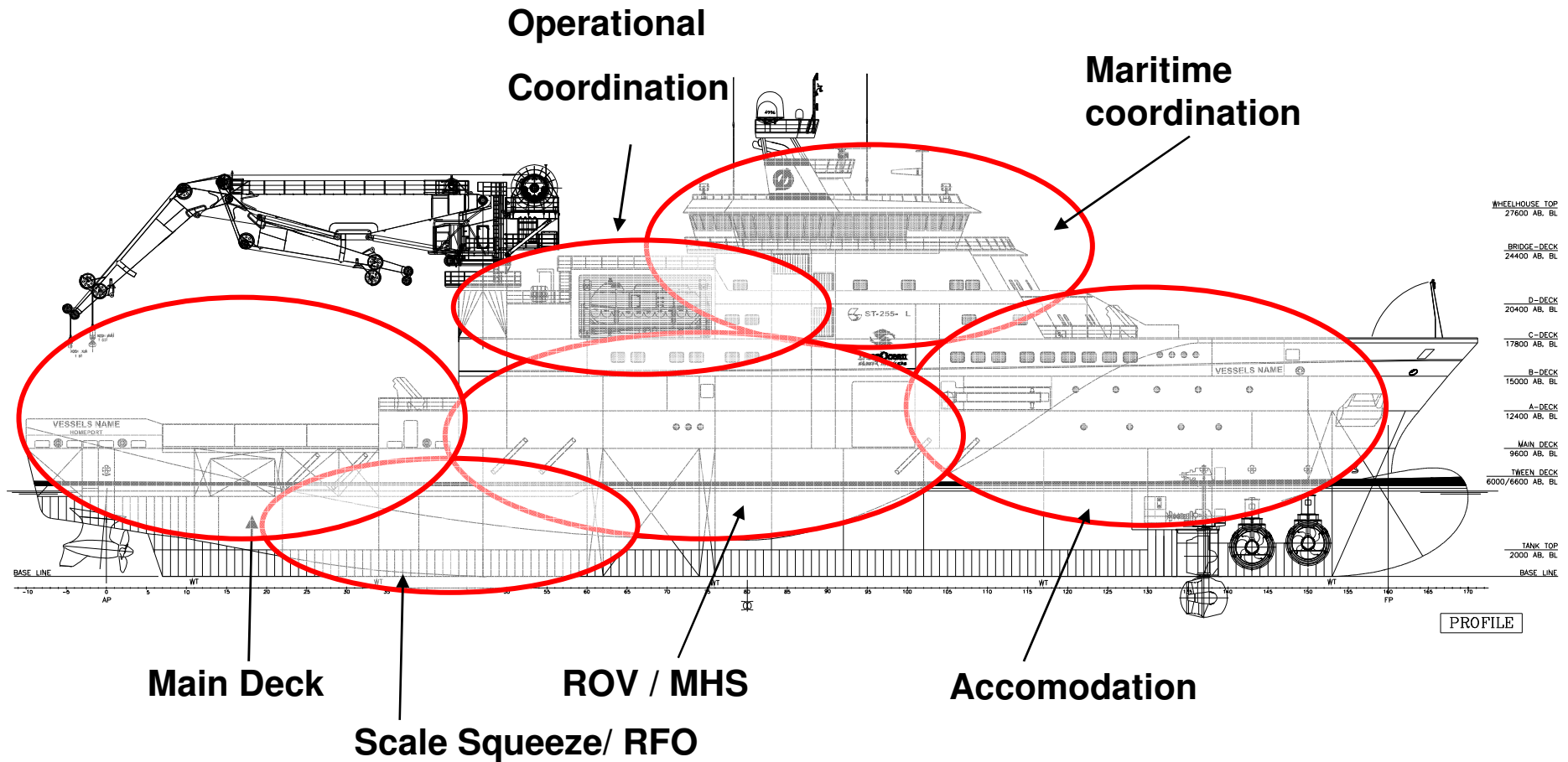


Stavanger 31.01.08 – Vessel integrated Scale Squeeze system

Vessel

- Newbuild - IMR Vessel Edda Fauna
- Østensjø Rederi
- Main properties:
 - Length o.a.: 108.70 m
 - Width: 23.00 m
 - Design draft: 6.50 m
 - Velocity: 15.0 knots+
- Integrated systems
 - 2 off Kystdesign Supporter WROV systems
 - 1 off Super Mohawk OBSROV system
 - Built-in MHS
 - Scale Squeeze/RFO system
- Accomodation for 90 people in 65 cabins

Vessel



Scale Squeeze/RFO



Pump room



Cargo rail manifold

Project

- IMR contract with StatoilHydro
- Scale Treatment operations an important part of the contract
- Scale treatment operations requires large spread and substantial mobilisation time and cost for
- Estimated 60-90 vessel days on Scale squeeze operations in 2008

Previous Operations



Goal for future operations...



Scale Squeeze



Introduction

Scale Squeeze

Main System

Tank Systems

Support Systems

RFO

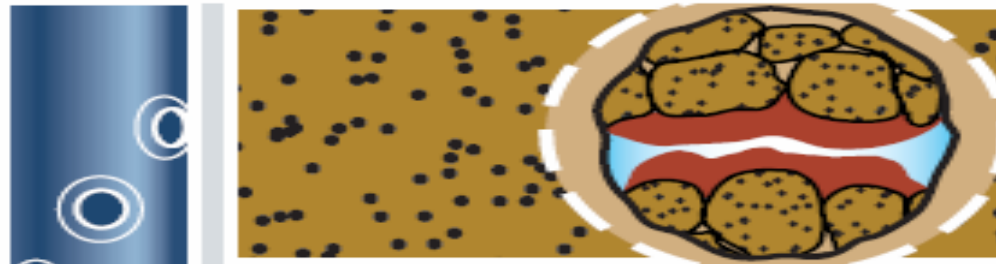
Stavanger 31.01.08 – Vessel integrated Scale Squeeze system

Scale

- A deposit or coating formed on the surface of metal, rock or other material
- Occurs when the saturation of produced water is affected by changing temperature and pressure or other conditions
- Creates significant restrictions to flow, and even plugs in severe conditions
- Typical scales in the oil and gas industry are calcite, calcium sulfates and barite



Scale cont.



- Reservoir clogged with scale



- Injection of scale dissolver and scale inhibitor



- Scale dissolver is backflowed while inhibitor is left in the reservoir

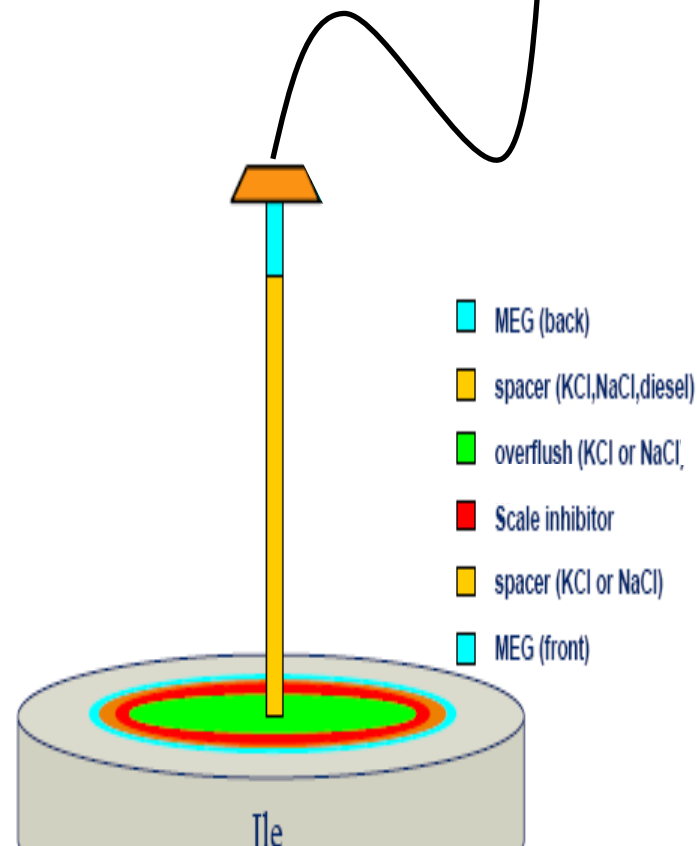
Scale treatment

- Tubing cleaning
- Scale dissolver
- Scale inhibitor squeeze
- Other related treatments like sand consolidation etc.

Scale treatment cont.

- Mobilisation
- Arrive at location
- Install ETC/modified choke bridge if required
- Deploy hose
- Establish steep/lazy wave configuration on hose
- Connect 3” HP connector to manifold or well
- Start pumping of chemicals

Scale squeeze



Main System



Introduction

Scale Squeeze

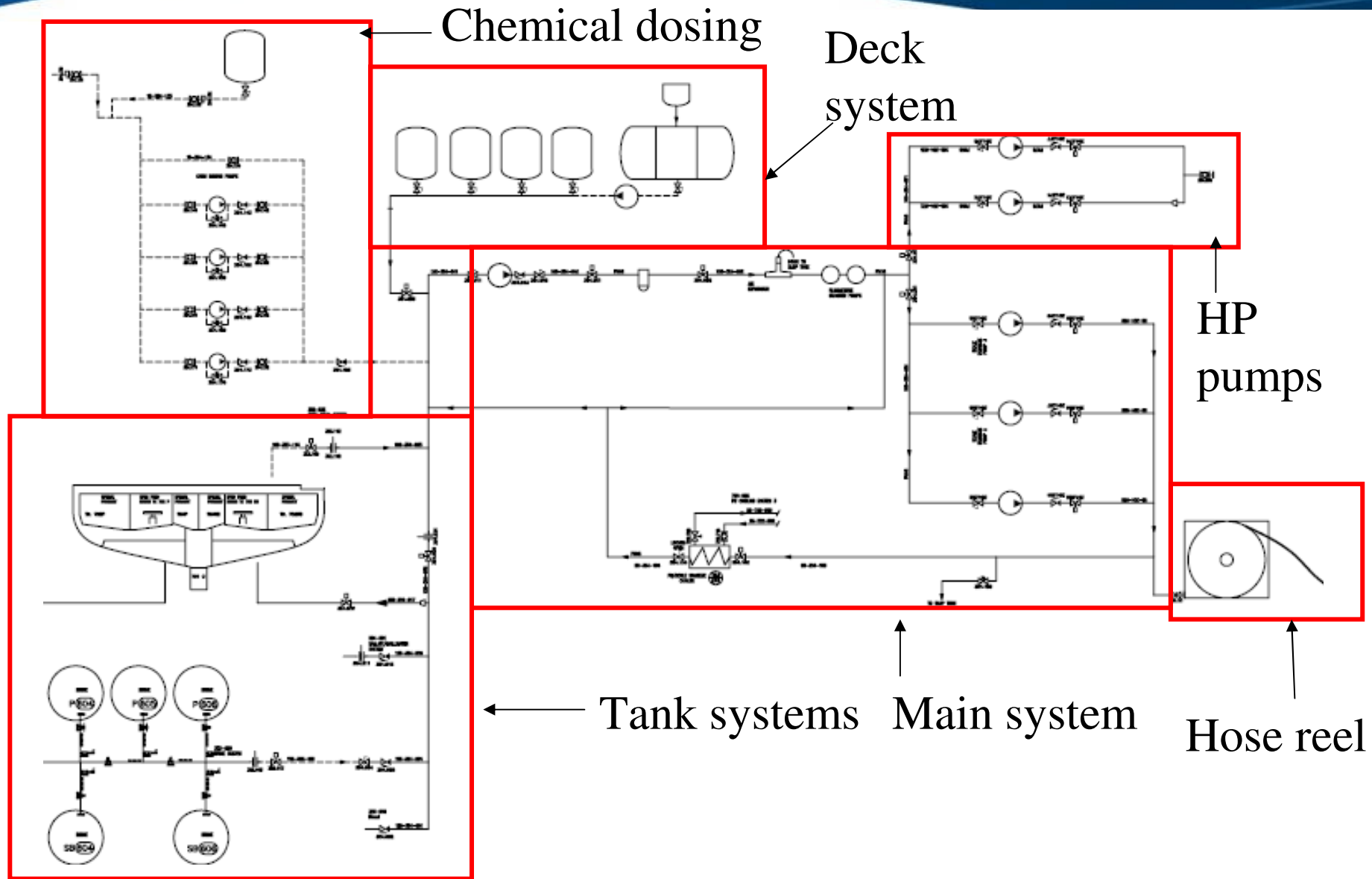
Main System

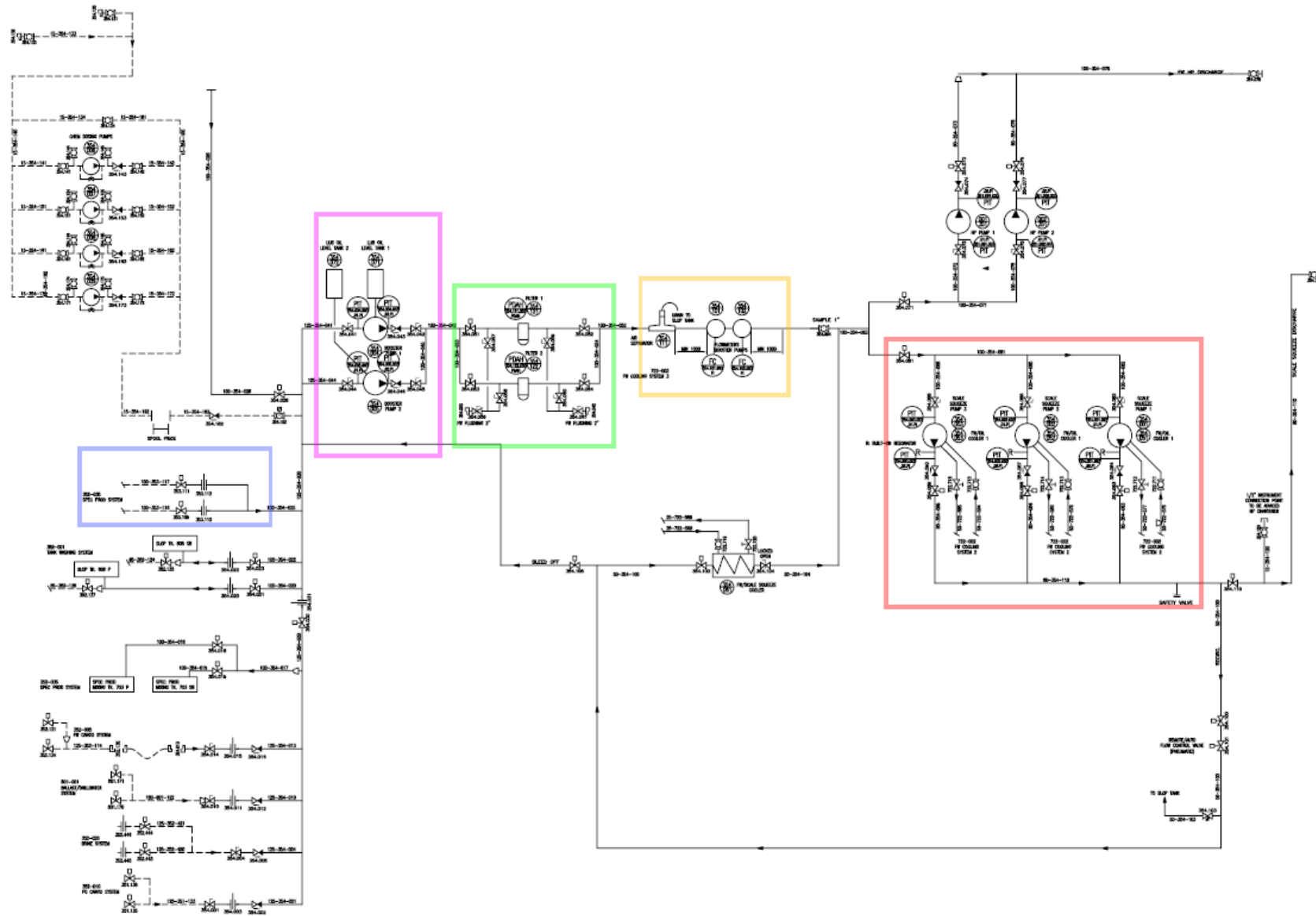
Tank Systems

Support Systems

RFO

Stavanger 31.01.08 – Vessel integrated Scale Squeeze system





Introduction

Scale Squeeze

Main System

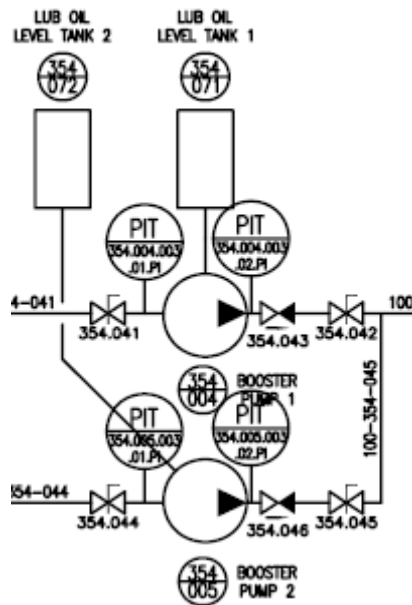
Tank Systems

Support Systems

RFO

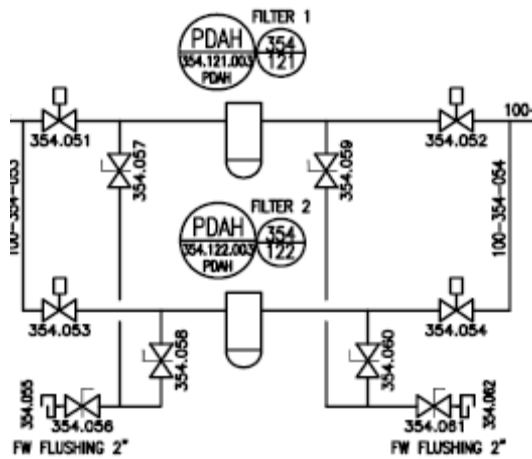
Stavanger 31.01.08 – Vessel integrated Scale Squeeze system

Booster pumps



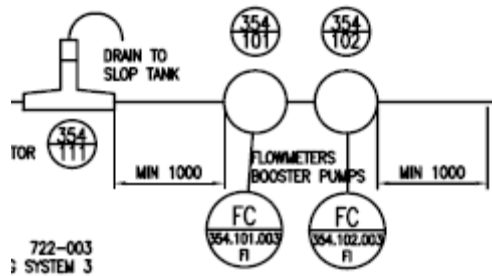
5.6 Bar discharge pressure
2 x 100 % capacity (75 m³/h)

Filters



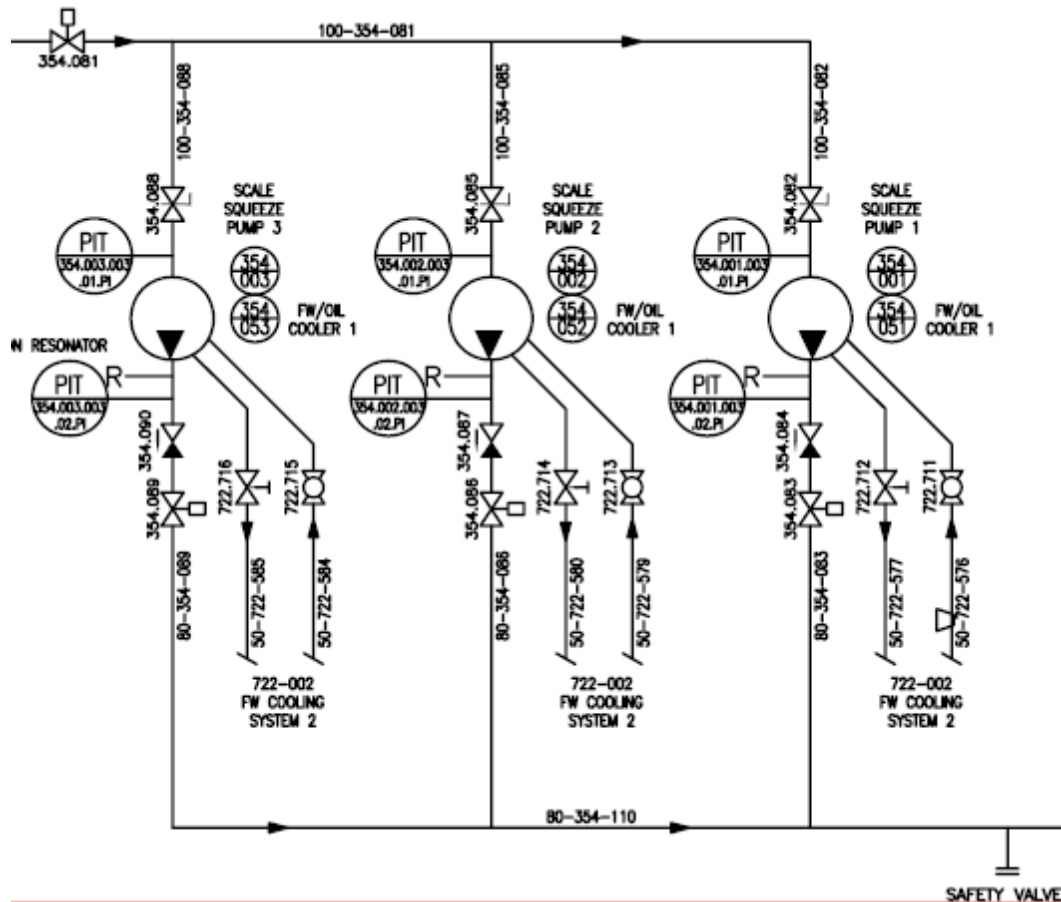
”Bucket filters”
2 x 100 % capacity

Flowmeters



Ultrasound metering allowing flowmetering of "all" liquids
2 x 200 % capacity (150 m³/h)

Scale Squeeze pumps

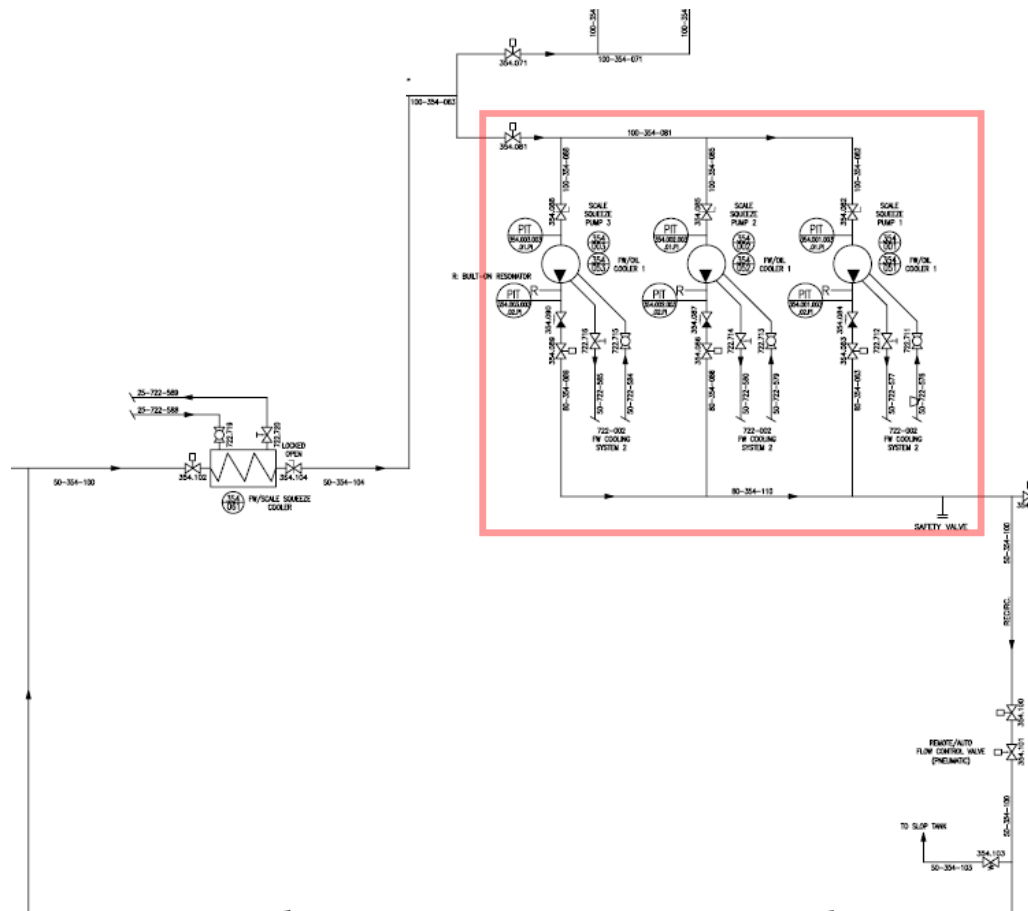


- 1100-1300 l/m
- 690 Bar/10.000 PSI
- 3 x 50 % capacity
- Hydraulic pumps with possible autostop
- Built in resonator

Scale Squeeze pumps cont.



Minimum flow protection loop



- Ensures that enough fluid is circulated to keep the pumps going at minimum RPM

- Cooler burns off the energy added by the pumps during recycling

Tank systems



Introduction

Scale Squeeze

Main system

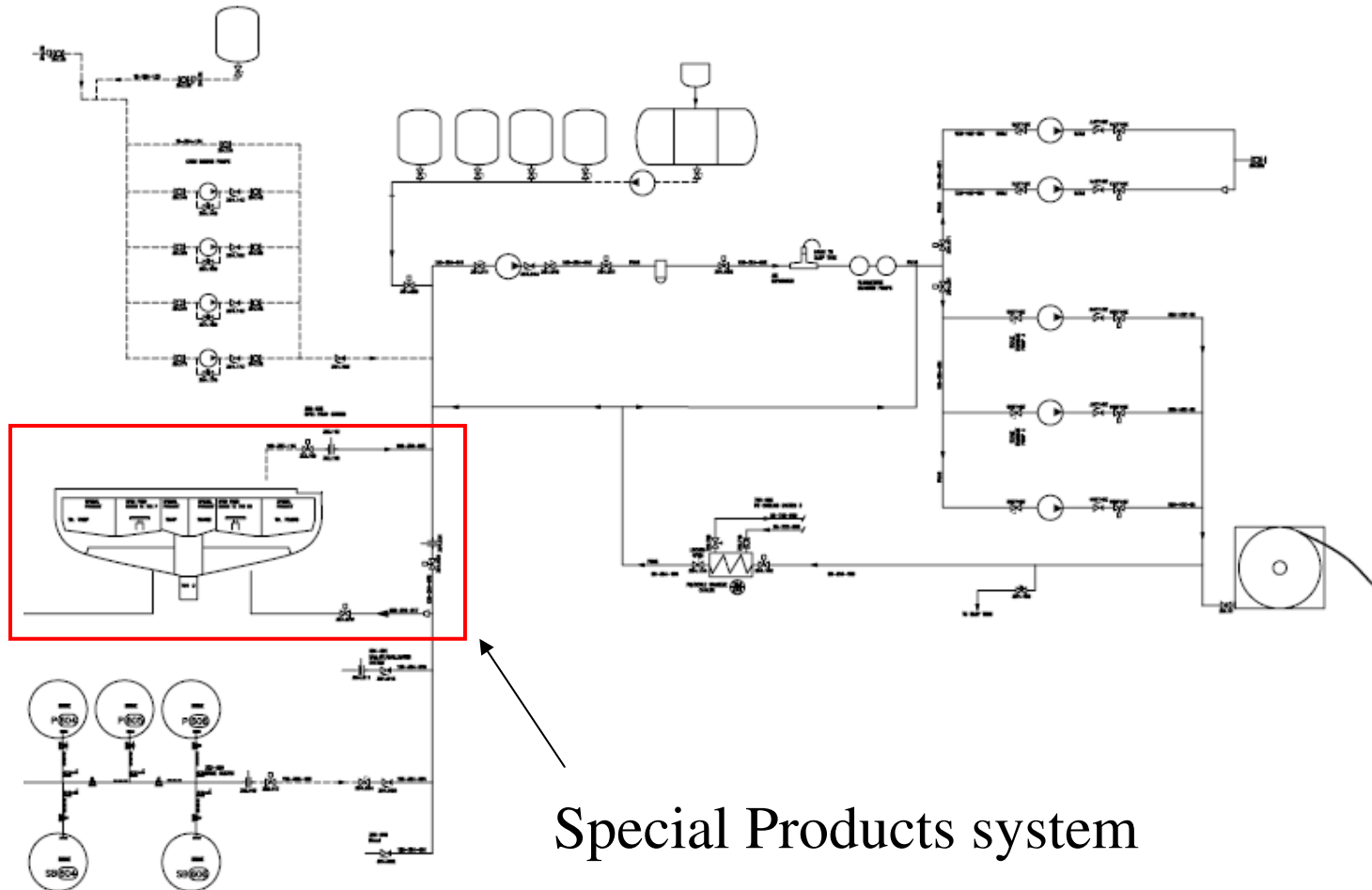
Tank Systems

Support Systems

RFO

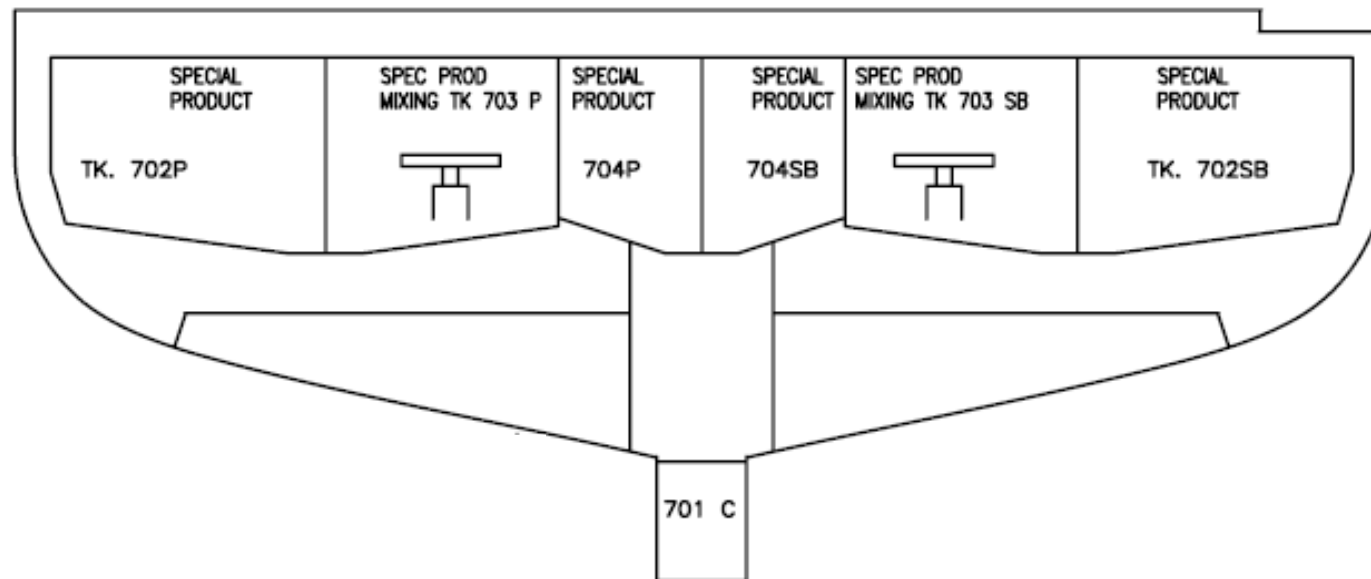
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Special products system



Special Products system

Special products system cont.



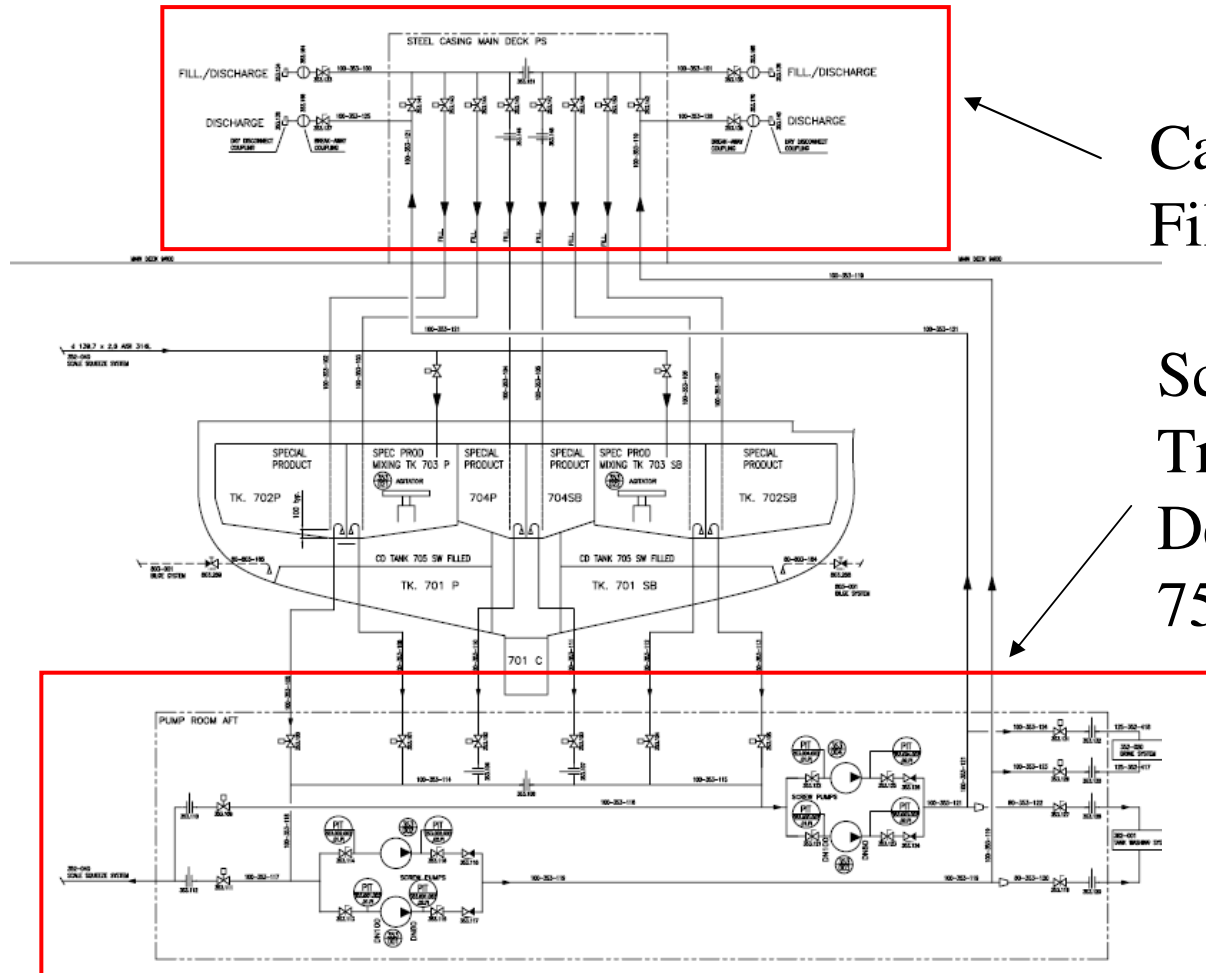
2 off 64,8m³ mixing tanks

4 off storage tanks (total of 175,4m³)

All stainless steel (AISI 316L)

Integrated tank washing system

Special products system cont.

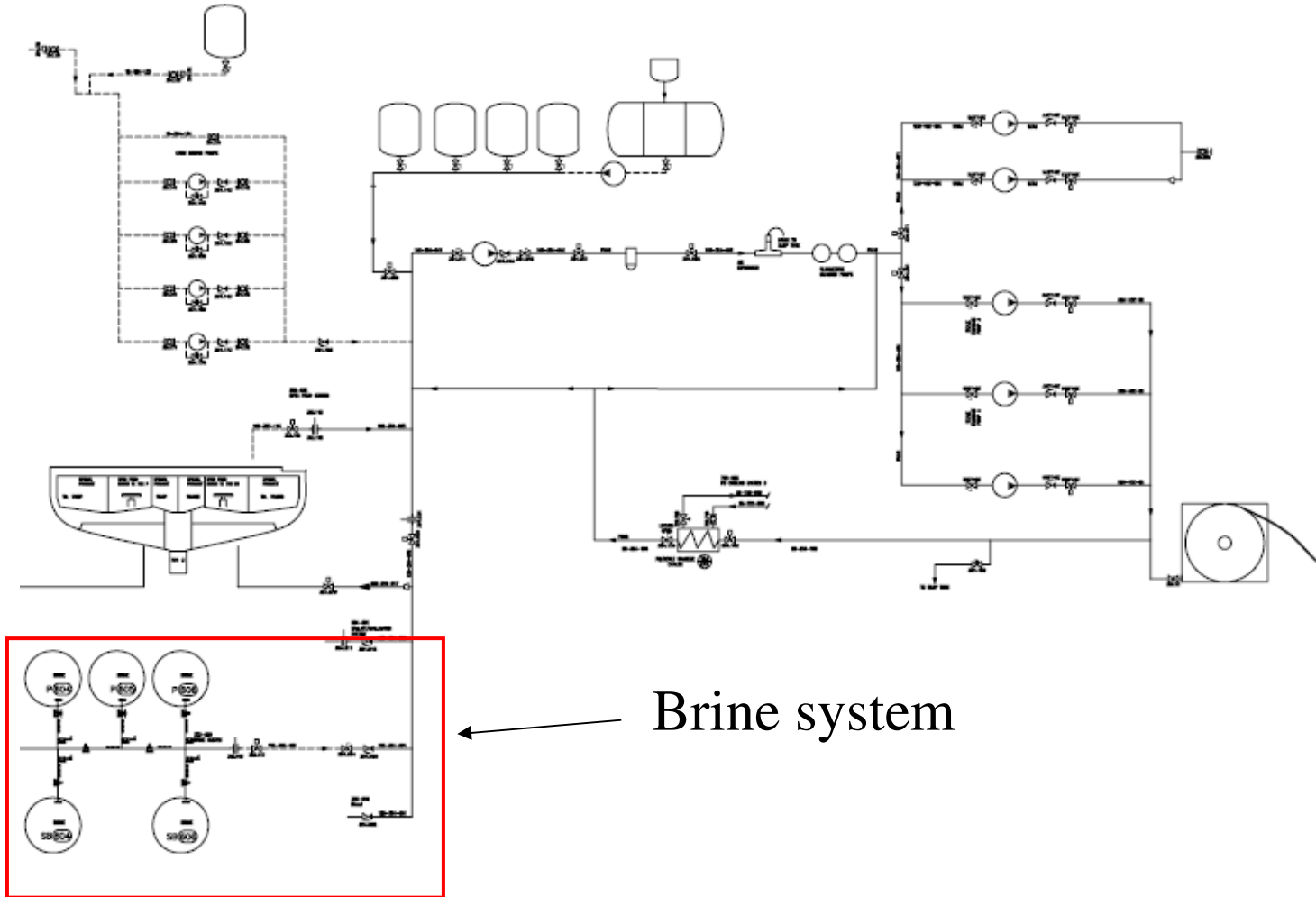


Cargo rail manifold
Fill/discharge of tanks

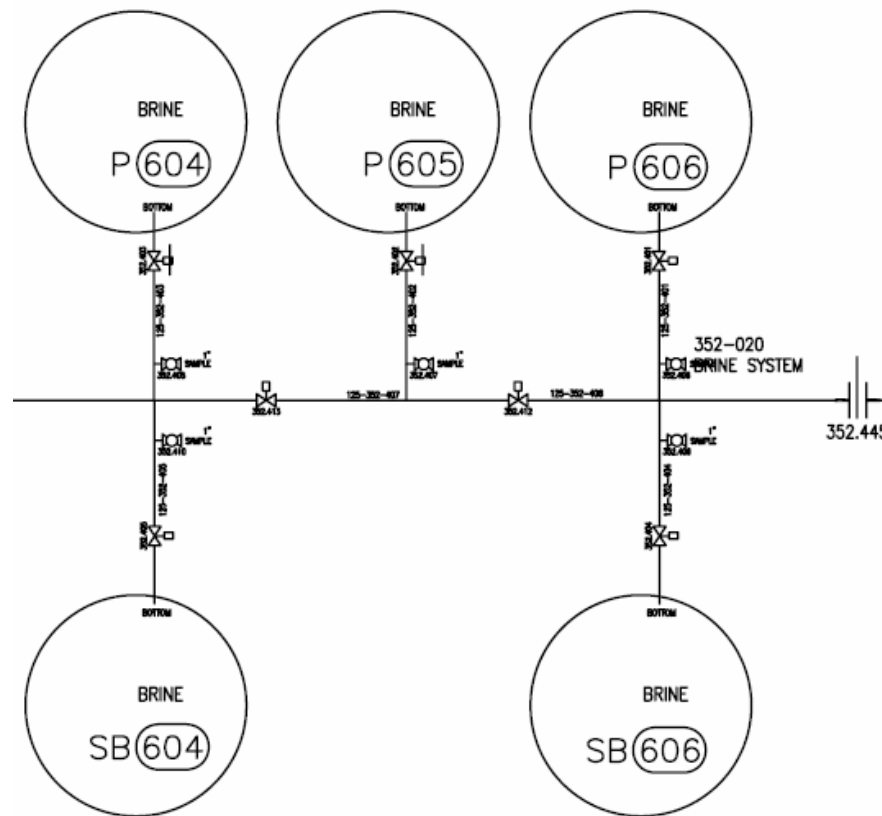
Screw pumps
Transfer of liquid
Delivery to main system
75 m³/h @ 9 Bar



Brine system



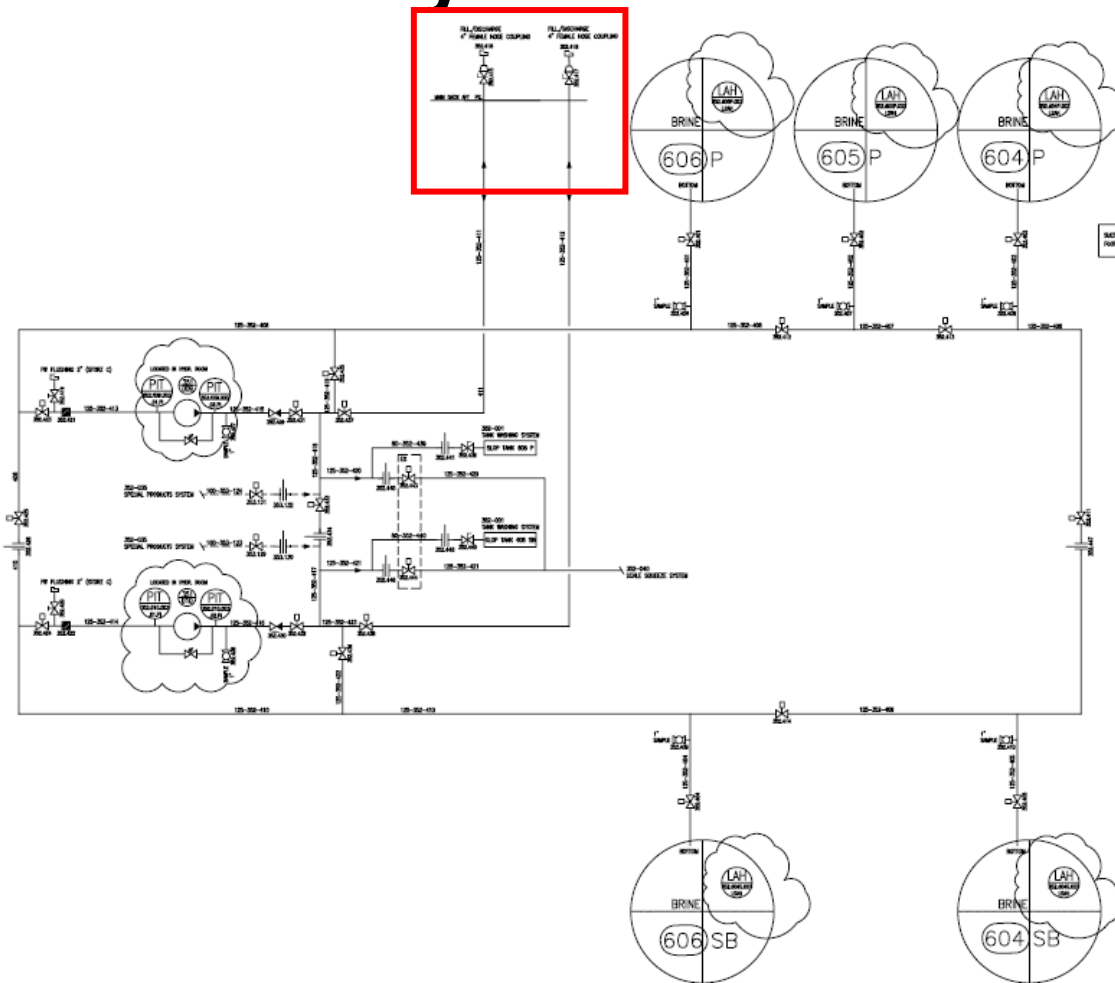
Brine system cont.



Total storage capacity of 483m³

Coating compatible with Statoil specified chemicals (SA1820, SD250, BioPac etc)

Brine system cont.



Brine Cargo pumps
125 m³/h @ 18 bar

Cargo rail manifold
fill/discharge

Cargo rail manifold



Support Systems



Introduction

Scale Squeeze

Main system

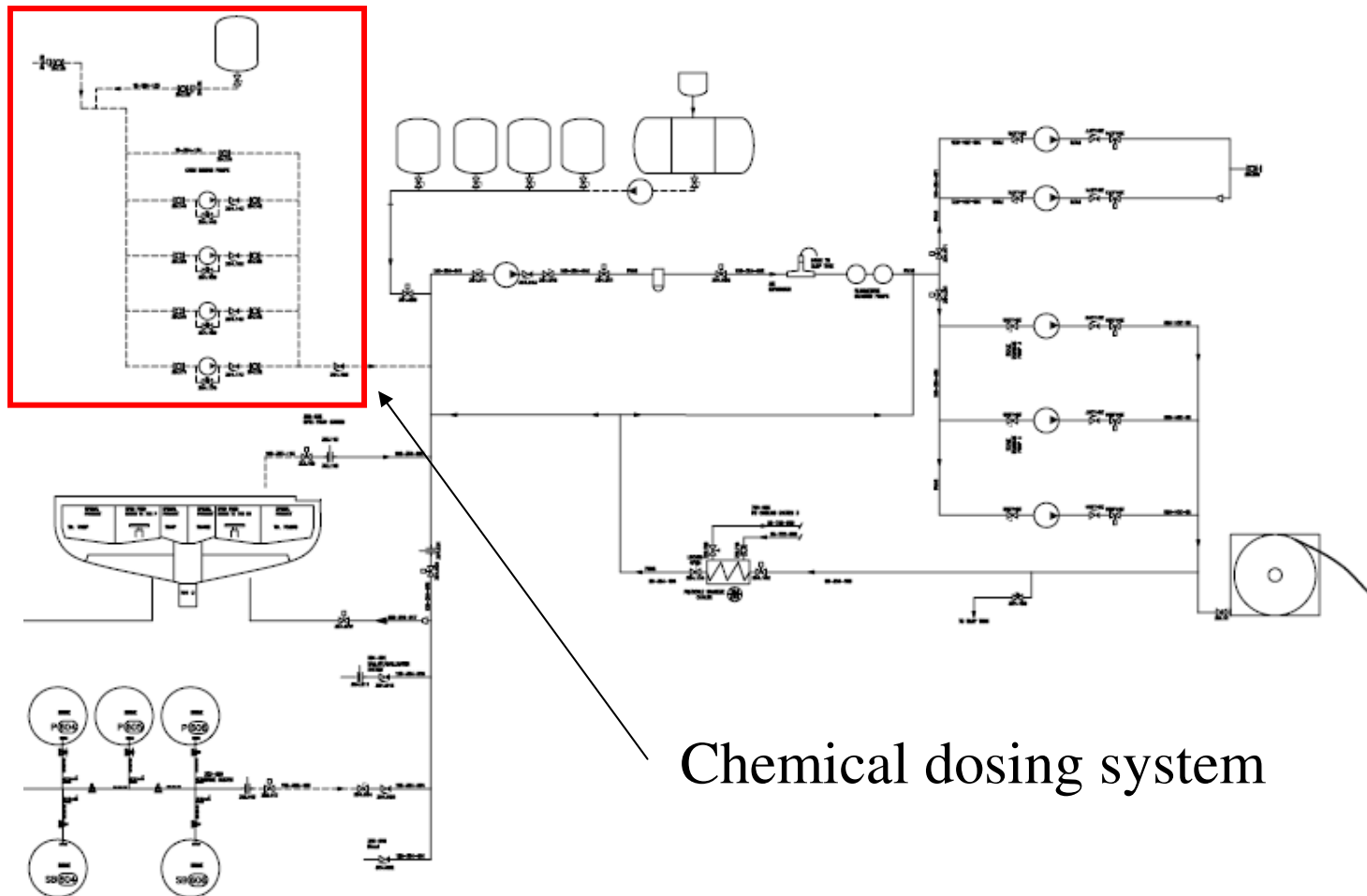
Tank Systems

Support Systems

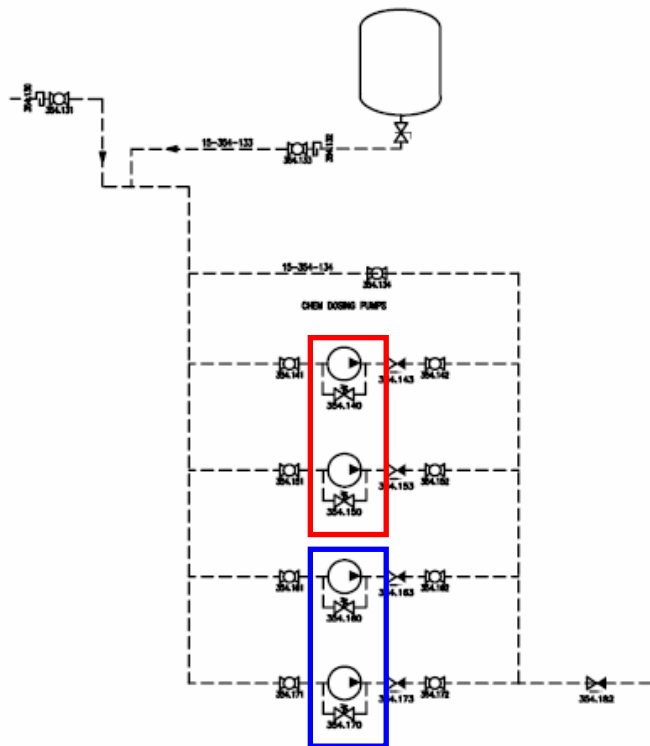
RFO

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Chemical dosing system



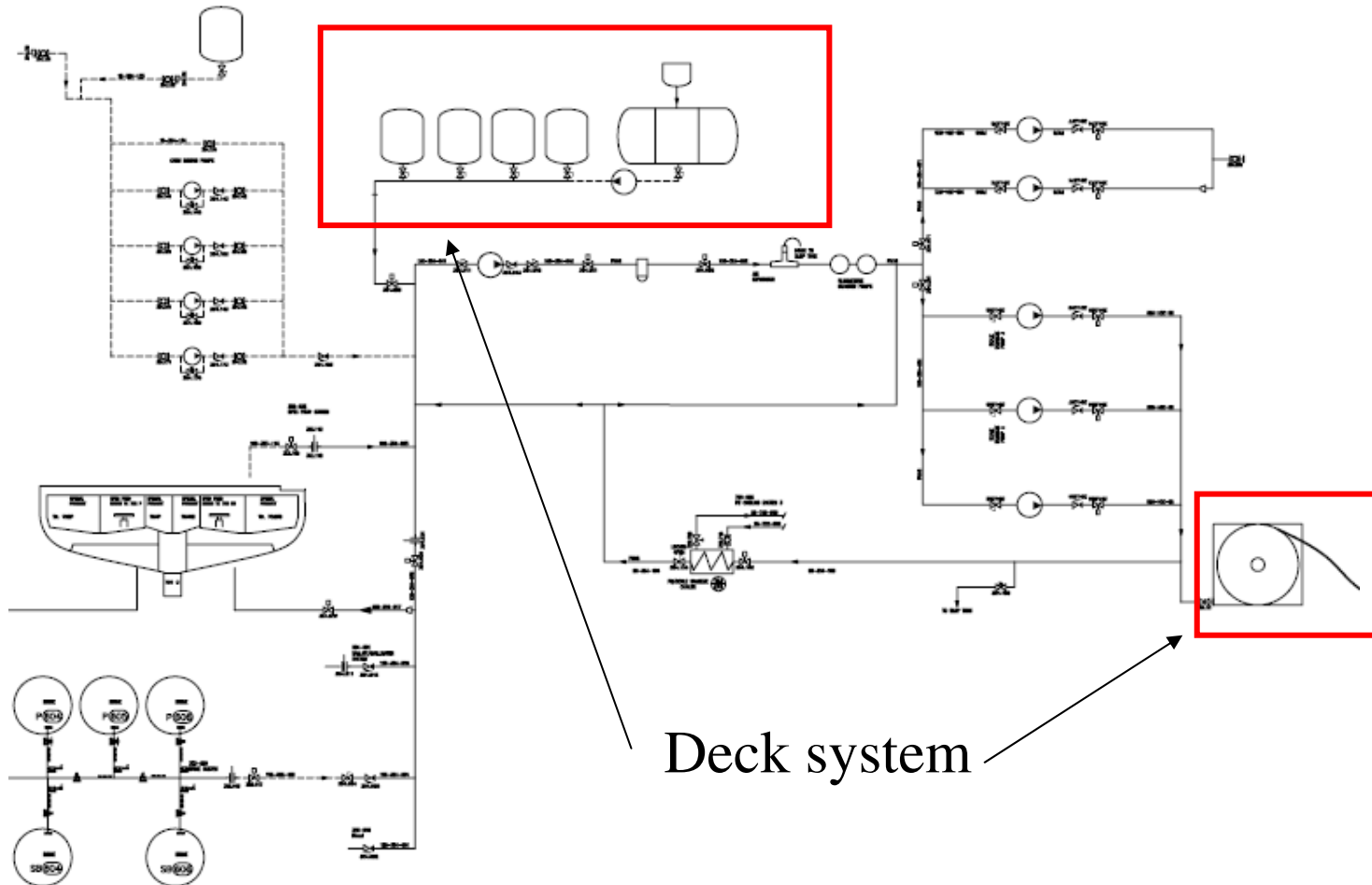
Chemical dosing system cont.



- 0-100 l/h (~1 ‰)
- 100-1000 l/h (~1 ‰)
- All stainless steel (AISI 316L)
- Connection points in cargo rail manifold and in cargo hold
- Bypass of pumps if required



Deck system



Deck tanks



- 4” line from deck to suction side of booster pump
- All stainless steel (AISI 316L)
- Extra pumps and/or manifolds as required

Hose reel and HP system

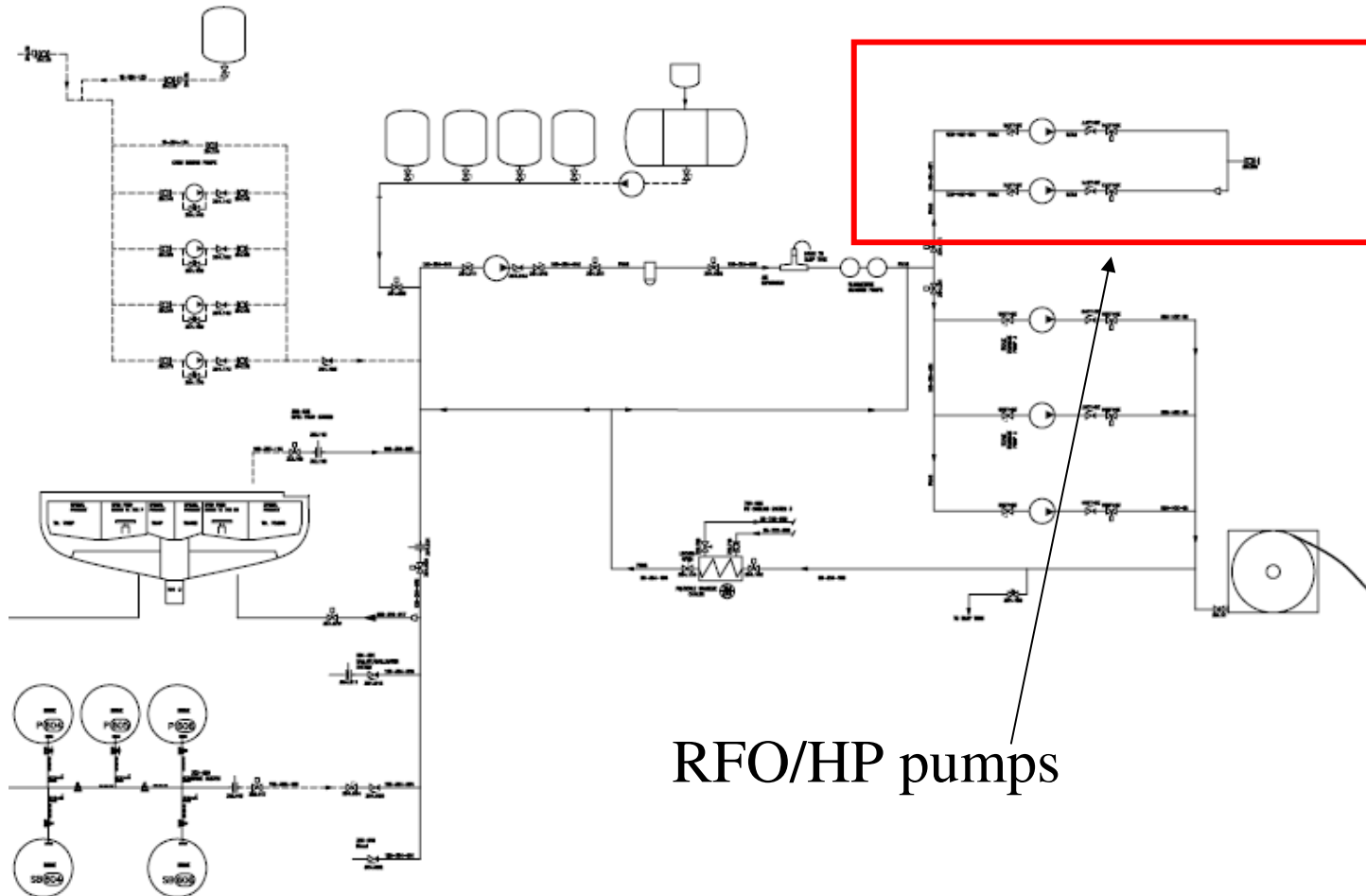


- Black Eagle hose
- 50mm ID - 690 Bar
- 3" 517 Bar HP connector
- Subsea check valve and bleed off assembly
- Emergency hose cutter
- Rigid piping from the SS outlet in Cargo rail manifold

RFO

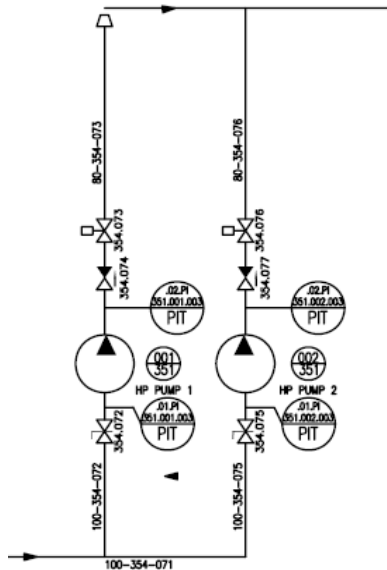


RFO/HP pumps



RFO/HP pumps

RFO/HP pumps cont.



60 Bar

2 x 100 % capacity (60 m³/h)

Outlet in cargo rail manifold