

An Example Processing
Plant Hot Water Supply
Ammonia Heat Pump
Modelled for New Industrial
Plant Integration

Mike Odey

- Presently there is commercially available a semi standalone Ammonia Hot Water Generating Heat Pump
- This system is designed to be implemented as part of an integrated ammonia refrigeration system
- Most / all food processing sites have a requirement for processing and cleaning hot water

Anhydrous Ammonia (NH₃)

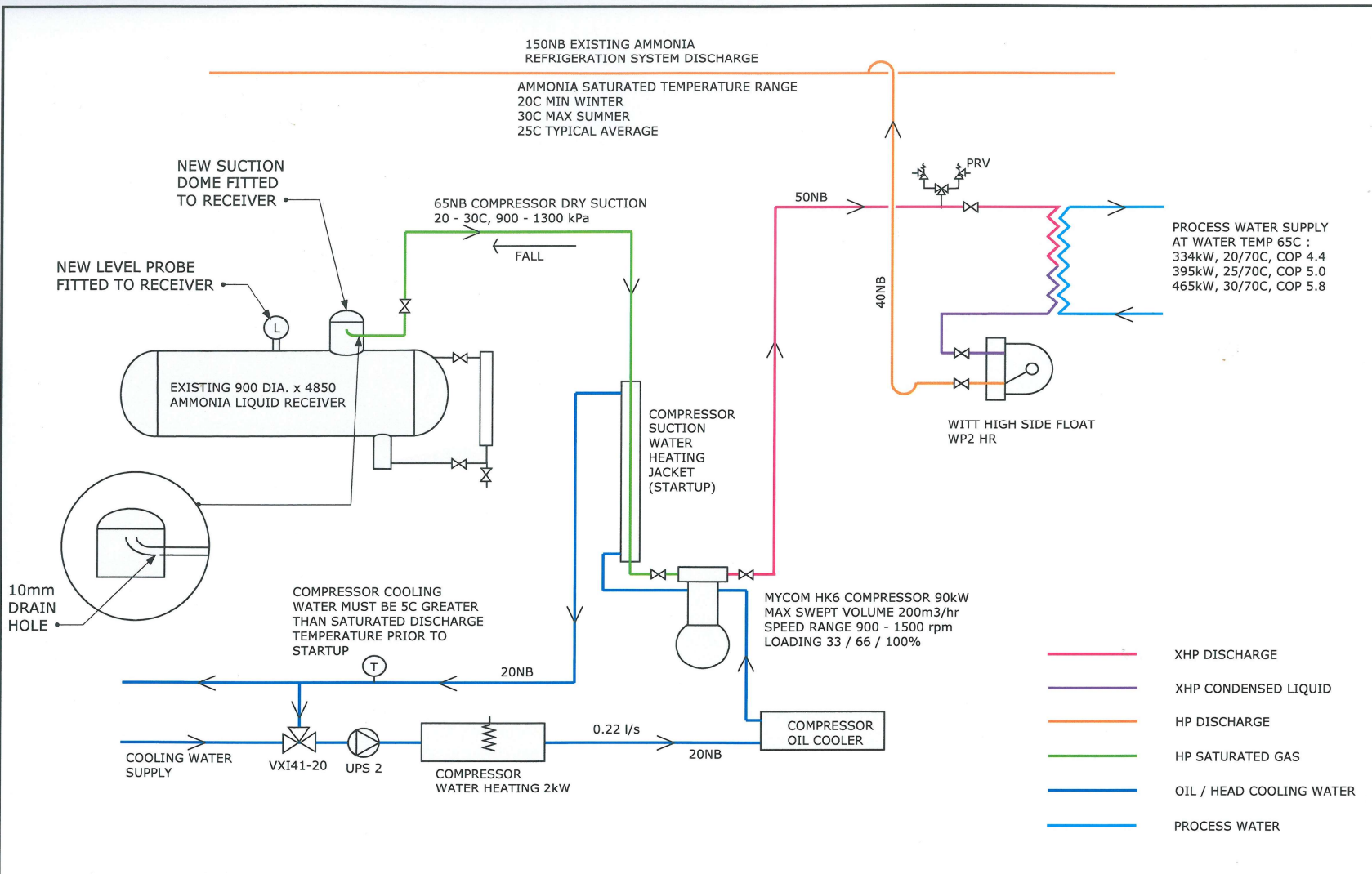
- Has an ODP (Ozone Depletion Potential) of 0
- Has a GWP (Global Warming Potential) of 0
- Is an effective and efficient refrigerant
- Is toxic and flammable

Additional Refrigeration System Components

- High Pressure Compressor (Mycom HK6)
- Plate & Shell Heat Exchanger (PSHE)
- Refrigerant Flow Control Float (HP Float Valve)

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2			
1	1/11/2019	DETAIL ADDED	
No.	Date	Revision Description	Drawn

**AMMONIA HOT WATER HEAT PUMP
SCHEMATIC DIAGRAM
OVATION WAIPUKURAU**

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Scale : NTS
Drawing Number : 19100
Date : 1.03.19 Revision : 1



IP 1

LP 3





Condenser



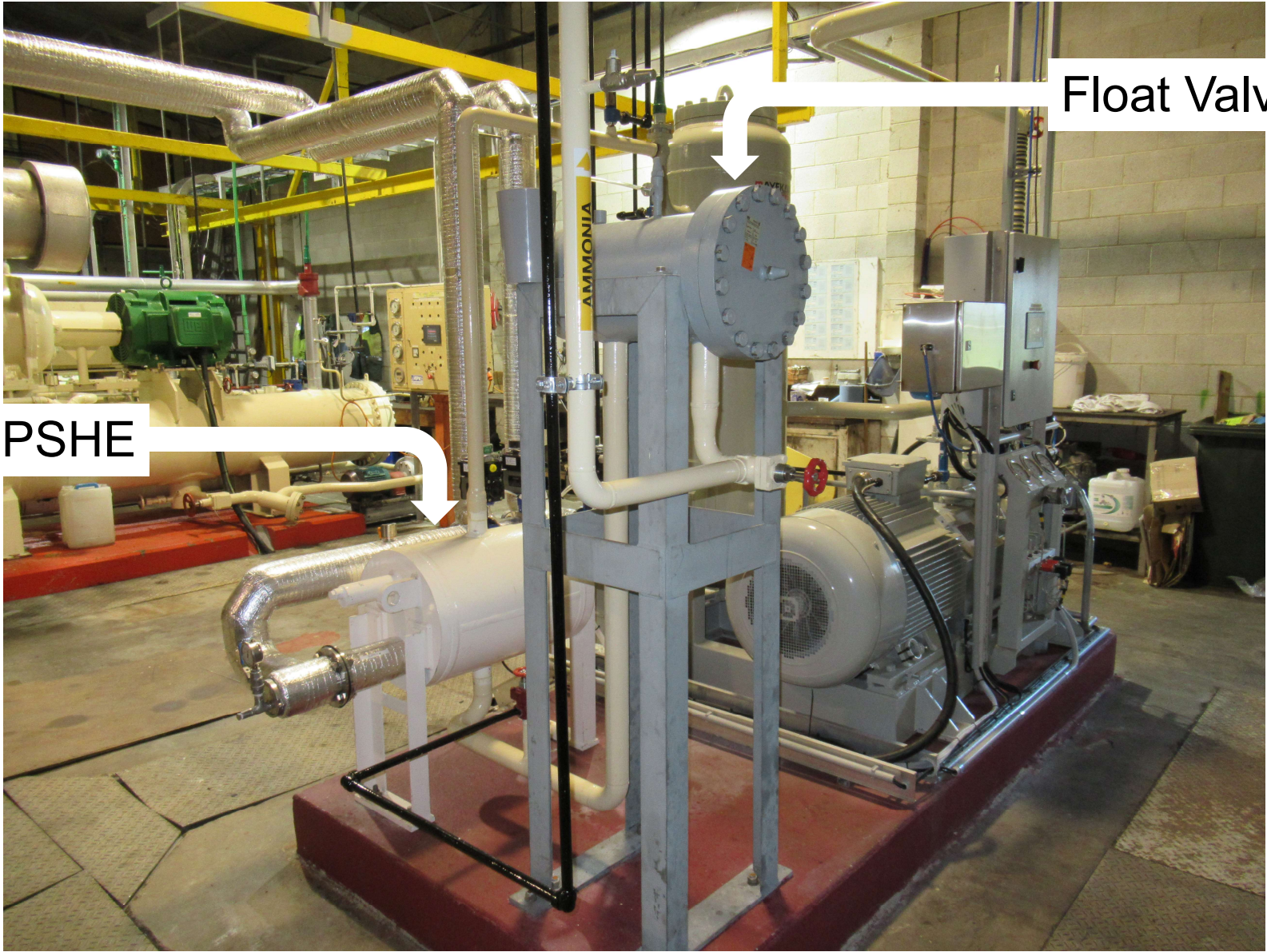
LIQUID RECEIVER

PURGE

ORICA



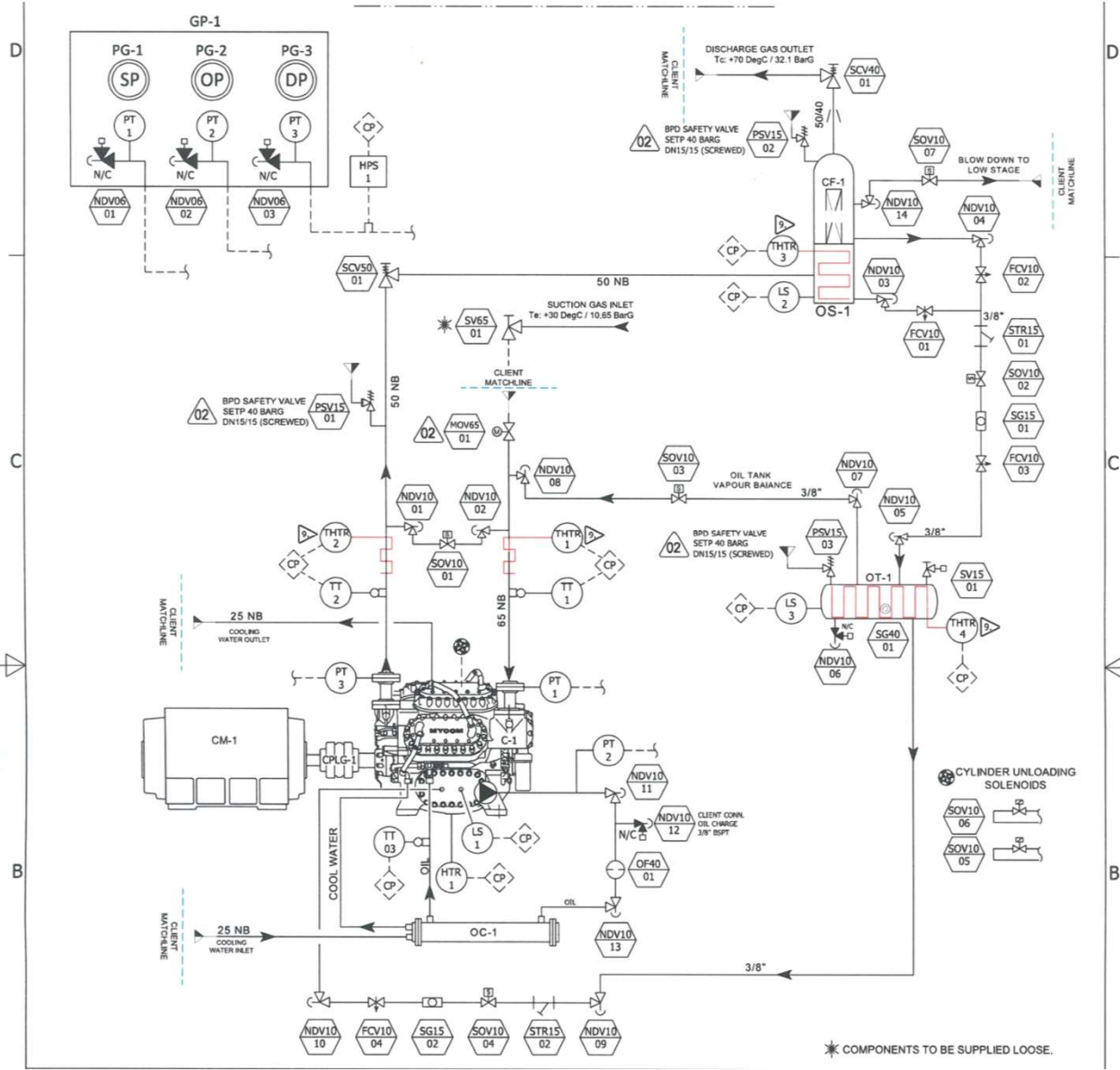
Compressor

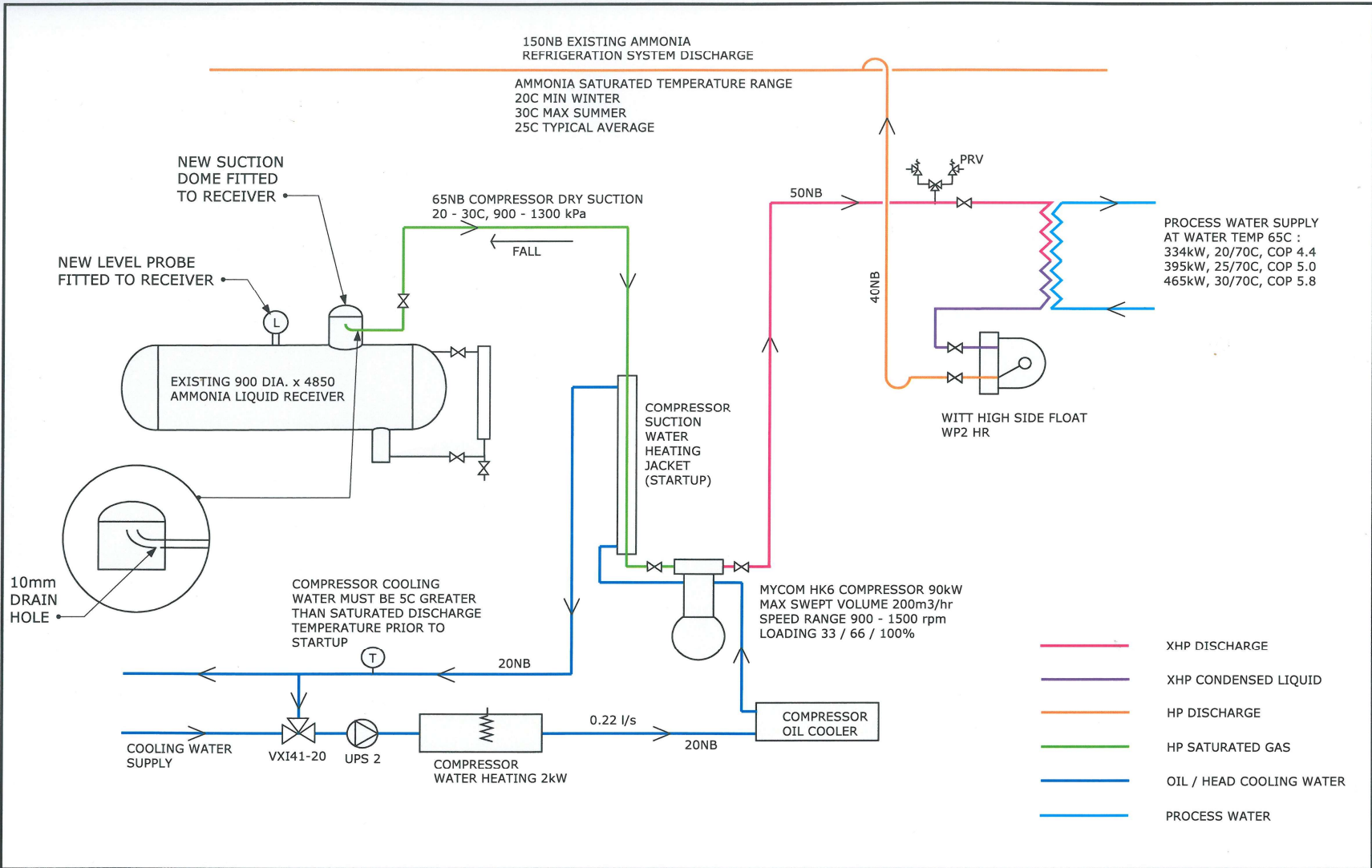


Float Valve

PSHE







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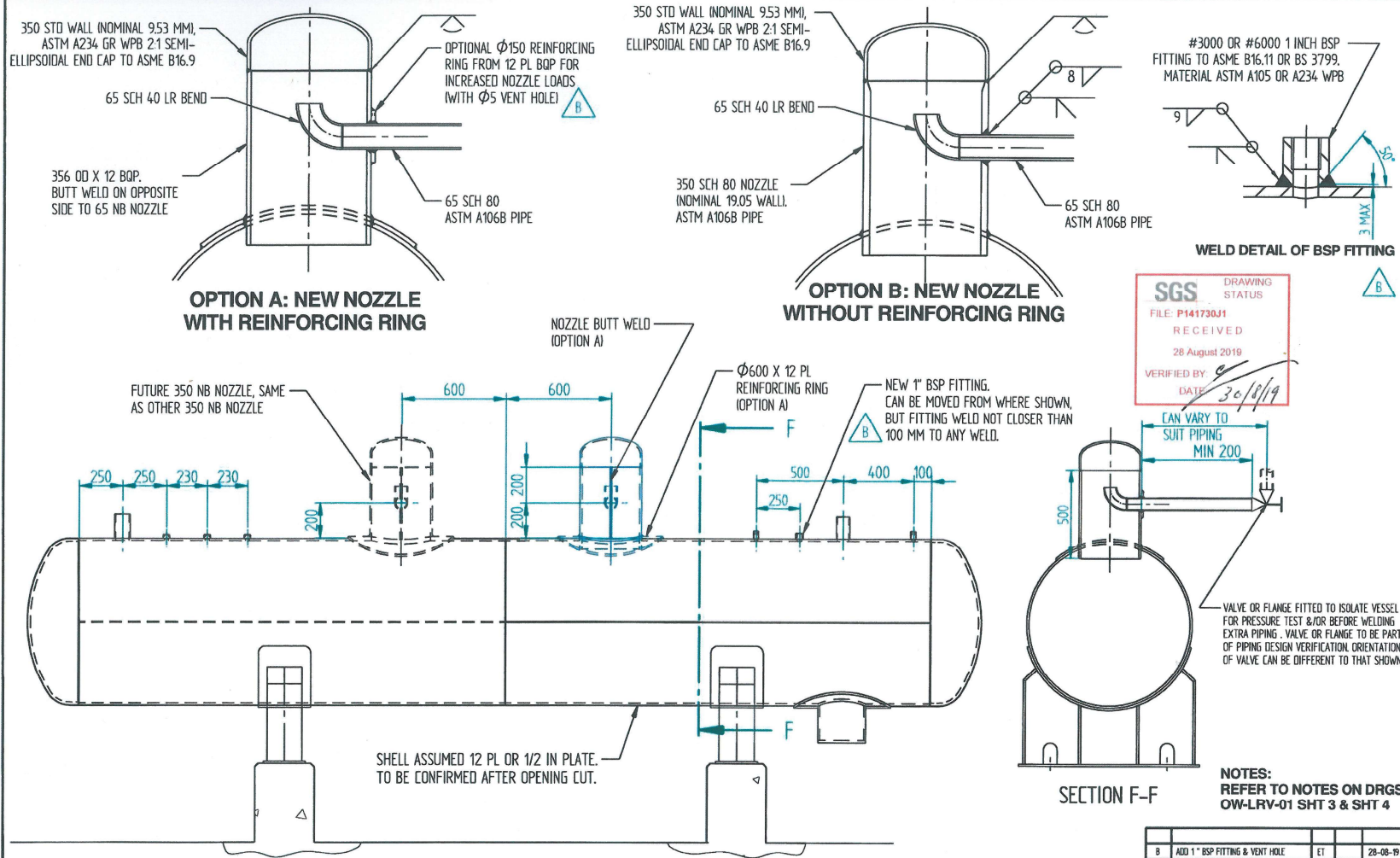
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New
Dome

LIQUID RECEIVER



SGS DRAWING STATUS
 FILE: P141730J1
 RECEIVED
 28 August 2019
 VERIFIED BY: [Signature]
 DATE: 30/8/19

Size: A3
Ovation Waipukurau R717 Liquid Receiver
O.N. 121846 New 350 NB Nozzles & Nozzle Loads

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Drawn: ET
 Date: 29-07-19
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 FILE NAME: OV-LR-200-01 Rev 7.dft

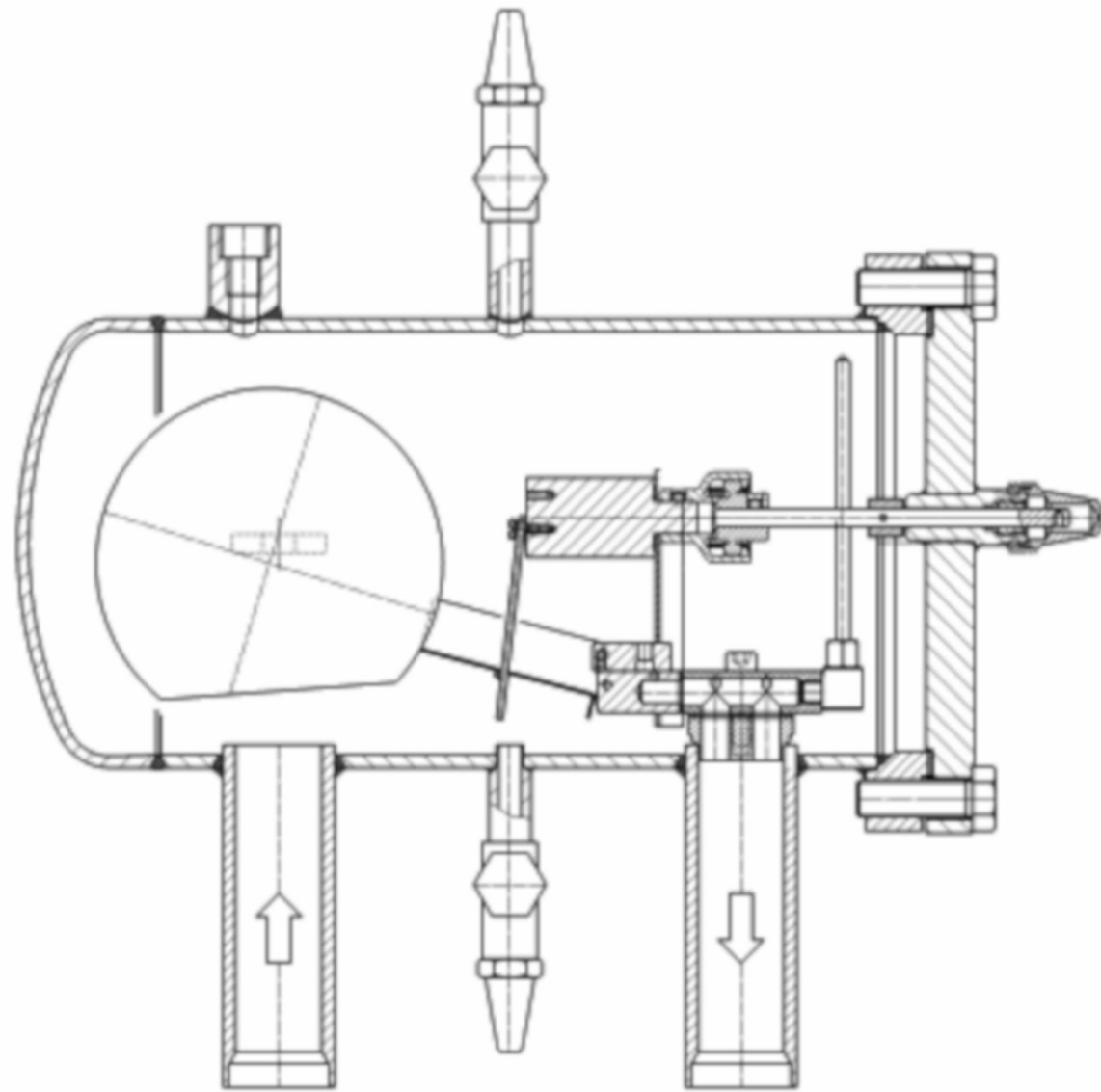
ETS Engineers Ltd
 Cell Ph: 021 679 564
 Project: Ovation Waipukurau Ammonia Liquid Receiver Vessel

Client: MIKE ODEY & ASSOCIATES
 Drawing No: OW-LRV-01 SHT 2
 Revision: B

REV	DESCRIPTION	BY	CHKD	DATE
B	ADD 1" BSP FITTING & VENT HOLE	ET		28-08-19
A	FOR DESIGN VERIFICATION	ET		19-08-19
P	FOR INFO	ET		2-08-19







Project Process Considerations

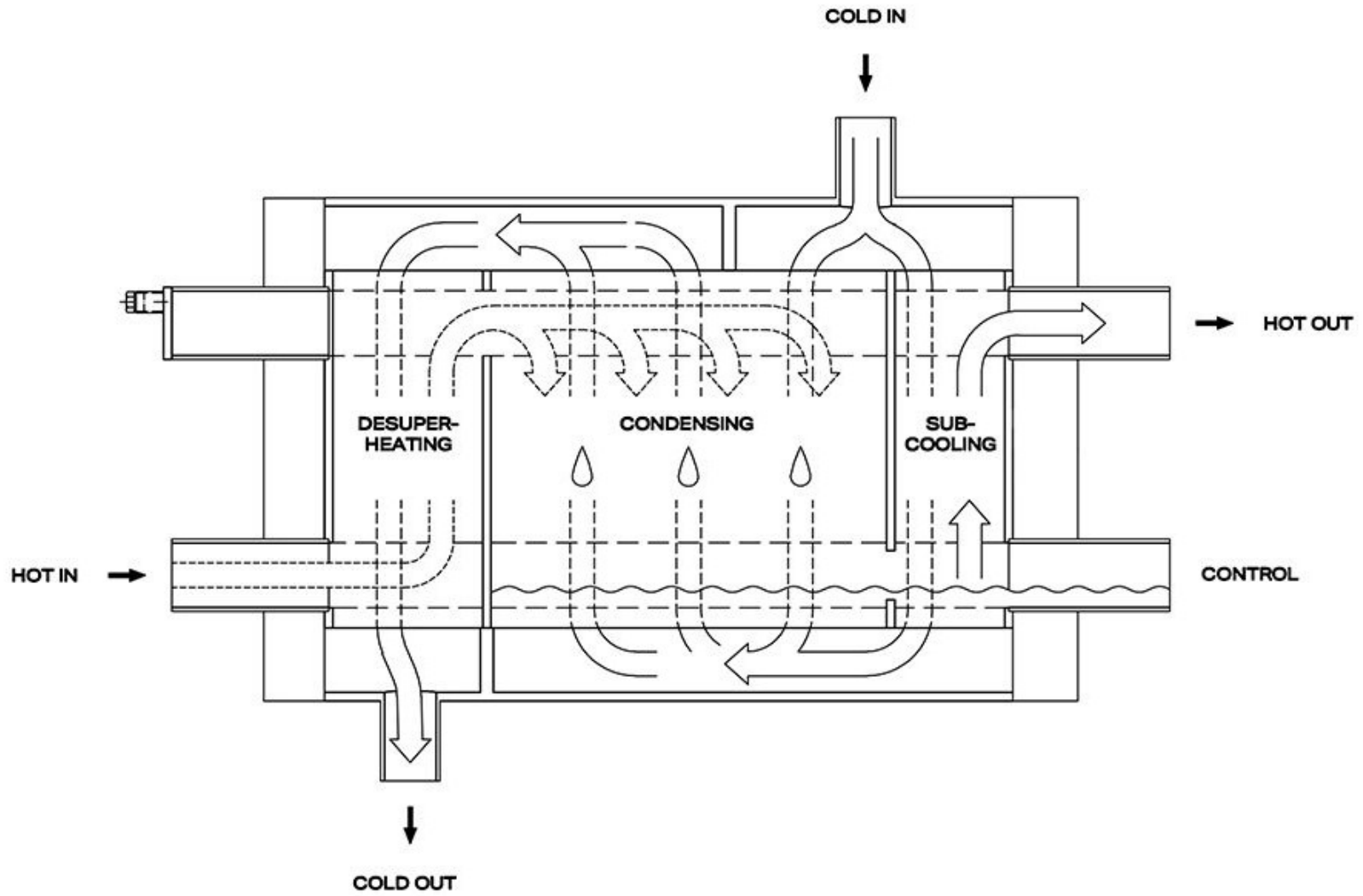
- Design of Compressor Foundation – Structural Engineers
- Specification of Float Valve – Sch 80 nozzles (normally DIN)
- Specification of PSHE, Seismic Support Frame, Sch 80 nozzles, specified nozzle loads
- Design Verification of PSHE – NZ Worksafe China Approved
- Design Verification of Receiver Dome
- Design of Float Support Frame
- Project Specification “Drift”

Project Commissioning Issues

- Covid long deliveries
- Air in system, purger not working
- No purge point off receiver dome
- Low system condensing temperatures / pressures reducing Heat Pump capacity

Project Outcomes

- Simple, cheap (relatively) system
- Reliable
- COP 4.0 to 5.0 at Heat Pump
- Water supply temperature 35 to 45C, site supply ~ 15C lowering Heat Pump COP
- Refrigeration System Discharge Pressures lowered reducing Heat Pump COP



Project Benefits?

- ~ 50% of cost of alternative Ammonia Heat Pump
- Provides 300 kW of Water Heating for a power consumption of 70 kWE

Questions?

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