

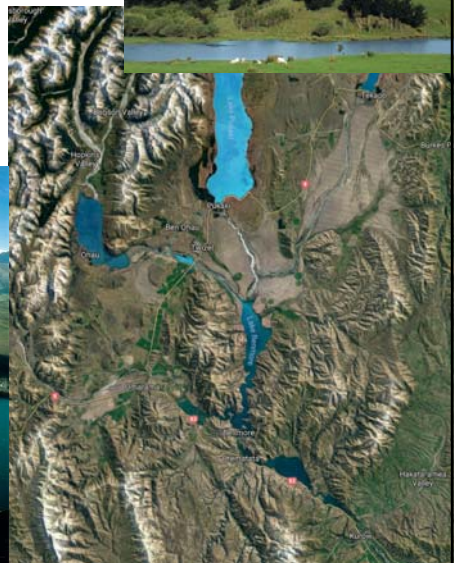


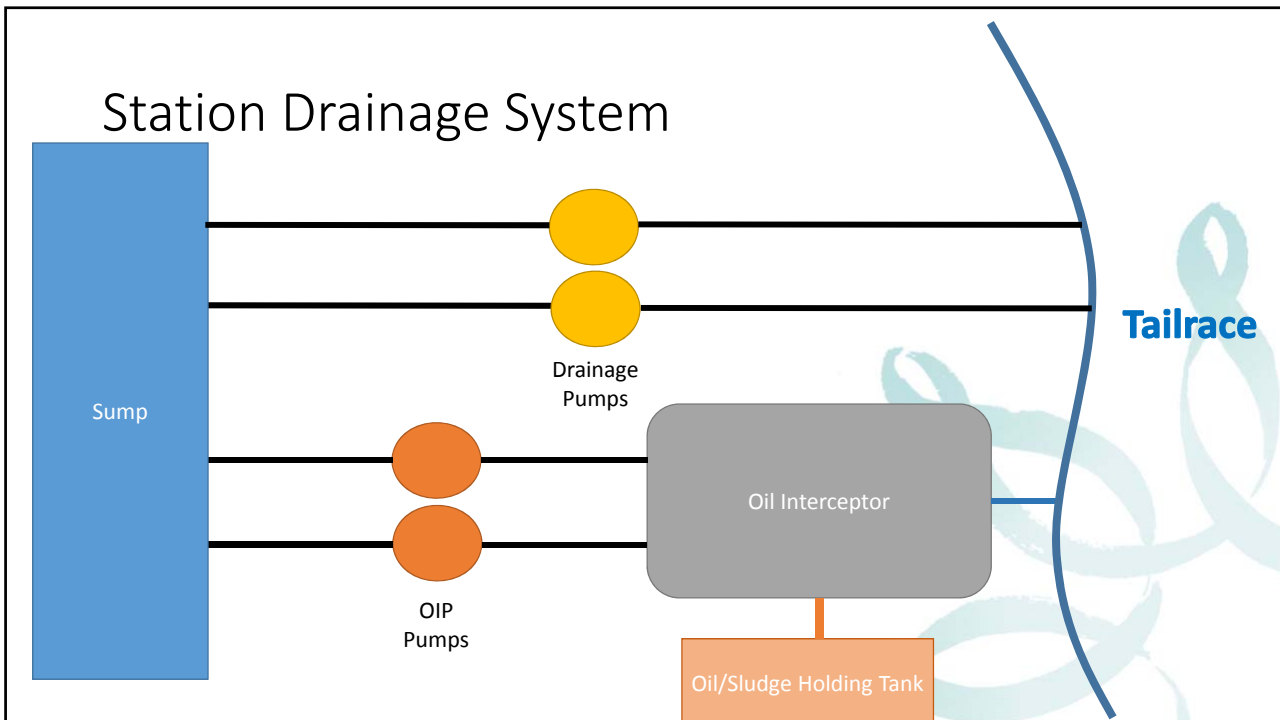
# A paradoxically dry chat on water pumping systems

*Harriet Miller-Brown*  
*Meridian Energy*  
APEX 2018- "Smarter Solutions"

## Meridian Energy – Generation

- 100% renewable electricity generation
- 9 hydropower stations
- 7 windfarms





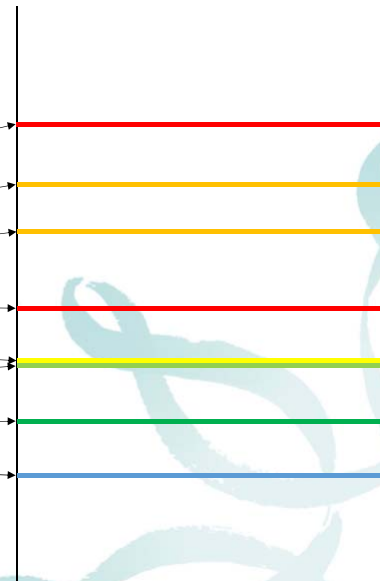
### Station Sump

- Station system discharge drains to sump
- Sump levels controlled by series of float switches
- Inflow is controlled using anti-emulsion towers



## Sump floats

Extremely High Level Alarm	6.1 m
Standby Drainage Pump Start	5.8 m
Duty Drainage Pump Start	5.4 m
Sump High Level Alarm	4.3 m
Drainage Pump Stop	4.0 m
Standby Oil Interceptor Pump Start	4.0 m
Duty Oil Interceptor Pump Start	3.4 m
Oil interceptor Pump Stop	2.4 m



## July 2017- High Sump Level Event

- Stop float failure - oil interceptor pump
  - Pumped water until no flow
- Failure of OIP to reprime
- Standby OIP also deprimed
- Both drainage pumps failed to start

### Event Analysis

- Float Failure
- Oil interceptor pump failure
- Drainage Pump failures

## Oil Interceptor Pump Failure

- Electrical lock out after no flow failure
- Inability to reprime



## Drainage Pumps

- Unknown condition
  - Mechanically inspected
  - Cannot run
- Poor control system
- History of faults



## Drainage Pump Maintenance

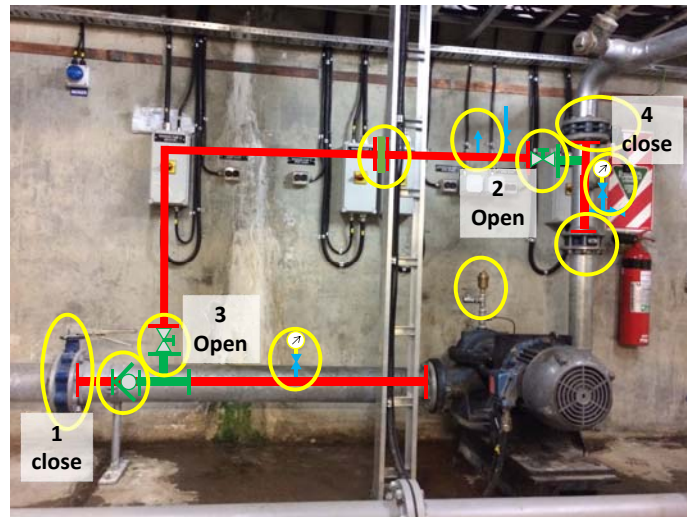
- Pump inspection
  - Bearings
  - Seals
  - Shaft
- No Function test
  - Risk of oil discharge – emergency only



## Existing Pipework



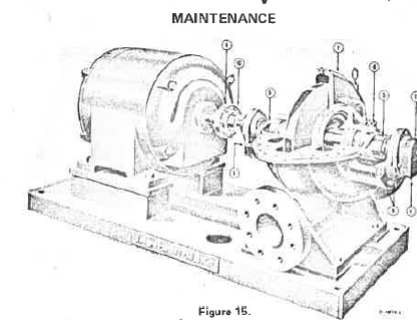
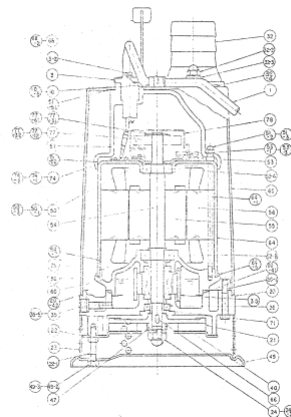
## Recirculation Pipework



## Maintenance Frequency

- Criticality
- Usage
- Inspection
- Run

4. CONSTRUCTION  
4.1. CONSTRUCTION OF LB-250 (with parts list) Drawing No 3020401-2





# Critical Systems

Drainage pumps are emergency back-up's but critical to station safety

Critical systems need to be tested  
-In this case adding recirculation pipework

