



INTEROFFICE MEMORANDUM

To : Complex Manager
Cc : Operation division manager
: Production manager
: Deputy Complex Manager
: Production SPT
: Maintenance SPT
: HSE coordinator

From : Acting Production Eng. Coordinator
Date : 27/01/2014
Subject : **Floating Roof sinking Failure report of
Condensate Tank 5E-220-TB002A**

Dears All,

With The Reference to the sinking problem of the Floating roof of stabilized condensate tank 5E- 220- TB002A dated on 25th Jan. 2014, the problem has been assessed as described below.

Background

The storage tanks 5E-220-TB-002A/B are floating roof type to minimize vapor losses and have working capacity 45650m³ each.

Furthermore the tanks are equipped with the following:

- Level transmitter, radar type, 5E-220-LT-002/006 connected to the tank gauging system, with local and remote indications and with low/high level alarms



- Temperature transmitter 5E-220-TE-001/003 connected to the tank gauging system, with local and remote indications
- Level transmitter, float type, 5E-220-LT-001/005 connected to the ESD system, with remote indication, high/low level alarms .
- Gauge hatch and stilling well
- Roof drain hose discharging on the tank apron
- Rim vent
- Automatic bleeder vent

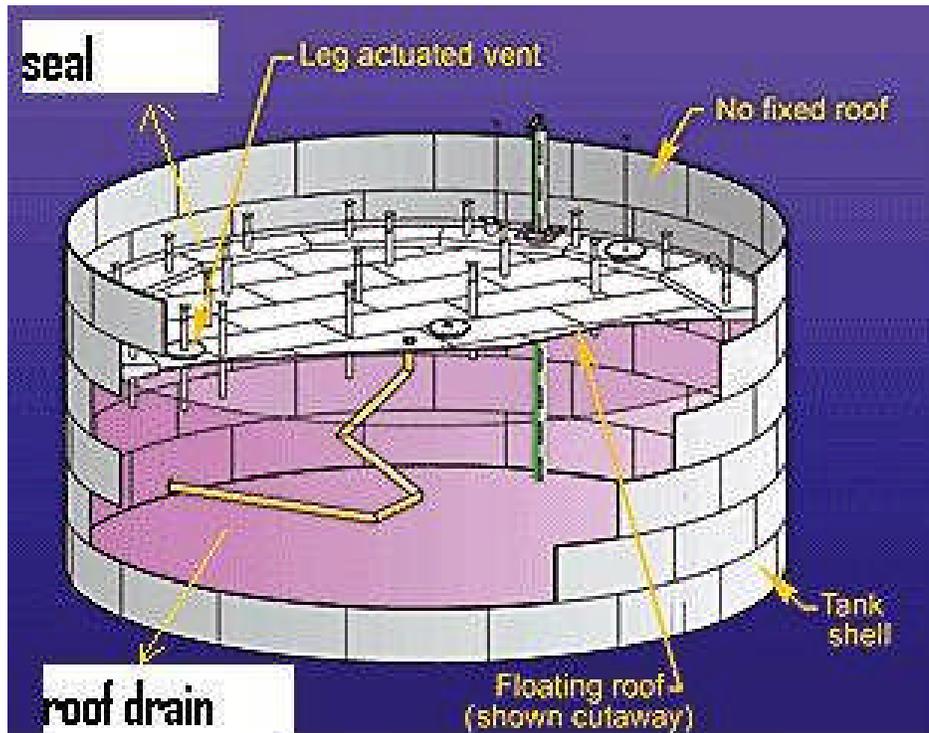


Fig no 1 : floating roof tank



Incident

The floating roof of stabilized tank 5E-220-TB002A at a Mellitah complex sank during the fire fighting deluge system activated. It sank into the stabilized condensate due to the weight of water /foam which remained on the floating roof of the stabilized condensate tank. And caused condensate spillage.

Failure description

On 25th Jan. 2014 the floating roof sank into of the stabilized condensate tank 5E-220-TB002A at Mellitah complex. due to the heavy fire water / foam , which continued for more than 5 hours , the floating roof sank into the stabilized condensate , the causes of the sinking are that a large amount of fire water / foam remained on the pontoon side , maybe the roof drain sump mouth was blocked with dust and the water entered to one of the two pontoons more than the other side , and an abnormal load was put on the one side of the pontoons or could be Both sides , which was caused an Inclination of the roof , which is led the stabilized condensate liquid moved above the roof , consequently the huge amount of contaminated condensate with water spillage out of the tank through the roof drain as per attached pictures , the estimated quantity of condensate spillage down into the dock area is about 500 to 700 barrels ,



Incident Sequence

- ESD activated on 25th Jan. 2014 at 4:56 am.
- At 06:05 the heat sensitive cable 50-700-TAHH018 A/B of stabilized condensate tank has been activated, consequently the deluge valves opened.
- TAHH 018A alarm indicated in the DCS
- 50700Q1 FIRCUM3 alarm indicated in the control room panel
- AT 06:05 the second fire fighting pump (jockey pump) started 40-730-PA001A
- At 06:06 the fire water pump 40-730-PH001 (electrical pump) started
- At 06: 07 the diesel oil fire water pump started 40-730-PH002A
- At 06: 07 the diesel oil fire water pump started 40-730-PH002C
- At 06: 12 the diesel oil fire water pump started 40-730-PH002B
- At 11:30 the heat sensitive cable 50-700-TAHH018B activated again
- At 16:00 the complex manager detected the smell of condensate, but no abnormality in the tank could be found. The deluge valves been isolated and immediately the drain valve of the roof isolated too.
- At 16:10 Abnormality of a floating roof was found. Condensate overflowed onto the roof from the tank's north side. And onto roof darin.
- At 16: 15 Contact was made to the safety and environment division from the control room.



Incident corrective action

During the incident the liquid quantities stored in the tank (condensate contaminated with water) were about 25,501 m³ and the condensate amount spillage down to the dock area is about 500 to 700 barrels. Accordingly the following action been taken:

- Safety section closed the tank area
- the condensate has been transferred to the oil buffer tank 4E-220-TB003
- the condensate level reduced to the lower level is about 80cm
- the roof legs set were not touched the bottom side of the tank
- the roof was covered by condensate and water
- The spillage condensate transferred using the vacuum truck to the waste water treatment.
- Connection was installed to drain the condensate which is covered the roof.

Action plan

The stabilized condensate 5E-220-TB002A will be out of service for unknown period for maintenance which is effecting the production and loading activity. Therefore action plan has been performed to overcome the mentioned problem as follows:

- 1- The stabilized condensate production diverted to the condensate buffer tank 5E-220-TB004
- 2- To prepare the stabilized condensate tank 5E-220-TB002B for shipping.
- 3- Start the loading activity from TB002B until to complete the stored quantity.



- 4- Drain the water from TB004
- 5- Hold-up the loading activity and transfer the condensate from tank TB004 to TB002
- 6- restart the loading activity from TB002
- 7- keep the stabilized condensate production always to the TB004

Conclusion

It was observed that all fire fighting pumps were started which is indicted that a large amount of fire water remained on the roof and seems to be the roof drain sump mouth was blocked with dust Water got into the pontoons located at the north side and an abnormal load was put on the roof and it sank into the condensate. The main cause of the accident seems to the cleaning of the floating roof upper surface was insufficient. And there is no normal routine check of the tanks during that day.

Recommendations

It is recommended by the following:

- 1- To check and repair the functionality of heat sensitive cable 50-700 TB018A/B which is the main cause of deluge system activation.
- 2- To remove the condensate above the roof ASAP, water wash is required to inspect the floating roof. Because it seems that the roof legs set were not touched the bottom side of the tank and the seal is twisted.
- 3- Improvement in the function of roof drain facilities



- 4- To improve operation control management by prepare specific reading or status sheet in order to check the floating Roof status of all tanks on daily basis.
- 5- To Review of the inspection standard.
- 6- Inspection is required also during the unusual weather (heavy rain) as lesson learned
- 7- PMR is required to install the sensor technology for floating roof tanks like inclinor device to detect if the roof is floating normally.

Attachments:

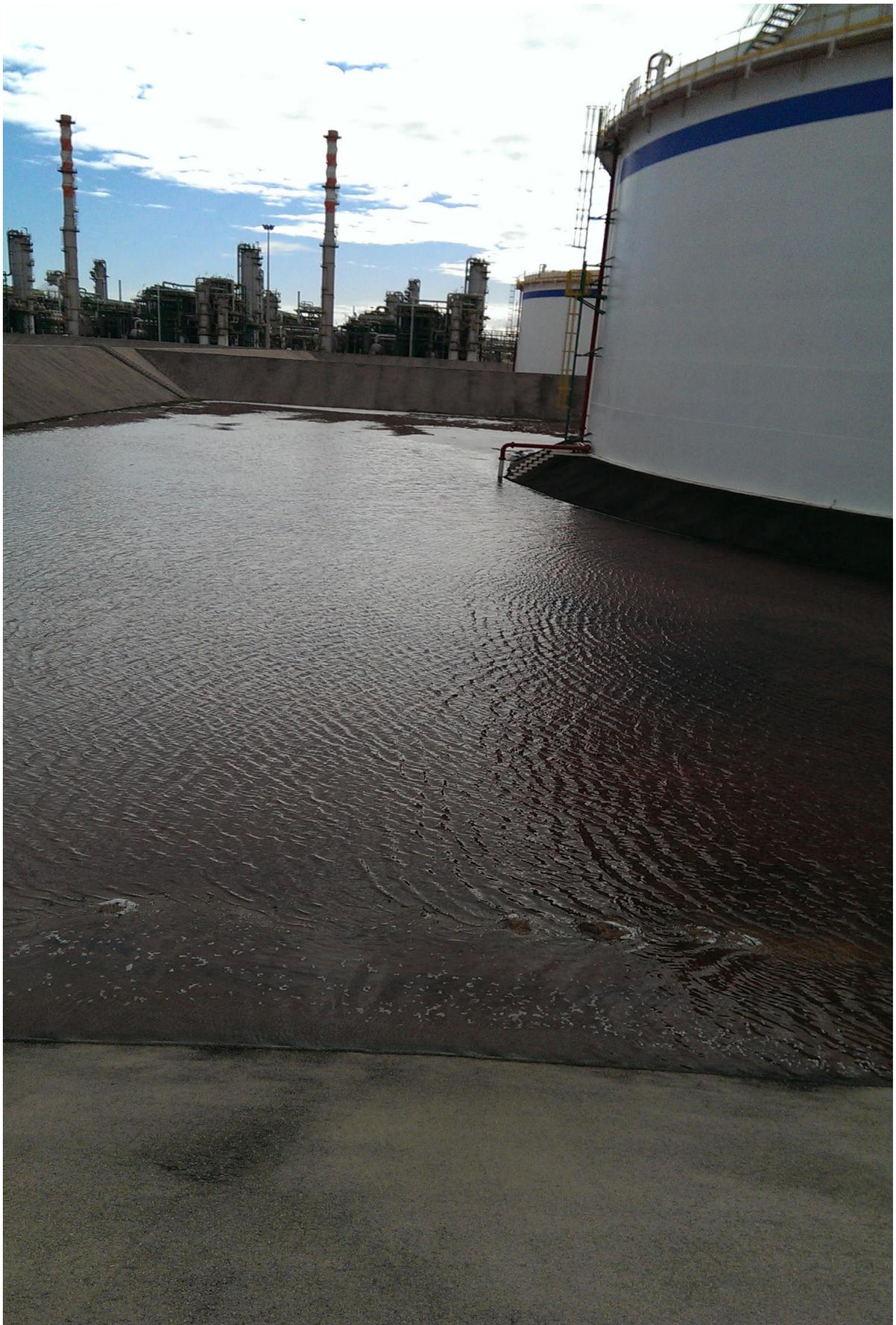
- Photos of Condensate spillage on dock area
- Photos of Condensate covered the floating roof
- sensitive cable 50-700-TAHH018 A/B trend
- activation logic diagram of the sensitive cable and deluge system
- fire fighting pump (jockey pump) trend
- diesel oil pump 40-730-PH002A trend
- diesel oil pump 40-730-PH002C trend
- diesel oil 40-730-PH002B trend

Prepared by

Abdelwahab Atargi

Acting prod eng coordinator

28/01/2014



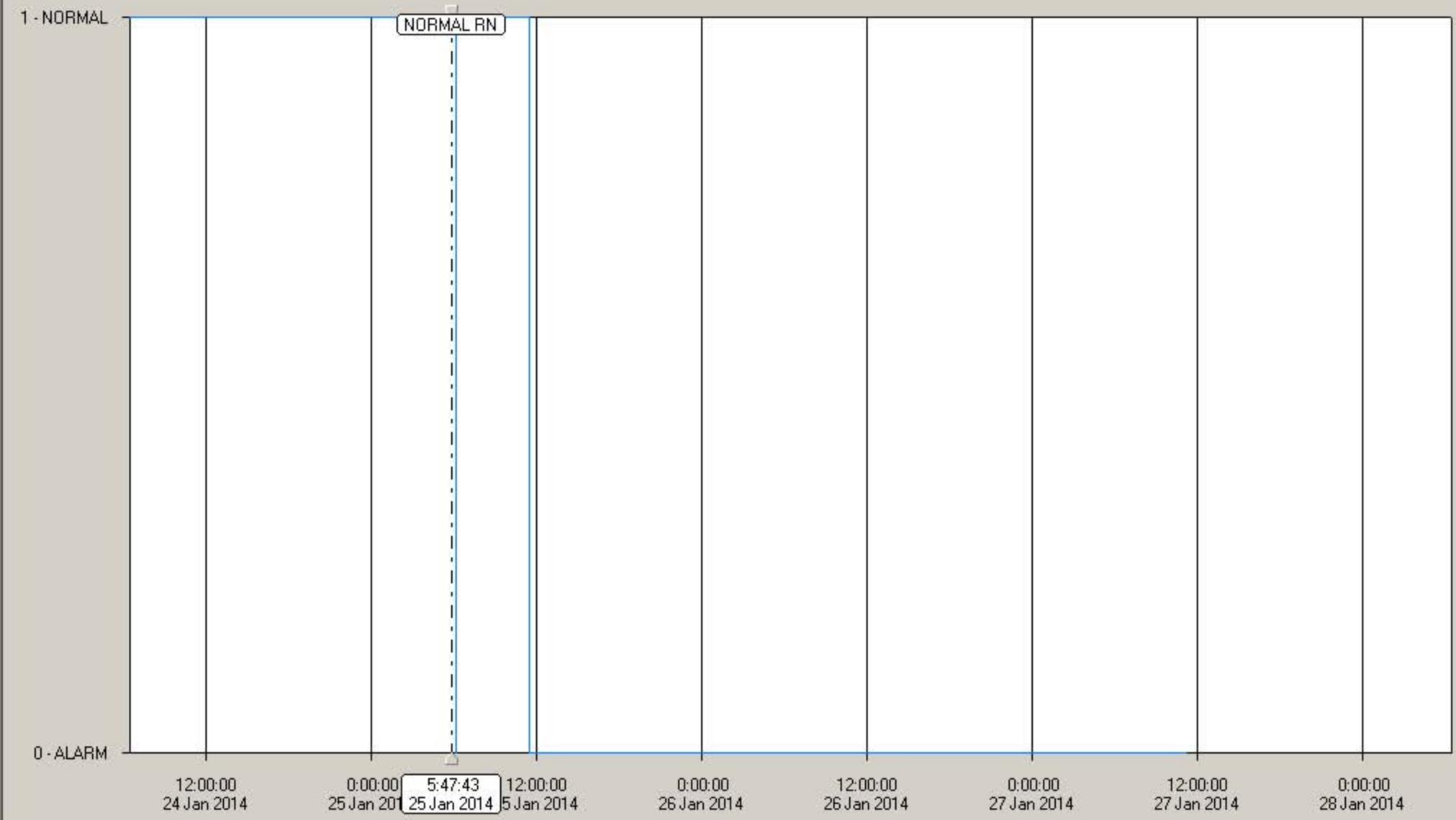








53191 50700TAHH018B 5E220TB002A "Q1" HEAT SENS.CABLE
25 Jan 2014 11:27:26.122 ALARM AL





8846 | 40730PA004B | FIRE WATER JOCKEY PUMPS PA001B

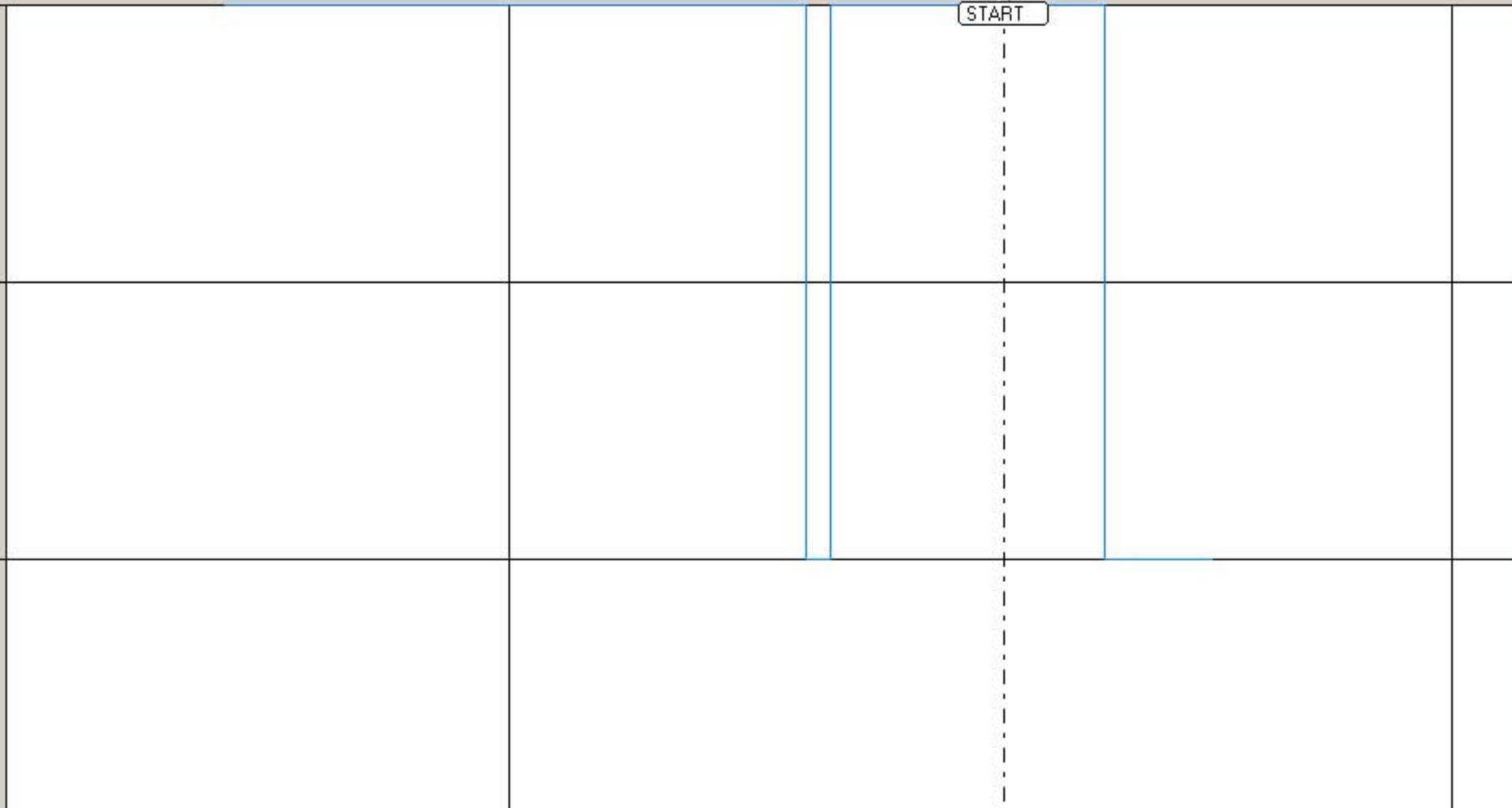
26 Jan 2014 7:31:56.531 | STOP (0)

3 - START

START

2 -

1 - STOP





20650 40730ULPH002AW FIRE WATER PUMP PH-002-A.

25 Jan 2014 6:20:43.967 NORMAL (0)

1 - ALARM

NORMAL RN



20649 40730ULPH001AW FIRE WATER PUMP PH-001.

25 Jan 2014 20:43:10.107 NORMAL (0)

1 - ALARM

ALARM AL



20651 40730ULPH002BW FIRE WATER PUMP PH-002-B.

25 Jan 2014 6:18:31.492 NORMAL (0)

1 - ALARM

ALARM AL

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1315 5E220LI002 STABILIZED CONDENSATE STORAGE TANK TB002A
27 Jan 2014 11:15:12.520 755 L (mm)

