

H₂S Gas Leak at CBNC HPP Line-2 Sulfurization During Plant Start-up Operations

November 18, 2022

0022H

ACTIVITIES FOR THE SULFURIZATION PROCESS START-UP

- At 2130H H₂S injection commenced to start Batch Reaction. H₂S gas was injected to pressurize MS Reactors.
- To maintain or reduced pressure at the MS Reactors excess H₂S gas is vented to the Scrubber through control and manual vent valve. Control valve is operated through DCS and manual vent is at field with an assigned personnel.
- Start-up activities is being closely monitored by Japanese Staff and Filipino Supervisors.
- The reading Scrubber CEMS (206AI013) was closely monitored and Caustic Soda (NaOH) injection was adjusted even the 206AI013 reading was still low to prevent H₂S leak.
- At around 0020H U00AI902 (near JMAINT Office) has an alarm but zero reading. Field operator also informed DCS that there was an alarm on the area. Then immediately informed DCS operators to check if there was a possible gas leak at MS Reactors and advice H₂S personnel to stop or standby the activity at R2211.
- 0022H – 0032H border detectors 201AI901 and 201AI902 (inside perimeter of the HPP) alarmed with reading more than 0.2 ppm (HH setting of detector), 201AI901 = 1.4 ppm and 201AI902 = 1.6 ppm., triggering the ESD of Line 1 and Line 2.
- Series of reading also detected by H₂S process detectors (reading 1-4 ppm) mostly located at Line 1 H₂S Plant area and at this time informed all personnel including contractors and sub-contractors to wear H₂S gas respirator and immediately proceed to assembly area and to wait for further advice.
- CBNC Safety personnel instructed and guide them to Evacuation Area A (Utilities Area).
- 206AI013 (206SR03 CEMS) DCS:25ppm; Gastec: Over Range (Gastec Tube Range: 0-20 ppm)
- Zero Reading of the detector outside of the plant (Southside): 09AI940 - 0

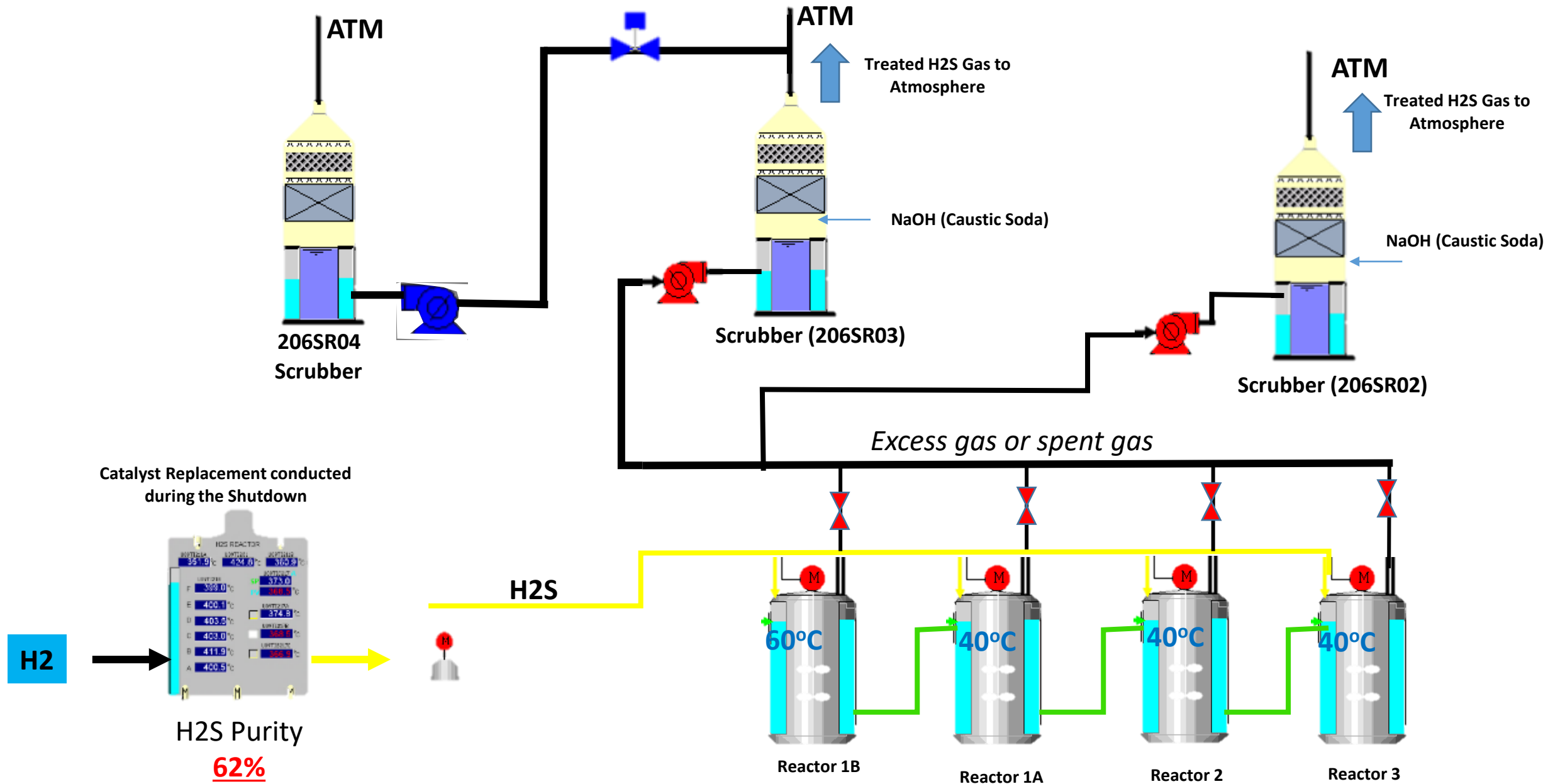


Diagram 1: During Batch Reaction

Other related information:

- **0022H- 0032H** Border Detection was observed (3 Detectors). Triggered the Emergency Shutdown of Line-1 and 2 Sulfurization Plant.
- High reading ($\text{H}_2\text{S} > 4.6$ ppm) indication of 206AI013/ 013B (206SR03 CEMS)
- Back up Scrubber (206SR04) was automatically activated during the incident. Redundant Safety feature to prevent release of H_2S gas.

Probable Cause:

- Vented excess H_2S gas during the batch reaction exceeded the capacity of 206SR03 to treat H_2S gas.

Immediate Action

- Immediately close all vent valves (manual/control) at MS Reactors going to Scrubber (206SR03)
- Standby the activity at R2211, H_2S gas purity adjustment
- Increased Caustic (NaOH) injection flow rate to Scrubber (206SR03)
- Advised CBNC personnel, contractors and sub-contractors at the affected area to wear H_2S gas respirator and proceed to Evacuation Area A.
- Safety personnel proceeded outside, Southside of the plant to confirm H_2S reading using portable H_2S Detector.

DETECTORS WITH H2S Concentration Maximum READING: 0022H - 0032H

201AI902: 1.6 ppm

201AI901: 1.4 ppm

00AI902: 3.00 ppm



WIND DIRECTION:

NE With wind speed 0.9m/s

HPP COMPLEX

N

source

OUTSIDE HPP Complex: [Zero Detection]

09AI940: 0 ppm



ENVIRONMENT MONITORING

HPP DETECTORS LOCATION MAP



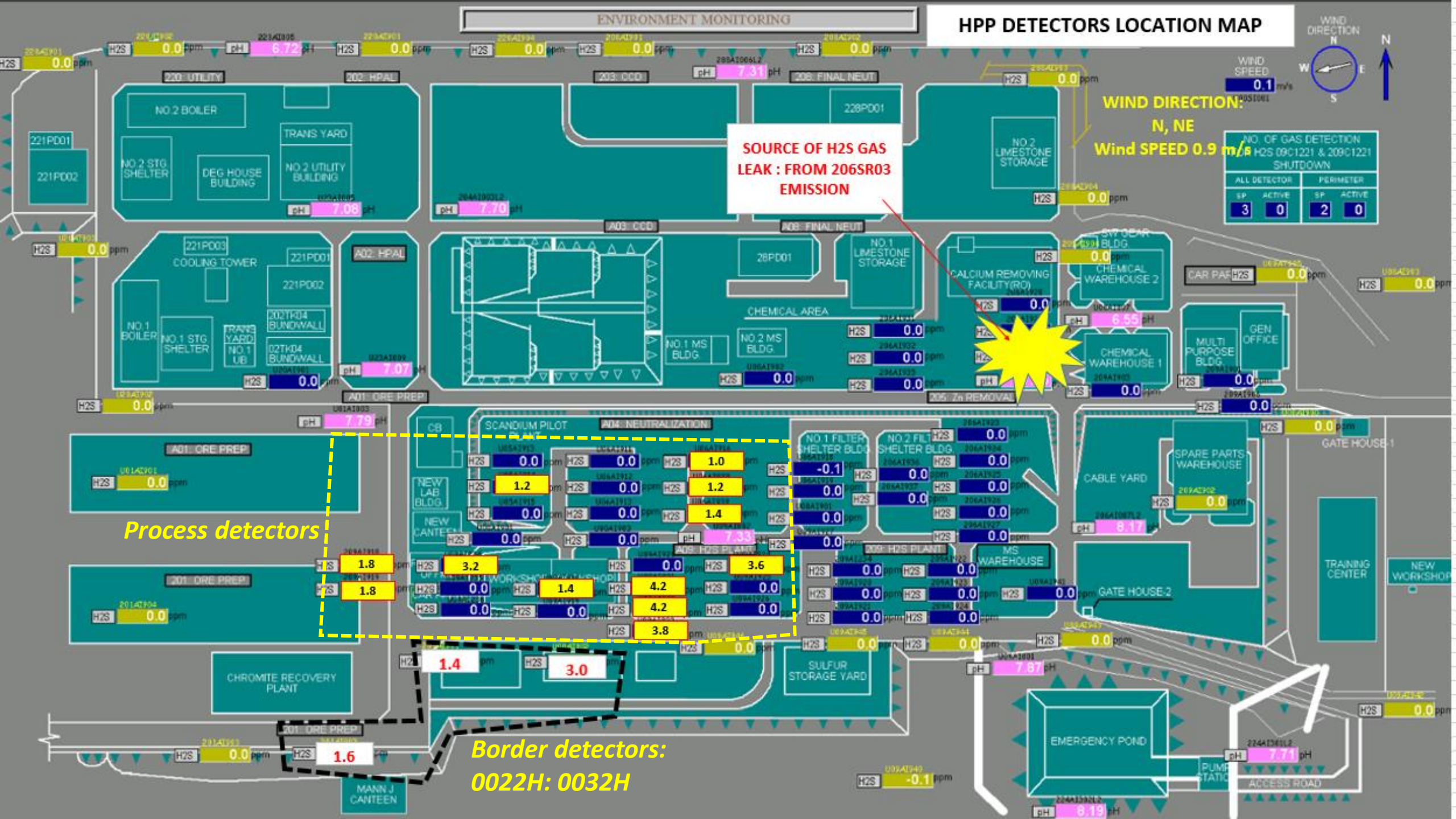
WIND DIRECTION:
N, NE
Wind SPEED 0.9 m/s

SOURCE OF H2S GAS LEAK : FROM 206SR03 EMISSION

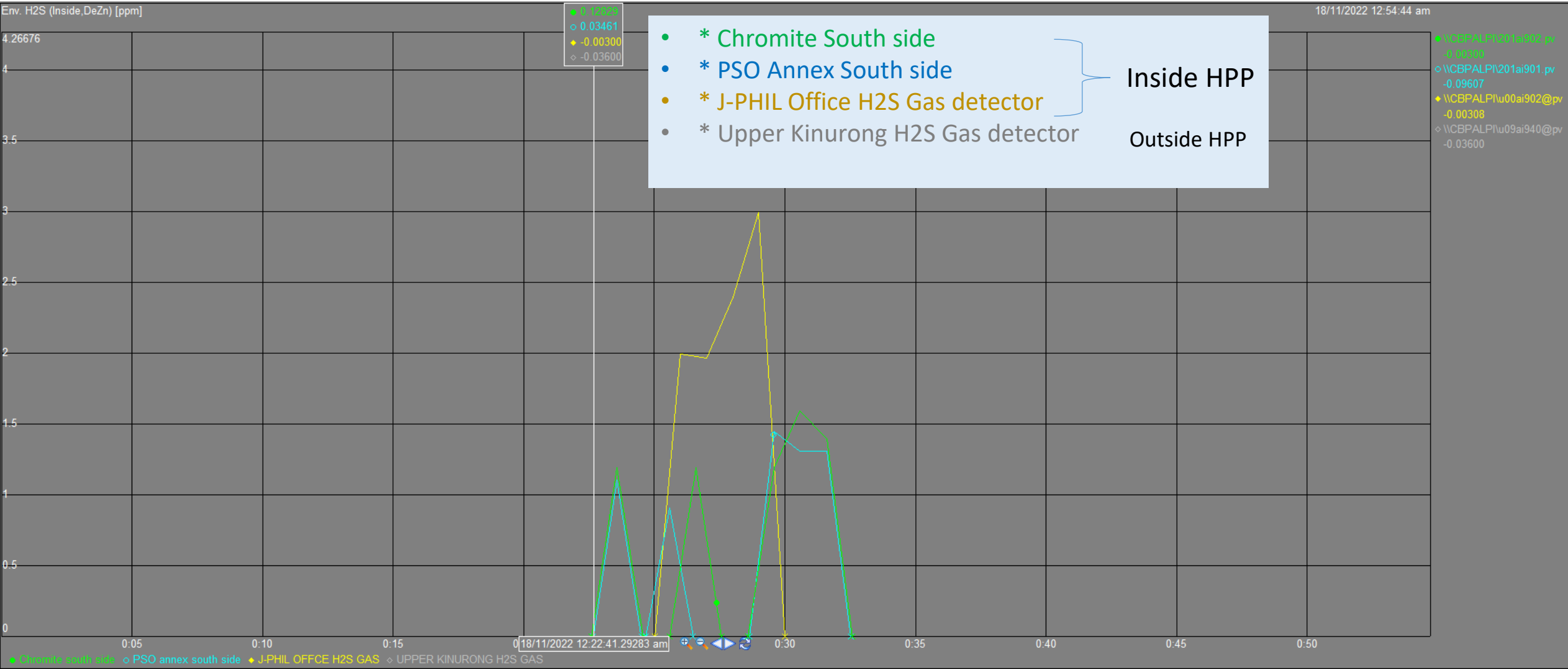
NO. OF GAS DETECTION H2S 09C1221 & 209C1221 SHUTDOWN			
ALL DETECTOR		PERIMETER	
SP	ACTIVE	SP	ACTIVE
3	0	2	0

Process detectors

Border detectors:
0022H: 0032H



Trend 1: Data logs of 3 border detectors





Coral Bay
Nickel Corporation

EMERGENCY EVACUATION AREAS





Assembly and Evacuation of Personnel to Evacuation Area A



Conducted Monitoring South of the Plant (Gamayon Area)

Corrective Action to Prevent Recurrence:

1. Review of the Start-up procedure and education to all personnel with focus on prevention of H2S leak.
2. Formulated special instruction and checklist and point out potential source of H2S leak.
3. Provision of lock to manual vent valves with instruction on its operation.



NO.	DESCRIPTION	STATUS	REMARKS
1	Review of the Start-up procedure and education to all personnel with focus on prevention of H2S leak.	Completed	Review of the Start-up procedure and education to all personnel with focus on prevention of H2S leak.
2	Formulated special instruction and checklist and point out potential source of H2S leak.	Completed	Formulated special instruction and checklist and point out potential source of H2S leak.
3	Provision of lock to manual vent valves with instruction on its operation.	Completed	Provision of lock to manual vent valves with instruction on its operation.

Countermeasure: 3

Implement Lock Out Tag- Out on vent valves, key control by Planner with approval by Production Manager with signage installation - **COMPLETED**

