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COLD BOX FOULING : NOV -15.

CONTENT OF PRESENTATION

- Event and finding.
- Possible root cause.
- Gap closing.

Event and finding-Reactor effluent drier (RED)'s event

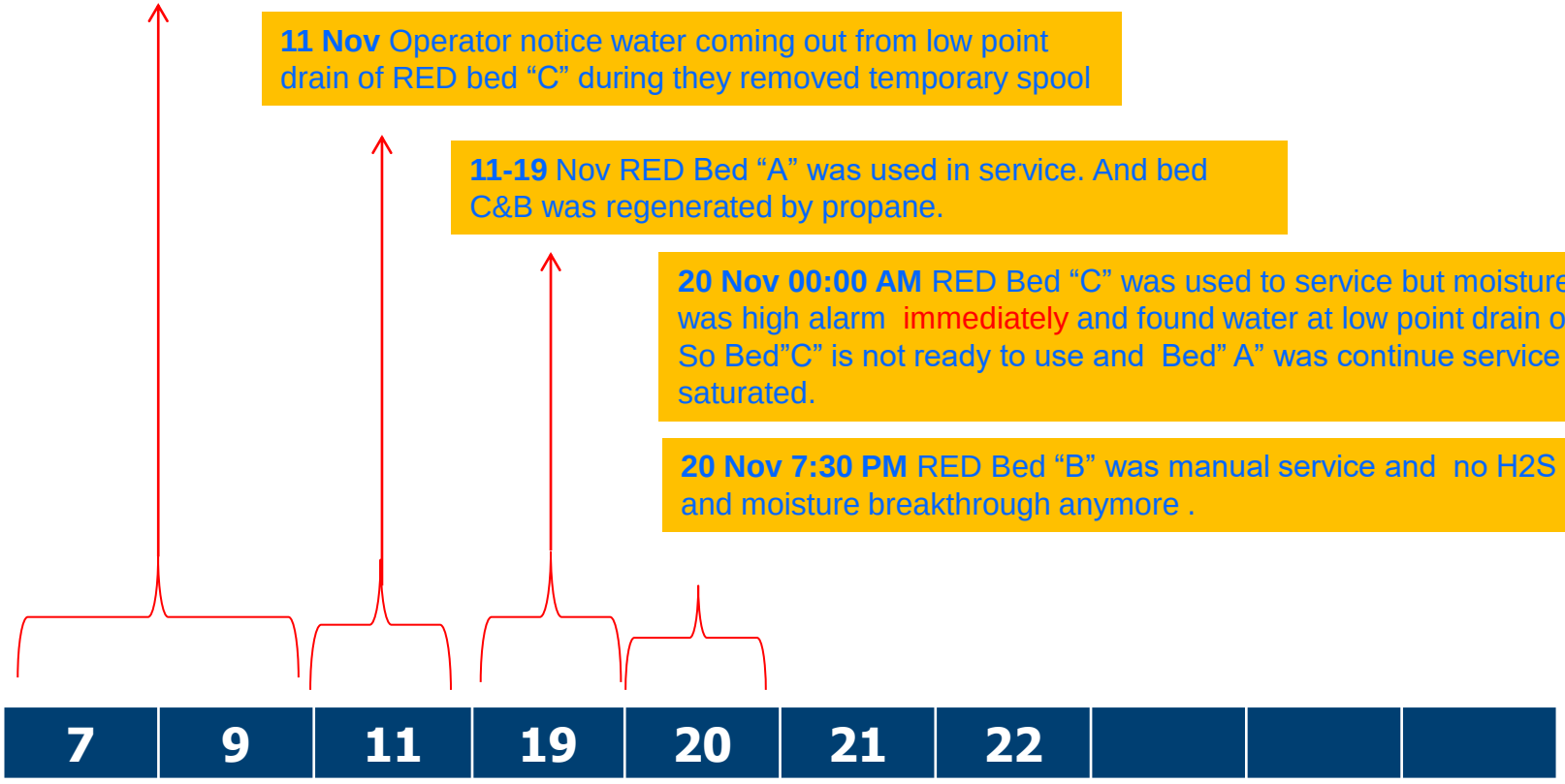
7-9 Nov. During reactor dry out,
process flow was passed through empty drum RED "B".

11 Nov Operator notice water coming out from low point drain of RED bed "C" during they removed temporary spool

11-19 Nov RED Bed "A" was used in service. And bed C&B was regenerated by propane.

20 Nov 00:00 AM RED Bed "C" was used to service but moisture analyzer was high alarm immediately and found water at low point drain of bed C. So Bed"C" is not ready to use and Bed" A" was continue service until saturated.

20 Nov 7:30 PM RED Bed "B" was manual service and no H2S and moisture breakthrough anymore .



November-2015

17-19 Nov. Dispersant was service.

Event and finding-RED and Cold box's event

= RED's event

= Cold box's event

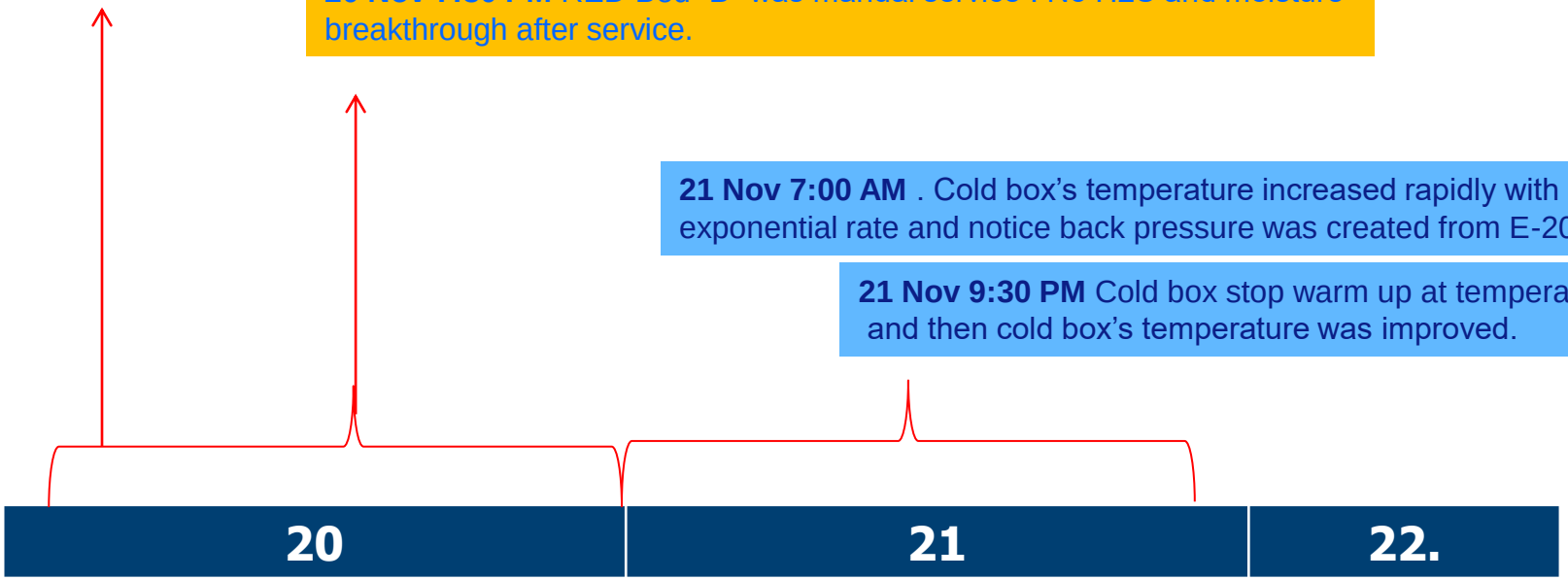
20 Nov 00:00 AM when RED Bed "C" was used to service , Moisture's analyzer was immediately high alarm.

20 Nov 00:00 AM . diff pressure across E-2020A suddenly increased . Cold box begin warm up slowly

20 Nov 7:30 PM RED Bed "B" was manual service . No H2S and moisture breakthrough after service.

21 Nov 7:00 AM . Cold box's temperature increased rapidly with exponential rate and notice back pressure was created from E-2021

21 Nov 9:30 PM Cold box stop warm up at temperature -46 ˚C and then cold box's temperature was improved.



November-2015

17-19 Nov. Dispersant was service.

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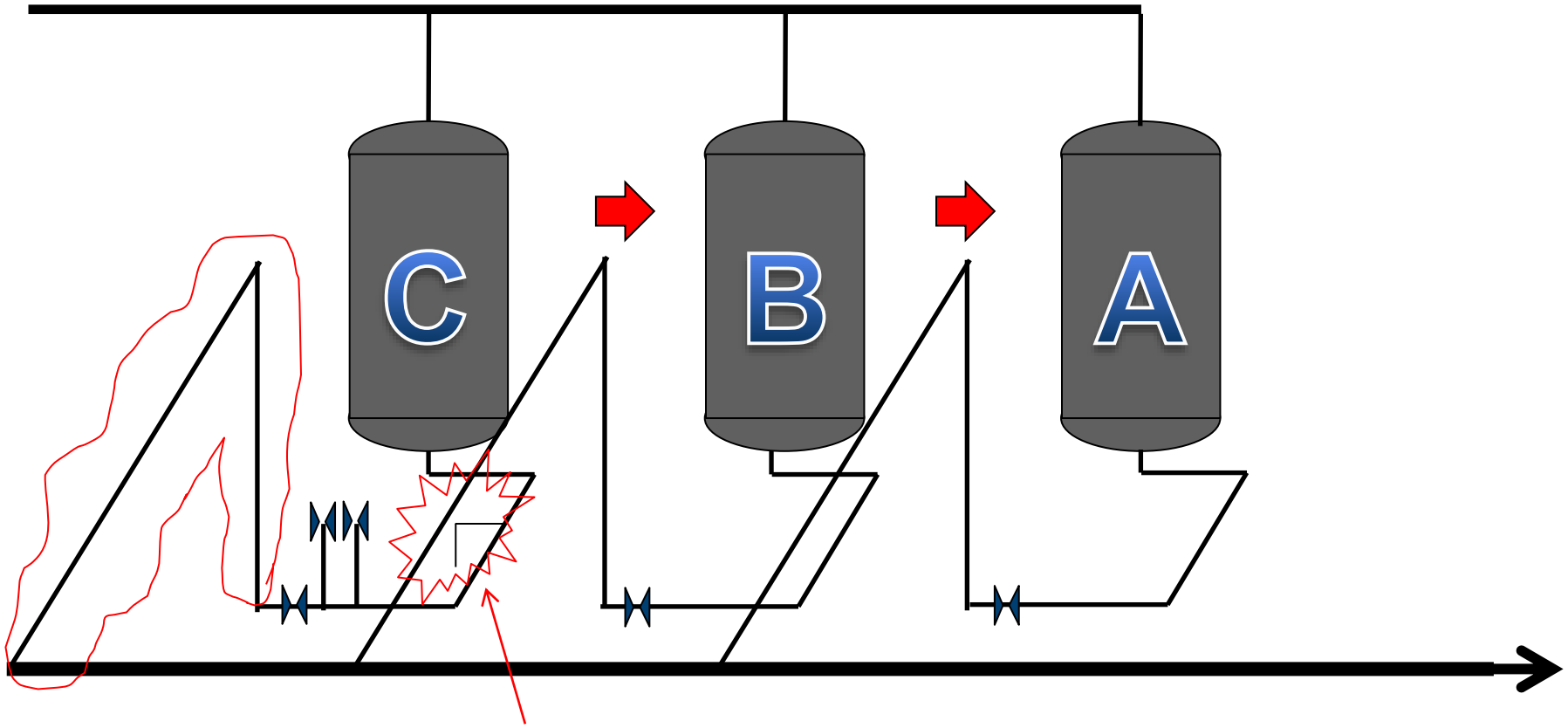
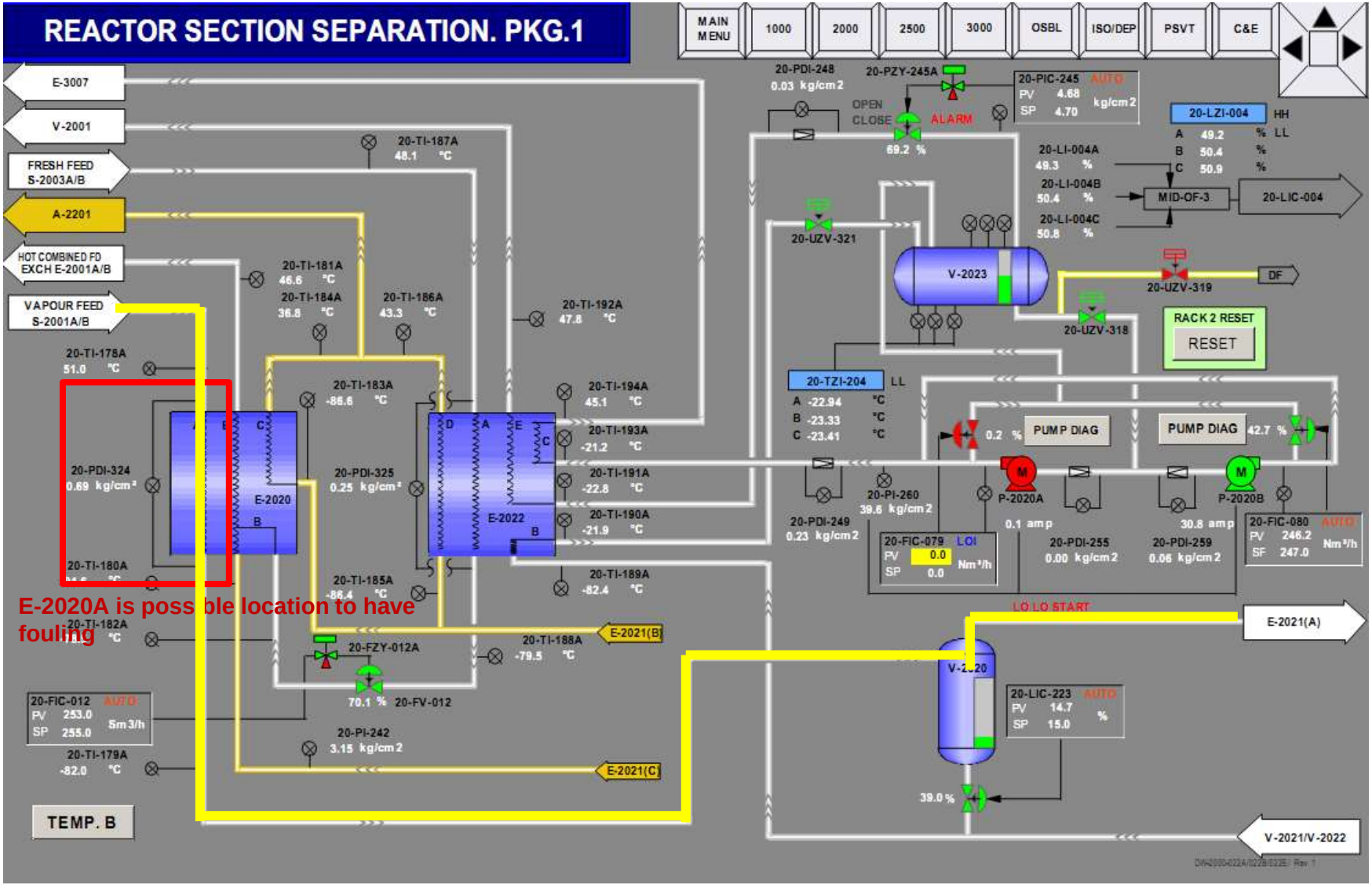
Event and finding : RED Diagram



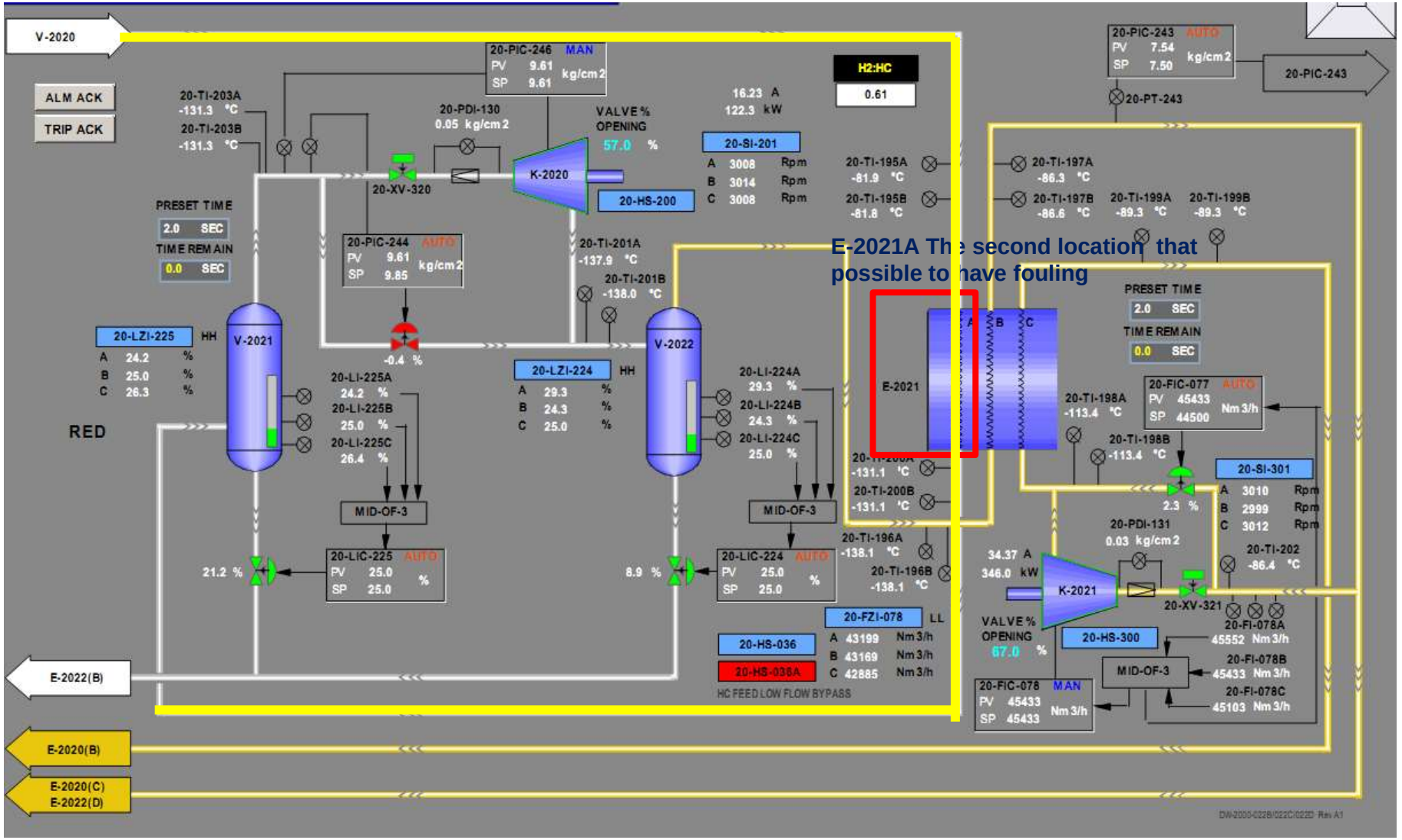
Free water was found here

S-2001A and Cold box

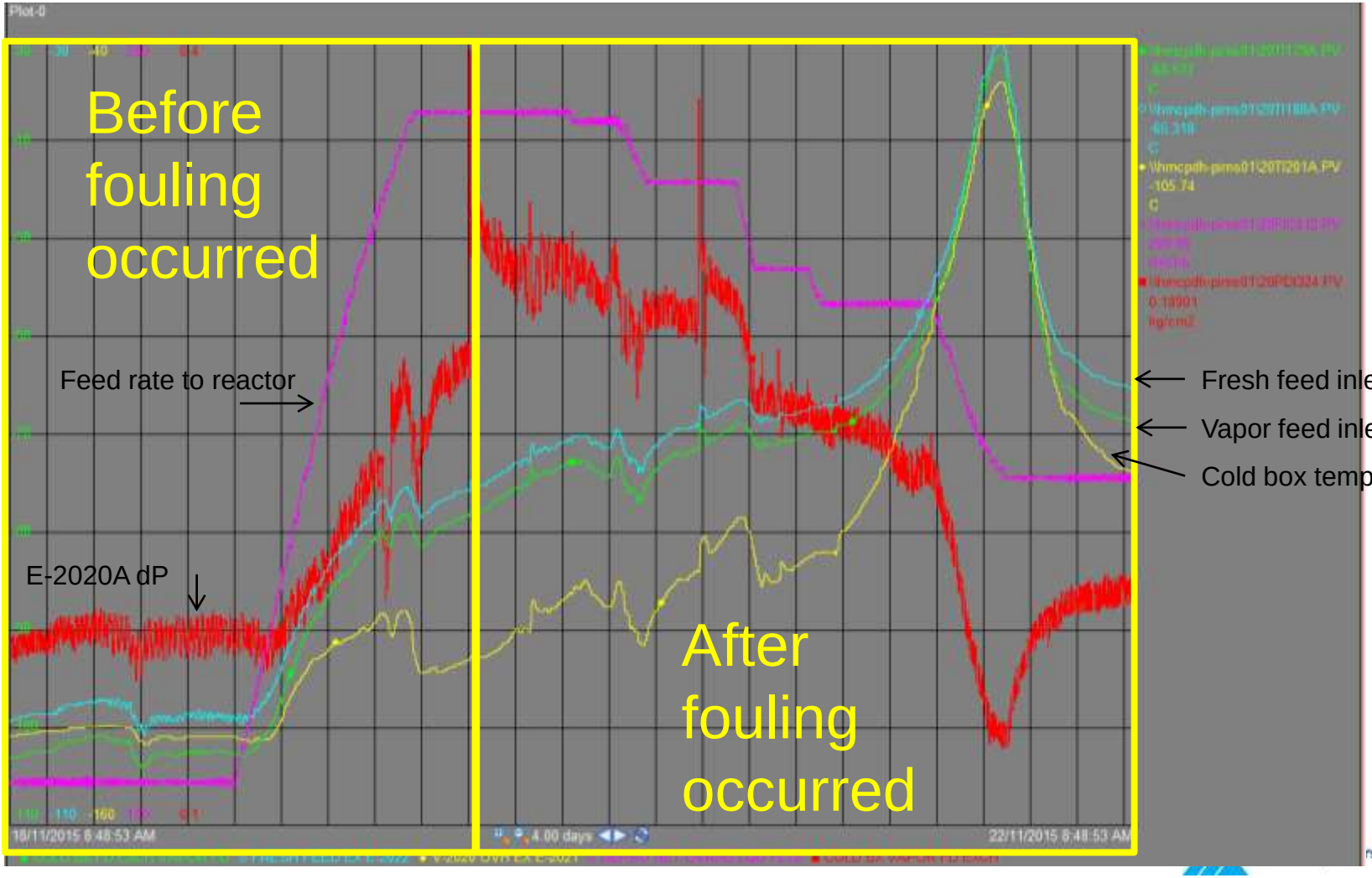
Event and finding : Possible fouling location.



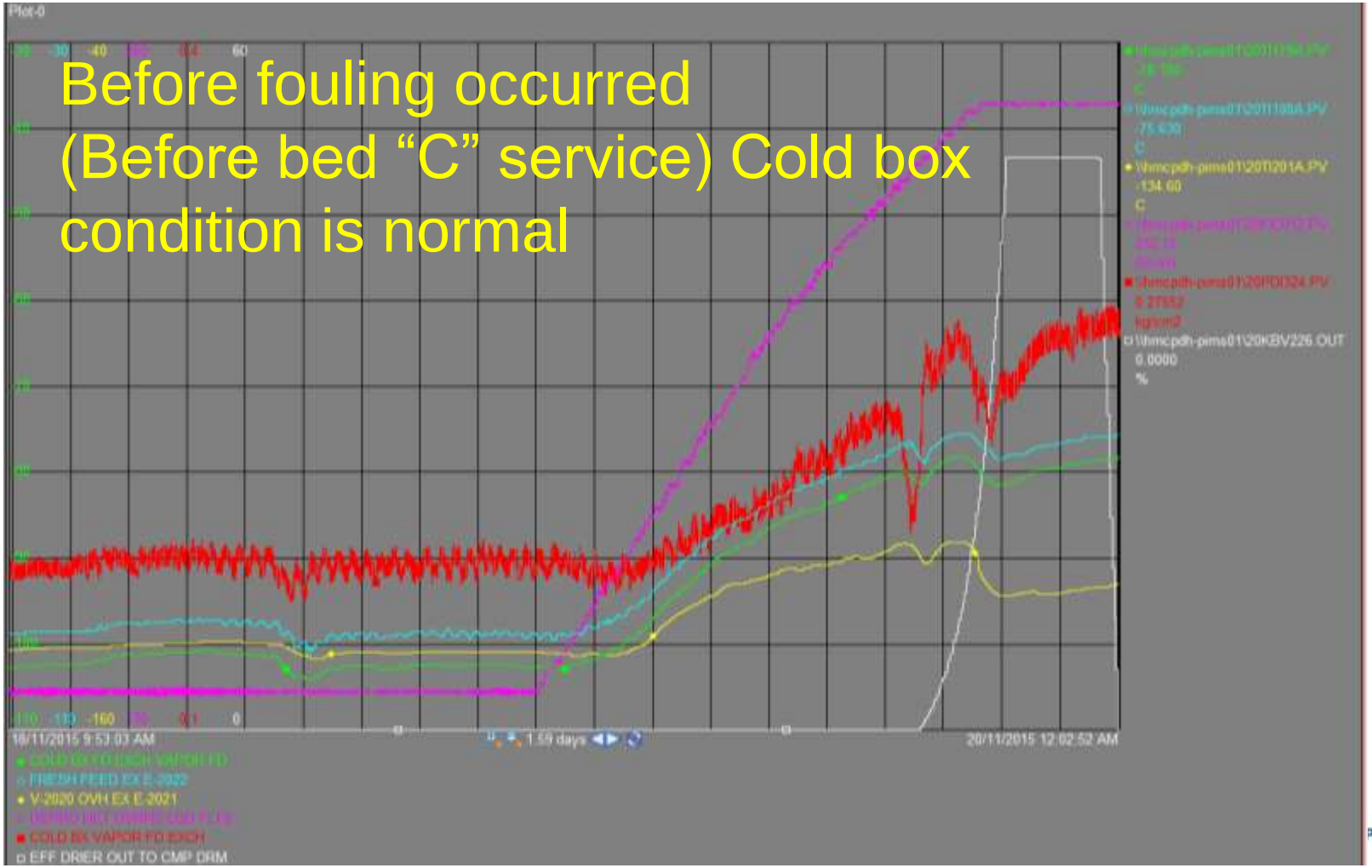
Event and finding : Possible fouling location.



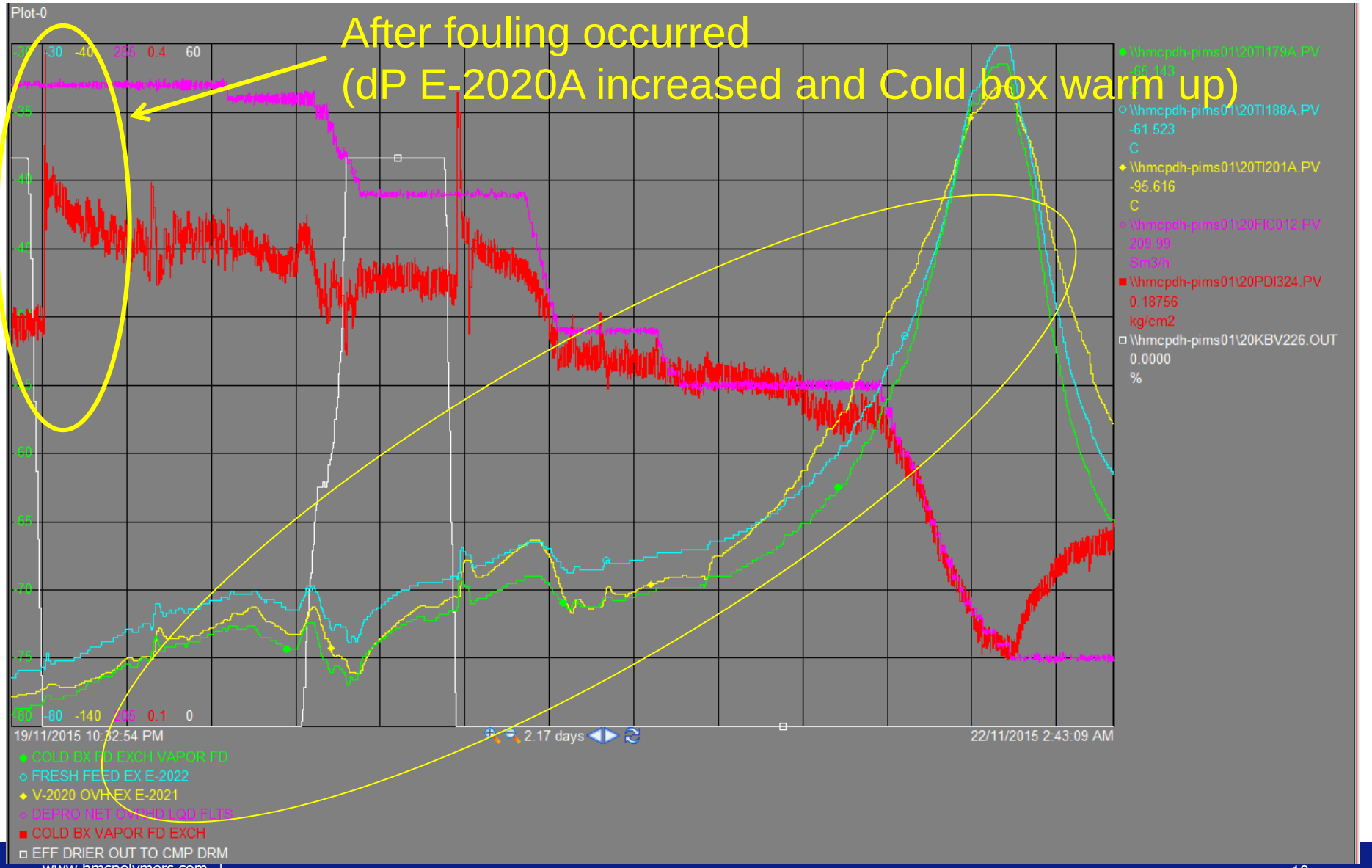
Event and finding-Overall condition



Event and finding-Overall condition



Event and finding-Overall condition



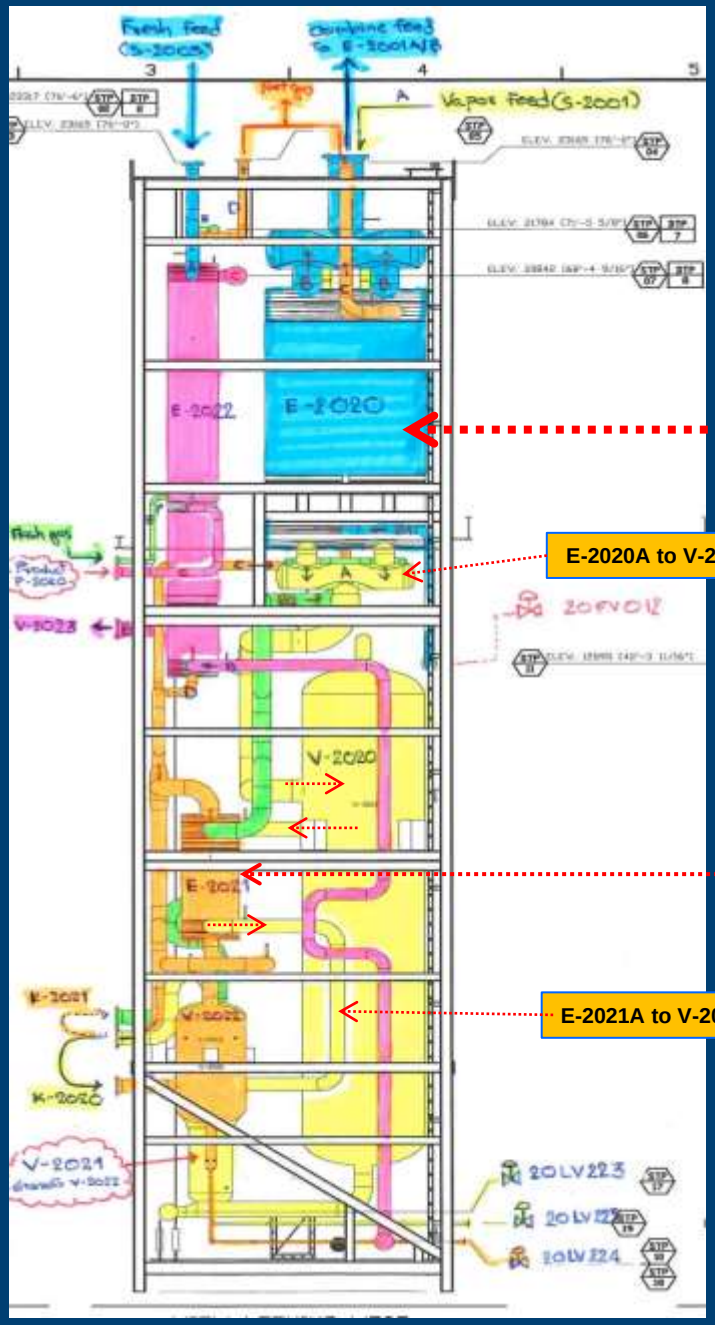
Event and finding-Possible root cause

Table 1 showing percentage of heat transfer loss.

	Path A	Path B	Path C	Path D	Path E
E-2020	-40.7%	-58.3%	-57.7%		
E-2021	-81.8%	-62.8%	88.8%		
E-2022	-47.7%	-58.2%	-36.6%	-49.9%	-19.1%

E-2021A is less heat transfer area during cold box warm up.

Cold box diagram



E-2020A to V-2020

E-2021A to V-2021(Behind V-2022)

First fouling at E-2020A (vapor feed line)

Then move to fouling at E-2021A

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Possible root cause

No	Possible root cause	Information	Likelihood
1	**Free water from pipe line of RED bed "C" (Dead pocket)**	1. Fouling in Cold box is occurred at E-2020A and E-2021A, Their upstream line is from vapor feed stream(Reactor and RED side). 2. Fouling occurred after RED Bed"C" put on service. 3. Operator observe free water come out from low point drain at RED"C". 4. Main pipeline of RED"C" was define to be dead pocket because "No flow pass through" during reactor dry out.	Most possible

Possible root cause

No	Possible root cause	Information	Likelihood
2	**Chemical (Dispersant & Solvent).**	Freezing point of chemical does not close to cold box temperature.	Less possible
3	**Heavy polymers.**	Bed "C" is new adsorbent bed and never used before, there is impossible to have any heavy hydrocarbon.	Less possible

GAP-CLOSING

GAP	Corrective Action	By	When
Free water from RED (Dead pocket) cause fouling in cold box	Push more dry feed to cold box to remove the residual foulant.	Operation	22-30 Nov 2015
	Drain Low point drain of all RED bed to flare before put in service.	Operation	Daily basis

GAP	Preventive Action	By	When
Free water from RED (Dead pocket zone) cause fouling in cold box	1. Created WI to recognize operator to flushing and drain dead pocket line of RED after turnaround.	Nitikom	30 Nov 2015
	2. Feasibility study to add drain line and bypass line of RED piping system.	Nitikom/Engineering	Feb-2016
	3. Feasibility study to add methanol injection unit to both vapor and combine feeds.	Nitikom/Engineering	Feb-2016

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Thank you

Event and finding-Possible root cause