Upset Operating Conditions	Causes / Solutions / Guidelines		
	Possible Causes	**Possible Solutions**	**Remarks**
High non-aromatics In Extract	1. Low EDC Btm. Temp.	1. Increase EDC Btm. Temp.	1. If high NA in Extract & low Arom. in Raff.
	2. Too low S/F ratio.	2. Increase S/F ratio.	2. If high NA in Extract & high Arom. in Raff
	3. Too high EDC Reflux.	3. Decrease EDC Reflux ratio.	3. If EDC reflux is too high, NA might concentrate and reduce the effective S/F ratio.
	4. Too high Solv. Temp to EDC	4. Adjust Solvent Temp to EDC.	4. Adjusting Solv. Temp. improve selectivity
	5. Too low water in Lean Solv.	5. Water in solvent 0.6-0.8wt%.	5. Low water/Solv. EDC btm vapor pressure lower, req. higher EDC Btm temp. Adjust EDC / SRC Column temp.
	6. Water contaminated with NA (Benzene off spec).	6. Route the water to water stripper. Adjust EDC feed location to higher point to gain more stages for aromatics purification.	6. If NA in steam to Regeneration Drum/ NA in extract.
Low Aromatics recovery (High aromatics in Raffinate)	1. Too low Solvent / Feed ratio	1. Increase S/F ratio	1. If high NA in Extract & high Arom. in Raff. at the same time, increase S/F ratio
	2. Too low Lean Solv. temp. to EDC	2. Adjust Solvent Temp to EDC	2. Higher Solv. Temp. improves recovery but hurts product purity.
	3. Too high EDC btm. temp.	3. Reduce EDC btm. Temp if high Arom in Raff. & low NA in Extract	
	4. Too high water in Ln. Solv.	4. If water in Solv. is too high, reduce the EDC btm. temp	4. Adjust also SRC Column btm. temp. & pressure.
	5. Rapid change in feed quality	5. Increase S/F ratio for higher aromatics in feed than normal	5. If the aromatic content in feed increases for a given solvent to feed ratio, the relative volatility between the solvent and the raffinate will be reduced because more aromatics dissolve in solvent. It will result to a higher S/F ratio to maintain the reasonable performance in terms of product purity and aromatic recovery.
	6. Aromatics build-up in Lean Solv. (Re-entry loss)	6. Increase S/F ratio & EDC temp. - Increase SRC Column bottom temp. - Increase the stripping steam.	

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Solvent Quality / Corrosion: Low pH, High Acid Number, Black Solvent	1. Air leaking into the process. 2. Solvent regeneration Drum upset. 3. Failure to purge degraded solvent. 4. Circulating contaminated water 5. Steam reboiler leaking 6. Feed with dissolved oxygen 7. No MEA injection.	1. Check feed tank blanketing and air leaking into SRC Column. Repair leaks- eliminate any oxygen leaks in the vacuum system. 2. Check samples from solvent regen. drum. Note any solid or dirty material at Regen. Drum. 3. Inspect / repair the Solv. Regen. 4. Check the make-up water and circulating water quality. If needed, replace with fresh water. 5. Check the water balance in the process. Identify which reboiler is leaking and repair. 6. Check the feed quality against feed contaminant specifications. 7. Inject MEA to the unit if the lean solvent pH is below 5.0. Keep monitoring the solvent and water pH, and MEA injection, on a regular basis, 1/shift, to avoid solvent degradation. - Increase frequency and quantity of degraded solvent purged from the system.	6. Look for dissolved oxygen, in any sources. The major cause of solvent degradation is the influence of oxygen. All extraction plant corrosion, fouling, and the solvent appearance concerns can be traced back to changes in oxygen intake via a feed system, make-up water or vacuum leaks. 7. The lean solvent pH should be 5.0 - 6.5 If solvent pH keeps below 4.5 with MEA addition, check the SRC Column for leaks. At low pH, the solvent will be corrosive to carbon steel. - It is important not to overdose the system with MEA, as MEA could itself be corrosive. The pH of the water circulation loop should also be maintained by MEA addition, keeping the pH between approximately 6.5 and 7.5 The MEA salts formed are not completely stable and can decompose at high temperatures in SRC Column. Both the acidic compounds and MEA are volatile, and they will recombine in the top condensing area to form neutral salts. Thus, both phases need to be considered for any pH control program.

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Foaming	1. Excessive lighter paraffins, olefins or other contaminants in feed 2. Excessive EDC feed flash due to high feed temperature or low EDC pressure.	1. When foaming in EDC has occurred, it will be seen that EDC overhead receiver and water boot will fill with liquid very quickly. -Inject anti-foam agent to the solvent at a rate of 0.1- 5 wppm on lean solvent flowrate. 2. Decrease the feed rate to EDC and when EDC receiver is stable at the design pressure, maintain the normal feed rate.	For optimum foam control should be considering continuous anti-foam injection at the level of 0.1 wt ppm (antifoam diluted with toluene) based on solvent rate.
Sulfur in Extract / Benzene Product	1. Sulfur present in Feed to EDC	Pygas hydrotreatment severity has to be increased: Either increase temperature or H2 partial pressure.	Thiophenic sulfur will get extracted in extract and land in Benzene product due to close boiling point.