7. <u>Process Safety Hazards (PHA) for processes involving use of "coke pots".</u>

Attachment 7A – 2008 FCC PHA Node 21

Section: 21. E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation

Section Description: E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation
Drawings: D-320282; D-321191

Deviation	Causes	Consequences	S Cat	Safeguards	S	L	RR	Recommendations
1. No Flow	1. LV-102A/B/D/E BFW level control valve closed.	1. Loss of level in E-102A or E-102B Fractionator bottoms reflux coolers. Loss of 150# steam generation. Operational upset. Tube failure in E-102A/B is not expected because tubes are designed for higher temperature than maximum process side operating temperature. May exceed E-102A/B shell design temperature but equipment failure is not expected. Loss of heat removal from C-90 Fractionator bottoms reflux circuit.	A	1. C90 52-TI-910 temperature indication and alarm 2. Engineer monitoring of differential temperature on process side	5	4	8	
	2. E-102s Fractionator bottoms reflux cooler continuous blowdown plugged or closed.	1. Build up of Total Dissolved Solids (TDS) in E-102s. If continues: Fouling of E-102s Catalyst cooler tubes. Reduced heat transfer. Reduced 150# steam generation. Operational upset. Tube failure is not expected to occur. Silica carryover to 150# steam header. Deposits on steam turbine drivers. Loss of driver efficiency. Economic penalty.	A	1. Global Operator routine sampling 2. Happens over time	5	4	8	
	3. E-102A/B Fractionator bottoms reflux	No new consequences.						

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Section: 21. E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation

Section Description: E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation
Drawings: D-320282; D-321191

Deviation	Causes	Consequences	S Cat	Safeguards	S	L	RR	Recommendations
	cooler intermittent blowdown plugged.							
	4. Solids trap (at V-102s, V-105, V-106) blowdown to relief system plugged.	Not a significant consequence.						
2. More Flow	1. LV-102A/B/D/E (E-102s level control) wide open.	1. Increased BFW to E-102A/B/D/E. May overfill E-102s. Water carryover to 150# steam header. Possible line and equipment damage due to water hammer. Potential personnel injury if exposed to 150# steam or condensate.	S	1. V33 LC-33H high level alarm 2. Water hammer is audible in field	4	4	7	
	2. E-102A/B Fractionator bottoms reflux coolers intermittent blowdown left open.	Loss of BFW to sewer, possible release to atm, LPO	A	1. V302 LC-302 high level alarm	6	4	9	
3. Less Flow	1. No new causes discovered.							
4. Reverse Flow	1. No new causes discovered.							
5. Mis-Directed Flow	1. C-90 Fractionator bottoms misdirected at V-	1. May occur during start-up or steaming out of strainer. Potential to drain liquid to sewer along with the solids causing	S	1. Global Operator training and SOPs 2. Manual block valves in place for isolation (put in place in 2005 as	4	2	5	29. Concern: During start-up or steaming out of V-102s, V-105s, and V-106s Fractionator bottoms strainers, the potential to drain liquid to sewer along with solids may cause back

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Section: 21. E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation

Section Description: E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation
Drawings: D-320282; D-321191

Deviation	Causes	Consequences	S Cat	Safeguards	S	L	RR	Recommendations
	102s, V-105s, V-106s Fractionator bottoms strainers to grade.	back splash to operators. Possible fire. Potential personnel injury. Potential environmental violation.		part of bottoms project)				splash resulting in possible fire or personnel injury. Consider relocating blowdown line to bottom of vessel to remove standing liquid thus eliminating this problem.
	2. 150# steam to LCO.	1. Potential to contaminate LCO flush oil with 150# steam.	A	1. Global Operator training and SOPs	6	3	8	
6. More Temperature	1. No new causes discovered.							
7. Less Temperature	1. No new causes discovered.							
8. More Pressure	1. No new causes discovered.							
9. Less Pressure	1. No new causes discovered.							
10. More Level	1. No new causes discovered.							
11. Less Level	1. No new causes discovered.							
12. Contamination	1. No new causes discovered.							
13. Startup/Shutdown	1. No new causes discovered.							
14. Leak/Rupture	1. Valve leaking in C-90 Fractionator bottoms service.	1. Loss of isolation. Possible personnel injury if exposed to hot hydrocarbon. Potential fire. Block valves in C-90 Fractionator bottoms service have a history of leaking due to coke deposits on valve seats, unable to provide tight shutoff.	S	1. Global New bottoms project (2005) spared equipment and sized for full feed rate	4	4	7	

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Section: 21. E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation

Section Description: E-102A/B/D/E Fractionator bottoms reflux coolers and V-102A/B, V-105s, V-106s Fractionator bottoms strainers switching operation
Drawings: D-320282; D-321191

Deviation	Causes	Consequences	S Cat	Safeguards	S	L	RR	Recommendations
15. Human Factors	1. No new causes discovered.							
16. Miscellaneous	1. No new causes discovered.							

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7. <u>Process Safety Hazards (PHA) for processes involving use of "coke pots".</u>

Attachment 7B – 2008 FCC PHA Recommendation 16698

Record Niumber: 16698

Consideration

ABU: Cracking Unit: FCC Draft Date: 10/13/2008 I/R: 2008

Section: 21 Item : 21.5.1.1 Consequence Category: S Risk Ranking: 5 SOA ☐

Additional Consideration

"29. Concern: During start-up or steaming out of V-102s, V-105s, and V-106s Fractionator bottoms strainers, the potential to drain liquid to sewer along with solids may cause back splash resulting in possible fire or personnel injury.Consider relocating blowdown line to bottom of vessel to remove standing liquid thus eliminating this problem."

ABU plan to address the Team's additional consideration

ABU Proposa

Review design and develop resolution

AC Assigned To: Elizalde, Mark T. and/or Assets Dep

Current Status: Completed ☐ Shutdown Required

The ABU has scheduled to complete this task 7/30/2009 Which is prior to the RI Guideline due date.

Notified On: 5/19/2009 Assigned By: Salomon, Karla J.

Resolution: Decribe the work that has been done to resolve the ABU proposal

Procedures were updated to resolve this operational issue.

Each A/C created after 1/1/01 requires verification. Please identify the person to perform this task, then click the signature button

By clicking on the "Signature" button, I acknowledge the assigned A/C has been comple

Completed By: Elizalde, Mark T. Completed On: 5/19/2009

Verifer Name: Salomon, Karla J. Notified On: 5/19/2009

☐ **No, there are some concerns about the new modificati**

☐ **Yes, It's completed according to specificati**

By clicking on the "Signature" button, I acknowledge the assigned A/C has been verified as com

Verified By: Salomon, Karla J. Verified On: 5/19/2009

Verifier Comment

verified

7. Process Safety Hazards (PHA) for processes involving use of "coke pots".

Attachment 7C – FCC Consequence of Deviation Table

Variable	Description	Comments	Range	UL	LL	Consequence of Deviation		Probable cause	Corrective action
52LC102A 52LC102B 52LC102D 52LC102E	E-102A/B/D/E drum level control		60%	90%	50%	High-	Water in steam line, hammering, gasket failure, possible line failure.	Incorrect setpoint, malfunction of 52LC102A/B/C.	Check for Proper operation of 52LC102 A/B or C. Check for proper operation of 52LC102 A/B or C. Monitor level & manually control BFW m/u to drum. Blow down vessel as necessary, Repair bad control loop.
						Low	Caustic embrittlement of floating head bolts.	Incorrect setpoint, malfunction of 52LC102A/B/C	Change setpoint, ensure P-303 is running, ensure gauge glass level to TDC PV, open bypass on LC.
52LC130	E-130 drum level control		60%	90%	50%	High-	Water in steam line, hammering, gasket failure, possible line failure.	Malfunction of 52LC130.	Manually block in level control valve. Monitor level & manually control BFW m/u to drum. Blow down vessel as necessary. Repair bad control loop.
						Low	Caustic embrittlement of floating head bolts.	Incorrect setpoint, malfunction of 52LC102A/B/C	Change setpoint, ensure P-303 is running, ensure gauge glass level to TDC PV, open bypass on LC.
52PD102A/B	V-102A/B Coke Pot DP		0-5 PSIG	H 5.5 PSIG HH 6.5PSIG		High-	Lift screens with bypassing of bottoms & coke into E-102's. Loss of bottoms reflux due to E-102's plugging	Routine coke accumulation or C-90 upset	Isolate & switch, flush & steam V-102.
52PD106A/B	V-106A/B Coke Pot DP		0-5 PSID	H 5.5PSIG HH 6.6PSIG		High-	Lift screens with bypassing of bottoms & coke into E-102's. Loss of bottoms reflux due to E-102's plugging	Routine coke accumulation or C-90 upset	Isolate & switch, flush & steam V-106.V-106.
52PD05A/B D/E	V-105A/B/D/E Coke Pot DP		0-2 PSID	H 2.5 PSIG HH 3.0PSIG		High-	Plug screens With coke. Loss of bottoms reflux due to loss of P-105/A/B Suction	Routine coke accumulation or C-90 upset	Isolate & switch, flush & steam V-105
52FI114	HCO to storage		2-6 KBPD		2 KBPD	Low-	Fouling of E-130/E-186/E-741 coolers, HCO to tankage too hot, foam-over storage tank.	52FC111, MCO product rate set too high, C-90 bottoms or MCO P/A heat balance not correct	Reduce MCO draw Adjust heat balance.
						Low-	Possible loss of P-105's due to light ends in bottom, cavitation, Flooding in C-90 bottoms due to cooler temps in bottom.	Malfunction of 52FC092: Loss of P-105's, Loss of P-106. Fouling in E-102's, E-106, E-102C. Plugging in V-102's or 106's. FV-100 not in proper pos.	Check 52FC092, change setpoint of 52FC092, check proper operation of P-105's & 106. Bounce E-102's. Check valve position of manual valve FV-100. Switch & clean V-102's of V-106's.
52LI090 52LC090	C-90 bottoms level		40-60%	95%	15%	High-	Possible C-90 damage as level reaches reaction mix inlet. PIS feed bypass at 95%		
						Low-	Possible loss of suction to P-105's on low level		
52PVXXX	Fractionator inlet velocity		70-85 ft/sec 78 design	90	65	Low-	Possible reaction mix line long term coking		
						High-	Possible maldistribution of vapor fractionator grid; grid coking		
52FC105	C-90 Fractionator bottoms reflux loop. Bed 1 Reflux		85-155 KBPD	160KBPD		High	Possible maldistribution of reflux above first bed causing Localized areas of coke buildup. Wear of 52FV105 or E-102 globe valves	52FC105 Setpoint too high. Valve open too much	Maintain flow setpoint in order to maintain vapor temps and allow for good distribution. PED recommends staying below 156KBPD flow for correct distribution over bed 1.

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8. <u>Injury & Illness Log 300A 2010 (not the summary).</u>

Attachment 8 – Injury & Illness Log 300 2010

CONFIDENTIAL

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 2010

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an injury and illness incident report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name: Chevron Products Company - Richmond Refinery

City: Richmond State: California

Identify the person		Describe the case				Classify the case											
(A) Case No.	(B) Employee's Name	(C) Job Title (e.g., Welder)	(D) Date of injury or onset of illness (mo./day)	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	CHECK ONLY ONE box for each case based on the most serious outcome for that case:				Enter the number of days the injured or ill worker was:		Check the "injury" column or choose one type of illness:					
						Death	Days away from work	Remained at work		Away From Work (days)	On job transfer or restriction (days)	(M) Injury	Skin Disorder	Respiratory Condition	Poisoning	Hearing Loss	All other illnesses
								Job transfer or restriction	Other record-able cases								
						(G)	(H)	(I)	(J)	(K)	(L)	(1)	(2)	(3)	(4)	(5)	(6)
E 01-2010	REDACTED	Mechanic	1/26/2010	RLOP	While installing blinds at P-1601B, Mechanic was loosening studs on 1 1/2" 2500# flange when mechanic felt straining sensation in right shoulder area. Mechanics finished job and returned to weld bay where mechanic called supervisor @ 2:15 pm to report discomfort		X			180		X					
E 02-2010		Instrument	3/14/2010	D&R	While looking for possible entry permit on E-2561 EE tripped and fell. EE reported discomfort in right shoulder.		X					X					
E 03-2010		Fire Fighter	3/17/2010	North Isomax	Worker was walking on elevated scaffolding. He stepped on uneven boards and rolled left ankle outward				X			X					
E 04-2010		Operator	7/25/2010	Long Wharf	While tying up a ship at the Long Wharf in berth #4 an Operator was attempting to remove rope frays from the messenger line, while it was being pulled by the mooring winch. His fingers were caught between the rope and winch and pinched the tips of three fingers off, on his right hand (middle, ring & pinky fingers).		X			180		X					
E-05-2010		Tool Shop	8/31/2010	Central Tool Room	While working on filling a fresh air trailer, the employee was walking around the rear of the trailer and tripped on the fill hose, hitting their head and knee on the ground.			X			56	X					
E-06-2010		Operator	10/17/2010	Cracking - FCC	FCC Shutdown: During plant cleanup operations, while unlatching strainer box under V-102B coke strainer, hot oil sprayed out of the box onto area operator, causing burn to leg.		X					X					
					Page totals	0	4	1	1	360	56	6	0	0	0	0	0

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9. **P&ID for the Cracking Area Business Unit FCC Plant with the location of section V105 A/B/C/D and V103 A/B and V106 A/B identified.**

Attachment 9A – P&ID for V-102A/B Strainers & V-102C Knockout Pot (D-333138-5)