

## BASELINE RISK ASSESSMENT FOR THE PHOSPHORIC MAINTENANCE AND PROCESS PLANT

ANNEXURE 1.2	RISK ASSESSMENT TYPE	Team	<p>V.R,Dubazane S.T.,Gcina Mkhonza,Neo Lesekele,Kurt Brinkhuis,Mandla Magudulela,M. Ngwenya.</p> <p>Pranli Sing,Wiseman Mvelase,Siyaya S.M,S.M.</p> <p>Mcobothi,M. Gcumsa,Pieter Engelbrecht,Zimu</p>
	Risk Assessment - Fokkor Acid Division		

[illegible][illegible]



12			Conveyor belt snapping and stopping during loading	injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
13			Changing of trough and return idlers	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
14			Changing of head, tail and snub pulleys	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
15			Training, aligning the conveyors	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
16			Tension take away conveyor	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
17			Change conveyor belt	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
18			Change bearings on pulleys	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
19			Repair / replace receiving hoppers	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
20			Repairs on structures	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
21			Repair / replace stringers	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
22			Splice conveyors	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
23			Rubber line pulleys in position	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
24			Repair / replace damaged guards	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	
25			Change conveyor motor	Injury	safety	Catastrophic	high		12	No	Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low		1	Yes	



26				Change conveyor gearbox	Injury	safety	Catastrophic	high	12	No		Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low	1	Yes	
27				Lubricate pulley bearings	Injury	safety	Catastrophic	high	12	No		Daily inspection by maintenance. Planned maintenance schedule in place. Trip wires in place. Emergency stop button in place and operational. Sirens in place prior to conveyor start-up. TD 10 PARN PAR 03 dry feed. Daily cleaning under the conveyor area. Sufficient lighting	minor	low	1	Yes	
28				Manually clean receiving hoppers	Injury	safety	Catastrophic	high	12	No		Installation of lump breaker to break away from people standing inside the hopper to clean.Use access platform.	minor	low	1	Yes	
				Manually cleaning of tranfer shute	Injury	safety	Catastrophic	high	12	No		Installation of hopper to clean.Use access platform.					
29		2	Reactor	Noise exposure from mechanical equipment , such as gear boxes	health	health	very serious	high	9	No		Annual medicals including noise induced hearing. Noise surveys (Annual and two yearly) . Signage. Induction. PPE (Variphones)	minor	low	1	Yes	
30				Pume of fumes from failure from scrubbing system operation	health	health	Catastrophic	high	12	No		Scrubber system in place and operational. BI weekly cleaning and maintenance of scrubber. PPE (respiratory mask)	minor	low	1	Yes	Daily inspections to be conducted
31				Increased Radiation exposure- due to maintenance conducted during annual shut down	Radiation	health	Catastrophic	high	12	No		Maintenance schedule in place Daily checks. Monitoring of reactor conditions such as mother liquor. Annual medicals. Permit work system with a register (COP 11). Radiation badge (TLDs) used to measure radiation levels during annual shutdowns. Designated wash bay and flushing of system during maintenance shutdown to reduce Fluorides. PPE worn at the area is cleaned separately.	minor	low	1	Yes	
32				Heat- when operators work inside the reactor	Heat stress	health	Catastrophic	high	12	No		Regular awareness and inspections	minor	low	1	Yes	
33				burns	burns	safety	Catastrophic	high	12	No		Regular awareness and inspections	minor	low	1	Yes	
34				The reactor area itself has low maneuvering space which causes ergonomics issues	Congestion	health	Catastrophic	high	12	No		Gas tester availability checked	minor	low	1	Yes	
35				Opening of strainer	Environmental / Safety	Burns / ergonomics	very serious	high	9	No		Isolate reactor. Open drain valves to drain reactor. Hira and clearance to be obtained. Wear correct PPE, IE. Gloves, goggles, acid resistant overalls, hard hat, safety boots, hearing protection	minor	low	1	Yes	
36				Breaking of flanges on top of the reactor.	Safety	Burns	very serious	high	9	No		Stop sulphuric and phosphoric pumps. Isolate motors electrically. Drain the pipe line. Have running water ready. Ergonomics. Build scaffolding if required. Obtain hira and clearance. Wear correct PPE, IE. Gloves, goggles, acid resistant overalls, hard hat, safety boots, hearing protection	minor	low	1	Yes	
37				Changing of V-Belts on the agitator	Safety	Injury / nip points	very serious	high	9	No		Electrically isolate the agitator. Build scaffolding for high places. Obtain Hira and Clearance. Release tension on V-Belts. And retighten tension after replacement.	minor	low	1	Yes	Fabricate mobile platforms
38				Removal of feed pumps	Safety	Excessive heat. Falling into reactor. Fumes. Nip points. Falling	very serious	high	9	No		Limit access. Block access by means of scaffolding barrier. Obtain Hira and Clearance. Electrically isolate the equipment. Use only qualified personal. Use guide ropes when do lifting. Barricade the area. Pre equipment check, quarterly checks on lifting equipment with colour code as proof of check. lifting equipment must be on a register. Keep scrubbers running to reduce fumes in the area. Flush the reactor with water.	minor	low	1	Yes	Fabricate covers for the openings



39			Removal of agitators	Safety	Excessive heat. Falling into reactor. Fumes. Nip points. Falling	very serious	high	9	No	Limit access. Block access by means of scaffolding barrier. Obtain Hira and clearance. Electrically isolate the equipment. Use only qualified personal. Use guide ropes when do lifting. Barricade the area. Pre equipment check, quarterly checks on lifting equipment with colour code as proof of check. lifting equipment must be on a register. Keep scrubbers running to reduce fumes in the area. Flush the reactor with water.	minor	low	1	Yes	
40			Removal of Gearboxes	Safety	Excessive heat. Falling into reactor. Fumes. Nip points. Falling	very serious	high	9	No	Limit access. Block access by means of scaffolding barrier. Obtain Hira and clearance. Electrically isolate the equipment. Use only qualified personal. Use guide ropes when do lifting. Barricade the area. Pre equipment check, quarterly checks on lifting equipment with colour code as proof of check. lifting equipment must be on a register. Keep scrubbers running to reduce fumes in the area. Flush the reactor with water.	minor	low	1	Yes	
41			Removal of motors	Safety	Excessive heat. Falling into reactor. Fumes. Nip points. Falling	very serious	high	9	No	Limit access. Block access by means of scaffolding barrier. Obtain Hira and clearance. Electrically isolate the equipment. Use only qualified personal. Use guide ropes when do lifting. Barricade the area. Pre equipment check, quarterly checks on lifting equipment with colour code as proof of check. lifting equipment must be on a register. Keep scrubbers running to reduce fumes in the area. Flush the reactor with water. Erect scaffolding for electrical.	minor	low	1	Yes	
42			Working on scrubber fibre glass ducting's	Safety / Environment	Injury	very serious	high	9	No	Obtain Hira and Clearance. Use safety harness. Stop scrubber fans.	minor	low	1	Yes	
43			Changing of V-Belts on the scrubber fans	Safety	Injury / nip points	very serious	high	9	No	Electrically isolate, Build scaffolding for high places. Obtain Hira and Clearance. Release tension on V-Belts. And retighten tension after replacement. Use PPE (Gloves)	minor	low	1	Yes	
44			Open manhole on the reactor	Safety / Environment	Acid burns	Catastrophic	Medium	8	No	Drain on manhole opened. Unlock man hole to ensure all is drained. Slag manhole bolts. Once no acid from reactor open all bolts	minor	low	1	Yes	Install emptying pump in old plant
45			Lifting of equipment- items that requires a crane to be removed	injury	safety	Catastrophic	high	12	No	Use qualified riggers,guide ropes and dermacation of the area.Qualified crane driver.SOP in place Risk assessment performed -HIRA and clearance certificate in place.	minor	low	1	Yes	
46			Crystal formation on product	poor quality of product leading to loss in sales	Quality	very serious	high	9	No	Crystals habit modifier (that helps avoids formation of crystals) availability- filtration process	minor	low	1	Yes	
47	3	Filtration Area	Lifting of equipment- items that requires a crane to be removed	Injury	Safety	Serious	high	6	No	Use qualified riggers,guide ropes and dermacation of the area.Qualified crane driver.SOP in place Risk assessment performed -HIRA and clearance certificate in place.	minor	low	1	Yes	
48			Fumes – when the gas scrubber is not operational	Inhalation of fumes	health	Catastrophic	high	12	No	Suspend/stop and cleaning of scrubber duct,Inspection of scrubber fans conducted.	serious	medium	4	Yes	
49			Fumes generated from the filter operations (Fluoride Gas)	Inhalation of fumes	health	Catastrophic	high	12	No	Ensure filtrationis working,PM in place,SOP' &COP'S in place, PPE (3M mask).Signage and awareness in place.	serious	medium	4	Yes	
50			Moving Machinery- moving filter (pan and belt) that employees are exposed	Injury	safety	Catastrophic	medium	8	No	SOP'S & COP'S to guide staff Preventative maintenance in place,machine guarding tripp wires. Inspections performed	minor	low	1	Yes	
51			Failure of equipment and filters	injury	safety	Catastrophic	medium	8	No	PM schedule in place Maintenance SOPS and COP'S in place Maintenance strategy in place AIA inspectors also appointed Statutory meeting held to discuss status and problems Statutory inspection schedule maintained on JDE by CMM MOC process on place Reports reviewed by Maintenance Managers	minor	low	1	Yes	



52	4	Concentration	C- Tank Farm Area- Acid splashes from over-head pipes at the area	Acid burns	safety	Catastrophic	High	12	No	Baricate the area. Isolate the source and repair,planned maintenance for piping,pipe support,correct material specifications. Flange covers for Sulphuric acid. Ensure right number of bolts on the flanges	minor	low	1	Yes	
53				Spillages conditions (due to de-sludging of tanks, spillages)	Safety	Catastrophic	high	12	No	Procedure developed for underflow solids & SG content in clarifiers Repair C Tank farm bund wall New agitators installed at De Villiers sump Product acid solid % analysis on a daily basis (weak acid) on PHOSMES Hourly in plant P205 analysis performed Daily & monthly DCS report of losses through effluents,barricate spillage and clean sludge on the floor.	minor	medium	2	Yes	
54			Waste sludge for disposal	Inhalation of fumes	Health	Catastrophic	high	12	No	Recovery of spillage back to the bunded area Installation of sump pump. Containment wall erected	minor	medium	2	Yes	
55			Accesses to critical operating areas.	injury	Safety	Catastrophic	high	12	No	Install permanent/Temporary platforms. Conduct proper MOC	minor	medium	2	Yes	
56			Ground water contamination due to Susceptible cracks on the bunded floor	Land contamination and ground water contamination	Environment	serious	medium	8	No	Ensure bund are in good condition,emptying bund area,schedule for cleaning of the sump,bund water proof,proper maintenance of the bund	minor	low	1	Yes	
57			Structural monitoring that can result to rupture of tanks e.g. tanks, control room, stairways.	equipment failure	Quality	Catastrophic	high	12	No	Statutory inspection done every 5yrs,Structural inspection in place, Pressure vessels inspection done every 3yrs,PM monthly	minor	low	1	Yes	
58			Sludge accumulation due to cleaning of the tanks.	spillages, land and ground contamination	Environment	serious	high	6	No	Control removal of sludge from the tank,slurry the the sludge and pumping to the designated area,ensure sump pumps are operational.	minor	low	1	Yes	
59			Delayed access to critical equipment for maintenance that can results to loss of production	Inoperability of safety devices	Quality	serious	Medium	4	No	Maintenance of equipment,PM in place, weekly planning meeting,COP 179	minor	low	1	Yes	
60			Power failure	injury	Safety	Catastrophic	medium	8	No	PM schedule in place. Maintenance SOPs and COPs in place. Maintenance strategy in place. Display Umthathuze power supply emergency contact	minor	medium	2	Yes	
61			E-Tank Farm- Acid splashes from over-head pipes at the area	Acid burns	safety	Catastrophic	High	12	No	Baricate the area. Isolate the source and repair,planned maintenance for piping,pipe support,correct material specifications. Flange covers for Sulphuric acid. Ensure right number of bolts on the flanges	minor	low	1	Yes	
62			Non-operation of safety showers	Acid burns	safety	Catastrophic	High	12	No	Safety shower checklist in place, daily inspection of safety showers,COP 164	minor	low	1	Yes	
64			Falling objects ( from always connecting tanks for maintenance and operations)	injury	safety	Catastrophic	high	12	No	Safe working procedure in place,Risk assessment to be performed -HIRA,Maintain in good housekeeping.	serious	low	2	Yes	
65			Fumes from the open room fragments in tanks	Inhalation of fumes	health	Catastrophic	high	12	No	Area dermacted as respiratory zone area,signage in place,awareness	minor	low	1	Yes	
66			Waste sludge for disposal	spillages, land and ground contamination	Environment	serious	high	6	No	Recover waste sludge into the sumps and pump to the gypsum system,Neutralize the sludge send to the gypsum dam,sell the gypsum sludge	minor	low	1	Yes	



70			Settling of solids at the storm water drains	blockages leading to spillages	Environment	serious		high	6	No	Use dry recovery system, Attendance to the leaks immediately,Regular inspection,Routine cleaning of trenches and sumps.	minor		low	1	Yes	
71			Quality of Acid Product before dispatch.	poor product leading to loss of sales	Quality	serious		medium	4	No	Ensure that all production requirements are met and everything is within spec, SOP,sampling of product every 2hrs.	minor		low	1	Yes	
72	5	Concentration Units (Old and New)	Noise from the equipment such as steam injectors, pumps	hearing loss in long term	health	serious		high	6	No	Hearing assessments performed yearly. Safety audits performed. SOP'S in place to guide employees. Protective hearing devices issued to staff	minor		low	1	Yes	
75			Aging and damage Ladder and grating that can results to employees falling	injury	safety	Catastrophic		high	12	No	Safe working procedure in place Risk assessments to be performed-HIRA Safety training provided Replace old ladders,catladder inspection.	minor		low	1	Yes	
76			Lighting for visibility in the plant (especially working at night)	injury	safety	Catastrophic		high	12	No	Lighting survey conducted annually, MSA monthly.	minor		low	1	Yes	
77			Steam and acid burns from rusted pipes	Acid burns	safety	Catastrophic		high	12	No	Regular inspection,lagging of steam pipes by AIA,replacement of corroding pipes,use of flanges cover's.	serious		low	2	Yes	
78	6	Cooling Tower	Acid rain from CT	Air pollution	Environment	very serious		high	9	No	COP -online analyser , ensure drift eliminators are working samples sent to the lab every two hours from each tower Back up acid strength analysers in place, run according to the operating procedure	serious		low	2	Yes	
79			Foam fall-out due to acid carry-over to the cooling towers	Acid burns	Safety	Serious		High	6	No	Inspection and cleaning of belt filters fume collection ducts CI test limits within parameters Bleed off system in place (old+new cooling tower) Internal pressure profile of fume collection suction dish CT headers, supply and return pipes for old CT TD 07 PARN Pickling of Reaction and Filtration Bi-monthly scrubber cleaning in old & new R & F Internal monitoring Cleaning of CT headers and nozzles for better distribution Adherence to pickling and scrubber cleaning schedule Crystal habit modifier & dosing defoamer in place Defoamers in place at cooling,oparate according to the procedure	minor		low	1	Yes	
80			Colling tower overflows during flushing or upset operational conditions	water and ground contamination	Environment	very serious		high	9	No	Lower cooling tower levels during scrubber shut to prevent overflow, bleed off continuously to main required level.	serious		low	2	Yes	
82	7	Dense and Buoyant Line	Waste- Gypsum cake disposal at landfill	water and ground contamination	Environment	serious		high	9	No	Pumping through gypsum system, waste gypsum neutralize and send to gypsum dam	minor		low	1	Yes	
83			Failure to comply with permits and license requirements	Non compliance to new permit requirements (2020)	Environment	serious		high	6	No	Compliance/monitoring with permit conditions. TD 07 PARN Pickling Of Reaction and Filtration. Levels discharged within tolerance limits - new plant. FSA consumed during pickling CoP 81 Pollution risk Control, Forum meetings to discuss compliance with the new requirements. Engagements with Mhlathuze Water to discuss future plans	serious		medium	4	Yes	
84			Disposal via dense line ( HF, PH, P2O5 off spec)	water and ground contamination	Environment	serious		high	9	No	Monitor effluent quality Ground water monitoring (bi-annually) COP 81 Forum meetings to discuss compiace with the new requirements Engagements with Mhlathuze Water to dicuss future plans Mhlathuze water taking daily samples to analyze	serious		medium	4	Yes	



85				Radiation- increased radioactivity	Occupational health related will be skin irritation on employees working in and around the area	Radiation	Catastrophic	high	12	No	Process maintenance plan in place PPE used is cleaned separately examinations Radiation badge used to measure radiation levels during annual shutdowns Designated wash bay. Flushing of system during maintenance shutdown Cleaning to be done at wash bay PPE to be worn by staff.	serious	medium		4	Yes	
86			Affect Flora and flora at the sea	water and ground contamination	Environment	serious	high	8	No	washing the gypsum off Approved waste disposal supplier performs cleaning & waste disposal Pumping to the sea comply with the National water act. Fish samples sent to NNR every 6 months	minor	low		1	Yes		
87	8	Holistic across plant risk	Exposure to radiation	Occupational health related will be skin irritation on employees working in and around the area	health	Catastrophic	high	12	No	Process maintenance plan in place PPE used is cleaned separately Staff undergo medical examinations Radiation badge used to measure radiation levels during annual shutdowns Designated wash bay. Flushing of system during maintenance shutdown Cleaning to be done at wash bay PPE to be worn by staff.	minor	low		1	Yes		
88			Exposure to Fluorine Gases	inhalation of gases	health	Catastrophic	high	12	No	Cleaning scrubber system bi-weekly(scrubber shut),SOP two hourly samples to the lab for analyses,new cooling tower FSA recovery system,old plant bleed off system.	serious	low		2	Yes		
89			Acid Spillages from pipes, including ground and overhead pipes	burns	safety	Catastrophic	medium	8	No	Treat all water looking spillages as though it were acid. Hence PPE to be worn. Proper working safety showers around plant avoiding contact with acid. 5 minutes safety talks on acid. Correct	minor	low		1	Yes		
90			Exposure to heat and/or high temperature	Heat stress	health	serious	high	8	No	Wear all protective gear COP 8 encourage workers to work only in areas well ventilated	minor	low		1	Yes		
91			Pipeline colour coding and flow direction.	Non compliance to COP on markings	Quality	serious	high	8	No	Enforce the COP 56 on Markings and colour coding	serious	medium		6	Yes		
93			Loose hanging cables from cable racks	injury	safety	Catastrophic	high	12	No	Encourage Hosekeeping 5 minutes safety talks on housekeeping,monthly SHREQ and routine inspection.	minor	low		1	Yes		
94			Functioning of safety showers	Acid burns	safety	Catastrophic	high	12	No	Install proper working showers conduct daily inspections on showers have clear signage directing to the nearest shower 5 minutes safety talks on showers	minor	low		1	Yes		
96			fumes around the plant.	inhalation of fumes around the plant.	health	Catastrophic	high	12	No	Emergency procedure in place COP 164,induction and awareness.	minor	low		1	Yes		
97			Raw Water shortage, Sulphuric and Rock available can affect production	water scarcity	Quality	serious	high	9	No	Awareness programs on the scarcity of water conduct environmental talks on water scarcity,production meetings and weekly planning meeting.	minor	low		1	Yes		
98			Leaking steam pipes	steam loss	Quality	serious	high	9	No	Inspect and close all steam leaks	minor	low		1	Yes		



99			Oil drainage from equipment	Land contamination and ground water contamination	Environment	serious		high		9 No	Used oil storage and dispose off by external supplier.	serious	low		2 Yes	
100			Upset release of Fluorides, Phosphates into the environment	inhalation of fumes around the plant.	health	Catastrophic		high		12 No	Emergency procedure in place COP 164, induction and awareness.	serious	medium		4 Yes	
101	9	Employees	Lack of training and skills	injury	safety	Catastrophic		high		12 No	Employ skilled workers only. Have training programs in place monthly, Training Department and IDP's in place	minor	low		1 Yes	
102	10	Sampling (belt & pan filters)	Taking filter cake samples (belt filter and pan filter)	injury	Safety	serious		high		8 No	Use walkway. Process training, use sample scoop to prevent contact.	minor	low		1 Yes	
103			Changing of belt filter clothes	Slip trip and fall, injury, fumes, inhalation	Safety, environment	Catastrophic		high		12 No	CTP in place, Obtain Hira and clearance. Train personal on changing the filter cloth. Process training. Use of correct PPE IE, goggles, gloves, gumboots, respirator pack. Supervision all the time. Slow belt filter to minimum speed. Person at stop/start button to be there all the time and must be visible. communication all the time. be alert. watch out for slippery conditions.	serious	medium		4 Yes	
104			Perform plant inspections.	injury	safety	serious		high		8 No	Use walkway. Process training. Gloves, goggles, hard hat, safety boots, acid resistant overall.	minor	low		1 Yes	
105			Changing of rollers	Slip trip and fall, pinch points, fumes, inhalation	Safety	very serious		high		9 No	CTP in place, Obtain Hira and clearance. Isolate the belt filter. Slag the belt. Lift the belt. Change the roller. Tighten the belt. Deisolate the belt. Sign the clearance certificate off. Start the belt. Do inspection.	minor	low		1 Yes	
106			Breaking of vacuum lines	Slip trip and fall, injury, fumes, inhalation	Safety	serious		medium		4 No	Stop vacuum pump. Open drain valves, SOP in place.	minor	low		1 Yes	
107			Remove / lower vacuum box	Slip trip and fall, injury, fumes, inhalation	Safety	very serious		high		9 No	Isolate vacuum pump. Use only trained competent Fitters and Riggers.	minor	low		1 Yes	
108			Cleaning of scrubber system.	Slip trip and fall, injury, fumes, inhalation	health	Catastrophic		high		12 No	Open up manholes on the scrubber system. PMC monthly scrubber maintenance schedule. Natural ventilation. If work inside the scrubber system obtain Hira and clearance	serious	medium		4 Yes	
109			Flash cooler cleaning.	Slip trip and fall, injury, fumes, inhalation	health	Catastrophic		VERY HIGH		16 No	Break vacuum. Stop unit and drain. Isolate mechanically and electrically. Break suction to the reactor / flush cooler. Erect scaffolding for access. Break vacuum top. Ventilate. Do gas test. Clean floor. Erect scaffolding to clean. Rotate personnel the do the cleaning	serious	medium		4 Yes	
110	11	Pan filter cleaning and maintenance	HP Clean filter cloths	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic		VERY HIGH		16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes	
111			Change balancing wheels	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic		VERY HIGH		16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes	
112			Change pans	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic		VERY HIGH		16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes	
113			Change vacuum lines	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic		VERY HIGH		16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes	
114			Repair tilting device	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic		VERY HIGH		16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes	



115				Work on filter device	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
116				Change girth gear.	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
117				Change segments	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
118				Change balancing springs	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
119				Change trough	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
120				Change centre frame	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
121				Change splash guards	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
122				Change the safety guards	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
123				Change nozzles inside the hopper	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
124				HP clean lead bath	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes
125				Working on structures,	Slip trip and fall, injury, fumes, inhalation	Safety, health	Catastrophic	VERY HIGH	16 No	Stop and isolate pan filter. HP clean lead bath. And wash filter cloths. Stop vacuum pumps as well. Use qualified artisans only. Work in a team. Use respirators for any gasses present. Obtain Hira and Clearance. Heat exhaustion may happen. Build hanging scaffolding inside hopper to prevent falling.	serious	medium		4 Yes



126	12	Concentration	Drain and pickling of the units. Old and new plant.	Slip trip and fall, injury, fumes, inhalation	Safety, health	serious		VERY HIGH	8	No	Break vacuum. Isolate pumps. Close steam to the units. Isolate acid lines and drain. Add water to the units and fuosilicic acid to pickle. Circulate (run inline pump) inject steam. Run for 6 - 8 hours. Drain the solution to the floor storm water system, C-sump then to the fluorine tank.(Break vacuum system). HP clean tubs. SOP inplace.	minor	low	1	Yes
127			Pressure test tubes in heat exchanger.	Slip trip and fall, injury, fumes, inhalation	Safety, environment.	serious		VERY HIGH	8	No	Break vacuum. Obtain Hira and clearance. HP clean heat exchanger. CTP in place.	minor	low	1	Yes
128			Clear unit side glass	Slip trip and fall, injury, fumes, inhalation	Safety, environment.	serious		VERY HIGH	8	No	Break vacuum. Close valves on acid. Isolate level chambers. Lower level of unit or empty unit.	minor	low	1	Yes
129			vacuum checks	Slip trip and fall, injury, fumes, inhalation	Safety, environment.	serious		high	6	No	Isolate MP steam and water. Open flange and check for blockages. If any blockages obtain Hira and clearance and HP clean the blocked area.	minor	low	1	Yes
130			Cleaning of the under flow of A, B, 800, 833 clarifiers	Slip trip and fall, injury, fumes, inhalation	Safety, environment.	very serious		high	9	No	Stop under flow pump. Close suction and discharge valves. Obtain Hira and clearance. Break lines to clear. HP clean lines and reassemble. Flush with water after cleaning.	minor	low	1	Yes
132	13	All tanks	Cleaning inside tanks C1,C2, 804, 808, F1, F2, F4, 812, 815, 819, 813, 889, 831, 837, 934, 918, 894, 924, 850, E1 to E8, digestion tanks	Slip trip and fall, injury, fumes, inhalation,	Safety, environment.	very serious		high	9	No	Spade all interconnected line. Close all inlet and outlet valves to tank. Isolate agitator. Drain the tank. Isolate under pump. Remove the pump. Open manhole. HP clean to make place to enter and exit. Install extraction fan for ventilation inside the vessel. Do gas test to determine to see if it is safe for personal to enter to do cleaning. Obtain hira and confine space clearance. clean area for bobcat. use bobcat to clean tank on the inside. Scrape all slurry through the man hole. Rotate personal regularly to get fresh air. ensure to have a person standing on the outside to observe for any deviances inside the tank. After cleaning close up tank. Ensure regular desludge. COP 8 in place.	minor	low	1	Yes
133		Primary Condensers	Cleaning and maintenance on the primary condensors	Slip trip and fall, injury, fumes, inhalation,	Safety, environment.	very serious		high	9	No	Spade all interconnected line. Close all inlet and outlet valves to primary condenser. Isolate Motors. Drain the whole unit. Isolate pump. Remove the pump. Open manholes. Install extraction fan for ventilation inside the vessel. Do gas test to determine to see if it is safe for personal to enter to do cleaning. Obtain hira and confine space clearance. Rotate personal regularly to get fresh air. ensure to have a person standing on the outside to observe for any deviances inside the vessel. After cleaning close up vessel.	minor	low	1	Yes
134		Evaporators	Cleaning and maintenance on the evaporators	Slip trip and fall, injury, fumes, inhalation,	Safety, environment.	very serious		high	9	No	Spade all interconnected line. Close all inlet and outlet valves to primary condenser. Isolate Motors. Drain the whole unit. Isolate pump. Remove the pump. Open manholes. Install extraction fan for ventilation inside the vessel. Do gas test to determine to see if it is safe for personal to enter to do cleaning. Obtain hira and confine space clearance. Rotate personal regularly to get fresh air. ensure to have a person standing on the outside to observe for any deviances inside the vessel. After cleaning close up vessel.	minor	low	1	Yes
135		Steam lines	Repairs on steam lines	Burns, environmental	Safety, environment.	very serious		high	9	No	Isolate steam. Cool down to permissible temperature. Obtain hira and clearance. Deisolate after work have been done	minor	low	1	Yes



136	Ducting's and stack	Cleaning and maintenance on ducting's and stack	Slip trip and fall, injury, fumes, inhalation,	Safety, environment,	very serious	high	9	No	Spade all interconnected line. Close all inlet and outlet valves to primary condenser. Isolate Motors. Drain the whole unit. Isolate pump. Remove the pump. Open manholes. Install extraction fan for ventilation inside the vessel. Do gas test to determine to see if it is safe for personal to enter to do cleaning. Obtain hira and confine space clearance. Rotate personal regularly to get fresh air. ensure to have a person standing on the outside to observe for any deviances inside the vessel. After cleaning close up vessel.	minor	low	1	Yes	
137	Primary and secondary dams	Sampling, pumping to sea	Slip trip and fall, injury, fumes, inhalation, drowning	Safety, environment,	very serious	high	9	No	Sample to be send to the lab to see what is the acid percentage in the dams. Ensure all valves are open when pump to see. Record the amount pump to the see.	minor	low	1	Yes	
138	Dosing by Materials handling area	Sewage dosing system	Slip trip and fall, injury	Safety, environment,	very serious	high	9	No	Ensure that the dosing been done according to the SOP. Clean area of all bags been use.	minor	low	1	Yes	
139	Effluent sump	Cleaning and sampling at the effluent sump	Slip trip and fall, injury, fumes, inhalation, drowning	Safety, environment,	very serious	high	9	No	Sample to be send to the lab to see what is the acid percentage in the effluent sump. Ensure all valves are open when pump to see. Record the amount pump to the see.	minor	low	1	Yes	
		COMPILED & REVIEWED		SIGNATURE:										
								APPROVED BY:		SIGNATURE				

*N. V. M. Costa*  
11640

*N. V. M. Costa*  
101345



