

# ISSUEANCE (INITIATOR)

# Abnormality Report

AR Number	:	115700
Title	:	Loss additive due to master mix feeder equipment problem
Recurrence case from AR No.	:	
Date Occurrence	:	12/11/2023
Date Reported	:	12/11/2023
Immediate Action	:	Replace unit agitator gearbox

AR Type	OPEDR	Non OPEDR	EXT		TAM	PMS	II	CCR	CORA	PM		MSA					
			PLN:	Comm:						No. AP:	No. TL:	Int:	2nd:	Ext:	TPM:	SMK3:	
*Uptime Plant	C2 Hot	C2 Cold	BD	B1MTBE	Utility	TY-Jetty	SDK	UCC1	UCC2	PEB	PP1	PP2	PP3	PPU	PPB	SPD1	SPD2
								X									

*Uptime Category	First Pass	Loss of Demand	Loss of Supply	Product Mix	Rate Loss	Schedule Downtime	Transition	Unscheduled Downtime
	X				X			



Severity	Slight	Minor	Moderate	Major	Catastrophic	People	Asset/ Property Damage	Environment	Loss (KUSD)
	X								2.44

Problem Type	A	B	C	D	Near Miss	Yes		No
						HPNM	NM	
**RCA Complexity	Low	Medium	High					
			X					

HPNM = High Potential Near Miss ; NM = Near Miss

***MSA Severity	OFI	Minor	Major	Critical	Type Incident	PSE	Non-PSE	PSMC?		Tag Eq.
								Yes	No	

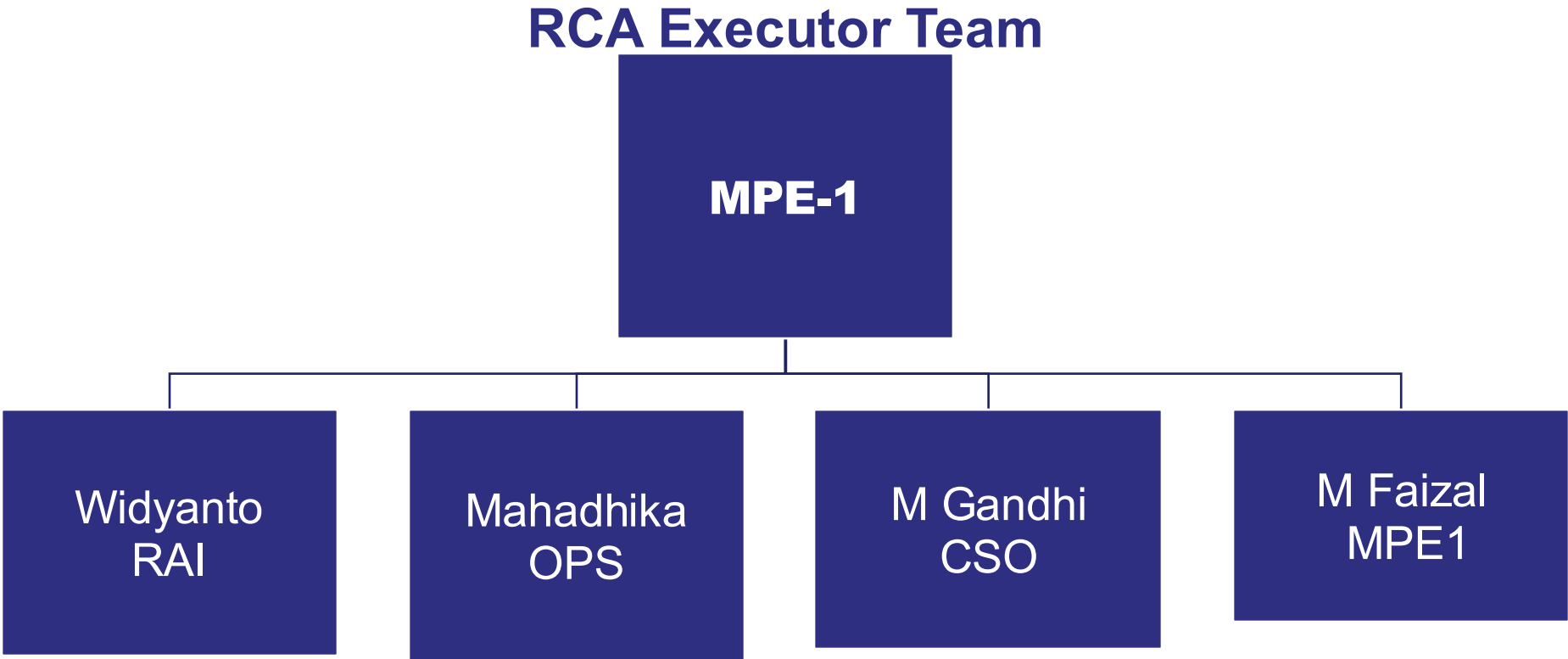
Cross (X) for major severity impact, and fill the total loss (KUSD)

Initiator	Severity Vericator
 Name : Mahadhika	 Name: Joko Pramono
Date :	Date:

ANALYSIS (RCA EXECUTOR)  
CONFIRMATION (REVIEWER)  
APPROVAL (APPROVER)

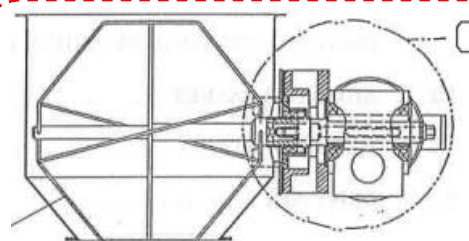
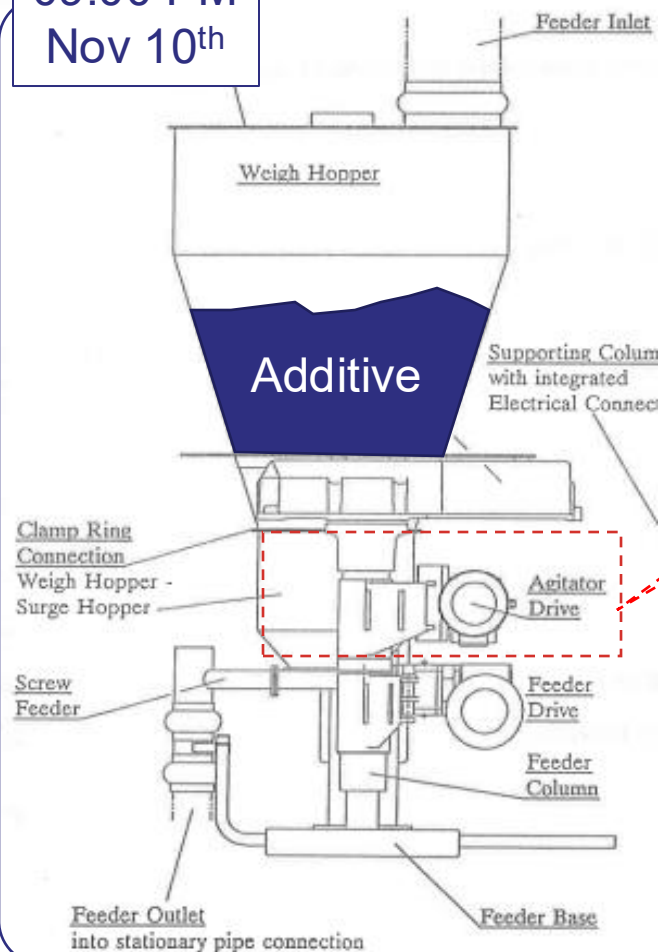
# Problem Identification

Initiator	RCA Executor	Reviewer	Approver	Verifier
Mahadhika	Ferry S	Wendarto A	F Indro K	

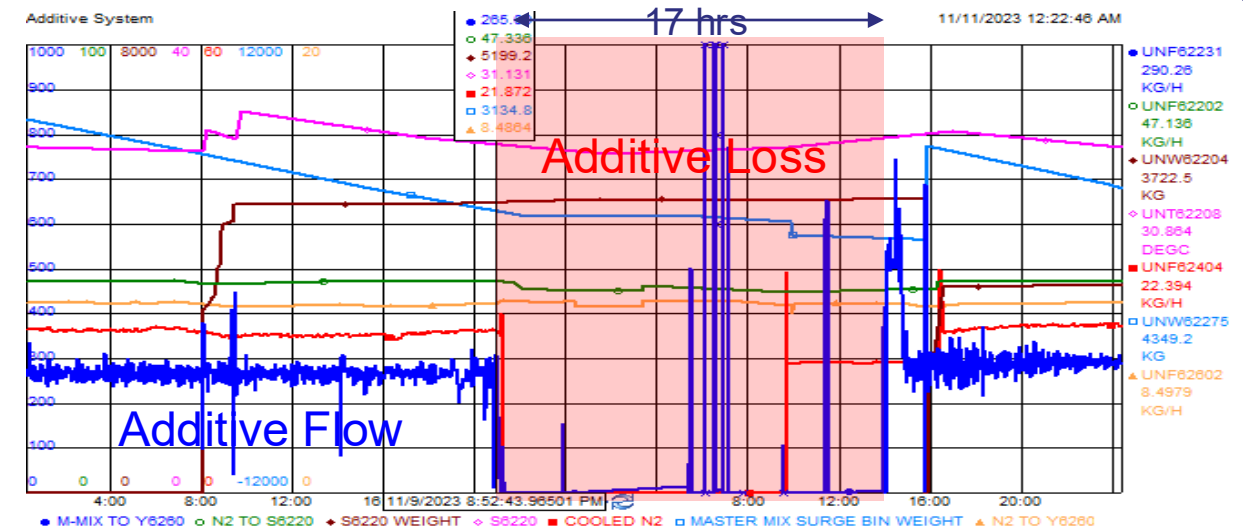


# Problem Identification

09:00 PM  
Nov 10<sup>th</sup>

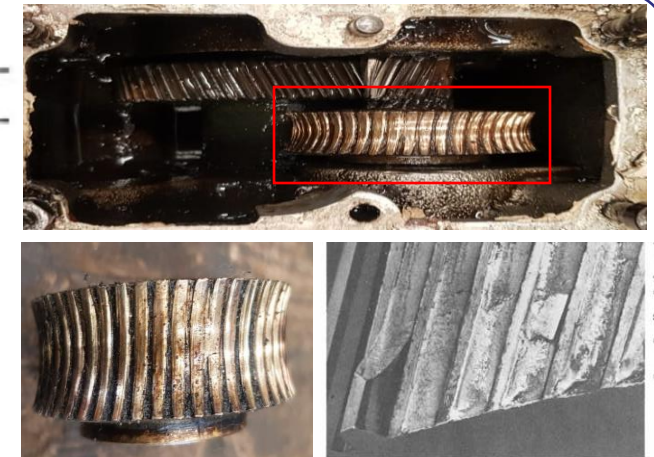
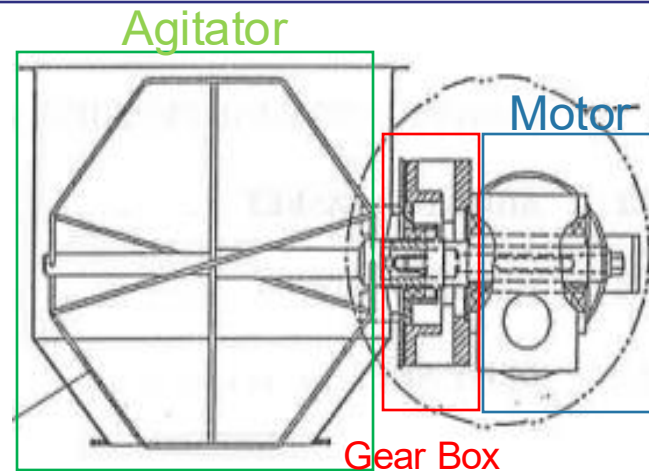


- Agitator Drive was stuck, meanwhile motor still run
- Overload indication not appear



- 09:00 PM Nov 10<sup>th</sup> additive feeder agitator was stuck and no additive fed into pelleter system. Operation team switch product to OFF silo and kept pelleter run.
- In parallely, Operation contact mechanic team to repair additive feeder agitator but during this time mechanic in charge at bagging and SDK plant.
- Therefore, product still produce without additive from 09:00 PM Nov 10<sup>th</sup> until 09:30 AM Nov 11<sup>th</sup> (Repairment was conducted with pelleter run)

# Problem Identification

Nov 11<sup>th</sup>

- Reconstruction problem was conducted at Nov 11<sup>th</sup> and resulting confirm that motor agitator run but agitator stuck as shown on the video beside
- After open the gearbox, found worm gear teeth of additive feeder broken as shown on picture above
- **Gear broken is the phenomenon** of this problem, then will breakdown based on principal, parameter and 4M+E on WWA

# Problem Identification

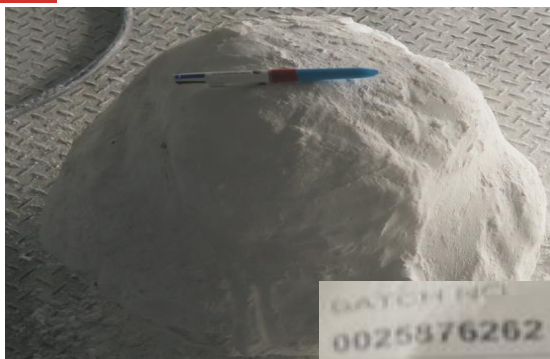
Nov 11<sup>th</sup>

Observation was conducted to find the potential root causes. Picture below were show all the findings that may help to develop why-why analysis

P6 NG



Packed additive which found at master mix hopper



Packed additive which found at jumbo bag Irgafos 168

- Before the problem occurred, operation team found packed additive at jumbo bag 168 then we take out this packed additive from jumbo bag Irgafos 168
- Even though has been separated, during the problem still found packed additive at mastermix hopper



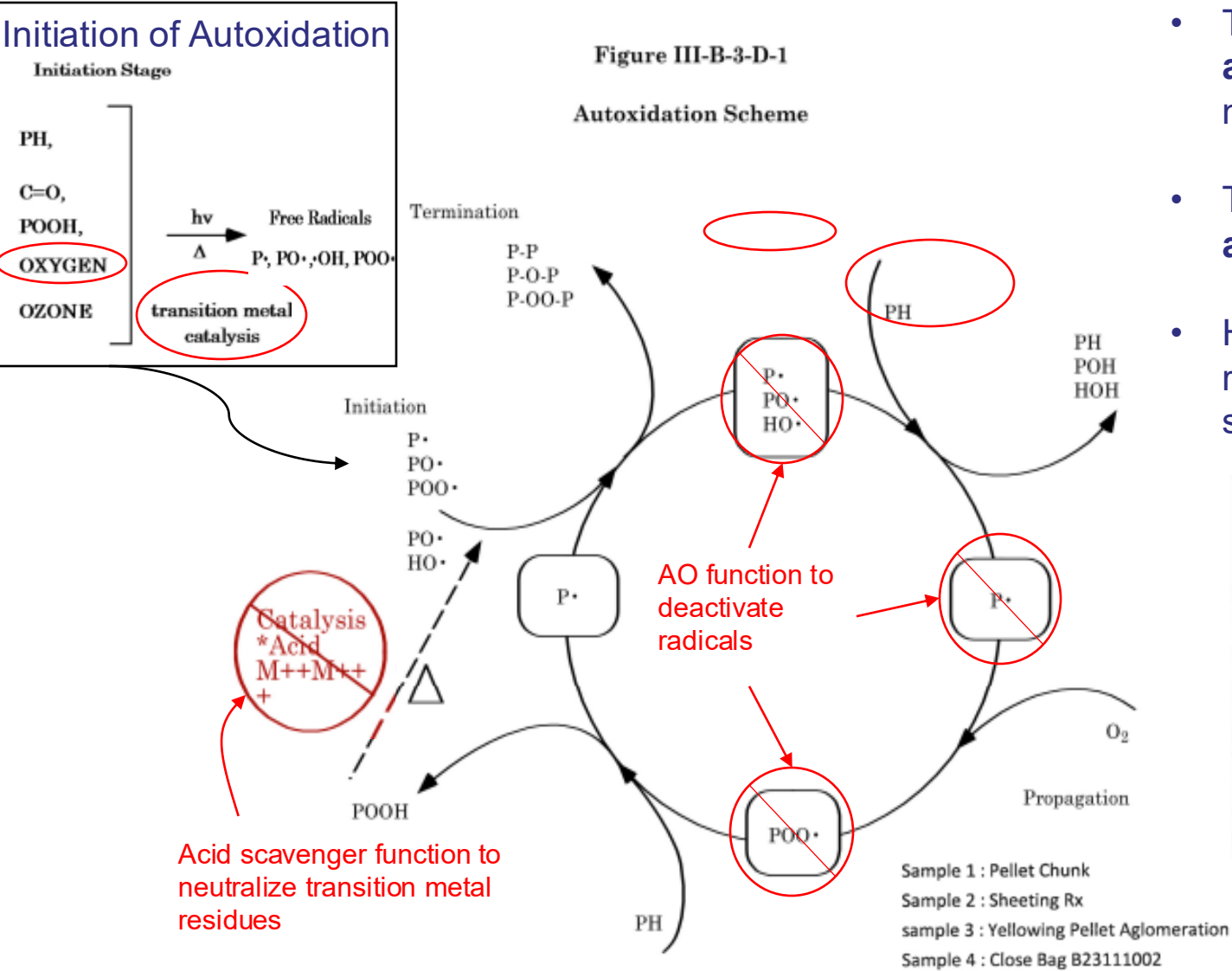
Sheeting which found at mixer hopper



Sheeting which found at rotary feeder S-5011

- At the same time pelleter trip due to suction melt pump pressure PAH which caused by sheeting
- During the problem found sheeting at mixer hopper and also at rotary feeder S-5011

# Assess



- The Initiation stage started with the **absence of additive** on pellet led to create **acidic condition** due to no acid scavenger to neutralize catalyst residue
- The absence of additive (anti oxidant) impact to **autoxidation-cycle** besides take places continuously
- High FI & Density indicates **polymer chain scission** reaction occurred through auto-oxidation reaction as shown on lab result below

UCC-1 Pellet Chunk OFF Silo 28.11.2023

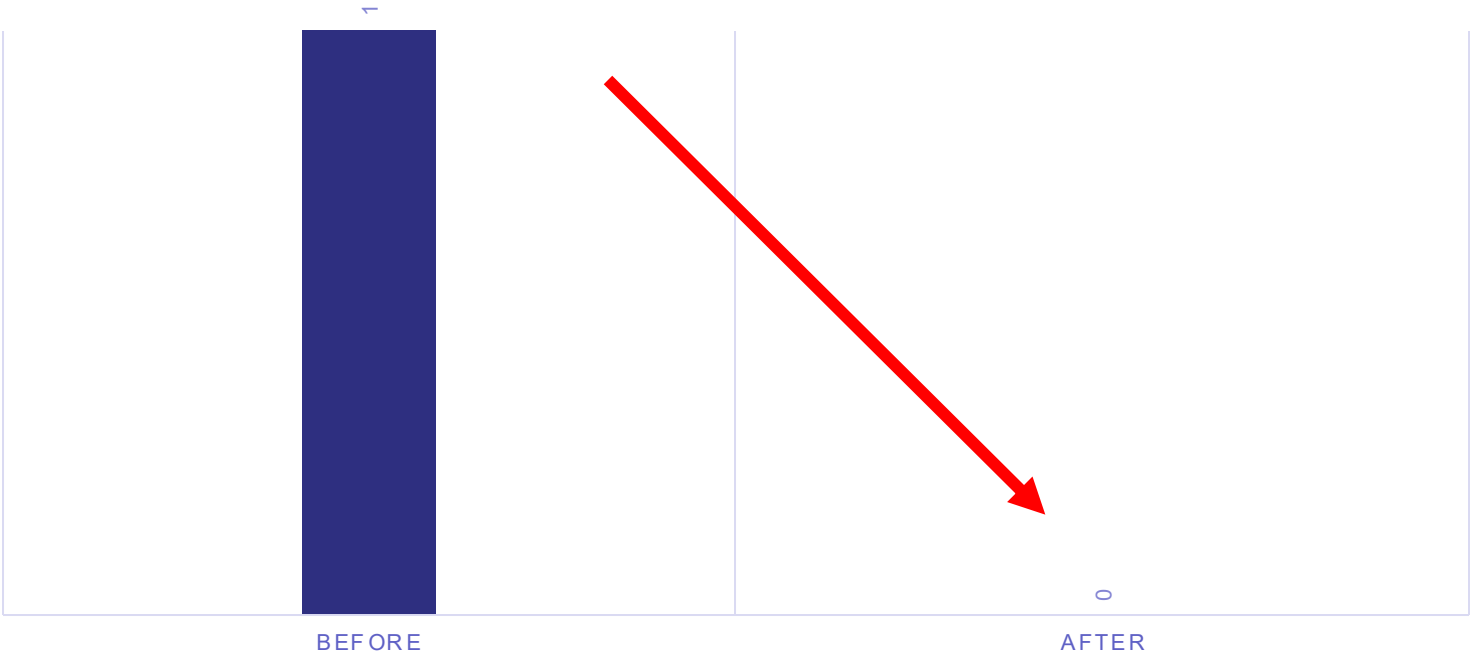
P1 NG

No	Analysis Item	Unit	Sample Name			
			Sample 1	Sample 2	Sample 3	Sample 4
1	HLMI	gr/10 min	219	12.78	8.98	4.74
2	Density	gr/cm3	0.9609	0.9512	0.987	0.9524
4	Ash Content	%	0.009	0.018	5.095	0.007
5	Carbonyl Content	No/1000 Carbon	46.84		8.86	0.034
6	Additive					
	ZnSt	%	0		0.074	0
	Irg168	%	0		0.099	0
	CaSt	%	0		0.112	0

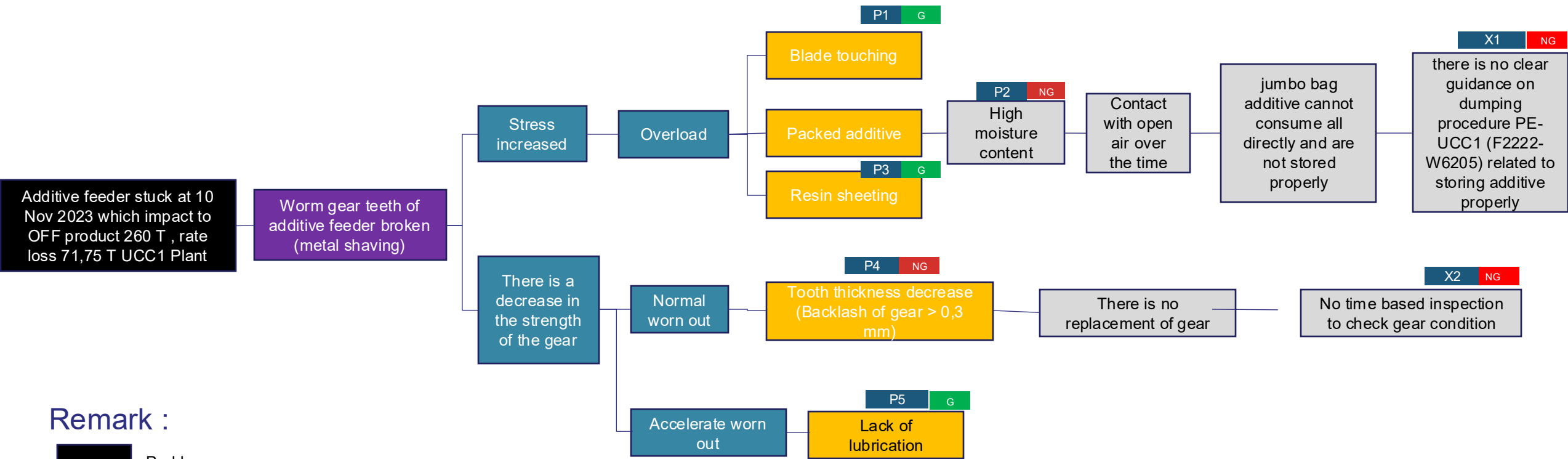
# Target Setting

Actual Condition (Before Improvement)	:	Loss additive due to master mix feeder equipment problem
Target Condition (Project Y)	:	No Loss additive due to master mix feeder problem

LOSS ADDITIVE DUE TO MASTER MIX FEEDER EQUIPMENT PROBLEM



# Root Cause Analysis (RCA)



## Remark :

- Problem
- Phenomenom
- Principle
- Parameter
- 4M1E
- NG Not Good
- G Good

# Root Cause Analysis (RCA) - Verification

P2: Packed Additive

High moisture content > 0.3% (Irg 168)

X1: Contact with open air over the time

jumbo bag additive cannot consume all directly and are not stored properly

there is no clear guidance on dumping procedure PE-UCC1 (F2222-W6205) related to storing additive properly

NG

No	Analysis Item	Unit	ie
			Sample 3
5	Melting Point	°C	155.8
6	Moisture content	ppm	6699.8

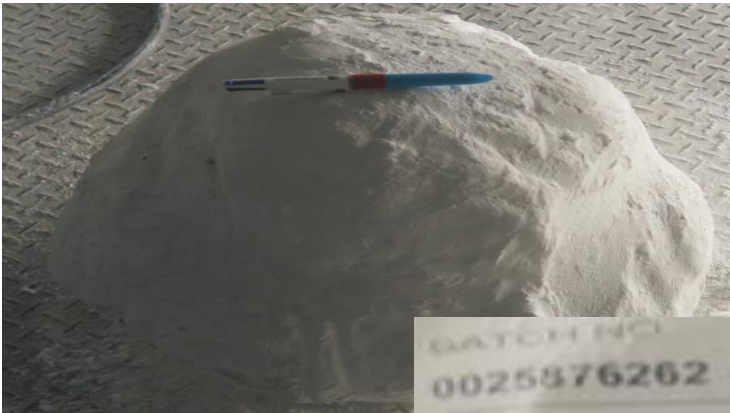
Packed Additive was checked for moisture content and resulting 0.66%

Moisture content from close bag Irg 168 from Jumbo is 0.01%. It means potential moisture coming from internal user CAP.

Sample	Result		
	Moisture (ppm)	AOR (°)	Melting Point (°C)
Irgafos 168 Jumbo Bag	1163.5	47	180
Irgafos 168 Small Bag	109.4	43	186

Date	7 Nov - SB	08 Nov - JB	9 Nov - SB	10 Nov - JB
Batch:	50526844	25876262	50526899	25876262
Dump Qty:	420 kg	260 kg	200 kg	380 kg

From data above shown that remain JB 25876262 still remain 380 kg and not used directly on next day but on the next 2 days. This condition impact potential higher moisture contact during this condition.



Executor	Procedure
Field Operator	7.3.1 Inform to Board Operator that will be done flushing master mix blender (S-6220) with ±200 kg resin to avoid additives contaminant.
	7.3.2 Put Y-6228 (diverter valve below S-6220) to DIVERT position from field
	7.3.3 Provide jumbo bag on divert line from Master Mix Blender (S-6220).
	7.3.4 Inform to Board Operator that field Operator will take resin ± 200 kg from Master mix Resin Cooler (E-6222)
	7.3.5 Board Operator gives permissive to run Master mix Blender Motor (SM-6220) by HS 6220-1A to NORMAL position and slide gate HS 6222-6A to OPEN position.

There is no clear guidance on dumping procedure PE-UCC1 (F2222-W6205) related to storing additive properly

# Root Cause Analysis (RCA) - Verification

Overload

P1: Blade touching



During overhaul the feeder, there is no found blade touching to body agitator

High friction inside gear

P5: Lack of lubrication



During overhaul the feeder, lubrication still available in gear box

P4: Long service time over than 5 years

X2: No PM replacement or gear teeth



Change Preventive Maintenance 3742441: Operation Overview

Complete (business)

Order MO03 3742441 PM REPLACE LUBE OIL GEAR BOX

Sys.Status REL NMAT PRC SETC REL1

HeaderData	Operations	Components	Costs	Partner	Objects	Additional Data	Location	Planning	Control
Op...	SOp	Work ctr	Plant	Co...	StTextK	S.. Operation short text	LT	Actual work	

There is no PM time based to check or overhaul the gear box  
Based on picture and measurement the gear backlash already too large > 0,2 mm (2 mm)

Sys.Status CRTD NMAT PRC RELR SREL

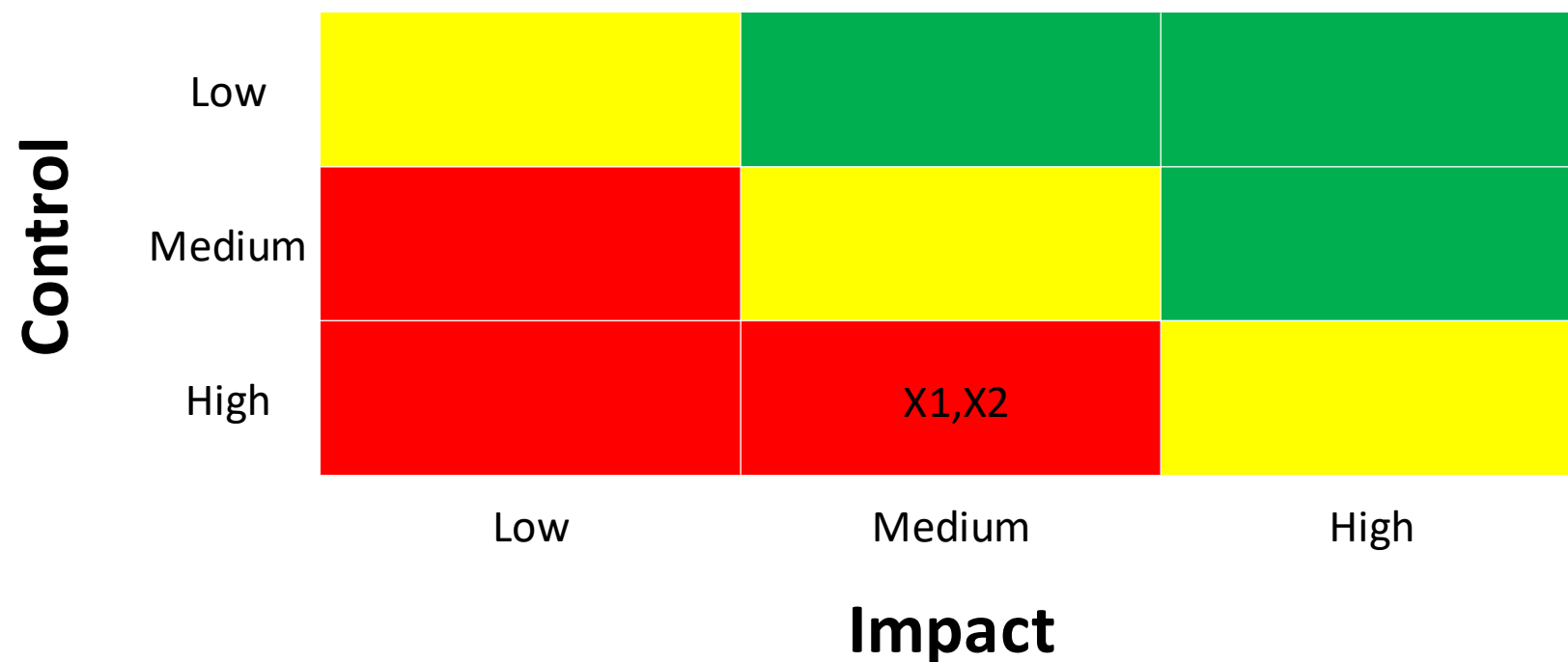
HeaderData	Operations	Components	Costs	Partner	Objects	Additional Data	Location	Planning	Control
Op...	SOp	Work ctr	Plant	Co...	StTextK	S.. Operation short text	LT	Actual work	
0010		1100	1000	PM01		1 Check&Cleaning Add.Line S-6223 to Y-7501		0.000	
0020		1100	1000	PM01		1 Check&Cleaning Add.Line S-6223 to Y-6260		0.000	



# Root Cause Analysis (RCA) - Matrix Priority

Ignore this page for problem type B & C

Prioritize improvement planning by matrix impact vs control



**Impact** can be defined by correlation value (statistic) or basic theoretical

**Control** can be defined based on effort, budget, resources, etc.




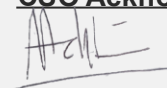
# Improve - Corrective, Proactive Action (CAPAA) for Root Causes

NO	Root Cause	Corrective Action	PCD	PIC (Name of person)	Status	Pro-Active Action (If Applicable)	PCD	PIC (Name of person)	Status
X1	There is no clear guidance on dumping procedure PE-UCC1 (F2222-W6205) related to storing additive properly	Revised procedure F222-W6205 with additional dumping for jumbo bag	20-05-2024	Mahadhika	Close				
X2	No PM routine to check condition of gear	Additional task list to maintenance plan in SAP	20-02-2024	Ferry S	Close				

PCD (Plan Completion Date), PIC (Person In-Charge)

Corrective Action: to eliminate the cause of a non-conformity and to prevent recurrence.  
Pro-Active Action: to prevent undesirable potential situations in other areas of similar nature (roll out to other similar system/items)

Executor: Operator / Supervisor / Engineer / Sr. Engineer / SI / Staff  
Reviewer: Sr. Engineer/ SI / SM  
Approver : SM / DM / GM  
CSO Acknowledge : CSO1 Engineer/ Sr. Engineer & SM for OPR, EPR, CCR, Non-OPEDR




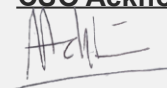
Executor RCA	Reviewer	Approver	CSO Acknowledge
			
Name : Ferry Sihombing	Name : M. Faizal	Nama : Joko Pramono	Name : Melita
Date :	Date :	Date :	Date :230525

# Improve - Preventive Action (PA) and Pro-Active Action (PAA) for Good Condition

No.	Item	Potential Failure	Possible root cause	Preventive Action	PCD (Plan Completion Date)	PIC (Name of person)	Status	Pro-Active Action (if applicable)	PCD (Plan Completion Date)	PIC (Name of person)	Status
P1	Blade touching	Agitator broken	Packed additive Miss installation	Check blade condition during SD	5-7-2024	Ferry S	Close				
P3	Resin Sheeting	Agitator broken	Contact with open air over the time	Cleaning additive line during shutdown	5-7-2024	Mahadhika	Close				
P5	Lack of lubrication	Gear teeth broken	Lack of PM	Monitoring PM	5-7-2024	Ferry S	Close				

Preventive Action: to eliminate the cause of potential non-conformity or other potential undesirable situation

Executor: Operator / Supervisor / Engineer / Sr. Engineer / SI / Staff  
Reviewer: Sr. Engineer/ SI / SM  
CSO Reviewer : CSO1 Engineer/ Sr. Engineer & SM  
Approver : SM / DM / GM

Executor RCA	Reviewer	Approver	CSO Acknowledge
			
Name : Ferry Sihombing	Name : M. Faizal	Nama : Joko Pramono	Name : Melita
Date :	Date :	Date :	Date :230525

No.	Corrective Action	Potential Risk	Countermeasure	PCD (Plan Completion Date)	PIC (Name of person)	Status
X1	Revised procedure F222-W6205 with additional dumping for jumbo bag	Delayed during approval	Follow up every week via email	20-05-2024	Mahadika	Close
X3	Additional task list to maintenance plan in SAP	Delayed update to SAP	Follow up every week via email	20-02-2024	Ferry Sihombing	Close

Potential Risk : to identify potential problem that occur when implemented Corrective Action  
Countermeasure : do risk mitigation plan

Executor: Operator / Supervisor / Engineer / Sr. Engineer / SI / Staff  
Reviewer: Sr. Engineer/ SI / SM  
Approver : SM / DM / GM

Executor RCA	Reviewer	Approver
		
Name : Ferry Sihombing	Name : M. Faizal	Nama : Joko Pramono
Date :	Date :	Date :

# Thank you



Chandra Asri



# GUIDELINES

# Guidelines

## 1. AR Numbering

**AR Type-Code  
number DIVDEPTSEC-  
year-month-no.**

*Ex: MSA-A0111-2022-12-1*

*Number (No.) Should be  
accumulation in each month*

Code number DIVDEPTSEC  
based on this link >> based  
on Executor RCA Code num  
ber DIVDEPTSEC

## 1. AR Type

No	AR Type
1	Policy Management (PM)
2	Daily Management <ul style="list-style-type: none"><li>• Operation Problem Report (OPR)</li><li>• Equipment Problem Report (EPR)</li><li>• Non OPEDR</li><li>• Turn Around Maintenance (TAM)</li><li>• Performance Management (PMS)</li><li>• Incident Investigation (II)</li><li>• Customer Concern Report (CCR)</li><li>• Process hazard Analysis (PHA)</li><li>• Pre Start-up Safety Review (PSSR)</li><li>• Countermeasure of Risk Assessment (CoRA)</li></ul>
3	Management System Audit (MSA)
4	Governance Risk Control Audit (GRCA)

# Guidelines

## 3. Management System

Internal Audit	External Audit	Customer Audit
IAMS (9001,14001,45001) LQMS (17025) EnMS (50001) Halal SMK3 SNI	IAMS (9001,14001,45001) LQMS (17025) EnMS (50001) Halal SMK3 RCI SNI Ekolabel	By (.....)*  *Fill Customer Name

# Guidelines

## 3. RCA Complexity

Factor		Complexity Level & Handling RCA Period		
		Low (1 – 14 Days)	Medium (15 – 30 Days)	High (31 – 90 Days)
Urgent	Normal	V	V	V
	Urgent	V	V	
	Emergency	V	V	
Team Involvement	Developing by Internally	V		
	Developing by within two or more Dept.		V	
	Developing by within two or more Dept. and required vendor			V
Availability Data	Available in online	V		
	Available in manual		V	
	Not available due to limited tool			V

## 4. Problem Type

How to Solve	Unknown	B	A
	Known	C	D
		Known	Unknown
	Root-cause of the problem		

- **Problem A & D:** Appropriate to use problem solving approach.
- **Problem B:** Require new technology (appropriate for innovation).
- **Problem C:** Simple problem, can be solved immediately.

Type A & D need to analyse the root cause;  
Type B & C no need analyse the root cause  
(ignore "ROOT CAUSE ANALYSIS" section)

# Guidelines

## 5. Severity Level

Severity Level	People (Health & Safety)	Assets/ Property Damage (USD)	Environment (definition see next slide)
Slight	<ul style="list-style-type: none"><li>• FAA - Non recordable</li><li>• Single/multiple over exposure causing noticeable irritation but no actual health effects</li></ul>	< 2.5K	Tier 3
Minor	<ul style="list-style-type: none"><li>• MTA – Recordable</li><li>• single/multiple health effects from common source/effect</li></ul>	2.5 - 25K	Tier 2
Moderate	<ul style="list-style-type: none"><li>• LTA</li><li>• Permanent partial disability</li><li>• Several non-permanent injuries of health impacts</li></ul>	25 - 100K	Tier 2
Major	<ul style="list-style-type: none"><li>• Single fatalities (1 fatality)</li><li>• ≥ 10 health effects either permanent or requiring hospital more than 24 hours</li></ul>	100K - 10M	Tier 1
Catastrophic	<ul style="list-style-type: none"><li>• Multiple fatalities (&gt; 1 fatalities)</li><li>• ≥ 30 health effects either permanent or requiring hospital more than 24 hours</li></ul>	> 10M	Tier 1

Choose the highest level of people, Asset/ Property Damage and Environment.



Chandra Asri

Reference: SCG Target Risk, IEC-61511-2  
CAP2 Follow this Target Frequency



# Guidelines

## 6. Severity Level (cont.)

Tier Environment	*Definitions of Environment: (include Reputation)
Slight (Tier 3)	No significant environmental impact
Minor (Tier 2)	Some damage: Discharges to air, land and/or water that impact only on-site areas and only have very short-term (i.e. day or less) impacts on plants, wildlife, soil, or water. Only limited on-site remediation efforts required.
Moderate (Tier 2)	Some damage with media coverage: Discharges to air, land and/or water that impact only on-site areas and only have very short-term (i.e. day or less) impacts on plants, wildlife, soil, or water. Only limited on-site remediation efforts required. Exceedance of site environmental permit limit and/or result in release of a reportable quantity of chemical, but not enough to cause effects warranting a higher consequences category classification. Local media/news reporter participate in this events.
Major (Tier 1)	Significant damage with media coverage: Discharges to air, land and/or water that impact only on-site areas and some off-site areas that are not deemed environmentally sensitive and have short-term (2-7 days) impacts on plants, wildlife, soil, or water. Moderate remediation efforts required
Catastrophic (Tier 1)	Severe environmental damage: Discharges to air, land and/or water having moderate to long-term (i.e. 1 to 6 months) impacts on plants, wildlife, soil, or water on the large areas; or shorter term (i.e. less than a month) on environmentally sensitive areas. Includes shorter duration events having severe community impact (e.g) adverse impact on local drinking water supply or other essential services. Effects reversible in long-term. Extensive on-site or offsite remediation efforts required.

# Guidelines

## 7. AR Duration based on Severity Level

			Problem occurred* *	Initiator	Executor (RCA)	Review	Approve	Follow up CAPA	Verification
Std. Duration	Slight	Low Complexity (RCA up to 14 Days)	D 0	D + 7	D + 21	D + 28	D + 35	N*	D + N* + 42
		Medium Complexity (RCA up to 30 Days)	D 0	D + 7	D + 37	D + 44	D + 51	N*	D + N* + 58
		High Complexity (RCA up to 90 Days)	D 0	D + 7	D + 97	D + 104	D + 111	N*	D + N* + 118
	Minor		D 0 7days	D + 7 21days	D + 28 3days	D + 31 4days	D + 35	N*	D + N* + 42
	Moderate		D 0 7days	D + 7 14days	D + 21 3days	D + 24 4days	D + 28	N*	D + N* + 35
	Major		D 0 5days	D + 5 10days	D + 15 3days	D + 18 3days	D + 21	N*	D + N* + 28
	Catastrophic		D 0 3days	D + 3 7days	D + 10 2days	D + 12 2days	D + 14	N*	D + N* + 21

# Guidelines

## 6. Severity Level (cont.)

Example of severity level definition.

Problem Definition: any fire in Ethylene pipe during sampling activity.

Fact: (1)People >> no casualties >> Slight

(2)Asset >> 10.000 USD >> Minor

(3)Environment >> no spill >> Slight

Refer to Severity Level (page 35)

Severity Level of Problem >> Minor (choose the highest level of 3 categories)

# Guidelines

## 8. Matrix of Severity Verification

	Severity Verificator	Assignor (RCA Executor's Superior)
Slight	SM	SM
Minor	SM	SM
Moderate	DM	DM
Major	DM	GM
Catastrophic	DM	Related BOD

## 9. Matrix of RCA CA/PA Approval

Issuance (Initiator)	Analysis (Executor)	Confirmation (Reviewer)	CSO Acknowledge	Approval (Approver)	Ver (V
Daily Management (OPEDR type)					
Engineer/ Sr. Eng/ SI	OPR Justification:				
	Operation/ PI Eng./ Sr. Eng./ SI	Operations DM	CSO1 SM	Operation	
	Operation/ PI SM	Operations DM	CSO1 SM	Operation	
	Operation DM	Operation GM	CSO DM	Direct BO	
	Operation GM		CSO DM	Direct BO	
	EPR Justification:				
	MTN/TEC Eng./ Sr. Eng/ SI	MTN/TEC DM	CSO1 SM	1. Operatio 2. MTN/TEC	
	MTN/ TEC SM	MTN/ TEC DM	CSO1 SM	1. Operatio 2. MTN/TEC	
	MTN/ TEC DM	MTN/ TEC GM	CSO DM	1. MFG B 2. MTN/ TEC	
	MTN/ TEC GM		CSO DM	1. MFG B 2. MTN/ TEC	
Daily Management (Non-OPEDR type)					
Operator/ Technician/ Lab. Analyst/ SV	Operator/ Technician/ Analyst/ SV	SI / Sr. Eng / Sr. Officer	CSO1 SM		SM
Officer/ Analyst/ Eng./ Chemist/ Sr. Eng./ Sr. Chemist/ / Sr. Officer/ SI	Officer/ Analyst/ Eng./ Chemist/ Sr. Eng./ Sr. Chemist/ Sr. Officer/ SI	SM	CSO1 SM		DM
	SM	DM	CSO1 SM		GM
	DM	GM	CSO DM		Direct Dire

# Guidelines

## 10. Definition of PSE, Non-PSE, Nearmiss, High Potential Nearmiss

**Process Safety Event (PSE)** is an unplanned or uncontrolled release of any material including non-toxic and non-flammable materials (e.g. steam, hot water, nitrogen, compressed CO<sub>2</sub> or compressed air) from a process, or an undesired event or condition that, under slightly different circumstances, could have resulted in a release of material.

**Non-Process Safety Event (Non-PSE)** is an event that not meet or fall outside the scope (see API RP 754 PSE Applicability Exclusions in attachment 14) of Process Safety Event (PSE) criteria.

**Nearmiss** is any unplanned event, or unplanned series of events where No injury, No Loss of Primary Containment (LOPC), No Fire or explosion occurs, but has the potential worst-case scenario might happen. (example: interlock active, safety device active)

**High Potential Nearmiss** which has potential severity level Tier 1 & 2 in Incident Classification table in Attachment 9., while for potential severity level Tier 3 only recorded on Incident Investigation Log. (refer to API 754)