

# IRON ORE RECOVERY FROM WASTE DUMP FINES IN SAIL MINES

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# DUMP FINES

## ✓ DALLI MINES

DUMP FINES TO THE TUNE OF 12 MILLION TONNES ARE ACCUMULATED DURING MANUAL MINING OVER A LONG PERIOD OF TIME AND IS DUMPED THERE FOR THE LAST 20 YEARS.

NOW THERE IS NO FURTHER GENERATION OF FINES AS THE OPERATION IS FULLY THROUGH WET CIRCUIT.

## ✓ GUA MINES

DUMP FINES OF ABOUT 40 MILLION TONNES ARE ALREADY ACCUMULATED. MORE FINES ARE BEING ADDED TO THE DUMP TO THE TUNE OF 1.5 MILLION TONNES ANNUALLY AS THE MINES HAS DRY CIRCUIT OPERATION WITH 3 MILLION TONNES THROUGHPUT CAPACITY.

# DALLI DUMP FINES



- **QUANTITY: 12 MILLION TONNES**
- **QUALITY: 56.0% Fe,  
13.0% silica and alumina combined.**
- **REQUIRED QUALITY : 62% Fe, for sinter making.  
7.0%(max.) silica and alumina  
combined.**

# Size-wise Chemical Analysis (Dalli Mines)

Size fraction, mm	Wt. %	Chemical Composition		
		Fe, %	SiO <sub>2</sub> , %	Al <sub>2</sub> O <sub>3</sub> , %
+10	8.30	61.22	2.97	2.18
-10+8	5.30	62.79	2.85	1.72
-8+6	3.60	62.36	2.88	1.78
-6+3	12.30	62.58	3.11	2.24
-3+1	21.20	58.63	4.35	2.56
-1+0.5	9.00	56.08	5.82	5.32
-0.5+0.25	8.60	56.07	5.9	6.3
-0.25	32.00	52.07	11.20	11.98
<b>Total</b>	<b>100.00</b>	<b>57.10</b>	<b>6.28</b>	<b>6.01</b>

**LEGEND**

Wt.	Fe,%	SiO <sub>2</sub> ,%	Al <sub>2</sub> O <sub>3</sub> ,%
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**FEED**

100 .0	56.6	8.63	9.5
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**Screen, 3mm**

29.5	62.28	3.12	2.14
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70.5	54.27	10.94	12.57
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+3mm

**Fines Product - 1**

-3mm

**Spiral Classifier**

O/F

30.0	48.39	15.44	22.28
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**Sand**

40.5	58.62	7.61	5.4
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**Jig**

**Tails-1**

**Conc.**

34.1	60.9	4.95	3.37
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**Fines Product - 2**

**Hydrocyclone**

O/F

**Tails-2**

U/F

19.4	53.15	10.79	10.8
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**WHIMS**

26% of 19.4 = 5.0

74% of 19.4 = 14.4

**Tails-3**

14.4	63.05	2.86	2.31
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**Fines Product - 3**

**Proposed flow sheet for Dalli dump iron ore fines**

# COMPREHENSIVE TEST RESULT OF LOW GRADE IRON ORE (Dalli Mines)



Particulars	Wt, %	Fe,%	SiO <sub>2</sub> ,%	Al <sub>2</sub> O <sub>3</sub> ,%
<b>Feed</b>	<b>100</b>	<b>57.1</b>	<b>6.28</b>	<b>6.01</b>
Product – 1 (wet Screen)	29.5	62.28	3.12	2.14
Product – 2 (Jig conc.)	34.1	60.90	4.95	3.37
Product – 3 (Magnetic conc.)	14.4	63.05	2.86	2.36
<b>Final Product</b>	<b>78.0</b>	<b>61.82</b>	<b>3.87</b>	<b>2.72</b>
Tails – 1(Jig reject)	6.4	46.66	21.16	9.71
Tails – 2 (Hrodro-cyclone overflow )	10.6	37.92	12.39	23.40
Tails –3 (WHIMS non-magnetic)	5.0	46.10	13.74	15.03
<b>Final tails</b>	<b>22.0</b>	<b>42.30</b>	<b>15.25</b>	<b>17.52</b>

# GUA DUMP FINES



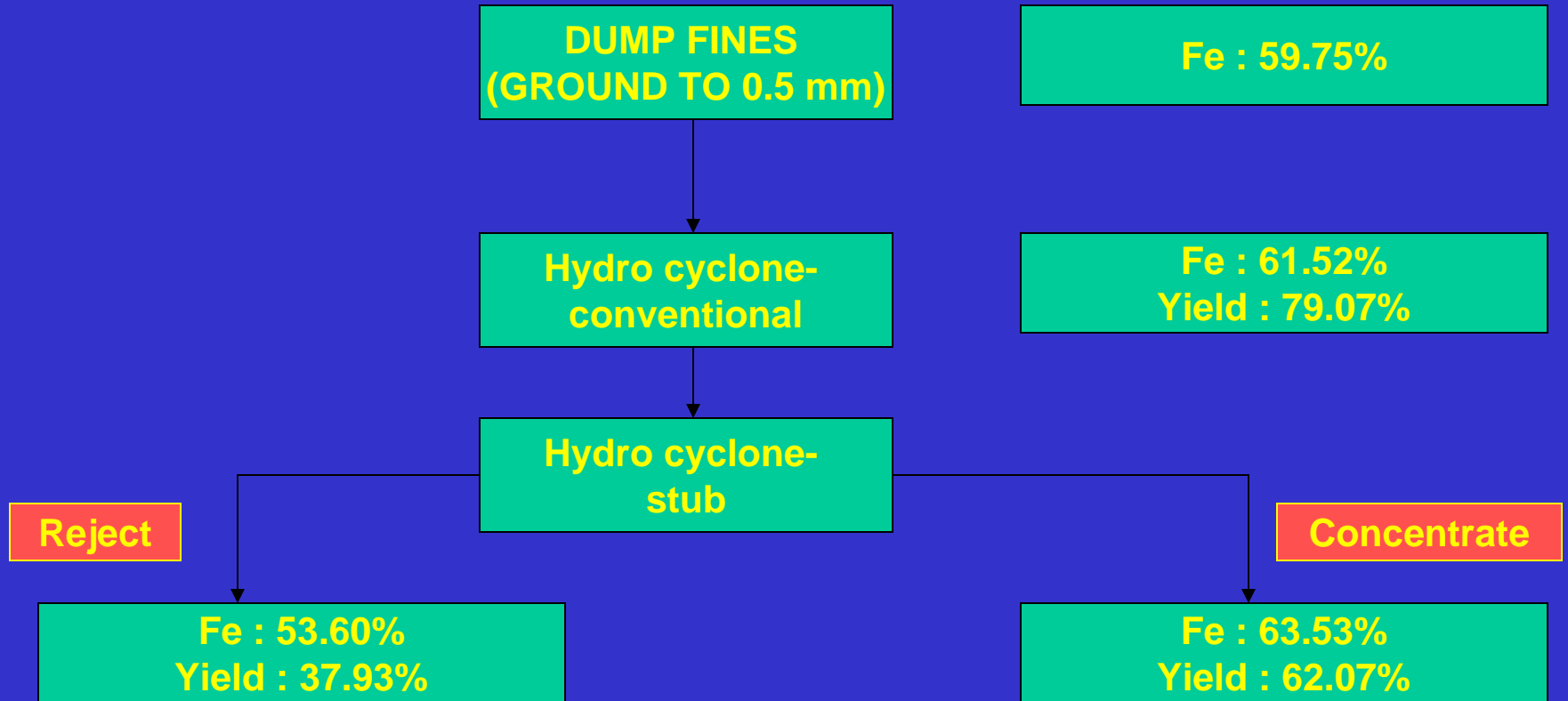
- **QUANTITY: 40 MILLION TONNES**
- **QUALITY: 58-60% Fe**  
**7.0% silica and alumina combined.**
- **REQUIRED QUALITY : 63-64% Fe, for sinter making,**  
**4.0%(max.) silica and alumina combined.**

# Size-wise Chemical Analysis (Gua Mines)



Size fraction, mm	Wt. %	Chemical Composition		
		Fe, %	SiO <sub>2</sub> , %	Al <sub>2</sub> O <sub>3</sub> , %
+10	3.60	59.4	2.4	4.1
-10+8	6.1	60	2.3	3.1
-8+3	25.9	60.6	2.7	3.4
-3+1	16.4	60.7	2.45	3.5
-1+0.75	3.6	59.8	2.7	3.5
-0.75+0.38	9.1	59.2	2.8	3.8
-0.38+0.2	9.5	59.1	2.9	4.2
-0.2+0.16	2.65	58.8	2.9	4.9
-0.16+0.15	3.65	58.8	3.2	5.2
-0.15	19.5	58.7	3.1	5.5
Total	100.00	59.75	2.75	4.05

# GUA DUMP FINES



Flow sheet for Gua dump iron ore fines

# COMPREHENSIVE TEST RESULT OF LOW GRADE IRON ORE FOR SINTER MAKING (Gua Mines)



Particulars	Wt, %	Fe,%	SiO <sub>2</sub> ,%	Al <sub>2</sub> O <sub>3</sub> ,%
<b>Feed</b>	<b>100</b>	<b>59.75</b>	<b>2.65</b>	<b>4.08</b>
Hydro cyclone U/F stage-1 (conventional)	79.07	61.52	2.22	3.40
Hydro cyclone U/F stage-2 (stub)	78.51	63.53	2.05	1.90
<b>Final concentrate</b>	<b>62.07</b>	<b>63.53</b>	<b>2.05</b>	<b>1.90</b>
Hydro cyclone O/F stage-1 (conventional)	20.93	53.01	4.27	6.65
Hydro cyclone O/F stage-2 (stub)	21.49	54.19	2.84	8.90
<b>Final Reject O/F</b>	<b>37.93</b>	<b>53.60</b>	<b>3.55</b>	<b>7.79</b>

## TOTAL RECOVERABLE ORE FROM WASTE DUMP FINES OF DALLI AND GUA MINES

<b>MINES</b>	<b>DUMP QUANTITY (Mte)</b>	<b>RECOVERY (%)</b>	<b>RECOVERY (Mte)</b>
<b>DALLI MINES</b>	<b>12</b>	<b>78</b>	<b>9.5</b>
<b>GUA MINES</b>	<b>40</b>	<b>62</b>	<b>25</b>
<b>TOTAL</b>	<b>52</b>	<b>66</b>	<b>34.5</b>



# Thank You

