5 CONCLUSIONS:

1 The ore consists of Hematite (79.52%) as main constituent while Goethite (9.74%) and Iron oxalate hydrate (1.09%) are the other iron bearing minerals present.

2 Kaolinite (4.44%) and Eudialyte (5.21%) are the associated gangue minerals.

3 The ore loses weight on heating in four stages due to removal of absorbed moisture, goethite and iron oxalate hydrate decomposition, eudialyte decomposition and finally due to the decomposition of kaolinite.

4 The sample ~~gain~~ weight at final stages of TG analysis due to oxidation of the decomposed products of eudialyte.

5 Goethite decomposition is a first order reaction and has an activation energy of 175 kJ/mole.

6 The decomposition process of two gangue minerals is overlapping in air and could be better resolved in nitrogen atmosphere.

7 The product of gangue decomposition depends on oxygen potential of environment and varies between fayalite, dicalcium silicate, sodium silicates, calcium ferrite, quartz and magnetite.

8 Melt formation is observed due to melting of silicates and ferrites.

9 There is evidence to believe that sodium silicates present in gangue decomposition product, melts and reacts with available FeO to form fayalite.

10 While heating the temperature distribution within pellet varies exponentially with time.

11 The average thermal diffusivity and thermal conductivity of iron ore pellets for radial heat transfer can be determined by calculating average heating rate and applying heat balance.

12 The thermal conductivity of pellet increases with decrease in porosity in the range 38% to 22% and the change could be well explained by model equations suggested by Eucken and Russel discussed by Akiyama.

13 The thermal conductivity at zero porosity of the pellet could be determined by using basic shrinkage parameters of densification such as ratio of actual volume of pellet to its volume at zero porosity and found to be $1.75 Wm^{-1}K^{-1}$.

14 The thermal conductivity and diffusivity attains a maximum value around 20-22% porosity. Further decrease in porosity decreases thermal conductivity and diffusivity considerably (40%)

15 The 20-22% porosity seems to be the value at which the pores tend to close and isolate, causing decrease in their average size, increasing pore/ore surface area.

16 Contribution of pore radiation towards effective thermal conductivity is very small. Hence the decrease in effective thermal conductivity by (40%) can not be attributed to decrease in pore size and pore radiation.

17 The decrease in thermal conductivity and diffusivity, at this level of porosity must hence be attributed to the increase in specific surface area of pores thus increasing the pore /ore interfacial area which adds resistance to heat conduction.