1-FAULT LEVEL CALCULATION –A

A1-1 Fault level on 66 KV side of Transformer at Alwaye substation = 1305 MVA

A1-2 Rating of 66KV/11KV Power Transformer = 10MVA

A1-3 Percentage Impedance of 66KV/11KV Transformer = 9.44%

A1-4 Equivalent percentage impedance of 1305 MVA (from 1.1) fault level on 10MVA base

$$= \frac{\text{Base}}{\text{Fault level}} \times 100 = \frac{10 \times 100}{1305}$$

$$= 0.766$$

A1-5 Total percentage impedance on 11KV side of 66kv/1 kV Transformer On 10MVA base (from A1.3 & A1.4)

$$= 9.44 + 0.766 = 10.206\%$$

A1-6 Fault level on 11kV side for percentage impedance Of 10.206 (from A1.5) on 10MVA base

$$= \frac{100 \times 10}{10.20} = 97.98\text{MVA}$$

A1-7 Length of 11 KV overhead line from 66KV sub Station to factory site = 1.5KM

A1-8 Size of conductor = Mink

A1-9 Resistance of Mink conductor = 0.456 ohnm/KM

A1-10 Total resistance for 1.5KM = 0.456 x 1.5 = 0.684 ohms.

A1-11 Total impedance of conductor (Taking the value of reactance as same as resistance)

$$= \sqrt{(R^2 + X^2)}$$

$$= \sqrt{(0.684^2 + 0.684^2)}$$

$$= \sqrt{(0.936)} = \underline{0.967\text{ohms}}$$

A1-12 Equivalent percentage value of 0.967 ohms, Ohms impedance on 500KVA base

$$= \frac{(KVA)_b \times X}{10 \times KV^2}$$

$$= \frac{500 \times 0.967}{10 \times 11^2}$$

$$= \underline{0.4\%}$$

A1-13 Equivalent percentage impedance Of 97.98MVA fault level (from A1.6) on 500KVA base.

$$= \frac{100 \times 500}{97.98 \times 1000}$$

$$= \frac{50{,}000}{97{,}980} = \underline{0.51\%}$$

A1-14 Total percentage impedance on 11KV side in f actory site on 5000KVA vase (from A1.12 and A1.13)

$$= 0.4 + 0.51 = \underline{0.91\%}$$

A1-15 Fault level on 11KV side at factory site for percentage impedance of 0.91 (from A1.14) on 500 KVA base.

$$= \frac{500 \times 100}{0.91}$$

$$= \underline{54945..1KVA}$$

$$= \underline{54.95MVA}$$

A1-16 Fault current on 11KV side of 500KVA Transformer at factory Premises

$$= \frac{54.95 \times 10^6}{\sqrt{(3 \times 11 \times 10^3}}$$

$$= \frac{54950000}{19052}$$

$$= 2884.21A$$

$$= \underline{2.88\ KA}$$

A1-17 Percentage im pidance of 500KVA Transformer = 4.6%

A1-18 Total percentage impedance on MV side of 500KVA Transformer on 500KVA base. (from A1.14 and A1.17)

$$= 0.91 + 4.6$$

$$= \underline{5.51\%}$$

A1-19 Fault level on secondary side of Transformer for percentage impedance of 5.51 (from A1.18) on 500KVA base.

$$= \frac{500}{5.51} \times 100$$

$$= 9074.41KVA$$

$$= \underline{9.07MVA}$$

A1-20 Fault current on MV side (433 Volt side) of 500KVA Transformer at factory site.

$$= \frac{9.07 \times 10^6}{\sqrt{(3 \times 433}}$$

$$= \frac{9.07 \times 10^6}{749.956}$$

$$= 12094.04A$$

$$= 12.094\ KA$$

1 FAULT LEVEL LCALCULATION – B

B1-1 Fault level on 11KV side of 500KVA Transformer at factory premises. = 250MVA

B1-2 Fault current on 11KV side of 500KVA Transformer for 250 MVA fault level.

$$= \frac{250 \times 10^6}{3 \times 11 \times 10^3}$$

$$= 13121.981\ A$$

$$= 13.12\ KA$$

B1-3 Equivalent percentage inmpidance of 250MVA fault level on 500KVA base

$$= \frac{100 \times 500}{250 \times 10^3}$$

$$= 0.2\%$$

B1-4 Percentage impedance of 500KVA Transforemer = 4.6%

B1-5 Total percentage impedance on MV side of 500KVA Transformer on 500KVA base (Form B1.3 & B1.4)

$$= 0.2 + 4.6$$

$$= \underline{4.8\%}$$

B1-6 Fault level on secondary side of Transformer for percentage impedance of 4.8 (From B1.5) on 500KVA base.

$$= \frac{500}{4.8} \times 100$$

$$= 10416.667 = 10.42MVA$$

B1-7 Fault current on MV side (433 Volt side) of 500KVA Transformer at factory site.

$$= \frac{1042 \times 10^6}{\sqrt{3} \times 433}$$

$$= \frac{10.42 \times 10^6}{749.956}$$

$$= 13894.148$$

$$= \underline{13.89 \text{ KA}}$$

B1-8 From B1-3 (Fault current on 11KV side as 13.12) and from B1.7 (fault current on MV side as 13.89) The maximum fault current that can come on 11KVF side is 13.12 KA and maximum fault current that can come on 433 Volt side is 13.89 KA for 500KVA Transformer at factory ;premises.