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RADIATION HAZARD STUDY

SITE: Rogers Arkansas

APPLICANT: Foundation Telecommunications Inc.

3.8 Meter Antnna, 2 0Watt Transmitter

RADIATION HAZARD STUDY

REGION	RADIATION LEVEL mw/cm^2	HAZARD ASSESSMENT
Far Field, RF= 413 meters	**0.178**	**Complies with guidelines**
Near Field, RN=192 meters	**0.423**	“ “ “
Transition Region, RT Rn<Rt<Rf	**<0.423**	“ “ “
Reflector Surface	**0.18**	“ “ “
Between Antenna and Ground	**0.0018**	“ “ “
Between Main Reflector and Feed	**438**	**Potential Hazard**

CONCLUSION:

Based on the above analysis it is concluded that harmful levels of radiation will not exist in regions normally occupied by the public or the earth station’s operating personnel. The earth station will be marked with the standard radiation hazard warnings, on the antenna itself, warning personnel to avoid the area in front of the reflector when the transmitter is operational. To ensure compliance with the safety limits, the earth station transmitter will be turned off whenever maintenance and repair personnel are required to work in an area where the radiation level exceeds the level recommended by applicable guidelines. Additionally, the earth station is secured and access is controlled.

SUPPORTING CALCULATIONS
REF: FCC BULLETIN #65

A. Far Field:

$R_f = \frac{0.6D^2}{\lambda} = \frac{0.6x(3.8)^2}{0.021} = 413 \text{ meters}$

$S = \frac{PG}{4\pi R^2} = \frac{20x1.905x10\hat{}5}{4\pi(413)^2} = 1.78W/m^2$

S=0.178mW/cm^2

B. Near Field

$R_n = \frac{D^2}{4\lambda} = \frac{(3.8)^2}{(4)x(0.021)} = 192 \text{ meters}$

$S = \frac{16\ nP}{\pi D^2} = \frac{(16)(.6)x(20)}{\pi(3.8)^2} = 4.23\ W/m^2$

S=0.423mW/cm^2

C. Transition Region:

Since the transition extends between R_n and R_f the power density can never exceed the power density in the near field.

$S = \frac{S(nf)xR(nf)}{R}$

D. Reflector Surface:

Assuming an even distribution of energy over the surface of the dish:

$S = \frac{P}{\pi r^2} = \frac{20x10^3}{\pi(1.9x10^2)^2} = 0.18mW/cm^2$

E. Between Antenna and Ground:

Nearest point is more than 1 diameter removed from the center of the main beam.

$$S = \frac{S(\text{reflector surface})}{100} = 0.0018 mW / cm^2$$

F. Between Main Reflector and Feed:

The diameter of the feed aperture is 7.62cm. The highest density will be at the aperture.

$$S = \frac{P}{\pi r^2} = \frac{20x10^3}{\pi (3.81)^2} = 438\, mW / cm^2$$