RF Exposure Calculation

The Slope Stability Radar (SSR) uses a mechanically scanned parabolic dish. The radar only transmits when the dish is moving. All personnel using the radar are trained to stay away from the dish when it is moving. The movement rate of the dish is such that common-sense would dictate this anyway. Clearly therefore to calculate the maximum power density to which a person may be exposed we can use the methods described in the section "Aperture Antennas" starting page 26 of OET Bulletin 65 (Edition 97-01). In particular the maximum value of the near-field power density is given by equation. 13, (page 28) and reproduced below.

$$S_{nf} = \frac{16\eta P}{\pi D^2} \qquad (13)$$

where: S_{nf} = maximum near-field power density
η = aperture efficiency, typically 0.5-0.75
P = power fed to the antenna
D = antenna diameter

Lets assume	η=1	Clearly the maximum possible value.
	P=30mW	The maximum average power output by the radar.
	D=90cm	

Therefore the maximum near-field power density is <0.02mW/cm^2. Over a factor of 100 below the acceptable limit for Occupational/Controlled Exposure of 5mW/cm^2.

Now if we consider General Population/Uncontrolled Exposure. The radar is used in mines which are closed to the general public. Mine staff even those not using the radar are trained to keep clear of the radar unless escorted by someone trained in its operation. Furthermore simple commonsense dictates staying clear of the obvious hazard of the scanning dish and as above the radar only transmits when scanning. Therefore the maximum near field power density can be calculated as above to be <0.02mW/cm^2 which is a factor of 50 below the acceptable limit for occupational/controlled exposure of 1mW/cm^2.