

**Yellowstone National Park  
Mt. Washburn RF Survey  
June 10, 2004**

**Overview**

On June 10, 2004 a survey was conducted to assess employee exposure to radio frequency radiation (RF). The survey was conducted by Bob Curtis, OSHA Health Response Team Director. Mr. Curtis has a degree in electrical engineering and is a member of the C93.1 ANSI/IEEE standard committee that creates employee protection standards to RF.

Three limited areas were identified as being over the FCC general population protection standard. These areas have little employee and visitor exposure but will be signed to warn individuals. All future additions of antennas to the lookout must be closely evaluated to assure employees are protected.

**RF Hazards**

Radio frequency radiation is one of several types of electromagnetic radiation. Many uses have been developed for RF energy. Familiar applications involving telecommunications include AM and FM radio, television, short wave radio, and cordless telephones.

It has been known for some time that high intensities of RF radiation can be harmful due to the ability of RF energy to heat biological tissues rapidly. Tissue damage can result primarily because of the body's inability to cope with or dissipate the excessive heat.

The Federal Communication Commission (FCC) has created two limits to protect employees and the general public from the hazards of RF. The limits are expressed in the unit  $mW/m^2$ , which is power density per unit area.

**Occupational/controlled** exposure limits apply to situations in which persons are exposed as a consequence of employment and in which those persons who are exposed have been fully aware of the potential for exposure and can exercise control over their exposures. This limit is  $5 mW/m^2$ . This level does not apply to Yellowstone's employees and workers.

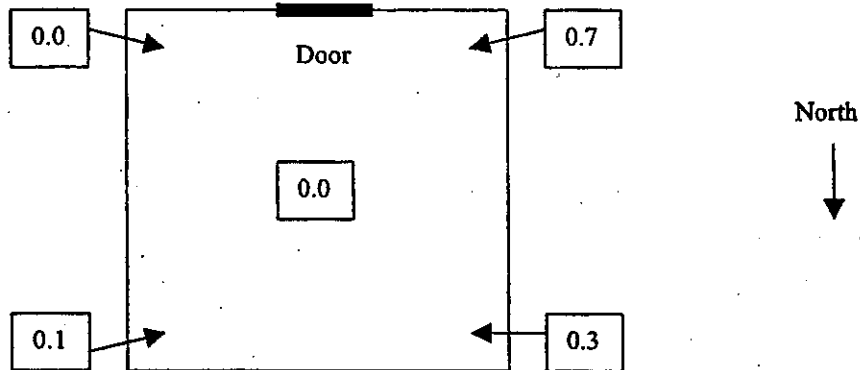
**General Population/uncontrolled** exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. This limit is  $1 mW/m^2$ . This level applies to Yellowstone's employees and workers.

## Methods and Results

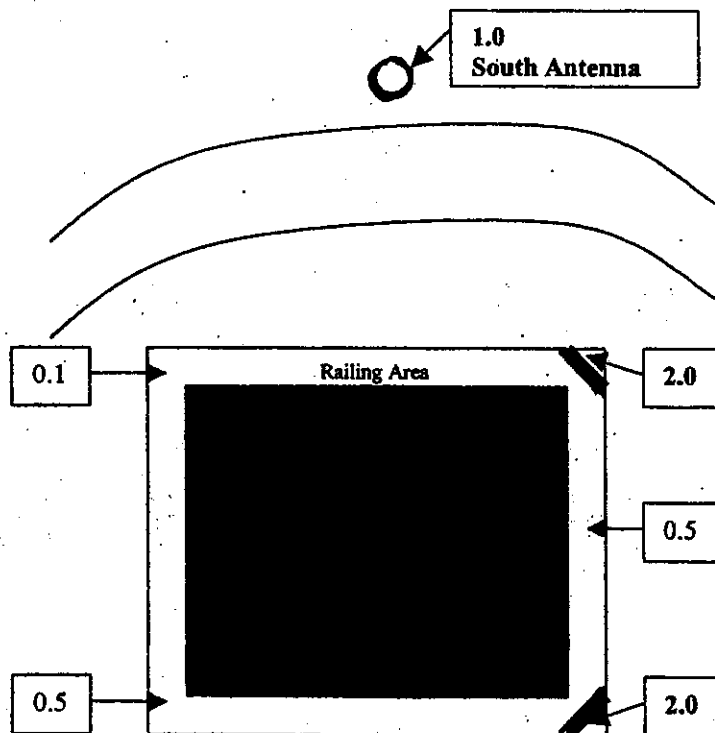
All samples were taken with a Narda 06 E-9 monitor which was calibrated by the OSHA Cincinnati Technical Center on May 5, 2004. The diagrams below illustrate the levels that were detected during the survey. Those results in red indicate an overexposure to FCC standards.

### Indoor

These samples were taken inside the lookout on the top level. No overexposures were detected inside the lookout.



### Outdoor



Other than the three areas indicated above, all other areas at the lookout are considered to be safe for visitors and employees.

### **Corrective and Preventative Action**

These corrective and preventative measures were recommended by Mr. Curtis.

1. All additional antennas that might be installed must be closely evaluated to prevent employee overexposure to RF. The lookout should be considered as "full" at this time. If any agency or division wants to add an antenna, an in-depth exposure study must be conducted **before** it is added.
2. RF warning signs must be installed on the lookout gate and on the lookout door. RF caution signs must be installed on the NW and SW corners of the lookout railing, and on the lone pole south of the lookout. These signs must contain a contact number for more information.
3. Train the following workers on the hazards of RF and hazard areas on the upper level of the lookout: Lookout Ranger, Telecommunication, Electricians, Area LE Rangers and Maintenance personnel.

### **Conclusion**

This survey identified three areas, the northwest and southwest corners of the lookout upper level and the "lone pole" that were above the FCC standard of 1 mW/m<sup>3</sup>. It is not expected that employees would be exposed more than a few minutes in these areas. Regardless, warning signs will be installed and employee training will be completed.

All areas routinely accessed in the lookout by visitors were below 1 mW/m<sup>3</sup>. The only area where visitors have access is the lone pole. This area will be signed to warn visitors to stay away.

All future installations of antennas on the Mt. Washburn lookout must be closely evaluated to insure the safety of employees and visitors.

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Safety Officer