

Environmental Assessment

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It has been determined by the applicant, TARA (Telescope Array RAdar), a research group based out of the University of Utah, that an EA is necessary because of the guidelines in Title 47 of the CFR, §1.1307, Table 1. Specifically, the application is for an experimental radio service with an ERP greater than 100W. There are no other criteria which require the submission of an environmental assessment.

A previous application for a transmitter antenna site has been accepted with call sign WF2XZZ for a location that is near the the CRC (Cosmic Ray Center) in Delta, UT. TARA's previous plan was to place the new transmitter in the space occupied by their current low-power transmitter associated with call sign WF2XHR and use the vacant field that's located directly west of the CRC for the new high-power antenna. The applicant has come to understand that there are a number of costs associated with this site that can be avoided by constructing a new transmitter building and antenna structure on the same, remote site.

The only amendments requested to the existing license WF2XZZ include moving the station about six miles away to a different, less populated site and *lowering* the antenna tower from 80 ft to about 30 ft. Other small changes will be made to the array configuration. Radiation pattern and gain figures will remain the same.

The specific details of the experiment, which are outlined in the Project Description¹, indicate that the greatest benefit will come from a transmitter located close to the Telescope Array² (TA), a cosmic ray detector located just outside of Hinckley, UT. TA is operated primarily by the University of Utah and Japanese collaborators. TARA has leased³ SITLA (School and Institutional Trust Land Association) land near TA. The specific lot is very close to the array and outside Hinckley city limits. A map⁴ showing city limits and the location of the proposed site has been attached as an exhibit. TARA have commissioned an archaeological impact survey⁵, in which the assessor states: "Implement project as proposed . . . no historic properties will be affected."

The site is zoned⁶ for agriculture. The closest structures are farms and a small commercial building. Surrounding land is either unused SITLA land or private property used for agriculture. County authorities have approved construction of an approximately 30' X 30' transmitter shack and Yagi antenna array. A letter⁷ of approval has been written by the Millard County Planning and Zoning Administrator, Sheryl Dekker. TARA have also obtained a building permit⁸.

The antenna structure was designed using 4NEC2⁹ to meet TARA specifications. It consists of four

1 Keck_Final 8.11.2010.pdf

2 TA_aerial.pdf

3 SITLA_application_filled.pdf

4 Delta_Area_city_limits_SITLA.jpg

5 TARA_Transmitter_Survey_Report.pdf

6 millard_county_zoning.pdf

7 planning_approval.pdf

8 MILLARD_COUNTY_BUILDING_PERMIT.pdf

9 Arie Voors. See <http://home.ict.nl/~arivoors/>.

antenna masts horizontally spaced by 0.75λ ¹⁰. Each mast has two five-element Yagi antennas spaced vertically by 0.55λ . The lowest antenna on each mast is 0.55λ from the ground, which places the top appurtenance 1.1λ (just under 20') above the ground. The result is a two row by four column Yagi array. Because of ground effects, the main lobe will have an elevation tilt between 10° and 15° . To achieve the desired elevation tilt, the highest appurtenance may be elevated in situ by several feet, but not exceeding 30 ft. A drawing¹¹ of this structure with dimensions and beam widths has been submitted as an exhibit. The antennas will be placed approximately 100 ft northwest of the transmitter building,¹² which itself is removed 80 ft north of the gravel road running closest to our site. Positioning the antenna in this way places the building in the exposure minimum and prevents interference with the radiation pattern by the prefabricated metal building.

The environmental impact of this site is limited to possible interference with federally listed or proposed endangered bird species. The possibility of interference is low because of the preferred habitats and behaviors of the listed birds and the very low antenna mast height (there will be no antenna tower). There is very little possibility of habitat breakup for other animals since the proposed site is situated among small farms and less than a kilometer from Route 6, an interstate highway. A barbed wire fence surrounds the entire lot. It has evidently been in place for decades. Additional cyclone fencing will enclose the transmitter shack.

Local habitat destruction is also limited because the field is sparsely covered by desert bushes, grasses and a few other indigenous plants, an environment in which a small footprint concrete foundation pad won't be particularly disruptive. There will be no removal of trees. Some brush will be cleared for a foot path to the antenna structure. Furthermore, there will be no gas, water or sewage service to the site. A list of endangered or proposed endangered species by county is available at <http://www.fws.gov/utahfieldoffice/EndSpp.html>, which has been attached¹³ as a courtesy. Regarding the possible danger to local wildlife, especially birds, Kevin Fritz of the Denver Fish and Wildlife Services in the office of Migratory Bird Management commented that the previously proposed 80' tower installation (for the original license WF2XZZ) seemed like a "small impact project." Certainly the 30' tall wood masts proposed for the current project will be of much less impact.

Nathan Darnall, a habitat conservation migratory biologist from Utah Ecological Services, a local division of the Fish and Wildlife Services, was consulted about the possible impact on local bird species. The applicant was merely referred to the "Service Guide on the Siting, Construction, Operation and Decommissioning of Communication Towers," a guide for Fish and Wildlife service personnel in determining the threat of communications towers. This guide¹⁴ has also been attached as a courtesy. Pursuant to and well within the guidelines, the proposed antenna structure is much less than 200 feet, does not require guy wires, and will be unlighted. No lighting is required for antenna structures less than 200 feet above the ground, see §17.21.

The worst-case (perfect ground plane) theoretical RF radiation exposure on the ground near the proposed antenna has been calculated and mapped¹⁵ also using 4NEC2. A 40 kW transmitter with a 10 degree elevation tilt was assumed; cable and connector injection losses were ignored. These numbers define the *maximum* radiation magnitude for all points in space relative to the radiation pattern center,

10 At 54.1 MHz. λ is 5.54 m.

11 4x2_array.pdf

12 SITLA_layout.pdf

13 Species_by_County-20110909.pdf

14 com_tow_guidelines.pdf

15 4x2array_exposure.pdf

which has been taken to be the center of the Yagi array. Scientists working in the transmitter building will not be exposed to radiation fields that exceed MPE due to the placement of the antenna relative to the building.

Passersby will not be exposed to the main lobe because of elevation tilt and the distance from the antenna to the site boundaries. Near the southwestern corner of the 40 acre SITLA site, where the main lobe is projected over the dirt road, the field strength that exceeds MPE will be many tens of feet above the road. Rear lobe exposure outside the SITLA plot will be negligible for the same reason. The transmitting antenna will be 1130 ft, 60 ft, 180 ft and 60 ft from the north, east, south and west boundaries of the site, respectively, so all areas where MPE are exceeded are located well within the fenced field boundaries or projected many tens of feet above the ground outside boundaries.

During the initial filing for this application, TARA have coordinated frequencies with John Dehnel¹⁶, the Salt Lake City SBE frequency coordinator. TARA have also contacted Jack Smith, the Southern Nevada Broadcast Auxiliary Coordinator and Stephen Weber, the Reno, Nevada coordinator. Stephen Weber had recommendations for observing sporadic-E skip events, but saw no problem with our transmission. Jack never replied to the emails.