Farnsworth Peak FM Master Antenna
NIER Analysis

Facilities Proposed

The proposed operation will be at an effective radiated power of 25 kilowatts. Operation is proposed with a 6-level circularly-polarized omni-directional Jampro panel antenna. This master antenna will be shared by approximately twelve FM stations, and will replace the existing 4-level panel antenna currently in use by those stations.

The antenna will be mounted on the KSL-TV tower at Farnsworth Peak, 17 miles southwest of Salt Lake City. This is a multiple-user communications site hosting a number of FM and television broadcast stations. The FCC Antenna Structure Registration Number for the tower is 1053380.

NIER Calculations

The power density calculations for the proposed facility were made using the techniques outlined in the EPA report titled: *An Engineering Assessment of the Potential Impact of Federal Radiation Protection Guidance on the AM, FM, and TV Broadcast Services* (Gailey & Tell, April, 1985). The calculations are based on the manufacturer's vertical plane radiation pattern (a copy of which is attached), and follow the procedure shown in the Gailey and Tell report.

"Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. Equation #1, contained in the Gailey & Tell report and shown below, was used to calculate the ground level power density figures from each antenna at incremental distances from the base of its supporting tower.

$$S(\text{FW/cm}^2) = \frac{(\text{Adjusted ERP in Watts}) \times 1.64 \times 2.56 \times 100}{4 \times B \times (\text{Distance})^2}$$

Where: Adjusted ERP in Watts is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

Distance = Distance in meters from the center of radiation to the calculation point.

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Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 1000 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed panel antenna system assume the vertical plane radiation pattern provided by the manufacturer, a copy of which is attached. The highest calculated ground level power density for a single station on this antenna occurs at a distance of 12 meters from the base of the antenna support structure. At this point the power density is calculated to be 84.5 FW/cm², 8.5% of 1000 FW/cm² (the FCC standard for controlled environments such as this one.)
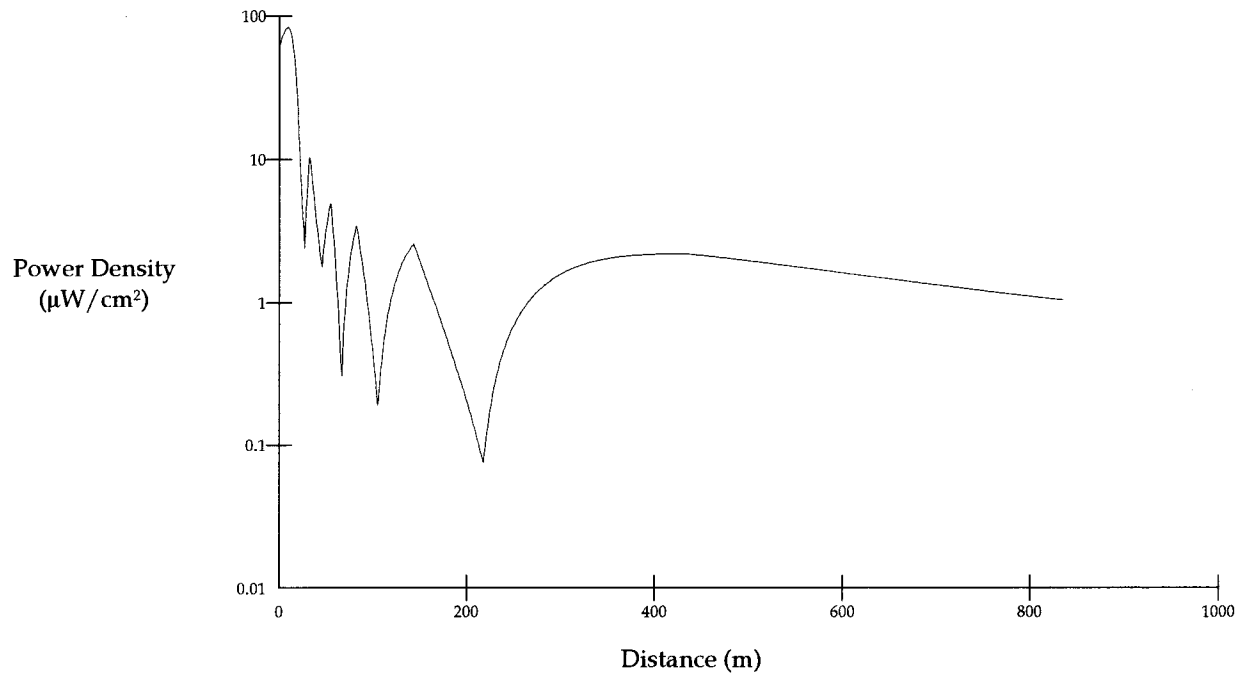
If required by the Commission, the users of the Farnsworth Peak FM master antenna will, upon completion of construction, make proper radiofrequency electromagnetic field strength measurements throughout the transmitter site area to determine if there are any areas that exceed the FCC guidelines for human exposure to RF fields. Any areas found to exceed those guidelines will be fenced and/or marked with appropriate visual warning signs.

The Farnsworth Peak communication site is located on an isolated mountain top in rough and rugged terrain, and is inaccessible to the general public. Public access to the site is restricted by a locked gate and the antenna tower is posted with warning signs. Pursuant to OST Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken.

The permittee/licensee in coordination with other users of the site must reduce power or cease

operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.

Power Density vs Distance

Power Density
(μW/cm^2)

Distance (m)

Ground-Level NIER Analysis   **OET FMModel**

Farnsworth Peak FM Master
Antenna Type: Jampro JAHD-6/4(24) Panel
Number of Elements: 6
Element Spacing: 1.0 wavelength

Distance: 1000 meters
Horizontal ERP: 25 kW
Vertical ERP: 25 kW

Antenna Height: 48 meters AGL

Maximum Power Density is 84.5 μW/cm^2 at 12 meters from the antenna structure.
(Calculation based on attached vertical plane pattern.)

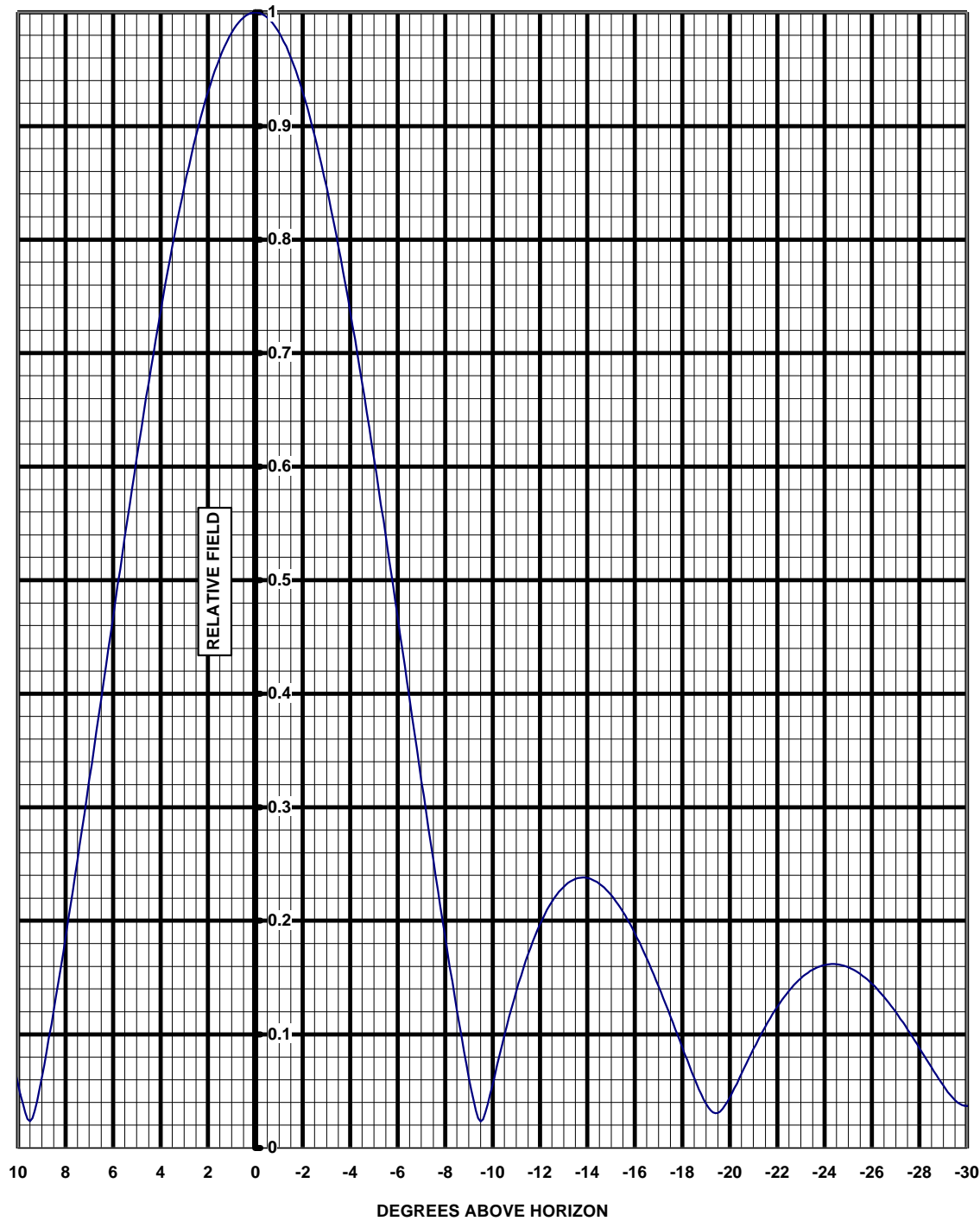Hatfield & Dawson Consulting Engineers

MODEL JAHD-6/4(24)

TABULATION

RELATIVE FIELD VS ELEVATION ANGLE

ELEVATION ANGLE	RELATIVE FIELD	ELEVATION ANGLE	RELATIVE FIELD	ELEVATION ANGLE	RELATIVE FIELD
10	0.056	-26	0.145	-61	0.150
9	0.062	-27	0.120	-62	0.178
8	0.185	-28	0.088	-63	0.205
7	0.324	-29	0.055	-64	0.229
6	0.467	-30	0.037	-65	0.251
5	0.607	-31	0.054	-66	0.270
4	0.736	-32	0.084	-67	0.287
3	0.846	-33	0.110	-68	0.301
2	0.930	-34	0.130	-69	0.313
1	0.982	-35	0.141	-70	0.322
0	1.000	-36	0.142	-71	0.329
-1	0.982	-37	0.135	-72	0.334
-2	0.930	-38	0.120	-73	0.337
-3	0.846	-39	0.098	-74	0.339
-4	0.736	-40	0.073	-75	0.339
-5	0.608	-41	0.049	-76	0.338
-6	0.467	-42	0.040	-77	0.337
-7	0.324	-43	0.055	-78	0.334
-8	0.186	-44	0.080	-79	0.331
-9	0.062	-45	0.105	-80	0.327
-10	0.056	-46	0.126	-81	0.323
-11	0.138	-47	0.143	-82	0.318
-12	0.197	-48	0.153	-83	0.314
-13	0.230	-49	0.157	-84	0.309
-14	0.238	-50	0.154	-85	0.305
-15	0.223	-51	0.145	-86	0.300
-16	0.189	-52	0.131	-87	0.295
-17	0.142	-53	0.112	-88	0.291
-18	0.088	-54	0.090	-89	0.286
-19	0.039	-55	0.066	-90	0.282
-20	0.044	-56	0.047		
-21	0.087	-57	0.045		
-22	0.124	-58	0.063		
-23	0.149	-59	0.091		
-24	0.161	-60	0.120		
-25	0.159				

MODEL JAHD-6/4(24)

ELEVATION PATTERN

RELATIVE FIELD

DEGREES ABOVE HORIZON

MODEL JAHD-6/4(24)

COMPUTED ELEVATION PATTERN

RELATIVE FIELD

DEGREES ABOVE HORIZON