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SUPPLEMENTAL ENVIRONMENTAL ASSESSSMENT (EA) OF THE ELECTROMAGNETIC EFFECTS OF OPERATING WEATHER SERVICE RADAR – 1988, DOPPLER (WSR-88D) TO SERVE COASTAL WASHINGTON AT SCAN ANGLES BELOW +0.5 DEGREE

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EXECUTIVE SUMMARY

The National Weather Service (NWS) is in the process of installing a Weather Service Radar – 1988, Doppler (WSR-88D) to serve the Coastal Washington area. The new radar will be incorporated into the NWS nationwide network of weather radars. The WSR-88D is being installed at the Langley Hill site in Grays Harbor County. The WSR-88D is an S-band Doppler, dual polarized weather radar. The NWS objectives are to improve analysis and prediction of strong winter storm systems that frequent the region and to optimize radar coverage over areas not adequately served by the existing NWS radars in Seattle, Washington, and Portland, Oregon. In July 2010, NWS issued a Final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for construction and operation of the WSR-88D to serve Coastal Washington. WSR-88Ds in the nationwide network currently operate at a minimum scan angle of +0.5 degree (deg) and the 2010 EA analysis addressed that minimum scan angle.

The NWS is considering operating the WSR-88D to serve Coastal Washington at a minimum scan angle between +0.5 and 0.0 deg (i.e., up to one-half deg lower than the current minimum system scan angle). Because the 2010 EA did not analyze scan angles below +0.5 deg, NWS prepared this Supplemental EA to analyze the environmental consequences of the proposed lower scan angles.

This Supplemental EA extends that prior study to examine the possible effects of operating the WSR-88D to serve Coastal Washington at scan angles between +0.5 and 0.0 deg (i.e., lower than the scan angles examined in the April 1993 Supplemental EA). The NWS objectives for this radar would be advanced by altering the scan pattern used by the radar to include scanning at angles below the +0.5 deg above horizontal. Operating this radar at lower scan angles would increase the area of radar coverage and increase the amount of radar information provided to NWS forecasters and other data users. Table S-1 (see page ii) shows the change in area covered at various elevations above site level (ASL) for the existing +0.5 deg scan angle and the lower scan angles under consideration by the NWS. Radar coverage distances would increase, primarily over the Pacific Ocean, with lowering of the minimum center of beam scan angle down to +0.2 deg. Lowering the scan angle below +0.2 deg would not result in any additional increase in coverage.

The time-averaged power density of radiofrequency radiation (RFR) was compared to the C95.1-2005 standard (i.e., the current national standard) for safe exposure of humans to RFR. The C95.1-2005 standard was developed by the Institute of Electrical and Electronic Engineers, and formally approved by the American National Standards Institute. This standard is intended to protect all members of society (including elderly persons, pregnant women, and infants) from long-term RFR exposure and includes a 50-fold safety factor to ensure that no harm will result to persons from exposure to RFR fields. The WSR-88D radio signal, operating at minimum center of beam scan angles of +0.5 to 0.0 deg, will comply with the safety standards for both the general public and occupational exposure at all locations outside the WSR-88D radome. At the surface of the radome, the RFR power density will be 60 percent below the safe exposure level for the general public contained in the standard. At ground level at the base of the tower, RFR power density will be 2,170 times less than safe exposure level for the general public. The

closest location where the ground surface would be illuminated by the WSR-88D main beam is 3.5 miles (mi) from the radar. At that distance, the RFR power density will be 10,000 times less than safe exposure level for the general public. Two licensed radio towers are located at distances of 2,900 and 5,600 ft from the WSR-88D site. Those towers would make negligible contributions to the RFR levels in the vicinity of the radar site. Cumulative RF exposure would comply with safety standards for human exposure to RFR.

The standard also covers occupational exposure; the RFR safety level for occupational settings is higher than the safe exposure level for the general public. Operating the WSR-88D to serve Coastal Washington at a minimum scan angle between +0.5 and 0.0 deg would not result in RFR exposure hazards to the general public or workers in the vicinity of the radar.

Table S-1. Change in Coverage Area for Each Minimum Scan Angle

Minimum Center of Beam Scan Angle (deg)	Coverage Floor Scan Angle (deg)	Total Area Covered at 2,000 feet (ft) ASL in square miles (sq mi) (change from +0.5 deg scan)	Total Area Covered at 4,000 ft ASL in sq mi (change from +0.5 deg scan)	Total Area Covered at 10,000 ft ASL in sq mi (change from +0.5 deg scan)
+0.5	0.0	9,419	19,669	52,240
+0.4	-0.1	11,402 (+21.1%)	22,382 (+13.8%)	56,540 (+7.9%)
+0.3	-0.2	13,715 (+45.6%)	25,311 (+28.5%)	60,699 (+16.2%)
+0.2	-0.3	16,131 (+71.3%)	28,196 (+43.4%)	64,573 (+23.6%)
+0.1	-0.4	16,131 (+71.3%)	28,196 (+43.4%)	64,573 (+23.6%)
0.0	-0.5	16,131 (+71.3%)	28,196 (+43.4%)	64,573 (+23.6%)

The WSR-88D to serve Coastal Washington will operate at a frequency of 2,836 megahertz (MHz). This frequency was selected to minimize the potential for electromagnetic interference (EMI) with other radiofrequency (RF) users. The National Telecommunications and Information Administration (NTIA) of the Department of Commerce licenses government radio stations and has approved the 2,836 MHz operating frequency for this WSR-88D. The NTIA regulations reserve the 2,700 to 3,000 MHz band for government radiolocation users (e.g., meteorological and aircraft surveillance radars). The WSR-88D operates outside the frequencies used by television and radio broadcasts, cellular telephones, and personal communication devices. Based on the government experience over the last 23 years operating 155 WSR-88Ds, the potential for WSR-88D to cause EMI with television, radio, cellular telephones, or personal communication devices is very low.

Under certain conditions, high power RFR can cause electro-explosive devices (EEDs) to pre-maturely detonate or ignite fuel being moved between containers (i.e., fueling of boats or aircraft). The U.S. Navy Sea Systems Command developed technical guidance that establishes the safe separation distance for EEDs and fuel handling activities, considering characteristics of

the RFR emitter and the susceptibility state of the EED. For the most susceptible EED, the safe separation distance from a WSR-88D is 6,030 ft. For fuel handling, the safe separation distance is 537 ft from the WSR-88D. These risks are only present if the EED or fueling is directly illuminated by the main beam of the radar. The WSR-88D operating at 0.0 deg minimum scan angle would not illuminate the ground within 3.5 mi (18,480 ft) of the radar. No hazards to EEDs or fuel handling activities would result.

Under certain conditions, high power RFR can cause EMI with active implantable medical devices (e.g., implantable cardiac pacemakers, implantable cardiac defibrillators). The Association for Advancement of Medical Instrumentation (AAMI) developed requirements for the RFR field levels that such devices must be able to withstand without malfunction or harm to the device. The WSR-88D main beam would exceed the AAMI threshold level only within 2,060 ft of the radar. The main beam would not illuminate the ground within that distance and there is very low potential for harm to wearers of active implantable medical devices.

Implementing the proposed action would not require construction of new facilities or physical modification to the WSR-88D tower, antenna, or support equipment and structures. No changes in the cultural or natural environment would result.

The NWS distributed the Draft Supplemental EA to interested members of the public and government agencies for review and comment. Comments on the Draft Supplemental EA were accepted by NWS during a 30-day comment period running from July 8, 2011 through August 7, 2011. Official responses to all pertinent comments are contained in Section 6.3 of this document.

The additional analysis contained in the Supplemental EA confirms that the Finding of No Significant Impacts issued by the NWS in 2010 remains valid. Neither individual not cumulative environmental impacts would be significant. Preparation of an environmental impact statement is not required.