



State of Washington
DEPARTMENT OF FISH AND WILDLIFE

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Energy Facility Site Evaluation Council
Utilities and Transportation Commission
PO Box 43172
Olympia, WA 98504

RE: Columbia Generating Station Cooling Water Intake Structure, Review and Evaluation

The Washington Department of Fish and Wildlife (WDFW), under contract # 13-1536 with Energy Facility Site Evaluation Council (EFSEC), was tasked to:

1. Review and evaluate the design of the Columbia Generating Station (CGS) cooling water intake structure for consistency with National Marine Fisheries Service's (NMFS) Anadromous Salmonid Passage Facility Design Manual, dated July 2011; and
2. Review and evaluate public comments submitted by Energy Northwest for functional equivalency to the above mentioned NMFS Manual.

Two reviews are enclosed which fulfill this portion of the contract:

NMFS: Anadromous Salmonid Passage Facility Design and Columbia Generating Station: Cooling Water Intake System Specifications, Review and Evaluation; and

NMFS: Anadromous Salmonid Passage Facility Design and Columbia Generating Station: NPDES Comments, Why Cylindrical Screens in Flowing Water Impinge and Entrain Few Fish and Its Importance for The Columbia Generating Station's Intake, Review and Evaluation.

The reviews consist of evaluating CGS intake existing conditions and supporting comments for consistency and functional equivalency with the NMFS Manual and are summarized below.

WDFW determined that the CGS intake screens do not meet the functional equivalency of the 2011 Anadromous Salmonid Passage Facility Design document. WDFW bases this determination on the CGS intake screen size and type. The probability of fry impingement is a function of approach velocity and entrainment of screen size. The CGS intake screen size of 3/8 inch diameter openings will not prevent entrainment of emergent fry. As designed and without debris impingement, the CGS passive intake screens will range at or above the acceptable approach velocity. When screens become occluded with debris the effective screen size is reduced and approach velocity increases, thereby increasing the probability of impingement. The CGS intake screens do not meet the diversion criteria for passive screens indicating the need for active screens. A debris cleaning system found on active screens will move debris from the surface of the screens, maintaining a consistent approach velocity and reducing the chances of impingement.

WDFW determined that the comments submitted by Energy Northwest do not support functional equivalency of the CGS intake with the NMFS Manual. Dr. Coutant provided compelling information for the efficacy of Cylindrical Wedgewire screens and the four sequential steps to avoid entrainment. Hydraulic bypass and avoidance behavior do reduce entrainment but slot size will determine the amount of entrainment and impingement. The fry that are not moved away from the screen through hydraulic bypass or avoidance behavior will come into contact with the screen. All fish that encounter the screen and have a head size smaller than the slot size will be entrained. Those with a larger head size may become impinged and die or swept off with possible injuries. The organisms that may be entrained or impinged are likely the weakest swimming species present, in their most vulnerable life stage, under adverse environmental conditions. Those are the species intended to be protected through the NMFS fish screening criteria. Hydraulic bypass and avoidance behavior will not protect the weakest organisms from injury and/or mortality associated with impingement and entrainment. Exclusion and low approach velocity are also necessary. The CGS intake will not prevent entrainment of fry less than 75 mm that do not utilize hydraulic bypass or avoidance behavior with the 9.5 mm perforations.

In conclusion CGS intake existing conditions and supporting comments are not consistent or functionally equivalent with the NMFS Manual.

WDFW appreciates the opportunity to provide the review and evaluation of the Columbia Generating Station cooling water intake structure and Energy Northwest NPDES comments for the Energy Facility Site Evaluation Council.

Sincerely,

A handwritten signature in cursive script that reads "Peggy Miller".

Peggy Miller – Renewable Energy Biologist, Habitat
Washington State Department of Fish and Wildlife
600 Capitol Way North – Olympia, WA 98501