Evaluation of Meteorological & Atmospheric Dispersion Results and Land Use Census on

Dispersion and Deposition Factors

Aziz Maly

Health Physicist III

Dominion - Kewaunee Power Station

ABSTRACT

There has been more attention from the regulators to update the dispersion and deposition factors used in dose estimation at the site boundary and the critical receptor locations, especially after the Fukushima Daiichi incident. 10CFR20, 10CFR50, NUREG0472 and NUREG1302 call for accurate estimation of the effluents and the impact on the environment and the general public. This can be achieved by frequently updating the dispersion and deposition factors to capture the changes in metrological conditions and affected pathways.

Nuclear power stations are required to report the Meteorological Joint Frequency Distribution and Land Use Census annually. Using this data to update the dispersion and deposition factors would result in a more accurate estimation for both dispersed nuclide activities and dose distributions around the plants.

This evaluation serves as a resolution to the above issue and recommends the following actions to be taken:

1- Include the new X/Q and D/Q values from the deposition and dispersion study in the ODCM.

2- Identify the conservative site boundary and critical receptor locations.

3- Determine pathways to be used for effluent estimations based on the best industry standards and conservative approach.

The evaluation included:

- Determination of the X/Q values using the shortest and semi circle approaches.

- Identification of the closest receptor and pathways in each sector from the Land Use Census.

- Calculation of dose using the isotope distribution table from the USAR.

- Determination of the D/Q values for each location using the Meteorological and Atmospheric Dispersion Report.

- Determination of the Critical Receptor from the doses of each organ to the critical receptor by sector.

- Analysis of the results and evaluation of new values relative to Environmental Monitoring and Effluent Programs.