


Secretaries' Science Advisory Board, October 2019

**Request for Review and Comment on 15A NCAC 02L .0202 Groundwater Quality Standard for PFOA and PFOS**

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**DEQ**  
 NORTH CAROLINA  
 Department of Environmental Quality

## Request of the SSAB

At the request of the Groundwater and Waste Management Committee of the Environmental Management Commission, the Division of Water Resources asks the Secretaries' Science Advisory Board to review and comment on DWR's recommendation to use the 2016 EPA Drinking Water Health Advisory values for PFOA and PFOS as a Groundwater Quality Standard (15A NCAC 02L .0202) for combined total PFOA and PFOS.



## Groundwater Quality Standards

Established as the least of the following:

1. Systemic threshold concentration
2. Concentration which corresponds to an incremental lifetime cancer risk of  $1 \times 10^{-6}$
3. Taste threshold limit value
4. Odor threshold limit value
5. Maximum contaminant level
6. National secondary drinking water standard

15A NCAC 02L .0202 (d)



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## Groundwater Quality Standards

Using the following references in order of preference:

1. EPA Integrated Risk Information System (IRIS)
2. EPA Drinking Water Health Advisories
3. Other EPA health risk assessment data
4. Other relevant, published health risk assessment data and scientifically valid peer-reviewed published toxicological data

15A NCAC 02L .0202 (e)



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## Groundwater Quality Standards

Systemic threshold concentration calculated as follows:

[Reference Dose (mg/kg/day) x 70 kg (adult body weight) x Relative Source Contribution (.10 for inorganics; .20 for organics)] / [2 liters/day (avg. water consumption)]

$$GWQS = \frac{RfD \times BW \times RSC}{WCR}$$

15A NCAC 02L .0202 (d)



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## Proposed PFOS/PFOA Groundwater Standard

- **Total** perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA): **0.07 µg/L** (ppb)
- 2016 EPA Drinking Water Health Advisories
- Based on the calculated noncancer systemic threshold using drinking water intake and body weight of lactating women



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## Drinking Water Health Advisory for PFOA and PFOS

- PFOA:
  - RfD = 0.00002 mg/kg/day; based on the LOAEL for reduced ossification of the forelimb and hindlimb in male and female pups and accelerated puberty in male pups of dams exposed (Lau et al. 2006)
  - Drinking water intake and body weight parameters for lactating women because of the potential increased susceptibility during pregnancy and lactation
  - Lifetime HA = DWEL x RSC = 0.00037 mg/L x 0.2 = 0.07 µg/L
- PFOS:
  - RfD = 0.00002 mg/kg/day; based on the NOAEL for decreased pup body weight in rats (Luebker et al. 2005b)
  - Drinking water intake and body weight parameters for lactating women because of the potential increased susceptibility during pregnancy and lactation
  - Lifetime HA = DWEL x RSC = 0.00037 mg/L x 0.2 = 0.07 µg/L

U.S. EPA (2016) Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)  
 U.S. EPA (2016) Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)



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## Drinking Water Health Advisory for PFOA and PFOS

Because the RfDs for both PFOA and PFOS are based on similar developmental effects and are numerically identical, where these two chemicals co-occur at the same time and location in a drinking water source, a conservative and health protective approach that EPA recommends would be to compare the sum of the concentrations ([PFOA] + [PFOS]) to the Health Advisory (0.07 µg/L).

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### Questions?

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## Drinking Water Health Advisory for PFOA and PFOS

### Drinking Water Equivalent Level (DWEL)

- Assumes that 100% of PFOS exposure comes from drinking water

$$\bullet \text{ DWEL} = \frac{RfD \times BW}{DWI} = \frac{0.00002 \frac{\text{mg}}{\text{kg}/\text{day}}}{0.054 \frac{\text{L}}{\text{kg}/\text{day}}} = 0.00037 \text{ mg/L}$$

### Lifetime Health Advisory

- HA = DWEL x RSC  
= 0.00037 mg/L x 0.2  
= 0.000074 mg/L = 0.7 µg/L

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