1996 Connecticut Remediation Standard Regulations

Derivation of Surface Water Protection Criteria

Surface Water Protection Criteria (SWPC) were developed to address the assumption that contaminated ground water could potentially discharge to a surface water body. The criteria are applicable to groundwater and are designed to prevent unacceptable impacts to surface waters and the people and aquatic communities that use this resource. Surface Water Protection Criteria were established using water quality criteria for surface water bodies, including Ambient Water Quality Criteria for the Protection of Human Health, which assume that fish may be caught and consumed from the surface water body, and also Ambient Water Quality Criteria for the Protection of Aquatic Life from chronic toxic impacts. These values were established in accordance with EPA procedures and adopted into the Connecticut Water Quality Standards. The 1992 Connecticut Water Quality Standards* were used to develop the Surface Water Protection Criteria in the 1996 RSRs.

Surface Water Protection Criteria were designed to be applied under low flow conditions, consistent with the requirements for ambient water quality criteria. The Water Quality Standards specify that Water Quality Criteria were to be applied under 7Q10 flow conditions, which represents a low flow which occurs approximately 1% of the time. This flow was selected by EPA as it is consistent with the short term exposure assumptions on which the aquatic life criteria are based. Human health based Water Quality Criteria have different exposure periods related to the mode of action of the chemical, either noncancer or cancer based endpoints. This would translate to application under differing flows within the surface water, flows which were greater than the 7Q10 flow. For noncarcinogens, EPA recommended applying the criteria under 30Q2 flows, which Connecticut determined to be approximately 2x the 7Q10 flow. For carcinogens, EPA recommended applying the criteria under Mean Harmonic Flows, which Connecticut determined to be approximately 3x the 7Q10 flows. CT DEEP used these “flow factors” to address this issue. The human health based Water Quality Criteria for noncarcinogens were multiplied by 2 and Water Quality Criteria for carcinogens were multiplied by 3 to allow for application under 7Q10 flows. Exceptions to this were made for chemicals which were designated by EPA as known human carcinogens or for chemicals with a higher potential to bioaccumulate. For these chemicals, a flow factor of 1 was used. Appendix D of the 1992 Water Quality Standards provide this additional information for each chemical and designate noncarcinogens (Threshold toxicants, TT), carcinogens (C), known human carcinogens (A) or have a high potential to bioaccumulate (HB).

In addition to considering the river flows under which SWPC were to be applied, the default SWPC are based on an assumption of 10:1 dilution being available within the surface water body.

Based on these considerations, the risk-based SWPC were calculated as the lower of:

Water Quality Criterion for Chronic Freshwater Aquatic Life Protection x 10

OR

Human Health based Water Quality Criterion for Fish Consumption x Flow Factor x 10

Where:

Flow Factor = 1 for known human carcinogens or substances which may bioaccumulate
Flow Factor = 2 for non-carcinogenic substances
Flow Factor = 3 for carcinogenic substances