

THE METHODOLOGY ON THE DERIVATION OF ENVIRONMENTAL QUALITY STANDARDS FOR HAZARDOUS SUBSTANCES IN SURFACE WATERS

PREPARED BY AYBALA KOÇ ORHON

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EXPERTISE THESIS ABSTRACT

Within the scope of this thesis study, the concept of EQS and the liabilities that it introduces to the countries via corresponding legal acts were investigated, national and international legislations that might be related with the subject either directly or indirectly were examined and general evaluation was made at the end.

Moreover, considering the “Technical Guidance for Deriving Environmental Quality Standards” prepared in 2011 in line with Water Framework Directive, methodology involved in the derivation of EQS, main steps followed at this stage and calculation methods (i.e. deterministic and probabilistic methods) were studied in detail and the comparison of these calculation methods was conducted as well. Also, by using the acute and chronic toxicity data gathered from the literature within the project conducted by the former Ministry of Forestry and Water Affairs to designate hazardous substances in coastal and transitional waters, case study on the derivation of EQS for freshwaters and salt waters was carried out for “Triclosan” (TCS) which is substance known to be used at a substantial amount in our country. According to the calculations, annual average EQS values of TCS for freshwaters and salt waters was obtained as 0,0015 µg/L and 0,0003 µg/L with deterministic method and 0,085 µg/L and 0,017 µg/L with probabilistic method, respectively. Maximum EQS values of TCS were, on the other hand, calculated as same for freshwaters and salt waters and deterministic and probabilistic methods resulted in the numbers like 0,11 µg/L and 0,30 µg/L, respectively. The results of case study demonstrated that existing toxicity data and the calculation method used had a significant effect on the calculated EQS and probabilistic method that was applied when the sufficient number of data was available ended up with more reliable water column EQS in general. In addition, sediment and biota EQS values were also calculated for TCS and freshwaters and salt water

EQSs were found as 43,2 µg/kg and 8,6 µg/kg (dry weight basis) for the sediment, and 20000 µg/kg and 2000 µg/kg for biota, as well. According to findings, more strict standards were obtained for salt waters in comparison to those of freshwaters, as expectedly.

Furthermore, approaches applied for the determination of EQS in European Union (EU) countries and our country were analyzed in this thesis study. Although the studies regarding this issue has been initiated earlier in EU and almost started in the year of 2011 in our country, Turkey has made a great success in a short time when compared with several EU countries and it achieved a leading position among other countries by means of the projects and legislation it holds.

On the other hand, within this thesis study, annual average and maximum EQS values for freshwaters and salt waters were proposed for the specific pollutants that are planned to be adapted to the national legislation and the number of which are 117 for point sources and 133 for diffuse sources respectively, by benefiting from the data produced within the scope of the projects conducted for EQS derivation by the former Ministry of Forestry and Water Affairs on behalf of our country. During this study, limit of detection values of the analytical methods for the chemicals involved and EQS values determined by other countries were also taken into consideration in order to propose EQS values implementable both technically and practically. Besides that, in order to evaluate the applicability of these EQSs in our country, implementation steps together with the possible problems and drawbacks that might arise during implementation phase were investigated and solution proposals were developed on our country basis accordingly.

Keywords: Environmental quality standards, toxicity, specific pollutants, deterministic and probabilistic methods, implementation steps