

Appendix 6 : Explosives Water Quality Criteria References

Explosive	Available Data on Toxicity In Water Environment	Data Source	For Web Data - Date Accessed
2, 4 DNT	1.7ug/l based on risks to human health (x10 ⁻⁵ risk)	Etnier, E. L. Water Quality Criteria for 2,4-dinitrotoluene and 2,6-dinitrotoluene: Final Report. Department of Energy, Washington, DC. 1987 Aug:149.:	
	1.1ug/l based on risks to human health (x10 ⁻⁵ risk)	USEPA DWS	9 March 2006 http://www.epa.gov/waterscience/criteria/wqcriteria.html
	0.044mg/l	USEPA R5 Surface water screening benchmark	http://risk.lsd.ornl.gov , 14 March 2006
	The threshold concentration for significant growth rate reduction in fish was 0.05 mg/L 2,4-DNT. Significant histopathological responses were observed in liver, spleen, trunk kidney, lateral line, and gill fish exposed to 0.5 - 8.0 mg/L 2,4-DNT for 45-56 days. Also see below for affect of isomer mixtures	Hartley, W. R. Evaluation of Selected Subacute Effects of the Nitrotoluene Group of Munitions Compounds on Fish and Potential Use in Aquatic Toxicity Evaluation. Tulane University, New Orleans, LA. School of Public Health and Tropical Medicine. 1981:223	
2, 6 DNT	68.3ng/l based on risks to human health (x10 ⁻⁵ risk)	Etnier, E. L. Water Quality Criteria for 2,4-dinitrotoluene and 2,6-dinitrotoluene: Final Report. Department of Energy, Washington, DC. 1987 Aug:149.	

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2, 6 DNT	<p>0.081mg/l</p> <p>The acute toxicity determined for fish (<i>Oryzias latipes</i>) was 27 mg/l (48h-LC50). Acute toxicity data available for the single isomers of the technical mixture show that the toxicity of 2,4- and 2,6-DNT is in the same order of the toxicity found for the technical mixture. However, the other isomers are about an order of magnitude more toxic to fish than the main isomers. With the model of concentration additivity a LC50 of about 17 mg/l can be estimated for the technical mixture which is in good agreement with the experimentally determined value.</p> <p>For algae, tests available for the different isomers show that the toxicities of the 2,4- and 2,3-isomers are more similar than the toxicities of the 2,4- and 2,6-DNT. As 2,4-DNT seems to be the most toxic isomer to algae, it can be concluded that the toxicity of the isomeric mixture for this trophic level can be described using the data for 2,4-DNT. The effect values from short-term tests for the technical DNT are between 0.08-27mg/l</p>	<p>USEPA R5 Surface water screening benchmark</p> <p>OECD SIDS dinitrotoluene (isomers mixture)</p> <p>UNEP Publications 6</p>	<p>http://risk.lsd.ornl.gov, 14 March 2006</p> <p>http://www.chem.unep.ch/irptc/sids/oecdsids; 9 March 2006</p>

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2, 6 DNT	Reliable tests on chronic toxicity towards fish, <i>Daphnia</i> , algae and blue-green algae are available as well. The lowest effect values were obtained with the 2,4-DNT with values between 0.02 (NOEL) and 1.9mg/l (48hr- ErC10)		
Picrite	Lifetime Exposure Health advisory level of 700ug/l. Drinking water equivalent level of 4000 ug/l.		
Picric Acid	<p>The 48-hr LC50 for <i>Daphnia</i> was approximately 65 ppm in picric acid</p> <p>The 96-hr LC50 for picric acid for rainbow trout was 109.6 mg/L. Sublethal no growth EC50 and shell deposition EC50s for oysters caused adverse effects at much lower concentrations than indicated by the LC50. For example, the 144-hr shell deposition EC50 was 27.9 mg/L for picric acid</p>	<p>DiSalvo, L. H., Guard, H. E., Gray, B., and Lego, J. A. Toxicity of Ordnance Wastes in Aquatic Environments. Naval Biosciences Laboratory, Oakland, CA. 1976 Jan 30:24.</p> <p>Goodfellow, W. L., Burton, D. T., Graves, W. C., Hall, L., and Cooper, K. R. Acute Toxicity of Picric Acid and Picramic Acid to Rainbow Trout (<i>Salmo gairdneri</i>) and American Oyster (<i>Crassostrea virginica</i>). Water Resources Bulletin. 1993; 19:641-648</p>	

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Nitroglycerine	0.13mg/l	USEPA Surface water screening benchmark	http://risk.lsd.ornl.gov , 14 March 2006
Nitrocellulose	Fish mortality at 1000mg/l based on US Army research 1976	PAN Pesticides Database – Chemicals – http://www.pesticideinfo.org cited Laboratory Evaluation of the Toxicity of Nitrocellulose to Aquatic Organisms, Bentley, R.E., G.A. LeBlanc, T.A. Hollister, and B.H. Sleight III, U.S.Army Medical Res.Develop.Command, Washington, D.C.:34 p.(U.S.NTIS AD-A037749/9ST) 1976	01-Dec-05
TNT	For TNT, a concentration of 0.04 mg/L should be used as an interim 24-hr average allowable concentration until a chronic no effect level is experimentally defined for fathead minnows exposed to TNT.	Bailey, H. C., Spangford, R. J., Javitz, H. S., and Liu, D. H. W. Toxicity of LAP Wastewater and 2,4,6-trinitrotoluene. SRI International, Menlo Park, CA. 1985 May: 80.	
RDX	Applying an application factor of 0.1 to the lower limit of observed acute toxicity values (3.6 mg/L, 96-hr LC for bluegill at pH 6.0), a water quality criterion of 0.35 mg/L 50 RDX is proposed.	Bentley, R. E., Dean, J. W., Eells, S. J., Hollister, T. A., and LeBlanc, G. A. Laboratory Evaluation of the Toxicity of Cyclotrimethylene Trinitramine (RDX) to Aquatic Organisms. EG and G Bionomics, Wareham, MA. 1977 Dec:99.	
RDX			

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	into groundwater, particularly if the soil has a high organic content. Picric acid, one of the breakdown products of tetryl, is soluble in water and is expected to leach through soil to groundwater in substantial amounts (Army 1987d).		
PETN	85mg/l	USEPA Surface water screening benchmark	http://risk.lsd.ornl.gov , 14 March 2006