

Technical Memorandum

Significant Nutrient Point Sources in the Baltimore Harbor (Patapsco River Mesohaline) Watershed

The U.S. Environmental Protection Agency requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources of the impairing pollutant or pollutants. The TMDL analysis for Baltimore Harbor addresses the total nitrogen (TN) and total phosphorus (TP) loads for the growing season conditions (May-October) and for average annual conditions. This technical memorandum identifies, in detail, the significant surface water discharges of TN and TP used as modeling input when computing the TMDLs. These are conceptual values that are within the TMDL thresholds. Whereas, actual effluent limits and related permit conditions will be established at the time of permit issuance or renewal through the permit process. The Maryland Department of the Environment (MDE) expressly reserves the right to allocate the loads among different sources using the above mentioned *permit process* in any manner that is reasonably calculated to achieve water quality standards.

Potential waste load allocations have been identified for National Pollutant Elimination System (NPDES)-regulated municipal and industrial wastewater treatment plants and municipal separate stormwater discharges in the Baltimore Harbor Watershed. There are two municipal wastewater treatment plants (WWTP) contributing nutrient loads to the Baltimore Harbor: the Patapsco WWTP and the Cox Creek WWTP. In addition to these two municipal WWTPs, there are five industrial point sources contributing to the total nutrients load into the Harbor: International Steel Group (ISG), WR Grace, Erachem-Comilog, US Gypsum, and Millenium Specialty. Waste load allocations have been identified for these point sources based on their permitted or actual discharge flows. Potential annual waste load allocations are also identified for five jurisdictions with municipal stormwater discharges in the Baltimore Harbor Watershed to address nutrient loads from urban sources during storm events. Baltimore City, Baltimore County, Anne Arundel County, Carroll County and Howard County are all covered under NPDES Phase I stormwater permits. Potential annual waste load allocations have been identified for these stormwater discharges based on the 1995-1997 watershed model. The stormwater nutrient loads account for contributions from urban land. The land use information was based on 1997 Maryland Department of Planning data.

The nutrient reductions for point sources, reflected in the TMDL analysis, are designed to protect water quality in the Baltimore Harbor and the Chesapeake Bay. It is likely, however, that future Chesapeake Bay Agreement nutrient goals may entail more ambitious point source nutrient reductions to protect the water quality of the Bay.

Tables 1a and 1b and 2a and 2b below identify provide the potential allocations of the nutrients nitrogen and phosphorus attributed to the point sources in the Baltimore Harbor: municipal and industrial WWTPs, and NPDES urban stormwater discharges. These allocations were used in the Baltimore Harbor Eutrophication Model (BHEM) simulation for the growing season and average annual conditions.

Table 1a

**Loads Attributed to Point Sources (WWTPs) Used to Compute the
Growing Season TMDL (May 1st - October 31st)**

<i>Point Source Name</i>	<i>Permit Number</i>	<i>Nutrient Loads (lbs/growing season)</i>		<i>Flow</i>	<i>Concentration (mg/l)</i>	
		TN	TP	(MGD)	TN	TP
Patapsco WWTP	MD0021601	333,330	33,330	73	3	0.3
Cox Creek WWTP	MD0021661	68,484	6,852	15	3	0.3
International Steel Group (ISG)	MD0001201-101	31,795	264	0.864	24.2	0.2
International Steel Group (ISG)	MD0001201-012	304,590	15,230	50	4	0.2
International Steel Group (ISG)	MD0001201-014	158,388	7,632	26	4	0.19
International Steel Group (ISG)	MD0001201-017	17,058	2,814	2.8	4	0.66
International Steel Group (ISG)	MD0001201-021	52,392	2,622	8.6	4	0.2
W. R. Grace	MD0000311	155,370	1,236	4.066	25	0.2
Erachem-Comilog	MD0001775	47,502	6	0.128	244	0.03
US Gypsum	MD0001457	192	30	0.007	18	3
Millenium	MD0001279-001	4,338	0	0.080	35.58	0
Millenium	MD0001279-002	6,750	0	0.545	8.13	0
Cox Creek DMCF		52,601	2,556	1.2	28.8	1.4
Total		1,232,790	72,572	N/A	N/A	N/A

Table 1b

**Loads Attributed to Point Sources (Urban Stormwater) Used to Compute the
Growing Season TMDL (May 1st - October 31st)**

<i>Point Source Name</i>	<i>Permit Number</i>	<i>Nutrient Loads (lbs/growing season)</i>	
		TN	TP
Baltimore City For Growing Season TMDL	MD0068292	102,306	10,164
Anne Arundel County For Growing Season TMDL	MD0068306	73,662	7,314
Baltimore County For Growing Season TMDL	MD0068314	167,784	16,662
Carroll County For Growing Season TMDL	MD0068331	28,644	2,844
Howard County For Growing Season TMDL	MD0068322	36,828	3,660
Total		409,224	40,644

Table 2a

**Loads Attributed to Point Sources (WWTPs) Used to Compute
the Average Annual Conditions TMDL**

<i>Point Source Name</i>	<i>Permit Number</i>	<i>Nutrient Loads (lbs/year)</i>		<i>Flow</i>	<i>Concentration (mg/l)</i>	
		TN	TP	(MGD)	TN	TP
Patapsco WWTP	MD0021601	889,453	66,709	73	4	0.3
Cox Creek WWTP	MD0021661	182,764	13,707	15	4	0.3
International Steel Group (ISG)	MD0001201-101	63,590	526	0.864	24.2	0.2
International Steel Group (ISG)	MD0001201-012	609,185	30,459	50	4	0.2
International Steel Group (ISG)	MD0001201-014	316,776	15,267	26	4	0.2
International Steel Group (ISG)	MD0001201-017	34,114	5,625	2.8	4	0.66
International Steel Group (ISG)	MD0001201-021	104,785	5,240	8.6	4	0.2
W. R. Grace	MD0000311	310,737	2,475	4.066	25	0.2
Erachem-Comilog	MD0001775	95,000	12	0.128	244	0.03
US Gypsum	MD0001457	384	64	0.007	18	3
Millenium	MD0001279-001	8,670	0	0.080	35.58	0
Millenium	MD0001279-002	13,495	0	0.545	8.13	0
Cox Creek DMCF		462,164	7,240	1.2/20*	28.8/38*	1.4/0.3*
Total		3,091,117	147,324	N/A	N/A	N/A

*Cox Creek DMCF estimated discharge of 1.2 mgd; TN = 28.8 mg/l and TP = 1.4 mg/l from April 1 to January 31. From February 1 to March 31 (maximum activity period) discharge of 20 mgd; TN = 38 mg/l and TP = 0.3 mg/l.

Table 2b

**Loads Attributed to Point Sources (Urban Stormwater) Used to Compute
the Average Annual Conditions TMDL**

<i>Point Source Name</i>	<i>Permit Number</i>	<i>Nutrient Loads (lbs/year)</i>		<i>Flow</i>	<i>Concentration (mg/l)</i>	
		TN	TP	(MGD)	TN	TP
Baltimore City For Average Annual TMDL	MD0068314	221,274	23,951	N/A	N/A	N/A
Anne Arundel County For Average Annual TMDL	MD0068306	159,318	17,245	N/A	N/A	N/A
Baltimore County For Average Annual TMDL	MD0068292	362,890	39,279	N/A	N/A	N/A
Carroll County For Average Annual TMDL	MD0068331	61,957	6,706	N/A	N/A	N/A
Howard County For Average Annual TMDL	MD0068322	79,659	8,622	N/A	N/A	N/A
Total		885,098	95,803	N/A	N/A	N/A