WATER QUALITY ISSUES FACING INDUSTRIES IN NORTH CAROLINA

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The North Carolina Environmental Management Commission has the authority and responsibility to implement the Clean Water Act in North Carolina and to protect, enhance and preserve the waters of the State. The Commission is required to determine the best usage of waters and to assign appropriate classification and standards to protect the human health and aquatic health of the State's waters.

The Commission has established a series of surface water classes (primary classifications) consisting of Class C, Class B, Class WS-I, Class WS-H, Class WS-III, Class WS-IV, Class WS-V, Class SC, Class SB, and Class SA, as well as a series of supplemental classifications consisting of HQW, ORW, Tr, NSW and Sw. Each of these primary and supplemental surface water classifications are described in the attached "Summary of North Carolina's Water Quality Classifications and Standards". The current draft wetland classes are also included. The wetland classes are proposed to be new surface water classes.

The purpose of the classification and standards is to restore and maintain the chemical, physical and biological integrity of the surface waters. The goal is to achieve a level of water quality that will provide for the protection and propagation of fish, aquatic life and wildlife, and to support other uses such as recreation, water supplies, agricultural uses, navigation and commerce.

Some of the basic water classes date back to 1963 when the first classifications and water quality standards were established. In more recent years the water quality classification system has been modified to include protection of surface water supply watersheds and protection of pristine waters. These new approaches are intended to prevent the deterioration of water quality at the source whether a traditional point source discharge or complex non-point source discharges. For example, many of the standards that apply to water supply watersheds are development limitations that can apply geographically across the entire watershed. Therefore, many of the new standards extend beyond the actual surface water body and may extend to the watershed ridge line. While these new approaches fundamentally encompass regulation of many more primary and secondary water quality impacts, they also have opened a new era of more complex regulations.

The new complexity in surface water quality standards that is emerging makes the process of site selection and permitting for new and expanded industries far more complex. This complexity can perhaps best be illustrated in the following new classes and standards:

Water Supply Watershed Classes

Industries that would have either domestic or industrial wastewater discharges to surface waters may be categorically prohibited from portions or all of WS-I, WS-II, WS-III watersheds and portions of WS-IV watersheds. This categorical prohibition can also apply in WS-II watersheds even if the discharge is into a publicly owned treatment works (POTW).

In addition, major new industries have been extremely cautious about locating in any water supply watershed even if allowed by regulations, due to the potential public relation problems. If this in fact does occur it amounts to a defacto prohibition. Water supply watersheds represent a significant portion of the land area, especially across the Piedmont of North Carolina. Therefore, these new regulations may pose significant difficulties in siting new industries in North Carolina.

High Quality Waters

High Quality Waters (HQW) includes waters that have an ambient water quality rating of excellent by DEM, primary nursery areas, native or special trout waters, critical habitat areas, WS-I waters, WS-II waters and SA waters. Stringent effluent discharge limitations apply to any HQW waters whether or not they have been designated. In addition, anti-degradation standards normally require additional stringent effluent discharge limitations on any HQW waters. Therefore, it is unlikely that a new or expanded industry could be permitted discharge into HQW waters.

Outstanding Resource Waters

Outstanding Resource Waters (ORW) apply to waters considered to be unique and special surface waters of the State. These waters are of exceptional state or national recreational or ecological significance and waters that have exceptional water quality.

Industrial wastewater discharges and stormwater discharges will most likely not be allowed into ORW waters. Therefore, permitting of new industries in ORW watersheds may be very problematic or simply not allowed.

Wetland Waters

The Division of Environmental Management has been required by EPA to develop regulations to classify and protect wetlands. The Division has prepared a draft set of regulations for freshwater wetlands (WL), saltwater wetland (SWL), and unique wetlands (UWL). The draft regulatory requirements are summarized in the attached summary table.

Most new industrial projects or expansion of existing industrial facilities across North Carolina will encounter wetlands and will require permitting of wetland impacts by the State, as well as by the U.S. Army Corps of Engineers. The draft regulations will require that the applicant prove that no practical alternative exists to impacting the wetlands, which the project provides wet detention stormwater facilities, and that appropriate mitigation is provided. Many projects may not meet the standards without significant and costly project modifications or use of alternative sites. In addition, SWL wetlands requires that the proposed facility be water dependent, and UWL wetlands can only be impacted by projects of demonstrated public need.

Therefore, all industrial projects impacting wetlands, even to a limited extend, will require that a serious effort be made to avoid wetland impacts. This may include consideration of alternative sites that would have less impact on wetlands. In addition, it will be difficult to determine if a given site is feasible early in the siting process. Therefore, these new regulations will significantly complicate industrial siting.

Saltwaters

Saltwater classes including SC, SB and SA basically require stormwater controls for all industrial projects. These requirements, combined with the draft SWL wetland regulations, will make industrial siting in the twenty coastal counties extremely complicated. The draft SWL regulations would prohibit wetland impacts except for water dependent projects. Most industrial projects are not considered to be water dependent.

Summary

The surface water classes noted above demonstrate the changing role of water quality regulations. The newer approaches emphasize both protection and preservation of water quality across water supply watersheds, high quality waters, outstanding resource waters, wetlands, and coastal saltwaters. All industrial projects that impact such classes of waters will be required to deal with these new protection and preservation requirements.

The basic approach to preserving the quality of these important waters is to regulate non-point source pollution through land use standards, stormwater management and through stringent standards for point source discharges. These new land use and land management approaches to industrial siting and industrial project engineering will require all involved parties to implement new innovative approaches to environmental protection and preservation of ecological systems. This can only be accomplished through fundamental changes in the way we make industrial siting decisions and in project planning and engineering.

SUMMARY OF NORTH CAROLINA'S WATER QUALITY CLASSIFICATIONS AND STANDARDS

PRIMARY CLASSIFICATIONS	BEST USAGE	NUMERIC STANDARDS	STORMWATER CONTROLS	OTHER REQUIREMENTS
Freshwater:				
Class C (standards apply to all freshwaters, unless preempted by more stringent standard for more protective classification)	Secondary recreation (including swimming on an unorganized or infrequent basis); fish and other aquatic life propagation and survival; agriculture and other uses, except for primary recreation, water supply or other food-related uses.	See Attached Table 1.: WATER QUALITY STANDARDS FOR FRESHWATER CLASSES; standards listed under "Standards For All Freshwaters" column (aquatic life and human health sections) apply to Class C waters, unless preempted by more protective standard.	Stormwater Disposal Rules apply in the 20 coastal counties as described in 15A NCAC 2H.1000	
Class B	Primary recreation (swimming on an organized or frequent basis) and all uses specified for Class C (and not water supply or other food-related uses)	Same as for Class C	Same as for Class C	Wastewater treatment reliability requirements (dual train design; backup power capability) may apply to protect swimming uses (15A NCAC 2H .0124)
WL Wetlands (draft)	Water quality standards for wetlands to protect, preserve, restore and enhance quality uses of wetlands including stormwater storage, hydrologic functions, filtration, habitat protection and recreational uses.	None	Mitigation of stormwater capacity and protection of downstream water quality required in order to impact wetland	Wetland impacts are only allowed if no practical alternative exists, if adverse impacts are minimized to maximum practical level, if no degradation of groundwater or surface waters will occur, if no unreasonable cumulative impacts will occur, and if downstream water quality will be protected. If impacts are approved, unavoidable losses must be mitigated.
SWL Wetlands (draft) Wetlands adjacent to HQW, SA, WS-I, WS-II, Trout, Wild & Scenic Rivers	Same as above	None	Same as above, if permitted.	Same as above, and acceptable wetland impacts must be only for water dependent facilities.
UWL Wetlands (draft) Unique Wetlands - adjacent to ORW, of exceptional ecological or recreational value, or habitat for rare, threatened, or endangered species		None	Same as above, if permitted.	No permit allowed, unless there is a demonstrated public need and wetland loss is mitigated.

SUMMARY OF NORTH CAROLINA'S WATER QUALITY CLASSIFICATIONS AND STANDARDS (continued)

PRIMARY CLASSIFICATIONS	BEST USAGE	NUMERIC STANDARDS	STORMWATER CONTROLS	OTHER REQUIREMENTS
WS-I Water Supply	Water supplies in natural and undeveloped watersheds	See Table 1. under "More Stringent Standards to Support Additional Uses": WS Classes heading; no wastewater or stormwater discharges allowed in watershed, except groundwater remediation when no alternative exists	Not applicable since watershed is undeveloped	No Landfills, sludge/residual or petroleum contaminated soils application allowed in watershed
WS-II Water supply	Water supplies in predominantly undeveloped watersheds	See Table 1. under "More Stringent Standards to Support Additional Uses": WS Classes heading; no new domestic or industrial wastewater discharges in watershed except groundwater remediation discharges allowed when no alternative exists	Local land management program required as per 15A NCAC 2B .0211 (d): 2- acre lots or 6% built-upon area in critical area; 1- acre lots or 12% built-upon area outside of critical area; up to 24% in the critical area and 30% built upon area outside of the critical area allowed with engineered stormwater controls for the 1" storm[1]	Buffers required along perennial waters; no new landfills allowed in the critical area and no new discharging landfills outside of critical area; no new sludge/residual or petroleum contaminated soils application allowed in the critical area; hazardous material and spill/failure containment plan required; spill containment structures required for new industries in the critical area using, storing or manufacturing hazardous materials
WS-III Water Supply	Water supplies in low to moderately developed watersheds	See Table 1. under "More Stringent Standards to Support Additional Uses": WS Classes heading: no domestic wastewater or stormwater discharges allowed in watershed, except for general permits, groundwater remediation discharges allowed when no alternative exists	Local land management program required as per 15A NCAC 2B .0211(3): 1-acre lots or 12% built-upon area in critical area; 1/2-acre lots or 24% built-upon outside of critical area; up to 30% in critical area and 50% built-upon area outside critical area allowed with engineered stormwater controls for the 1" storm[1]	Buffers required along perennial waters; no new landfills allowed in the critical area; no new sludge/residential or petroleum contaminated soils application allowed in the critical area; hazardous material and spill/failure containment plan required
WS-IV	Water supplies in moderately to highly developed watersheds	See Table 1. under "More Stringent Standards to Support Additional Uses": WS Classes heading; general permits, domestic and industrial discharges allowed throughout water supply[2]; groundwater remediation discharges allowed when no alternative exists	Local land management program required as per 15A NCAC 2B .0211 (f)" 1/2-acre lots or 24% built-upon area in critical area and protected area [3,4]; up to 50% in critical area and 70% built-upon area outside critical area with engineered stormwater controls for the 1" storm[1]	Buffers required along perennial waters; no new landfills allowed in the critical area; no new sludge/residual or petroleum contaminated soils application allowed in the critical area; hazardous material and spill/failure containment plan required

SUMMARY OF NORTH CAROLINA'S WATER QUALITY CLASSIFICATIONS AND STANDARDS (continued)

PRIMARY CLASSIFICATIONS	BEST USAGE	NUMERIC STANDARDS	STORMWATER CONTROLS	OTHER REQUIREMENTS
WS-V Water Supply	River Segment	No categorical restrictions on development or wastewater dischargers. Instream water quality standards for water supply waters are applicable		

NOTE: Please refer to ISA NCAC 2B .0101..0104..0202..0211 and .0301 for more specific requirements for surface water supply protection.

1 If the high density development option is utilized, then wet detention basins are required and local governments will assume ultimate responsibility for the operation and maintenance of these engineered stormwater control structures.

2 New industrial process wastewater discharges in the critical area are allowed but must meet additional treatment requirements.

3 Applies to projects requiring an Erosion/Sedimentation Control Plan.

4 1/3 acre or 36% built-upon area is allowed for projects without a curb and gutter street system in the protected areas.

- Critical area is 1/2 mile and draining to water supplies from normal pool elevation of reservoirs, or 1/2 mile and draining to a river intake.
- Protected area is 5 miles and draining to water supplies from normal pool elevation of reservoirs, or 10 miles upstream of and draining to a river intake.
- Agricultural activities are subject to provisions of the Food Security Act of 1985 and the Food, Agriculture, Conservation and Trade Act of 1990. In WS-I watersheds and critical areas of WS-II, WS-III and WS-IV area, agricultural activities must maintain a 10 foot vegetated buffer or equivalent control, and animal operations >100 animal units must use BMPs as determined by the
- Silviculture activities are subject to the provisions of the Forest Practices Guidelines Related to Water Quality (15A NCAC 1I .0101-.0209).
- The Department of Transportation must use BMPs as described in their document, "Best Management Practices for Protection of Surface Waters."

PRIMARY CLASSIFICATIONS	BEST USAGE	NUMERIC STANDARDS	STORMWATER CONTROLS	OTHER REQUIREMENTS
Saltwater:				
Class SC	Saltwaters protected for secondary recreation, aquatic life propagation and survival and other uses as described for Class C	See attached Table 2.; WATER QUALITY STANDARDS FOR SALTWATER CLASSES; standards listed under "Standards For All Tidal Saltwaters: column (aquatic life and human health sections) apply to Class SC waters, unless preempted by more protective standard.	Stormwater Disposal Rules (15A NCAC 2H .1000) apply to all waters in the 20 coastal counties; low density option: 30% built-upon area or 1/3 acre lots, or structural stormwater controls with higher density, as specified	
Class SB	Saltwaters protected for primary recreation and all Class SC uses (similar to Class B)	Same as Class SC except no floating solids, settleable solids or sludge deposits attributable to sewage, industrial or other wastes	Same as Class SC	Reliability requirements same as for Class B
Class SA	Shellfishing and all Class SC and SB uses	Same as for Class SC, except fecal coliform = 14 colonies per 100 ml of water; all others - 200/100 ml fecal	Same as for Class SC, except low density option = 25% built-upon area	No domestic discharges and only nonprocess industrial discharges, such as seafood packing house or cooling water discharges

SUMMARY OF NORTH CAROLINA'S WATER QUALITY CLASSIFICATIONS AND STANDARDS

PRIMARY CLASSIFICATIONS	BEST USAGE	NUMERIC STANDARDS	STORMWATER CONTROLS	OTHER REQUIREMENTS

Supplemental Classifications are added to the primary classifications as appropriate (Examples include Class C-NSW, Class SA-ORW, Class B-Trout, etc.) and impose additional requirements

SUPPLEMENTAL CLASSIFICATIONS	BEST USAGE	NUMERIC STANDARDS	STORMWATER CONTROLS	OTHER REQUIREMENTS
High Quality Waters (HQW) (categories: (1) waters rated as Excellent by DEM; (2) Primary Nursery Areas; (3) Native or Special Native Trout Waters; (4) Critical Habitat Areas; (5) WS-I and WS-II water supplies; (6) SA waters) since stormwater control requirements already apply	Waters with quality higher than the standards (EPA's Tier II waters; the minimum standards for Class C and SC define Tier I); see Standards and Stream Classifications Rules (15) NCAC 2B .0100) for detailed description (15A NCAC 2B .0101 (e)(5))	For new or expanded discharges, advanced treatment requirements are: BOD_5=5 mg/1; NH_3-N=2 mg/1; DO=6 mg/l	Projects requiring Erosion/Sedimentation Control Plan and are within 1 mile and draining to HQW waters: 1-acre lots or 12% built-upon area, or higher density with engineered structural controls (wet detention ponds); WS-I, WS-II and 20 coastal counties exempt	Other treatment requirements may apply, dependent upon type of discharge and characteristics of receiving waters (see pp. 1 and 2 of Section .0200 Rules: 15A: NCAC 2B .0201(3) of Antidegradation Policy)
Outstanding Resource Waters (ORW)	Unique and special waters having exceptional water quality and being of exceptional state or national ecological or recreational significance; must meet other certain conditions and have 1 or more of 5 outstanding resource value criteria as described in Rule 2B .0216	Water quality must clearly maintain and protect uses, including outstanding resource values; management strategies must include at a minimum: no new or expanded discharges to freshwater ORWs; some discharges may be allowed in coastal areas	Same as for High Quality Waters for Freshwater ORWs; for Saltwater ORWs, development activities within a 575; buffer must comply with the low density option, have no stormwater collection system, have 1 acre lots and maximum 12% built-on area.	Other management strategy components as described in Rule .0216
Trout Waters (Tr)	Protected for natural trout propagation and survival of stocked trout;	More protective standards for cadmium, total residual chlorine, chlorophyll-a, dissolved oxygen, turbidity and toluene to protect these sensitive species (see Table 1. under "Trout" heading)	Same as above, if permitted.	Same as above, and acceptable wetland impacts must be only for water dependent facilities.
Nutrient Sensitive Waters (NSW)	Waters needing additional nutrient management due to their being subject to excessive growth of microscopic or macroscopic vegetation	No increase of nutrients over background levels		
Swamp Waters (Sw)	Waters with low velocities and other characteristics different from other waterbodies (generally, low pH, DO, high organic content)	pH as low as 4.3 and DO less than 5 mg/l allowed if due to natural conditions		

Table 1. Water Quality Standards for Freshwater Classes

	Standards for All Freshwater		More Stringent Standards to Support Additional Uses	
Parameters	**Aquatic Life**	**Human Health**	**Water supply Classes**	**Trout Waters**
Arsenic (ìg/l)	50			
Barium (mg/l)			1.0	
Benzene ((ìg/l)		71.4	1.19	
Beryllium (ng/l)		117	6.8	
Cadmium (ìg/l)	2.0			0.4
Carbon tetrachloride (ìg/l)		4.42	0.254	
Chloride (mg/l)	230 (AL)		250	
Chlorinated benzenes (ìg/l)			488	
Chlorine, total residual (ìg/l)	17 (AL)			17
Chlorophyll a, corrected (ìg/l)	40 (N)			15 (N)
Chromium, total (ìg/l)	50			
Coliform, total (MFTCC/100ml)			50 (N) (2)	
Coliform, fecal (MFTCC/100ml)		200 (N)		
Copper (ìg/l)	7 (AL)			
Cyanide (ìg/l)	5.0			
Dioxin (ng/l)		0.000014	0.000013	
Dissolved gases	(N)			
Dissolved oxygen (mg/l)	5.0 (Sw) (1)			6.0
Fluoride (mg/l)	1.8			
Hardness, total (mg/l)			100	
Hexachlorobutadiene (ìg/l)		49.7	0.445	
Iron (mg/l)	1.0 (AL)			
Lead (ìg/l)	25 (N)			
Manganese (ìg/l)			200	
MBAS (Methylene-Blue-Active Substances) (ìg/l)	500			
Mercury (ìg/l)	0.012			
Nickel (ìg/l)	8.8		25	
Nitrate nitrogen (mg/l)			10	
Pesticides				
Aldrin (ng/l)	2.0	0.136	0.127	
Chlordane (ng/l)	4.0	0.588	0.575	
DDT (ng/l)	100			
Endosulfan (ng/l)	50			
Endrin (ng/l)	2.0			
Guthion (ng/l)	10			
Heptachlor (ng/l)	4.0	0.214	0.208	
Lindane (ng/l)	10			
Methoxychlor (ng/l)	30			
Mirex (ng/l)	1.0			
Parathion (ng/l)	13			
Toxaphene (ng/l)	0.2			
2,4-D (ìg/l)			100	
2,4,5-TP (Silvex)(ìg/l)			10	
pH (units)	6.0-9.0 (Sw)			
Phenolic compounds (ìg/l)		(N)	1.0 (N)	
Polychlorinated biphenyls (ng/l)	1.0	0.079		
Polynudear aromatic hydrocarbons (ng/l)		31.1	2.8	
Radioactive substances		(N)		
Selenium (ìg/l)	5			
Silver (ìg/l)	0.06 (AL)			
Solids, total dissolved (mg/l)			500	
Solids, suspended	(N)			
Sulfates (mg/l)			250	
Temperature	(N)			
Tetrachloroethane (1,1,2,2) (ìg/l)		10.8	0.172	
Tetrachloroethylene (ìg/l)			0.8	
Toluene (ìg/l)	11			0.36
Toxic substances	(N)			
Trialkyltin (ìg/l)	0.008			
Trichloroethylene (ìg/l)		92.4	3.08	
Turbidity (NTU)	50; 25 (N)			10 (N)
Vinyl chloride (ìg/l)		525	2	
Zinc (ìg/l)	50 (AL)			

NOTE:
(N) See 2B .0211 (b), (c), (d), or (e) for narrative description of limits.
(AL) Values represent action levels as specified in .0211 (b) (4).
(Sw) Designated swamp waters may have a pH as low as 4.3 and dissolved oxygen less than 5.0 mg/l if due to natural conditions.
(1) An instantaneous reading may be as low as 4.0 ìg/l, but the daily average must be 5.0 ìg/l or more.
(2) Applies only to unfiltered water supplies.

Table 1. Water Quality Standards for Saltwater Classes

Parameters	Standards for All Tidal Saltwaters: Aquatic Life	Standards for All Tidal Saltwaters: Human Health	More Stringent Standards to Support Additional Uses: Classes SA
Arsenic (ug/1)	50		
Benzene (ug/1)		71.4	
Beryllium (ng/1)		117	
Cadmium (ug/1)	5.0		
Carbon tetrachloride (ug/1)		4.42	
Chlorophyll a, corrected (ug/1)	40 (N)		
Chromium, total (ng/1)	20		
Coliform, fecal (MFTCC/lOOml)		200 (N)	14 (N)
Copper (ug/1)	3 (AL)		
Cyanide (ug/I)	1.0		
Dioxin (ng/1)		0.000014	
Dissolved gases	(N)		
Dissolved oxygen (mg/1)	5.0(1)		
Hexachlorobutadiene (ug/1)		49.7	
Lead(ug/1)	2fi (N)		
Mercury (ng/1)	0.025		
Nickel (ug/1)	8.3		
Pesticides			
Aldrin (ng/1)	3.0	0.136	
Chlordane (ng/1)	4.0	0.588	
DOT (ng/1)	1.0	0.591	
Endosulfan (ng/1)	100		
Endrin (ng/1)	2.0	0.144	
Guthion (ng/1)	9.0		
Lindane (ng/1)	4.0		
Methoxychlor (ng/1)	30		
Mirex (ng/1)	1.0		
Parathion (ng/1)	17g		
Toxaphene (ng/1)	0.2		
pH (unite)	6.8-8.5 (1)		
Phenolic compounds (ug/1)		(N)	
Polychlorinated biphenyls (ng/1)	1.0	0.079	
Polynuclear aromatic hydrocarbons (ng/1)		31.1	
Radioactive substances	(N)		
Salinity	(N)		
Selenium (ug/I)	71		
Silver (ug/1)	0.1 (AL)		
Solids, suspended	(N)		
Temperature	(N)		
Tetrachloroethane (1,1,2,2) (ug/1)		10.8	
Toxic substances	(N)		
Trialkyltin (ug/1)	0.002		
Trichloroethylene (ug/1)		92.4	
Turbidity (NTU)	25 (N)		
Vinyl chloride (ug/I)		525	
Zinc (ug/1)	86 (AL)		

NOTE: (N) See 2B .0212 (b),(c), (d), or (e) for narrative description of limits.
(AL) Values represent action levels as specified in .0212 (b) (4).
(1) Designated swamp waters may have a pH as low as 4.3 and dissolved oxygen less than 5.0 mg/1 if due to natural conditions.

This table is provided by NCDEHNR Water Quality Planning Section.