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Combined Sewer Overflows "Briefing Paper" & Proceedings from

Narragansett Bay Project Management Committee 120 pp

Narragansett Bay Estuary Program

# *Current* Report

The Narragansett Bay Project

## COMBINED SEWER OVERFLOWS "BRIEFING PAPER" AND PROCEEDINGS FROM NARRAGANSETT BAY PROJECT MANAGEMENT COMMITTEE

Mr. Richard Zingarelli,  
Ms. Caroline A. Karp,  
and the staff of the  
Narragansett Bay Project

#NBP-91-60

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Recommendations included in this briefing paper represent preliminary decisions reached by the Management Committee and are subject to amendment prior to their incorporation into the Comprehensive Conservation and Management Plan ( CCMP ).



The Narragansett Bay Project is sponsored by  
the U.S. Environmental Protection Agency and  
the R.I. Department of Environmental Management.



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## FOREWORD

The United States Congress created the National Estuary Program in 1984, citing its concern for the "health and ecological integrity" of the nation's estuaries and estuarine resources. Narragansett Bay was selected for inclusion in the National Estuary Program in 1984, and the Narragansett Bay Project (NBP) was established in 1985. Narragansett Bay was designated an "estuary of national significance" in 1988. Under the joint sponsorship of the U.S. Environmental Protection Agency and the Rhode Island Department of Environmental Management, the NBP's mandate is to direct a program of research and planning focussed on managing Narragansett Bay and its resources for future generations.

The NBP will develop a draft Comprehensive Conservation and Management Plan (CCMP) by December, 1991, which will recommend actions to improve and protect the Bay and its natural resources.

The NBP has established the following seven priority issues for Narragansett Bay:

- management of fisheries
- nutrients and potential for eutrophication
- impacts of toxic contaminants
- health and abundance of living resources
- health risk to consumers of contaminated seafood
- land-based impacts on water quality
- recreational uses

The NBP is taking an ecosystem/watershed approach to address these problems and has funded research that will help to improve our understanding of various aspects of these priority problems. The Project is also working to expand and coordinate existing programs among federal, state and local agencies, as well as with academic researchers, in order to apply research findings to the practical needs of managing the Bay and improving the environmental quality of its watershed.

The attached report includes a "briefing paper" prepared for consideration by the Management Committee of the Narragansett Bay Project ( Section I ) and Management Committee Proceedings ( Section II ). Section II includes a) minutes of the Management Committee meeting(s) where the issues identified in the "briefing paper" were discussed (Appendix A); b) preliminary recommendations endorsed by the Management Committee (Appendix B); and c) Management Committee attendance (Appendix C). The Narragansett Bay Project will subsequently estimate the cost of each preliminary recommendation made by the Management Committee and identify possible funding sources. This information will enable the Management Committee to develop the draft CCMP including priorities for implementation over a five year planning horizon. Upon completion, the draft CCMP will be available for public review and comment.



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## **SECTION I:**

# **COMBINED SEWER OVERFLOWS " BRIEFING PAPER "**

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and the staff of the  
Narragansett Bay Project**

**" You can't go walking in a sewer and not get some garbage on you. "**

**Attributed to James Michael Curley, former mayor of Boston.**

## SYNOPSIS

All urban areas in the United States have infrastructure systems designed for the collection, conveyance, and discharge of sanitary and industrial waste water and storm runoff. In many older areas, particularly in the Northeastern United States, a single system was constructed for both wastewater and stormwater. These systems are referred to as combined sewers. During periods of precipitation, the combined wastewater and storm runoff flows may exceed the carrying capacity of the system. Combined sewer overflows (CSO's) divert flows from a combined sewer directly to a receiving water in order to prevent hydraulic overload of the conveyance system or wastewater treatment facility (WWTF).

Over 100 CSO's and WWTF bypasses discharge directly to Narragansett Bay or to its tributaries. The largest portion of these discharges are owned by the Narragansett Bay Commission (61 CSO's in Providence), the Blackstone Valley District Commission (28 CSO's in Pawtucket and Central Falls), and the City of Fall River (19 CSO's). Additional CSO's are under the control of Newport (3), Worcester (1), and Taunton (1).

The estimated annual discharge to Narragansett Bay from these CSO's and bypasses is 4 billion gallons, compared to approximately 73 billion gallons per year from treated WWTF discharges. However, since CSO's discharge high flows on an intermittent basis, the relative importance of CSO discharges during wet weather periods is significantly greater than the above figures would indicate. Additionally, since CSO discharges represent untreated and undisinfected mixtures of sanitary waste, storm runoff and industrial process wastewater (depending on the service area), the CSO discharges pose a more concentrated and potentially greater threat to public health and the health of Narragansett Bay than do treated WWTF discharges. In 1989, Rhode Island's conditional shellfish harvesting areas were closed for 263 days (72% of year) due to precipitation-triggered CSO discharges. Through December 11, 1990, under new criteria established in May 1990, Conditional Area A has been closed for 266 days (77%) and Conditional Area B has been closed for 226 days (66%) in 1990.

The primary problems caused by CSO discharges are from fecal contaminants, and to a lesser degree from BOD and TSS. However, CSO discharges also represent sources of metals, nutrients, and organics. Fecal contamination from CSO's, which appear to be by far the single greatest source of fecal contamination to the Narragansett Bay, represents a potential severe health risk related to shellfish

harvesting. Although the harmful impacts of CSO discharges to Narragansett Bay have been recognized for decades, progress in CSO abatement has been slow. Several CSO abatement projects have been constructed within the Narragansett Bay watershed (Newport, Worcester, NBC). Other CSO projects (NBC, Newport) are currently under construction. In addition to those measures currently completed or under construction, several abatement measures have been recommended through facility planning and are scheduled for future construction (NBC, Fall River). BVDC initiated its CSO abatement study for the Blackstone and Seekonk Rivers in November 1990.

This briefing paper outlines the issues which the Management Committee must address in consideration of the following goal for CSO abatement:

**GOAL: Combined sewer overflows and bypasses shall be eliminated or abated by the year 2000 for the purpose of improving the water quality of receiving waters, in order to reopen historic shellfish harvesting grounds that are conditionally closed and to meet all state receiving water quality criteria.**

The issues presented for the consideration of the Management Committee are divided into the following categories:

- 1. CSO ABATEMENT POLICIES**
- 2. CSO ABATEMENT TECHNOLOGIES**
- 3. FINANCING AND IMPLEMENTATION**
- 4. OTHER ISSUES**

## BRIEFING PAPER

### COMBINED SEWER OVERFLOWS

#### **Combined Sewer Systems**

All urban areas in the United States have infrastructure systems designed for the collection, conveyance, and discharge of sanitary and industrial waste water and storm runoff. These systems are intended to capture sanitary waste for treatment to protect public health, and to capture stormwater for discharge to prevent flooding. In most cities, separate systems have been designed for wastewater and stormwater. In many older urban areas, particularly in the Northeastern United States, a single system was constructed for both wastewater and stormwater, hence, the term "combined sewers."

During dry weather, combined sewers carry residential and industrial waste flows. These flows, in a properly designed and operating system, are conveyed to a wastewater treatment facility (WWTF) for treatment and subsequent discharge. During periods of precipitation or snow melt, however, these flows are combined with storm runoff, and may exceed the carrying capacity of the system. Combined sewer overflows (CSO's) were designed to divert flows from a combined sewer directly to a receiving water in order to prevent hydraulic overload of the conveyance system or WWTF. A diagram of a typical CSO structure is shown as Figure 1.

Several factors in a faulty combined sewer system can cause discharges to a receiving water in dry weather, as well as increasing wet weather overflows. Depending on the water table and structural integrity of the drainage system, significant volumes of groundwater can infiltrate into the system. Physical blockages of the regulating structures can also result in dry and wet weather overflows.

CSO's are distinguished from bypasses, which are defined as "intentional diversions of waste streams from any portion of a treatment facility" [40 CFR 122.41(m)]. A treatment facility is defined to begin at the headworks where equalization of the waste streams takes place (USEPA, 1989).

#### **Hydrologic background**

Combined sewer overflows are triggered by hydrologic events, when the amount of discharge produced during a precipitation event (consisting of the sanitary and industrial waste base flow plus storm runoff) exceeds the capacity of the conveyance system or WWTF.

Hypothetical or "design" storms are used by hydrologists and modelers in predicting the response of a combined sewer system, and the likelihood and characteristics of CSO discharges. In referencing a hypothetical storm event, hydrologists describe it by two terms, the storm's recurrence interval and its duration. A hypothetical storm event referred to as the 1-year, 6-hour storm has a recurrence interval of one year and a duration of six hours.

The recurrence interval of a storm is the period of time over which the storm, on a long-term average, is expected to recur. Thus, a 5-year storm is expected to occur or be exceeded, on average, once every 5 years, a 1-year storm once a year, and a 3-month storm once every three months. The recurrence interval is inversely related to a storm's frequency of occurrence. Over a five year period, on average, the 5-year storm will be equalled or exceeded once, the 1-year storm will be equalled or exceeded five times (once a year), and the 3-month storm will be equalled or exceeded twenty times (four times a year).

The duration of a storm is the period of time over which precipitation occurs. For a given recurrence interval, as the storm duration increases, the total precipitation will increase, but the peak precipitation intensity will decrease. In general, storm durations selected for design storms correspond to the hydrologic response time of the drainage basin as well as the typical duration of precipitation events for the desired location.

### **CSO's in the Narragansett Bay Basin**

Over 100 CSO's and WWTF bypasses discharge directly to Narragansett Bay or to its tributaries. The Narragansett Bay Commission (NBC) owns 61 CSO's in Providence, plus a secondary bypass (i.e., bypass with primary treatment, but prior to secondary treatment) at the Field's Point WWTF. The Blackstone Valley District Commission (BVDC) is responsible for 28 CSO's in Pawtucket and Central Falls, including a major diversion at its Bucklin Point WWTF, just prior to the plant's headworks, known as the North Diversion Structure. The BVDC also has a secondary bypass at Bucklin Point. The City of Newport has three CSO's that discharge directly to Narragansett Bay (RIDEM, 1990). In Massachusetts, CSO's discharge to Mill Brook, a tributary of the Blackstone River (one CSO in Worcester), the Taunton River (one CSO in Taunton and four in Fall River), the Quequechan River (eight CSO's in Fall River), and directly to Mount Hope Bay by seven CSO's in Fall River (MADEP, 1990; Maguire Group, 1990). The estimated annual discharge to Narragansett Bay from these CSO's and bypasses is 4 billion gallons. The general locations of Narragansett Bay CSO's are shown in Figure 2.

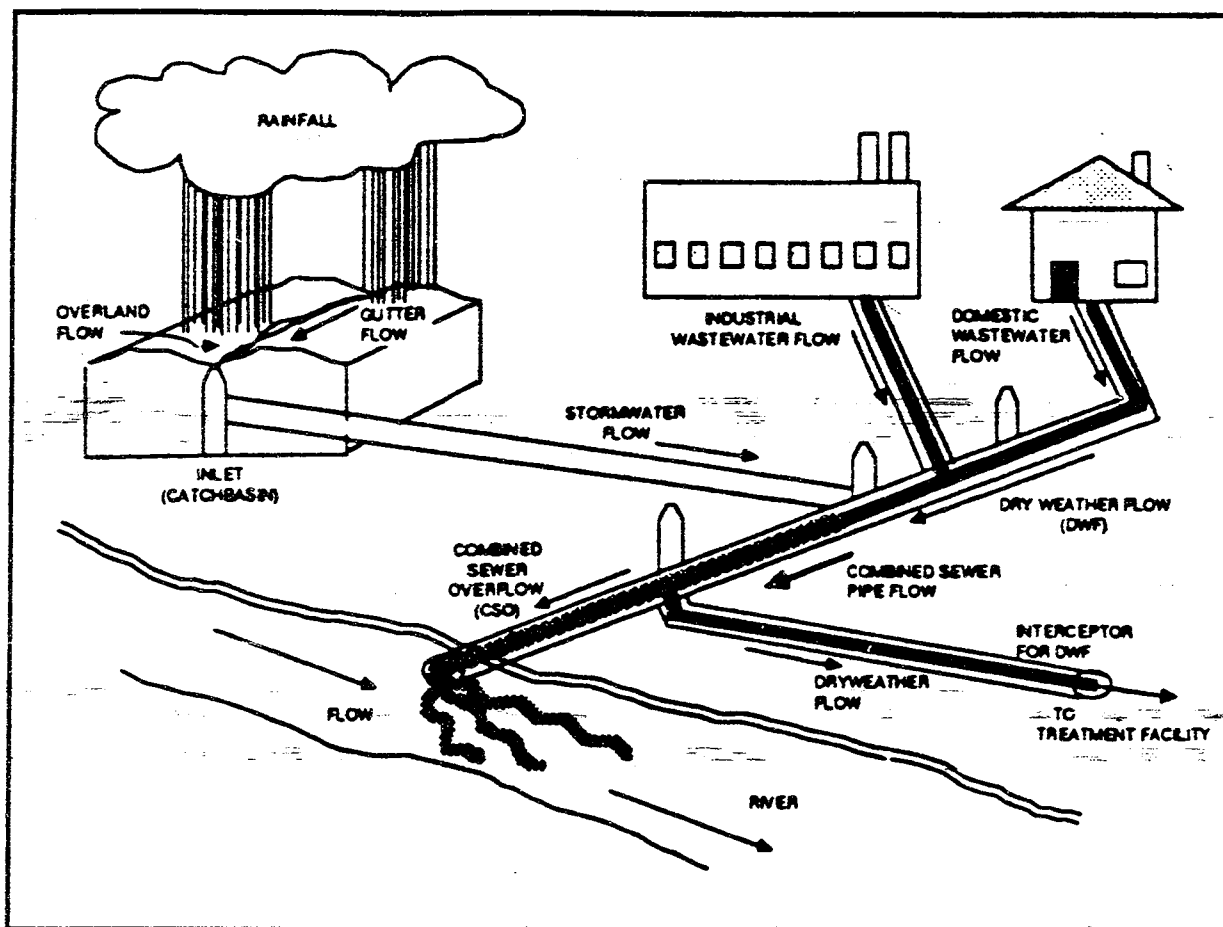


Figure 1. Schematic representation of a combined sewer overflow system. (Source: Roman, 1990)



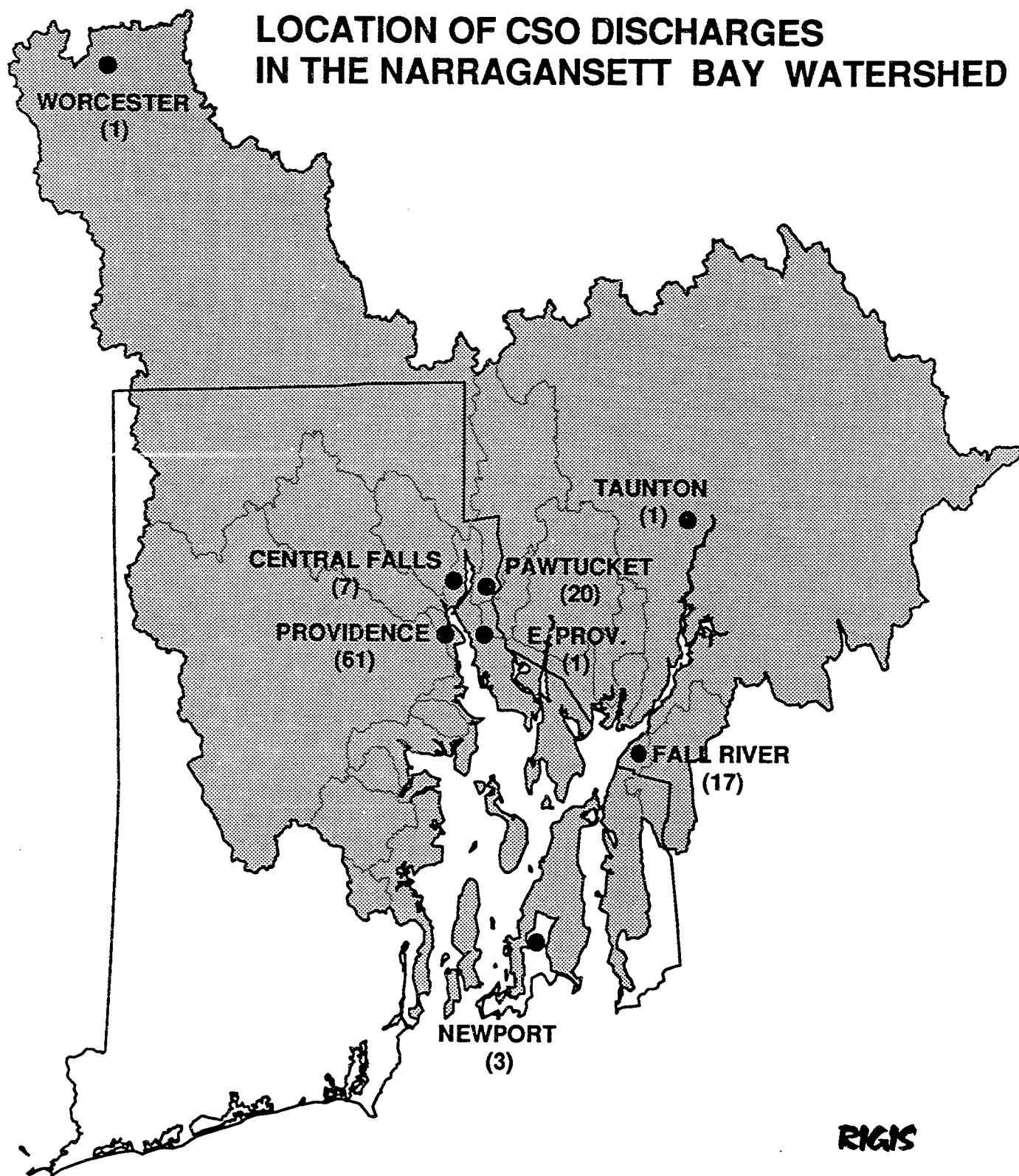


FIGURE 2

## Regulatory framework

Each of the agencies involved in regulating WWTF and CSO discharges has recently published policies and/or regulations regarding CSO's. A copy of the policies is included as an Appendix.

On September 8, 1989, EPA published its *National Combined Sewer Overflow Control Strategy* in the Federal Register. The stated objectives of the strategy are:

**"(1) To ensure that if CSO discharges occur, they are only as a result of wet weather,**

**"(2) To bring all wet weather CSO discharge points into compliance with the technology-based requirements of the CWA [Clean Water Act] and applicable State water quality standards, and**

**"(3) To minimize water quality, aquatic biota, and human health impacts from wet weather overflows."**

The strategy states that CSO's are point sources subject to National Pollutant Discharge Elimination System (NPDES) permit requirements including both technology-based and water quality-based requirements of the CWA. CSO's are not, however, subject to secondary treatment regulations of the CWA applicable to publicly owned treatment works (POTW's). CSO's currently discharging without a permit are unlawful and must be permitted or eliminated. [Bypasses are not subject to this strategy, and are not issued NPDES permits. Bypasses are only allowed under the emergency conditions established in 40 CFR 122.41(m).] When permitting CSO's, the States are responsible for establishing technology-based permit limits for best practicable control technology currently available (BPT), best conventional pollutant control technology (BCT), and best available technology economically achievable (BAT) based upon best professional judgment [CWA Sections 301(b)(1)(A) and 301(b)(2)]. A minimum BCT/BAT, established on a best professional judgment basis, is to consist of: (1) proper operation and regular maintenance programs for the sewer system and combined sewer overflow points; (2) maximum use of the collection system for storage; (3) review and modification of pretreatment programs to assure CSO impacts are minimized; (4) maximization of flow to the POTW for treatment; (5) prohibition of dry weather overflows; and (6) control of solid and floatable materials in CSO discharges. Additional control measures may be required by the State as a technology-based standard; the above

comprise a minimum requirement. CSO discharges are also subject to compliance with State water quality requirements. CWA section 301(b)(1)(C) requires any additional permit limits, above and beyond the technology-based limits established, that may be necessary to protect State water quality standards. The national CSO strategy requires States to develop permitting strategies to ensure implementation of and consistency with the national strategy and the CWA.

In October, 1987, prior to issuance of the national CSO strategy, EPA Region I issued a *Policy Statement Concerning the Relationship Between the Regulation of Discharges From Combined Sewer Overflows and Water Quality Standards*. In its policy, Region I stated that "the legitimate goal of CSO abatement planning is the implementation of that treatment needed to achieve compliance with water quality standards at all times or, alternatively, the complete elimination of CSO discharges." A CSO discharger is required to prepare a facilities plan to assess a range of CSO abatement alternatives, and select for implementation an alternative that will achieve compliance with current water quality standards. However, should the discharger determine that implementing such measures would be technologically or economically infeasible, it could seek a segment-specific revision to the water quality standards in accordance with Federal regulations [40 CFR §131.10(g), (h), and (j)].

In accordance with EPA's national strategy, RIDEM prepared its *Combined Sewer Overflow Policy*, which was accepted by EPA on April 24, 1990, in fulfillment of the requirements of the national strategy. As a delegated state under the NPDES program, Rhode Island regulates WWTF and CSO discharges through the Rhode Island Pollutant Discharge Elimination System (RIPDES) permit program. Since EPA has not defined BCT/BAT for CSO's, RIDEM instituted a technology-based requirement of equivalent primary treatment for each CSO discharge. RIDEM defines equivalent primary treatment as the use or combined uses of storage, screening, settling, or other technologies such that the treated effluent results in removal rates of 50% of the total suspended solids (TSS) and 35% of the biochemical oxygen demand (BOD) loadings or 100% of all settleable solids, whichever is demonstrated to have the greatest water quality impact. All flows created by the one year, six hour storm, and storms occurring more frequently, are subject to the requirement of equivalent primary treatment. If the water quality impacts from a particular CSO discharge necessitate greater than equivalent primary treatment, more extensive treatment can be required. If significant beneficial water quality improvements can be demonstrated to occur incorporating a level of treatment less than equivalent primary treatment for the one year, six

hour storm, the CSO community/sewer authority can petition RIDEM for relief from compliance with that requirement.

Although the RIDEM CSO policy was accepted by EPA in fulfillment of the requirements of the national strategy, a "major concern" was specified regarding the use of the technology-based standard. EPA's concern is that the policy does not go far enough to guarantee that water quality-based requirements will be satisfied in or beyond designated CSO mixing zones. Technology-based standards are considered a minimum level of treatment, which apply only if water-quality standards are being met. EPA's position is that it would have to be shown in every instance that, where CSO discharges are expected to continue to occur, equivalent primary removal rates will result in meeting class A/SA or B/SB standards at CSO discharge zone boundaries (USEPA, 1990).

The Massachusetts Division of Water Pollution Control (MDWPC) published its *Implementation Policy for the Abatement of Pollution from Combined Sewer Overflows* on May 24, 1990. MDWPC's stated primary goal with regard to CSO abatement measures is the elimination of receiving water impacts. When elimination of CSO impacts is not feasible, the relocation of CSO's to another (less sensitive) stream segment is to be evaluated. If neither elimination nor relocation is feasible, the impacted segment may be assigned a partial use subcategory. MDWPC's engineering target is that the designated uses of a segment be protected during the three month storm. This policy would allow the discharge of untreated overflows an average of four times a year.

### Impacts from CSO discharges

The general environmental and health significance of CSO's and WWTF bypasses has been well documented. Discharges from CSO's are known to contain high concentrations of solids, BOD, bacteria, nutrients, metals, and toxic organics. A summary of typical characteristics of combined sewage as compared to other sources is given in Table 1 (Metcalf & Eddy, 1990). In general, the characteristics of combined sewage reflect the characteristics of untreated municipal wastewater when combined with stormwater runoff, which itself may contain substantial concentrations of certain contaminants. The characteristics of combined sewage are highly variable, both geographically within a given watershed and temporally for a specific location, depending on numerous factors such as the characteristics of the rainfall event (storm size, duration, intensity), the watershed (size, slope, impervious area, soils, land use), the combined system (pipe slope, size, flow regulation, sediment build-up), and the wastewater

TABLE 1. COMPARISON OF CHARACTERISTICS OF COMBINED SEWAGE WITH OTHER SOURCES

Parameter	Unit	Typical Range of Parameter Concentrations		
		Rainfall(1)	Stormwater Runoff(2)	Combined Sewage(3) Untreated Municipal Wastewater
Suspended Solids	mg/L		67 - 101	270 - 550 100 - 350
Biochemical Oxygen Demand (5-day)	mg/L	1 - 13	8 - 10	60 - 220 110 - 400
Chemical Oxygen Demand	mg/L	9 - 16	40 - 73	260 - 480 250 - 1,000
Fecal Coliform Bacteria	MPN/100 ml		1,000 - 21,000	200,000 - 1,100,000 10 <sup>6</sup> - 10 <sup>7</sup>
Nitrogen (total as N)	mg/L			4 - 17 20 - 85
Total Kjeldahl Nitrogen Nitrate		0.05 - 1.0	0.43 - 1.00 0.48 - 0.91	20 - 85 0
Phosphorus (total as P)	mg/L	0.02 - 0.15	0.67 - 1.66	1.2 - 2.8 4 - 15
Metals	µg/L			
Copper			27 - 33	
Lead		30 - 70	30 - 144	140 - 600
Zinc			135 - 226	

1. Adapted from Huber, 1984

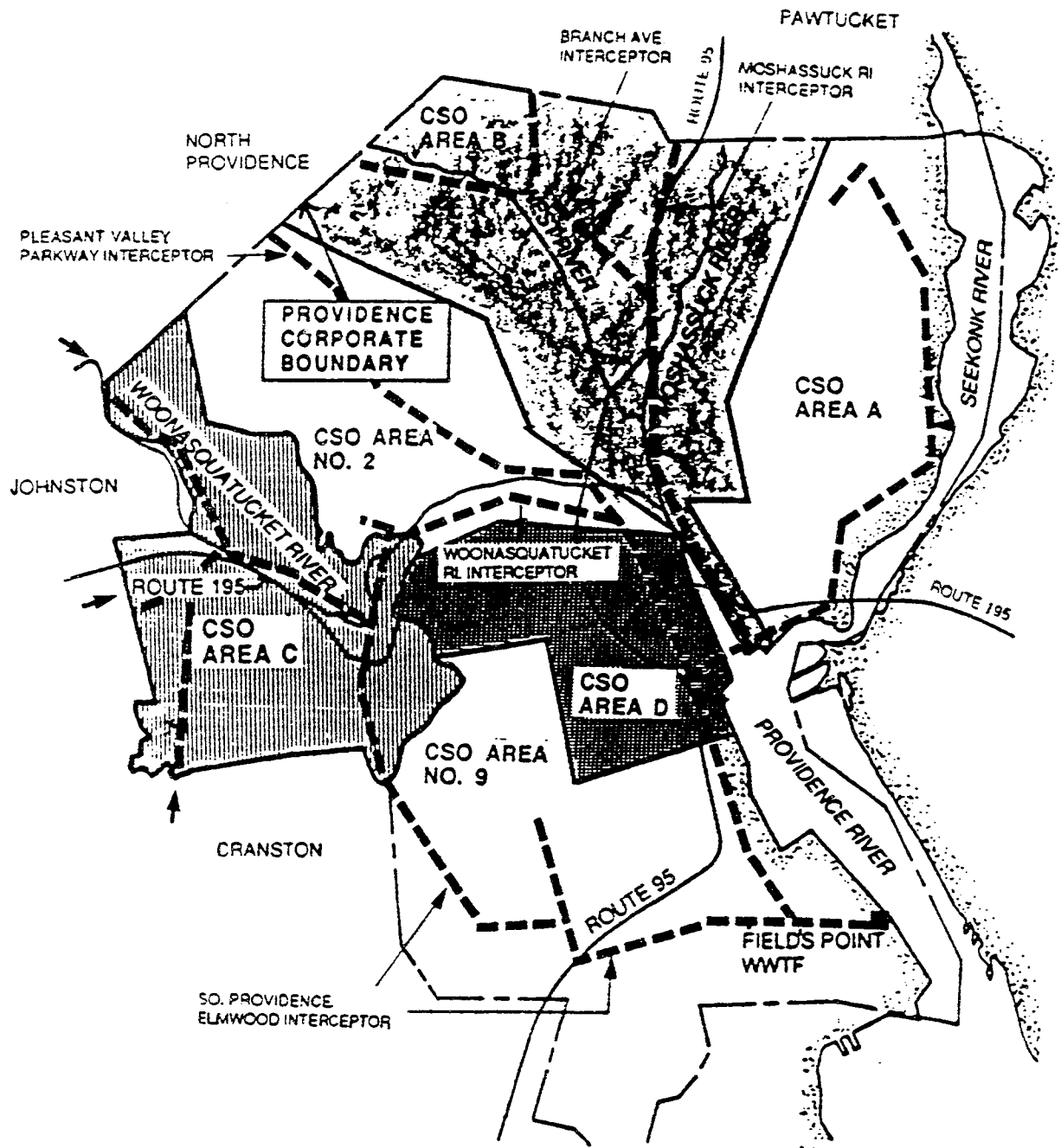
2. Adapted from U.S. Environmental Protection Agency, 1983

3. Adapted from Metcalf & Eddy, Inc., 1977

Source: Metcalf & Eddy, 1990

(flow, variability, level of commercial or industrial contribution). CSO discharges in general, however, can be responsible for violations of water quality criteria for turbidity, dissolved oxygen, bacteria, metals, and toxic organics, as well as contributing to eutrophication due to their high nutrient content.

Numerous studies have been conducted (and others are in various stages of completion) by all of the communities or authorities within the Narragansett Bay watershed that have responsibility for CSO discharges, to evaluate their impacts and/or to recommend CSO abatement measures. The NBC has, over the past ten years, conducted studies of each of its six CSO areas. (The 61 CSO outfalls have been divided into six areas, based on drainage basin, to facilitate the studies, as shown in Figure 3.) Studies of CSO Areas 2 and 9 were conducted by the City of Providence, prior to the formation of the NBC in 1982. The remaining four CSO areas have been studied by the NBC, with the last area report (Area D) being completed in draft form in 1990. The NBC is currently conducting a systemwide analysis of its CSO discharges to evaluate the relative impacts from each CSO area and develop a CSO abatement prioritization schedule. The systemwide modeling of the system is due to be completed in Fall 1991, and all phases of the study are scheduled for completion in Summer 1992. The Pawtucket and Central Falls CSO's were addressed in a 1977 Combined Sewer Management Report, and a Step One Facilities Plan completed in 1980. These CSO's, now under the control of the BVDC, will be reexamined in a recently initiated facilities plan expected to be completed in late 1992. Facilities plans were completed for Newport, Taunton, and Worcester, in 1986, 1987 (draft, not yet final), and 1976, respectively. The Taunton draft facility plan was not approved by MADEP, and a study is underway to evaluate if inflow and infiltration, rather than stormwater, are causing the overflows during wet weather periods. Fall River completed its Phase I facilities plan in 1987, and a draft Phase II facilities plan was issued in November 1990. CSO abatement studies are described in Table 2. In addition to the studies described above, a number of studies have been conducted that, in part, identify the impacts that CSO discharges have on Narragansett Bay and its tributaries (Martin and Robadue, 1983; Hoffman et al., 1983; Hoffman et al., 1984; Wright et al., 1990; Watkins and Rippey, 1990; Metcalf & Eddy, 1990).



SOURCE: CAMP DRESSER AND McKEE, 1989

FIGURE 3. NBC CSO STUDY AREAS

**Table 2. CSO Abatement Studies in the Narragansett Bay Watershed.**

<u>Location</u>	<u>Receiving Water(s)</u>	<u>Study Date</u>	<u>Study Conducted by</u>
NBC Area 2	Woonasquatucket R.	1982	CE Maguire
NBC Area 9	Providence R.	1983	Hayden/Castellucci
NBC Area A	Seekonk R.	1986	Metcalf & Eddy
NBC Area B	Moshassuck R., West R.	1988	O'Brien & Gere
NBC Area C	Woonasquatucket R.	1989	Camp Dresser & McKee
NBC Area D	Providence R.	1990 (draft)	Greeley & Hansen
NBC Systemwide	all above	1992 (sch.)	Univ. of Rhode Island
BVDC	Seekonk R.,	1979	Anderson-Nichols/Waterman
(Pawtucket/	Blackstone R.,	1985	Tutela Engineering
Central Falls)	Moshassuck R.	1992 (sch.)	Beta Engineering
Newport	Narragansett Bay	1986	Metcalf & Eddy
Worcester	Mill Brook	1976	Fay Spofford & Thorndike
Taunton	Taunton R.	1987 (draft)	Tighe-Bond
Fall River	Mount Hope Bay	1987 (Phase I)	Maguire Group
	Taunton R., Quequechan R.	1990 (Phase II, draft)	Maguire Group

From the individual CSO studies (see above) and estimates made on the basis of area served by combined sewers in the case of BVDC (Metcalf & Eddy, 1990), the estimated CSO flow to Narragansett Bay is nearly 4 billion gallons per year (BGY), compared to approximately 73 BGY from treated WWTF discharges (Karp et al., 1990). However, CSO's do not discharge on a continual basis as do WWTF's, so the relative, episodic importance of CSO discharges during wet weather periods is significantly greater than the above figures would indicate. Additionally, since CSO discharges represent untreated and undisinfected mixtures of storm runoff and residential and industrial waste flows, the CSO discharges pose a more concentrated and potentially greater threat to public health and the health of Narragansett Bay than do treated WWTF discharges. The primary problems caused by CSO discharges are from fecal contaminants, and to a lesser degree from BOD and TSS, although CSO discharges also represent sources of metals, nutrients, and toxic organics.

Fecal contamination from CSO's represents a health risk related to shellfish harvesting in Narragansett Bay. Over 26,000 acres (28%) of Narragansett Bay are permanently closed to shellfishing because of their proximity to CSO's and WWTF's. An additional 10,672 acres (11%) of the Bay are conditionally closed depending on the occurrence



and duration of rain-triggered CSO's and bypasses. In 1989, the conditional areas were closed for 263 days (72% of year). Through December 11, 1990, under new criteria established in May 1990, Conditional Area A has been closed for 266 days (77%) and Conditional Area B has been closed for 226 days (66%). Since a precipitation event or bypass results in a seven-day closure of conditional areas, these figures do not represent the amount of time that CSO's and bypasses are discharging, but rather the amount of time that receiving waters are sufficiently impacted to warrant closure to shellfishing.

Evidence indicates that CSO's are by far the single greatest source of fecal contamination to the Narragansett Bay. Preliminary data from the wet weather study indicate that nearly 80% of the total measured fecal coliform loading to the Providence River during precipitation events may result from CSO's and the NBC and BVDC bypasses (Wright et al., 1990). Fecal coliform loading from Providence River CSO's and the two bypasses in a "typical" wet weather event were estimated at  $2 \times 10^{15}$  cells (Wright et al., 1990). Annual fecal coliform loads for the NBC and BVDC CSO's are nearly four orders of magnitude (i.e., a factor of 10,000) higher than the corresponding WWTF's, and are approximately 200 times the estimated annual loadings from separate storm drains (Metcalf & Eddy, 1990). Similarly, sanitary surveys in Mount Hope Bay showed that CSO's were responsible for 96% of the fecal coliform entering the bay in wet weather periods (Rippey and Watkins, 1988; Roman, 1990). Preliminary SWMM modeling for Fall River CSO's estimated an annual fecal coliform loading of  $1.43 \times 10^{16}$  cells (Maguire Group, 1990).

CSO discharges also appear to be a significant source of BOD and TSS loadings. On an average annual basis, the loadings from the NBC and BVDC CSO's are estimated to be roughly 20 to 40 percent those of the related WWTF's (Metcalf & Eddy, 1990). It is likely that TSS loadings from CSO's are attributable to both the stormwater and wastewater portions of the combined flow, as separated storm drains, WWTF's, and CSO's have all been established as significant sources of TSS loadings in Providence (Metcalf & Eddy, 1990).

Nutrient (i.e., nitrogen and phosphorus) loadings from CSO's are quite small when compared to loadings from WWTF's and other sources such as direct runoff or rainfall. Average annual loadings of phosphorus, nitrate, and ammonia from WWTF's were reported as 100 times greater than from CSO's in the Providence River area (Metcalf & Eddy, 1990). As more stringent nutrient limits are placed on WWTF's, as is currently the case with the Pawtuxet River WWTF's, the relative significance of CSO's is likely to increase.

There are few sources of information regarding the relative importance of CSO discharges as relates to metals and toxic organics. Violations of water quality standards for copper, zinc, and nickel have occurred during wet weather periods in the Blackstone, Seekonk, and Providence Rivers in the past, as have violations for PCB's in the Blackstone River (Metcalf & Eddy, 1990; Wright et al., 1990). Although urban runoff has been identified as a significant source of metals and toxic organics (Hoffman et al., 1983; Hoffman et al., 1984), only the latest CSO area studies and the wet weather study have specifically identified the metals and toxic organics loadings from individual CSO discharges. Extrapolation of the limited data to all CSO's results in estimates of annual CSO loadings for metals and toxic organics significantly smaller than WWTF and river loadings, particularly those from the Blackstone, Seekonk, and Pawtuxet Rivers (Metcalf & Eddy, 1990), although the Blackstone and Seekonk Rivers receive both CSO discharges and WWTF bypass flows. As with nutrients, more stringent requirements on metals and toxic organics discharges from WWTF's through revised NPDES/RIPDES permits may cause the relative significance of uncontrolled discharges to increase. More stringent requirements at WWTF's will be achieved through industrial pretreatment and "pollution prevention" programs, which may have the effect of correspondingly reducing the loadings from CSO discharges through their wastewater component. The relative importance of CSO discharges may increase somewhat, however, as the stormwater component, which contains both urban and highway runoff, will likely be unaffected by pretreatment programs.

### **CSO abatement technologies**

Several structural and non-structural measures can be used to eliminate or abate CSO discharges. Structural CSO abatement measures fall into three categories. The first involves the separation of combined sewer flows into independent sanitary and storm flows. The sanitary flows then receive full (usually secondary) treatment. An important remaining consideration, however, is the level of treatment that should be provided to storm sewer discharges, since storm runoff, particularly from urban areas and highways, is an important source of heavy metals such as lead, zinc and cadmium, and organic chemicals such as petroleum hydrocarbons and polycyclic aromatic hydrocarbons (PAH's). The second category of structural measures involves the storage of wet weather combined sewer flows, and subsequent discharge to WWTF's when treatment capacity is available. Storage can be achieved prior to runoff entering the collection system via detention systems, located at or near individual overflow points ("localized" storage), or at a central location tributary to the WWTF. Treatment technologies comprise the third category of structural

measures. As with storage measures, treatment can be conducted either in a localized or centralized manner. Treatment measures commonly used include screening, sedimentation, coagulation-flocculation, and swirl concentration-vortex separation. Disinfection (typically chlorination or chlorination/dechlorination) can also be provided to CSO discharges.

Non-structural mitigation measures, or "Best Management Practices" (BMP's), can be used as stand-alone CSO abatement strategies or in conjunction with structural measures to reduce the scale of structural improvements. BMP's such as street sweeping and controlling erosion from construction sites reduce the base pollutant load since these materials would be captured and treated under normal dry weather operating conditions. Inflow reduction methods such as elimination of groundwater infiltration and inflow and the use of porous paving materials can decrease the total combined flow during a wet weather event thereby reducing the volume of CSO discharge. Interceptor capacity can be enhanced by sewer flushing to remove trapped solids and by adjustment of regulators to ensure that the full capacity of the system is utilized, and existing network storage can be increased by planned surcharging or the use of inflatable dams.

### **CSO abatement in the Narragansett Bay Basin**

Although the harmful impacts of CSO discharges to Narragansett Bay have been recognized for over 40 years (Needham and Robadue, 1990), progress in abating CSO discharges has been slow. Requirements for preparation of CSO abatement plans were included in NPDES permits issued in 1983 by the EPA to Pawtucket and Central Falls. Lack of action by the communities resulted in the issuance of Notices of Violation to Pawtucket and Central Falls by RIDEM in 1987, ordering them to submit abatement plans within six months. The City of Pawtucket signed a consent agreement with RIDEM in November 1987, and subsequently awarded a contract to conduct the study. Pawtucket subsequently sued RIDEM in November 1988 to rescind the agreement, claiming the responsibility of the studies belonged to the BVDC. In July 1989, the Rhode Island General Assembly transferred responsibility for the CSO's to the BVDC, which awarded a contract in November 1990 to conduct a facility plan. Progress in the city of Fall River has followed a similar path, from NPDES permit requirements for a facilities plan by October 1985, through two EPA Administrative Orders in September 1987 and September 1989, to completion of the draft Phase II Facility Plan in November 1990.

Several CSO abatement projects within the Narragansett Bay watershed have been constructed in recent years or are currently under

construction. A CSO facility was recently constructed in Worcester that stores, screens, and (in summer months only) disinfects CSO discharges from up to the 5-year storm. The facility officially went on-line on December 8, 1990, the effective date of its NPDES permit. A CSO treatment and disinfection facility at Washington Street in Newport, which will treat flows from up to the 3-month, 1-hour design storm, is under construction and is scheduled for completion in March 1991 (Roy Anderson, pers. comm.). The Wellington Avenue microstrainer in Newport was constructed in 1978 and has experienced operational problems since that time. Modifications to that facility are expected to be completed in January 1991. As a result of recommendations contained in its Phase I facilities plan, Fall River has virtually eliminated its illegal dry weather discharges, including discharges to the Quequechan River (Maguire Group, 1990). The NBC modified its slot/connector structures and rehabilitated an interceptor to provide in-line storage in Area 2. Although the Area 2 report predicted that 33 MGY of overflow would still occur after implementation of the abatement measures, NBC personnel have stated that overflows rarely occur since completion of the project (Metcalf & Eddy, 1990). The NBC also constructed a three-foot high weir within CSO 9 that provides in-line storage, as well as diverting up to 14 mgd of combined sewage flows from CSO 9 to the Field's Point WWTF. The weir provided a significant reduction in potential CSO discharge from the storms evaluated in the 1988-89 wet weather study (Ray Wright, pers. comm.).

In addition to those measures currently completed or under construction, several abatement measures have been recommended and are scheduled for future construction. The various NBC area studies have included recommendations for CSO abatement projects, some of which are likely to be reexamined in the NBC systemwide study. The Comprehensive Sewerage Plan for the BVDC has identified several CSO abatement measures (BVDC, 1990), but these are to be reevaluated in the new facilities plan and are considered unlikely to be implemented as presented. The Fall River Phase II facility plan has recommended a deep rock tunnel for storage and conveyance of CSO flows up to the 1-year storm, and construction of a separate CSO treatment facility. Completed and planned CSO abatement projects are listed in Table 3 below.

**Table 3. CSO Abatement Projects in the Narragansett Bay Watershed.**

<u>Location</u>	<u>Project</u>	<u>Status</u>	<u>Project Cost</u>
NBC Area 2	In-line storage	Completed-1986	\$2.2 million
	Repair outfall headwalls	Complete-1996 (sch.)	\$0.4 million (est.)
NBC Area 9	In-line storage (weir)	Completed-1986	\$0.7 million
	Treatment facility	Complete-1995 (sch.)	\$17.1 million (est.)
		To be re-evaluated	
NBC Area A	Various repairs	Complete-1992 (sch.)	\$5.5 million (est.)
	Storage and treatment facilities	Complete-2000 (sch.)	\$21.0 million (est.)
NBC Area B	Various repairs	Complete-1992 (sch.)	\$2.6 million (est.)
	Storage and treatment facilities, sewer separation	Complete-1998 (sch.)	\$29.0 million (est.)
NBC Area C	Storage and treatment facilities	Complete-1998 (sch.)	\$38.4 million (est.)
NBC Area D	Off-line storage	Complete-1997 (sch.)	\$78.9 million (est.)
BVDC (Pawtucket/ Central Falls)	To be determined	Facility Plan Completion- 1993 (sch.)	To be determined
Newport	Sewer separation Wellington Ave.	Completed-1979	\$15 million
	Microstrainer	Completed-1978	\$3.0 million
	Washington St.	Modifications-Jan. 1991	\$0.4 million
		Complete-Mar. 1991 (sch.)	\$13.3 million (est.)
Worcester	Storage, treatment, and disinfection; sewer separation	Completed-1990	\$40 million
Taunton	Evaluating I/I problem	Evaluation ongoing	To be determined
Fall River	Eliminate dry weather discharges	Completed-1990	
	Storage and treatment	Complete-2000 (sch.)	\$122.4 million (est.)

TOTAL SPENT TO DATE-- \$60.9 million \*  
ESTIMATED FUTURE COST- \$327 million \*\*

\* Does not include Fall River

\*\* Does not include BVDC or Taunton

## **ISSUES FOR MANAGEMENT COMMITTEE CONSIDERATION**

**GOAL:** Combined sewer overflows and bypasses shall be eliminated or abated by the year 2000 for the purpose of improving the water quality of receiving waters, in order to reopen historic shellfish harvesting grounds that are conditionally closed and to meet all state receiving water quality criteria.

### **1. CSO ABATEMENT POLICIES**

**ISSUE A:** Should efforts be undertaken to make the CSO policies of RI and MA more consistent with each other?

The approaches of the RI and MA CSO policies are quite dissimilar. The MA policy closely follows EPA's national strategy in that it primarily focuses upon the elimination of receiving water impacts as the goal of CSO abatement. No attempt is made to set technology-based standards for CSO abatement. The RI policy, on the other hand, sets a specific technology-based standard for abatement—effective primary treatment. RIDEM reserves the right to require higher levels of treatment if the water quality impacts so necessitate, but no means is directly incorporated into the policy to require an assessment of predicted receiving water impacts before CSO abatement projects are constructed.

Since both policies are very new, no CSO abatement projects have been constructed to date that have been formulated and constructed in accordance with the state policy. Since each policy allows the permitting agency great flexibility in setting requirements, the actual implementation of the individual policy is likely to be at least as important as the policy statement itself in determining the effectiveness of CSO abatement. It is, therefore, difficult to determine whether the fundamental difference in the policy statements will result in fundamentally different CSO abatement projects or ultimate water quality benefits.

**ALTERNATIVE A-1:** No action. Both state policies, while very different in their approaches to CSO abatement, have been approved as consistent with EPA's national and regional policies. The EPA policies specifically leave it up to individual states to set policies and procedures necessary for compliance with water quality standards. No major inequities have, as yet, resulted from the difference in approaches.

**ALTERNATIVE A-2:** The states of MA and RI should conduct negotiations toward the development of more consistent CSO policies, particularly relating to shared waters. Since CSO discharges in both states influence Narragansett Bay, consistent treatment should be required for all direct and indirect CSO discharges to the Bay. It is important that in addressing interstate waters, water quality goals are clearly stated, consistent, and met, and that neither state is made to shoulder an unfair burden in achieving desired water quality improvements.

**ALTERNATIVE A-3:** The U.S. Environmental Protection Agency should carefully review and monitor the implementation of state CSO policies, to ensure that states are consistently and equitably moving toward compliance with water quality standards. As stated previously, each state's CSO policy, while consistent with national and regional CSO strategies, allows the permitting authority extensive flexibility in regulating CSO discharges. Technology-based standards, to the extent that they are more stringent than EPA's minimum requirements, are left solely to the discretion of the individual states. If, however, one state were to, for instance, mandate secondary treatment of all CSO discharges as a technology-based standard, there is no reason that a neighboring state, with which it shares waters, should be required to adopt a similar standard, as long as water quality standards were being met with a less stringent requirement. Alternatively, EPA has an obligation under the CWA to ensure that CSO abatement projects result in water quality improvements and compliance with receiving water standards.

**RECOMMENDED ALTERNATIVE:** Alternative A-3. Technology-based standards for CSO abatement are clearly left to the jurisdiction of individual states. However, CSO discharges are not to result in violations of State water quality standards, under section 301(b)(1)(C) of the CWA. Therefore, it is incumbent upon the EPA and the states to ensure that state CSO policies result in the attainment of designated uses of CSO-impacted receiving waters. This should be ensured through the following activities:

- EPA should review relevant federal and state CSO policies every three years, with subsequent revision, as needed, to ensure that the policies, as applied, are adequate to ensure compliance with state water quality standards,

- Efforts should be taken, as outlined in the Mount Hope Bay briefing paper, to reconcile the water quality classifications of interstate waters, such as Mount Hope Bay and the Blackstone River. Consistent water quality classifications are vitally important in ensuring the achievement of water quality goals for interstate waters through CSO abatement,
- EPA and the states should impose receiving water monitoring requirements in all CSO-related permits (see Issue E) in order to assess the ultimate success of CSO abatement projects in achieving water quality standards, and
- EPA should carefully review NPDES/RIPDES permits issued to CSO dischargers, to ensure that (a) the permits are in compliance with all applicable CSO policies (federal, regional, and state), (b) the permits are sufficiently stringent to attain designated uses of receiving waters, and (c) appropriate state or local authorities monitor receiving waters to evaluate the success of CSO abatement in meeting water quality standards. Permits that affect interstate waters should be reviewed by both states to ensure consistency with water quality standards in both states.

In reviewing the RIPDES permit and facility plan for the BVDC, EPA and RIDEM should be especially concerned about the water quality impacts of the BVDC North Diversion Structure. The North Diversion is an overflow structure of the main interceptor to the Bucklin Point WWTF, located just prior to its headworks. Preliminary data from the wet weather study indicate that the North Diversion Structure is the single largest source of fecal coliform loading to the Providence River, contributing nearly 40 percent of the measured point source loading (Wright et al., 1990). EPA and RIDEM should ensure that the facility plan evaluates the water quality impacts of the North Diversion Structure. If the facility plan confirms the severe water quality impacts suggested by the preliminary data, EPA and RIDEM should require greater than primary treatment of all flows from the North Diversion Structure, through expansion



of the secondary treatment capacity at Bucklin Point or through construction of an off-site facility.

**ISSUE B:** Should RIDEM's CSO policy be revised to incorporate a stronger water quality-based approach, in addition to the current technology-based approach?

As outlined in the above issue, the RIDEM CSO policy includes explicit technology-based requirements for CSO abatement. Additionally, the Department reserves the right to require more extensive treatment for a discharge, should the water quality impacts from the discharge so necessitate. EPA notes in its acceptance of the RIDEM policy that, in its next update of the policy, RIDEM should consider modifications that would more clearly lead to compliance with water quality-based requirements.

**ALTERNATIVE B-1:** The RIDEM CSO policy need not be revised at this time. The RIDEM CSO policy has been accepted by the EPA as being in fulfillment of the national strategy. A provision is included in the policy to require greater treatment than the minimum, technology-based standard should the water quality impacts of a CSO discharge dictate higher levels of treatment. Specific water quality-based requirements are generally difficult to establish, since they are based on water quality modeling.

**ALTERNATIVE B-2:** The RIDEM CSO policy should be revised to incorporate a water quality-based approach to CSO abatement. Under section 301(b)(1)(C) of the CWA, CSO discharges are not to result in violations of State water quality standards. There is no means directly incorporated into the RIDEM policy to determine or evaluate receiving water impacts before CSO abatement projects are constructed, thus ensuring compliance with water quality standards for the full range of pollutants, including fecal coliform and toxics. A CSO authority could thus proceed with abatement efforts without adequately determining whether the abatement project is sufficient to comply with federal law. The policy should be strengthened to incorporate requirements for the CSO authority to conduct sufficient study, construction, and monitoring to ensure attainment of designated uses of receiving waters. During this revision, RIDEM should expand the technology-based requirements of the policy to address removal of fecal contaminants and toxics, in addition to BOD and TSS.

**RECOMMENDED ALTERNATIVE:** Alternative B-2. RIDEM should, at its earliest opportunity, revise the CSO policy as outlined above.

**ISSUE C:** Should CSO abatement plans developed before the approval of state CSO policies be exempt from the requirements of that policy?

**ALTERNATIVE C-1:** CSO abatement plans developed before the approval of state CSO policies should be exempt. Facilities plans, and in certain cases, the initiation of construction, for CSO abatement projects were undertaken prior to the development and approval of the state CSO policies. Those communities which have been operating in good faith toward CSO abatement should not be penalized for having conducted efforts prior to the development of abatement policies. For example, if the Newport facility currently under construction were deemed not to be in compliance with RIDEM's CSO policy, the city could be forced to immediately replace, expand, or otherwise retrofit the facility before it were to go on line. By the issuance of a state policy, millions of dollars of planning and construction could instantly be voided.

**ALTERNATIVE C-2:** CSO abatement plans developed before the approval of state CSO policies should be subject to all the requirements of those policies.

The RI and MA state CSO policies were developed to administer requirements of the CWA that have been in place for years. The requirement that CSO discharges not cause violation of state water quality standards is a CWA requirement that cannot be waived unilaterally by any state. Older CSO abatement studies, such as the NBC Area 9 and BVDC studies, are likely outdated and are being reconsidered by the individual authorities, in any case. The CSO policies will only be effective in achieving the goal of meeting water quality standards if all discharges are subject to those policies.

**RECOMMENDED ALTERNATIVE:** Alternative C-2. The federally-mandated goal of meeting water quality standards in all Narragansett Bay waters can only be achieved if all CSO dischargers are subject to the requirements of the CWA and the MA and RI CSO abatement policies. The CWA goal of achieving "fishable-swimmable" standards has been in place since 1972. The objective of "eliminating or abating" CSO's in order to achieve this goal has been explicitly stated in RI discharge permits at least since 1983. Therefore, these requirements should apply to all CSO abatement studies and projects regardless of their current status. However, special consideration should be given authorities which have begun construction of projects that could technically be in noncompliance with state policies. Existing plans which do not meet state guidelines should be required to be updated with the minimum

level of effort necessary to develop recommended alternatives consistent with the goal of meeting water quality standards. Facilities under construction that cannot be easily modified to meet state requirements should be required to upgrade their facilities to meet those guidelines within a reasonable period of time, so that state water quality standards may be achieved. However, upgrades of new (albeit substandard) facilities should receive lower priority than abatement of a currently untreated CSO discharge.

**ISSUE D:** Should a formal petition process be instituted for requesting a waiver from the RIDEM CSO policy technology-based requirement of effective primary treatment for storms up to the 1-year, 6-hour storm?

The RIDEM CSO policy allows a CSO authority to petition RIDEM for relief from the technology-based requirement of effective primary treatment for storms up to the 1-year, 6-hour storm, should "significant beneficial water quality improvements" be demonstrated to occur incorporating a lesser level of treatment, using a cost-benefit analysis. No provisions are included in the policy, however, outlining the specific actions that the authority must undertake to petition for relief.

**ALTERNATIVE D-1:** No formal waiver process should be established. All CSO abatement facility plans developed in Rhode Island are reviewed by RIDEM. As part of that review, RIDEM will make a determination as to whether the recommended plan is consistent with the state CSO policy. It will be the responsibility of the CSO authority to demonstrate, as part of the facility plan, that a waiver would be justified based on significant beneficial water quality improvements.

**ALTERNATIVE D-2:** A formal process should be established for requesting a waiver from the requirements of the CSO policy. The RIDEM CSO policy provides very explicit requirements for a minimum, technology-based CSO abatement level. This type of requirement has the advantage of being easily understood, implemented, and monitored. Unless an official waiver process is instituted, requiring a direct request from the CSO authority outlining which requirements it wishes waived, the benefit of having such an explicit policy will be minimized. A formal waiver process will also make it part of the public record when the policy is being waived because of "demonstrable water quality benefits."

**RECOMMENDED ALTERNATIVE:** Alternative D-2. A formal waiver process should be established to provide consistent determinations and a clear public record of the requirements being placed on each CSO

authority for their abatement efforts. RIDEM should establish criteria for conducting cost-benefit analyses used in justifying a waiver request. The benefits of having an open review process outweigh the disadvantage of any increased paperwork. In all cases where a waiver is requested, it should be demonstrated that the waiver will not result in any violation of state water quality standards.

**ISSUE E:** Should the community/authority with responsibility for CSO's be responsible for conducting water quality monitoring of CSO discharges, as well as ambient monitoring within and beyond the designated mixing zones?

The "Long-Term Monitoring" briefing paper contained a recommendation, approved by the Management Committee, that the receiving waters of direct dischargers, including WWTF's and CSO's, in the Narragansett Bay watershed should be monitored within a defined area of the discharge zone as a condition of their RIPDES/NPDES permits. The recommendation will not be reconsidered in this briefing paper.

Monitoring of CSO discharges inherently poses problems different from monitoring of WWTF effluent. In the NBC service area, for example, there are 61 CSO outfalls that could potentially require monitoring, as compared to a single WWTF discharge. The outfalls are typically distributed throughout the service area, as opposed to being located at the WWTF. The intermittent nature of CSO discharges and the temporal variation in pollutant concentration necessitates that any monitoring program established be capable of sampling during all rainfall events, and at periodic intervals throughout the event.

**ALTERNATIVE E-1:** CSO discharges should be monitored at all CSO discharge points during all storm events. The geographic and temporal variation of CSO discharges, as well as their characteristics (in terms of pollutant loading), necessitates that all discharges be monitored to ensure compliance with applicable policies and laws.

**ALTERNATIVE E-2:** A program of CSO discharge monitoring should be established that includes monitoring of selected outfalls. Due to the potential difficulty and expense involved in monitoring all CSO discharges at all times, a manageable program should be established that reasonably verifies compliance with applicable policies and laws. The monitoring program should be developed by the permitting authority in conjunction with the sewer authority responsible for CSO's, and could have the following characteristics:

- A calibrated and verified model (e.g., SWMM) of the combined sewer system should be utilized to determine the storm characteristics that would be likely to result in CSO discharge. Forecasted and observed weather data would be used to determine when such storms are likely to occur or are occurring.
- The above model would be used to identify "critical" CSO outfalls. The critical outfalls would be monitored for 3-5 storms of variable intensity per year to test the predictions of the SWMM model and performance of the CSO or CSO abatement facility.
- A system would be established to monitor, on a rotating basis, non-critical outfalls.
- Routine monitoring of all outfalls would be conducted to ensure the elimination of dry weather discharges, which are illegal.
- The results of the above monitoring would be used to recalibrate the model, if necessary.

**ALTERNATIVE E-3:** Receiving waters impacted by CSO discharges should be monitored within a defined area of the discharge zone. This recommendation was approved by the Management Committee in response to the "Long-Term Monitoring" briefing paper. The purpose of mandatory "local effects" monitoring will be to evaluate the performance of the CSO's and/or CSO abatement facility in achieving water quality improvements and meeting water quality standards. Monitoring should be required prior to, during and after construction in order to allow an objective determination of the project's success in meeting water quality objectives. A procedure should be established for suspending the monitoring requirement if water quality standards are consistently met within the zone of discharge following construction.

**RECOMMENDED ALTERNATIVE:** Alternatives E-2 and E-3. See above discussion.

**ISSUE F: Should CSO authorities be required to maximize CSO flows to the WWTF?**

The "Implementation" section of the EPA national CSO abatement strategy, in paragraph 5, lists several technology-based limitations as a minimum BCT/BAT for abatement of CSO discharges. The minimum limitations include "maximization of flow to the POTW for treatment." These requirements, however, are not specifically identified in the state CSO policies for either Massachusetts or Rhode Island.

**ALTERNATIVE F-1: CSO authorities should not be required to maximize CSO flows to the WWTF.** All flows that enter the headworks of a WWTF are considered flows of the treatment plant and are required to receive secondary treatment under CWA section 301(b)(1)(B). Secondary discharges must achieve 85 percent removal of TSS and BOD and meet Federal effluent limitations of 30 mg/l of TSS and BOD on an average monthly basis and 45 mg/l on an average weekly basis [40 CFR 133.102]. Although the secondary treatment requirement for 85 percent removal of TSS and BOD can be modified under 40 CFR 133.103(a), the effluent concentration limits may limit the amount of CSO flow that could legitimately be treated at the WWTF.

**ALTERNATIVE F-2: CSO authorities should be required to maximize CSO flows to the WWTF.** As noted above, the EPA national CSO strategy requires maximization of flows to the WWTF as a minimum technology-based limitation for CSO abatement. Maximization of flow to the WWTF provides a cost effective means of providing treatment of CSO discharges. Failure to maximize flows to the WWTF would result either in additional untreated CSO discharges or more expensive off-site treatment of CSO discharges.

**RECOMMENDED ALTERNATIVE: Alternative F-2.** Maximization of CSO flows to WWTF's is an important, cost effective CSO abatement strategy. MADEP and RIDEM should revise their state CSO policies to specifically incorporate this abatement requirement as a preferred alternative.

**ISSUE G: Should CSO flows, once brought into the WWTF for treatment, be subject to the secondary treatment requirements for WWTF's in the CWA?**

Many WWTF's, e.g., NBC and BVDC, possess excess primary treatment capacity (as compared to their secondary treatment capacity) during wet weather periods. In these situations, the preferred CSO abatement strategy would be to bring the CSO discharges into the WWTF for full primary treatment, provide secondary treatment to the WWTF's capacity, and provide disinfection of all flows prior to discharge. This strategy would take advantage of the WWTF's excess primary treatment and disinfection capacity to provide low-cost CSO abatement. In fact, both BVDC and NBC utilize excess primary capacity, and subsequent secondary bypasses, to provide some level of treatment to a portion of their combined sewage flow, rather than allow for increased discharges of raw sewage through CSO's upstream of the WWTF's.

However, all flows that enter the headworks of a WWTF are considered flows of the treatment plant. All discharges from a WWTF are required to receive secondary treatment under CWA Section 301(b)(1)(B). These discharges must meet Federal effluent limitations of 30 mg/l of TSS and BOD on an average monthly basis and 45 mg/l on an average weekly basis [40 CFR 133.102]. Since CSO flows are typically more dilute than wastewater flows (see Table 1), the EPA has recognized that it may be difficult to achieve 85 percent removal even with secondary treatment. Therefore, the WWTF may be granted a modification of the requirement to achieve 85 percent removal of TSS and BOD during periods when CSO flow is brought into the WWTF under 40 CFR 133.103(a). Although the secondary treatment requirement for 85 percent removal of TSS and BOD can be modified, the effluent concentration limits may effectively limit the amount of CSO flow that could legitimately be treated at the WWTF without causing occasional permit violations.

**ALTERNATIVE G-1: CSO discharges should be subjected to technology-based and water quality-based standards rather than secondary treatment requirements, whether abated within a WWTF or elsewhere.** The impacts of a particular CSO flow are not greater because they are discharged from a WWTF instead of a CSO abatement facility. It is, therefore, illogical to require greater treatment levels for CSO flows than the flows would legally be subject to if discharged from an independent CSO treatment facility, simply because they are

discharged, after treatment, from a WWTF. A policy requiring full secondary treatment for CSO flows diverted to the WWTF for treatment create a disincentive for a CSO authority to maximize use of existing primary and secondary capacity at the WWTF.

**ALTERNATIVE G-2:** All WWTF discharges should remain subject to the secondary effluent requirements of the CWA, regardless of whether they include CSO flows.

Section 301(b)(1)(B) of the CWA mandates secondary treatment of flows from a publicly owned treatment works. The only exception allowed to this requirement is that WWTF effluent that includes CSO flows may be relieved from the requirement for 85 percent removal of TSS and BOD [40 CFR 133.103(a)]. Secondary treatment requirements for WWTF's have been critical in reducing the occurrence in water quality violations nationwide, removing from state permitting authorities the burden of proving water quality impacts from WWTF discharges.

In addition, although secondary treatment was intended to control "conventional" pollutants as total suspended solids (TSS) and biochemical oxygen demand (BOD), secondary treatment requirements have also proved effective in reducing the discharge of particle-associated metals and organic compounds. Urban runoff, which is a major component of combined sewer flows during storms, contains petroleum hydrocarbons, polycyclic aromatic hydrocarbons, lead, zinc and cadmium from automobile and industry-derived combustion products (Wright et al., 1990; Metcalf & Eddy, 1990; Hoffman et al., 1983; Hoffman et al., 1984). Since CSO's constitute a potentially significant source of these metals and petroleum byproducts, enhanced solids removal provided by full secondary treatment is desirable in order to reduce discharges to the marine environment. (Note that EPA and Rhode Island are developing a stormwater management policy that focuses on best management practices for the reduction of pollutant discharges, including toxics, to receiving waters. The policy proposed above is consistent with EPA's emerging focus on stormwater discharges of pollutants, including toxics, found in urban and highway runoff.)

**RECOMMENDED ALTERNATIVE:** Alternative G-2. The CWA and EPA regulations are clear in requiring full secondary treatment for all WWTF effluent. The removal of these requirements for CSO discharges, unless those discharges can be segregated and separately monitored, would pose a strong threat to the secondary treatment requirements for wastewater flows as well, and would tend to make the interim measure of utilizing excess primary capacity more permanent. Furthermore, removal of the secondary treatment requirements may



be in violation of the anti-backsliding provisions contained in section 402(o) of the CWA.

The preferred CSO abatement strategy should be to bring the maximum possible CSO flow to the WWTF for full primary treatment, secondary treatment to the limit of the WWTF's capacity, and disinfection of all flows prior to discharge. In order to implement this policy, the 85 percent removal requirement for BOD and TSS should be waived for the peak periods of wet weather flow. The use of excess primary capacity at a WWTF for the treatment of CSO flows, beyond the point at which the WWTF can continue to meet effluent concentration limits for the recombined effluent flows, should not be considered a permanent CSO abatement solution.

Facility plans for CSO abatement, when examining excess primary capacity at a WWTF, should evaluate expansion of a plant's secondary capacity, the use of upstream storage and/or treatment, and the potential for increased future secondary capacity requirements at the WWTF before seriously considering utilizing the excess primary capacity as a long-term CSO abatement measure. However, in situations similar to that at the BVDC, where a facility plan has not been completed, the use of excess primary capacity should be endorsed as an interim measure until the implementation of a long-term CSO abatement program can be effected.

## **2. CSO ABATEMENT TECHNOLOGIES**

**ISSUE A:** Should certain CSO abatement measures be endorsed as "preferred solutions", based on their impacts on receiving water quality?

Various categories of CSO abatement measures have different levels of cost, and have diverse impacts on receiving water quality. The nonstructural measures, or best management practices (BMP's), typically are of very low cost, and can be implemented quickly with a minimal amount of study and construction. If not already in place, BMP's can in some situations effect significant reductions in CSO flows and pollutant loadings, and can, in marginal situations, represent a complete solution. Separation of sanitary and storm flows allows for full treatment of all sanitary flows at a WWTF, but typically provides for direct, unmitigated discharge of storm runoff. Storage measures, if sized adequately, can capture most of the combined flows and, if routed back to the WWTF, provide full treatment of all but the most extreme CSO flows. Separate treatment facilities can be designed to provide the

appropriate level of treatment required to meet water quality objectives. Disinfection technologies are addressed in Issue B below.

**ALTERNATIVE A-1:** All abatement measures that meet the requirements of applicable CSO policies should be considered on an equal basis. Policies for CSO abatement have been developed that institute technology-based and water quality-based requirements on CSO authorities. Any and all measures that are consistent with the requirements of the policies (and applicable federal and state regulations) should be considered within a facility plan.

**ALTERNATIVE A-2:** Certain abatement technologies should be identified as "preferred alternatives". The advantages and disadvantages of certain categories of abatement technology go beyond the specific requirements of federal, regional, and state CSO abatement policies. BMP's, for instance, are already recognized in the federal and state CSO policies as a set of abatement measures that should be undertaken prior to or in conjunction with the construction of abatement projects. Sewer separation projects could technically be in compliance with all CSO policies and laws, while merely shifting problems to a less regulated form (i.e., stormwater) without mitigating the impacts of storm runoff. Categories of structural CSO abatement technologies should be considered for similar "preferred alternative" status.

**RECOMMENDED ALTERNATIVE:** Alternative A-2. In reviewing facility plans for CSO abatement, state permitting authorities (MADEP and RIDEM) should look at all effects of alternative CSO abatement plans rather than looking solely at whether the plans comply with applicable regulations and policies. Storage projects, with subsequent high (e.g., secondary) levels of treatment utilizing existing WWTF capacity, should be considered preferable to separate CSO treatment projects with lesser treatment, assuming other factors including cost are relatively equal. Sewer separation should be considered a "least preferred" alternative, unless the stormwater flows at a particular location have clearly been demonstrated to be an insignificant source of pollutants, and/or sewer separation is combined with BMP's for toxics reduction and stormwater management.

**ISSUE B:** Should the EPA, Rhode Island and Massachusetts CSO policies explicitly require effective and environmentally safe disinfection of CSO flows prior to discharge in order to enable Rhode Island to re-open conditionally closed shellfish harvesting areas? If so, should CSO abatement plans explicitly address the issue of disinfection and consider the use of alternative disinfection methods?

CSO's by definition carry a combination of untreated sanitary waste, storm runoff, and industrial process wastewater depending on the service area. The discharge of untreated sanitary waste from CSO's following precipitation events is primarily responsible for closure of conditional shellfish harvesting waters in upper Narragansett Bay and permanent closures in Mount Hope Bay (Karp et al., 1990). If the presently CSO-impacted shellfish areas are to be re-opened as a goal of the CSO abatement projects, mitigation and/or disinfection of CSO flows is necessary to protect the public from possible exposure to pathogenic microorganisms discharged to the marine environment and accumulated by harvestable shellfish.

Effective disinfection of CSO discharges may be technically difficult to accomplish for two reasons. First, CSO's discharge intermittently in response to storm intensity and duration. Since disinfection efficiency is largely dependent on the contact time of the the infectious particles of concern (bacteria, viruses, protozoans, etc.) with the disinfecting agent or process, variable rates and volumes of CSO flow make it difficult to assure adequate dose and contact time prior to discharge. Second, and more importantly, CSO's transport complex flows that contain large solids as well as fine inorganic and organic particles. Bacteria and viruses, presumably including potential pathogens, tend to aggregate on fine organic particles. The efficiency of disinfection is therefore directly related to the concentration of solids in the wastestream, i.e., the more solids, the larger the required disinfectant dose and/or the longer the required contact time.

In summary, effective disinfection of CSO's will depend on adequate solids removal and contact time regardless of the disinfection practice chosen. In addition, as discussed in the "Sewage Contamination - Pathogens" briefing paper (Karp et al., 1990), secondary problems related to the use of chlorine as the disinfection agent should be considered, i.e., many of the same concerns related to chlorination at WWTF's also apply to CSO's. The use of gaseous chlorine is a safety hazard, which is increased by the fact that most CSO disinfection facilities are likely to be unstaffed but in close proximity to the general public (WPCF, 1989). Chlorine is acutely toxic to marine fish and aquatic invertebrates, even at low concentrations (Petrocelli et al., 1990).

While chlorine has proven very effective at reducing bacterial concentrations in sewage effluents, it is relatively ineffective at controlling viruses (Goyal, 1984; Roman, 1990).

**ALTERNATIVE B-1:** The EPA, Rhode Island and Massachusetts CSO policies do not need to be revised to explicitly require effective and environmentally safe disinfection of CSO discharges. Both the EPA and Massachusetts CSO policies explicitly require approved CSO abatement plans to result in attainment of state water quality standards. Compliance with federal and state standards for fecal coliform concentrations is therefore implicit in these policies. Although Rhode Island has elected to impose technology-based requirements for CSO abatement, the policy has been approved by EPA as being in compliance with EPA's national CSO strategy. Therefore, compliance with federal and state water quality standards is implicitly included as a goal in the Rhode Island policy.

**ALTERNATIVE B-2:** The EPA, Rhode Island and Massachusetts CSO policies should be revised to explicitly require effective and environmentally safe disinfection of CSO discharges. Unless the sanitary waste component of the CSO discharge is completely eliminated via sewer separation or other means, disinfection of some or all CSO flows will be necessary if the presently CSO-impacted shellfish areas are to be re-opened as a goal of the CSO abatement projects. None of the CSO policies under consideration explicitly address the question of disinfection or secondary issues regarding chlorine toxicity. The Rhode Island and Massachusetts CSO policies should be revised to explicitly state that one goal of CSO abatement is to reduce pollutant loadings to the state's receiving waters and meet state water quality standards in order to be able to re-open conditional shellfish harvesting areas that are presently impacted by CSO's.

The CSO policies should also explicitly require that all practical, effective and environmentally safe disinfection technologies should be considered in CSO abatement plans. Alternative disinfection technologies include ozonation and ultraviolet (UV) irradiation. Ozonation, while generally twice as expensive as chlorination, is non-toxic and actually contributes dissolved oxygen to the effluent. UV disinfection is also non-toxic, is simpler to operate and maintain, and can be competitive in cost to chlorination/dechlorination. Depending on the individual CSO discharge and level of treatment prior to disinfection, solids may not be present at a high enough concentration to rule out UV disinfection. Ozonation and UV disinfection have a significant advantage over chlorination in that they are both viricidal as well as bactericidal measures (Roman, 1990). There is evidence that

chlorination produces extremely toxic chloramines and chlorbromines which are not removed through dechlorination (USEPA, 1986).

**RECOMMENDED ALTERNATIVE:** Alternative B-2. The choice of mitigation and disinfection strategies is highly site-specific and involves a number of factors. The use of alternative disinfection technologies at WWTF's has grown and is providing a substantial base of knowledge as to their effectiveness. Although their cost is generally greater than that for chlorination, the applicability of alternative disinfection technologies should be considered when safety, toxicity, viricidal, or dissolved oxygen considerations are important.

### **3. FINANCING AND IMPLEMENTATION**

**ISSUE A:** Should Massachusetts and Rhode Island develop specific statewide prioritization schedules for CSO abatement projects?

Both Massachusetts and Rhode Island have prioritization programs for improvements to WWTF's, which have been expanded to include CSO abatement projects. Additionally, the RIDEM CSO policy requires that each community/sewer district develop a priority ranking list of its CSO's. However, no programs currently exist that would rank all proposed CSO projects on a statewide basis, taking into account the intermittent and highly variable nature of water quality impacts from CSO's as opposed to WWTF's.

**ALTERNATIVE A-1:** The states should develop specific statewide prioritization schedules for CSO abatement projects. The various CSO abatement projects currently identified, and likely to be identified in the future, for the NBC and BVDC CSO areas are estimated to have construction costs of approximately one-half billion dollars. Individual projects will have different benefits (in terms of water quality improvements), resulting in different returns on expenditure. A statewide prioritization schedule would be the only means of assuring that limited state funds, available either through the State Revolving Fund (SRF) or other grant programs, be applied first to those facilities producing the greatest water quality benefit. The existing priority determination systems for water pollution abatement projects do not take into account the intermittent nature of CSO's, including their high variability between storm events.

**ALTERNATIVE A-2:** The states should not develop specific statewide prioritization schedules for CSO abatement projects. All CSO abatement projects, if developed in compliance with federal, regional, and state CSO policies, will have positive impacts on receiving water quality. The development of CSO prioritization schedules could have the effect of delaying projects which are ready for construction until those of higher priority can be studied, designed, and constructed, a potential delay measured in years if the higher priority project is early in the planning stages. Since CSO abatement is mandated by the CWA and all projects developed pursuant to the states' CSO abatement policies are presumptively worthwhile, a project should be approved and funded for construction when study and design have been completed, regardless of the project's position on a priority listing.

**RECOMMENDED ALTERNATIVE:** Alternative A-1. The construction costs of all CSO abatement projects for the states of Massachusetts and Rhode Island will clearly be beyond the short-term funding capabilities of the states and affected communities. Only a statewide prioritization system can guarantee that the most critical needs are addressed first. However, the system should be established so as not to cause undue delays to projects of moderate priority that could be constructed immediately.

The NBP and RIDEM should jointly prepare a prioritization system and schedule to address the Rhode Island CSO's. The long delays in providing for CSO abatement have been in part due to an overall state CSO abatement plan. The system to be developed, and brought before the Management Committee for discussion and approval, should address the following considerations:

- **Volume of CSO discharge.** Most of the CSO studies conducted have some estimate of the volume of CSO flow discharged to receiving waters. The necessary information currently exists to develop an accurate ranking of CSO's on this basis. While discharge volume does not necessarily relate directly to water quality impacts, it does provide the simplest means of evaluating the significance of the various CSO's.
- **Pollutant loading of CSO discharge.** Pollutant loading is the most widely available data source that provides a direct measurement of potential CSO impacts. Virtually all studies have loading information for fecal coliform, and most have estimates of BOD and TSS. Some studies have additional information on toxics. Relative pollutant loads, although they do not take into account the differing

assimilative capacities of receiving waters, would provide a useful means of ranking CSO's. Since fecal contamination is the most important recognized problem related to CSO discharges, fecal coliform loadings should be used. (Loadings for BOD, TSS, toxics, and nutrients should be considered where available.)

- **Water quality impacts of CSO discharge.** Since all CSO abatement projects are aimed at improving receiving water quality, receiving water impacts are the most important estimate of the relative importance of a CSO discharge. The impacts shall be measured both in terms of the likelihood of future violation of state water quality standards (both in-stream and down-stream) and probable impact on existing and desired uses of receiving waters (e.g., shellfishing).
- **Frequency of CSO discharge.** Analyses of CSO discharges must examine the frequency of discharges, and the frequency at which water quality violations or use impairments occur.
- **Readiness to proceed.** All CSO discharges are required to be eliminated, abated, and/or permitted under the CWA. Therefore, CSO projects should be ranked, in part, based upon the authority's ability to proceed with construction.
- **Cost of CSO abatement.** An important factor in setting project priority is the cost for CSO abatement. Relatively low-cost alternatives that provide significant water quality benefits should be expedited to the extent possible. Public recognition of improvements to water quality from CSO abatement can also provide significant impetus toward continued abatement of CSO discharges.

**ISSUE B: What general sources of funds should be considered appropriate for the financing of CSO abatement projects?**

A large number of potential funding sources could be utilized to finance CSO abatement projects, either singly or through a combination of sources. The specific source(s) that should be used for individual projects will not be addressed here; those types of analyses will be presented in a subsequent briefing paper. It is the intent of this section to determine the appropriate categories of sources that should

be investigated fully by NBP staff, in consultation with the ad hoc funding work group, to determine their applicability to CSO abatement projects.

Federal grant money has been utilized over the years to fund capital improvements to WWTF's. A small amount of federal money has also been made available to abate marine CSO's as a one percent set-aside from the federal construction grants program. Federal marine CSO funds have been utilized for construction of the Newport CSO facility, and the NBC CSO abatement studies. This funding totalled only \$24 million annually nationwide at its peak, and ended in 1990. The prospect for increased federal funding of capital improvement pollution abatement projects is not considered very bright at this time, although several proposed amendments to the CWA have called for continued federal involvement in CSO abatement.

Similar to federal grants, state grants have been made available to fund capital improvements to WWTF's. Unlike WWTF's, however, not all communities have CSO's, so the use of state grants raises a basic question of equity. This question has in fact led several BVDC communities that do not have CSO's (Lincoln, Cumberland, Smithfield, and East Providence) to file a lawsuit against the BVDC, attempting to restrain the BVDC from using their user fees to fund CSO improvements in Pawtucket and Central Falls. Residents of non-CSO, and perhaps even unsewered, communities may consider it inappropriate that their taxes be used to fund CSO improvements in one or two large communities. There is, however, precedent for the use of state funds in CSO abatement. The R.I. Aqua Fund Council has authorized state funds for construction of Newport's CSO abatement facility and a sewer separation project to be constructed by the NBC, as well as for BVDC's CSO abatement study.

Massachusetts and Rhode Island have both established State Revolving Funds (SRF's) as a means for funding pollution abatement projects. SRF's were established under amendments to the CWA in 1987, as the construction grants program was being phased out. Under an SRF, federal and state "seed" money is used to establish a fund that will provide low interest loans to communities for pollution abatement projects. These loans are guaranteed by the community, generally through a dedicated revenue source such as user fees. As the loans are repaid, the money is then available for future loans—hence, a "revolving" fund. In the 1990 election, Rhode Island voters approved a referendum item authorizing issue of \$35 million in bonds for capitalizing the SRF.



Although the funds provided to the communities are repaid into the SRF, some of the same equity questions may apply to SRF's as to state grants. Since the loans are provided at a subsidized interest rate, the amount of rate subsidy is effectively a state (and federal) grant. The loan interest rate can be established to provide a desired subsidy level; current preliminary plans for the RI SRF would provide a subsidy of approximately one-third (W. Penn, pers. comm.). Equity concerns may not be as severe as with direct grants, however, since the community has a larger direct stake in the improvement, and the subsidy can be rather small.

The last available funding category is direct local funding. A community may decide to fund capital improvements through any of a number of means—user fees, property or other taxes, one-time assessments, or a combination of means.

**ALTERNATIVE B-1: Federal grants.** Sources of federal grant money for CSO's currently are limited at best, and are not expected to increase in the near future. To the extent that this money may still be available, or may be made available in the future, the states and relevant CSO authorities should attempt to obtain federal funds. EPA Region I and state and locally elected officials should help to assure that CSO projects in the Narragansett Bay watershed should obtain their "fair share" of any available federal funding.

**ALTERNATIVE B-2: State grants.** In many cases, the responsibility for and benefits from CSO abatement may be considered to be statewide. In those cases, state grant money may be considered an appropriate source of all or part of the funding for CSO abatement projects.

**ALTERNATIVE B-3: State Revolving Fund, to be repaid through local funding (e.g., user fees, property taxes).** The SRF program was specifically established in the CWA as a replacement for the construction grants program. This program recognizes the continued federal and state interest in pollution abatement while shifting much of the financial burden to the individual community responsible.

**ALTERNATIVE B-4: Local funding only.** In situations of localized impact, or when the cost of improvements is relatively small, local funding may be the simplest, fastest, and most equitable source of funding. A major consideration will be the funding capability of the individual community.

**RECOMMENDED ALTERNATIVE:** Alternatives B-1 through B-4. All funding sources for CSO abatement projects should be investigated in detail by NBP staff, in consultation with the ad hoc funding work

group. In particular, the equity issues and relative merits related to each source should be investigated, to determine the most appropriate and equitable mix of sources that should be utilized for CSO abatement projects. The NBP should also initiate and/or participate in national, regional, and local efforts to resume or expand currently unfunded or underfunded programs (e.g., federal marine CSO grants).

#### **4. OTHER ISSUES**

##### **ISSUE A: Should new construction be allowed to connect to existing combined sewers?**

New construction, particularly large developments, that connect to existing combined sewers can exacerbate existing CSO problems by increasing the base sanitary flow and/or by increasing storm runoff. Existing CSO discharges are a problem that, in general, cannot be eliminated without great expense. New or increased CSO discharges, on the other hand, can potentially be avoided through connection to existing (nearby) separated sewers, provision of on-site treatment, or relocation of the proposed development to an area without combined sewers.

**ALTERNATIVE A-1:** New construction should be allowed to connect to existing combined sewers. A general prohibition against permitting new connections to combined sewers is a serious step that should not be taken lightly. The individual impacts from new connections may be insignificant. In addition, it may not be practically possible to tie in to a separate sanitary sewer, and the cost of alternative treatment options may render them economically unfeasible.

**ALTERNATIVE A-2:** No new construction should be allowed to connect to existing combined sewers. The connection of new development with either a sanitary or process wastewater discharge to combined sewers will only serve to increase the expense already required for abatement of existing CSO discharges. In many cases, separate and combined sewers are not very far apart, and connection to a separate sanitary sewer would not be a significant expense. When connection to sanitary sewers is not an option, it shall be the property owner's responsibility to demonstrate that any expected or probable discharge will not individually or cumulatively result in a violation of state water quality standards or that alternative disposal options are technologically and legally feasible and will not result in any violation of state water quality standards. Proposed developments that cannot

meet these requirements should not receive building or environmental permits.

**RECOMMENDED ALTERNATIVE:** **Alternative A-2.** A connection of new construction to combined sewers should only be allowed if the property owner demonstrates that they will not, individually or cumulatively, result in a violation of state water quality standards. The states of RI and MA should revise their respective CSO strategies to clearly establish this policy. All state regulatory authorities including state environmental regulatory agencies, sewer authorities and local permitting authorities should be required to evaluate the cumulative impact of proposed development on water quality in approving connections to a combined sewer.

**ISSUE B:** Should storm drains that discharge sanitary waste due to illegal connections, effectively operating as combined sewers, be regulated in the same manner as CSO's?

**ALTERNATIVE B-1:** Storm drains that discharge sanitary waste should be regulated in the same manner as CSO's. A storm sewer that, through illegal connections or other means, discharges sanitary waste in addition to stormwater acts, in effect, as a combined sewer. The EPA national strategy requires the regions and states to identify the communities with combined sewer systems and to regulate each CSO discharge point within these communities. Many storm drains that discharge sanitary waste have been identified by RIDEM, although there have been difficulties in identifying the specific sources of the illegal connections and sanitary waste (J. Migliore, pers. comm.). Identifying these discharges as CSO's would require the communities to obtain permits for the discharges, conduct abatement studies to determine the discharge sources, and abate their impacts. This would, in effect, give the states a means of requiring the communities to address the illegal interconnection problem.

**ALTERNATIVE B-2:** Storm drains that discharge sanitary waste should not be regulated in the same manner as CSO's. Storm drains are exclusively intended to prevent flooding by capturing and diverting storm runoff. As a result, direct sewer hook-ups to storm drains are illegal. CSO's, however, were intentionally constructed in urban areas to carry sanitary and industrial waste water during dry weather, and storm runoff during periods of precipitation. Regulating storm drains in the same manner as CSO's would therefore subvert existing storm drain policy by potentially permitting currently illegal connections.

**RECOMMENDED ALTERNATIVE: Alternative B-2.** Illegal connections to storm drains must be eliminated. Regulations of storm drains in the same manner as CSO's could potentially allow these connections to remain. Alternative stormwater management methods, which would include requirements for communities to identify and map their storm drains, will be addressed in a subsequent briefing paper addressing stormwater management issues.

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## APPENDIX

## NATIONAL COMBINED SEWER OVERFLOW CONTROL STRATEGY

### INTRODUCTION

Combined sewer overflows (CSOs) are flows from a combined sewer in excess of the interceptor or regulator capacity that are discharged into a receiving water without going to a publicly owned treatment works (POTW). CSOs occur prior to reaching the headworks of a treatment facility and are distinguished from bypasses which are "intentional diversions of waste streams from any portion of a treatment facility" (40 CFR 122.41(m)).<sup>1</sup>

Most major municipal areas in the United States are served by a combination of sanitary sewers, separate storm sewers, and combined sanitary and storm sewers. The Agency has estimated that there are between 15,000 and 20,000 CSO discharge points currently in operation. Sanitary sewer systems must adhere to the strict design and operational standards established to protect the integrity of the sanitary sewer system and wastewater treatment facilities. Discharges from separate sanitary sewer systems with less than secondary treatment are prohibited. The regulation of discharges from separate storm sewer systems is addressed in Section 402(p) of the Clean Water Act (CWA). EPA is proposing regulations implementing Section 402(p) which include requirements to develop system-wide municipal storm water management programs to reduce pollutants from municipal separate storm sewers. The following strategy is designed to control effluents from combined systems which are not regulated under the sanitary system standards nor as discharges from separate storm sewer regulations.

This CSO permitting strategy is designed to complement the control programs for sanitary sewers and separate storm sewers. This strategy establishes a uniform, nationally-consistent approach to developing and issuing NPDES permits for CSOs. CSOs have been shown to have severe adverse impacts on water quality, aquatic biota, and human health under certain conditions. Therefore, permits for CSOs are to be developed expeditiously to minimize these potential impacts by establishing technology-based and water quality-based requirements.

Flows to the treatment works (POTW), including dry weather and wet weather flows, are subject to secondary treatment regulations, water quality standards, and the National Municipal Policy. Dry weather discharges from CSOs, which are also subject to this strategy, are illegal and must be expeditiously eliminated. Regions and approved States should use appropriate enforcement actions to eliminate such activities and assure compliance.



The objectives of this strategy are threefold:

- 1) To ensure that if CSO discharges occur, they are only as a result of wet weather,
- 2) To bring all wet weather CSO discharge points into compliance with the technology-based requirements of the CWA and applicable State water quality standards, and
- 3) To minimize water quality, aquatic biota, and human health impacts from wet weather overflows.

#### STATEMENT OF STRATEGY

CSOs are point sources subject to NPDES permit requirements including both technology-based and water quality-based requirements of the CWA. CSOs are not subject to secondary treatment regulations applicable to publicly owned treatment works (Montgomery Environmental Coalition vs. Costle, 646 F. 2d 568 (D.C. Cir. 1980)).

Technology-based permit limits should be established for best practicable control technology currently available (BPT), best conventional pollutant control technology (BCT), and best available technology economically achievable (BAT) based on best professional judgement (BPJ) when permitting CSOs. The CWA of 1977 mandates compliance with BPT on or before July 1, 1977. The Water Quality Act Amendments of 1987 (WQA) mandates compliance with BCT/BAT on or before March 31, 1989.

Section 301(b)(1)(C) of the CWA mandates compliance with water quality standards by July 1, 1977. In addition it is likely that at least some CSO discharges will be point source discharges to waters listed under Section 304(1) of the CWA and subject to the control requirements of that Section.

All CSO discharges must be brought into compliance with technology-based requirements and State water quality-based requirements. The Agency expects that this can be achieved using a combination of CSO control measures.

## **APPLICABILITY OF STRATEGY**

This strategy applies to all CSOs. Flows in combined sewers can be classified into two categories: wet weather flow and dry weather flow. Wet weather flow is a combination of sanitary flow, industrial flow, infiltration from groundwater, and stormwater flow, including snow melt. Dry weather flow is the flow in a combined sewer that results from domestic sewage, groundwater infiltration and industrial wastes with no contribution from stormwater runoff or stormwater induced infiltration.

This strategy applies to EPA and approved NPDES States. EPA Headquarters will oversee the implementation of the strategy to ensure actions taken by the Regions and States are consistent with the national strategy and that the Agency as a whole is making progress towards meeting the statutory requirements and achieving the water quality objectives of the CWA.

This strategy does not apply to bypasses. Bypasses are "intentional diversions of waste streams from any portion of a treatment facility." The treatment facility begins at the headworks where equalization of the waste streams takes place. Bypasses are regulated under 40 CFR 122.41(m). Bypasses from any portion of the treatment facility are prohibited unless the criteria in 40 CFR 122.41(m)(4) are satisfied. These criteria are (1) bypasses are unavoidable to prevent loss of life, personal injury, or severe property damage; (2) there are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime; and (3) the permittee submitted notices as required under 40 CFR 122.41(m)(3).

## **IMPLEMENTATION**

State-wide permitting strategies will be developed by the States or Regions to ensure implementation and consistency with this CSO strategy. Permitting strategies should be developed no later than January 15, 1990 and Regions should approve State strategies no later than March 31, 1990. A discussion of different elements that may be addressed in the strategies is provided below.

## 1. Identification

CSO point sources currently discharging without a permit are unlawful and must be permitted or eliminated. The Regions and States must identify the communities with combined sewer systems and each particular CSO discharge point within these communities. The permitting strategy should place each CSO discharge point into one of three categories: (1) not permitted; (2) permitted in conjunction with POTW; and (3) permitted separately from POTW. The status of compliance with technology-based and water quality-based permit requirements should be provided for each CSO discharge. An ongoing commitment of evaluating and maintaining CSO location and permit discharge status records should be adopted by every community.

## 2. Priorities

The Regions and States are expected to set priorities in permitting and controlling the unpermitted and insufficiently permitted discharges. In addition to the requirements identified above, the permitting strategy should describe the Regional or State completed and planned actions and timing to bring the discharges into compliance. Permitting and control priorities should be established based upon a system-wide evaluation of known or suspected impacts from CSOs using estimates of flows, frequencies, durations, and pollutant loadings to rank POTW collection systems for permitting.

One of the most important considerations for establishing priorities is whether the CSO discharges to marine or estuarine waters. Other factors to be considered in the priority setting effort are the nature of CSO control measures and the use designation of streams and the estimated increases in beneficial uses resulting from these measures, receiving waters listed under Section 304(l) of the Water Quality Act of 1987, other water program efforts such as the Great Lakes program and pretreatment program evaluations.

### 3. Permit Issuance

A single, system-wide permit should be issued whenever possible for all discharges, including overflows, from a combined sewer system operated by a single authority. The permit should identify separately, as specifically as possible, the location of each overflow in the system (i.e., longitude, latitude, street address, and a map).

Different parts of a single combined sewer system are in some cases owned and/or operated by more than one authority. Permits issued to such authorities should require joint preparation and implementation of the requirements of this strategy and specifically define the responsibilities and duties of each owner and operator. The POTW is responsible for planning and coordinating a system-wide approach. The individual owners and/or operators are responsible for their own discharges and must cooperate with the POTW. When a CSO is permitted separately from the POTW, the POTW's NPDES permit should cross-reference this for informational purposes.

### 4. Compliance Schedules

Compliance dates for water-quality and technology-based limitations are governed by the statutory deadlines in Section 301 of the CWA. CSOs that discharge toxic pollutants into water bodies listed under paragraph (B) of Section 304(1) of the CWA are additionally regulated under Section 304(1). All CSOs that are subject to Section 304(1) must achieve applicable water quality standards by the statutory deadlines in that Section (see Final Guidance for Implementation of Requirements Under Section 304(1) of the CWA as Amended, March 1988 and forthcoming regulations). To the extent technology and water quality-based limitations cannot be met by the applicable dates, the permit should contain the statutory dates and public notice should be given simultaneously with an administrative enforcement order or other appropriate enforcement actions requiring compliance within the shortest reasonable time. Effluent limitations based upon newly developed water quality standards or new interpretations of existing water quality standards, however, may be covered by compliance schedules in the NPDES permit. This strategy is not to be considered a new development or new interpretation of water quality standards.

## **5. Minimum Technology-Based Limitations**

All permits for CSO discharges should require the following technology-based limitations as a minimum BCT/BAT, established on a BPJ basis: (1) proper operation and regular maintenance programs for the sewer system and combined sewer overflow points; (2) maximum use of the collection system for storage; (3) review and modification of pretreatment programs to assure CSO impacts are minimized; (4) maximization of flow to the POTW for treatment; (5) prohibition of dry weather overflows; and (6) control of solid and floatable materials in CSO discharges. Control measures, as mentioned below, may also be required on a case-by-case basis to address the particular circumstances of each combined sewer system and overflow point. All BPJ permits must consider the factors set forth at 40 CFR 125.3(d).

## **6. Additional CSO Control Measures**

Cost is always a consideration when establishing technology-based limits in NPDES permits (40 CFR 125.3). However, the CWA under Section 301(b)(1)(C) also requires any additional permit limits that may be necessary to protect State water quality standards. In the event additional control measures are necessary, the permittee should choose the most cost effective control measures which will insure compliance with water quality standards. For example, CSO control programs should be designed to incorporate best management practices and other low cost operational methods and only incorporate more expensive control measures if necessary to meet water quality standards.

Additional control measures that should be considered to bring all wet weather CSOs into compliance with technology-based and applicable State water quality standards include improved operation and maintenance, best management practices, system-wide storm water management programs, supplemental pretreatment program modifications, sewer ordinances, local limits program modifications, identification and elimination of illegal discharges, monitoring requirements, pollutant specific limitations, compliance schedules, flow minimization and hydraulic improvements, direct treatment of overflows, sewer rehabilitation, in-line and off-line storage, reduction of tidewater intrusion, construction of CSO controls within the sewer system or at the CSO discharge point, sewer separation, and new or modified wastewater treatment facilities.

## 7. Monitoring

Monitoring requirements for wet weather CSOs will vary based on the unique circumstances of each combined sewer system and overflow point. Cost effective monitoring requirements should be developed to serve three purposes: (1) to characterize CSO discharges, including their frequency, duration, and pollutant loadings; (2) to evaluate the water quality impacts of these discharges; and (3) to determine compliance with CSO permit requirements.

Discharge monitoring and/or modeling, wasteload allocations that address rainfall-related hydrological conditions, and often stream surveys are necessary to measure the extent to which CSO discharges are causing violations of technology-based limitations or water quality standards, and to design corrective programs. These monitoring/modeling requirements should be included in the initial CSO permits with reopener clauses to adjust permit limits as warranted.

Compliance monitoring requirements should also be included in CSO permits. These monitoring requirements should include collecting and reporting data on CSO events and insuring that no dry weather overflows occur. Monitoring may also include inspections or reports aimed at assuring that required facility improvements have been made and/or that best management practices and other operation and maintenance requirements are being effectively implemented. Permits should require development and implementation of a monitoring plan or program to assure data needs are met. In-stream monitoring is expected to be conducted after improvements are made to assure water quality standards are met.

## 8. Water Quality Standards Modification

Section 301(b)(1)(C) of the CWA mandates compliance with water quality standards. Permits must be written to ensure CSO discharges do not cause violations of water quality standards. The applicability of water quality standards should not be waived under any circumstances. In limited cases, it may be appropriate to adjust some water quality standards to address the impact of pollutants in wet weather flows more adequately. In these cases, this strategy encourages monitoring, modeling, or wasteload allocation procedures to better quantify influences and formulate control strategies to address rainfall-related hydrological conditions.

EPA sets forth the criteria for modifying State water quality standards at 40 CFR 131.10(g). In general, States may remove a designated use which is not an existing use as defined in 40 CFR 131.3, or establish subcategories of a use if the State can demonstrate that attaining the designated use is not feasible because of one of the six enumerated criteria listed at 40 CFR 131.10(g) including that controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact. States may not remove designated uses if they are existing uses, as defined in 40 CFR 131.3, unless a use requiring more stringent criteria is added; or if such uses will be attained by implementing effluent limits required under Section 301(b) and 306 of the Act and by implementing cost effective and reasonable best management practices for nonpoint source control. Additionally, prior to removing any uses or establishing subcategories of use, the State must provide notice and an opportunity for public hearing under 40 CFR 131.20(b). Changes in designated uses or the establishment of subcategories of uses must be made on a site-specific basis in accordance with the procedures specified in 40 CFR 131.10(j).

In instances where current State water quality standards waive or relax compliance with those standards during wet weather, these wet weather provisions should be revised during the next triennial review to ensure appropriate water quality standards coverage during wet weather events.

## 9. Funding

CSOs which cause adverse impacts on water quality and human health should be considered for funding. CSO corrections are fundable under both the Construction Grants and State Revolving Fund programs, although significant limitations apply.

Construction grants may be awarded for CSOs under the following CWA provisions: Section 201(g)(1) Governor's 20 percent discretionary fund; Section 201(n)(1) funding from State's regular allotment for CSOs that are a major State priority and meet the water quality criteria in regulation (40 CFR 35.2024); and Section 201(n)(2) special national fund, from a reserve of 1 percent of construction grants appropriated in FY 89 and FY 90, for marine CSOs that meet the water quality criteria in the regulation.

Before a State Revolving Fund (SRF) may use the capitalization grant, State match, or repayments of first round loans from the grants for CSOs, the State must meet the first use requirements, i.e., its National Municipal Policy list of projects must all be in compliance, on an enforceable schedule, have an enforcement action filed, or have a funding commitment. Once the first use requirement is met, the SRF may make loans or provide other assistance for CSOs with 20 percent of its grant amount (or with other grant dollars for CSOs under Section 201(n)(1)) and with all of its matching or other funds in excess of the grant amount. Before the first use requirement is met, the SRF may fund CSOs with State funds in excess of the matching, bond proceeds in excess of the grant and match, and repayments of loans made with non-grant funds. For further information regarding SRF funding, see Initial Guidance for SRFs, January, 1988.

#### 10. Permit Application Forms

CSOs that are permitted in conjunction with a POTW should be identified in the permit application form submitted to the permitting authority. POTWs must submit a Form A (EPA Form 7550-22) 180 days prior to discharge or permit expiration. CSOs that are permitted separately from a POTW, should submit a NPDES Form 2C (EPA Form 3510-2C) to the permitting authority 180 days prior to permit expiration. For new CSOs, NPDES Form 2D (EPA Form 3510-2D) should be submitted 180 days prior to discharge.

Rebecca W. Hammer  
Rebecca W. Hammer, Acting  
Assistant Administrator for Water

10 August 1989  
Date



EPA REGION I POLICY STATEMENT CONCERNING THE  
RELATIONSHIP BETWEEN THE REGULATION OF DISCHARGES FROM  
COMBINED SEWER OVERFLOWS AND WATER QUALITY STANDARDS

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Introduction

This paper sets forth the United States Environmental Protection Agency, Region I's Policy Statement Concerning the Relationship Between The Regulation Of Discharges From Combined Sewer Overflows and Water Quality Standards. The goal of this guidance is to further the coordination of water quality management planning and facilities planning/engineering for combined sewer overflows ("CSOs") abatement by the regulatory agencies and the public so that well informed decisions are made.

Combined sewers are sewers which are designed to transport both storm water and sanitary sewage. Combined sewer overflow discharges are discharges from such combined sewers. CSOs are a significant source of pollution that must be controlled. While the impacts of particular CSOs may vary with the amount and frequency of the discharge, the nature of the pollutants in the discharge, and the sensitivity of the receiving water, these impacts can be severe.

CSOs also are point sources subject to both the technology-based and water quality-based requirements of the Clean Water Act (the "Act"). Since no technology-based effluent guidelines

have been promulgated for CSOs, technology-based limitations are to be established case-by-case based on a Best Professional Judgment determination. Current water quality standards must be complied with at all times. EPA recognizes that CSOs present difficult issues to the regulatory agencies and that the abatement of CSOs to achieve compliance with the Act and water quality standards can be costly. Nevertheless, regulatory strategies for CSOs must be consistent with the requirements of applicable statutes and regulations. Certain pertinent provisions of the Act and Federal regulations are discussed in Appendix A.

#### Guidance

Consistent with the objectives of the Act, the goal of this Guidance is to foster the maintenance of current water quality standards where the uses specified in Section 101(a)(2) of the Act are being achieved (i.e., the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water) ("Goal Uses"), and the improvement of water quality where they are not being achieved. In particular, every effort must be made to eliminate CSO discharges from critical use areas, such as drinking water sources, beaches, and shell-fishing areas. Thus the Region believes the legitimate goal of CSO abatement planning is the implementation of that treatment needed to <sup>①</sup>achieve compliance with water quality standards at all times <sup>②</sup>or, alternatively, the complete elimination of CSO discharges. At the same time, the Region recognizes that there may be instances in which achieving such compliance will be

infeasible. However, the law and regulations set up a strict test for determining whether or not such infeasibility exists. Therefore, EPA supports the approach outlined below, which seeks to address the possibility of such instances on a case-by-case basis without having any "across-the-board" changes to current water quality standards.

In addressing necessary CSO abatement work, the CSO discharger should prepare a facilities plan or similar engineering report that assesses a range of alternative CSO abatement measures. This range must include, at a minimum, measures that would eliminate the particular discharge or otherwise result in compliance with current water quality standards.<sup>1/</sup> The State and discharger should assess each measure to determine its implementation costs and whether it will result in compliance with current water quality standards. In addition to assessing the range of alternatives, a CSO facilities plan or engineering report should include an assessment of the following:

- a) the frequency and magnitude of pollutant discharges from the overflow;
- b) the expected instream water quality impacts and the resultant uses which could likely be supported;
- c) the costs to be incurred from the implementation of each measure from the range of measures evaluated; and

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<sup>1/</sup> Water quality standards, which include both designated uses and water quality criteria, must be complied with at all times. Even temporary designated use impairments, such as periodic beach closures, or criterion exceedances caused by rainfall induced CSO discharges, are violations of these standards, unless the standards expressly allow them.

- d) the "existing" (as defined in 40 C.F.R. §131.3(e)) and designated uses of waters in the vicinity of each CSO discharge.

*change laws* \*  
From an environmental and legal standpoint, the alternative to be implemented must achieve compliance with current water quality standards. However, in some circumstances, the CSO discharger might determine that it believes that, under applicable regulations, implementing such measures will be technologically or economically infeasible. (see Appendix A, #4). In such an instance, the discharger could seek a segment-specific (i.e., for a particular segment of a water body receiving a CSO discharge) revision to current water quality standards for each segment at which it believes it can establish the infeasibility of meeting those standards due to its CSOs. The necessary information to establish whether or not meeting current standards is infeasible under the regulations could be developed in the facilities plan or engineering report. Of course, any alternative to be implemented must comply with any newly applicable standards and must eliminate all dry weather overflows.

In implementing this approach, any changes to state water quality standards must be adopted in accordance with Federal regulations. Under these regulations, states may change water quality standards in two ways. ① A state may remove a designated use which is not an existing use, as defined in the regulations, ② or it may establish subcategories of uses, if it can demonstrate that certain specified conditions make attaining the designated use infeasible (see Appendix A, #4).

As stated above, the data necessary to determine whether or not these conditions exist would be developed in the CSO facilities plan or engineering report. If a removal of a designated use is to be sought, the proponent of the removal should be prepared to show that attaining the designated use is infeasible either because controls more stringent than those required by sections 301(b) and 306 of the Act would result in "substantial and widespread economic and social impact" or because one of the other expressly limited conditions identified in the Federal regulations exists (see 40 C.F.R. §131.10(g)(1)-(6)(1986)). In addition, any change to the current water quality standards must be made in accordance with the Federal regulations' requirements for public participation and EPA review and approval (see Appendix A, #6), and must comply with any applicable anti-degradation policy (see 40 C.F.R. §131.12). Thus, there will be an opportunity for public input concerning any proposed change to standards and the reasons for that change.

It is contemplated that any such changes to current water quality standards would be granted only for particular CSOs on a case-by-case, receiving water segment-specific basis, and only after the necessary facts have been established. Thus, no changes would be adopted in advance of necessary study and any changes would be "pin-pointed" in location, rather than made for an entire water body. This will ensure that water quality standards are maintained except in the limited cases where the re-

quired justification for non-attainment of current standards is established. In accordance with 40 C.F.R. §131.20(a), a re-examination of any water body segment with water quality standards that do not include Goal Uses will continue to be required every three years.

This approach might be implemented by the state's creating any new categories or subcategories of uses independently of specific cases. These would be subject to public review and EPA review and approval in accordance with 40 C.F.R §§131.20, 131.21 and 131.22. This will make public the range of alternative standards and help facilities planners and regulators to consider different CSO abatement techniques, in light of the difficult burden that must be met to establish the infeasibility of meeting current standards. Even after the creation of new categories or subcategories of uses, however, a decision to grant an actual receiving water segment-specific revision to water quality standards will be subject to the public participation and EPA review and approval requirements of the Federal regulations.

If a State proposes to adopt or revise designated uses or adopt subcategories of uses which will not include Goal Uses or which will require less stringent criteria than those required to protect Goal Uses, then a use attainability analysis ("UAA") must be prepared (see Appendix A, #5). The UAA must support the proposed action. The preliminary data for the UAA for a receiving water segment-specific change to water quality standards could efficiently be prepared as a part of the CSO facilities plan or engineering report, as discussed above.

## Conclusion

This approach to CSOs has a number of virtues. It allows the agencies, with public input, to determine the appropriate CSO abatement measures within the framework of existing law. It allows decisions to be made on a case-by-case basis that recognizes the site-specific impacts of CSO discharges. In addition, it allows public involvement at a meaningful stage in the decision-making process, and permits the dovetailing of water quality standards management and facilities planning/engineering for a particular project (including the processing of any grant applications that might be involved). Finally, this approach neither results in an "across-the-board" revision of standards, when a revision might not be necessary, nor rigidly requires that the standards existing at the time of facilities planning must be met without regard to the consequences.

It is important to emphasize that it is not the Region's intention to encourage the States to change existing water quality standards classifications to allow the continued operation of CSOs. To the contrary, as stated above, the Region supports the achievement of current water quality standards and there is a difficult burden to be met if a revision to standards is to be sought. However, since it may not always be practicable to construct CSO facilities to meet current water quality standards, this Policy suggests an approach for addressing CSO discharges that is consistent with the law, regulations and sound public policy.

MASSACHUSETTS WATER QUALITY STANDARDS  
IMPLEMENTATION POLICY FOR THE ABATEMENT OF POLLUTION  
FROM  
COMBINED SEWER OVERFLOWS

May 24, 1990

Summary:

1. This policy shall apply to those surface waters of the Commonwealth impacted by the discharge of Combined Sewer Overflows (CSO's). A list of these segments is attached and will be updated every two years.
2. It is the goal of the Division to eliminate the adverse impacts of CSO's. Where elimination is not feasible the impacts shall be minimized to achieve the highest water quality attainable.
3. Where it is not feasible to remove a CSO, the impacted segments shall be reclassified in the Water Quality Standards as "partial use" to denote occasional short-term impairment of uses. This designation does not relax requirements for other discharges to the segment.
4. An engineering target is established for the use of a three month design storm as a minimum technology - based effluent limitation. This will result in untreated overflows on an average of four (4) times a year. Further protection may be warranted by an analysis of critical uses or when it is cost effective.
5. Abatement plans may involve phased work plans with the most cost effective control, or control providing the most benefit, given the highest priority. All abatement programs will proceed with a uniform analysis methodology and opportunity for public comment.
6. Elimination of receiving water impacts is the goal of the policy rather than uniform treatment requirements. Effluent limitations shall be based on a "bubble concept" where CSO discharges causing overlapping receiving water effects are considered a single source of pollution.

I. Introduction

Combined sewers are collection systems that convey both sanitary sewage and stormwater runoff. These collection systems are designed to convey dry weather flows, and those portions of wet weather flows, which do not exceed the capacity of the downstream interceptors or wastewater treatment facilities. Regulation devices allow excess flows to overflow to an adjacent waterbody; these are considered combined sewer overflows (CSO's).



Research has failed to define a best practicable technology (BPT) for these sources of pollution. Therefore best professional judgement must be used to determine abatement measures. Solutions must be site-specific in order to address a wide variety of technical and economic constraints. This policy is adopted in order to define the Division's general goals; interpret water quality standards and criteria in relation to CSO abatement projects; and specify uniform evaluation procedures for facilities planning.

This policy applies to segments impacted by the discharge of CSO's. A list of these waterbodies is attached. The list will be updated every two years as part of the Summary of Water Quality Report pursuant to Section 305(b) of the Federal Clean Water Act.

## II. Goals

The Division has the following goals with regard to CSO abatement measures:

1. Elimination of receiving water impacts is the primary goal. Waters shall fully support their designated uses.
2. Where elimination of CSO's is not feasible, minimization of impacts to the maximum extent feasible is the goal. This means attaining the highest water quality achievable. In these areas the delineation and protection of critical uses is essential.

## III. Application of Standards

### A. Classification

In determining the appropriate classification for a particular water, the Division shall designate the national goal uses of protection and propagation of fish, shellfish, other aquatic life and wildlife and recreation in and on the water (known as the fishable/swimmable goal) wherever attainable. [314 CMR 4.03(4)]. The Division has adopted six water use Classes in its regulations:

1. Class A - Public Water Supply, fishable/swimmable to the extent compatible with this use.
2. Class B - Fishable/swimmable and other compatible uses.
3. Class C - Fishable, but not swimmable.
4. Class SA - Fishable/swimmable plus open shellfishing.
5. Class SB - Fishable/swimmable plus restricted shellfishing.
6. Class SC - Fishable, but not swimmable.

Waters must be classified B (or SB) or better in order to comply with the national fishable/swimmable goal.

Untreated overflows from CSO's violate the fishable/swimmable goal. Since there is no finite limit to the magnitude and duration of a precipitation event, any control strategy for CSO's can only lower the probability of untreated overflows, not eliminate them entirely. Therefore, to meet the goal at all times CSO's must be eliminated by sewer separation. The impacts on any particular segment may be eliminated by relocating a CSO to another (less sensitive) segment.

Alternatively, the Division's regulations allow for the designation of a partial use subcategory for waters impacted by CSO's. This is appropriate when it is not feasible to eliminate CSO discharges. In order to demonstrate that the sewer separation is not feasible, the permittee must show that the cost of separation will cause substantial and wide spread economic and social impact [314 CMR 4.03(4)]. This may consist of documentation that the costs are excessive when compared to the benefits to be achieved. When determining the benefits to be achieved, potential interactive/overlapping pollution sources such as discharges from the storm drain system after separation may be taken into account. Once it has demonstrated to the satisfaction of the Division that elimination of CSO discharges is not feasible, the relocation of CSO's should be evaluated. Relocating alternatives must be examined on a system-wide basis so that the maximum recovery of water uses is achieved, including the protection of critical uses. When it is not feasible to eliminate the CSO's by separation or eliminate the impacts by relocation, the impacted segment may be assigned a partial use subcategory.

The community sewer system response to precipitation events and the assimilative capacity of waterbodies throughout the state are highly variable in nature. Therefore variations in water quality caused by CSO's will vary greatly from segment to segment. However, it is appropriate that the Division set an engineering target for the achievement of designated uses to the maximum extent feasible in partial use segments. The Division has determined that a reasonable target is to protect the use during precipitation events that occur no more often than once in three months. This will result in untreated overflows on an average of four (4) times a year. If the average duration of receiving water impacts is estimated at four days, then the target translates into achieving full use greater than 95 percent of the time. In some cases further protection may be reasonable.

The Division shall use information developed in the Evaluation Procedure (Section IV of this policy) and other information that may be available to determine whether the target provides adequate protection of uses. Site-specific factors such as the presence or absence of critical uses and the duration and area of impact may influence this decision. Where the cost-benefit analysis and availability of technology so indicate, the Division may require more stringent protection than the state-wide target. Where these same factors, as well as other economic and environmental factors, result in the permittee requesting less stringent control than the three month storm technology the permittee shall be responsible for providing documentation that compliance with the target will result in substantial and widespread economic and social impacts.

Segments with abatement measures in compliance with this policy shall be eligible for a Class B partial use or class SB partial use designation. Partial use subcategories shall not be assigned to Class A waters. Class SA waters may be assigned a partial use subcategory only with the agreement of the Division of Marine Fisheries which assures that the shellfishing use can be adequately managed in this manner.

#### B. Procedure for Establishing Partial Use

Partial use subcategories shall be assigned in Section 4.06(3) of the water quality standards. Currently no waterbody segment has a partial use subcategory assigned. The following procedure shall be followed in order to establish a partial use subcategory in the regulations.

A Permittee must petition the Division to amend the water quality standard designations in 314 CMR 4.06 to establish a partial use for a particular segment. 310 CMR 2.00 contains procedures for petitioning the Division to amend its regulations.

The Permittee must provide adequate documentation in its petition to prove that controls necessary to meet current water quality standards would result in substantial and widespread economic and social impacts [see 314 CMR 4.03(4), see also 40 CFR 131.10(g)(g)]. The Permittee must also provide a CSO facilities plan which shows compliance with the Division's three month storm minimum technology based effluent limitation and which demonstrates that further controls are not cost effective.

Finally, the Permittee is responsible for satisfying the MEPA document requirements. A proposal for adoption of regulations which lessen the stringency of existing regulations of which a primary purpose is to protect the environment require an Environmental Notification Form (301 CMR 11.27, 11.28). The Division will not promulgate a final regulation creating a partial use until the Permittee has received final MEPA certification from EOEA.

#### C. Antidegradation Provisions

The waters of the Commonwealth are further protected by the Antidegradation Provisions. Whereas, subcategories of use determine the application of specific criteria, the antidegradation provisions provide for the prohibition of discharges in prescribed circumstances (314 CMR 4.04). Three provisions directly apply to CSO discharges which include the protection of (1) existing uses, (2) high quality and other significant resources and (3) outstanding resource waters. Waters covered by (2) and (3) are specifically designated in Section 4.06(3) of the water quality standards. Protection of existing uses applies to all waters.

All Class A waters and certain other waters are designated as Outstanding Resource Waters. The Division shall not permit discharges to waters so designated except for the express purpose and intent of maintaining or enhancing the resource. Existing CSO's must be removed and new CSO's are prohibited. If existing CSO's cannot be removed the segment shall be reclassified to remove the outstanding resource water designation.

Waters designated as Significant Resources include high quality waters low flow waters and other waters that are not adequately described or protected by traditional criteria. The vast majority of waters so designated do not currently receive point source discharges. The applicant for a new or increased discharge to these waters must provide, in addition to the water quality analysis, socio-economic and technologic justification of the discharge including an evaluation reasonable alternatives. Existing CSO's in these waters shall be removed or treated as appropriate. New discharges of CSO's are prohibited.

The protection of existing uses provision means that waters currently meeting water quality criteria cannot be lowered below those specific criteria; and waters that do not currently meet criteria cannot be further degraded. No new or increased CSO's discharges shall be permitted to these waters except as justified by a site-specific analysis of critical uses within the segment. Removal of CSO's from a critical use area may justify relocating the CSO discharge in an area without critical uses where it is not feasible to eliminate the discharge completely.

#### D. Criteria

Criteria for segments designated for partial use shall be site-specific. To the maximum extent feasible they shall conform to the criteria assigned to the Class. Where CSO's are the reason for the designation, criteria may depart from the criteria assigned to the Class only to the extent necessary to accommodate the technology-based treatment limitations of the CSO discharge. Regarding other discharges to these segments, nothing in this policy should be construed as reason not to apply any technology, process or best management practice which has been demonstrated to be achievable in the judgement of the Division and consistent with fully supporting the uses assigned to the Class.

#### E. Critical Water Use

These general rules allow for a specific starting point for the design of abatement measures for CSO's. However, they cannot replace best professional judgement when considering site-specific factors in the reasonable implementation of the policy. The most important site-specific factors governing these judgements are the actual and projected water uses in a segment.

Certain uses may be deemed critical in that no untreated overflows are desirable. These include water uses that relate to public health or welfare. Often these uses fall outside the purview of the Division in that they are directly regulated by other agencies with superseding criteria. These uses include:

1. Public Water Supply Intakes - In no case will the Division approve a new or relocated CSO where the impacts are anticipated to encompass an intake for an existing or proposed Public Water Supply. The Division shall not approve an existing CSO upstream of an existing or proposed intake or water supply wells which are hydraulically connected to the subject waterbody without the written concurrence of the Department of Environmental Protection's Division of Water Supply.
2. Shellfish Harvest Waters - CSO discharges to shellfishing areas shall not be approved without consultation with the Department of Public Health and the concurrence of the Department of Fisheries, Wildlife and Environmental Law Enforcement's Division of Marine Fisheries.
3. Public bathing beaches, other recreation areas, wildlife refuges and areas of ecologic or economic concern may be identified as critical uses through the facilities planning and public participation process. In each case the goal shall be eliminate the CSO's in these areas and where this is infeasible, to minimize their impacts..

#### IV. Evaluation Procedure

The Division does not attempt to specify uniform treatment levels for CSO discharges. However, the Division requires that a uniform analysis methodology be applied to all CSO projects including:

1. Inventory of existing combined sewer systems including location of intakes, bypasses, pipes, regulators and outfalls;
2. Assessment of system performance. Identification of measures to maximize sewer system efficiency and minimize overflows. These may include correcting malfunctions, unblocking clogged lines, optimizing regulator functions, and locating unused in-line storage capacity;
3. Measurement or estimation of the wastewater constituents and concentrations, and wastewater flow duration and frequency;
4. Measurement or estimation of receiving water impacts, duration and frequency. This includes identifying beneficial uses, the public interest and demand for these uses, seasonal limitations, natural limitations, and the compatibility of multiple uses of the receiving water;
5. Identification and evaluation of potential interactive/overlapping pollutant sources in impacted areas;
6. Projection of future wasteloads, flows and impacts; and
7. Development of alternatives for eliminating or mitigating impacts and the associated costs. Alternatives include source control, collection system controls and storage and treatment. A full range of alternatives for the entire CSO System must be examined so that the maximum recovery of water uses is achieved. Costs should be associated with benefits.

Based on this policy's allowable frequency of untreated overflows, the most severe hydrologic condition will be determined for which abatement measures must be provided. In complex situations the abatement plan will identify the sequence of efforts that should be followed in order to gain the most improvement in water quality. This may involve implementing a phased work plan.

Each plan will be required initially to minimize discharges from CSO's and their resultant impacts on water quality by improved system management. Permittees will be required to develop and institute a regular maintenance program including: sewer inspection, sewer, catch basin and regulator cleaning; sewer replacement where necessary; and disconnection of connections not authorized by the Sewer Use Ordinance. The goals will be to maintain system integrity and minimize infiltration. Permittees will be required to regularly monitor the flow of major CSO's.

Abatement measures will be implemented to meet water quality standards and support the designated uses. CSO effluent limitations will be developed under a "bubble concept." This means that all CSO's with overlapping instream effects will be considered as a single discharge. All individual discharges need not be eliminated or treated to the same degree as long as the total load of pollutants is reduced to meet water quality standards. This allows greater flexibility to produce alternatives and the possibility of more cost-effective abatement measures based on an optimal mix of structural and non-structural solutions.

Effluent limitations for specific discharges will be developed by the Division and delineated in the NPDES Permits. Compliance with standards will be determined through the use of mandatory monitoring by the applicant at the discharge site(s). Specific reporting and notification procedures will be incorporated into all CSO program approvals. Written notifications will be supplemented by telephone notifications where impacts are predicted to water supplies or shellfish growing areas.

## **COMBINED SEWER OVERFLOW POLICY**

**Rhode Island Department  
of Environmental Management  
Division of Water Resources  
March, 1990**

## RIDEM COMBINED SEWER OVERFLOW POLICY

Introduction - According to the U.S. Environmental Protection Agency's (EPA) Interim Final National Control Strategy for Combined Sewer Overflows, January, 1989, CSOs are point sources subject to NPDES permit requirements, including both technology-based and water quality-based requirements of the Clean Water Act (CWA). CSOs are not subject to secondary treatment regulations applicable to publicly owned treatment works (Montgomery Environmental Coalition vs Costle, 646 F. 2d 568(D.C. Cir. 1980)). Moreover, the EPA states in its strategy that technology-based permit limits should be established for best practicable control technology currently available (BPT), best conventional pollutant control technology (BCT), and best available technology economically achievable (BAT) based on best professional judgement (BPJ) when permitting CSOs. The CWA of 1977 mandates compliance with BPT on or before July 1, 1977. The Water Quality Act Amendments of 1987 (WQA) mandates compliance with BCT/BAT on or before March 31, 1989. In addition, Section 301(b)(1)(c) of the CWA mandates compliance with water quality standards by July 1, 1977.

However, since the US EPA has not defined BCT/BAT, RIDEM set a treatment technology standard to fill this void. Moreover, RIDEM sets forth requirements in the goal of the policy to ensure that compliance with water quality standards will be achieved. The policy also outlines how the goal is to be attained as well as implemented. Appendix A provides information on each permittee (Blackstone Valley District Commission, Narragansett Bay commission, and the City of Newport), their completed CSO studies, compliance status, and RIDEM's activities to ensure compliance.

Sections 6.32 and 6.33 of the Rhode Island Water Quality Regulations for Water Pollution Control, as amended, define the class-specific criteria for fresh and salt waters. All combined sewer overflows in Rhode Island discharge to Class SC or C waters. The Department, in order to satisfy sections 6.32.2 and 6.33.2 of the RI Water Quality Regulations, selected the largest storm that would both protect water quality and the socio-economic health of the Combined Sewer Overflow (CSO) communities. Based upon the statistical listing of storm events in Rhode Island between the years 1949 and 1982, the average storm duration was six (6) hours. The Department decided that the target storm frequency should be the one year storm. When compared to all storm events from the 1949-1982 period, the 1 year - 6 hour storm was surpassed by only 1.2 percent of all storms in terms of total rainfall. This storm equates to 2.46 inches of rain with a peak intensity of 0.91 inches per hour.



**Goal** - Combined sewer overflows (CSOs) are responsible for the discharge of untreated combined sanitary sewage, industrial wastewater, and storm runoff which impair or impact the water quality, uses, and public health concerns of the receiving waterbody. It is the Department of Environmental Management's goal to reduce or eliminate the input of floatables, and organic, inorganic and microbial contaminants which are a result of discharges from combined sewer overflows.

In keeping with Sections 6.32 and 6.33 of the Rhode Island Water Quality Regulations for Water Pollution Control, the Department is hereby requiring that each CSO discharge receive equivalent primary treatment. The Department defines equivalent primary treatment as the use of or combined uses of storage, screening, settling, or other technologies such that the treated effluent results in removal rates of 50% of the Total Suspended Solids (TSS) and 35% of the Biochemical Oxygen Demand (BOD) loadings or 100% of all settleable solids, whichever is demonstrated to have the greatest water quality impact. All flows created by the one year - six hour storm, and more frequently occurring storms shall be subject to this requirement. Should the water quality impacts from a particular CSO discharge necessitate treatment greater than the above defined equivalent primary treatment, the Department reserves the right to require more extensive treatment for the discharge. This will occur solely on a case by case basis. Likewise, should significant beneficial water quality improvements be demonstrated to occur incorporating a level of treatment less than the above defined equivalent primary treatment (i.e. "crest of the knee" on the cost/benefit economic analysis), the CSO community/sewer authority may petition the Department for relief from compliance with this requirement.

**Attainment of the Goal** - The removal rates associated with equivalent primary treatment from CSO discharges up to the one year - six hour storm are based upon calculated mass loadings (BOD and TSS) or concentration (settleable solids) to the receiving water. Compliance with the goal's removal rates does not necessarily mean that communities/sewer districts must construct facilities to treat up to the one year - six hour storm. The intent of this CSO policy is to provide flexibility for each community/sewer district in its efforts to comply with the State's goal for CSO discharges. A community/sewer district shall be allowed to select the most cost effective means of treatment for its CSO discharges to comply with this policy.

Implementation - In keeping with the national policy on CSOs as developed by the Environmental Protection Agency, the Department will implement its CSO Policy in accordance with the following:

1. Identification and Permitting

All CSOs in Rhode Island currently are catalogued and permitted within the RIPDES permit of the municipality or sewer district in which the CSO lies. (See Appendix A.) All CSOs will continue to be covered by RIPDES permits and the appropriate permit holder will have its permit modified or rewritten to incorporate this policy.

2. Prioritization

Each community/sewer district which utilizes CSOs must perform a CSO abatement study which determines the pollutant contribution to the receiving waterbody from each CSO, the water quality impacts from said discharge by itself and in combination with other CSO discharges, and the means by which the discharge will be brought into compliance with this policy. Each study will develop a priority ranking list of the CSOs to receive control measures based upon water quality impacts.

As part of its CSO abatement study, each community/sewer district shall model the fecal coliform die off rate in the receiving water from each overflow and in conjunction with all other overflows. For those overflows which seriously impact receiving water standards for fecal coliform, the Department reserves the right to dictate the means of treatment by which the overflow will comply with the goal of this policy.

3. Control Measures

Upon receipt of Department approval of the completed abatement study and priority ranking, each community/sewer district shall commence with the construction of the recommended CSO control measures based on the priority ranking. If for any reason the community/sewer district wishes to vary from the priority ranking, said community/sewer district shall first receive Department approval. The lack of funding shall not be an excuse by any community/sewer district for inaction upon its CSO priority ranking list.

4. Best Management Practices

In addition to CSO discharge treatment, the Department will require those communities/sewer districts which are serviced by CSOs to adopt and implement a schedule

of effective best management practices which shall include but not be limited to:

1. A regular schedule of street sweeping and catch basin maintenance where applicable.
2. Maximization of sewerage system capacity for storage of combined sewage.
3. Maintenance of the collection system to ensure that capacity is not being utilized by accumulated grit, rags or other refuse.
4. A regular schedule of inspection and maintenance of all CSO structures, regulators and tidegates.

5. Monitoring

Regular monitoring of CSOs shall be done in compliance with the community/sewer district's RIPDES permit. Computer modeling of a CSO discharge may be used to assist in a permittee's monitoring.

6. Funding

CSO treatment and abatement projects are eligible for Federal and State Revolving Funds and the State Aqua Fund. All projects must be ranked using the state priority determination system and projects will be funded based upon priority and readiness to proceed.

Related Policies

Dry Weather Discharges - Dry weather discharges from CSOs are violations of State law and Department regulations. Any discharge from a CSO during dry weather conditions (excluding times of heavy snow melt) shall be subject to penalty.

Holding Tank Wastes and Septage - The direct discharge of holding tank wastes and septage to a CSO is prohibited. Discharges of holding tank wastes and septage into the sewer system must be at locations which minimize the likelihood of concentrated wastes being discharged from CSOs.

Timetable - Implementation of this policy shall be governed by the RIPDES permit for each community/sewer district which uses CSOs. The implementation of the policy's best management practices shall begin upon receipt of this policy.

Severability - This policy is intended to be and recognized by the Department as a dynamic policy. The Department shall revise and update this policy as treatment technologies improve and research contributes to the greater understanding of the impacts from CSO discharges. This present policy shall serve as the base line from which all future CSO policies shall be developed.

**SECTION II:**

**PROCEEDINGS FROM  
NARRAGANSETT BAY PROJECT  
MANAGEMENT COMMITTEE**

**DECEMBER 19, 1990  
JANUARY 17, 1991  
JANUARY 24, 1991**

**APPENDIX A:**

**MANAGEMENT COMMITTEE MEETING MINUTES**

**DECEMBER 19, 1990  
JANUARY 17, 1991  
JANUARY 24, 1991**

NARRAGANSETT BAY PROJECT  
MANAGEMENT COMMITTEE MEETING  
December 19, 1990  
1:00 p.m. - 4:00 p.m.

Meeting Minutes

**I. Review and Approval of Minutes from November Meetings**

Mr. Malcolm Grant (Chair) presented the minutes from the November 19 and November 26 Management Committee meetings for review and approval.

Dr. Christopher Deacutis (RIDEM) said that a statement he made at the November 26 meeting had been misconstrued. In regards to ISSUE 5.A (page 6 of the minutes), he clarified that he had suggested working through existing entities and networks where possible, but not to the exclusion of new or proposed groups such as the Bay State/Ocean State Compact.

Mr. Grant directed staff to note this correction. The minutes for both meetings were accepted without further revision.

**II. Review and Approval of Summaries of Decisions from November Meetings**

Mr. Grant presented the Summary of Decisions from the November meetings for review and approval. The Summaries were accepted without revision.

**III. Announcements**

NBP staff distributed written comments on the CSO Briefing Paper from Paul Sams (Blackstone Valley District Commission) and from Judy Pederson (Massachusetts CZM).

**IV. Combined Sewer Overflows**

**Summary of Decisions and Policies**

Mr. Richard Zingarelli (NBP) distributed and gave a brief overview of a "Summary of Decisions and Policies" related to the CSO paper.

Mr. Eric Jankel (NBC) noted that it was unclear whether or not BVDC has legal authority over its CSOs. BVDC may have permit responsibility for the CSOs associated with its facility, but it does not have physical or legal ownership of them and may not have the right to alter them, he said.

Dr. Deacutis asked if the NBP had more recent figures than those from the 1977 Metcalf & Eddy study presented in the Summary Table.

Mr. Zingarelli noted that data on CSOs vary widely and are debated frequently. He emphasized that the figures in the table refer to typical ranges, and said that Metcalf & Eddy believe these ranges are accurate today.

Mr. Jankel and Mr. Tom Brueckner (NBC) said that the ranges for Suspended Solids were much higher than those that NBC experiences, except during first flush. Mr. Brueckner said the other ranges match those which NBC experiences.

Dr. Scott Nixon (URI-GSO) said that the statement in the Briefing Paper that CSOs pose a greater public health threat than treated sewage is too broad and needs to be clarified and qualified.

Mr. Grant directed staff to qualify this statement.

**ISSUE 1. A: Should efforts be undertaken to make the CSO policies of RI and MA more consistent with each other?**

**Alternative A-1: No action.**

**Alternative A-2: MA and RI should conduct negotiations toward the development of more consistent CSO policies, particularly relating to shared waters.**

**Alternative A-3: U.S. EPA should carefully review and monitor the implementation of state CSO policies to ensure that states are consistently and equitably moving toward compliance with water quality standards.**

Mr. Angelo Liberti (RIDEM Water Resources) observed that consistent implementation is more crucial and more difficult to achieve than consistent policies. He added that he understood that in practice mention of water quality standards refers only to fecal coliform levels.

Ms. Caroline Karp (NBP) said that CWA language requires compliance with broader, more inclusive standards.

Mr. Liberti said that no MA POTW is currently evaluating or planning (in their facilities plans) to measure any standards other than fecal coliform.

Ms. Gwen Ruta said that fecal coliform will be the focus of the EPA strategy, but that monitoring will look at other parameters also.

Dr. Deacutis asked if EPA will place a limit on these other parameters.

Mr. Warren Kimball (MA DEP) said that neither the criteria nor the standards were in place when the last facilities plans were made. He said that this recommendation would be more important during the next round of facilities planning.

Ms. Karp asked Mr. Liberti if he meant that, in spite of the EPA strategy to broaden water quality monitoring, both MA and RI were in fact taking a narrow approach. Mr. Liberti said yes.

Ms. Karp asked if RIDEM planned to continue interpreting this policy narrowly.

Mr. Liberti replied that RIDEM wanted to be consistent with EPA Region I and MA. He said RIDEM doesn't want to force any one facility to spend limited funds on additional monitoring unless all facilities will be required to do so. He acknowledged, however, that NBC has already spent significant funds examining its CSOs.

Ms. Ruta said that the policy does not mean that facilities don't need to meet other water quality standards.

Mr. Liberti said that in practical terms, it does. He noted that rainwater itself is 10-20 times higher in some metals concentrations than the applicable water quality criteria.

Mr. Jankel said that this discussion seemed to raise two separate questions: 1) What does the EPA policy mean in terms of facilities planning and design? The answer, he said, seems to be that POTWs should concentrate on controlling fecal coliform, but also monitor and evaluate other criteria. 2) What is the next level of pollutant problem and how should we monitor it?

Mr. Liberti said that this process, which MA is following, has two stages. The second stage, which will occur in a few years, is to look at these other water quality criteria.

Ms. Karp said that RI's policy of requiring equivalent primary treatment lies at the heart of this question, because the policy is silent regarding water quality standards.

Mr. Liberti said he agreed with the need for consistency, but did not want RI facilities to be singled out. He reiterated that consistency of implementation is much more important than consistency of policies which subsequently may be interpreted differently by the each state.

Mr. Terry Sullivan (Fall River Sewer Commission) said that Fall River recently submitted its Facility Plan, calling for advanced primary treatment of all CSOs. The Plan recommends dye studies of several water quality parameters in addition to testing for fecal coliform.

Mr. Grant suggested that the Committee should consider one-by-one the specific "bulleted" activities under the recommended alternative.



- (1) • EPA should review relevant federal and state CSO policies every three years, with subsequent review as needed.

Mr. Kevin Brubaker (Save the Bay) said that this was an excellent recommendation and hoped that it would be placed on the same 3-year cycle as the review of water quality standards.

Mr. Brueckner said that this was a good idea but that it would be difficult for EPA to determine if policies are adequate to ensure compliance. To do so, he said, EPA would need to rely on modelling, which is not necessarily reliable.

Ms. Karp said that modelling might not be necessary in all cases. To take an extreme example, she said, off-line storage could be proposed by a municipality. In this case loading would be eliminated altogether.

Mr. Brueckner said that this would be possible, but that metals loading would still exist and receiving waters would still need to be evaluated.

Ms. Karp said that empirical data gathering is the best way to evaluate receiving water quality.

Mr. Brueckner cautioned that the disadvantage to this approach is that POTWs make long-term decisions based on what we tell them now. But if we later measure the water and find out something else, then they need to change their decisions.

Ms. Ruta suggested that EPA will implement this review through EPA review of NPDES/RIPDES permits.

Mr. Grant said it sounds like people wanted to see agreement between the states and EPA on the implementation and objectives of the CSO abatement policy. If this agreement can be reached, he said, then the 3-year recommendation makes sense. He suggested that the Management Committee recommend that representatives from EPA, RI, and MA meet to develop a written understanding about what the policy and its implementation requires.

Dr. Harold Ward (Brown University) suggested that the Committee take a more active approach and convene a "Round Table" to help reach this understanding.

Mr. Grant agreed and directed NBP staff to act as a catalyst between EPA and the states to generate a written statement on this policy. He emphasized that the NBP was not claiming any authority to determine this agreement, but that the NBP had a valid interest in and need to know how these parties interpret the policy.

- (2) • Efforts should be undertaken, as outlined in the Mt. Hope Bay briefing paper, to reconcile the water quality classifications of interstate waters, such as Mount Hope Bay and the Blackstone River.

Mr. Grant said that the Management Committee had already discussed and agreed to this step.

- (3) • EPA and the states should impose receiving water monitoring requirements in all CSO-related permits.

Mr. Grant said that this recommendation would be discussed at the Round Table and under Issue E.

Ms. Karp said that this recommendation was intended to apply to all water quality standards.

Mr. Jankel said that this was acceptable to the extent that the state is not passing funding requirements onto the POTWs.

- (4) • EPA should carefully review NPDES/RIPDES permits issued to CSO dischargers.

Mr. Grant observed that EPA already had this requirement.

Ms. Karp referenced Mr. Sams written comments: "The BVDC North Diversion Structure should be treated as a CSO, and not a bypass since the contributing flows that cause an overflow at this point are rainfall induced."

Mr. Jankel asked if the Committee was trying to write specific permit requirements, and said that this recommendation may be too detailed for this forum.

Ms. Karp said that NBP staff had the responsibility to bring particularly acute water quality problems to the attention of the Management Committee.

Mr. Brubaker agreed, but said that we need to be mindful of the legal implications of definitions. If we call the North Diversion structure a bypass, that could involve huge costs.

Mr. Zingarelli said that he did not intend to define this structure as a bypass in the briefing paper. Rather, he intended to flag it as a key problem and to suggest some recommendations, based on available data, to solve this problem.

Mr. Jankel asked Ms. Karp if the NBP had put this concern on record at the BVDC public hearing. Ms. Karp said yes.

Ms. Katrina Kipp (EPA Region I) said that this paragraph could be made acceptable if the words "consideration of" were inserted after "require" at the bottom of page 16.

Mr. Grant suggested that perhaps we could simply acknowledge that the North Diversion structure is a major problem which needs to be addressed.

Ms. Karp suggested removing the word "bypass" from this paragraph.

Ms. Ruta said that the Committee could also list this structure as the number one priority when it discusses CSO abatement priorities.

**ISSUE 1.B: Should RIDEM's CSO policy be revised to incorporate a stronger water quality based approach, in addition to the current technology-based approach.**

**Alternative B-1: No revision at this time.**

**Alternative B-2: The RIDEM CSO policy should be revised to incorporate a water quality-based approach to CSO abatement.**

Mr. Brubaker, while acknowledging the need for consistency, said that we don't want to make a recommendation that inadvertently gives away the "meat" of the Clean Water Act requirements.

Mr. Jankel said that it looks like Issues B, C, and D, when taken together, will require that no facilities can be built or modified until we have all the answers to these questions. He noted that the NBC had spent \$18 million and 8 years on a system wide study. Over the next three months NBC will be making decisions that will direct the next five years of construction. If NBC were to stop now, and wait to base its decisions on receiving water quality data, it would not be able to act. Meanwhile Save the Bay would take NBC to court for not acting fast enough. The most logical step, he concluded, is to move forward with NBC's current plans.

Ms. Karp said that BVDC, for instance, which has not yet submitted facilities plans, would benefit from a clear, revised statement of policy.

Mr. Grant asked if the recommendations included the premise that a facility which has made and begun implementing decisions based on existing policies should continue implementing these policies, rather than wait and cease further action until the new policies are completed.

Mr. Brubaker asked Mr. Jankel to clarify if he was objecting to the policy recommendations under discussion or to the existing RIDEM policy.

Mr. Jankel said that he approved of the existing RIDEM CSO policies because of their flexibility.

Mr.. Liberti said that the RIDEM policies were designed with an eye to towards achieving some manageable and worthwhile gains in CSO abatement, rather than spending the next decade trying to define the level of treatment necessary to solve all the problems, but only producing questionable results and not implementing any abatement of CSOs.

Mr. Brubaker said there seemed to be some confusion between the purpose of having both water quality-based standards and technology-based standards. The technology, he said, provides the inescapable floor of what can and must be achieved. Water quality-based standards allow us to rise above that floor.

Mr. Liberti observed that before we can build the floor, we need to evaluate existing conditions and policies.

Mr. Grant asked if there was agreement that POTWs should build solutions now, not wait and cease action while policy is being evaluated.

Ms. Karp said we need to reconsider what we are designing these facilities to accomplish.

Mr. Jankel said it seemed apparent that capturing and treating 92% of the CSO flow should be adequate.

Mr. Jay Manning (RIDEM) said that RIDEM needs to clarify what is required by its CSO monitoring policy.

Mr. Roy Anderson (Newport) said that if Alternative B-2 could be reworded to make reference to technology limits as well as a water quality-based approach, he'd be willing to accept the recommendation. In addition, he suggested that this should not be interpreted to require CSO authorities to stop or delay current activities undertaken under RIDEM's existing CSO policy.

Mr. Grant concluded that there was consensus on the need to clarify that this recommendation was intended to expand upon the existing technology base, and should not be interpreted to stop or delay existing CSO abatement activities.

Mr. Jankel asked what sort of timetable staff envisioned for RIDEM to revise the CSO policy.

Ms. Karp said that there was no precise timetable, but that staff imagined the revisions could take place soon.

Mr. Grant asked if the committee could agree that POTWs in the process of facilities should follow through on those commitments.

Mr. Liberti said that this agreement should extend beyond those facilities in mid-process to those willing and ready to begin the process. We should allow these facilities to initiate action without waiting for in depth water quality evaluation to be completed, he said.

Mr. Grant asked if the Committee could agree that Recommendation B-2 and the other recommendations in the paper should not be interpreted as stopping progress on CSO abatement.

Mr. Anderson said yes, noting that while recognizing that planning is a dynamic process, we should also recognize the crucial need to allow municipalities to act now.

Ms. Karp expressed concern that by continuing on the present course, we may find ourselves a generation from now with a whole new set of contaminants requiring mitigation. If that happens, she said, the State and the public will then be asked to make another costly expenditure to solve a problem that we understand in large part right now.

Mr. Anderson said that, in reality, that understanding will take many more years to achieve.

Mr. Jankel observed that the need to address pollution problems in each generation is inevitable. Recognizing our need to solve the most pressing problems of the day, he urged that we should allow POTWs to act now, even though we may be leaving additional problems to future generations.

Ms. Karp noted that the Bay Project's mandate is to develop a comprehensive policy that will obviate the need for continuous environmental crisis management in each generation. She stressed that staff were not suggesting that any ongoing processes should be stopped, but that water quality-based standards should be added to the revised policy.

Mr. Jankel asked if source reduction, rather than capital facilities, would be a better approach to solving many of these water quality conditions.

Ms. Karp said both approaches were necessary.

Mr. Jankel asked what types of facilities this meant POTWs should be designing and building. He also asked if the NBP was suggesting that POTWs should make a supplemental plan submittal to RIDEM.

Ms. Karp said that the building needs of each POTW would depend on their particular situation. She said that staff were not suggesting supplemental submittals to RIDEM, or challenging RIDEM's policy. Rather, the NBP was simply recommending that water quality standards should be added to RIDEM's CSO policy.

Mr. Brueckner said that the third "bullet" under ISSUE A, which the Committee had already agreed to, addresses this concern (i.e., that receiving water quality conditions be taken into account).

Ms. Karp said that these two recommendations were not the same.

Mr. Jankel and Mr. Zingarelli said that the "issue statement" needs to be changed to replace the words "rather than the current technology-based approach" with "in addition to....".

Mr. Jankel added that the Management Committee also needs to recognize that POTWs implementing CSO abatement strategies now are acting in "good faith" in fulfillment of current policies.

Mr. Grant agreed and said that this recognition should be made an essential part of all recommendations. He also directed staff to state explicitly that the RIDEM CSO policy should be revised quickly.

Dr. Deacutis suggested that the staff should also note, for the benefit of those who may use these recommendations as a model for other programs, that water quality-based permits are predicated on water quality-based criteria. MA and RI criteria are presently similar, but they have differed in the past. In addition, other states sharing common borders currently may use widely varying criteria.

**ISSUE 1.C:           Should CSO abatement plans developed before the approval of state CSO policies be exempt from the requirements of that policy?**

**Alternative C:1:   CSO abatement plans developed before the approval of state CSO policies should be exempt.**

**Alternative C-2;   CSO abatement plans developed before the approval of state CSO policies should be subject to all the requirements of those policies.**

Ms. Kristine Stuart (Soil Conservation Services) asked what the effective duration was for POTW permits.

Mr. Liberti said that the permits themselves are valid for five years, but noted that the compliance schedule contained in a facilities plan could cover a 15- to 20-year time period.

Mr. Jankel added that permits are not revised immediately at the end of each five year period.

Mr. Brubaker observed that there wasn't much room for discussion on this recommendation, because it is required by the Clean Water Act.

Mr. Grant clarified that staff was not suggesting that "grandfathering" constitutes a blanket exception. Rather, he said, they intended to give permit holders protection for good faith actions.

Mr. Jankel observed that POTWs are already required to do what regulators tell them to do.

Ms. Karp said that this recommendation was directed to regulators, not directly to POTWs.

Ms. Kipp said that the EPA compliance section expects to allow monitoring for a few years. If facilities don't meet water quality requirements by the end of this period, they will be required to submit a new facilities plan.

Mr. Grant asked if this recommendation was necessary, given that the CWA requires the actions contained therein.

Ms. Karp, noting that the CWA has required these actions without resolving the problem since 1970, said that we should make the recommendation more explicit.

Mr. Jankel suggested rephrasing the issue statement to acknowledge where POTWs have acted in good faith.

Ms. Karp said staff will remove the term "grandfather."

**ISSUE 1.D: Should a formal petition process be instituted for requesting a waiver from the RIDEM CSO policy technology-based requirement of effective primary treatment for storms up to the 1-year, 6-hour storm?**

**Alternative D-1: No formal waiver process**

**Alternative D-2: A formal waiver process should be established for requesting a waiver from the requirements of the CSO policy**

Ms. Karp explained that this recommendation was necessary because of the degree of subjectivity allowed in the current policy. For POTWs proposing to conduct less than the equivalent of primary treatment, this recommendation would ensure a formal petition process.

Mr. Jankel asked if staff was recommending a formal adversarial process with public notice and hearings.

Ms. Karp said that staff did not want to create a long legal process, but rather to require a documented process for waivers.

Mr. Grant asked how this process was currently conducted.

Mr. Liberti said the process should take place as part of facilities planning. He added that no facility has gone through this process under the RIDEM CSO policy.

Mr. Zingarelli clarified that this recommendation was prompted, in part, by the NBC Area D study, and that the word "formal" should be taken to mean "documented."

Mr. Jankel said that the end-product of the current process already provided documentation in the form of an order of approval.

Mr. Grant suggested rephrasing the recommendation to request that "specific requirements for a particular waiver need to be articulated."

Mr. Zingarelli agreed and said that this wording captured his intended meaning.

Mr. Jankel commented that, in many cases, we already know what these requirements are, but that they vary for each particular case.

Ms. Karp said that there was still a need to set forth the conditions under which RIDEM may grant a waiver.

Mr. Liberti said that RIDEM's revised policy will address this need.

Mr. Brubaker noted that this issue raised the following two questions. 1) Should there be a documented process? 2) Should a "cost-benefit analysis" be required? The CWA, he said, clearly states that a cost-benefit analysis should not be a determining factor. Only an unacceptable cost incurring significant economic harm should be able to justify a waiver on economic grounds.

Mr. Brueckner said that the requirement for a draft submittal plan constitutes a documented process.

Ms. Ruta said that formulating specific conditions may not be the best use of RIDEM staff time, when, as Mr. Jankel observed, it would be more productive and practical to examine these conditions on a case by case basis as waivers are requested.

Mr. Grant concluded that there was consensus on the need for an open review process, but that a specific requirement of conditions to be met could not be defined, except on a case by case basis.

Mr. Brubaker agreed, as long as the costs-benefits criteria is not included as a determining factor.

Ms. Karp said that the costs of meeting the CWA requirements would be the main reason for requesting a waiver.

Mr. Brubaker said that some costs-benefits analysis is necessary, but that the CWA expressly forbids making this analysis the determining factor.

Mr. Jankel asked if staff could interpret RI water quality regulations (6.32 and 6.33) to determine what the state requires.

Ms. Karp said yes.



Mr. Brubaker suggested that National and Municipal policy also be interpreted and suggested that this issue be raised at the Round Table discussion proposed for EPA, MA, and RI officials to reach agreement on interpreting CSO policies.

**ISSUE 1.E:** Should the community/authority with responsibility for CSOs be responsible for conducting water quality monitoring of CSO discharges, as well as ambient monitoring within and beyond the designated mixing zones?

**Alternative E-1:** CSO discharges should be monitored at all CSO discharge points during all storm events.

**Alternative E-2:** A program of CSO discharge monitoring should be established that includes monitoring of selected outfalls.

**Alternative E-3:** Receiving waters impacted by CSO discharges should be monitored within a defined area of the discharge zone.

Mr. Anderson suggested adding an explicit provision requiring dialogue between the affected party and the state.

Mr. Grant agreed and directed staff to do so.

Ms. Karp said the staff also recommended that monitoring of parameters which proves inutile should be discontinued.

Mr. Liberti agreed, but noted that some RIPDES monitoring requirements can not be removed.

Ms. Karp agreed, but said she was referring to local effects.

Mr. Jankel asked if this program would be implemented through the permit process.

Ms. Karp said yes.

Agreement was reached on Alternative E-3.

**ISSUE 1.F:** Should CSO authorities be required to maximize CSO flows to the WWTF?

**Alternative F-1:** No requirement.

**Alternative F-2:** CSO authorities should be required to maximize CSO flows to the WWTF.

Mr. Jankel said that it does not make sense for proximity to be the governing factor.

Mr. Brubaker said that he understood this recommendation as maximizing CSO flows to the WWTF only to the degree that this was possible and cost effective.

Mr. Zingarelli said that Mr. Brubaker's interpretation was correct and clarified that he did not intend to suggest pushing more CSO flow through a WWTF than it could handle adequately.

Mr. Liberti said that the recommendation still might not make sense in certain cases.

Mr. Jankel said that where incorporating CSO flows into a WWTF makes sense, it should be done. But he stressed that proximity doesn't determine if such action makes sense.

Mr. Liberti suggested replacing "maximize" with the phrase "evaluate maximization."

Mr. Zingarelli said that this wording change would contradict EPA policy. EPA requires maximization of flow as a minimum technology-based requirement.

Mr. Jankel said that RIDEM policy refers to transport to the plant.

Mr. Lawrence Oliver (US Army Corps of Engineers) asked why WWTFs had excess capacity.

Mr. Jankel said that many facilities were designed to have excess capacity, based on decisions dating back decades. He also said that NBC will be capable of maximizing flows for its CSOs within a few months.

Mr. Grant concluded that there was consensus on this recommendation but that the word "proximity" should be removed.

**NARRAGANSETT BAY PROJECT  
MANAGEMENT COMMITTEE MEETING**

January 17, 1991  
1:00 p.m. - 4:00 p.m.

**Meeting Minutes**

**I. Announcements**

Ms. Caroline Karp (NBP) announced that since both Mr. Mal Grant (Chair) and Mr. Jim Fester (RIDEM) were absent, she would act as Chair. She suggested delaying the distribution, review, and approval of the minutes and summary from the last meeting until discussion of the CSO briefing paper is completed. Ms. Karp also announced that the Management Committee schedule for February will include discussion of the Implementation briefing paper and the presentation of a "Draft CCMP" incorporating decisions made to date.

**II. Slide Show on CSOs**

Mr. Kevin Brubaker (Save the Bay) presented a brief slide-show overview of the CSO issue to clarify the nature of the problem and to help focus the discussion on the real consequences of CSO abatement. In addition to showing a number of specific sewer overflows, he commented that RI does not post signs to inform recreational users of potential public health risks from CSO discharges. He stressed that a number of organizations have been working on CSO abatement for years and that at the present moment there was widespread public commitment to solving the problem, including political support from Governor Sundlun and other officials.

**III. Combined Sewer Overflows (continued from 12/19/90)**

**PROPOSED GOAL**

**Combined Sewer Overflows and bypasses shall be eliminated or abated by the year 2000 for the purpose of improving the water quality of receiving waters, in order to reopen historic shellfish harvesting grounds that are conditionally closed and to meet all state receiving water quality criteria.**

Ms. Karp suggested that the Committee revisit the goal statement for CSOs in order to reach a consensus before proceeding with the discussion of specific recommendations. She noted that the proposed goal essentially has three elements:

1. To improve the water quality of receiving waters,
2. To help reopen historic shellfishing grounds,
3. To meet all state receiving water quality criteria.

Dr. Walter Combs (RIDOH) suggested trying to draft the goal in a more concrete form that allows for measuring progress.

Mr. Rich Zingarelli (NBP) said that one possibility for doing so is through the water quality classifications and criteria assigned to receiving waters.

Mr. Roger Greene (RIDEM) suggested measuring progress from the use side, in a similar fashion to the fishable and swimmable classifications used for fresh water.

Mr. Jan Smith agreed, noting that Massachusetts has always geared its CSO goals to preserving critical uses.

Mr. Greene and Mr. Combs said that this would be a good approach for RI as well.

Mr. Brubaker also said that this idea was a good one, but only as an overlay to the Clean Water Act (CWA) baseline goals of meeting water quality criteria, preventing all dry weather overflows regardless of the size of their impact, and treating all wet weather flows regardless of their impact.

Dr. Combs suggested adding an explicit requirement to prevent dry weather flows.

Mr. Angelo Liberti (RIDEM) said that this requirement is already an explicit RIDEM policy.

Dr. Christopher Deacutis (RIDEM), noting that the CWA requirement is Class B (fishable and swimmable) for all waters, said that it sounds like people are asking for Class A goals.

Dr. Jan Prager (U.S. EPA ERL-N) noted that Section 101A requires us to "restore and maintain" water quality.

Mr. Smith observed that the periodic nature of CSOs raises the question of how much of the time it is necessary to meet water quality standards in order to be considered in compliance with the CWA. Recognizing the impossibility of designing goals to meet the infinitely large storm, he said, MA has chosen to meet water quality standards 99% of the time, while preserving critical uses 100% of the time.

Mr. Liberti commented that many RIDEM standards are already much lower than what is possible to achieve. He said its difficult to have faith in numeric standards such as metals criteria (based on levels developed in labs), which are violated in the cleanest streams in RI and in our drinking water. He also noted the impossibility of designing abatement strategies that will meet all water quality criteria on all parameters. Therefore, he said, meeting these criteria makes sense as an ultimate goal, but not as a specifically measurable one.

Ms. Karp asked if RI has done anything similar to the MA approach.

Mr. Liberti said that RI theoretically has the same goals as the CWA and that he believed the MA approach applied only to fecal coliform, which is only one of 30-40 relevant criteria. He recommended a staged approach to meeting those water quality criteria which are technologically achievable (fecal coliform, TSS, BOD) along with designing some use goals to be met within a given period.

Ms. Karp asked him to clarify if he meant that the technology does not exist to meet some of the CWA goals.

Mr. Liberti said yes and noted that for some metals criteria, drinking water is 10-50 times higher than EPA standards for aquatic life.

Dr. Deacutis pointed out that the Committee should recognize that EPA and the states have two different levels of standards: one for risk to humans, and another for risk to the most sensitive organisms. It is the latter level of EPA standards (for metals) that are 10-50 times stricter than drinking water levels.

Dr. Combs said that a third level of standards also exists, for drinking water as it comes out of the faucet.

Ms. Karp asked if these same problems applied to other pollutants.

Dr. Prager noted that the disparity between the two levels of water quality standards simply reflects the fact that aquatic organisms live and breathe in the water and should not deter us from the need to meet both standards. Stressing that anything that comes out of a CSO pipe is untreated, he said that we must keep the elimination of all CSOs as a long range goal, for phase-in over the next 100 years or more. The year 2000 is much too soon, he said, adding that we must keep increasing the capacity of POTWs and developing new technologies. Otherwise, he observed, we will keep revisiting this issue indefinitely without solving it.

Dr. Scott Nixon (URI-GSO) said that if we concentrate only on eliminating sewers from CSOs, we risk ignoring petroleum based and other pollutants in stormwater.

Dr. Smith said that MA has found that pathogens are the primary problem and that by controlling for pathogens, POTWs can control many other pollutants at the same time. He agreed, however, that simply removing sewage from CSOs is not a solution. Given that we must address both sewage and stormwater and that we can not currently eliminate all CSOs, he concluded that the best solution was to follow an approach similar to that chosen by MA to treat all CSOs 99% of the time.

Ms. Karp summarized the MA approach of focussing on fecal contaminants and the RI approach of concentrating on an acceptable frequency of storm induced overflows and asked if it would be worthwhile to examine nutrient loadings as well, in the Providence River for instance.

Mr. Liberti said that it would be difficult to isolate wet weather from dry weather impacts, and that given the Providence River's stratification, it would be difficult to show the impact of nutrients and BOD on dissolved oxygen. The more parameters we address, he added, the more overwhelming the CSO problem becomes. We would get the best result, he said, if we narrow our focus to a look at a sub-optimal parameter such as fecal.

Ms. Karp, repeating Mr. Jankel's caution from the last meeting that subtle changes in goals can have enormous consequences for facilities planning and development, asked if it would be accurate to conclude that both MA and RIDEM view removal of fecal contaminants as an indicator of their policies' success.

Mr. Brubaker said that RIDEM actually relies on TSS/BOD as its indicator.

Mr. Liberti agreed, but noted that TSS/BOD standards can not be correlated to uses readily.

Ms. Karp asked if there were agreement that MA use of fecal and RIDEM's use of TSS/BOD indicators are the correct approach for achieving user-based goals.

Mr. Greene noted that this policy ignores stormwater, petroleum-based contaminants, except for those removed incidentally.

Mr. Smith noted that the MA policy also requires permanent closure of a defined area around all discharged. This requirement is not based on water quality criteria, he said, but on flow rate, publicity warning rate, and the effectiveness of treatment. He added that MA has difficulty involving fisheries representatives in the planning of these closures.

Ms. Karp asked if the MA policy is meant to restore and ensure uses.

Mr. Smith said that restoring uses was the MA goal, but noted the state's difficulty in meeting the goal precisely because of the permanently closed areas around discharges. For instance, he said, even with the best treatment, there will always need to be a large closure area in Mount Hope Bay. Given the marginal return for reopening this area, he suggested we might not be able to justify the expense of reopening it, even if it were possible. But that does not preclude us from retaining restoration of uses as a goal, he added.

Mr. Brubaker said that the CWA requires elimination of all CSOs, regardless of cost/benefit considerations.

Mr. Liberti said he was not convinced that EPA had such a rigid interpretation of the CWA. Part of EPA's plan, he said, is to move CSOs to areas without planned uses. He doubted that we will ever be able to draw up a list of uses guaranteed by a particular abatement strategy. He said that ultimately the Committee may have to recognize the harsh truth that we must settle for the highest technologically achievable removals that we can afford.

Dr. Harold Ward (Brown University) said that it seemed like Mr. Liberti was saying that we won't even try to meet certain water quality criteria because they are not achievable. If that's the case, he added, then we should say so explicitly and not deceive the public.

Mr Liberti agreed, but said that we should keep what's not presently achievable as an ultimate goal. He cautioned against inviting water quality modelers to define the level of treatment necessary to meet all water quality criteria prior to implementing any controls. This would lead to extended debate and no action and is the reason that RI's CSO policy specifies that all CSOs receive a minimum level of treatment based on BOD, TSS and SS.

Dr. Nixon agreed on the hazards opening up a modelling debate. He said that MA and RI are probably on track in focussing on TSS/BOD and fecal. In addition, we should take other measures that we know are effective and where we know they are effective, such as pretreatment, pollution prevention, source reduction, conservation, particulate removal, and public education.

Ms. Karp asked if there was agreement that we should try to achieve a certain percentage removal of both TSS/BOD and fecal, with the ultimate goal of removing all pollutants.

Ms. Gwen Ruta (U.S. EPA) suggested that we might want to set the goal for fecal as an absolute number rather than as a percentage.

Mr. Tom Grala (NBC) said that the goal should also reflect the recognition that some areas around discharges may never reopen.

Mr. Smith agreed and said the goal should also recognize the need to move certain CSOs.

Ms. Karp asked if there was agreement that our CSO goal is to achieve easily removable parameters with the intent of meeting water quality standards and restoring those uses which are in fact restorable.

Mr. Brubaker asked if this goal does anything more than approve current RIDEM policy.

Mr. Smith asked which water quality standards the goal referred to.

Ms. Karp said it referred to fecal and TSS/BOD first and measurably, but to other standards indirectly.

Dr. Prager said that the problem with relying on technology-based standards is that they provide no incentive to improve technology and noted that we're still using 1800's technology.

Ms. Karp said we should recognize the limited ability of RI to solve a national technological gap, and the need to act now rather than wait for the development of new technology. She stated that agreement had been achieved on a goals statement.

**1. CSO ABATEMENT POLICIES**

**ISSUE 1. G: Should CSO flows, once brought into the WWTF for treatment, be subject to the secondary treatment requirements for WWTF's in the CWA?**

**Alternative G-1: CSO discharges should be subjected to technology-based and water quality-based standards rather than secondary treatment requirements, whether abated within a WWTF or elsewhere.**

**Alternative G-2: All WWTF discharges should remain subject to the secondary effluent requirements of the CWA, regardless of whether they include CSO flows.**

Mr. Zingarelli noted that this issue is related to Issue F, which recommended maximizing CSO connections to WWTFs. This maximizing recommendation may contain an incongruity to the extent that WWTFs could be required to take in a flow beyond their secondary treatment capacity, he said, noting that Issue G was intended to address the possible need for exemptions to secondary treatment.

Mr. Eric Jankel (NBC) said that this issue raises a number of legal questions. In addition, he said that the "proximity" requirement makes no sense and should be dropped.

Ms. Karp noted that the Management Committee agreed at the last meeting on the desirability of maximizing CSO flow to WWTFs.

Mr. Zingarelli observed that the Management Committee agreed to remove the "close proximity" wording at the last meeting and asked if WWTFs would be able to provide secondary treatment for all the CSOs that they do include.

Mr. Jankel noted that secondary treatment can not operate at maximum capacity for long periods of time. This requirement, he said, could result in the degradation of all secondary treatment quality simply to allow for the treatment of some discharges that don't need secondary treatment to begin with. In addition, he said that because the percentage of pollutants drops as the flow increases, it becomes more difficult to remove a steady percentage of pollutants.

Mr. Zingarelli said he was referring to the 30/30 effluent concentration requirements, not percent removals. He asked Mr. Jankel if he thought that secondary effluent discharge requirements for CSOs should be waived.

Mr. Jankel said yes, because these requirements are neither necessary nor achievable.



Ms. Karp        there seemed to be only two options: either to provide secondary treatment all inflow and allow a waiver of the 85% removal requirements during storm flows or not to require secondary treatment of any storm flows.

Mr. Brubaker said that the problem is that the CWA requirements conflict with common sense.

Mr. Jankel suggested recommending that incorporated CSOs be provided secondary treatment to the extent that existing secondary capacity allows.

Ms. Karp asked if this recommendation would be compatible with EPA policy, and noted that it would allow us to maximize CSO flow.

Mr. Zingarelli agreed, and said that this apparent impasse underscored the desirability of giving the WWTFs a clear statement of policy on secondary treatment of CSOs.

Mr. Jankel said the Committee has already made a good policy statement and should be careful not to get too close to permit writing.

Ms. Karp acknowledged this concern but said that staff had raised the issue here to ensure that an explicit policy gets formulated.

Ms. Ruta said that perhaps a policy consciously has not been formulated in order to allow for flexibility where EPA regulations do not make sense.

Mr. Zingarelli suggested that this recommendation be rephrased to acknowledge that the CWA requirements must be met, while giving all possible consideration for flexibility on a case by case basis.

Ms. Ruta supported this recommendation and said that an explicit written statement to cover all situations would be either illegal or unreasonable.

Dr. Prager said that we may be removing any incentive to improve capacity.

Mr. Jankel said that we don't know if secondary treatment of all CSOs makes sense.

Dr. Prager said that we already know that the first pulse of water coming through CSOs during wet weather is by far the worst. Can we design a system to capture the first flush, but divert the rest. These questions need to be thought through, he noted, but not at this forum.

Ms. Karp asked if any one would support the notion that WWTFs should build enough capacity to provide secondary treatment for all CSOs.

Mr. Brubaker said the practical consequences of not making an explicit policy on secondary treatment of CSO flows are that POTWs will divert flows.

Mr. Jankel noted that the Committee had already recognized the soundness of existing RIDEM policy in this regard.

Mr. Liberti said that we need to leave room for EPA to interpret the CWA.

Mr. Smith said that MA has determined that it must give all CSOs full secondary treatment in order to meet water quality standards.

Ms. Karp noted that WWTFs are not currently required to increase their secondary capacity. She asked if it is appropriate to require WWTFs to increase their secondary capacity to accommodate more CSOs.

Dr. Prager said the Committee should recognize that any changes recommended for treatment capacity will take at least a decade to implement.

Mr. Jankel stressed that we can not, with any certainty, link water quality problems to the difference between primary and secondary treatment. The CSO problems probably arise from lack of primary treatment, he said.

Dr. Nixon agreed and said he was unaware of any evidence associating problems with the absence of secondary treatment for CSOs.

Dr. Deacutis asked, in the event that we develop excess capacity to handle CSOs, who would have the legal right to hook-up to sewers. He asked whether new homes or storm drains would take precedence.

Ms. Karp said that the Committee would address this question at a later time.

## **2. CSO ABATEMENT TECHNOLOGIES**

**ISSUE 2.A: Should certain CSO abatement measures be endorsed as "preferred solutions," based on their impacts on receiving water quality?**

**Alternative A-1: All abatement measures that meet the requirements of applicable CSO policies should be considered on an equal basis.**

**Alternative A-2: Certain abatement technologies should be identified as "preferred alternatives."**

Mr. Smith said that MA does not want to rule out any possible solutions.

Ms. Katrina Kipp said that no strategies should be eliminated.

Mr. Brubaker observed that RIDEM had already stated informally that storage is better than flow through.

Mr. Liberti said he was not aware of this.

Dr. Ward asked what the consequences were of calling a strategy preferred.

Mr. Zingarelli said that the wording was intended to communicate that some policies have extra benefits beyond their policy rationale and that these policies should be considered as a first alternative.

Mr. Liberti said that there may not be a generic preferred strategy.

Mr. Jankel asked staff what sorts of strategies they had in mind.

Mr. Zingarelli cited the choice between sewer separation, which meets all policies without bestowing any real benefits on stormwater, and a storage and treatment approach, which not only meets all policies, but also provides some treatment of the stormwater.

Mr. Jankel suggested that perhaps the Committee should simply recommend storage and treatment as favorable to sewer separation.

Ms. Karp said that given the Committee's earlier agreement to maximize CSO treatment, we wanted to recommend the technologies that allow us to achieve the best results. We also want to anticipate EPA stormwater treatment requirements.

Dr. Prager asked if storage facilities made sense as a way to deal with septage.

Mr. Jankel said that septage storage would create problems.

Dr. Ward said that if the staff was intending to say that, "all else being equal," strategies which treat stormwater are preferable, then we should say this explicitly.

Ms. Ruta agreed and noted that we should probably avoid the words "preferred alternative" because the phrase has a specific meaning in facilities planning (the preferred alternative is the selected strategy).

Mr. Zingarelli said that Dr. Ward had captured his intention and asked if other statements would apply as well.

Mr. Brubaker, noting that Newport's facilities are under construction and that NBC is about to begin construction, said that this recommendation will only affect BVDC, because only BVDC is considering sewer separation. Therefore, he suggested that we address the recommendation specifically to BVDC.

Ms. Karp said a more general recommendation is preferable because it would address Fall River, Taunton, and other facilities.

Ms. Kipp commented that a Facilities Plan already takes the steps in this recommendation.

Mr. Jankel suggested not listing any preferred strategies, but rather stating explicitly that state policy should not encourage stormwater separation.

Mr. Liberti suggested that we want to go beyond this to recommend that WWTFs should evaluate and compare secondary benefits for broader parameters than are required.

Ms. Karp concluded that there was consensus that the policy should be to provide the best possible treatment for stormwater, provided all other elements of the treatment strategies under consideration are comparable.

Dr. Prager agreed, but suggested that the phrase "highest quality effluent" replace the word "treatment."

**ISSUE 2.B: Should the EPA, Rhode Island, and Massachusetts CSO policies explicitly require effective and environmentally safe disinfection of CSO flows prior to discharge in order to enable Rhode Island to re-open conditionally closed shellfish harvesting areas? If so, should CSO abatement plans explicitly address the issue of disinfection and consider the use of alternative disinfection methods?**

**Alternative B-1: The EPA, Rhode Island and Massachusetts CSO policies do not need to be revised to explicitly require effective and environmentally safe disinfection of CSO discharges.**

**Alternative B-2: The EPA, Rhode Island and Massachusetts CSO policies should be revised to explicitly require effective and environmentally safe disinfection of CSO discharges.**

Mr. Smith said that in areas which can not be reopened because of proximity to a discharge, disinfection may not be desirable both because of the toxicity of treatment and because there will be only a marginal benefit for a large expense.

Mr. Dick Sisson (RIDEM) agreed and noted that these conditionally closed areas are extremely valuable as a source of shellfish for relays.

Mr. Brubaker said that Save the Bay is not willing at this point to foreclose completely the option of someday reopening outfall areas. He added that there may be other management alternatives for those areas.

Mr. Smith said we can not escape FDA requirements about human health risks.

Dr. Deacutis agreed and said we should also consider the critical impact of the perception of health risk on the shellfish industry. In addition, he said, there may

be other non-fecal related health risks (i.e., PAH, metals, sediments, etc.) in these areas that we are unaware of presently.

Ms. Karp said that this issue was directed at determining whether disinfection is a necessary requirement to allow reopening of shellfish beds.

Mr. Liberti said that we may end up with a policy that doesn't require treatment of all CSOs.

Mr. Smith said that these decisions may more appropriately be made at the Facilities Planning level.

Ms. Karp asked if MA planned to require disinfection in all cases.

Mr. Smith said no, but that disinfection would be required in Fall River.

Mr. Liberti said it often does not make sense to introduce the chlorine toxicity produced during disinfection.

Ms. Karp asked if we would still have a toxics problem, even after after we improved the sanitary quality of the water column.

Ms. Ruta said that the available data does not show a health risk from nonpathogenic sources.

Ms. Kipp said that more data is necessary, however, to support a definitive statement in this regard.

Mr. Liberti expressed concern about the impact on consumers of opening upriver areas to shellfishing.

Dr. Deacutis asked what period of time the term "historical" covers. He also noted that there would be fewer obstacles to reopening conditional areas, than areas that are presently permanently closed.

Mr. Smith said that MA has had to define some areas as historic use areas that are presently without shellfish, but capable of supporting shellfish habitats.

Mr. Jankel suggested that the policies currently in place will rectify most of the conditionally closed problems simply by reducing CSO discharges. Disinfection of CSO discharges will not help much and may create more problems than it solves.

Mr. Zingarelli said that this was true for NBC since they were planning on storage and treatment, but that because RIDEM policy does not address disinfection directly, BVDC and other facilities could meet the requirements of that policy without addressing the underlying disinfection issue.

Mr. Brueckner and Mr. Liberti said that RIDEM policy does address chlorination of fecal contaminants.

Mr. Jankel said the second half of the issue is more important and needs to be addressed.

Ms. Karp asked him if he supported the first part of the statement. Mr. Jankel said yes.

Ms. Karp asked if the Committee thought federal and state disinfection policies are adequate to achieve the CSO goal agreed to earlier.

Ms. Kipp noted that NBP studies indicated that it was difficult to maximize bacterial kill and minimize toxicity.

Mr. Brubaker suggested making an explicit statement recognizing that chlorination always involves some tradeoff, and that in some cases it has no measurable benefit.

NARRAGANSETT BAY PROJECT  
MANAGEMENT COMMITTEE MEETING

January 24, 1991  
1:00 p.m. - 4:00 p.m.

Meeting Minutes

**I Approval of Technical Reports**

The Management Committee approved the following revised final technical reports for publication and release:

- Nixon, S.W. 1990 "A history of metal inputs to Narragansett Bay"
- Lee, T.C., S. B. Saila, R.E. Wolke. 1990 "Winter flounder contaminant and pathological survey—Narragansett Bay and vicinity", with addendum, Wolke, R.E., C.W. Recksiek. 1990 "Narragansett Bay winter flounder macrophage aggregate number corrected for age"
- Horsley Witten Heggeman, Inc., 1990. "Evaluation of critical protection area delineation techniques"

**II Combined Sewer Overflows (continued from 1/17/91)**

Mr. Malcolm Grant (Chair) summarized the following CSO "Goal Statement" (revised at the the last meeting):

**GOAL:** Combined sewer overflows shall be eliminated or abated by the year 2000 with the intent of meeting water quality criteria for fecal coliform, BOD, and TSS, and of meeting other water quality standards to the greatest extent technologically achievable, in order to preserve and restore existing and historical uses wherever possible.

Mr. Grant concluded that there was general consensus on this goal statement.

**3. FINANCING AND IMPLEMENTATION**

**ISSUE 3.A:** Should Massachusetts and Rhode Island develop specific statewide prioritization schedules for CSO abatement projects?

**Alternative 3.A-1:** Yes.

**Alternative 3.A-2:** No.

Dr. Harold Ward (Brown University) asked if the NBP was planning to develop a scoring system for rating abatement projects.

Ms. Caroline Karp (NBP) said yes, in conjunction with RIDEM and MA agencies.

Mr. Dave Borden (RIDEM) asked if this recommendation applied to all of MA, or only to the Narragansett Bay watershed portions.

Ms. Karp said that it covered only the watershed portions.

Mr. Kevin Brubaker (Save the Bay) said that this type of planning is a good idea, but expressed concern about the practical implications of this recommendation. Noting that NBC is ready to begin construction of new facilities, while BVDC and other facilities are just beginning the planning phase, he cautioned against stopping solutions that are in process or ready to begin. He also said that different WWTFs have widely varying funding, and noted that NBC has already begun to develop its own internal priorities.

Mr. Jay Manning said that while RIDEM has a sound CSO policy requiring a priority schedule for abatement actions within a facility, a facility that can not afford to undertake its highest priority projects should nonetheless be allowed to move forward on lower priorities.

Dr. Ward said that a cross-facility scoring system would still prove useful as a guide for state-wide planning.

Mr. Grant agreed, but said the intent of this recommendation is not to force facilities to wait until the scoring is complete or until they can afford their highest priority.

Ms. Karp said that this recommendation was designed to allow us to rank all wet weather sources and to help address the disparity between CWA requirements for CSOs and for bypasses. The CWA requires abatement for all CSOs, but does not require it for some bypasses that are potentially more harmful than many CSOs.

Mr. Brubaker asked how this system would dovetail with existing RIDEM CSO ranking systems, and if it would entail changing RIDEM priorities.

Ms. Karp said the NBP would begin with the existing systems, "upgrading" them as necessary. With RIDEM cooperation, the NBP would then recommend any appropriate changes in priorities.

Mr. Angelo Liberti (RIDEM) asked if the staff planned to wait until BVDC completed its system-wide study.

Ms. Karp said that staff proposed to proceed now with the best available information and to make changes as new information indicated.



Mr. Manning asked if this ranking would include other RIDEM capital improvements.

Ms. Karp said the ranking would only include CSOs and bypasses, but would endeavor to incorporate its results with other RIDEM decisions.

Mr. Manning suggested that the ranking system might work best if kept on a town or facility level. He expressed concern that we may otherwise create a reason for facilities with lower priority abatement projects to argue that they don't need to act until after the facilities with the highest priority projects have begun abatement.

Ms. Karp said that rankings should be prepared at the state level with the state's water quality objectives for a particular water body in mind.

Mr. Robert Klumpe (SCS) asked if people were suggesting that funding considerations, rather than priority rankings, determine what projects are undertaken.

Mr. Grant said that the availability of funds was only one factor, but noted that we do need to be pragmatic enough to allow funding of the highest priority project that can be funded.

Mr. Roy Anderson (Newport) and Mr. Klumpe agreed.

Mr. Liberti cautioned that this approach may potentially lead us to squander available funds on less beneficial projects.

Mr. Richard Zingarelli (NBP) said that this concern highlighted the need for the proposed ranking system which would enable enlightened decision-making.

Mr. Brubaker said that this ranking seemed to be directed to the state and the state's use of its resources, rather than to individual WWTFs.

Mr. Zingarelli agreed, adding that the state may want to use this list to persuade a WWTF authority to change its priorities.

Mr. Roger Greene suggested superimposing a tier system over the priority rankings to ensure that funds are used within a priority tier. Several people supported this suggestion.

Mr. Grant concluded that there was consensus that the states should develop statewide priority rankings to help determine how state funds should be spent on CSO abatement projects. This ranking should be used in conjunction with internal priorities established by individual communities and WWTFs, but should not prevent any currently planned and funded projects from proceeding.

**ISSUE 3.B: What general sources of funds should be considered appropriate for the financing of CSO abatement projects?**

**Alternative B-1: Federal grants.**

**Alternative B-2: State grants.**

**Alternative B-3: State Revolving Fund.**

**Alternative B-4: Local funding.**

Mr. Brubaker said that he disagreed with the statement that local funding is the most equitable source and suggested that it be omitted. After Mr. Zingarelli explained that the wording was intended simply to note that there may be cases where local funding is most equitable, Mr. Brubaker agreed that the statement should be left as written.

Ms. Karp noted that both Mr. Paul Sams (BVDC) and Mr. Robert Bendick (NY Dept. of Environmental Conservation) had submitted written comments urging that all sources of funding be considered.

Ms. Gwen Ruta (EPA) said that Mr. Bendick also urged that all of us and all the NEPs should push the federal government to make more funds available, perhaps as part of the CWA reauthorization.

Dr. Harold Ward (Brown University) asked when the Committee would begin discussing financing and implementation in more detail.

Ms. Karp noted that the Committee had directed staff to begin assembling funding estimates as decisions are made and to return to the Committee with alternative sources of funding once all the recommendations have been made. She said that staff expected to start assembling costs within two months and to bring funding alternatives before the Committee in September or October.

Mr. Ken Nickolai (NBP) noted that the financing group will meet again soon.

Mr. Liberti observed that some communities have considered raising sewer rates now in order to "stockpile" funds for later large projects. He noted that the RI Public Utilities Commission (PUC) won't allow this type of funding and asked if the NBP would recommend changes in PUC regulations.

Ms. Karp said that the NBP is examining possibilities for utility reform and, with the NBC, is also exploring ways to prevent rate shock. She added that *Green Rhode Island*, led by Dr. Ward, is looking at this issue independently.

#### 4. OTHER ISSUES

**ISSUE 4.A: Should new construction be allowed to connect to existing combined sewers?**

**Alternative 4.A-1: Yes.**

**Alternative 4.A-2: No.**

Mr. Tom Mulhearn (Rhode Island Association of Realtors, Inc.) distributed a letter outlining the Association's response to this issue and asked what the justification was for the recommended alternative (4.A-2).

Ms. Karp explained that, with the state considering spending as much as \$500 million on CSO abatement, the staff thought it would be inconsistent to allow additional sanitary flow to combined sewers that currently overflow.

Ms. Susan Morrison (RI Division of Statewide Planning) asked if CSO abatement plans account for projected development.

Mr. Tom Grala (NBC) said that NBC distinguishes between dry weather and wet weather flows in its planning. In its twenty year planning process, NBC found that the Providence facilities can easily accommodate growth during dry weather. He added that NBC policy, however, does not allow new stormwater connections to combined sewers that overflow during wet weather.

Mr. Klumpe noted that domestic sewage is much more predictable than stormwater and suggested that perhaps we should distinguish between our approaches to regulating the two types of flows.

Mr. Brubaker noted that RI is experiencing an exodus from urban areas. Given this trend, he suggested that we should endeavor to encourage urban redevelopment to take advantage of existing infrastructure. He expressed concern that the proposed alternative might serve to discourage any such efforts.

Ms. Karp said that while the RI Division of Statewide Planning projects greater population growth for the suburbs, many of these projected suburbanites will work in the city and contribute to its sanitary and industrial base load.

Dr. Ward, noting that bans create cumbersome enforcement issues, asked if staff had considered tradeable discharge credits or other "offsets" similar to those used to protect air quality.

Ms. Karp said that staff was looking at these options.

Dr. Ward asked if offsets would be more palatable to builders if the initiative to trade credits was left to the developer.

Mr. Mulhearn said he couldn't speak for the developers. He suggested dealing with stormwater through on-site mitigation efforts such as retention basins.

Mr. Klumpe and Dr. Prager agreed. Dr. Prager added, however, that most of these measures require large areas, and that in many places buffers are the only land that remains unbuilt. He said that we need to find a way to continue development, but not at the cost of our water quality.

Ms. Karp said that this issue was not about stormwater, but about sanitary and industrial baseflow.

Mr. Mulhearn said he interpreted this recommendation as preventing new development from using existing excess capacity.

Mr. Tim Dillingham (CRMC) said that this recommendation does not prohibit new development. It simply advocates a process for addressing an inconsistency and for dealing with the problems caused by new development.

Mr. Grant asked if it would be acceptable to clarify that the priority is to limit new connections of stormwater.

Mr. Mulhearn said yes.

Ms. Karp and several others said no. Ms. Karp pointed out that the sanitary flows from the newly constructed DOA building enter directly into the Providence River during wet weather.

Mr. Manning suggested that the sanitary component be addressed during facilities planning and that the Committee recommend that no new stormwater be tied to CSOs.

Mr. Greene noted that the Committee had decided at the last meeting that stormwater was not as critical a problem as sanitary waste.

Mr. Grant agreed that sanitary flow is the "bad actor," but noted that stormwater can still be considered a "bad agent" because it flushes out the sanitary wastes. He supported Mr. Manning's suggestion that we allow for some reasonable growth of sanitary inflow, but disallow all stormwater connections.

Mr. Klumpe agreed, adding that we must treat the stormwater separately.

Mr. Mulhearn agreed, and supported Mr. Brubaker's suggestion that we channel growth into urban areas.

Mr. Liberti agreed, adding, however, that we can still treat increased volumes of stormwater, at a lower rate, through storage.

Mr. Dave Borden asked if the staff would present recommendations on extending the sewer system to existing, unconnected areas.

Ms. Karp said staff would address this issue at a later date.

Mr. Grala suggested that the Stormwater "briefing paper" should address how stormwater functions as a limit to growth in urban areas where biological controls (i.e., retention basins, etc.) are not feasible.

Ms. Ruta suggested using the MA policy requiring 2-for-1 reductions of inflow and infiltration for any new connection to the system. Local cities and towns have responsibility for ensuring the reduction and determine whether or not to pass that responsibility on to the developer.

Mr. Grala supported this suggestion.

Mr. Grant asked if there was consensus that the combined sewer system abatement planning should accommodate the sanitary component of new development, but that this development should not result in a net increase in stormwater inflow.

Dr. Prager stated that he was against putting sanitary flow into a combined sewer.

Mr. Dillingham expressed concern about the assumption that urban stormwater can be treated somewhere else than at the treatment facility, and said that this may not be possible.

Mr. Anderson said that the increase in stormwater will occur mainly in non-urban areas. Urban areas, he said, are already almost 100% impervious.

Mr. Dillingham repeated his concern that the Committee was trying to determine a technical decision that should be left to WWTF authorities.

Mr. Brubaker disagreed, noting that the no "net" increase requirement did indeed place the decision in the hands of the WWTFs.

Mr. Liberti clarified that Mr. Dillingham was suggesting that additional stormwater may not be a problem, as long as we plan facilities for treating it.

Mr. Grant suggested that it would still be cheaper to abate stormwater where it's generated.

Ms. Karp said the underlying issue is that we don't want to increase stormwater volume.

Mr. Dillingham disagreed, noting that we were discussing marginal additions. Whether or not these additions would be too expensive or difficult to treat, he said, is a technical, site specific decision.

Dr. Prager said that the stormwater will ultimately enter our surface waters. The question, he said, is how we treat it in the interim.

Mr. Grant asked if his earlier summation was acceptable as a general principle, with the added caveat that in some cases, marginal additions of stormwater may be acceptable, as long as they can be treated.

Mr. Klumpe said yes.

Dr. Ward asked what the NBC's time horizon was for this projected growth and asked if any of NBC's calculations incorporated projections on global warming.

Mr. Grala said NBC's time-line was twenty years and that they had only considered historical rainfall records.

Dr. Ward asked if the Committee was willing to look at climatic change.

Ms. Karp suggested recommending that DSP require WWTFs to look at climatic change in their facilities plans.

Dr. Prager said that we don't want to plan too far ahead with old technology. Rather, in making these recommendations, we should recognize that eventually we will have new waste treatment technologies that don't require us to mix sanitary waste with stormwater and pump it out on our beaches.

Ms. Karp said that in regards to new development, the developer and the community should examine the alternatives, including connecting to separate sewers, and choose the best possible treatment.

Mr. Brubaker asked how such a recommendation would be implemented.

Mr. Grala said that NBC is conducting small scale, cost effective sewer separation projects in Providence.

Mr. Mulhearn explained that his recommendation was to require new development to connect to or build a separate sanitary connection, where possible.

Mr. Grala said that unfortunately NBC does not have many separate sanitary pipes and that ultimately these pipes connect to combined sewers.

Mr. Anderson said that Newport has separate sewers in many areas.

Ms. Ruta agreed that separate sewers would work for new developments located close enough to WWTFs to allow affordable construction of new sanitary sewers. She asked if there were any provisions to allow access to nearby facilities across town borders.

Ms. Karp said that several "regionalization" efforts under consideration could potentially provide for cross jurisdictional connections.

Mr. Grant concluded that there was consensus on this recommendation as revised above.

**ISSUE 4.B: Should storm drains that discharge sanitary waste due to illegal connections, effectively operating as combined sewers, be regulated in the same manner as CSO's?**

**Alternative 4.B-1: Yes.**

**Alternative 4.B-2: No.**

Mr. Mulhearn expressed support for this recommendation.

Mr. Grant concluded that there was consensus on this recommendation.

**APPENDIX B:**

**SUMMARY OF MANAGEMENT COMMITTEE DECISIONS**

**DECEMBER 19, 1990  
JANUARY 17, 1991  
JANUARY 24, 1991**



# COMBINED SEWER OVERFLOWS

## BRIEFING PAPER

### SUMMARY OF DECISIONS:

The following statement (page i and page 8) in the Briefing Paper is to be revised as shown: "Additionally, since CSO discharges represent untreated and undisinfected mixtures of sanitary waste, storm runoff and industrial process wastewater (depending on the service area), the CSO discharges pose a **more concentrated and potentially** greater threat to public health and the health of Narragansett Bay than do treated WWTF discharges."

### GOAL STATEMENT

PROPOSED GOAL (from draft briefing paper): Combined sewer overflows and bypasses shall be eliminated or abated by the year 2000 for the purpose of improving the water quality of receiving waters, in order to reopen historic shellfish harvesting grounds that are conditionally closed and to meet all state receiving water quality criteria.

RECOMMENDED GOAL (as revised by Management Committee): Combined sewer overflows shall be eliminated or abated by the year 2000 with the intent of meeting water quality criteria for fecal coliform, BOD, and TSS, and of meeting other water quality standards to the greatest extent technologically achievable, in order to preserve and restore existing and historical uses wherever possible.

### ISSUES FOR MANAGEMENT COMMITTEE CONSIDERATION

#### 1. CSO ABATEMENT POLICIES

ISSUE A: Should efforts be undertaken to make the CSO policies of RI and MA more consistent with each other?

DECISION: U.S. EPA should carefully review and monitor the implementation of state CSO policies to ensure that states are consistently and equitably moving toward compliance with water quality standards.

- EPA should review relevant federal and state CSO policies every three years, concurrent with the review of state water quality standards, with subsequent review as needed, to ensure that the policies, as applied, are adequate to ensure compliance with state water quality standards.

NBP staff should convene a meeting as a forum for representatives from EPA, MA, and RI agencies to develop a written statement of agreement on the goals, interpretation and implementation of these policies.

- Efforts should be taken, as outlined in the Mount Hope Bay briefing paper, to reconcile the water quality classifications of interstate waters, such as Mount Hope Bay and the Blackstone River.

- EPA and the states should impose receiving water monitoring requirements in all CSO-related permits (as outlined in Issue E) in order to assess the ultimate success of CSO abatement projects in achieving water quality standards.

- EPA should carefully review NPDES/RIPDES permits issued to CSO dischargers, to ensure that (a) the permits are in compliance with all applicable CSO policies (federal, regional, and state), (b) the permits are sufficiently stringent to attain designated uses of receiving waters, and (c) appropriate state or local authorities monitor receiving waters to evaluate the success of CSO abatement in meeting water quality standards. Permits that affect interstate waters should be reviewed by both states to ensure consistency with water quality standards in both states.

In reviewing the RIPDES permit and facility plan for the BVDC, EPA and RIDEM should be especially concerned about the water quality impacts of the BVDC North Diversion Structure. EPA and RIDEM should ensure that the facility plan evaluates the water quality impacts of the North Diversion Structure. If the facility plan confirms the severe water quality impacts suggested by preliminary data, EPA and RIDEM should require greater than primary treatment of all flows from the North Diversion Structure, through expansion of the secondary treatment capacity at Bucklin Point or through construction of an off-site facility.

**ISSUE B:** Should RIDEM's CSO policy be revised to incorporate a stronger water quality-based approach, in addition to the current technology-based approach?

**DECISION:** The RIDEM CSO policy should be revised, as quickly as possible, to incorporate a stronger water quality-based approach, in addition to the current technology-based approach, to CSO abatement.

The Management Committee recognized that POTWs presently implementing CSO abatement strategies based on current policies are acting in "good faith." The Management Committee directed NBP staff to make this recognition an essential part of all recommendations, by explicitly stating that revisions to the RIDEM CSO policy should not be interpreted to delay CSO abatement projects undertaken under RIDEM's CSO policy.

The Management Committee also directed staff to note that water quality-based permits are predicated on water quality-based criteria, which may currently vary in neighboring states with shared water bodies.

**ISSUE C:** Should CSO abatement plans developed before the approval of state CSO policies be exempt from the requirements of that policy?

**DECISION:** CSO abatement plans developed before the approval of revised state CSO policies should be subject to all the requirements of those policies.

WWTFs currently implementing CSO abatement plans in "good faith" should continue to implement those plans. The Management Committee directed NBP staff to delete any references to these actions as "grandfathered," in recognition that these actions are based on current CSO policies.

**ISSUE D:** Should a formal petition process be instituted for requesting a waiver from the RIDEM CSO policy technology-based requirement of effective primary treatment for storms up to the 1-year, 6-hour storm?

**DECISION:** A documented waiver process, open to public review, should be established for requesting a waiver from the RIDEM CSO policy technology-based requirement of effective primary treatment for storms up to the 1-year, 6-hour storm. The Management Committee recognized that the specific requirements for a waiver can only be

determined on a case by case basis.

NBP staff should review Federal, State, and local water quality regulations to clarify what these policies require and to raise any inconsistencies at the proposed Round Table discussion between EPA and MA and RI officials.

**ISSUE E:** Should the community/authority with responsibility for CSO's be responsible for conducting water quality monitoring of CSO discharges, as well as ambient monitoring within and beyond the designated mixing zones?

**DECISION** A program of CSO discharge monitoring should be established, through NPDES/RIPDES discharge permits, that includes monitoring of selected outfalls. The State should cooperate with the implementing authority in developing this program.

- A calibrated and verified model (e.g., SWMM) of the combined sewer system should be utilized to determine the storm characteristics that would be likely to result in CSO discharge. Forecasted and observed weather data would be used to determine when such storms are likely to occur or are occurring.
- The above model would be used to identify "critical" CSO outfalls. The critical outfalls would be monitored for 3-5 storms of variable intensity per year to test the predictions of the SWMM model and performance of the CSO or CSO abatement facility.
- A system would be established to monitor, on a rotating basis, non-critical outfalls.
- Routine monitoring of all outfalls would be conducted to ensure the elimination of dry weather discharges, which are illegal.
- The results of the above monitoring would be used to recalibrate the model, if necessary.

Receiving waters impacted by CSO discharges should be monitored within a defined area of the discharge zone.

**ISSUE F:** Should CSO authorities be required to maximize CSO flows to the WWTF?

**DECISION:** CSO authorities should be required to maximize CSO discharge flows under their jurisdiction to the WWTF, so as to take maximum advantage of the primary and secondary treatment capacity of the WWTF.

**ISSUE G:** Should CSO flows, once brought into the WWTF for treatment, be subject to the secondary treatment requirements for WWTF's in the CWA?

**DECISION:** The maximum possible use of existing primary and secondary treatment capacity at WWTF's should be made for treatment of CSO flows. CSO flows, once brought into a WWTF for treatment, should be subject to CWA requirements. In cases where secondary capacity is limited, however, consideration should be made to allow flexibility in implementing CWA secondary treatment requirements for the combined flow, in order to allow for maximum use of existing capacity without harming the integrity of the WWTF structure or treatment processes. Secondary capacity of WWTF's should not be increased exclusively for the purpose of treating all wet weather flows at the WWTF.

## **2. CSO ABATEMENT TECHNOLOGIES**

**ISSUE A:** Should certain CSO abatement measures be endorsed as "preferred solutions", based on their impacts on receiving water quality?

**DECISION:** Proposed CSO abatement measures should be evaluated based on their ability to achieve the goal of meeting water quality standards and preserving and restoring historic uses, in addition to their compliance with existing state and federal requirements. Secondary benefits of alternative measures, such as providing the greatest possible treatment of the stormwater portion of combined flows, should also be considered.

**ISSUE B:** Should the EPA, Rhode Island and Massachusetts CSO policies explicitly require effective and environmentally safe disinfection of CSO flows prior to discharge in order to enable Rhode Island to re-open conditionally closed shellfish harvesting areas? If so, should CSO abatement plans explicitly address the issue of disinfection and consider the use of alternative disinfection methods?

**DECISION:** Effective and environmentally safe disinfection of CSO flows may be difficult to achieve due to low solids removals, limited contact times, and potential chlorine toxicity problems. The need for disinfection should be evaluated based upon expected ability to meet the desired goal of preserving and restoring historic uses such as shellfish harvesting balanced against potential treatment or chlorine toxicity problems.

### **3. FINANCING AND IMPLEMENTATION**

**ISSUE A:** Should Massachusetts and Rhode Island develop specific statewide prioritization schedules for CSO abatement projects?

**DECISION:** The States of Rhode Island and Massachusetts should develop statewide priority rankings to help determine how state funds should be spent on CSO abatement projects. The RI prioritization schedule should be jointly prepared by NBP and RIDEM staff. Massachusetts should, as a minimum, develop a prioritization schedule for the portion of the state within the Narragansett Bay watershed. These rankings should be used in conjunction with internal priorities established by individual communities and WWTFs. The rankings are not to prevent any currently planned and funded projects from proceeding.

**ISSUE B:** What general sources of funds should be considered appropriate for the financing of CSO abatement projects?

**DECISION:** All sources of funding, including Federal and State grants, the State Revolving Fund, and local sources, should be considered appropriate for the financing of CSO abatement projects. The NBP, EPA, and state agencies should explore federal sources of funding, perhaps as part of the CWA re-authorization.

#### **4. OTHER ISSUES**

**ISSUE A:** Should new construction be allowed to connect to existing combined sewers?

**DECISION:** Sewer authorities with combined sewers should implement a policy that:

- allows "no net increase" of stormwater flows to combined sewers as a result of new construction. Potential stormwater increases should be mitigated by on-site measures (e.g., detention basins);
- requires new sanitary connections to tie in to separate sanitary sewers whenever technically and economically feasible;
- encourages cross-jurisdictional sanitary connections to separate sanitary sewers whenever feasible and necessary to avoid connection to combined sewers; and
- requires a 2 for 1 reduction in infiltration/inflow for any new sanitary connections to the system. The sewer authority would have the responsibility for ensuring the reduction, and the option of whether to pass the responsibility on to the developer.

A moratorium on new sanitary connections to combined sewers should specifically not be considered, since such a policy would tend to direct development away from areas having existing infrastructure to areas requiring the construction of new infrastructure.

**ISSUE B:** Should storm drains that discharge sanitary waste due to illegal connections, effectively operating as combined sewers, be regulated in the same manner as CSO's?

**DECISION:** Storm drains that discharge sanitary waste due to illegal connections, effectively operating as combined sewers, should not be regulated in the same manner as CSO's. Sanitary connection to storm drains are illegal and must be eliminated.

**APPENDIX C:**

**MANAGEMENT COMMITTEE ATTENDANCE**

**DECEMBER 19, 1990  
JANUARY 17, 1991  
JANUARY 24, 1991**



## Management Committee Attendance at December 19, 1990 Meeting

### Attended:

Mr. Eddie Agin  
Board Member  
RI Shellfishermen's Association

Mr. Roy B. Anderson  
Director of Utilities  
Newport Water Department

Mr. Malcolm J. Grant (Chair)  
Assistant Director for Administration  
RI Department of Environmental Management

Mr. Eric R Jankel  
Executive Director  
Narragansett Bay Commission

Ms. Caroline A. Karp  
Project Manager  
Narragansett Bay Project

Ms. Katrina V. Kipp  
Project Officer  
Region I  
US Environmental Protection Agency

Ms. Susan P. Morrison  
Chief, Office of Systems Planning  
Division of Planning  
RI Department of Administration

Dr. Scott W. Nixon  
Director  
RI Sea Grant

Mr. Lawrence R. Oliver  
Environmental Resources Specialist  
Environmental Resources Branch  
US Army Corps of Engineers, New England Division

Mr. David L. Rocha  
Assistant Executive Director  
Mfg. Jewelers & Silversmiths of America

Mr. Terence J. Tierney  
Special Assistant Attorney General  
RI Attorney General's Office

Dr. Harold R. Ward  
Director  
Center for Environmental Studies  
Brown University

**Sent Alternate:**

Mr. Roger Greene for  
Mr. David Abedon  
Cooperative Extension  
University of Rhode Island

Mr. Warren Kimball for  
Mr. Alan N. Cooperman  
Technical Services Branch  
MA Department of Water Pollution Control

Mr. Ken Kubic for  
Ms. Holly A. DesRosiers  
Executive Director  
RI Marine Trade Association

Dr. Christopher Deacutis for  
Mr. James W. Fester  
Assistant Director for Regulations  
RI Department of Environmental Management

Ms. Gwen Ruta for  
Mr. David A. Fierra  
Water Management Division  
Region I  
US Environmental Protection Agency

Mr. Richard Lapan for  
Dr. Norbert A. Jaworski  
Environmental Research Laboratory - Narragansett  
US Environmental Protection Agency

Ms. Kristine Stuart for  
Mr. Robert Klumpe  
US Department of Agriculture - Soil Conservation Service

Mr. Kevin Brubaker for  
Mr. H. Curtis Spalding  
Save the Bay, Inc.

Mr. David Borden for  
Mr. John A. Stolgitis  
Division of Fish & Wildlife  
RI Department of Environmental Management

**Did Not Attend:**

Mr. Allen D. Beck  
Reserve Manager  
Narragansett Bay - National Estuarine Research Reserve

Mr. Robert L. Bendick, Jr.  
Deputy Commissioner  
NY Department of Environmental Conservation

Mr. Thomas E. Bigford  
Division Chief  
National Marine Fisheries Service  
National Oceanic and Atmospheric Administration

Senator David Carlin  
R.I. Senate Majority Leader  
Rhode Island State Senate

Ms. Priscilla Chapman  
Executive Director  
New England Division  
Sierra Club

Mr. David C. DePetrillo  
Director of Tourism  
RI Department of Economic Development

Mr. Grover J. Fugate  
Executive Director  
RI Coastal Resources Management Council

Mr. Thomas Hall, III  
President  
Ocean State Fishermen's Association

Ms. Virginia Lee  
Coordinator of Domestic and Environmental Programs  
Coastal Resources Center  
University of Rhode Island

The Hon. Robert J. McKenna  
Representative  
RI League of Cities and Towns

Mr. Thomas E. Mulhearn  
Executive Vice President  
RI Association of Realtors

Dr. Judith Pederson  
Principal Policy Analyst  
MA Coastal Zone Management Program

Ms. Anna Prager  
Senior Policy Analyst  
RI Governor's Office

Mr. R. Daniel Prentiss, Esq.  
Attorney-at-Law

Mr. Gary S. Sasse  
Executive Director  
RI Public Expenditure Council

Dr. Harold R. Ward  
Director  
Center for Environmental Studies  
Brown University

Mr. Eric Weiner  
Assistant Executive Director  
Manufacturing Jewelers and Silversmiths of America, Inc.

## **Management Committee Attendance at January 17, 1990 Meeting**

### **Attended:**

Mr. David Abedon  
Cooperative Extension Specialist  
University of Rhode Island

Dr. Walter S. Combs, Jr.  
Associate Director, Environmental Affairs  
RI Department of Health

Mr. Grover J. Fugate  
Executive Director  
RI Coastal Resources Management Council

Mr. Malcolm J. Grant (Chair)  
Assistant Director of Administration  
RI Department of Environmental Management

Ms. Caroline A. Karp  
Project Manager  
Narragansett Bay Project

Ms. Katrina V. Kipp  
Project Officer  
Region I  
US Environmental Protection Agency

Ms. Susan P. Morrison  
Chief, Office of Systems Planning  
Division of Planning  
RI Department of Administration

Mr. Thomas E. Mulhearn  
Executive Vice President  
RI Association of Realtors

Dr. Scott W. Nixon  
Director  
RI Sea Grant

Mr. Lawrence R. Oliver  
Environmental Resources Specialist  
Environmental Resources Branch  
US Army Corps of Engineers, New England Division

Dr. Harold R. Ward  
Director  
Center for Environmental Studies  
Brown University

Ms. Janet White  
Principal Policy Analyst  
RI Governor's Office

**Sent Alternate:**

Ms. Gwen Ruta for  
Mr. David A. Fierra  
Water Management Division  
Region I  
US Environmental Protection Agency

Dr. Jan Prager for  
Dr. Norbert A. Jaworski  
Environmental Research Laboratory - Narragansett  
US Environmental Protection Agency

Mr. David Weeks for  
Mr. Robert Klumpe  
US Department of Agriculture - Soil Conservation Service

Mr. Jan Smith for  
Dr. Judith Pederson  
MA Coastal Zone Management Program

Mr. Dick Sisson for  
Mr. John A. Stolgitis  
Division of Fish & Wildlife  
RI Department of Environmental Management

**Did Not Attend:**

Mr. Eddie Agin  
Board Member  
RI Shellfishermen's Association

Mr. Roy B. Anderson  
Director of Utilities  
Newport Water Department

Mr. Allan D. Beck  
Reserve Manager  
Narragansett Bay - National Estuarine Research Reserve

Mr. Robert L. Bendick, Jr.  
Deputy Commissioner  
NY Department of Environmental Conservation

Senator John J. Bevilacqua  
RI Senate Majority Leader  
Rhode Island State Senate

Mr. Thomas E. Bigford  
Division Chief  
National Marine Fisheries Service  
National Oceanic and Atmospheric Administration

Ms. Priscilla Chapman  
Executive Director  
New England Division  
Sierra Club

Mr. Alan N. Cooperman  
Environmental Engineer  
Technical Services Branch  
MA Department of Water Pollution Control

Mr. David C. DePetrillo  
Director of Tourism  
RI Department of Economic Development

Ms. Holly A. DesRosiers  
Executive Director  
RI Marine Trade Association

Mr. James W. Fester  
Assistant Director for Regulations  
RI Department of Environmental Management

Mr. Thomas Hall, III  
President  
Ocean State Fishermen's Association

Mr. Eric R Jankel  
Executive Director  
Narragansett Bay Commission

Ms. Virginia Lee  
Coordinator of Domestic and Environmental Programs  
Coastal Resources Center  
University of Rhode Island

The Hon. Robert J. McKenna  
Representative  
RI League of Cities and Towns

Mr. R. Daniel Prentiss, Esq.  
Attorney-at-Law

Mr. David L. Rocha  
Assistant Executive Director  
Mfg. Jewelers & Silversmiths of America

Mr. Gary S. Sasse  
Executive Director  
RI Public Expenditure Council

Mr. H.Curtis Spalding  
Executive Director  
Save The Bay

Mr. Terence J. Tierney  
Special Assistant Attorney General  
Attorney General's Office



## Management Committee Attendance at January 24, 1991 Meeting

### Attended:

Mr. Roy B. Anderson  
Director of Utilities  
Newport Water Department

Dr. Walter S. Combs, Jr.  
Associate Director, Environmental Affairs  
RI Department of Health

Mr. Malcolm J. Grant (Chair)  
Assistant Director of Administration  
RI Department of Environmental Management

Ms. Caroline A. Karp  
Project Manager  
Narragansett Bay Project

Ms. Katrina V. Kipp  
Project Officer  
Region I  
US Environmental Protection Agency

Mr. Robert Klumpe  
State Conservationist  
US Department of Agriculture - Soil Conservation Service

Ms. Susan P. Morrison  
Chief, Office of Systems Planning  
Division of Planning  
RI Department of Administration

Mr. Thomas E. Mulhearn  
Executive Vice President  
RI Association of Realtors

Dr. Harold R. Ward  
Director  
Center for Environmental Studies  
Brown University

**Sent Alternate:**

Mr. Roger Greene for  
Mr. David Abedon  
Cooperative Extension  
University of Rhode Island

Mr. Ken Kubic for  
Ms. Holly A. DesRosiers  
RI Marine Trade Association

Dr. Christopher Deacutis for  
Mr. James W. Fester  
RI Department of Environmental Management

Ms. Gwen Ruta for  
Mr. David A. Fierro  
Water Management Division  
Region I  
US Environmental Protection Agency

Mr. Timothy Dillingham for  
Mr. Grover J. Fugate  
RI Coastal Resources Management Council

Mr. Thomas Grala for  
Mr. Eric R Jankel  
Narragansett Bay Commission

Dr. Jan Prager for  
Dr. Norbert A. Jaworski  
Environmental Research Laboratory - Narragansett  
US Environmental Protection Agency

Ms. Kristie Kapp for  
Dr. Judith Pederson  
MA Coastal Zone Management Program

Mr. Ray Hewitt for  
Mr. Gary S. Sasse  
RI Public Expenditure Council

Mr. Kevin Brubaker for  
Mr. H. Curtis Spalding  
Save The Bay

Mr. David Borden for  
Mr. John A. Stolgitis  
Division of Fish & Wildlife  
RI Department of Environmental Management

**Did Not Attend:**

Mr. Eddie Agin  
Board Member  
RI Shellfishermen's Association

Mr. Allan D. Beck  
Reserve Manager  
Narragansett Bay-National Estuarine Research Reserve

Mr. Robert L. Bendick, Jr.  
Deputy Commissioner  
NY Department of Environmental Conservation

Senator John J. Bevilacqua  
RI Senate Majority Leader  
Rhode Island State Senate

Mr. Thomas E. Bigford  
Division Chief  
National Marine Fisheries Service  
National Oceanic and Atmospheric Administration

Ms. Priscilla Chapman  
Executive Director  
New England Chapter  
Sierra Club

Mr. Alan N. Cooperman  
Environmental Engineer  
Technical Services Branch  
MA Department of Water Pollution Control

Mr. David C. DePetrillo  
Director of Tourism  
RI Department of Economic Development

Mr. Thomas Hall, III  
President  
Ocean State Fishermen's Association

Rep. Donald J. Lally, Jr.  
RI General Assembly

Ms. Virginia Lee  
Coordinator of Domestic and Environmental Programs  
Coastal Resources Center  
University of Rhode Island

The Honorable Robert J. McKenna  
Representative  
RI League of Cities and Towns

Dr. Scott W. Nixon  
Director  
RI Sea Grant

Mr. Lawrence R. Oliver  
Environmental Resources Specialist  
Environmental Resources Branch  
US Army Corps of Engineers, New England Division

Mr. R. Daniel Prentiss, Esq.  
Attorney-at-Law

Mr. David L. Rocha  
Assistant Executive Director  
Mfg. Jewelers & Silversmiths of America

Mr. Terence J. Tierney  
Special Assistant Attorney General  
Attorney General's Office

Ms. Janet White  
Senior Policy Analyst  
RI Governor's Office