1994/95 Annual Combined Sewer Overflow (CSO) Report

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METRO
King County Department of Metropolitan Services

Clean Water – A Sound Investment

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Section 1 - Overview and Status of CSO Control Program

Introduction

This report is prepared and submitted to the Department of Ecology (Ecology) in accordance with the requirements established within NPDES Permits WA-002918-1 and WA-002901-7 and WAC 173-245-090. As outlined in the WAC, this report includes:

- An overview and status of King County Department of Metropolitan Services Water Pollution Control Division's (WPCD's) CSO Control Program
- 1994/95 overflow volume and frequency information
- An overview of WPCD's CSO Monitoring Program

Background

King County Water Pollution Control Division (formerly Metro) provides wholesale wastewater conveyance and treatment for flows from the City of Seattle and thirty-three other local agencies. The City of Seattle collection system contains combined sewers that collect both sanitary sewage and stormwater. Seattle's wastewater collection system conveys flow to County trunks and interceptors which then convey flow to the County's West Point treatment plant. When storm events occur, flows may exceed the capacity of the collection system pipes, resulting in combined sewer overflows into Lake Washington, Lake Union, the Ship Canal, the Duwamish River and Elliott Bay. CSOs are a recognized source of water pollution that can result in aesthetic degradation of shorelines during CSO events and impact sediment quality at discharge sites. CSOs may also raise public health concerns in areas where there is potential for public contact.

Since the 1960s, King County has been conducting CSO control projects to improve water quality in the Seattle-King County area. The County first formalized its CSO control program with the development of its *1979 CSO Control Program (1979 Program)*. The *1979 Program* identified nine projects to control CSO events into fresh water areas (i.e., Lake Washington, Lake Union, and the Ship Canal).

In 1985, new regulations were introduced with the Washington State Water Pollution Control Act (RCW 90.48) requiring all municipalities with CSOs to develop plans for "..the greatest reasonable reduction at the earliest possible date." The County's *1986 Plan for Secondary Treatment Facilities and Combined Sewer Overflow Control (1986 Plan)* met this state requirement.

Before the *1986 Plan* was implemented, new regulations were promulgated by Ecology. The new regulations (WAC 173-245-020) defined "greatest reasonable reduction" to mean "control of each CSO such that an average of one untreated discharge may occur per year." The County worked with Ecology to develop an interim goal of 75 percent reduction of CSO volumes system-wide by the end of 2005. The County's *Final 1988 Combined Sewer*

Overflow Control Plan (1988 Plan) identified eleven CSO control projects designed to meet this interim goal. In the *1988 Plan*, the County evaluated CSO control projects based on the "knee-of-the cost/benefit curve." This curve was used to determine the cost-effectiveness of projects by identifying the point at which costs rose disproportionately to the achievable CSO reduction.

As part of the renewal process for the West Point NPDES permit, King County recently prepared an update/amendment to its *1988 Plan*. The *1995 CSO Update* includes an assessment of the effectiveness of CSO reduction efforts to date, a reevaluation of priority for CSO sites, and a list of projects for the next five years.

Regional Wastewater Services Plan

King County WPCD's CSO planning is only one component of WPCD's current long-range wastewater planning effort, the *Regional Wastewater Service Plan (RWSP).*

The *Metropolitan Seattle Sewerage and Drainage Survey* was prepared in 1958 to guide a long-range program of sewerage and drainage services for the Seattle area. That first comprehensive planning document was intended to provide a concise, up-to-date, central source of information concerning King County's long-range plans. Since that time, numerous changes have been made to the original comprehensive plan. The *RWSP* will be an amendment to the *Metropolitan Seattle Sewerage and Drainage Survey* that will integrate long-range planning in all areas of wastewater services, including treatment and conveyance, biosolids reuse, CSO control, and water reuse. The *RWSP* planning process will establish the priorities for all wastewater programs, including those that affect CSO controls. The *RWSP* is scheduled to be completed and adopted by the King County Council in 1996.

Status of CSO Control Projects

CSO Control Projects from the *1988 Plan*

The *1988 Plan* identified several CSO control projects that King County would undertake through late 2005 to meet the interim goal of 75 percent reduction of CSO volumes system-wide. The following projects from the *1988 Plan* have been completed:

South Hanford Street Tunnel Separation Project

The County portion of the Hanford project included installation of a new 36-inch sanitary sewer line inside the existing 108-inch South Hanford Street Tunnel. The work was done in conjunction with a City of Seattle partial separation project covering about 1,132 acres upstream of the existing tunnel. The new 36-inch line carries sewage flows to the Elliott Bay Interceptor, while the tunnel is used to transport separated stormwater to the Diagonal Way storm drain and then to the Duwamish River. The project was originally thought to have eliminated CSOs discharged at the Hanford No. 1 Regulator Station. New evidence suggests that probable overflows occur from the County system upstream of the Hanford tunnel, eventually reaching the Diagonal Way storm drain. The overflows occur at three weirs in the Rainier Valley and may be caused by hydraulic restrictions in the 36-inch line in the Hanford Tunnel causing flow to be spilled to the stormwater line that leaves the system at the Hanford No. 1 Regulator site. Further study is required to confirm overflow values. The Hanford project was completed in October 1987 and reduced overflows at Hanford #1 and #2 significantly.

Lander Separation/Bayview Storage Project

The Lander Separation project was conducted in two phases. Phase I provided about 1.4 million gallons of storage capacity through the installation of a new 96-inch sanitary trunk line constructed at South Lander Street. The Bayview tunnel was reconditioned and reactivated in 1986 to divert sanitary flows from the Hanford basin to the new 96-inch trunk line. A new regulator station was also constructed as part of this work, designated Lander No. 2. Phase II of the project involved installation of a new stormwater collection system in the Lander basin. Construction of the Lander/Bayview project was completed in January 1992. An interlocal agreement between the City of Seattle and King County clarifies NPDES stormwater permit responsibilities within the Lander and Densmore drainage basins.

CATAD Modifications

The Computer Augmented Treatment and Disposal System (CATAD) controls the West Point collection system. A new control program for the CATAD system was developed to improve system efficiency by increasing utilization of storage capacity in existing sewers. Prior to the improvements, the CATAD system utilized 17 to 28 million gallons (MG) or 28 to 47 percent of storage within the collection system's estimated 60 MG capacity. Initial estimates projected that modifications to the system would reduce CSO volumes by 150 MG per year. Computer simulations indicate that the overflow reduction achieved by these improvements may total 200 MG per year. The project is mostly complete, although calibration work on level sensors is continuing. The new control program was not operating during most of the 1994-95 reporting period due to computer hardware problems at West Point.

Fort Lawton Parallel Tunnel Project

The Fort Lawton Parallel Tunnel Project involved construction of a new 12-foot diameter tunnel to reduce CSOs in the West Point service area. The new tunnel provides a reliable influent line to the West Point Treatment Plant. The existing 144-inch brick tunnel was rehabilitated as part of this effort. The two tunnels are designed to operate in parallel and convey flows up to 440 million gallons per day (mgd) to West Point. Tunnel construction was completed in the summer of 1991, and the new tunnel went into operation during November of that year. In June and July 1993, flows to West Point were restricted due to secondary upgrade construction activities. Only six out of twelve sedimentation tanks were in operation during this period. Flows to West Point have recently been limited to about 300 mgd due to concerns about the integrity of the outfall. The County anticipates that flows can be increased to 440 mgd as facility modifications are made and emergency bypass issues are addressed.

University Regulator Separation

The University Regulator Separation project included construction of a gravity pipeline, pump station, force main, and outfall pipeline to divert stormwater runoff from the Densmore drain, Interstate 5 and outflow from Green Lake. The stormwater runoff is diverted from the County's north interceptor sewer system to a new outfall located in the Lake Washington Ship Canal. The reduction in stormwater through the University Regulator will significantly decrease CSO discharges to Portage Bay. Construction of major project components was completed in 1994, and the facility has begun operation. The stormwater separation was not operational for most of the 1994/95 reporting period due to defective air vacuum/air release valves.

Carkeek Park Transfer and CSO Treatment Facility

The Carkeek project was designed to transfer combined sewer flows up to 8.4 mgd from the Carkeek drainage basin to the West Point plant for secondary treatment. In 1994, the existing Carkeek Park wastewater treatment plant was converted into a CSO treatment facility to provide primary treatment and disinfection for flows exceeding 8.4 mgd (to a maximum of 20 mgd) with discharge through the existing outfall. Combined sewer flows above 20 mgd will be stored until flows subside and treatment capacity is available. If storage capacity is not available, excess flows are discharged at a permitted CSO discharge location. Construction of all elements of the project is complete. The Carkeek CSO Treatment Facility began operation in the fall of 1994.

The following projects from the *1988 Plan* are in progress or have been modified since the *1988 Plan* was issued:

Alki Transfer/CSO Facilities

The Alki project is designed to transfer flows up to 18.9 mgd from the Alki drainage basin to the West Point plant for secondary treatment. Combined sewer flows above 18.9 mgd up to a maximum of 65 mgd will receive primary treatment and disinfection at a modified Alki plant with discharge through the existing outfall. The modifications at the Alki plant will allow for intermittent treatment. In order to protect the treatment facility, flows in excess of 65 mgd will be discharged via the 63rd Avenue Pump Station outfall, which is a permitted CSO location.

A new West Seattle Pumping Station and Tunnel will provide conveyance of Alki flows to the Elliott Bay Interceptor and West Point. To avoid capacity issues in the West Point system due to the addition of Alki flows, pipelines are under construction to transfer approximately 18.9 mgd from the Norfolk regulator station to the East Division Reclamation Plant at Renton via the Allentown Trunk and Interurban Pump Station. A pipeline for control of Harbor regulator station overflows is being added to this project as discussed later in this report.

The Alki project began design in 1992 and construction of some project components has begun. Final completion and start-up for the project have been delayed as a result of a bid protest on the tunnel portion of the project. Completion of the Alki Transfer project is expected to occur by late 1997. Completion of the Alki Treatment Plant modifications is expected to occur by late 1998. Specific permit conditions for operation of the Alki facility will be negotiated with the Department of Ecology.

Denny Way CSO Control

The *1986 Plan* identified a storage and treatment approach to controlling Denny Way overflows. In the *1988 Plan*, the Denny Way project was changed to include partial separation of 584 acres in the Denny/Lake Union and Denny Local drainage basins. Predesign for the project was scheduled to begin in 1993 with construction ending in 1999.

In late 1991, the Seattle Drainage and Wastewater Utility (DWU) requested that King County participate in a joint analysis of CSO alternatives to control discharges into Lake Union from Seattle's system and into Elliott Bay from the County's system at the Denny Way regulator station. In 1992, a joint Denny Way/Lake Union CSO project was submitted as a candidate for federal Coastal Cities Grant funds. During 1994, a specific joint City of Seattle/King County Denny Way/Lake Union CSO Control project was identified for the next five years and a $35 million Coastal Cities Grant received. This joint project is discussed later in this report.

Kingdome/Industrial Area Storage and Separation Project

In the *1988 Plan*, the Kingdome project included total separation of the Kingdome parking lot and the industrial area south of the Lander project. The project was one of the final *1988 Plan* projects, with design to begin in 2000 and completion to occur by the end of 2005. The predesign effort for the Kingdome project was accelerated to 1992 in conjunction with work undertaken by the City of Seattle to improve Royal Brougham Way for car ferry access.

The predesign report indicated that total separation was not cost-effective due to the cost of disconnecting building drains on private property. The project was then modified to include partial separation of the industrial area to remove street drainage and Kingdome parking lot runoff from the combined sewer system via new storm drains. The revised project also includes a new 96-inch sanitary trunk in Royal Brougham Way, 11.3 MG of off-line storage, and a new regulator station and connection to the Elliott Bay Interceptor. Recent County modeling results indicate that the volume of off-line storage could be reduced from 11.3 MG to 6 MG.

In order to coordinate with the City of Seattle's Royal Brougham street-widening project, construction of a portion of the 96-inch line was accelerated to 1994 and completed in 1995.

The remaining components of the project are under review as part of the *RWSP* effort.

Michigan Separation Project

The Michigan project, as described in the *1988 Plan*, included total separation in the Michigan basin. The project was scheduled for completion by the end of 2005. The predesign effort for the Michigan project was accelerated to 1992 in conjunction with work being undertaken by the Washington Department of Transportation to upgrade the First Avenue South Bridge.

The predesign report rejected total separation as too costly and disruptive to private property and instead recommended installation of approximately 3,430 feet of sanitary trunk sewer in South Michigan Street/Corson Avenue South, separation of industrial areas identified in the basin, construction of a new regulator station, and a 4.2 MG storage tank. Recent County modeling results indicate that the storage tank volume will need to be increased to 5.5 MG. Final design of the project will depend on action recommended by the *RWSP*.

Diagonal Separation Project

The Diagonal project would provide total separation of sanitary and storm drainage by installing new sewers in about 720 acres of combined or partially-separated industrial area. The project would compliment the City of Seattle's project that separated areas adjacent to the County's Duwamish pump station. In the final *1988 Plan*, the Diagonal storage/separation project was identified as a City of Seattle project and not as a County project.

1995 CSO Update Projects

Since the *1988 Plan*, four new projects for CSO control have emerged primarily as a result of more accurate modeling information. The projects are discussed in the *1995 CSO Update* and are as follows:

Harbor CSO Pipeline
Henderson/Martin Luther King Jr. Way CSO Control Engineering Evaluation
North Beach Storage/Pump Station Upgrade
Brandon Separation

The Harbor CSO Pipeline and Henderson/Martin Luther King Jr. Way Engineering Evaluation, along with a revised Denny Way project, form the basis of the CSO Control Program for the next five years. A schedule for the North Beach project and the Brandon project will be identified in the *RWSP*.

Denny Way/Lake Union CSO Control Project

As discussed earlier, a joint City of Seattle/King County Denny Way/Lake Union project was identified in 1994. One of the selection criteria used to determine a preferred project was the County's desire that the project be able to integrate with any program that the *RWSP* might recommend.

The selected Denny Way/Lake Union project alternative consists of a new 18-foot diameter, 6800-foot long tunnel under Mercer Street. The tunnel would run from Westlake Avenue to Elliott Avenue. The project also includes a 2.5 MG concrete storage tank near the Denny Regulator Station on Elliott Avenue West, two pump stations, a new outfall into Elliott Bay and necessary piping and regulators. The project would control CSOs by storing Denny and south Lake Union flows in the 18-foot storage tunnel when the Elliott Bay Interceptor is full. When the tunnel is full, flows would be diverted to the storage tank on Elliott Avenue West. During most storms, storage capacity would be adequate to contain Denny/Lake Union sewage until flows in the Elliott Bay Interceptor subside and capacity becomes available. The stored wastewater would then drain into the interceptor and be transported to the West Point Treatment Plant. If a storm produces more combined flows than the system can handle, the excess flows would pass through the storage tank, providing some removal of floatables, followed by discharge out the new outfall into Elliott Bay.

The Denny Way/Lake Union project has been phased to coincide with the *RWSP* process while still qualifying for the Coastal Cities Grant funding. The project is divided into the following four phases:

Phase 1: City of Seattle's project to upsize pipes along Eastlake to control several of the City's Lake Union CSOs.

Phase 2: Continuation of the City's project that will connect the City's Eastlake project to the County's Phase 3.

Phase 3: King County's project to accommodate the increased flows from the City's Lake Union system, reduce the Dexter CSO discharge to one event per year and reduce the Denny Way discharges to 50 percent of the baseline annual CSO volume. The preferred alternative is described above and consists of a parallel Lake Union tunnel, a 2.5 MG storage tank, two pump stations and a new outfall in Elliott Bay.

Phase 4: King County's project to reduce CSOs at Denny to one event per year. This phase will be coordinated with the *RWSP*.

Design for Phase 1 has been initiated by the City of Seattle with construction to begin this fall. An environmental impact statement and facilities plan for Phases 2 and 3 are scheduled for completion in 1996. Construction of Phases 2 and 3 is scheduled to be completed by 2001. *RWSP* decisions may affect the completion dates and final configuration of these facilities.

Harbor CSO Pipeline Project

The Harbor CSO Pipeline project will convey overflows from the Harbor Regulator to the new West Seattle Tunnel for storage, controlling CSO events at the Harbor Regulator station to one event per year or less. This is a change from the *1988 Plan* which recommended partial separation to control Harbor CSOs. The project was revised when recent County modeling indicated that partial separation would not control Harbor CSOs to the one event per year level, requiring the addition of storage. The availability of nearby storage in the West Seattle Tunnel also made the Harbor CSO Pipeline a cost-effective option.

The current Harbor project has been reprioritized to be done sooner than scheduled in the *1988 Plan* due to the cost and environmental benefits from constructing the pipeline concurrently with the Alki project's West Seattle Forcemain contract. The Harbor pipeline portion of the project enlarges the trench for the forcemain and lays a new 54-inch pipe underneath. The cost of the current Harbor project is much less than the cost would be of excavating a new pipeline and trench for the 54-inch pipe in the future. Risk of affecting the integrity of the forcemain in the future is also avoided.

The Alki project's West Seattle Forcemain contract has been awarded and work is currently underway. The Harbor CSO pipeline will become operational by late 1997 when the West Seattle Tunnel and Pumping Station are commissioned.

Henderson/Martin Luther King Jr. Way CSO Control Engineering Evaluation

At the time of adoption of the *1988 Plan*, the County believed that all CSOs into Lake Washington, including the discharge from the Henderson Street Pump Station and Martin Luther King Jr. Way overflow weirs, had been controlled to the one event per year level. However, recent monitoring data indicate that overflows occur more frequently than once per year.

As a result, the County has conducted an engineering evaluation of the area to determine the sources and causes of the overflows at these locations and identify interim and permanent corrective measures to control overflows. The evaluation also considered the impact of these measures on the downstream Norfolk Regulator.

Based on this evaluation, the following three alternatives are recommended for further development in predesign:

- Norfolk Storage/Treatment and Expanded Henderson Pump Station
- Norfolk Storage/Treatment and Henderson Storage
- Henderson, King, and Norfolk Storage Tanks

The final report discussing the engineering evaluation is scheduled to be completed this fall.

North Beach Storage/Pump Station Upgrade

King County believed in 1988 that overflows from the North Beach Pump Station had been controlled to one event per year. However, during predesign for the Carkeek Park CSO Treatment Plant, overflows exceeding one event per year were identified. As a result, the

County initiated a predesign effort to control these overflows and a report was completed in July 1993. The report recommended construction of a new storage basin at the pump station site, an increase in pump station capacity, and construction of a new pipeline in Carkeek Park to reroute flows from two City of Seattle gravity sewer lines that discharge directly to the County's forcemain. The schedule for implementation of the predesign report recommendations will be determined in the *RWSP*.

Brandon Separation Project

During predesign of the Michigan Separation project, the predesign team recommended the addition of a Brandon partial separation and storage project. Brandon basin separation will require 1,640 feet of new sanitary sewer trunk, partial separation of about 52 acres, construction of a new regulator station and a new 4.7 MG off-line storage facility. Recent County modeling indicates that the storage facility could be reduced to 3 MG. Preliminary design of Brandon was completed in 1992 in conjunction with the Michigan separation project. A portion of the Brandon design was accelerated to allow coordination with the First Avenue South bridge improvements. Final design may begin in 1998, depending on an *RWSP* decision.

Other Related Projects

Lander and Densmore Stormwater Management Program

King County and the City of Seattle are jointly undertaking a stormwater management program in the Lander and Densmore drainage basins as required by the NPDES municipal stormwater permit. This is an on-going program which includes the following elements: baseline sampling of stormwater discharges, surveys, inspections, educational outreach and development of compliance and enforcement schedules.

Sediment Baseline Monitoring Plan

A *Sediment Baseline Monitoring Plan* was submitted to the Department of Ecology and approved in August 1995. The Plan provides for monitoring of marine sediments in the vicinity of wastewater treatment plant outfalls and CSOs. Each CSO site is characterized in the Plan according to the status of clean-up activities as follows:

- For five sites, a cleanup study is already underway or contemplated in the near future; therefore, no new baseline sampling is being proposed under the plan.
- For five sites, baseline sampling is complete, and no additional sampling is planned unless requested by the Department of Ecology.
- For three sites, cleanup activities are anticipated, and sampling is required to facilitate those activities.
- For seven sites, new baseline sampling is proposed. For these sites, the monitoring plan specifies the manner in which sampling will be carried out.

Section 2 - 1994/95 CSO Volume and Frequency Summary

Introduction

The volume and frequency of CSOs at regulator and pump stations in the West Point System are monitored by the County's CATAD System. Figure 1 shows the location and magnitude of existing King County and City of Seattle CSO discharges. In general, the area south of the Ship Canal is referred to as the Southern Service Area, and the area north of the Ship Canal is referred to as the Northern Service Area. The County deploys portable flowmeters at the following six CSO locations not currently monitored by CATAD: S. Magnolia, 11th Ave. NW (East Ballard), North Beach, Martin Luther King Jr. Way, Henderson Street, and SW Alaska Street (Beach Drive).

Baseline Conditions

For any selected time period, the actual volume and frequency of CSOs depend on the pattern of rainfall. The existence and extent of overflows are also functions of the physical characteristics of the system. King County and the Department of Ecology determined that the County CSO collection and conveyance system, as it existed in 1981-1983, would be an appropriate baseline from which to measure the progress of CSO control. Thus the term "baseline" refers to the physical characteristics of the system during 1981-1983, as well as the average volumes and frequencies of overflows which were thought to have occurred from that system. The baseline overflow volumes are an estimate of average annual CSO volumes that would have occurred in the collection system as it existed in 1981-1983 for the average rainfall of 36 inches per year that occurred from 1943-1988.

In the *1988 Plan*, the baseline conditions were characterized by a computer model. Seven design storms which occurred in 1981-1983 were selected for use in estimating annual CSO volumes. These storms were selected to cover a range of rainfall intensities and durations. Adequate CATAD flow and overflow data existed for the system during these storms. From a long-term computer simulation, factors were determined to apply to the design storm overflow volumes to approximate the number of times per year storms of that magnitude occur. When the overflows computed from the design storms were multiplied by these factors and the results for all design storms summed, an estimate of the total system annual overflow volume was obtained.

Baseline Overflow Volumes

In the *1988 Plan*, the baseline overflow volumes were generated using the Seattle Area Combined Sewer Routing Organizer (SACRO) to model the system. SACRO computes overflow volumes by adding all of the inflows to a given location and subtracting the estimated capacity of the pipes or pump station leaving that location. Recorded CATAD data provided the bulk of the information used in the *1988 Plan* modeling effort. Locations which were not monitored by the CATAD system were not included in the model because they were thought to be controlled to the one event per year level or because there was not enough information to determine their level of control. Results of this analysis are shown in Table 1 under the column entitled "*1988 Plan* Baseline."

Since the *1988 Plan* was prepared, the County has developed a new, more sophisticated computer model for simulating the behavior of its conveyance system during storms. The new model, known as "UNSTDY," computes flow velocities and water surface levels throughout the system. This allows the computer to simulate backwater, flow reversal, surcharged and open channel flow, as well as correct regulator and pump station operation. "UNSTDY" provides a degree of detail and accuracy which was not available with older models.

Using the new model with the same rainfall data and system characteristics from the *1988 Plan* has resulted in revised baseline overflow volumes that give a better, more accurate picture of the location and volumes of overflows under the 1981-1983 baseline conditions. As shown on Table 1, the difference between the *1988 Plan* total baseline volume of 2,409 million gallons and the revised total baseline volume of 2,393 million gallons is less than one percent.

Although the difference in the *1988 Plan* total baseline volume and the revised total baseline volume is small, the variations at specific CSO locations is sometimes significant. Development of the new model required an investigation of the collection system and the previous CATAD control software. During this analysis, the County discovered and corrected errors in the computer code used for the old control program, errors in pipe characteristics in the system, and inaccuracies in the level sensors at certain control points. The new model was then recalibrated. Due to this error-location, error-correction effort, the new baseline volumes for the University and Montlake Regulators and Duwamish Pump Station are notably lower. At the same time, the Chelan and Norfolk Regulator baseline overflow volumes have increased. Denny Way baseline overflow volume has also increased. Some overflows which were thought controlled to one event per year are not and are included in the revised baseline volumes.

Baseline CSO Frequency of Events

In the *1988 Plan*, baseline CSO frequency of events was estimated using CATAD reported overflows during the baseline years 1981-1983. King County has traditionally defined a CSO event as a period of rainfall during which an overflow was recorded that was preceded by three hours with no rain and followed by three hours without rain after the overflows from the system ceased. Frequency estimates were not given for the Duwamish Pump Station, Canal Street, and 3rd Avenue West due to a lack of CATAD data.

Upon development of the new model, the baseline CSO frequency of events was re-examined. For overflow locations monitored by portable flowmeters during the past few years, an average of the overflow frequencies during the monitored years was used to estimate CSO frequency of events. For stations which have not been monitored such as the Alki stations,

Table 1 - Baseline Overflow Volumes

Station	*1988 Plan* Baseline (MG)	Revised Baseline (MG)[c]	Difference in Volume (MG)
Southern Service Area			
8th Avenue South	15	15	0
W. Michigan Street	2	2	0
Terminal 115	N/A	5	5
Harbor Avenue	55	55	0
East Marginal Way	N/A	0	0
Chelan Avenue	25	65	40
Norfolk Street	4	70	66
Michigan Street	250	190	(60)
Brandon Street	35	60	25
Hanford #1	N/A		
Hanford #2	N/A		
Total Hanford	680[b]	605	(75)
Lander Street	215	190	(25)
Connecticut Street	90	90	0
King Street	70	55	(15)
Denny Local	N/A		
Denny Lake Union	N/A		
Interbay	N/A		
Total Denny	370[b]	405	35
Duwamish	130	1	(129)
Martin Luther King Jr. Way[a]	N/A	88	88
Rainier Avenue	N/A	0	0
Henderson Street[a]	N/A	10	10
S. Magnolia[a]	N/A	15	15
Northern Service Area			
Dexter Avenue	12	15	3
Canal Street	10	1	(9)
East Pine Street	N/A	0	0.
30th Avenue NE	N/A	0	0
Belvoir	N/A	0	0
Matthews Park	N/A	0	0
University	211	110	(101)
Montlake	40	10	(30)
Ballard	N/A		
11th Ave. NW (E. Ballard)	N/A		
Total Ballard	90[b]	90	0
3rd Ave. W. (& Ewing St.)	105	125	20
North Beach[a]	N/A	2	2
Alki			
Murray Street[a]	N/A	5	5
Barton Street[a]	N/A	7	7
53rd Avenue SW[a]	N/A	<1	<1
SW Alaska Street[a]	N/A	12	12
63rd Avenue SW[a]	N/A	95	95
Total (MG)	**2409**	**2393**	**(16)**

[a]Stations not connected to CATAD and for which data was limited or non existent in 1988.
[b]Methodology used to make these estimates necessitated the reporting of totals for closely associated overflows.
[c]Revised 1981-83 baseline estimate based on new model.

Table 2 - Baseline CSO Frequency of Events

Station	*1988 Plan* Baseline Frequencies (overflows/year)	Revised Baseline[c] Frequencies (overflows/year)	Difference in Frequencies (overflows/year)
Southern Service Area			
8th Avenue South	12	12	0
W. Michigan Street	9	9	0
Terminal 115	N/A	8	8
Harbor Avenue	46	56	10
East Marginal Way	N/A	<1	<1
Chelan Avenue	16	25	9
Norfolk Street	7	12	5
Michigan Street	31	40	9
Brandon Street	25	40	15
Hanford #2	27	40	13
Lander Street	19	29	10
Connecticut Street	25	34	9
King Street	31	31	0
Denny Local[b]	N/A		
Denny Lake Union[b]	N/A		
Interbay[b]	N/A		
Total Denny	51	51	0
Duwamish	N/A	<1	<1
Martin Luther King Jr. Way[a]	N/A	23	23
Rainier Avenue	N/A	<1	<1
Henderson Street[a]	N/A	16	16
S. Magnolia[a]	N/A	21	21
Northern Service Area			
Dexter Avenue	4	4	0
Canal Street	0	<1	<1
East Pine Street	N/A	<1	<1
30th Avenue NE	N/A	<1	<1
Belvoir	N/A	<1	<1
Matthews Park	N/A	<1	<1
University	14	14	0
Montlake	16	16	0
Ballard	13	13	0
11th Ave. NW (E. Ballard)	13	13	0
3rd Ave. W. (& Ewing St.)	N/A	20	20
North Beach[a]	N/A	18	18
Alki			
Murray Street[a]	N/A	8	8
Barton Street[a]	N/A	23	23
53rd Avenue SW[a]	N/A	<1	<1
SW Alaska Street[a]	N/A	23	23
63rd Avenue SW[a]	N/A	<1	<1
Total (overflows/yr)	**359**	**599**	**240**

[a]Stations not connected to CATAD and for which data was limited or non existent in 1988.
[b]Stations which overflow at the same discharge point are reported as one total.
[c]Revised 1981-83 baseline estimate based on new model and additional monitoring data.

the new model was used to estimate CSO frequencies based on the seven design storms. Each design storm has a recurrence interval which defines the number of times similar storms occur on average in a one year period. Table 2 displays the results of this analysis.

As shown on Table 2, the revised total baseline CSO frequency of events is quite a bit more than the *1988 Plan* total baseline CSO frequency of events. Stations which were not connected to CATAD and for which data was limited or non existent in 1988 have now been included, resulting in an increase in the number of CSO events per year. In addition, the new model error-location, error-correction effort also resulted in an increase in the number of CSO events.

The new revised baseline volumes and frequencies reflect the increase in knowledge gained since the *1988 Plan*. As the County continues to improve and refine its modeling capabilities, the baseline conditions will continue to be revised. Revisions will be presented as part of subsequent Annual CSO Report submittals in the years ahead.

1994/95 CSO Volumes

The total system overflow volume for this reporting period, June 1994 through May 1995, was 1,041 MG compared to a baseline volume of 2,393 MG.

As shown on Table 3, rainfall measured by County rain gauges at pump and regulator stations averaged 35.23 inches for the 1994/95 reporting period. This compares closely with the average baseline rainfall of 36 inches per year. The monthly variation of rainfall followed a normal trend with the wettest months occurring from November through March. Correspondingly, the majority of overflows occurred during these months.

The total system overflow volume for the reporting period was less than the baseline volume for a year with average rainfall of about 36 inches. Table 4 contains the monthly overflow volumes and comparisons to revised baseline conditions for each station. Figure 2 graphically illustrates the relationship between rainfall and CSO volumes.

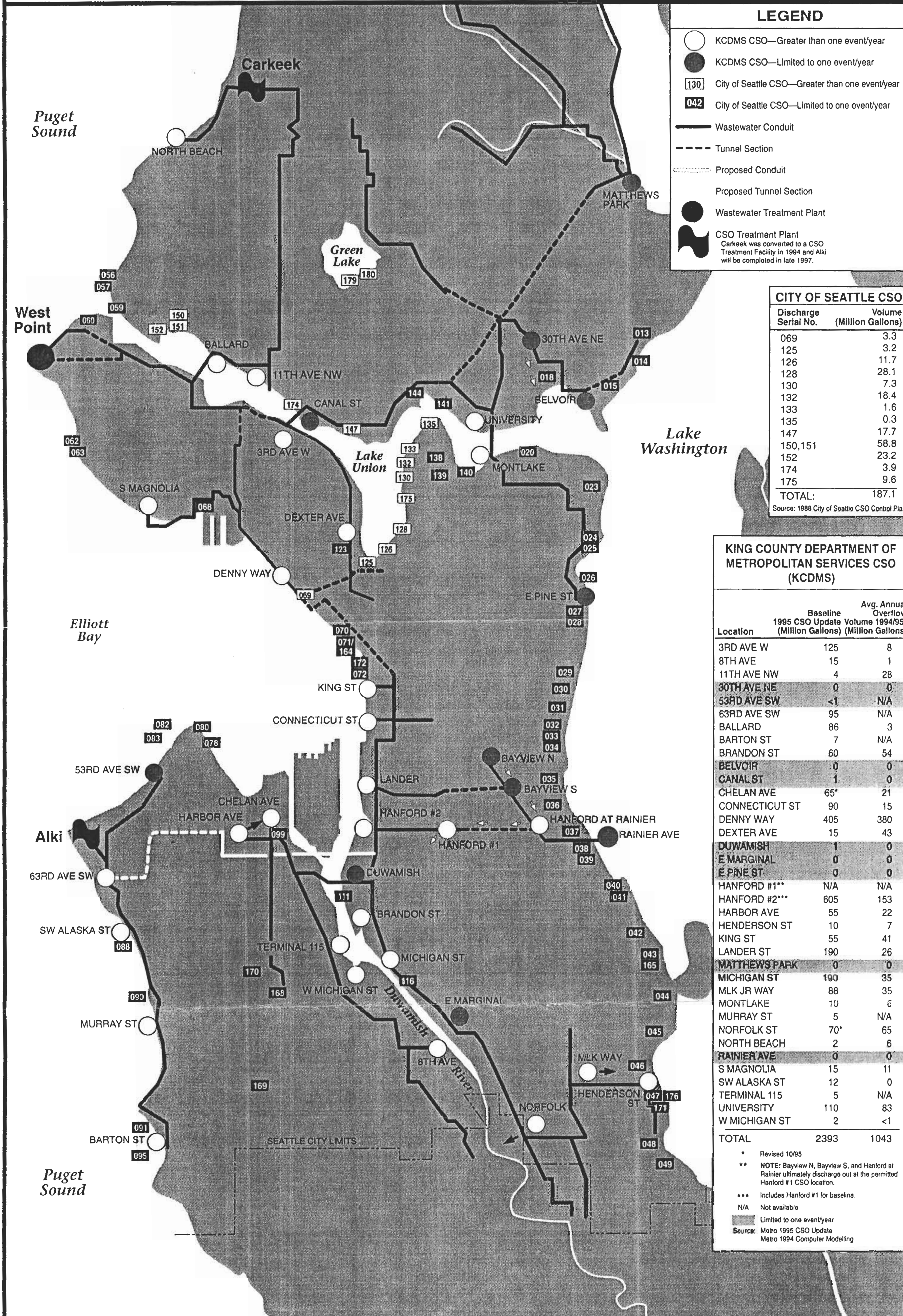
Table 3

1994/95 Rainfall at Pump and Regulator Stations

(in inches)

Station	Jun-94	Jul-94	Aug-94	Sep-94	Oct-94	Nov-94	Dec-94	Jan-95	Feb-95	Mar-95	Apr-95	May-95	1994/95 Total
King Street	1.3	0.09	0.17	0.68	2.83	4.37	7.28	4.29	3.64	4.11	1.7	0.69	31.15
Chelan Avenue	1.36	0.1	0.23	0.9	3.27	5.31	8.45	4.71	3.81	4.37	1.99	0.61	35.11
Denny Way Lake Union	1.35	0.19	0.26	1.01	3.04	5.13	9.58	5.14	3.81	5.53	2.76	0.95	38.75
Ballard	1.12	0.18	0.2	1.09	2.94	5.24	8.81	5.07	3.25	4.86	2.27	0.94	35.97
University	1.9	0.46	0.2	1.04	3.6	6.81	8.89	5.56	3.97	4.65	3.02	0.96	41.06
Hollywood	1.31	0.54	0.3	1.55	3.59	5.4	7.29	4.11	3.06	3.97	2.46	0.92	34.50
Rainier Avenue	1.2	0.02	0.32	0.89	3.19	5.98	8.81	4.9	4.01	4.14	1.88	0.66	36.00
E. Marginal Way	1.08	0.16	0.3	1.05	3.03	4.88	6.67	3.95	3.26	3.91	1.74	0.57	30.60
Henderson	1.22	0.22	0.13	1.09	3.3	5.81	7.75	4.66	4.19	3.98	1.8	0.56	34.71
E. Pine Street	1.37	0.22	0.23	1	3.16	5.7	8.4	4.4	3.83	4.78	2.19	1.05	36.33
Matthews Park	1.38	0.97	0.11	1.02	3.07	5.23	7.78	4.48	2.93	4.06	2.3	1.02	34.35
Kenmore	1.12	0.45	0.1	1.57	3.08	5.14	7.72	4.43	2.76	4.17	2.34	1.36	34.24
Average	**1.31**	**0.30**	**0.21**	**1.07**	**3.18**	**5.42**	**8.12**	**4.64**	**3.54**	**4.38**	**2.20**	**0.86**	**35.23**

Combined Sewer Overflow (CSO) Map



CITY OF SEATTLE CSO

Discharge Serial No.	Volume (Million Gallons)
069	3.3
125	3.2
126	11.7
128	28.1
130	7.3
132	18.4
133	1.6
135	0.3
147	17.7
150,151	58.8
152	23.2
174	3.9
175	9.6
TOTAL:	187.1

Source: 1988 City of Seattle CSO Control Plan

KING COUNTY DEPARTMENT OF METROPOLITAN SERVICES CSO (KCDMS)

Location	Baseline 1995 CSO Update (Million Gallons)	Avg. Annual Overflow Volume 1994/95* (Million Gallons)
3RD AVE W	125	8
8TH AVE	15	1
11TH AVE NW	4	28
30TH AVE NE	0	0
53RD AVE SW	<1	N/A
63RD AVE SW	95	N/A
BALLARD	86	3
BARTON ST	7	N/A
BRANDON ST	60	54
BELVOIR	0	0
CANAL ST	1	0
CHELAN AVE	65*	21
CONNECTICUT ST	90	15
DENNY WAY	405	380
DEXTER AVE	15	43
DUWAMISH	1	0
E MARGINAL	0	0
E PINE ST	0	0
HANFORD #1**	N/A	N/A
HANFORD #2***	605	153
HARBOR AVE	55	22
HENDERSON ST	10	7
KING ST	55	41
LANDER ST	190	26
MATTHEWS PARK	0	0
MICHIGAN ST	190	35
MLK JR WAY	88	35
MONTLAKE	10	6
MURRAY ST	5	N/A
NORFOLK ST	70*	65
NORTH BEACH	2	6
RAINIER AVE	0	0
S MAGNOLIA	15	11
SW ALASKA ST	12	0
TERMINAL 115	5	N/A
UNIVERSITY	110	83
W MICHIGAN ST	2	<1
TOTAL	2393	1043

* Revised 10/95

** NOTE: Bayview N, Bayview S, and Hanford at Rainier ultimately discharge out at the permitted Hanford #1 CSO location.

*** Includes Hanford #1 for baseline.

N/A Not available

(shaded) Limited to one event/year

Source: Metro 1995 CSO Update
Metro 1994 Computer Modelling

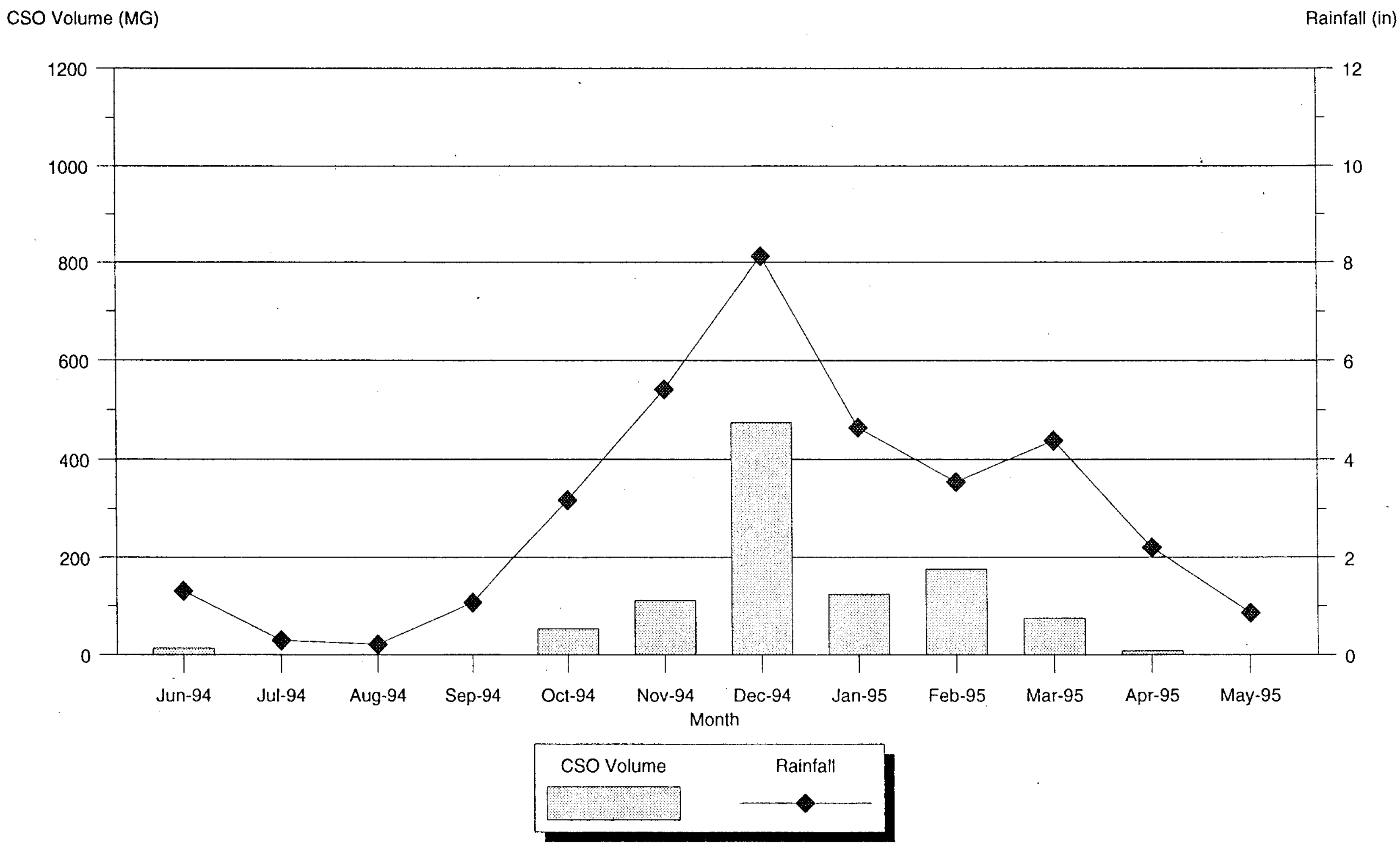
TP899.10/11/95. B&W CSO Master/CSO Annual Report/MCD

Table 4
1994/95 CSO Volume Summary by Service Area
(in million gallons)

Station	Jun-94	Jul-94	Aug-94	Sep-94	Oct-94	Nov-94	Dec-94	Jan-95	Feb-95	Mar-95	Apr-95	May-95	1994/95 Total (MG)	Revised Baseline (MG)
SSA														
Denny Way	4.11	0	0	0.30	18.62	42.15	142.02	58.56	73.02	40.82	0.15	0.03	379.78	405
King Street	0.97	0	0	0	3.37	3.91	19.14	6.12	6.61	0.99	0	0	41.11	55
Connecticut Street	0.05	0	0	0	1.47	3.62	6.42	1.72	1.35	0	0	0	14.63	90
Hanford	0.66	0	0	0	6.74	10.91	66.46	18.01	38.83	11.34	0	0	152.95	605
Lander Street	0	0	0	0	0.20	0.42	8.43	7.97	4.36	4.38	0	0	25.76	190
Harbor Avenue	0.58	0	0	0	0	0	14.69	4.73	0.94	0.97	0.11	0.04	22.06	55
Chelan Avenue	0	0	0	0	0.38	1.96	15.88	0.95	1.59	0.01	0	0	20.77	65
W. Michigan Street	0	0	0	0	0	0	0.16	0	0.01	0	0	0	0.17	2
8th Avenue	0	0	0	0	0	0.25	0.40	0	0	0	0	0	0.65	15
Brandon Street	1.63	0	0	0.32	4.73	4.12	23.00	9.24	4.44	6.13	0.11	0	53.72	60
Michigan Street	0.47	0	0	0.25	3.93	8.21	22.29	0	0	0	0	0	35.15	190
Norfolk Street	0.09	0	0	0	0.81	4.79	36.41	5.74	16.38	0.90	0	0	65.12	70
Duwamish P.S.	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Henderson Street (1)	0.01	0	0	0.004	0.07	0.46	4.74	0.60	1.52	0.01	0	0	7.41	10
MLK Jr. Way (1)	0	0	0	0.25	0.38	2.58	10.22		20.94	0.44	0	0	34.82	88
Rainier Avenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Marginal Way	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S. Magnolia (1)	0.04	0	0	0	0.66	1.79	5.88	1.22	0.28	0.73	0.76	0.01	11.36	15
Terminal 115													N/A	5
SSA SUBTOTAL	8.61	0.00	0.00	1.13	41.36	85.17	376.14	114.85	170.27	66.73	1.13	0.08	865.46	1921.00
NSA														
Ballard	0.47			0.00	1.58	3.49	17.50	2.32	2.00	1.03	2.10	0.40	30.90	90
Dexter	0.20			0.18	6.93	13.36	9.16	3.85	1.02	5.16	3.17		43.03	15
University	2.51				4.51	9.76	60.56	2.39	2.26	0.22	0.38	0.04	82.63	110
Montlake	2.03				0	0	0	0	0	1.82	1.66	0.10	5.61	10
Canal Street (Lake City)	0				0	0	0	0	0	0	0		0.00	1
3rd Ave. W. (& Ewing St.) (2)							7.37	0.03	0.13				7.53	125
E. Pine Street													0.00	0
Belvoir													0.00	0
Matthews Park													0.00	0
30th Ave. NE													0.00	0
North Beach (1)				0.10	0.16	0.40	3.87	0.55	0.25	0.12	0.12	0.04	5.59	2
NSA SUBTOTAL	5.21	0.00	0.00	0.28	13.17	27.01	98.46	9.15	5.66	8.36	7.43	0.58	175.29	353.00
Carkeek														
Carkeek CSO Plant (3)													N/A	
Alki														
Murray Street													N/A	5
Barton Street													N/A	7
53rd Ave. SW													N/A	<1
SW Alaska St. (Beach Dr.) (1)													0.00	12
63rd Ave. SW													N/A	95
TOTAL	13.82	0.00	0.00	1.40	54.53	112.18	474.60	124.00	175.92	75.08	8.55	0.66	1040.75	2393.00

(1) Portable flow meters; not currently monitored by CATAD
(2) Level sensor at 3rd Ave. W. (& Ewing St.) was not working properly from 6/94-11/94.
(3) Carkeek CSO Plant was officially placed into service on 11/1/94. CSO discharge volumes are not available for the reporting period due to problems with the effluent flowmeter.

Figure 2 - 1994/95 CSO Volume vs. Rainfall



While the establishment of baseline conditions identifies average annual volume and frequencies of discharge, year-to-year comparisons to baseline conditions can be misleading. Annual rainfall cannot indicate year-to-year variations in CSO volumes for individual basins as rainfall can be extremely variable in the Seattle area. Individual storm events can disproportionately influence total overflow volume. This is illustrated during the 1994/95 reporting period by three peak storms which contributed to large overflow volumes. These storms accounted for approximately fifty-three percent of the total overflow volume for the reporting period. Table 5 summarizes the storm dates and overflow volumes.

Table 5
Peak Overflow Events

Storm Date	Duration (hrs)	Overflow Volume (MG)	Percent of 1994/95 CSO Volume Total
12/19/94 -12/21/94	46	229.89	22%
12/26/94 -12/27/94	31	153.71	15%
2/18/95 - 2/20/95	51	162.31	16%

Southern Service Area (SSA)

Overflow volumes in the Southern Service Area for 1994/95 were 865 MG compared to a baseline of 1,921 MG. Overflow volumes at all SSA stations were below baseline overflow volumes. Completed CSO control projects appear to be successfully reducing overflow volumes.

- The actual Denny Way overflow volume is estimated at 380 MG compared to a baseline of 405 MG; however, the CATAD system recorded an overflow volume of 865 MG at Denny Way. (The Denny Way overflow represents the total overflow volume from Denny Way Lake Union, Denny Way Local, and the Interbay Pump Station.) Investigation of the CATAD overflow volume revealed that the 865 MG was inaccurate. It was discovered that a broken spring on the outfall gate transmitter caused erroneous CATAD readings. CATAD was recording that the outfall gate was open much more than it really was (e.g. 94% versus 20%) resulting in inflated calculated overflow volumes. Readings were taken at different levels to estimate the relationship between the CATAD outfall gate reading and the real gate opening. This relationship was used to estimate the actual CATAD overflow volumes at Denny Way. The outfall gate transmitter spring was broken for the entire 1994/95 reporting period.

  It was also determined that the equation to calculate overflows at Interbay was resulting in inflated numbers. The equation was corrected and the overflow volumes were recalculated for Interbay. Both of these changes resulted in a corrected Denny Way overflow volume of 380 MG.

The overflow volume at Denny Way may have been even lower if not for two system operating conditions. During the reporting period, the stations were primarily in local control versus auto control due to hardware problems with the West Point computers. In local control mode, flows are directed to the interceptor as long as the flow depth in the interceptor is at or below a specified set point. In auto control, the overall volume of CSOs are minimized by controlling wastewater flows and using available in-line storage. Since the stations were primarily in local control, most of the flows were conveyed down the Elliott Bay Interceptor (EBI) so that the majority of overflows occurred at Denny Way instead of being distributed at upstream stations along the EBI.

While investigating the CATAD recorded volume at Denny Way, it was also found that the newly constructed Kingdome Regulator station was not regulating flow into the EBI. Since instrumentation at the Kingdome Regulator station was not fully connected, all of the flow through the Kingdome station was conveyed directly to the EBI, which increased overflows at Denny Way.

- Flow calculations for the Lander CSO were developed in 1994 so that overflow data is now available for this location. 1994/95 Lander overflows totaled 26 MG compared with a baseline of 190 MG. The completed Lander CSO control project appears to be successfully reducing overflows.

- Brandon experienced overflow volumes of 54 MG compared with a baseline of 60 MG. Overflows at Brandon continue to be below baseline.

- Overflow volumes at Michigan were 35 MG compared to a baseline of 190 MG. The low CATAD recorded overflow volume may be due to the fact that the regulator gate broke in late 1994 and was removed. The flow through the Michigan Regulator station was not restricted by a gate to the EBI. In addition, the outfall gate did not open in some large storms and overflows exited only via the overflow weir.

  There is a significant operating relationship between the Michigan and Brandon basins that may account for unusually high or low volumes and frequencies at either location. An assessment of the total volume at both regulator stations may more accurately reflect volume and frequency reductions.

- All SSA stations experienced higher overflow volumes than reported in the previous 1993/94 period due to the return of rainfall to average conditions of about 36 inches per year. Rainfall during the 1993/94 reporting period was about 26 inches.

Northern Service Area (NSA)

1994/95 overflow volumes in the Northern Service Area were 175 MG compared to a baseline of 353 MG. Thus, the Northern Service Area also experienced a reduction in overflow volumes during the 1994/95 reporting period.

- Dexter overflowed 43 MG compared to a baseline of 15 MG. The higher Dexter volume is being investigated. Changes to the gate control program at the regulator station may result in lower overflow volumes.

- 1994/95 overflow volumes at North Beach were also slightly higher than baseline. Possible causes of the higher volume are being investigated.

- The 3rd Avenue West CSO location is monitored using level sensors and calculations to determine overflow volumes. The level sensor for the site was not operating properly during the first half of the reporting period. Thus, overflow data was not available from June 1994 through November 1994. The level sensor was repaired and resumed operation in December 1994.

- All NSA stations also experienced higher overflow volumes than reported in the previous 1993/94 period due to the return of rainfall to average conditions of about 36 inches per year.

Carkeek Park CSO Plant

The Carkeek CSO Treatment Facility began operation in the Fall of 1994. Carkeek experienced eight discharge events during the 1994/95 reporting period. Discharge events at Carkeek begin when treated effluent leaves the CSO facility and is discharged into Puget Sound. Discharges occurring less than 48 hours apart are considered to be associated with an individual rainfall event.

Further information on plant performance can be found in the monthly Carkeek discharge monitoring reports and the Carkeek annual report.

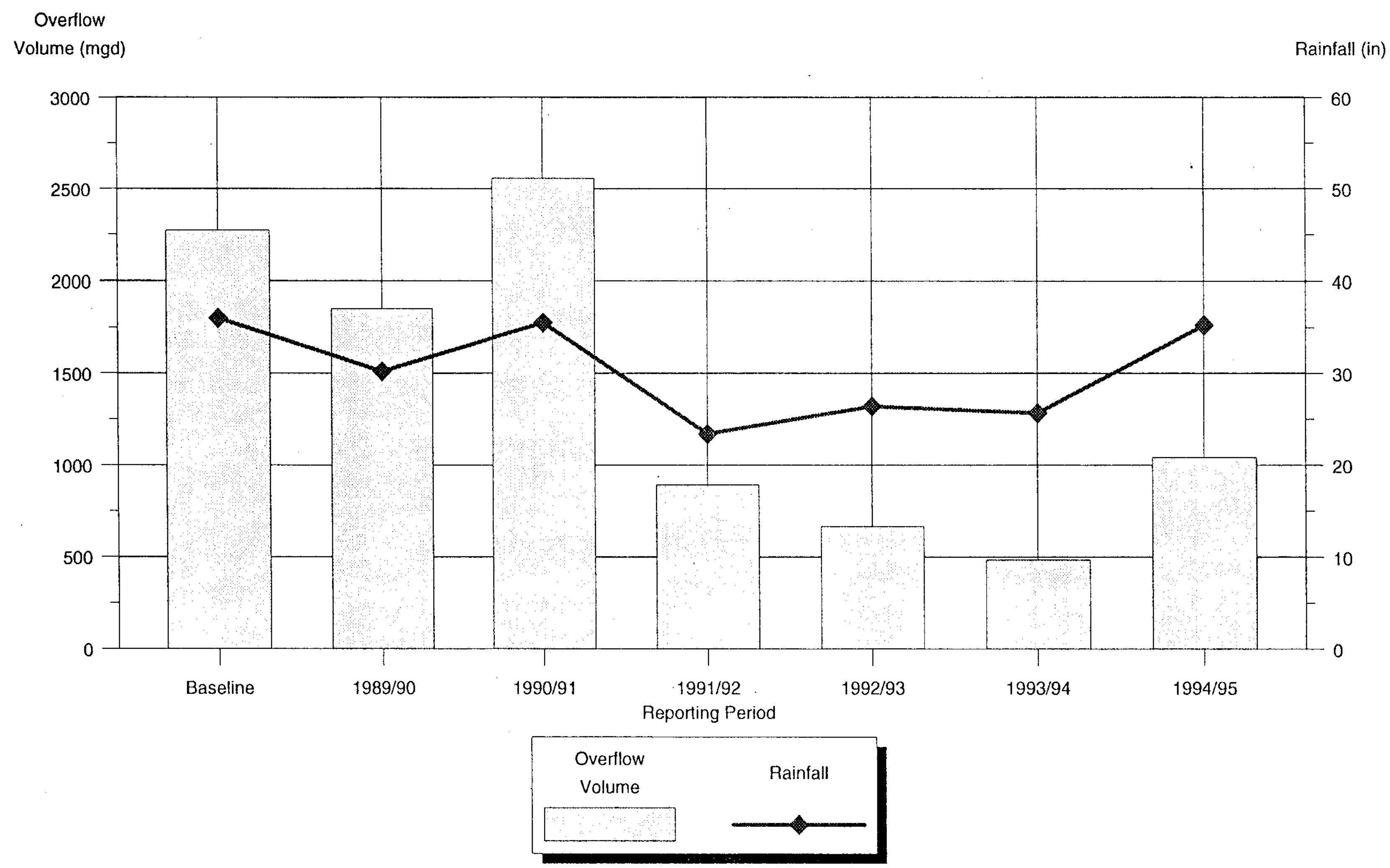
Alki

The calibration of the County model has not been completed at the Alki CSO locations. Data is now being collected to confirm the baseline estimates. Flow calculations were not available for the Alki stations so overflows were not recorded for the reporting period. Flow calculations are being developed so that overflow data will be included in the next annual CSO report.

1994/95 CSO Volumes Compared to Previous Years

Figure 3 illustrates the progress King County has made in CSO control. During the 1989/90 and 1990/91 reporting periods, a number of CSO control projects were still under construction and benefits had not yet been realized. Below average rainfall during the 1991/92, 1992/93, and 1993/94 reporting periods resulted in decreased overflow volumes. Average rainfall returned during the 1994/95 reporting period, but overflow volumes continue to remain below baseline overflow volumes. Benefits from the completed CSO control projects are now being

Figure 3 - Annual CSO Volumes



observed. Also, there may be some lingering effects from the three previous years of below average rainfall. For example, it may take more than one year of average rainfall before the groundwater table returns to average conditions.

1994/95 CSO Frequency of Events

During the 1994/95 reporting period, 368 overflow events occurred compared to a baseline of 599 events as shown in Table 6. Figure 4 graphically illustrates the monthly rainfall and overflow events for the 1994/95 reporting period.

The County has traditionally defined an overflow event as a period of rainfall during which an overflow was recorded that was preceded by three hours with no rain and followed by three hours without rain after the overflows from the system ceased. Thus, each event is separated by a three-hour period of non-discharge.

An evaluation of the event definition is underway to determine if the current definition is appropriate based on historical rainfall record for the Seattle area. In reporting CSO events, a single independent rainfall event should produce only one CSO event. The three-hour period of non-discharge is being examined to determine if rainfall patterns in the King County Metro service area may require a longer period of non-discharge to define independent events.

For comparison purposes, the 1994/95 CSO frequency of events were re-calculated based on a 48-hour period of non-discharge. The 48-hour period of non-discharge was chosen since it is used to characterize discharge events at Carkeek and may be more typical of storm event durations for the Seattle area than the three-hour event definition used in the *1988 Plan*. This resulted in 229 events during the reporting period (see Table 7), a significant decrease from the 368 events earlier calculated. This significant decrease suggests that many of the overflow events occur within a few hours of each other and are the result of a single rainfall event. Figure 5 graphically illustrates the monthly rainfall and overflow events based on a 48-hr non-discharge definition for the 1994/95 reporting period.

To date, the County has controlled the following CSO locations to one event per year: E. Pine St., Belvoir, Matthews Park, Rainier Ave., E. Marginal, 30th Ave. NE, Canal Street, Duwamish Pump Station, and 53rd Avenue SW.

Table 6
1994/95 Frequency of CSO Events
(Based on 3 hour non-discharge definition)

Station	Jun-94	Jul-94	Aug-94	Sep-94	Oct-94	Nov-94	Dec-94	Jan-95	Feb-95	Mar-95	Apr-95	May-95	1994/95 Total (overflows/yr)	Revised Baseline (overflows/yr)
SSA														
Denny Way	1			1	4	5	6	4	3	10	2	1	37	51
King Street	1				4	2	5	3	3	1			19	31
Connecticut Street	1				1	1	4	2	1				10	34
Hanford	1				3	1	5	3	3	6			22	40
Lander Street					1	1	5	3	3	4			17	29
Harbor Avenue	3						10	6	3	3	1	1	27	56
Chelan Avenue					1	2	5	2	1	1			12	25
W. Michigan Street							2		1				3	9
8th Avenue						1	1						2	12
Brandon Street	1			2	3	6	7	4	4	7	2		36	40
Michigan Street	1			1	2	2	5						11	40
Norfolk Street	1				1	2	5	2	2	5			18	12
Duwamish P.S.													0	<1
Henderson Street (1)	1			1	1	2	3	1	1	2			12	16
MLK Jr. Way (1)				1	1	4	2		2	2			12	23
Rainier Avenue													0	<1
E. Marginal Way													0	<1
S. Magnolia (1)	1				6	4	4	4	2	5	5		31	21
Terminal 115													N/A	8
NSA														
Ballard	1				1	1	4	1	1	1	1		11	13
11th Ave. NW (E. Ballard) (1)	1				2	3	5	2	1	4	2	1	21	13
Dexter Avenue	1			1	2	1	4	1	1	3	2		16	4
University	1				1	1	4	2	1	1	1	1	13	14
Montlake	1									3	1	1	6	16
Canal Street (Lake City)													0	<1
3rd Ave. W. (& Ewing St.) (2)							4	1	1				6	20
E. Pine Street													0	<1
Belvoir													0	<1
Matthews Park													0	<1
30th Ave. NE													0	<1
North Beach (1)				1	1	1	5	2	1	4	2	1	18	18
Carkeek														
Carkeek CSO Plant (3)						1	2	2	1	2			8	
Alki														
Murray Street													N/A	8
Barton Street													N/A	23
53rd Ave. SW													N/A	<1
SW Alaska St. (Beach Dr.) (1)													0	23
63rd Ave. SW													N/A	N/A
TOTAL	17	0	0	8	35	41	97	45	36	64	19	6	368	599

(1) Portable flow meters; not currently monitored by CATAD
(2) Level sensor at 3rd Ave. W. (& Ewing St.) was not working properly from 6/94-11/94.
(3) Carkeek CSO Plant was officially placed into service on 11/1/94. Events reported are based on a 48 hour non-discharge definition specific to Carkeek.

Figure 4 - 1994/95 CSO Events (Based on 3 hr non-discharge) vs. Rainfall

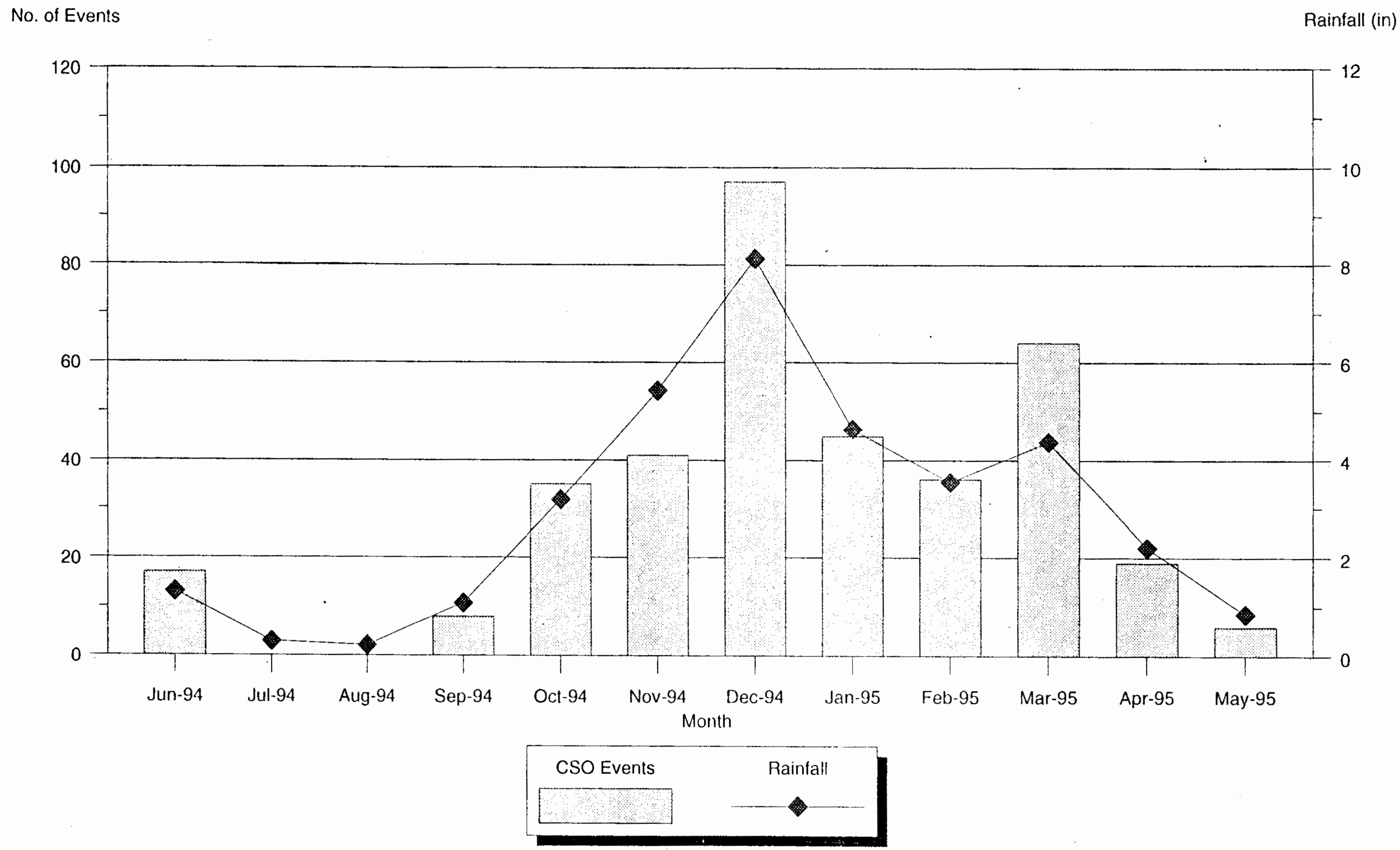


Table 7

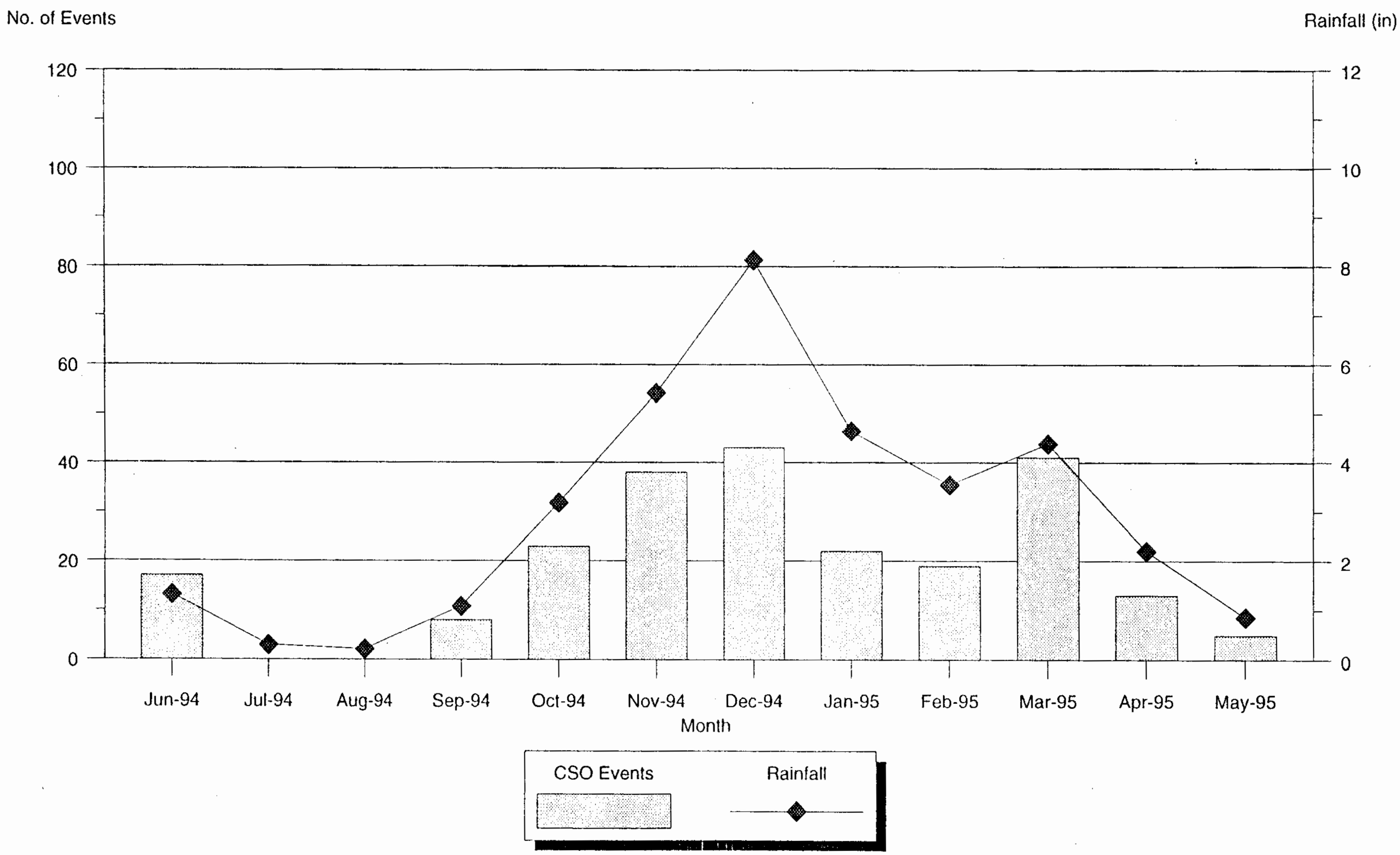
1994/95 Frequency of CSO Events

(Based on 48 hour non-discharge definition)

Station	Jun-94	Jul-94	Aug-94	Sep-94	Oct-94	Nov-94	Dec-94	Jan-95	Feb-95	Mar-95	Apr-95	May-95	1994/95 Total (overflows/yr)	Revised Baseline (overflows/yr)
SSA														
Denny Way	1			1	2	4	2	2	1	4	1		18	51
King Street	1				2	2	2	1	1	1			10	31
Connecticut Street	1				1	1	2	1	1				7	34
Hanford	1				2	1	2	1	1	3			11	40
Lander Street					1	1	2	1	1	2			8	29
Harbor Avenue	3						3	3	1	2	1	1	14	56
Chelan Avenue					1	1	2	1	1	1			7	25
W. Michigan Street							2		1				3	9
8th Avenue						1	1						2	12
Brandon Street	1			2	2	6	2	2	1	3	2		21	40
Michigan Street	1			1	1	2	2						7	40
Norfolk Street	1				1	2	2	1	1	2			10	12
Duwamish P.S.													0	<1
Henderson Street (1)	1			1	1	2	2	1	1	2			11	16
MLK Jr. Way (1)				1	1	4	2		1	2			11	23
Rainier Avenue													0	<1
E. Marginal Way													0	<1
S. Magnolia (1)	1				3	4	2	2	1	4	3		20	21
Terminal 115													N/A	8
NSA														
Ballard	1				1	1	2	1	1	1	1		9	13
11th Ave. NW (E. Ballard) (1)	1				1	3	2	1	1	4	1	1	15	13
Dexter Avenue	1			1	1	1	2	1	1	3	1		12	4
University	1				1	1	2	1	1	1	1	1	10	14
Montlake	1									2	1	1	5	16
Canal Street (Lake City)													0	<1
3rd Ave. W. (& Ewing St.) (2)							3	1	1				5	20
E. Pine Street													0	<1
Belvoir													0	<1
Matthews Park													0	<1
30th Ave. NE													0	<1
North Beach (1)				1	1	1	2	1	1	4	1	1	13	18
Carkeek														
Carkeek CSO Plant (3)													0	
Alki														
Murray Street													N/A	8
Barton Street													N/A	23
53rd Ave. SW													N/A	<1
SW Alaska St. (Beach Dr.) (1)													0	23
63rd Ave. SW													N/A	N/A
TOTAL	17	0	0	8	23	38	43	22	19	41	13	5	229	599

(1) Portable flow meters; not currently monitored by CATAD
(2) Level sensor at 3rd Ave. W. (& Ewing St.) was not working properly from 6/94-11/94.
(3) Carkeek CSO Plant was officially placed into service on 11/1/94. Events reported are based on a 48 hour non-discharge definition specific to Carkeek.

Figure 5 - 1994/95 CSO Events (Based on 48 hr non-discharge) vs. Rainfall



Section 3 - CSO Monitoring Program

Introduction

King County's CSO monitoring program includes discharge and sediment sampling of selected CSO sites to meet the requirements of WAC 173-245-040 and conditions in NPDES Permit WA-002918-1. As described in the *1988 Plan*, the County's sampling program was to collect data for five CSO sites per year. Discharge samples were to be taken four times per year under overflow conditions to characterize the CSO effluent at each site.

The *1988 Plan* also provided for sediment samples to be taken at nine CSO sites. These requirements were completed in 1990. However, the County has developed an additional comprehensive, site-specific baseline study plan for chemical and biological analysis of the sediment to meet additional NPDES requirements. Refer to the first section of this report for a description of the study.

1994/95 Sampling Status

Tables 8 and 9 summarize the sampling status of each site in the CSO monitoring program. As of the last reporting period, discharge sampling requirements remained at the following four stations: 8th Avenue, Dexter Avenue, Chelan Avenue, and Montlake. Successful sampling could not be completed during the previous reporting period due to inadequate storm events and equipment failures.

During the 1994/95 reporting period, one sample was taken at Montlake, one sample was taken at 8th Avenue, three samples were taken at Chelan Avenue, and two samples were taken at Dexter Avenue. Results from the 1994/95 discharge samples are contained in Appendix A.

In 1995, the County and the Department of Ecology agreed that four discharge samples per year would not be required for the remaining sites. Overflows at these sites occur so infrequently and briefly that they are difficult to capture. Thus, the discharge monitoring requirements are now complete.

Montlake Regulator

Three samples had been captured at Montlake Regulator during prior reporting periods, and only one sample remained to satisfy the four discharge samples per year requirement. The one remaining sample was captured at Montlake in March 1995. Conventionals and microbiology results were typical of CSOs, except for the chemical oxygen demand which was slightly high. No pesticides or PCBs were detected in the sample. Organic results were typical of CSOs. Acetone, a common solvent frequently detected in wastewater, was present at 7.8 ppb, a level below the reportable detection limit. Low levels of aluminum, chromium, barium, copper, iron, lead, and zinc were also found in the sample.

Dexter Regulator

Two samples were captured at Dexter Regulator during the 1994/95 reporting period. Conventionals and microbiology results were typical of CSOs. A small amount of the PCB Aroclor 1254 was detected (1.45 ppb). Organics results were typical of CSOs. The industrial solvents tetrachloroethylene (55.6 ppb) and acetone (36.1 ppb) were detected at slightly higher levels. Low levels of aluminum, chromium, barium, copper, iron, lead, mercury, silver, and zinc were also detected.

Chelan Regulator

Three samples were captured at Chelan Regulator during the 1994/95 reporting period. Conventionals and microbiology results were typical of CSOs. No pesticides or PCBs were detected. Organics results were typical of CSOs. The following metals were detected at low concentrations: aluminum, chromium, barium, copper, iron, lead, mercury, and zinc.

8th Avenue Regulator

One sample was captured at 8th Avenue Regulator Station in December 1994. Conventionals and microbiology results were typical of CSOs. No pesticides or PCBs were detected in the sample. Organics results were typical of CSOs. Some volatiles and BNA's were found; however, they were all below the reportable detection limit. Low concentrations of aluminum, barium, copper, iron and zinc were also found in the sample.

Table 8 - CSO Discharge Monitoring Program Status

CSO Location	Serial	Date	Sample #	Status of Program
Michigan Street	W039	03/26/88	8800300	Permit Requirements Met
Lander Street	W030	03/26/88	8800301	Permit Requirements Met
Denny Way	W027	03/25/88	8800302	Permit Requirements Met
11th Ave. NW (E. Ballard)	W004	02/22/89 04/06/88 01/14/88 11/02/88	8801743 8800352 8800052 8802026	Permit Requirements Met
3rd Avenue West (& Ewing Street)	W008	02/22/89 01/14/88 03/26/88 11/02/89	8801742 8800053 8800303 8802027	Permit Requirements Met
Ballard	W003	12/02/89 03/09/90 10/04/90 01/06/90	8909776 9000286 9000880 9000002	Permit Requirements Met
Connecticut Street	W029	08/22/89 10/22/89 04/23/90 02/07/90	8900832 8909689 9000394 9000215	Permit Requirements Met
Brandon Street	W041	03/14/90 06/03/90 10/04/90 12/04/90	9000289 9000510 9000881 9010003	Permit Requirements Met
Norfolk Street	W044	10/14/90 06/06/90 04/03/91 12/04/90	9000887 9000524 9100612 9010006	Permit Requirements Met
W. Michigan Street	W042	01/12/91 04/03/91 01/28/92 10/06/93	9100012 9100613 9200134 L2224-1	Permit Requirements Met
8th Avenue	W040	12/27/94	L5152-1	Further Monitoring Not Required
Chelan Avenue	W036	10/26/94 11/30/94 01/31/95	L4817-1 L5032-1 L5357-1	Further Monitoring Not Required
Dexter Avenue	W009	12/19/94 02/18/95	L5122-1 L5494-1	Further Monitoring Not Required
Montlake	W014	12/04/90 04/03/91 02/21/92 03/23/95	9100009 9010609 9010006 L5766-1	Permit Requirements Met

Table 9 - CSO Sediment Monitoring Program Status

CSO Location	Serial	Date	Sample #	Status of Program
Ballard	W003	05/30/89	8900560	Permit Requirements Met
11th Ave. NW (E. Ballard)	W004	05/30/89	8900561	Permit Requirements Met
3rd Ave. W. (& Ewing St.)	W008	05/30/89	8900563	Permit Requirements Met
Dexter Avenue	W009	05/30/89	8900565	Permit Requirements Met
Montlake	W014	05/30/89	8900564	Permit Requirements Met
8th Avenue	W040	05/23/90	9006690	Permit Requirements Met
Brandon Street	W041	05/23/90	9006687	Permit Requirements Met
Michigan Street	W042	05/23/90	9006691	Permit Requirements Met
Norfolk Street	W044	05/23/90	9006688	Permit Requirements Met

Appendix A
1994/95 Discharge Monitoring Data

NPDES CSO's -- MONTLAKE REGULATOR

Station I.D.:	**S031026**			
Collect date:	23-Mar-95			
Station description:	**Montlake Reg. CSO**			
Lab sample number:	L5766-1			
Sample description:	approx. 14 samples, sampler pulsed @ 100,000 gal.			
Time (hr):	0314			
Delta time (hrs):	1			
Discharge volume (gallons):	**1,466,229**			
CONVENTIONALS	mg/l	MDL	RDL	METHOD
Biochemical Oxygen Demand	**68**	2	5	SM5210
Chemical Oxygen Demand	**340**	3	5	SM5220-D
Oil and Grease, Total	**7.9**	2	5	SM5520-B
Total Suspended Solids	**170**	0.5	1	SM2540-D
Volatile Suspended Solids	**54.5**	0.5	1	SM2540-E
Cyanide	<MDL	0.005	0.01	SM4500-CN-C,E
MICROBIOLOGY	orgs/100mls			METHOD
Fecal Coliform	**250,000**			SM-9222 D ed.17
Enterococcus	**52,000**			SM-9230 C ed.17
METALS	mg/l	MDL	RDL	METHOD
Calcium, Total, ICP	**10.6**	0.05	0.25	METRO 16-02-001
Magnesium, Total, ICP	**3.85**	0.03	0.15	METRO 16-02-001
Beryllium, Total, ICP	<MDL	0.001	0.005	METRO 16-02-001
Aluminum, Total, ICP	**5.81**	0.1	0.5	METRO 16-02-001
Cadmium, Total, ICP	<MDL	0.003	0.015	METRO 16-02-001
Antimony, Total, ICP	<MDL	0.03	0.15	METRO 16-02-001
Arsenic, Total, ICP	<MDL	0.05	0.25	METRO 16-02-001
Chromium, Total, ICP	(<RDL)**0.014**	0.005	0.025	METRO 16-02-001
Barium, Total, ICP	**0.062**	0.001	0.005	METRO 16-02-001
Copper, Total, ICP	**0.0487**	0.004	0.02	METRO 16-02-001
Iron, Total, ICP	**6.12**	0.05	0.25	METRO 16-02-001
Lead, Total, ICP	(<RDL)**0.097**	0.03	0.15	METRO 16-02-001
Mercury, Total, CVAA	<MDL	0.0002	0.002	METRO 16-01-001
Manganese, Total, ICP	**0.155**	0.002	0.01	METRO 16-02-001
Molybdenum, Total, ICP	<MDL	0.02	0.1	METRO 16-02-001
Nickel, Total, ICP	<MDL	0.02	0.1	METRO 16-02-001
Potassium, Total, ICP	<MDL	2	10	METRO 16-02-001
Selenium, Total, ICP	<MDL	0.05	0.25	METRO 16-02-001
Silver, Total, ICP	<MDL	0.004	0.02	METRO 16-02-001
Sodium, Total, ICP	**3.43**	0.5	2.5	METRO 16-02-001
Thallium, Total, ICP	<MDL	0.2	1	METRO 16-02-001
Zinc, Total, ICP	**0.147**	0.005	0.025	METRO 16-02-001
BNA's (Semi-volatiles)	ppb	MDL	RDL	METHOD
N-Nitrosodimethylamine	<MDL	3.8	5.71	EPA 625
Phenol	<MDL	3.8	5.71	EPA 625
Bis(2-Chloroethyl)Ether	<MDL	0.57	0.952	EPA 625
2-Chlorophenol	<MDL	1.9	3.81	EPA 625
1,3-Dichlorobenzene	<MDL	0.57	0.952	EPA 625

1,4-Dichlorobenzene		<MDL	0.57	0.952	EPA 625
1,2-Dichlorobenzene		<MDL	0.57	0.952	EPA 625
Bis(2-Chloroisopropyl)Ether		<MDL	1.9	3.81	EPA 625
N-Nitrosodi-N-Propylamine		<MDL	0.95	1.9	EPA 625
Hexachloroethane		<MDL	0.95	1.9	EPA 625
Nitrobenzene		<MDL	0.95	1.9	EPA 625
Isophorone		<MDL	0.95	1.9	EPA 625
2-Nitrophenol		<MDL	0.95	1.9	EPA 625
2,4-Dimethylphenol		<MDL	0.95	1.9	EPA 625
Bis(2-Chloroethoxy)Methane		<MDL	0.95	1.9	EPA 625
2,4-Dichlorophenol		<MDL	0.95	1.9	EPA 625
1,2,4-Trichlorobenzene		<MDL	0.57	0.952	EPA 625
Naphthalene		<MDL	1.5	2.86	EPA 625
Hexachlorobutadiene		<MDL	0.95	1.9	EPA 625
4-Chloro-3-Methylphenol		<MDL	1.9	3.81	EPA 625
Hexachlorocyclopentadiene		<MDL	0.95	1.9	EPA 625
2,4,6-Trichlorophenol		<MDL	3.8	7.62	EPA 625
2-Chloronaphthalene		<MDL	0.57	0.952	EPA 625
Acenaphthylene		<MDL	0.57	0.952	EPA 625
Dimethyl Phthalate		<MDL	0.38	0.571	EPA 625
2,6-Dinitrotoluene		<MDL	0.38	0.762	EPA 625
Acenaphthene		<MDL	0.38	0.762	EPA 625
2,4-Dinitrophenol		<MDL	1.9	3.81	EPA 625
4-Nitrophenol		<MDL	1.9	3.81	EPA 625
2,4-Dinitrotoluene		<MDL	0.38	0.762	EPA 625
Fluorene		<MDL	0.57	0.952	EPA 625
Diethyl Phthalate		<MDL	0.95	1.9	EPA 625
4-Chlorophenyl Phenyl Ether		<MDL	0.57	0.952	EPA 625
4,6-Dinitro-O-Cresol		<MDL	1.9	3.81	EPA 625
N-Nitrosodiphenylamine		<MDL	0.95	1.9	EPA 625
1,2-Diphenylhydrazine		<MDL	1.9	3.81	EPA 625
4-Bromophenyl Phenyl Ether		<MDL	0.38	0.571	EPA 625
Hexachlorobenzene		<MDL	0.57	0.952	EPA 625
Pentachlorophenol		<MDL	0.95	1.9	EPA 625
Phenanthrene		<MDL	0.57	0.952	EPA 625
Anthracene		<MDL	0.57	0.952	EPA 625
Di-N-Butyl Phthalate		<MDL	0.95	1.9	EPA 625
Fluoranthene		<MDL	0.57	1.14	EPA 625
Benzidine		<MDL	23	45.7	EPA 625
Pyrene		<MDL	0.57	0.952	EPA 625
Benzyl Butyl Phthalate		<MDL	0.57	0.952	EPA 625
Benzo(A)Anthracene		<MDL	0.57	0.952	EPA 625
Chrysene		<MDL	0.57	0.952	EPA 625
3,3'-Dichlorobenzidine		<MDL	0.95	1.9	EPA 625
Bis(2-Ethylhexyl)Phthalate		<MDL	0.57	0.952	EPA 625
Di-N-Octyl Phthalate		<MDL	0.57	0.952	EPA 625
Benzo(B)Fluoranthene		<MDL	1.5	2.86	EPA 625
Benzo(K)Fluoranthene		<MDL	1.5	2.86	EPA 625
Benzo(A)Pyrene		<MDL	0.95	1.9	EPA 625
Indeno(1,2,3-Cd)Pyrene		<MDL	0.95	1.9	EPA 625
Dibenzo(A,H)Anthracene		<MDL	1.5	2.86	EPA 625
Benzo(G,H,I)Perylene		<MDL	0.95	1.9	EPA 625

Aniline	<MDL	1.9	3.81	EPA 625
Benzyl Alcohol	<MDL	0.95	1.9	EPA 625
2-Methylphenol	<MDL	0.95	1.9	EPA 625
4-Methylphenol	<MDL	0.95	1.9	EPA 625
Benzoic Acid	<MDL	3.8	5.71	EPA 625
4-Chloroaniline	<MDL	1.9	3.81	EPA 625
2-Methylnaphthalene	<MDL	1.5	2.86	EPA 625
2,4,5-Trichlorophenol	<MDL	3.8	7.62	EPA 625
2-Nitroaniline	<MDL	3.8	5.71	EPA 625
3-Nitroaniline	<MDL	3.8	5.71	EPA 625
Dibenzofuran	<MDL	0.95	1.9	EPA 625
4-Nitroaniline	<MDL	3.8	5.71	EPA 625
Carbazole	<MDL	0.95	1.9	EPA 625
Coprostanol	**44.4**	3.8	5.71	EPA 625
PESTICIDE's/PCB's	ppb	MDL	RDL	METHOD
4,4'-DDD	<MDL	0.048	0.0952	EPA 608
4,4'-DDE	<MDL	0.048	0.0952	EPA 608
4,4'-DDT	<MDL	0.048	0.0952	EPA 608
Aldrin	<MDL	0.048	0.0952	EPA 608
Alpha-BHC	<MDL	0.048	0.0952	EPA 608
Aroclor 1016	<MDL	0.48	0.952	EPA 608
Aroclor 1221	<MDL	0.48	0.952	EPA 608
Aroclor 1232	<MDL	0.48	0.952	EPA 608
Aroclor 1242	<MDL	0.48	0.952	EPA 608
Aroclor 1248	<MDL	0.48	0.952	EPA 608
Aroclor 1254	<MDL	0.48	0.952	EPA 608
Aroclor 1260	<MDL	0.48	0.952	EPA 608
Beta-BHC	<MDL	0.048	0.0952	EPA 608
Chlordane	<MDL	0.24	0.476	EPA 608
Delta-BHC	<MDL	0.048	0.0952	EPA 608
Dieldrin	<MDL	0.048	0.0952	EPA 608
Endosulfan I	<MDL	0.048	0.0952	EPA 608
Endosulfan II	<MDL	0.048	0.0952	EPA 608
Endosulfan Sulfate	<MDL	0.048	0.0952	EPA 608
Endrin	<MDL	0.048	0.0952	EPA 608
Endrin Aldehyde	<MDL	0.048	0.0952	EPA 608
Gamma-BHC (Lindane)	<MDL	0.048	0.0952	EPA 608
Heptachlor	<MDL	0.048	0.0952	EPA 608
Heptachlor Epoxide	<MDL	0.048	0.0952	EPA 608
Methoxychlor	<MDL	0.24	0.476	EPA 608
Toxaphene	<MDL	0.48	0.952	EPA 608
VOLATILES	ppb	MDL	RDL	METHOD
CHLOROMETHANE	<MDL	1	2	EPA 624
VINYL CHLORIDE	<MDL	1	2	EPA 624
BROMOMETHANE	<MDL	1	2	EPA 624
CHLOROETHANE	<MDL	1	2	EPA 624
TRICHLOROFLUOROMETHANE	<MDL	1	2	EPA 624
ACROLEIN	<MDL	5	10	EPA 624
1,1-DICHLOROETHYLENE	<MDL	1	2	EPA 624
METHYLENE CHLORIDE	<MDL	5	10	EPA 624

ACRYLONITRILE		<MDL	5	10	EPA 624
TRANS-1,2-DICHLOROETHYLENE		<MDL	1	2	EPA 624
1,1-DICHLOROETHANE		<MDL	1	2	EPA 624
CHLOROFORM		<MDL	1	2	EPA 624
1,1,1-TRICHLOROETHANE		<MDL	1	2	EPA 624
CARBON TETRACHLORIDE		<MDL	1	2	EPA 624
BENZENE		<MDL	1	2	EPA 624
1,2-DICHLOROETHANE		<MDL	1	2	EPA 624
1,1,2-TRICHLOROETHYLENE		<MDL	1	2	EPA 624
1,2-DICHLOROPROPANE		<MDL	1	2	EPA 624
BROMODICHLOROMETHANE		<MDL	1	2	EPA 624
2-CHLOROETHYLVINYLETHER		<MDL	1	2	EPA 624
TRANS-1,3-DICHLOROPROPENE		<MDL	1	2	EPA 624
TOLUENE		<MDL	1	2	EPA 624
CIS-1,3-DICHLOROPROPENE		<MDL	1	2	EPA 624
1,1,2-TRICHLOROETHANE		<MDL	1	2	EPA 624
TETRACHLOROETHYLENE		<MDL	1	2	EPA 624
CHLORODIBROMOMETHANE		<MDL	1	2	EPA 624
CHLOROBENZENE		<MDL	1	2	EPA 624
ETHYLBENZENE		<MDL	1	2	EPA 624
BROMOFORM		<MDL	1	2	EPA 624
1,1,2,2-TETRACHLOROETHANE		<MDL	1	2	EPA 624
ACETONE		(<RDL)**7.8**	5	10	EPA 624
CARBON DISULFIDE		<MDL	1	2	EPA 624
VINYL ACETATE		<MDL	5	10	EPA 624
2-BUTANONE (MEK)		<MDL	5	10	EPA 624
4-METHYL-2-PENTANONE (MIBK)		<MDL	5	10	EPA 624
2-HEXANONE		<MDL	5	10	EPA 624
TOTAL XYLENES		<MDL	1	2	EPA 624
STYRENE		<MDL	1	2	EPA 624
		MDL = minimum detection limit			
		RDL = reportable detection limit			

NPDES CSO's -- DEXTER REGULATOR

Station I.D.:	**S035026**	**S035026**			
Collect date:	19-Dec-94	18-Feb-95			
Station description:	**Dexter Reg. CSO**	**Dexter Reg. CSO**			
Lab sample number:	L5122-1	L5494-1			
Sample description:	17 grabs composited	6 grabs composited			
Time (hr.):	1521	1059			
Delta time (hrs):	4	1			
Discharge volume (gallons):	**8,658,280**	**987,098**			
CONVENTIONALS	mg/l	mg/l	MDL	RDL	METHOD
Biochemical Oxygen Demand	**47**	**28**	2	5	SM5210
Chemical Oxygen Demand	**90**	**100**	3	5	SM5220-D
Oil and Grease, Total	**9.2**	**24**	2	5	SM5520-B
Total Suspended Solids	**150**	**130**	0.5	1	SM2540-D
Volatile Suspended Solids	**46**	**52**	0.5	1	SM2540-E
Cyanide	<MDL	permit req's met	0.005	0.01	SM4500-CN-C,E
MICROBIOLOGY	orgs/100mls	orgs/100mls			METHOD
Fecal Coliform	**230,000**	**250,000**			SM-9222 D ed.17
Enterococcus	**40,000**	**53,000**			SM-9230 C ed.17
METALS	mg/l	mg/l	MDL	RDL	METHOD
Calcium, Total, ICP	**13.6**	**6.51**	0.05	0.25	METRO 16-02-001
Magnesium, Total, ICP	**1.95**	**1.81**	0.03	0.15	METRO 16-02-001
Beryllium, Total, ICP	<MDL	<MDL	0.001	0.005	METRO 16-02-001
Aluminum, Total, ICP	**3.57**	**3.61**	0.1	0.5	METRO 16-02-001
Cadmium, Total, ICP	<MDL	<MDL	0.003	0.015	METRO 16-02-001
Antimony, Total, ICP	<MDL	permit req's met	0.03	0.15	METRO 16-02-001
Arsenic, Total, ICP	<MDL	<MDL	0.05	0.25	METRO 16-02-001
Chromium, Total, ICP	(<RDL)**0.0094**	(<RDL)**0.0095**	0.005	0.025	METRO 16-02-001
Barium, Total, ICP	**0.0618**	permit req's met	0.001	0.005	METRO 16-02-001
Copper, Total, ICP	**0.0479**	**0.0548**	0.004	0.02	METRO 16-02-001
Iron, Total, ICP	**3.28**	**3.87**	0.05	0.25	METRO 16-02-001
Lead, Total, ICP	(<RDL)**0.054**	(<RDL)**0.048**	0.03	0.15	METRO 16-02-001
Mercury, Total, CVAA	(<RDL)**0.00031**	(<RDL)**0.00066**	0.0002	0.002	METRO 16-01-001
Manganese, Total, ICP	**0.0759**	**0.0792**	0.002	0.01	METRO 16-02-001
Molybdenum, Total, ICP	<MDL	<MDL	0.02	0.1	METRO 16-02-001
Nickel, Total, ICP	<MDL	<MDL	0.02	0.1	METRO 16-02-001
Potassium, Total, ICP	(<RDL)**2.2**	(<RDL)**2.2**	2	10	METRO 16-02-001
Selenium, Total, ICP	<MDL	<MDL	0.05	0.25	METRO 16-02-001
Silver, Total, ICP	<MDL	(<RDL)**0.01**	0.004	0.02	METRO 16-02-001
Sodium, Total, ICP	**4.58**	**5.24**	0.5	2.5	METRO 16-02-001
Thallium, Total, ICP	<MDL	<MDL	0.2	1	METRO 16-02-001
Zinc, Total, ICP	**0.125**	**0.157**	0.005	0.025	METRO 16-02-001
BNA's (Semi-volatiles)	ppb		MDL	RDL	METHOD
N-Nitrosodimethylamine	<MDL	permit req's met	3.8	5.66	EPA 625
Phenol	<MDL	permit req's met	3.8	5.66	EPA 625
Bis(2-Chloroethyl)Ether	<MDL	permit req's met	0.57	0.943	EPA 625
2-Chlorophenol	<MDL	permit req's met	1.9	3.77	EPA 625
1,3-Dichlorobenzene	<MDL	permit req's met	0.57	0.943	EPA 625
1,4-Dichlorobenzene	<MDL	permit req's met	0.57	0.943	EPA 625
1,2-Dichlorobenzene	<MDL	permit req's met	0.57	0.943	EPA 625

NPDES CSO's -- DEXTER REGULATOR

Bis(2-Chloroisopropyl)Ether	<MDL	permit req's met	1.9	3.77	EPA 625
N-Nitrosodi-N-Propylamine	<MDL	permit req's met	0.94	1.89	EPA 625
Hexachloroethane	<MDL	permit req's met	0.94	1.89	EPA 625
Nitrobenzene	<MDL	permit req's met	0.94	1.89	EPA 625
Isophorone	<MDL	permit req's met	0.94	1.89	EPA 625
2-Nitrophenol	<MDL	permit req's met	0.94	1.89	EPA 625
2,4-Dimethylphenol	<MDL	permit req's met	0.94	1.89	EPA 625
Bis(2-Chloroethoxy)Methane	<MDL	permit req's met	0.94	1.89	EPA 625
2,4-Dichlorophenol	<MDL	permit req's met	0.94	1.89	EPA 625
1,2,4-Trichlorobenzene	<MDL	permit req's met	0.57	0.943	EPA 625
Naphthalene	<MDL	permit req's met	1.5	2.83	EPA 625
Hexachlorobutadiene	<MDL	permit req's met	0.94	1.89	EPA 625
4-Chloro-3-Methylphenol	<MDL	permit req's met	1.9	3.77	EPA 625
Hexachlorocyclopentadiene	<MDL	permit req's met	0.94	1.89	EPA 625
2,4,6-Trichlorophenol	<MDL	permit req's met	3.8	7.55	EPA 625
2-Chloronaphthalene	<MDL	permit req's met	0.57	0.943	EPA 625
Acenaphthylene	<MDL	permit req's met	0.57	0.943	EPA 625
Dimethyl Phthalate	<MDL	permit req's met	0.38	0.566	EPA 625
2,6-Dinitrotoluene	<MDL	permit req's met	0.38	0.755	EPA 625
Acenaphthene	<MDL	permit req's met	0.38	0.755	EPA 625
2,4-Dinitrophenol	<MDL	permit req's met	1.9	3.77	EPA 625
4-Nitrophenol	<MDL	permit req's met	1.9	3.77	EPA 625
2,4-Dinitrotoluene	<MDL	permit req's met	0.38	0.755	EPA 625
Fluorene	<MDL	permit req's met	0.57	0.943	EPA 625
Diethyl Phthalate	<MDL	permit req's met	0.94	1.89	EPA 625
4-Chlorophenyl Phenyl Ether	<MDL	permit req's met	0.57	0.943	EPA 625
4,6-Dinitro-O-Cresol	<MDL	permit req's met	1.9	3.77	EPA 625
N-Nitrosodiphenylamine	<MDL	permit req's met	0.94	1.89	EPA 625
1,2-Diphenylhydrazine	<MDL	permit req's met	1.9	3.77	EPA 625
4-Bromophenyl Phenyl Ether	<MDL	permit req's met	0.38	0.566	EPA 625
Hexachlorobenzene	<MDL	permit req's met	0.57	0.943	EPA 625
Pentachlorophenol	<MDL	permit req's met	0.94	1.89	EPA 625
Phenanthrene	(<RDL)**0.69**	permit req's met	0.57	0.943	EPA 625
Anthracene	<MDL	permit req's met	0.57	0.943	EPA 625
Di-N-Butyl Phthalate	<MDL	permit req's met	0.94	1.89	EPA 625
Fluoranthene	(<RDL)**1**	permit req's met	0.57	1.13	EPA 625
Benzidine	<MDL	permit req's met	23	45.3	EPA 625
Pyrene	(<RDL)**0.76**	permit req's met	0.57	0.943	EPA 625
Benzyl Butyl Phthalate	(<RDL)**0.79**	permit req's met	0.57	0.943	EPA 625
Benzo(A)Anthracene	<MDL	permit req's met	0.57	0.943	EPA 625
Chrysene	(<RDL)**0.69**	permit req's met	0.57	0.943	EPA 625
3,3'-Dichlorobenzidine	<MDL	permit req's met	0.94	1.89	EPA 625
Bis(2-Ethylhexyl)Phthalate	**9.51**	permit req's met	0.57	0.943	EPA 625
Di-N-Octyl Phthalate	<MDL	permit req's met	0.57	0.943	EPA 625
Benzo(B)Fluoranthene	<MDL	permit req's met	1.5	2.83	EPA 625
Benzo(K)Fluoranthene	<MDL	permit req's met	1.5	2.83	EPA 625
Benzo(A)Pyrene	<MDL	permit req's met	0.94	1.89	EPA 625
Indeno(1,2,3-Cd)Pyrene	<MDL	permit req's met	0.94	1.89	EPA 625
Dibenzo(A,H)Anthracene	<MDL	permit req's met	1.5	2.83	EPA 625
Benzo(G,H,I)Perylene	<MDL	permit req's met	0.94	1.89	EPA 625
Aniline	<MDL	permit req's met	1.9	3.77	EPA 625
Benzyl Alcohol	**2.33**	permit req's met	0.94	1.89	EPA 625
2-Methylphenol	<MDL	permit req's met	0.94	1.89	EPA 625
4-Methylphenol	**3.63**	permit req's met	0.94	1.89	EPA 625

Benzoic Acid	**27.6**	permit req's met	3.8	5.66	EPA 625
4-Chloroaniline	<MDL	permit req's met	1.9	3.77	EPA 625
2-Methylnaphthalene	<MDL	permit req's met	1.5	2.83	EPA 625
2,4,5-Trichlorophenol	<MDL	permit req's met	3.8	7.55	EPA 625
2-Nitroaniline	<MDL	permit req's met	3.8	5.66	EPA 625
3-Nitroaniline	<MDL	permit req's met	3.8	5.66	EPA 625
Dibenzofuran	<MDL	permit req's met	0.94	1.89	EPA 625
4-Nitroaniline	<MDL	permit req's met	3.8	5.66	EPA 625
Carbazole	<MDL	permit req's met	0.94	1.89	EPA 625
Coprostanol	**30.1**	permit req's met	3.8	5.66	EPA 625
PESTICIDE's/PCB's	ppb		MDL	RDL	METHOD
4,4'-DDD	<MDL	permit req's met	0.047	0.0943	EPA 608
4,4'-DDE	<MDL	permit req's met	0.047	0.0943	EPA 608
4,4'-DDT	<MDL	permit req's met	0.047	0.0943	EPA 608
Aldrin	<MDL	permit req's met	0.047	0.0943	EPA 608
Alpha-BHC	<MDL	permit req's met	0.047	0.0943	EPA 608
Aroclor 1016	<MDL	permit req's met	0.47	0.943	EPA 608
Aroclor 1221	<MDL	permit req's met	0.47	0.943	EPA 608
Aroclor 1232	<MDL	permit req's met	0.47	0.943	EPA 608
Aroclor 1242	<MDL	permit req's met	0.47	0.943	EPA 608
Aroclor 1248	<MDL	permit req's met	0.47	0.943	EPA 608
Aroclor 1254	**1.45**	permit req's met	0.47	0.943	EPA 608
Aroclor 1260	<MDL	permit req's met	0.47	0.943	EPA 608
Beta-BHC	<MDL	permit req's met	0.047	0.0943	EPA 608
Chlordane	<MDL	permit req's met	0.24	0.472	EPA 608
Delta-BHC	<MDL	permit req's met	0.047	0.0943	EPA 608
Dieldrin	<MDL	permit req's met	0.047	0.0943	EPA 608
Endosulfan I	<MDL	permit req's met	0.047	0.0943	EPA 608
Endosulfan II	<MDL	permit req's met	0.047	0.0943	EPA 608
Endosulfan Sulfate	<MDL	permit req's met	0.047	0.0943	EPA 608
Endrin	<MDL	permit req's met	0.047	0.0943	EPA 608
Endrin Aldehyde	<MDL	permit req's met	0.047	0.0943	EPA 608
Gamma-BHC (Lindane)	<MDL	permit req's met	0.047	0.0943	EPA 608
Heptachlor	<MDL	permit req's met	0.047	0.0943	EPA 608
Heptachlor Epoxide	<MDL	permit req's met	0.047	0.0943	EPA 608
Methoxychlor	<MDL	permit req's met	0.24	0.472	EPA 608
Toxaphene	<MDL	permit req's met	0.47	0.943	EPA 608
VOLATILES	ppb		MDL	RDL	METHOD
CHLOROMETHANE	<MDL	permit req's met	1	2	EPA 624
VINYL CHLORIDE	<MDL	permit req's met	1	2	EPA 624
BROMOMETHANE	<MDL	permit req's met	1	2	EPA 624
CHLOROETHANE	<MDL	permit req's met	1	2	EPA 624
TRICHLOROFLUOROMETHANE	<MDL	permit req's met	1	2	EPA 624
ACROLEIN	<MDL	permit req's met	5	10	EPA 624
1,1-DICHLOROETHYLENE	<MDL	permit req's met	1	2	EPA 624
METHYLENE CHLORIDE	<MDL	permit req's met	5	10	EPA 624
ACRYLONITRILE	<MDL	permit req's met	5	10	EPA 624
TRANS-1,2-DICHLOROETHYLENE	<MDL	permit req's met	1	2	EPA 624
1,1-DICHLOROETHANE	<MDL	permit req's met	1	2	EPA 624
CHLOROFORM	(<RDL)**1.1**	permit req's met	1	2	EPA 624
1,1,1-TRICHLOROETHANE	<MDL	permit req's met	1	2	EPA 624
CARBON TETRACHLORIDE	(<RDL)**1.3**	permit req's met	1	2	EPA 624

BENZENE	<MDL	permit req's met	1	2	EPA 624
1,2-DICHLOROETHANE	<MDL	permit req's met	1	2	EPA 624
1,1,2-TRICHLOROETHYLENE	<MDL	permit req's met	1	2	EPA 624
1,2-DICHLOROPROPANE	<MDL	permit req's met	1	2	EPA 624
BROMODICHLOROMETHANE	<MDL	permit req's met	1	2	EPA 624
2-CHLOROETHYLVINYLETHER	<MDL	permit req's met	1	2	EPA 624
TRANS-1,3-DICHLOROPROPENE	<MDL	permit req's met	1	2	EPA 624
TOLUENE	<MDL	permit req's met	1	2	EPA 624
CIS-1,3-DICHLOROPROPENE	<MDL	permit req's met	1	2	EPA 624
1,1,2-TRICHLOROETHANE	<MDL	permit req's met	1	2	EPA 624
TETRACHLOROETHYLENE	**55.6**	permit req's met	1	2	EPA 624
CHLORODIBROMOMETHANE	<MDL	permit req's met	1	2	EPA 624
CHLOROBENZENE	<MDL	permit req's met	1	2	EPA 624
ETHYLBENZENE	<MDL	permit req's met	1	2	EPA 624
BROMOFORM	<MDL	permit req's met	1	2	EPA 624
1,1,2,2-TETRACHLOROETHANE	<MDL	permit req's met	1	2	EPA 624
ACETONE	**36.1**	permit req's met	5	10	EPA 624
CARBON DISULFIDE	<MDL	permit req's met	1	2	EPA 624
VINYL ACETATE	<MDL	permit req's met	5	10	EPA 624
2-BUTANONE (MEK)	<MDL	permit req's met	5	10	EPA 624
4-METHYL-2-PENTANONE (MIBK)	<MDL	permit req's met	5	10	EPA 624
2-HEXANONE	<MDL	permit req's met	5	10	EPA 624
TOTAL XYLENES	<MDL	permit req's met	1	2	EPA 624
STYRENE	<MDL	permit req's met	1	2	EPA 624
	MDL = minimum detectable limit				
	RDL = reportable detectable limit				

NPDES CSO's -- CHELAN REGULATOR

Station I.D.:	**S055318**	**S055318**	**S055318**			
Collect date:	26-Oct-94	30-Nov-94	31-Jan-95			
Station description:		**Chelan Regulator CSO**				
Lab sample number:	L4817-1	L5032-1	L5357-1			
Sample description:	41 samples	286 samples	50 samples			
Time (hr.):	1321	0319	0656			
Delta time (hrs.):	2	9	6			
Discharge volume (gallons):	**371,082**	**1,855,529**	**713,249**			
CONVENTIONALS	mg/l	mg/l	mg/l	MDL	RDL	METHOD
Biochemical Oxygen Demand	**32**	**34**	**23**	2	5	SM5210
Chemical Oxygen Demand	**81**	**140**	**67**	3	5	SM5220-D
Oil and Grease, Total	**11**	**22**	(<RDL)**4**	2	5	SM5520-B
Total Suspended Solids	**150**	**180**	**220**	0.5	1	SM2540-D
Volatile Suspended Solids	**56**	**69.9**	**110**	0.5	1	SM2540-E
Cyanide	(<RDL)**0.006**	permit req's met	permit req's met	0.005	0.01	SM4500-CN-C,E
MICROBIOLOGY	orgs/100mls	orgs/100mls	orgs/100mls			METHOD
Fecal Coliform	**500,000**	**500,000**	**370,000**			SM-9222 D ed.17
Enterococcus	**190,000**	**260,000**	**200,000**			SM-9230 C ed.17
METALS	mg/l	mg/l	mg/l	MDL	RDL	METHOD
Calcium, Total, ICP	**9.52**	**15.6**	**12.9**	0.05	0.25	METRO 16-02-001
Magnesium, Total, ICP	**2.5**	**4.61**	**4.01**	0.03	0.15	METRO 16-02-001
Beryllium, Total, ICP	<MDL	<MDL	<MDL	0.001	0.005	METRO 16-02-001
Aluminum, Total, ICP	**3.52**	**4.64**	**1.86**	0.1	0.5	METRO 16-02-001
Cadmium, Total, ICP	<MDL	<MDL	<MDL	0.003	0.015	METRO 16-02-001
Antimony, Total, ICP	<MDL	permit req's met	permit req's met	0.03	0.15	METRO 16-02-001
Arsenic, Total, ICP	<MDL	<MDL	<MDL	0.05	0.25	METRO 16-02-001
Chromium, Total, ICP	(<RDL)**0.012**	(<RDL)**0.016**	(<RDL)**0.0056**	0.005	0.025	METRO 16-02-001
Barium, Total, ICP	**0.0549**	**0.0709**	**0.0295**	0.001	0.005	METRO 16-02-001
Copper, Total, ICP	**0.044**	**0.0483**	(<RDL)**0.019**	0.004	0.02	METRO 16-02-001
Iron, Total, ICP	**4.28**	**5.42**	**1.87**	0.05	0.25	METRO 16-02-001
Lead, Total, ICP	(<RDL)**0.073**	(<RDL)**0.048**	<MDL	0.03	0.15	METRO 16-02-001
Mercury, Total, CVAA	<MDL	(<RDL)**0.00033**	<MDL	0.0002	0.002	METRO 16-01-001
Manganese, Total, ICP	**0.157**	**0.164**	**0.0725**	0.002	0.01	METRO 16-02-001
Molybdenum, Total, ICP	<MDL	<MDL	<MDL	0.02	0.1	METRO 16-02-001
Nickel, Total, ICP	<MDL	<MDL	<MDL	0.02	0.1	METRO 16-02-001
Potassium, Total, ICP	(<RDL)**2.8**	(<RDL)**2.4**	not requested	2	10	METRO 16-02-001
Selenium, Total, ICP	<MDL	<MDL	<MDL	0.05	0.25	METRO 16-02-001
Silver, Total, ICP	<MDL	<MDL	<MDL	0.004	0.02	METRO 16-02-001
Sodium, Total, ICP	**7.93**	**8.83**	not requested	0.5	2.5	METRO 16-02-001
Thallium, Total, ICP	<MDL	<MDL	<MDL	0.2	1	METRO 16-02-001
Zinc, Total, ICP	**0.315**	**0.253**	**0.0695**	0.005	0.025	METRO 16-02-001
BNA's (Semi-volatiles)	ppb	ppb	ppb	MDL	RDL	METHOD
N-Nitrosodimethylamine	<MDL	permit req's met	permit req's met	4	6	EPA 625
Phenol	<MDL	permit req's met	permit req's met	4	6	EPA 625
Bis(2-Chloroethyl)Ether	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
2-Chlorophenol	<MDL	permit req's met	permit req's met	2	4	EPA 625
1,3-Dichlorobenzene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
1,4-Dichlorobenzene	**2.07**	permit req's met	permit req's met	0.6	1	EPA 625
1,2-Dichlorobenzene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Bis(2-Chloroisopropyl)Ether	<MDL	permit req's met	permit req's met	2	4	EPA 625

N-Nitrosodi-N-Propylamine	<MDL	permit req's met	permit req's met	1	2	EPA 625
Hexachloroethane	<MDL	permit req's met	permit req's met	1	2	EPA 625
Nitrobenzene	<MDL	permit req's met	permit req's met	1	2	EPA 625
Isophorone	<MDL	permit req's met	permit req's met	1	2	EPA 625
2-Nitrophenol	<MDL	permit req's met	permit req's met	1	2	EPA 625
2,4-Dimethylphenol	<MDL	permit req's met	permit req's met	1	2	EPA 625
Bis(2-Chloroethoxy)Methane	<MDL	permit req's met	permit req's met	1	2	EPA 625
2,4-Dichlorophenol	<MDL	permit req's met	permit req's met	1	2	EPA 625
1,2,4-Trichlorobenzene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Naphthalene	<MDL	permit req's met	permit req's met	1.6	3	EPA 625
Hexachlorobutadiene	<MDL	permit req's met	permit req's met	1	2	EPA 625
4-Chloro-3-Methylphenol	<MDL	permit req's met	permit req's met	2	4	EPA 625
Hexachlorocyclopentadiene	<MDL	permit req's met	permit req's met	1	2	EPA 625
2,4,6-Trichlorophenol	<MDL	permit req's met	permit req's met	4	8	EPA 625
2-Chloronaphthalene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Acenaphthylene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Dimethyl Phthalate	<MDL	permit req's met	permit req's met	0.4	0.6	EPA 625
2,6-Dinitrotoluene	<MDL	permit req's met	permit req's met	0.4	0.8	EPA 625
Acenaphthene	<MDL	permit req's met	permit req's met	0.4	0.8	EPA 625
2,4-Dinitrophenol	<MDL	permit req's met	permit req's met	2	4	EPA 625
4-Nitrophenol	<MDL	permit req's met	permit req's met	2	4	EPA 625
2,4-Dinitrotoluene	<MDL	permit req's met	permit req's met	0.4	0.8	EPA 625
Fluorene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Diethyl Phthalate	**2.08**	permit req's met	permit req's met	1	2	EPA 625
4-Chlorophenyl Phenyl Ether	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
4,6-Dinitro-O-Cresol	<MDL	permit req's met	permit req's met	2	4	EPA 625
N-Nitrosodiphenylamine	<MDL	permit req's met	permit req's met	1	2	EPA 625
1,2-Diphenylhydrazine	<MDL	permit req's met	permit req's met	2	4	EPA 625
4-Bromophenyl Phenyl Ether	<MDL	permit req's met	permit req's met	0.4	0.6	EPA 625
Hexachlorobenzene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Pentachlorophenol	<MDL	permit req's met	permit req's met	1	2	EPA 625
Phenanthrene	(<RDL)**0.62**	permit req's met	permit req's met	0.6	1	EPA 625
Anthracene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Di-N-Butyl Phthalate	<MDL	permit req's met	permit req's met	1	2	EPA 625
Fluoranthene	<MDL	permit req's met	permit req's met	0.6	1.2	EPA 625
Benzidine	<MDL	permit req's met	permit req's met	24	48	EPA 625
Pyrene	**1.3**	permit req's met	permit req's met	0.6	1	EPA 625
Benzyl Butyl Phthalate	**1.09**	permit req's met	permit req's met	0.6	1	EPA 625
Benzo(A)Anthracene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Chrysene	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
3,3'-Dichlorobenzidine	<MDL	permit req's met	permit req's met	1	2	EPA 625
Bis(2-Ethylhexyl)Phthalate	**7.75**	permit req's met	permit req's met	0.6	1	EPA 625
Di-N-Octyl Phthalate	<MDL	permit req's met	permit req's met	0.6	1	EPA 625
Benzo(B)Fluoranthene	<MDL	permit req's met	permit req's met	1.6	3	EPA 625
Benzo(K)Fluoranthene	<MDL	permit req's met	permit req's met	1.6	3	EPA 625
Benzo(A)Pyrene	<MDL	permit req's met	permit req's met	1	2	EPA 625
Indeno(1,2,3-Cd)Pyrene	<MDL	permit req's met	permit req's met	1	2	EPA 625
Dibenzo(A,H)Anthracene	<MDL	permit req's met	permit req's met	1.6	3	EPA 625
Benzo(G,H,I)Perylene	<MDL	permit req's met	permit req's met	1	2	EPA 625
Aniline	<MDL	permit req's met	permit req's met	2	4	EPA 625
Benzyl Alcohol	<MDL	permit req's met	permit req's met	1	2	EPA 625
2-Methylphenol	<MDL	permit req's met	permit req's met	1	2	EPA 625
4-Methylphenol	<MDL	permit req's met	permit req's met	1	2	EPA 625
Benzoic Acid	<MDL	permit req's met	permit req's met	4	6	EPA 625
4-Chloroaniline	<MDL	permit req's met	permit req's met	2	4	EPA 625

2-Methylnaphthalene	<MDL	permit req's met	permit req's met	1.6	3	EPA 625
2,4,5-Trichlorophenol	<MDL	permit req's met	permit req's met	4	8	EPA 625
2-Nitroaniline	<MDL	permit req's met	permit req's met	4	6	EPA 625
3-Nitroaniline	<MDL	permit req's met	permit req's met	4	6	EPA 625
Dibenzofuran	<MDL	permit req's met	permit req's met	1	2	EPA 625
4-Nitroaniline	<MDL	permit req's met	permit req's met	4	6	EPA 625
Carbazole	<MDL	permit req's met	permit req's met	1	2	EPA 625
Coprostanol	**38**	permit req's met	permit req's met	4	6	EPA 625
PESTICIDE's/PCB's	ppb	ppb	ppb	MDL	RDL	METHOD
4,4'-DDD	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
4,4'-DDE	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
4,4'-DDT	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Aldrin	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Alpha-BHC	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Aroclor 1016	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Aroclor 1221	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Aroclor 1232	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Aroclor 1242	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Aroclor 1248	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Aroclor 1254	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Aroclor 1260	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
Beta-BHC	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Chlordane	<MDL	permit req's met	permit req's met	0.25	0.5	EPA 608
Delta-BHC	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Dieldrin	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Endosulfan I	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Endosulfan II	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Endosulfan Sulfate	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Endrin	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Endrin Aldehyde	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Gamma-BHC (Lindane)	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Heptachlor	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Heptachlor Epoxide	<MDL	permit req's met	permit req's met	0.05	0.1	EPA 608
Methoxychlor	<MDL	permit req's met	permit req's met	0.25	0.5	EPA 608
Toxaphene	<MDL	permit req's met	permit req's met	0.5	1	EPA 608
VOLATILES	ppb	ppb	ppb	MDL	RDL	METHOD
CHLOROMETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
VINYL CHLORIDE	<MDL	permit req's met	permit req's met	1	2	EPA 624
BROMOMETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
CHLOROETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
TRICHLOROFLUOROMETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
ACROLEIN	<MDL	permit req's met	permit req's met	5	10	EPA 624
1,1-DICHLOROETHYLENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
METHYLENE CHLORIDE	<MDL	permit req's met	permit req's met	5	10	EPA 624
ACRYLONITRILE	<MDL	permit req's met	permit req's met	5	10	EPA 624
TRANS-1,2-DICHLOROETHYLENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
1,1-DICHLOROETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
CHLOROFORM	<MDL	permit req's met	permit req's met	1	2	EPA 624
1,1,1-TRICHLOROETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
CARBON TETRACHLORIDE	<MDL	permit req's met	permit req's met	1	2	EPA 624
BENZENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
1,2-DICHLOROETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
1,1,2-TRICHLOROETHYLENE	<MDL	permit req's met	permit req's met	1	2	EPA 624

1,2-DICHLOROPROPANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
BROMODICHLOROMETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
2-CHLOROETHYLVINYLETHER	<MDL	permit req's met	permit req's met	1	2	EPA 624
TRANS-1,3-DICHLOROPROPENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
TOLUENE	**2.6**	permit req's met	permit req's met	1	2	EPA 624
CIS-1,3-DICHLOROPROPENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
1,1,2-TRICHLOROETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
TETRACHLOROETHYLENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
CHLORODIBROMOMETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
CHLOROBENZENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
ETHYLBENZENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
BROMOFORM	<MDL	permit req's met	permit req's met	1	2	EPA 624
1,1,2,2-TETRACHLOROETHANE	<MDL	permit req's met	permit req's met	1	2	EPA 624
ACETONE	**14.7**	permit req's met	permit req's met	5	10	EPA 624
CARBON DISULFIDE	<MDL	permit req's met	permit req's met	1	2	EPA 624
VINYL ACETATE	<MDL	permit req's met	permit req's met	5	10	EPA 624
2-BUTANONE (MEK)	<MDL	permit req's met	permit req's met	5	10	EPA 624
4-METHYL-2-PENTANONE (MIBK)	<MDL	permit req's met	permit req's met	5	10	EPA 624
2-HEXANONE	<MDL	permit req's met	permit req's met	5	10	EPA 624
TOTAL XYLENES	<MDL	permit req's met	permit req's met	1	2	EPA 624
STYRENE	<MDL	permit req's met	permit req's met	1	2	EPA 624
	MDL = minimum detection limit					
	RDL = reportable detection limit					

Station I.D.:	**S071308**			
Collect date:	27-Dec-94			
Station description:	**8th Ave. So. Reg. CSO**			
Lab sample number:	L5152-1			
Sample description:	57-61 samples			
Time (hr.):	0617			
Delta time (hrs.):	2			
Discharge volume (gallons):	**383,601**			
CONVENTIONALS	mg/l	MDL	RDL	METHOD
Biochemical Oxygen Demand	**20**	2	5	SM5210
Chemical Oxygen Demand	**50**	3	5	SM5220-D
Oil and Grease, Total	(<RDL)**4**	2	5	SM5520-B
Total Suspended Solids	**33**	0.5	1	SM2540-D
Volatile Suspended Solids	**12.6**	0.5	1	SM2540-E
Cyanide	<MDL	0.005	0.01	SM4500-CN-C,E
MICROBIOLOGY	orgs/100mls			METHOD
Fecal Coliform	**100,000**			SM-9222 D ed.17
Enterococcus	**110,000**			SM-9230 C ed.17
METALS	mg/l	MDL	RDL	METHOD
Calcium, Total, ICP	**13.3**	0.05	0.25	METRO 16-02-001
Magnesium, Total, ICP	**3.73**	0.03	0.15	METRO 16-02-001
Beryllium, Total, ICP	<MDL	0.001	0.005	METRO 16-02-001
Aluminum, Total, ICP	**1.53**	0.1	0.5	METRO 16-02-001
Cadmium, Total, ICP	<MDL	0.003	0.015	METRO 16-02-001
Antimony, Total, ICP	<MDL	0.03	0.15	METRO 16-02-001
Arsenic, Total, ICP	<MDL	0.05	0.25	METRO 16-02-001
Chromium, Total, ICP	<MDL	0.005	0.025	METRO 16-02-001
Barium, Total, ICP	**0.0232**	0.001	0.005	METRO 16-02-001
Copper, Total, ICP	(<RDL)**0.015**	0.004	0.02	METRO 16-02-001
Iron, Total, ICP	**1.91**	0.05	0.25	METRO 16-02-001
Lead, Total, ICP	<MDL	0.03	0.15	METRO 16-02-001
Mercury, Total, CVAA	<MDL	0.0002	0.002	METRO 16-01-001
Manganese, Total, ICP	**0.0658**	0.002	0.01	METRO 16-02-001
Molybdenum, Total, ICP	<MDL	0.02	0.1	METRO 16-02-001
Nickel, Total, ICP	<MDL	0.02	0.1	METRO 16-02-001
Potassium, Total, ICP	(<RDL)**3.9**	2	10	METRO 16-02-001
Selenium, Total, ICP	<MDL	0.05	0.25	METRO 16-02-001
Silver, Total, ICP	<MDL	0.004	0.02	METRO 16-02-001
Sodium, Total, ICP	**7.93**	0.5	2.5	METRO 16-02-001
Thallium, Total, ICP	<MDL	0.2	1	METRO 16-02-001
Zinc, Total, ICP	**0.144**	0.005	0.025	METRO 16-02-001
BNA's (Semi-volatiles)	ppb	MDL	RDL	METHOD
N-Nitrosodimethylamine	<MDL	3.8	5.63	EPA 625
Phenol	<MDL	3.8	5.63	EPA 625
Bis(2-Chloroethyl)Ether	<MDL	0.56	0.939	EPA 625
2-Chlorophenol	<MDL	1.9	3.76	EPA 625
1,3-Dichlorobenzene	<MDL	0.56	0.939	EPA 625

1,4-Dichlorobenzene	<MDL	0.56	0.939	EPA 625
1,2-Dichlorobenzene	<MDL	0.56	0.939	EPA 625
Bis(2-Chloroisopropyl)Ether	<MDL	1.9	3.76	EPA 625
N-Nitrosodi-N-Propylamine	<MDL	0.94	1.88	EPA 625
Hexachloroethane	<MDL	0.94	1.88	EPA 625
Nitrobenzene	<MDL	0.94	1.88	EPA 625
Isophorone	<MDL	0.94	1.88	EPA 625
2-Nitrophenol	<MDL	0.94	1.88	EPA 625
2,4-Dimethylphenol	<MDL	0.94	1.88	EPA 625
Bis(2-Chloroethoxy)Methane	<MDL	0.94	1.88	EPA 625
2,4-Dichlorophenol	<MDL	0.94	1.88	EPA 625
1,2,4-Trichlorobenzene	<MDL	0.56	0.939	EPA 625
Naphthalene	<MDL	1.5	2.82	EPA 625
Hexachlorobutadiene	<MDL	0.94	1.88	EPA 625
4-Chloro-3-Methylphenol	<MDL	1.9	3.76	EPA 625
Hexachlorocyclopentadiene	<MDL	0.94	1.88	EPA 625
2,4,6-Trichlorophenol	<MDL	3.8	7.51	EPA 625
2-Chloronaphthalene	<MDL	0.56	0.939	EPA 625
Acenaphthylene	<MDL	0.56	0.939	EPA 625
Dimethyl Phthalate	<MDL	0.38	0.563	EPA 625
2,6-Dinitrotoluene	<MDL	0.38	0.751	EPA 625
Acenaphthene	<MDL	0.38	0.751	EPA 625
2,4-Dinitrophenol	<MDL	1.9	3.76	EPA 625
4-Nitrophenol	<MDL	1.9	3.76	EPA 625
2,4-Dinitrotoluene	<MDL	0.38	0.751	EPA 625
Fluorene	<MDL	0.56	0.939	EPA 625
Diethyl Phthalate	<MDL	0.94	1.88	EPA 625
4-Chlorophenyl Phenyl Ether	<MDL	0.56	0.939	EPA 625
4,6-Dinitro-O-Cresol	<MDL	1.9	3.76	EPA 625
N-Nitrosodiphenylamine	<MDL	0.94	1.88	EPA 625
1,2-Diphenylhydrazine	<MDL	1.9	3.76	EPA 625
4-Bromophenyl Phenyl Ether	<MDL	0.38	0.563	EPA 625
Hexachlorobenzene	<MDL	0.56	0.939	EPA 625
Pentachlorophenol	<MDL	0.94	1.88	EPA 625
Phenanthrene	<MDL	0.56	0.939	EPA 625
Anthracene	<MDL	0.56	0.939	EPA 625
Di-N-Butyl Phthalate	<MDL	0.94	1.88	EPA 625
Fluoranthene	(<RDL)**0.59**	0.56	1.13	EPA 625
Benzidine	<MDL	23	45.1	EPA 625
Pyrene	<MDL	0.56	0.939	EPA 625
Benzyl Butyl Phthalate	<MDL	0.56	0.939	EPA 625
Benzo(A)Anthracene	<MDL	0.56	0.939	EPA 625
Chrysene	<MDL	0.56	0.939	EPA 625
3,3'-Dichlorobenzidine	<MDL	0.94	1.88	EPA 625
Bis(2-Ethylhexyl)Phthalate	<MDL	0.56	0.939	EPA 625
Di-N-Octyl Phthalate	<MDL	0.56	0.939	EPA 625
Benzo(B)Fluoranthene	<MDL	1.5	2.82	EPA 625
Benzo(K)Fluoranthene	<MDL	1.5	2.82	EPA 625
Benzo(A)Pyrene	<MDL	0.94	1.88	EPA 625
Indeno(1,2,3-Cd)Pyrene	<MDL	0.94	1.88	EPA 625
Dibenzo(A,H)Anthracene	<MDL	1.5	2.82	EPA 625
Benzo(G,H,I)Perylene	<MDL	0.94	1.88	EPA 625

Aniline	<MDL	1.9	3.76	EPA 625
Benzyl Alcohol	<MDL	0.94	1.88	EPA 625
2-Methylphenol	<MDL	0.94	1.88	EPA 625
4-Methylphenol	(<RDL)**1.3**	0.94	1.88	EPA 625
Benzoic Acid	(<RDL)**4.6**	3.8	5.63	EPA 625
4-Chloroaniline	<MDL	1.9	3.76	EPA 625
2-Methylnaphthalene	<MDL	1.5	2.82	EPA 625
2,4,5-Trichlorophenol	<MDL	3.8	7.51	EPA 625
2-Nitroaniline	<MDL	3.8	5.63	EPA 625
3-Nitroaniline	<MDL	3.8	5.63	EPA 625
Dibenzofuran	<MDL	0.94	1.88	EPA 625
4-Nitroaniline	<MDL	3.8	5.63	EPA 625
Carbazole	<MDL	0.94	1.88	EPA 625
Coprostanol	<MDL	3.8	5.63	EPA 625
PESTICIDE's/PCB's	ppb	MDL	RDL	METHOD
4,4'-DDD	<MDL	0.047	0.0943	EPA 608
4,4'-DDE	<MDL	0.047	0.0943	EPA 608
4,4'-DDT	<MDL	0.047	0.0943	EPA 608
Aldrin	<MDL	0.047	0.0943	EPA 608
Alpha-BHC	<MDL	0.047	0.0943	EPA 608
Aroclor 1016	<MDL	0.47	0.943	EPA 608
Aroclor 1221	<MDL	0.47	0.943	EPA 608
Aroclor 1232	<MDL	0.47	0.943	EPA 608
Aroclor 1242	<MDL	0.47	0.943	EPA 608
Aroclor 1248	<MDL	0.47	0.943	EPA 608
Aroclor 1254	<MDL	0.47	0.943	EPA 608
Aroclor 1260	<MDL	0.47	0.943	EPA 608
Beta-BHC	<MDL	0.047	0.0943	EPA 608
Chlordane	<MDL	0.24	0.472	EPA 608
Delta-BHC	<MDL	0.047	0.0943	EPA 608
Dieldrin	<MDL	0.047	0.0943	EPA 608
Endosulfan I	<MDL	0.047	0.0943	EPA 608
Endosulfan II	<MDL	0.047	0.0943	EPA 608
Endosulfan Sulfate	<MDL	0.047	0.0943	EPA 608
Endrin	<MDL	0.047	0.0943	EPA 608
Endrin Aldehyde	<MDL	0.047	0.0943	EPA 608
Gamma-BHC (Lindane)	<MDL	0.047	0.0943	EPA 608
Heptachlor	<MDL	0.047	0.0943	EPA 608
Heptachlor Epoxide	<MDL	0.047	0.0943	EPA 608
Methoxychlor	<MDL	0.24	0.472	EPA 608
Toxaphene	<MDL	0.47	0.943	EPA 608
VOLATILES	ppb	MDL	RDL	METHOD
CHLOROMETHANE	<MDL	1	2	EPA 624
VINYL CHLORIDE	<MDL	1	2	EPA 624
BROMOMETHANE	<MDL	1	2	EPA 624
CHLOROETHANE	<MDL	1	2	EPA 624
TRICHLOROFLUOROMETHANE	<MDL	1	2	EPA 624
ACROLEIN	<MDL	5	10	EPA 624
1,1-DICHLOROETHYLENE	<MDL	1	2	EPA 624
METHYLENE CHLORIDE	<MDL	5	10	EPA 624

ACRYLONITRILE	<MDL	5	10	EPA 624
TRANS-1,2-DICHLOROETHYLENE	<MDL	1	2	EPA 624
1,1-DICHLOROETHANE	<MDL	1	2	EPA 624
CHLOROFORM	<MDL	1	2	EPA 624
1,1,1-TRICHLOROETHANE	<MDL	1	2	EPA 624
CARBON TETRACHLORIDE	<MDL	1	2	EPA 624
BENZENE	<MDL	1	2	EPA 624
1,2-DICHLOROETHANE	<MDL	1	2	EPA 624
1,1,2-TRICHLOROETHYLENE	<MDL	1	2	EPA 624
1,2-DICHLOROPROPANE	<MDL	1	2	EPA 624
BROMODICHLOROMETHANE	<MDL	1	2	EPA 624
2-CHLOROETHYLVINYLETHER	<MDL	1	2	EPA 624
TRANS-1,3-DICHLOROPROPENE	<MDL	1	2	EPA 624
TOLUENE	(<RDL)**1.3**	1	2	EPA 624
CIS-1,3-DICHLOROPROPENE	<MDL	1	2	EPA 624
1,1,2-TRICHLOROETHANE	<MDL	1	2	EPA 624
TETRACHLOROETHYLENE	<MDL	1	2	EPA 624
CHLORODIBROMOMETHANE	<MDL	1	2	EPA 624
CHLOROBENZENE	<MDL	1	2	EPA 624
ETHYLBENZENE	<MDL	1	2	EPA 624
BROMOFORM	<MDL	1	2	EPA 624
1,1,2,2-TETRACHLOROETHANE	<MDL	1	2	EPA 624
ACETONE	<MDL	5	10	EPA 624
CARBON DISULFIDE	<MDL	1	2	EPA 624
VINYL ACETATE	<MDL	5	10	EPA 624
2-BUTANONE (MEK)	<MDL	5	10	EPA 624
4-METHYL-2-PENTANONE (MIBK)	<MDL	5	10	EPA 624
2-HEXANONE	<MDL	5	10	EPA 624
TAL XYLENES	<MDL	1	2	EPA 624
RENE	<MDL	1	2	EPA 624
	MDL = minimum detection limit RDL = reportable detection limit			