

Annual Stormwater Monitoring Report

for

Seattle-Tacoma International Airport

for the period July 1, 2000 through June 30, 2001

September 2001

Ex#429 (also #6)

AR 022631



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Prepared by

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AR 022632

Table of Contents

. 1

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1 Executive Summary 1
2 Introduction
3 Background
3.1 Sea-Tac International Airport7
3.2 STIA Storm Drainage Subbasins8
3.3 Sampling locations10
3.4 Storm sampling procedures and analytes
4 Sampling Results
4.1 General
4.2 Data Presentation Methods
4.3 Storm events sampled 18
4.4 Grab Sample Results
4.4.1 Total Petroleum Hydrocarbons (TPH)22
4.4.2 Fecal Coliforms
4.5 Composite Sample Results
4.5.1 Suspended Solids and Turbidity
4.5.2 Biochemical Oxygen Demand (BOD ₅)
4.5.3 Metals
4.6 Deicing Event Samples
4.6.1 Background
4.6.2 Current Results
4.7 Other Results
4.7.1 Field Quality Control Samples 44
4,7.2 Source Tracing Studies
4.8 Outfall Inspections
5 Conclusions
6 References
Appendices
Appendix A Storm Event Hydrologic and Hydraulic Data
Appendix B Tabular NPDES Sample Data Summaries



Appendix C Tabular Deicing Event Sample Data Summaries	111
Appendix D Other Sample Data	100
Appendix E Outfall Inspection Summary	133
	135

List of Tables

Table 1 Nomenclature for Outfalls listed in NPDES Permit Condition S2B	Q
Table 2 Offeite Influence Art in the	····· ··· ··· ··· ··· ··· ··· ··· ···
Table 2 Offsite Influences Affecting STIA Monitoring Locations'	13
Table 3 Applyton Mothering 1 D in 1	
Table 3 Analytes, Methods and Detection Limits	14
Table 4 Stormwater Quality Comments	
Table 4 Stormwater Quality Comparators ^a	

List of Figures

Figure 1 STIA Subbasis M	
Figure 1 STIA Subbasin Map	15
Figure 2 Rainfall Summary	21
Figure 3 TPH for current year	· 2 ·
Figure 4 Fecal coliforms for current year	24 25
Figure 5 TSS for Current Yoar	., 20
Figure 5 TSS for Current Year	29
Figure 6 Turbidity for Current Year.	20
Figure 7 BOD ₅ for Current Year	. 23
Figure 8 Total Recoverable Copper for Current Year	. 32
Figure 9 Total Recoverable Lead for Current Year	. 34
Figure 10. Total Passwork 12 - C - C	. 36
Figure 10 Total Recoverable Zinc for Current Year	. 38
Figure 11 Glycol results for Current Year	43

7

÷

1 EXECUTIVE SUMMARY

This Annual Stormwater Monitoring Report has been prepared pursuant to Special Condition S2.E of the NPDES permit for the Port of Seattle's Seattle-Tacoma International Airport (STIA). This report covers required stormwater sampling for the 14 outfalls listed in permit condition S2.B. The Port took a total of 61 grab and 59 composite stormwater samples from a total of 22 storm events in the past year, bringing the 7-year totals to over 400 samples and 168 storm events. The Port complied with all sampling and reporting requirements in the NPDES permit.

In summary, STIA stormwater quality, especially airfield runoff, continues to have constituent concentrations lower than those reported in comparable regional studies. Results continue to demonstrate that most constituent concentrations in STIA airfield outfall discharges are much lower than those from the landside outfalls. This difference is most likely due to higher vehicular use in the landside areas and a higher degree of biofiltration present in the airfield subbasins. Nonetheless, overall STIA results are generally lower than results from other studies for roadways and commercial areas.

The Port is continuing to investigate management options for the zinc in runoff associated with two cargo buildings with galvanized metal rooftops. This work is a follow up to whole effluent toxicity (WET) testing findings reported in 2000. Recent work has focused on stormwater treatment alternatives where several media have been tested in controlled laboratory experiments, including commercially available CSF® deciduous leaf compost produced by Stormwater Management (Portland OR) and specially modified soybean hulls developed by the U.S. Department of Agriculture. Both the leaf compost and the soybean hulls are agricultural waste products that can be recycled as water-treatment media.

Current implementation concepts may include deploying the media in commercially available Stormfilter™ cartridges in below-grade, pre-cast vaults; or in cartridges adapted for above-grade downspouts. These options amount to a new stormwater BMP option that appears more cost-effective than re-roofing or painting to eliminate zinc sources. Future onsite studies may include long-term performance monitoring and an evaluation of the costs for operation and maintenance.

A fecal coliform source tracing study corroborated previous work, demonstrating an absence of cross connections for sanitary sewage with STIA storm drainage. Baseflow in the several outfalls tested was often absent, and when present had low to non-detectable fecal coliforms with no indications of human sources. The study used the microbial source tracing (MST) technique developed at the University of Washington. The MST method isolates *E. coli* bacteria DNA in the samples and compares it to isolates from specific sources already characterized in the regional database and several site-specific sources characterized in the study. The Port issued a separate report for this study (Herrera, 2001).

The SDE4 discharges that formed the impetus for this study have exhibited sporadically elevated fecal coliform levels that the study indicated were associated primarily with animal wastes, principally nuisance bird populations (e.g. pigeons). This study also showed that fecal coliform sources, notably some attributable to humans, were present in runoff and baseflows upgradient from STIA (Bow Lake), even in samples with low fecal coliform concentrations. Human sources found in airport runoff were limited to isolated samples from SDE4 and SDS3 runoff, where many samples had low fecal coliform concentrations. Aircraft lavatory wastewater-specific sources were implicated in less than 10% of all SDS3 samples and none of the SDE4 samples. Because the data suggest these human sources may be associated with aircraft lavatory waste transfer operations, the Port will continue to investigate this issue.

The Port removed a potential source of glycols and other constituents in SDS1 runoff by re-routing a portion of the SDS1 drainage to the industrial waste system (IWS) in September 2000. Several samples and observations in the past year showed that glycols were at much lower concentrations than in past years. Prior to the re-routing, there were episodic indications of certain constituents (glycols and soaps) associated with aircraft and ground service equipment (GSE) servicing near the South Satellite. This BMP is a direct result of the stormwater monitoring program.

In the past year, two short periods of winter weather in February 2001 triggered runway and other ground surface deicing at STIA. Glycol and BOD₅ concentrations were similar to winter weather sampling in past years. According to the Port's SWPPP, the six to eight inches of snowfall from the second event was plowed and moved to the snow storage areas (BMPs), where snowmelt drains to the IWS.

According to the provisions of the recently issued Water Quality Certification (401 permit) for the Master Plan Update, the Port will be developing a workplan to assess and develop appropriate site-specific water quality indicators. This work will determine the appropriate monitoring locations and water quality measures that best relate airport runoff to the local receiving streams (Miller, Walker and Des Moines Creeks). The Port plans to work with Ecology in developing this plan in the near future. Also, the Port will be submitting NPDES permit renewal application materials by the end of 2001.

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2 INTRODUCTION

The STIA stormwater monitoring program has been in place since 1993 pursuant to the National Pollutant Discharge Elimination System (NPDES) permit. The first permit was issued June 30, 1994, and was renewed and reissued on February 20, 1998, becoming effective March 1, 1998 (permit number WA-002465-1.) In early 1999, a major permit modification issued by Ecology reduced sampling frequency based upon a permit appeal settlement (WDOE 1999.) A second major modification was issued in mid 2001, though it did not change any of the routine (non-construction) stormwater monitoring requirements. The Port will begin the next permit renewal process this year where the application is due by December 31st.

The Port conducts the required monitoring activities according to the specific guidelines and criteria of the Ecology-approved Procedure Manual for Stormwater Monitoring (POS 1999a). This report summarizes and discusses results from the seventh year of sampling conducted in the 12-month period July 2000 through June 2001, the conclusions, and potential new initiatives to be undertaken. Results summarized in this report include data already submitted to Ecology in Discharge Monitoring Reports (DMRs) plus additional results from other samples unrelated to DMR reporting. The Port has previously submitted six Annual Reports (POS 1995, 1996a, 1997a, 1998a, 1999b, 2000a). The Annual Stormwater Monitoring Reports and associated DMRs do not apply to construction or IWTP monitoring.

This report satisfies Special Condition S2.E of the National Pollutant Discharge Elimination System (NPDES) permit for the Port of Seattle's (Port) Sea-Tac International Airport (STIA). Special Condition S2.E of the permit states: "On or before October 1 of each year, the Permittee shall submit a report to the Department summarizing the results of the stormwater monitoring conducted pursuant to Special Condition S2.B or S3.E of this permit during the preceding

5

twelve (12) month period from July 1 through June 30. The report shall present the analytical data, the Port's conclusions as to what is being learned from the data, and any new initiatives to be undertaken as part of the Stormwater Pollution Prevention Plan for Airport Operations required in Special Condition S12."

Additionally, Special Condition S2B of the permit requires that: "The permittee shall include the following data for each storm event in the Annual Stormwater Monitoring Summary Report...: date, duration, the number of dry hours preceding the storm event, total rainfall during the storm event (inches), maximum flow rate during the rain event (gallons per minute), and the total flow from the rain event (gallons). The permittee shall also include a monthly summary of daily rainfall..." All of the information required under Special Condition S2B appears in Appendix A.

3 BACKGROUND

3.1 Sea-Tac International Airport

Seattle-Tacoma International Airport (STIA) lies about mid-way between the cities of Seattle and Tacoma, Washington. The airport was built in the 1940s and has expanded throughout the years to become the 18th busiest airport in the U.S. The highly urbanized cities of SeaTac, Des Moines, and Burien surround the airport.

STIA storm drainage discharges through 14 individual outfalls, four that drain to Miller Creek, eight that drain to Des Moines Creek, and two that drain to a City of SeaTac system. Together, these 14 outfalls drain a total area of about 970 acres of which about 56% are impervious surfaces. Only 17% of this total area (165 acres) drains to Miller Creek, while the remaining area of about 800 acres drains to Des Moines Creek. An area of about 370 acres, mostly the impervious surfaces of terminal gate and ramp areas, drains to the Industrial Waste System (IWS) and the Industrial Waste Treatment Plant (IWTP.) Three large lagoons detain and equalize runoff flowing to the IWTP, which removes suspended solids and petroleum products using the dissolved air flotation process. The IWTP discharges directly to Puget Sound via a separate outfall that combines with the Midway sewage treatment plant. IWTP (and construction project) monitoring results are not included in nor required to be addressed in this report.

The Port has determined future stormwater management needs in the Comprehensive Stormwater Management plan (CSMP), which is part of the Master Plan Update (MPU). Issues addressed in this plan include retrofitting existing development to meet state and local guidelines for stormwater quantity and quality BMPs (Parametrix, 2001). The CSMP has been approved and adopted for implementation by the Port's Water Quality Certification (401 permit) for the MPU.

7

3.2 STIA Storm Drainage Subbasins

The NPDES permit refers to outfalls by number; however, this report refers to subbasins and their outfalls by location names (see Table 1). The Port codes STIA storm drainage subbasin names according to location, for example, "SDS1" means "storm drain south number 1". In addition, the Port identifies all manholes according to an alphanumeric scheme, some of which are referred to in this report. For convenience and consistency, many of these locations were renamed and renumbered in 1999, though physical monitoring locations have not been moved. Drainage area estimates are included in Appendix A. Figure 1 shows the individual stormwater drainage subbasins and the STIA stormwater management boundaries.

STIA stormwater subbasins fall into the general categories listed in Table 1. These categories group subbasins together that have similar land use and other characteristics. These categories include "landside," "airfield," and other nonspecific, low-activity areas. Previous reports showed that concentrations of TPH, TSS and other constituents were different for the landside and airfield categories (POS 1996a, 1997a.)

Outfalls SDS3, SDS4, SDN3, and SDN4 drain the principal subbasins of the airfield. These four outfalls drain a total of 626 acres (45% impervious) of the Aircraft Movement Area (AMA), which includes the airport runways, taxiways, and other open space of the "airfield." These four airfield subbasins represent approximately 65 percent of the total STIA storm drainage area. Previously an airfield outfall, SDN2 now discharges to the Industrial Waste System (IWS) via two pump stations constructed as BMPs in 1997.

Four subbasins (SDE4, SDN1, EY, and TY) compose the 165 acres (about twothirds impervious) of "landside" areas of the airport, primarily draining public roads, parking, passenger vehicle areas and rooftops. SDE4 alone comprises

about 149 acres, or 90% of this total landside area drainage. Although 11 percent of the total impervious area of SDE4 drains portions of Taxiways A and B, the "landside" designation is appropriate because roads, parking, and other vehicle areas on the landside of the airport are the predominant impervious areas of SDE4.

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Outfall #	Port Name	Category	Creek	Proximity to receiving water
002	SDE4	landside	Des Moines	Combines w/Bow Lake & City flows
				before daylighting in East Branch
003	SDS1	none	Des Moines	Direct outfall to East Branch
004	SDS2	none	Des Moines	Flows through swale, NW Ponds then
				into W. Branch
005	SDS3	airfield	Des Moines	Flows through swale, NW Ponds then
			_	into W Branch
006	SDN1	landside	Miller	Flows through 1000'+ natural channel
				and Lake Reba detention Pond
007	SDN2	Drains to IWS ¹	Miller	Same as SDN1
800	SDN3	airfield	Miller	Same as SDN1
009	SDS4	airfield	Des Moines	Direct outfall near confluence of East
				and West Branches
010	SDS72	none	Des Moines	Combines w/City streets commercial
			1	area, via swale & NW Ponds
011	SDN4	airfield	Miller	Same as SDN1
012	EY	landside	Gilliam	Via City drains to stream
013	TY	landside	Gilliam	Via City drains to stream
014	SDS6 ²	none	Des Moines	Same as SDS7
015	SDS5 ²	none	Des Moines	Same as SDS7
Table notes:				

Table notes:

11

1. Two pump stations divert all runoff from the former SDN2 subbasin to the IWS. Discharges to SDN2 only occur when rainfall intensity exceeds the 0.20 inches per hour design for these pump stations. These two pump stations were constructed in 1997 as SWPPP BMPs.

2. Outfalls 010, 014 and 015 were previously named "SDW3", "B" and "D", respectively

In earlier reports, the SDS1 subbasin was included in the "terminal" category, which is no longer appropriate. Several stormwater BMPs undertaken in 1996-97, and 2000 have removed all known ramp areas from SDS1 (the only "industrial activity" in SDS1 was the total of about 2.5 acres removed from SDS1 that was associated with aircraft ramp areas near the B-Concourse and South Satellite). Other BMPs disconnected ramp areas that occasionally drained to SDS1 when intense rainfall surcharged certain structures. As a result, SDS1 now drains only three hangar rooftops (about 8 acres), employee parking (about 5 acres), and no ramp areas. The added employee parking areas for the new Northwest Airlines hangar have detention vaults for the runoff. In addition, expanded drainage from South 188th Street was added to SDS1 in 1998-99, adding about 1 acre of offsite (non-Port) area to the total SDS1 area.¹ Four other outfalls (SDS2, SDS5, SDS6 and SDS7) drain a total of about 110 acres, mostly open spaces (about 11% impervious) in the southwestern portion of STIA.

3.3 Sampling locations

11

The Port monitors stormwater discharges at 14 locations, one for each subbasin within the boundary of the permit. Figure 1 shows the location of the outfalls and monitoring locations.

Four monitoring locations (subbasins SDE4, SDN1, EY, and TY) are in-pipe, substantially upstream from the final discharge point where the outfall actually "daylights". Runoff contributions from other, non-STIA sources that are outside the Port's jurisdiction enter these storm drains and therefore necessitate monitoring at the first location, often a manhole, upstream of the majority of offsite inputs. Table 2 lists these offsite influences. However, offsite runoff is inextricable for sampling stations for SDE4, SDS1, SDS2, and SDS3.

¹ In 1998-99 the City of SeaTac added drainage area to SDS1 through the widening of about 800 linear feet of S. 188th Street, adding curb, gutter, piping and a number of storm drain inlets. This section of roadway previously drained sheetwise off the shoulder to grassed ditches. Prior to these improvements, only one inlet drained a much smaller portion of this public roadway that is outside the Port's jurisdiction.

Considering that the offsite area for outfalls SDS1 and SDS2 is primarily roadways, the runoff contributed by non-Port entities is substantial and may influence the Port's monitoring results.

To remove biases from highway SR518 runoff, in 1997 the sampling location for SDN1 was moved upstream to its current location. Therefore, outfall SDN1 has two datasets, one for the period prior to January 1997 that includes results influenced by SR518 runoff, and the other for the "SDN1up" location (more-representative of Port property) for the ensuing period. Past reports have shown how the SR518 runoff biased the Port's sampling results upward (POS 2000a, 1998a).

It is important to note that because of their distance from receiving waters, certain current sampling locations do not integrate all possible factors that could influence water quality prior to discharging to the streams. Only two of STIA's current outfalls (SDS1 and SDS4) discharge directly to the receiving waters. These two outfalls are sampled at these "daylight", or end-of-pipe locations.

In contrast, because of factors in addition to those mentioned above, all other outfalls are sampled at points well removed from the biotic community (see Table 1). As a result, the sampling results do not reflect the complex interactions with chemical, physical, and biological elements that can enhance water quality prior to where STIA stormwater actually enters receiving waters.

For example, drainage from all four Miller Creek outfalls (SDN1, SDN2, SDN3, and SDN4) passes through additional piping and surface conveyance, and then passes through Lake Reba prior to entering Miller Creek. Lake Reba² is a

² Lake Reba, sometimes referred to as "little Lake Reba" is the perennial pool (with several feet of live storage) that receives runoff from the airport and other areas. The Lake Reba facility was built by the Port in 1973, is adjacent to Miller Creek and drains to this creek via an outlet control structure that was renovated in 1998. Lake Reba lies within the footprint of the larger Miller Creek Detention Facility (MCDF), which is an *instream* detention facility (built by King County

constructed stormwater detention pond that also serves a water quality function (WDOE 1997). The potential influences of these important factors are not accounted for in the current sampling scheme required by the permit. These issues should be addressed in the NPDES permit renewal.

According to the provisions of the recently issued Water Quality Certification for the Master Plan Update ("401" permit number 1996-4-0235 (amended-1) dated 9/21/01), the Port will be developing a workplan to assess and develop appropriate site-specific water quality indicators. This work will determine the appropriate monitoring locations and water quality measures that best relate airport runoff to the local receiving streams (Miller, Walker and Des Moines Creeks). The Port plans to work with Ecology in developing this plan in the near future.

3.4 Storm sampling procedures and analytes

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The Port's Procedure Manual for Stormwater Monitoring (POS 1999a) describes the criteria for sampling storm events, and describes all relevant sampling, programming, and handling necessary to comply with requirements of the permit. Table 4 lists required sampling frequencies, constituent analytes, methods, and detection limits. The Port reports data on DMRs only where results from storms and samples meet representativeness criteria of the manual. In addition to data provided in the DMRs, results from samples not meeting these criteria or those taken for other purposes are also included in this report. Using automatic samplers, the Port generally takes a grab sample then a flow-weighted composite sample during rainstorms of 0.20 inches or greater that are preceded by less than 0.1 inch of rainfall in the previous 24 hours.

in 1992) that does not have an associated permanent pool (no dead storage). Under high flow conditions, the backwaters formed by the live storage of the MCDF (the ultimate footprint) may inundate Lake Reba.

Table 2 Offsite Influences Affecting STIA Monitoring Locations¹

Outfall (manhole) ²	Total Area (ac)	Offsite Area (ac)	Percent Offsite	Comment
SDE4 (SDE4-65)	149	0.6	<1%	Offsite area of SR99, may be greater than 0.6 acre
SDS1 (outfall)	14,4	0.85	6%	Offsite area of S. 188th St. includes area added by City in Fall 1998
SDS2 (outfall)	13.2	2.9+	>21%	Offsite 16th Ave S., S. 188th St, and possible non-Port commercial area.
SDS3 (outfail)	462	3	<1%	Approximate offsite area of S. 188th St.
SDN1 (SDN1-56)	24+	9.9+	>40%	Former SDN1 location includes public road runoff, Runoff from add'l 49 ac non-POS area enters below,prior to entering L. Reba
SDN1up (SDN1-41) Table notes	13,8	0	0%	Air Cargo Road is about 50% of SDN1 area.

Table notes

1. All area estimates are as of September 2001 and subject to change.

 Though manhole number designations were changed in 1999, sampling locations remained the same as in previous years.



			Applicable Subbasins/Outfails			
Analyte	Method ⁽²⁾	Detection limit (MDL) mg/l	SDE4, SDS3, SDN1, SDN4	EY,TY, SDN2	SDS1, SDN2	SDS1, SDS2, SDN3, SDS4, SDS5, SDS6, SDS7
pH ^(e)	150.1	0,1	x	X	X	X
FOG (Oil and						
Grease)	413.1	1.0	(f)	(f)	(f)	(f)
TPH (IR)	418.1 mod ^(b)	1.0	(f)	(f)	(f)	(1)
TPH (GC)	NWTPH- Dx	0.15	x	x	x	x
Fecal coliforms (MPN)	9221 E	2	x		n/a	x
TSS (total suspended solids)	160.2	0.5	x	x	x	x
Turbidity	180.1	0.1	X	n/a	X	×
BOD ₅	405.1	4	x	n/a	x	n/a
Total Glycols ^(c)	GC FID	4	x	n/a	x	X
Total Recoverable copper, lead, zinc ^(d) (a) Method refers	200	Cu: 2 µg/l Pb: 2 µg/l Zn: 5 µg/l	x	n/a	n/a	n/a

Table 3 Analytes, Methods and Detection Limits

(a) Method refers to EPA-600/4-79-020, March 1979. Fecal coliform method refers to 18th edition of Standard Methods for the Examination of Water and Wastewater (APHA, 1995), or as revised.

(b) Washington State Department of Ecology method WTPH-418.1 Modified.

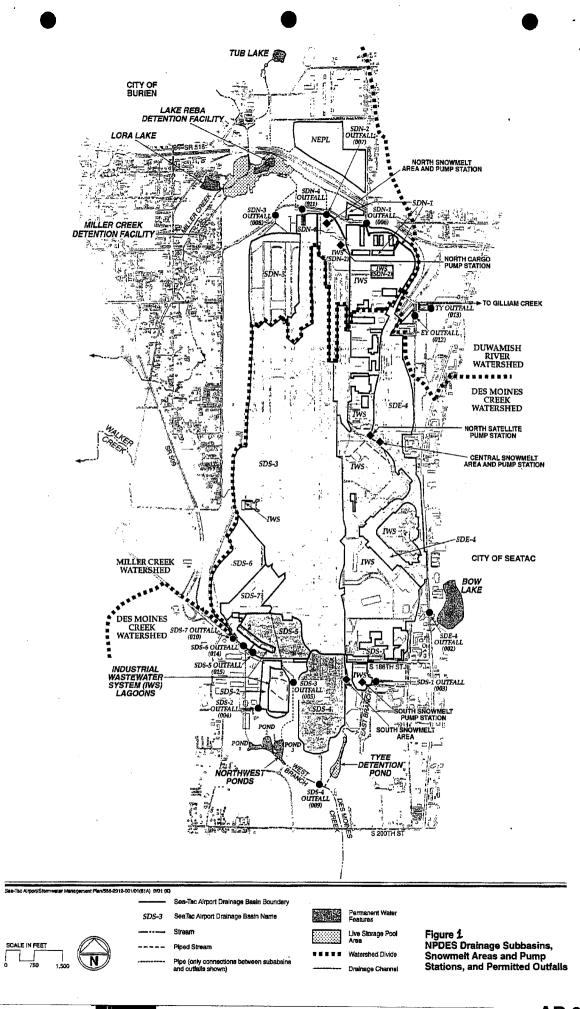
(c) Analyzed by Gas Chromatograph, Flame Ionization Detector. MDL is 2 mg/l each for propylene and ethylene gycols.

(d) Lead and copper by atomic absorption (AA) furnace, zinc by ICP.

(e) pH is not required by permit, but is used as a reference parameter

11

(f) FOG and TPH (IR) methods replaced by NWTPH-Dx March 1, 1998.



AR 022649

4 SAMPLING RESULTS

4.1 General

This chapter presents and discusses data separately for results from grab samples, composite samples, and deicing event (glycol) samples. These types of samples employ different protocols that represent different temporal periods of the particular stormwater discharge event (i.e., grab samples versus composite samples) and should be evaluated separately.

The required hydraulic and hydrologic data are included in Appendix A. Samples were validated according to the representativeness criteria described in the Port's Procedure Manual for Stormwater Monitoring (Port 1999a). Appendix B tabulates and summarizes analytical results for each outfall. Data previously submitted to Ecology in the monthly DMRs represent samples collected strictly from those storms and sampling routines that fully met the criteria of the Procedure Manual. In addition to this DMR data, this report summarizes all other data collected at the storm drain outfalls covered under condition S2B of the NPDES permit (Table 1).

4.2 Data Presentation Methods

Because the NPDES permit does not specify discharge limits for stormwater, this report compares the Port's data to others' stormwater data listed as reference comparators in Table 4. Most reference comparators discussed in this report were the lowest results from two City of Bellevue studies. These comprehensive, local studies had similar sampling protocols to the Port's. However, the samples in the 1995 Bellevue study were taken at instream stations and therefore reflect stormflows in receiving waters, as opposed to direct outfall discharges.

Nonetheless, contrasting STIA *outfall* discharges to this *instream* comparator results in more conservative conclusions. This report uses the Portland NPDES data for copper because it better represents commercial and industrial outfall

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discharges *before* mixing with receiving waters. Again, the reader should consider the nature of the STIA sampling locations discussed in Section 3.3.

Comparator data and outfall sampling results appear on box plots that illustrate the central tendency, spread, and skew of the stormwater data (Figures 2 through 9). The bold line within a box represents the median value, while the bottom and top of a box show the 25th and 75th percentiles, respectively. In other words, the interquartile range (central 50 percent) of the data fall within values highlighted by the box. SPSS software was used to generate the box plots (SPSS 1999).

When summarizing data to compare typical values, outliers usually represent unusual conditions or anomalies, atypical of what could be expected under usual circumstances given historical data. In a box plot, the "whiskers" show the largest values that are not considered outliers. SPSS box plots show two types of outliers: those more than 1.5 box-lengths from the 75th percentile plotted with the symbol "o", and those more than 3.0 boxlengths with a star symbol ("*"). In most cases, the boxplots show the outliers, but in some cases the scales selected prevent plotting all outliers. Outliers have also been defined as those values in a particular outfall's data set that are more than 3 standard deviations from the mean (99.7% of the data fall within this range by definition in a normal distribution). All data are tabulated in Appendix B and C.

4.3 Storm events sampled

Consistent with permit requirements, the 2000-2001 sampling season began on July 1, 2000 and ended June 30, 2001. During this 12-month period, about 25 inches of rain fell at STIA, which is about13 inches (35%) below the 60+ year average and very different than the past two seasons, especially the 1998-99 period, influenced by the very wet La Nina weather pattern. See Figure 2.



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In the 12 months ending June 2001, the Port sampled 22 rainfall events. Rainfall during these events ranged from 0.23 to 1.28 inches. Dry weather preceding these events averaged 4 days, with a minimum of about one day to a maximum of nearly one-month (8/18/00 event). Appendix A summarizes daily rainfall and storms sampled.



Standard^(e) no standard no standard no standard background WA State no standard 6.5 - 8.5 based on 10.3⁽¹⁾ 72⁽¹⁾ 20 39⁽ⁱ⁾ na Airfield (SDS3, SDS4, SDN3, SDN4) 0.08 TPH-Dx 7-yr median 0.13 TPH 0.5 FOG 7,3 7,45 6.2 ω g 32 5 27 STIA 1.7 TPH-Dx 7-yr median (SDE4, SDN1) Landside 2.6 FOG 1.8 TPH 42.5 110 6.7 6.7 E. 24 171 22 ÷ Portland NPDES^(d) 1040年 median 1993 119 6.5 376 20 25 Highway Runoff^(c) 1981 106 mean 466^(c) 638 43 Comparative Study Data^a 3.7 Bellevue 201 1/29.4 7.2 - 7.8 1995^(b) 1 26.3 161,4 1 82.3 normal median 10.4 not analyzed in any of these studies <u>бо</u> . . Metro 1982 mean 210 110 20 5.2 - 7.4 6.6 50 例 BURP mean^(g), 1984 median 980 170 120 19 1000 to 21000 NURP 1983 median 100 144 160 თ 34 std units 100 ml Units l/gm i/gm mg/l mg/l l/gm l/6rl l/Brl l/brt statistic reported Constituent coliforms Cu (TR)^(I) Zn (TR)⁽¹⁾ glycols Pb (TR)" BOD₅ Fecal TPH Turb TSS Ηd

Table 4 Stormwater Quality Comparators^a

11

Comparative values used in this report are in bold. Blank space means no data available, reported, or applicable

(a)

Bellevue, 1995 data are for <u>instream</u> stormwater runoif samples from the "Sturtevant Creek, downstream" site. Ð

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Highway runoff from an 15 location in Seattle with 57,000 ADT, 43 to 54 storm samples in 1980-81 (Chui, Mar, and Horner, 1982). Because this study was conducted prior to the phase-out of leaded gasoline, lead results were higher than for other later studies.

City of Portland 1993 NPDES Part 2 Municipal Application. Median of 10 samples from "12" "industrial" outfall, Ð

Standards listed are for class AA waters, see WAC 173-201A. e

Total recoverable metals. WA State acute standards expressed as total recoverable, calculated at 56 mg/l hardness using generic translators in Ecology's "TSDCALC8.XLW" spreadsheet (see Section 4.5.3). This hardness value is the median of seven instream samples collected in Miller and Des Moines Creeks in 1999. Ξ

For Turb, Cu, Pb, and Zn, BURP 1984 data was mean of grab samples, therefore Bellevue, 1995 data are more representative comparators because they represent median of (6)

composite samples, comparable to STIA samples and data for these parameters.

STIA median data cited reflect 37 to 112 samples per parameter for landside group samples, and 90 to 153 samples per parameter for airfield group samples Ξ

About 70% of all STIA sample results for glycols have been below detection limits of 5 mg/l (to April 1997) and 2 mg/l (May 1997-current). Ξ

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AR 022653

In the past year's sample events there was a single summer storm event (8/18/00) that produced higher than typical constituent concentrations at one outfall (copper at SDS3, see Section 4.5.3). In previous years, thunderstorms or other periods of intense rainfall after protracted dry periods of a month or more caused elevated levels of certain constituents (POS 1999b). These meteorological factors resulted in the unusual combination of a lengthy accumulation period and high scour from the intense rainfall. Patterns like these have been most evident in the late summer and early fall months, particularly in 1998. The 3 highest copper results for SDS3 were from storms sampled in the month of August (8/2/96, 8/16/98 and 8/18/00). These factors are important to take into account when considering how representative a particular sample result is given the naturally occurring, and perhaps infrequent seasonal influences.

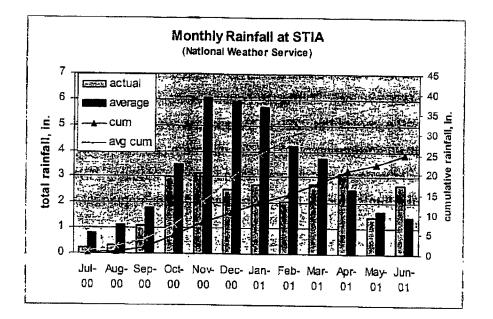


Figure 2 Rainfall Summary

4.4 Grab Sample Results

The following discussion includes results from 61 grab samples collected in the past year, bringing the 7-year total to 431 total grab samples. Grab samples are analyzed only for TPH and fecal coliform bacteria per current permit requirements. Previous versions of the permit required FOG, and TPH analysis by methods now outdated (413.1 and 418.1, respectively). Both of these parameters were replaced by NWTPH-Dx by the permit revision of February, 1998, though historical data for FOG and TPH are included in Appendix B.

4.4.1 Total Petroleum Hydrocarbons (TPH)

The results from the current year presented in Figure 2 continue to demonstrate that concentrations of petroleum-type constituents in STIA stormwater are consistently less than in stormwater from other urban areas. The overall results indicate the following:

- STIA stormwater overall continues to have less petroleum-type constituents than typical urban runoff. During the past 4 years, with a median of 0.26 mg/l, more than 95 percent of the 220 STIA results were less than the Bellevue, 1995 median (instream samples) of 3.7 milligrams per liter (mg/l). Only two of 61 samples in the past year exceeded the Bellevue median. On the whole, TPH was not detected in 79 (36%) of a total of 220 samples taken since March 1998.
- Airfield stormwater (SDS3, SDS4, SDN3, and SDN4) continues to contain far less TPH than runoff from the landside subbasins (SDE4, SDN1, and TY.) To date, median airfield TPH is 0.08 mg/l compared to the 1.1 to 2.4 mg/l median levels for the landside outfalls. TPH was not detected in 63 (72%) of the 88 airfield outfall samples in the past four years. All but two TPH results from these 88 airfield outfall samples were less than 0.5 mg/l, which is one half the

22

detection limit of the previous TPH (IR) method of 1.0 mg/l. Current results are similar to these overall patterns.

- New maxima occurred at two airfield outfalls in the May 14, 2001 storm samples (2.75 and 1.59 at SDS3 and SDN4, respectively). See Figure 3. Interestingly, from this same event, TPH results for both landside outfall samples (SDE4 and SDN1) were non-detectable. Typically, the situation for these pairs of outfalls is opposite: landside outfall TPH>>airfield TPH, as explained above. Relative to the extensive sampling history for their respective outfails, the results for SDS3 and SDN4 samples are anomalies. pronounced statistical outliers according to both definitions (SPSS and ±3 Standard deviations). Instead, the SDS3 and SDN4 TPH results for the 5/14/01 event would be more typical of SDE4 and SDN1, falling well within historical interquartile ranges (middle 50% of the data) for these two landside outfalls, respectively. Chain of custody records and laboratory data were not in error, though the results suggest that the labels on the sample bottles may have been interchanged in error. There were no incidents reported on or near this sampling date that might have caused the elevated TPH in the airfield samples.
- Because most of the TPH detected in landside runoff is motor oil, it is likely
 attributable to lubricants from cars and trucks (there are no passenger vehicle
 roads in the 4 airfield subbasins). Diesel oil fractions are rarely detected while
 motor oil has represented the majority of the TPH at the landside outfalls
 (SDE4, SDN1, and TY.) Diesel fractions were not detected in current year
 TPH data therefore a boxplot is unnecessary.
- The IWS effectively isolates aviation-related fuel spills and drips from the storm drains. For all outfalls, measurements of diesel fractions³ are typically

³ The diesel range results for TPH by method NWTPH-Dx would represent jet fuels (e.g. JP4, JP5, etc) which have complex mixtures of C10-C16 hydrocarbons, overlapping with the C8-C24 hydrocarbon range found in diesel fuel.

below detection limits (92% of the 220 samples), with a historical maximum of 0.8 mg/l. Considering that subbasins SDE4 and SDS3 are contiguous with aircraft service (IWS) areas where fueling takes place, sample results for these two outfalls show low incidence of TPH, especially diesel fractions (consistently non-detected in SDS3 and SDE4 samples). Up to 90% of the 39 samples from SDE4 had TPH less than the 3.7 mg/l comparative value for urban areas. More than 70% of the total of 40 SDS3 samples had non-detectable TPH.

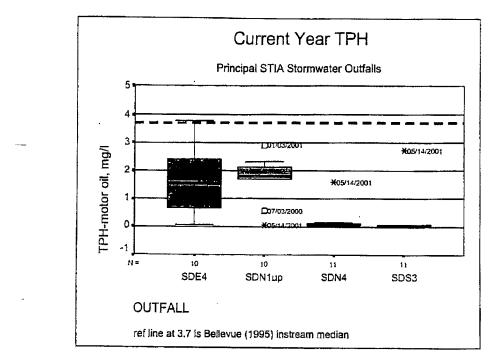


Figure 3 TPH for current year

4.4.2 Fecal Coliforms

Overall, the median value for fecal coliforms in 289 samples to date is 30 per 100 ml, with more than two thirds of the results less than 200 per 100 ml. Relative to the comparative values (Table 4), these overall results indicate that STIA stormwater contains fewer fecal coliforms than typical urban stormwater. More than 80 percent of the 127 airfield subbasin samples taken to date showed fecal coliforms less than the Bellevue (1995) comparative value of 201 per 100 ml (see



5

Figure 4). Current year results from a total of 56 samples from ten outfalls continue this pattern, where 88 percent were less than the Bellevue comparative value. See Figure 4 for current year data.

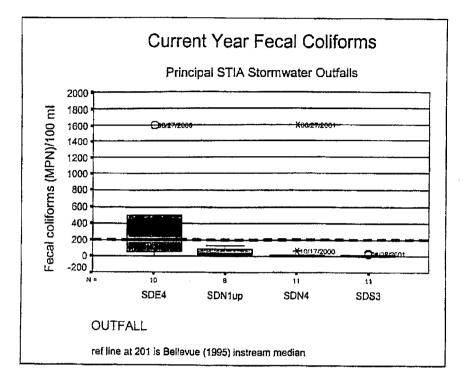


Figure 4 Fecal coliforms for current year

There are numerous sources of fecal coliforms including fecal matter from birds and mammals. Urban stormwater often contains fecal coliforms at sporadically elevated levels. Human sources, such as septage or sanitary sewage are not always implicated as contaminants. Importantly, all fecal coliform test methods often overestimate true fecal coliform concentrations, plus they are susceptible to interference from non-pathogenic coliform bacteria including *klebsiella* species (U.S. EPA, 1986). Fecal coliforms are a presumptive indicator, meaning that if present, pathogens are presumed present as well, which may not always be the case. To remove these sources of uncertainty and to better serve public health, the U.S. EPA stated in 1986 that *E. coli* and enterococcus-based methods and standards should be used by the states (U.S. EPA, 1986) as a means of measuring the presence of pathogens. Ecology is considering these changes in the triennial review of water quality standards process (WDOE, 1998, 2000b).

A method called the Microbial Source Tracing (MST) technique matches "fingerprints" isolated from *E. coli* bacteria DNA with those previously characterized from known human and animal sources. Professor Mansour Samadpour of the University of Washington's School of Environmental Health developed this technique which has been used in a number of surface water studies in the region and nationally (Farag et al. 2000, NVRC 2000, Herrera 1999, KCDNR 1997, Trial et al 1993).

Using the MST technique, the limited sampling for the Des Moines Creek Basin Plan showed that some of the fecal contamination in the lower watershed was attributable to unsewered residential areas (septage) and that animal sources existed as well (KCDNR, 1997). Human sources were less prevalent upstream nearer the airport, where dog and avian sources together comprised up to 34% of the results. This study had limited statistical power due to the limited number of samples, plus a number of the isolates were unmatched with known sources.

The Port recently completed a study using the MST technique to identify potential fecal coliform sources in airport runoff (Herrera, 2001). This study found that more than 90% of the sample results from STIA runoff and instream samples above and below STIA were associated with animals, while humans accounted for less than 10%. Human sources were implicated only infrequently in storm runoff and not found in baseflows from STIA. The study also showed that upstream sources of fecal contamination existed, including human sources not attributable to the airport. Several sources of avian fecal matter were found at STIA, including a pigeon colony on the rooftop of Concourse A (removed during

concourse demolition in February 2001). The study indicated birds, particularly pigeons were a significant source of fecal coliforms for SDE4 and the other locations sampled. See Section 4.7.2 for more details.

In past reports, the Port showed that sporadically elevated fecal coliform counts occurred mostly in the landside subbasin SDE4. Of the ten current year fecal coliform results for SDE4, only two samples showed elevated results, while others ranged from non-detectable to 500 per 100 ml, well within the typical range for STIA and other regional stormwater (see Table 4). The Port's MST study corroborated work discussed in previous annual reports showing an absence of cross-connections with sanitary sewer lines. Baseflow samples were not contaminated (generally non-detectable fecal coliforms, and an absence of human "fingerprints") and indicated that there was no continuous source of fecal coliform bacteria, whether arising from human, animal or other sources.

Elevated fecal coliform results for SDN1 and SDN4 samples from the June 27, 2001 storm were unique. Relative to the extensive sampling history, these samples are statistical outliers according to both definitions (SPSS and ±3 standard deviations). Typical fecal coliform concentrations for these two subbasins have been very low with many non-detectable. The MST study found only avian sources in storm samples from these two outfalls, while baseflow discharges were absent as is the usual case. Thus, the elevated results in the two SDN1 and SDN4 samples in the past year were most likely caused by avian influences, with no indications of sanitary cross connections.

4.5 Composite Sample Results

In the past year, the Port took a total of 59 flow-weighted composite samples, bringing the six-year total to 412 for all outfalls. The discussion of these composite sample results are segregated from grab samples because grab samples represent instantaneous values. Composite sample results, especially those from samples that comprise the entire hydrograph, represent an average

value or event-mean concentration (EMC) over a longer time period. All composite sample data reported below met the representativeness criteria of the Procedure Manual. Non-representative composite data not reported below are in Appendix D.

4.5.1 Suspended Solids and Turbidity

11

STIA outfalls continue to discharge typically less total suspended solids (TSS) and turbidity than urban areas. In the seven-year sampling history at STIA, more than 80 percent of the 386 TSS samples and 336 turbidity samples were below the comparative values of 50 mg/l, and 29 NTUs, respectively. As shown in Figure 5 and Figure 6, the majority of results for the past year continue to be consistently low.

The four airfield outfalls (SDS3, SDS4, SDN3, and SDN4) continue to produce less TSS and turbidity than the two principal landside subbasins (SDE4 and SDN1). In the past seven years, 86 percent of the 146 TSS results from the airfield outfalls were less than one-half the regional comparative median value of 50 mg/l. Because these airfield outfalls represent about 61 percent of the total SDS area, the data show that the majority of STIA runoff is much lower in suspended material than runoff from comparable regional urban areas.

In the past year, 3 samples exhibited higher than typical TSS and turbidity; two at SDN4 and 1 at the taxi yard (TY). All three TSS results (366, 331, and 660 mg/l) were new maxima for the respective outfalls (SDN4 and TY). The SDN1 turbidity results of 170 and 198 NTU were new maxima for that outfall. No other constituent maxima were associated with these SDN1 results, though lead and zinc were relatively high compared to historical data (see Section 4.5.3.2).

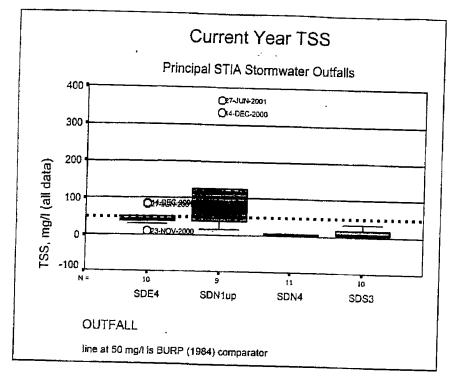


Figure 5 TSS for Current Year

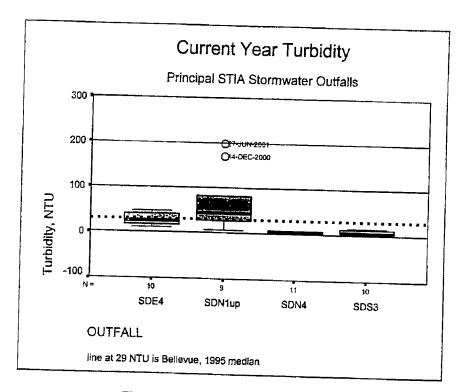


Figure 6 Turbidity for Current Year

BMPs were added in SDN1 in January 2001 (flexible catch basin inserts) after the first occurrence. Subsequent TSS and turbidity dropped in the next five SDN1 samples until the 6/27/01 sample event indicated new peaks. Visual observations suggested that the source of sediment was associated with two factors: 1) truck traffic on air cargo road, and 2) sediment mobilized by vehicle traffic turning around in a small unpaved shoulder area on the south side of S. 154th St about 100m west of the SDN1 sampling station. The embankment construction areas have a complete range of BMPs onsite to minimize tracking, including truck wheel washes and roadway sweeping.

The Port's construction erosion and sediment control program provides effective erosion and sediment controls. The stormwater batch treatment system used over the past three seasons for the third runway embankment project has been highly effective. Discharges from this system always met water quality standards for turbidity in Miller Creek, and in fact, were typically much cleaner than background conditions in the creek upstream from the project (Tobiason et al., 2000).

The elevated TSS of 660 mg/l in the 1/28/01 Taxi Yard sample may have been associated with limited construction in the area (electrical ductbank station) and/or inappropriate sediment disposal onsite. A small pile of sediment and other debris was observed near the dumpster at the taxi facility. Staff were notified and the sediment was removed shortly thereafter.

4.5.2 Biochemical Oxygen Demand (BOD₅)

Results for the past year continue to indicate overall low levels of BOD_5 in STIA stormwater. In 42 samples analyzed in the past year, the median BOD_5 was 7.7 mg/l, just above the 6.6 mg/l regional urban comparator (BURP, 1984, see Table 4). See Figure 7. Overall, 54% of the 335 samples to date were less than the

regional comparator. Elevated results have usually only been associated with major deicing periods.

Principal sources of elevated BOD₅ concentrations in the past were associated primarily with infrequent and short-lived winter weather episodes and ground surface deicing. During these events, acetate-based ground surface deicing chemicals are the primary sources of BOD₅. The Port discontinued the use of urea and glycol-based ground surface deicers in 1996. There have been only a few isolated indications of limited BOD₅ contributions to stormwater from aircraft deicing glycols. Two elevated BOD₅ results in the past year, 84.3 and 137 mg/l at SDS3 on November 23, 2000 and January 28, 2001 appeared to be associated with glycols (84.3 and 122 mg/l total glycols respectively). Direct sources of glycols have been eliminated from the storm drains through numerous BMPs (POS, 1998c). In September 2000, the Port rerouted drainage to the IWS from an SDS1 area of about 0.1 acre near the South Satellite that can receive infrequent aircraft deicing/anti-icing fluids (ADAFs) when and if applied to aircraft at gates S3 and S4. See Section 4.7.2.

In the past year, two limited periods of winter weather occurred: February 8-9, and February 16-17, 2001. In time-composites taken during these two events, BOD5 ranged from 53 mg/l (SDE4) to 756 mg/l (SDS3). Because these samples were time-composites they do not appear on the figure below. Section 4.6 discusses these in more detail. Snowfall from the more substantial second event required plowing and storage in the three snowmelt BMP areas. During both of these events, there were no discharges from outfall SDN2, which could drain the north snowmelt BMP area in the event of an IWS pump station bypass⁴.



⁴ The entire drainage area of outfall SDN2 was re-routed to the IWS in 1997 as a result of two BMPs.

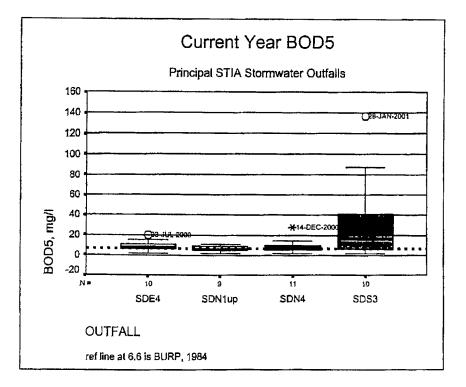


Figure 7 BOD₅ for Current Year

4.5.3 Metals

All data reported below are for total recoverable metals. It is important to note that Washington State Water Quality Standards (WAC 173-201A) apply to the receiving waters, not to the discharges from a particular outfall. See the discussion in Section 3.3 concerning the STIA monitoring locations relative to the receiving streams.

The Washington State water quality standards for copper, lead, and zinc are based on toxicity associated with the dissolved fraction of the metal. Because of complex water chemistry, only a portion of the dissolved fraction is actually bioavailable (Hall et al., 1997). Thus, direct comparisons of dissolved metals with standards may result in "false positives" where a sample is not actually toxic. Results for dissolved copper and zinc analyzed in WET testing and source tracing studies (POS, 2000b) at the Port's principal outfalls have shown that dissolved fractions were often substantially less than the 96% to 98% ratios applied by default in the water quality standards (Ecology's and EPA's). The comparisons offered below are based on the total recoverable metal using the non-specific ratios (partitioning coefficients) provided in the water quality standards and Ecology's TSDCALC8 workbook. The application of site-specific coefficients for these calculations would be more appropriate.

4.5.3.1 Copper

Overall, in 312 samples in the past six years, the median copper value for all outfalls sampled is 0.024 mg/l. Airfield and landside outfall data in this case are similar, with medians ranging from 0.020 to 0.031 mg/l. See Figure 8. Nearly 80% of all STIA copper data to date (312 samples) are less than the 0.040-mg/l median from the City of Portland's sampling results (City of Portland, 1993.)

These comparisons are more representative of outfall discharges than the Bellevue, 1995 median of 0.01 mg/l that was for *instream* stormwater samples. However, note that the comparators listed in Table 4 show that urban runoff typically exceeds receiving water standards for copper when compared directly and without mixing.

In samples from the minor subbasins SDS2, SDS5, SDS6, and SDS7 not associated with landside or airfield activity, median copper ranges from 0.005 to 0.013 mg/l, where all data has been substantially less than the two comparators cited here. Nearly half of the copper data for these four outfalls has been below the receiving water standard of 0.010 mg/l. Passenger vehicle roads and/or parking is very limited to non-existent in these four subbasins.

Copper results from the past year exhibited no new maxima, though an SDS3 result of 0.111 from the August 18, 2000 sample ranked third in the total of 58 samples to date. In past years, some samples associated with certain seasons and/or weather patterns have resulted in elevated copper. The top three SDS3

copper results all occurred in samples from storms in the month of August after extended dry periods of 2 weeks to 33 days (in 1996, 1998, and 2000). Though the length of the dry antecedent period may be significant in its effect on copper, there may be other important determinants such as rainfall intensity.

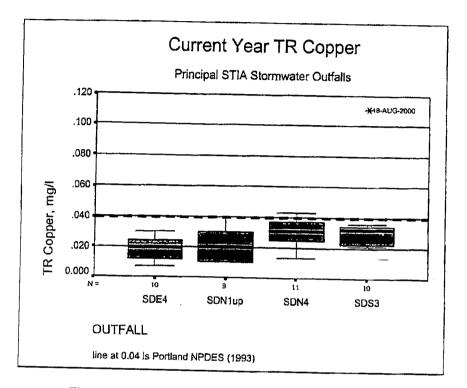


Figure 8 Total Recoverable Copper for Current Year

4.5.3.2 Lead and zinc

Samples from airfield outfalls continue to contain less lead and zinc concentrations than typical urban sources. In the seven-year permit sampling history, the vast majority of the 312 results for lead and zinc in all STIA outfalls were below the median for comparable regional data for commercial areas. For the four airfield outfalls, which comprise more than 65% of the total SDS, nearly all (more than 97%) of the 145 sample results to date for lead and zinc were less than the comparators.

AR 022667



These comparisons have added significance given that the commercial/industrial comparators cited (see Table 4) are very conservative data. Plus, these Bellevue (1995) lead and zinc comparators reflect *instream* sample concentrations after outfall discharges were mixed with receiving waters. Thus, metals in the vast majority of STIA stormwater, especially airfield runoff, are generally far lower than those measured in other local and regional studies. Current results continue these patterns, See Figure 9 and Figure 10.

Much of the airfield outfall lead and zinc data are below water quality standards. All but one of 145 lead results in the past seven years are below the standard of 0.039 mg/l calculated at a hardness of 56 mg/l (Table 4.) In fact, lead was not detected in 50% of these 145 total samples. Airfield zinc was similar in that more than 85% of the 145 results are less than the standard of 0.072 mg/l at 56 mg/l hardness⁵. See Figure 9 and Figure 10.

Importantly, lead and zinc concentrations measured in airfield outfall samples were far lower than those in the landside outfall samples were. The overall median lead and zinc values for principal airfield outfalls SDS3 and SDN4 (0.041 and 0.021 mg/l respectively) were three to ten times *less* than for the landside outfalls SDE4 and SDN1 (0.134 and 0.192 mg/l, respectively). See Figure 9 and Figure 10. This difference is likely associated with a higher degree of passenger and service vehicle usage in the landside areas.

The lead result of 0.035 mg/l from the SDN1 sample of 12/14/00 was associated with elevated TSS and turbidity in the sample. These TSS and turbidity results were new maxima for SDN1, representing outliers most likely associated with truck traffic. See Section 4.5.1. Though not an overall outlier, this lead result ranked third overall in the 37-sample history for SDN1, and was near the

⁵ In two storms in 1999, hardness values in seven Miller and Des Moines Creek instream composite samples ranged from 41 to 74 mg/l with a median of 56 mg/l.

historical maximum of 0.048 mg/l of January 13, 1999. Though not unusual, the zinc result in this sample was in the 78th percentile for all SDN1 data.

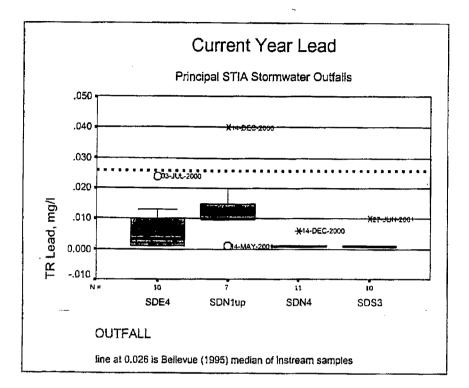


Figure 9 Total Recoverable Lead for Current Year

The landside subbasins experience considerable vehicle traffic where tire wear is a likely source of zinc (EPA 1993). Roads and parking areas constitute more than 50 percent of the impervious surfaces draining to SDE4 and SDN1. The lower results for the airfield outfall samples are most likely attributable to the fact that airfield runoff flows through grass areas prior to draining to the piping system. Certain portions of landside subbasins SDE4 and SDN1 will be assessed for appropriate BMP retrofits, such as biofiltration, according to the recent CSMP (Parametrix 2001).

Zinc associated with runoff from galvanized roofing material appears to effect only outfall SDN1. Unlike SDE4, where several metal-roofed cargo buildings make up a few percent of the total impervious area in the subbasin, three similar



8 11

cargo buildings comprise nearly 30% of the total impervious area drained by SDN1 (at the sampling station). Five WET tests in 1998-99 did not indicate toxicity in the SDE4 samples, while significant toxicity was found in multiple SDN1 samples. Source-tracing indicated that the SDN1 toxicity was attributable to zinc (POS 2000b; Tobiason and Logan 2000). However, the SDN1 sampling point tested is more than ½ mile upgradient from Lake Reba (a detention facility) and its outfall to Miller Creek. Several instream samples below the Lake Reba outfall have shown much less zinc than the SDN1 data and have not indicated toxicity (POS, 1997c, Parametrix 1999).

Despite the benefits provided by the Reba detention facility, the Port has been collaborating with other researchers in investigating several options for mitigating the zinc in the SDN1 (rooftop) runoff. Because re-roofing or painting costs appear high, runoff treatment by media filtration appears as a potential cost effective solution. According to the manufacturer of the roofing material, painting it would cause product warranty problems. Therefore, there are more issues to consider than cost alone.

Stormwater treatment media tested recently in controlled laboratory experiments include commercially available CSF® deciduous leaf compost produced by Stormwater Management Inc. (Portland, Ore.) and speciallymodified soybean hulls developed by the U.S. Department of Agriculture Agricultural Research Service Southern Regional Research Center (New Orleans, La.). Both the leaf compost and the soybean hulls are agricultural waste products that can be recycled as water-treatment media. Other media tested proved less suitable or even generated some degree of toxicity.

Implementation concepts include deploying the media in commercially available Stormfilter[™] cartridges in below-grade, pre-cast vaults; or in cartridges adapted for above-grade downspouts. These options amount to a new stormwater BMP option that appears much more cost-effective than re-roofing or painting to eliminate zinc sources. Further studies will characterize the long-term performance and operations and maintenance costs for these options for dealing with metal rooftop runoff. In addition, in the coming year, the Port will begin evaluating other rooftop runoff according to the provisions of the CSMP (Parametrix 2001).

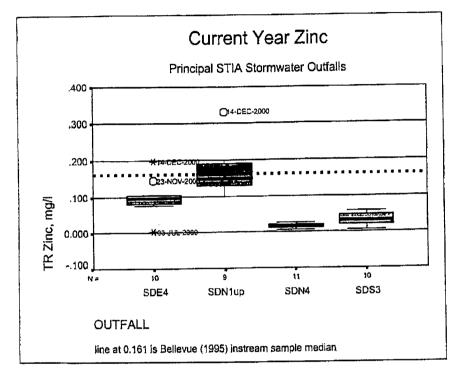


Figure 10 Total Recoverable Zinc for Current Year

4.6 Deicing Event Samples

11

The permit requires sampling and analysis for glycols during "deicing events". The Port conducts this sampling according to the Ecology-approved Procedure Manual (POS, 1999a.) The glycol data discussed below encompass mostly composite samples collected during periods of aircraft deicing, representing average values during a storm event discharge. Some of the data are from grab samples as required for outfalls SDS1 and SDN2. The two major deicing events of 2001 (February 8 and 16th) were sampled on a time-composite basis because the weather and associated deicing activities persisted for several days.

4.6.1 Background.

In 1995-1997, as recommended by the SWPPP, the Port implemented seven BMPs that rerouted drainage to the IWS from certain areas in four SDS subbasins: SDE4, SDS1, SDS3, and SDN2 (POS 1998c). Several limited areas within these subbasins were subject to aircraft servicing, including periodic ADAF (glycol) application. Two of these BMPs use multiple pump stations that have performed as intended over the past four-plus years.

Two of these pump stations divert runoff to the IWS from the entire SDN2 subbasin. In the past year, there were only three storms that resulted in bypasses from these pump stations to the SDN2 outfall (October 9, 2000, January 4, 2001 and June 11, 2001). Two of these were sampled according to permit requirements and no unusual results were found. All bypasses were of very short duration compared to the length of the rainfall event and the period flows were pumped to the IWS. As intended in the station design, these bypasses to SDN2 represented only a fraction of the peak flows of the hydrograph. None of these bypasses occurred during a major deicing period or when snowmelt was present.

The Port's Annual Glycol Reports (POS, 2001, 2000c, 1999c, 1998b, 1997b, 1996b) detail ADAF (glycol) application at STIA. These reports summarize data reported by the airlines for the volumes of both ethylene and propylene glycol applied and number of aircraft treated each day. The Federal Aviation Administration (FAA) authorizes only specially formulated ethylene and propylene glycols for aircraft deicing and anti-icing. Port tenants perform all glycol application at STIA (applied by airlines or their ground service providers). Importantly, to ensure public safety, aircraft pilots make the ultimate decision on whether to apply glycols or not.

During the winters of 1998-99 and 1999-2000, the Port investigated the possible effects of ground deicing chemicals (acetates) on receiving-water dissolved oxygen (DO). As indicated by conductivity and/or tracer constituents of the potassium acetate, sodium acetate and calcium-magnesium acetate chemicals, these two studies showed that the deicing materials travel rapidly through the streams (Cosmopolitan Engineering, 1999; POS, 2000d). Though extended detention periods for the affected runoff occurred in Northwest Ponds, and Lake Reba to a lesser degree, it was not possible to attribute oxygen depletion to the chemicals. The studies documented very dynamic and often extreme DO fluctuations existed in background conditions for the ponds, weeks and months before any ground deicing chemicals were used.

Prior to these ground-deicing events, runoff glycol concentrations attributable to aircraft deicing were either absent or at low levels insufficient to have caused any of the observed oxygen deficits observed in the ponds. Runoff data during these major deicing events indicated BOD₅ attributable to glycols was a small fraction of the total given the acetate-based chemicals used concurrently. Moreover, the data indicated that the IWS effectively captures the majority of the total volume of glycols applied to aircraft.

4.6.2 Current Results

Glycols have been present infrequently, usually limited to the rare, one to two day winter weather episodes, amounting to just a few days annually. In the past year, glycols were analyzed in a total of 58 samples from five outfalls⁶. The majority of samples were collected at the regular sampling locations (SDE4,

⁶ Multiple time-composites were taken at SDE4, SDS3 and SDN4 during the 4-day deicing period of February 16-19, 2001. Results in Appendix C include each of these time-series samples plus an overall single sample comprised of equal volume aliquots from each time-series composite. Thus, the overall time-composite of up to 6 sub-samples is considered to represent the entire event. BOD5 and glycol concentrations in the overall composite used in the data summaries closely agree with mathematical averages of the individual time-series samples.

SDS3, and SDN4.) A total of 18 of these samples were time-composite series taken during the 4-day period of February 16-19, 2001. Total glycol concentrations ranged from non-detectable to a maximum of 548 mg/l in an SDS3 sample. Fourteen of the 27 samples representing individual events were below the detection limit of 2 mg/l. Glycols were typically detected only during periods of winter weather and considerable aircraft deicing activity.

The total number of aircraft deiced in the dry period before sampling events ranged from 1 to 414, with a median of 148. Data appear in Figure 11 and are summarized in tabular form in Appendix C. These results continue to indicate that glycols are typically absent in STIA stormwater discharges except during periods of major winter weather.

In the past year, two limited periods of winter weather occurred: February 8-9, and February 16-19, 2000. During the first event, the minor snowfall of 2 to 3 inches did not require plowing because it melted rapidly with the ensuing rainfall. The second event had up to 8 inches of snow that was plowed from the airfield and moved to the three snow storage areas. There were no discharges from outfall SDN2 during either of these events⁷. In both events, deicing/anti-icing chemicals were applied to ground surfaces during periods of a few hours.

These were the only periods in the winter of 2000-2001 when the Port applied chemicals to ground surfaces (primarily runways and taxiways.) Storms following both events were sampled at various outfails. Glycols and BOD were generally higher during the first event. Note that the BOD measured in these samples aggregates multiple constituents (acetate-based ground-surface deicing agents, plus lesser contributions from glycols and other potential sources). In composite samples from the first event, glycols were 41 mg/l at SDE4, 7 mg/l at SDS1, 426 mg/l at SDS3 and 144 mg/l at SDN4. Glycols in time-composites during the

⁷ The entire drainage area of outfall SDN2 was re-routed to the IWS in 1997 as a result of two BMPs.

second event⁸ ranged from 6 to 48 mg/l at SDE4, 12 to 167 mg/l at SDS3, and <4 to 33 mg/l at SDN4.

The 1999 Annual Report identified a clogged IWS drain inlet that may have overflowed to SDS3. Because of the proximity to certain gates of the C-Concourse, these overflows could have been a potential source of glycols found sporadically in past SDS3 samples. The Port corrected this problem last year and the IWS drain inlet now functions properly.

Drainage reroutes in September 2000 near the South Satellite appear to be effective in abating glycols in SDS1 discharges. Compared to past years' samples, glycols in 5 SDS1 samples in the past year were much lower, ranging from 5 to 49 mg/l. Prior to this BMP, an elevated glycol result of 801 mg/l in the SDS1 sample of January 12, 2000 was associated with substantial aircraft deicing that took place at the South Satellite.

Several small area drains under the South Satellite roof overhang near gates S3 and S4 receive limited runoff from a small area between the nearby IWS flush gutters and the building. Only the forward sections of larger aircraft may overhang this area, resulting in the potential for ADAFs to enter the associated drains. See Section 4.7.2. These drains were reconnected from SDS1 to the IWS during the Northwest hangar and North Ductbank construction projects in September 2000. The SDS1 sampling this past year coincided with one to six aircraft deiced by the airline that is most likely to have used the affected area during or just prior to the sampling events⁹.

^a Most time-composites in the series sampled for the February 16-19 event represented periods of about 12-hours of discharge. Glycols and BOD₅ in the overall composites for these series closely approximated averages of the individual samples.

⁹ According to Port records (POS, 2001), Northwest Airlines delced a total of 58 aircraft in the winter sampling period coinciding with this report. A total of at least 16 aircraft of these aircraft were delced on or the day before SDS1 was sampled. See Appendix C,

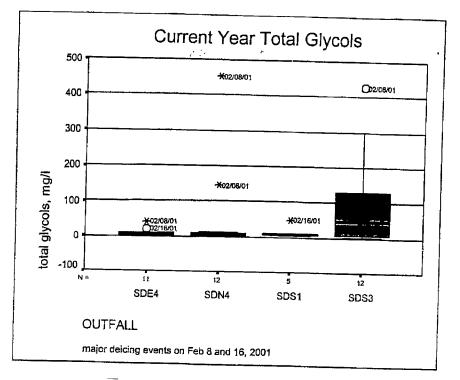


Figure 11 Glycol results for Current Year

The Port has exceeded minimum sampling requirements of Special Condition S2B4 for deicing events at outfalls SDS1 (003) and SDN2 (007). This permit condition was added when the current permit became effective on March 1, 1998. Previous annual reports have discussed how the data signify that the BMPs have been effective and the intent of this monitoring requirement is satisfied. As allowed for in Special Condition S2B4, the Port has requested Ecology's approval to cease this monitoring (POS, 1999d, POS, 2000e). The SDS1 samples discussed above were taken to further demonstrate BMP effectiveness.

4.7 Other Results

The following results were obtained from samples taken for purposes other than to satisfy permit condition S2B.

4.7.1 Field Quality Control Samples

The Port routinely collects duplicate and equipment blank samples during NPDES sampling events according to the Procedure Manual. Appendix D summarizes these results. The field equipment blanks taken in the past year indicate that sampling techniques and equipment do not contribute a high bias to sample results reported, notably for metals. These results support the efficacy of the Port's "clean" sampling methods that were developed for stormwater monitoring, in particular for the WET testing source tracing (POS, 1999e).

4.7.2 Source Tracing Studies

Because some sampling results have indicated elevated levels for certain constituents, the Port has conducted source-tracing studies aimed at identifying and characterizing potential inappropriate sources. Through past efforts, the Port has already discovered and eliminated several other sources of stormwater contamination in subbasins SDE4, SDN1, and SDS4 that are discussed in previous Annual Reports¹⁰.

As discussed in the metals section above, the Port investigated and found the likely source of toxicity exhibited in SDN1 samples. These results from SDN1 were included in last year's report (in Appendix D) and were elaborated further in the final WET characterization report submitted to Ecology in May 2000 (POS, 2000b). Other source tracing investigations are summarized below.

4.7.2.1 SDE4 Source Tracing

The Port began studying fecal coliforms in SDE4 discharges in 1998 and completed the series of investigations in early 2001 (Herrera, 2001). This work used several special forensic techniques aimed to identify potential sources of

¹⁰ See POS 1997, 1998. Inappropriate connections to the stormdrains were found and eliminated in subbasins SDE4, SDN1, and SDS4.



the sporadic elevated results. Past Annual Report's have discussed findings that corroborate the most recent and final portion of this investigation. Multiple data over several years using state of the art techniques have demonstrated an absence of sanitary sewer cross connections. The most recent work found that animals, primarily birds accounted for more than 90% of the fecal coliforms in samples from several outfalls.

4.7.2.1.1 Fecal coliform history

To date, the median of the 47 NPDES storm event grab samples from SDE4 is 220 per 100 ml, which is about 100 to 200 units higher than median values at other STIA outfalls. See Appendix B. Results to date for SDS3 and other outfalls show very low counts, which are consistent with the 7-years' sampling summarized in Section 4.4.2. Baseflow samples at SDS3 have shown non-detectable fecal coliforms.

Many other studies have shown that fecal coliforms in stormwater can be highly variable with frequent highly elevated numbers. The BURP (1984) study found a fecal coliform median of 980 per 100 ml in 326 *instream* stormwater samples. Fecal coliforms had a mean concentration of 4,500 MPN/100 mL in the 200 stormwater samples for 11 stations in suburban catchments during the comprehensive Bellevue (1995) study, which concluded that the high concentrations were probably due to animal wastes.

Work in 1998-99 showed that concentrations of certain chemical constituents in SDE4 storm and baseflow samples (e.g. ammonia, surfactants, fluoride, potassium) have been below levels that might indicate cross connections with sanitary wastewater (POS, 1999b, 2000a). These particular indicators have shown an absence of wastewater that might be linked with the sporadically high fecal coliforms, demonstrating an absence of direct cross connections with sanitary sewage.



AR 022678

4.7.2.1.2 Microbial source tracing (MST) technique

The Port conducted multiple storm and baseflow rounds of microbial source tracing (MST) sampling routines in 2000. This MST technique uses a special method of RNA fingerprinting developed by Professor Mansour Samadpour of the University of Washington's School of Environmental Health. Several other local and regional studies used this technique and have been able to attribute fecal contamination in surface waters to multiple specific sources, including domestic animals and septage (Trial et al. 1993, King County 1995, Herrera 1999). Ecology recognizes the MST method as "...an excellent method for determining some of the sources of fecal contamination in a watershed" (Sargeant, 1999.)

Using the MST technique, King County (1997) attributed up to 64% of the results in the lower Des Moines Creek basin to unsewered residential areas (leaking septic tanks). In upstream samples taken nearer the airport, human sources comprised 10% or less of the results, while avian and dog sources together represented up to 34%. However, the two rounds of MST analysis in this King County study provided limited statistical power and resulted in 36% to 59% unmatched results, which may also be due to the limited number of "fingerprints" available in the database at that time. Nonetheless, the study indicated that human sources were prevalent in lower basin areas (City of Des Moines) suggesting that aging septic systems should be addressed.

4.7.2.1.3 Summary of Port's (2001) MST Study Results

The following are excerpts from the Port's MST study report (Herrera 2001):

 During storm flow, mean fecal coliform bacteria concentrations increased downstream within the SDE4 subbasin (165, 538, and 945 organisms/100 mL at the upstream, midstream and outfall locations, respectively), and were

higher at the SDE4 outfall than at the other STIA outfalls (range from 3 to 83 organisms/100 mL). These results are similar to the six-year NPDES monitoring results and further suggest that fecal sources were most concentrated in the vicinity of the main terminal area located in the southeast portion of STIA.

- Base flow was rarely present at the STIA outfalls and exhibited low mean fecal coliform bacteria concentrations (ranged from 3 to 4 organisms/100 mL) when present. These findings corroborate previous STIA studies and indicate that drainage from STIA was not contaminated during dry conditions by sanitary sewer cross-connections or leaks.
- Overall, the vast majority (92 percent) of the fecal coliform bacteria found in the stormwater and stream samples originated from non-human sources (58 percent birds and 34 percent non-human mammals for all samples). Birds were the most prevalent source observed during both storm flow (57 percent) and base flow (67 percent). Source percentages did not vary substantially among the stormwater and stream stations.
- A large quantity (approximately 1 cubic yard) of pigeon feces was found on the roof of Concourse A (located in the main terminal area) and was removed during concourse demolition in February 2001. Substantial accumulations of bird feces were not present on the many other rooftops that were inspected. The removal of pigeon feces from Concourse A may reduce fecal coliform bacteria concentrations at the SDE4 outfall in the future. Construction practices at STIA should minimize the amount of potential bird habitat to reduce stormwater contamination (and increase aircraft safety).
- Bacteria from human sources accounted for less than 10 percent of the total isolates obtained from each monitoring station during storm flow. Human sources accounted for 9 percent at the SDE4 outfall, 6 percent at the SDS3

outfall, 9 percent at the Bow Lake outlet (upstream) station, and 6 percent at the Des Moines Creek (downstream) station during storm flow. Human sources were not consistently observed at any station, and were rarely observed at both upstream and downstream stations during a single storm event. These results suggest that human sources were a small contribution to the fecal coliform bacteria present at the stormwater and stream stations, and there was no continuous source of bacteria from human sources during the monitored storm events.

- Human sources were not detected at the SDE4 upstream station, SDN1 outfall, SDN4 outfall, and the Northwest Ponds inlet (upstream) station during storm or base flow. Thus, human sources were not observed in the northernmost subbasins of STIA that drain to Miller Creek, or in the residential/commercial area west of STIA that drains to the west fork of Des Moines Creek.
- During base flow, human sources were not observed at the STIA outfalls and were only observed at the Bow Lake outlet (upstream) station (20 percent of base flow isolates) and the Des Moines Creek (downstream) station (7 percent of base flow isolates). These results suggest that human sources of bacteria present in Des Moines Creek during dry periods likely originated from Bow Lake and not STIA outfalls.
- Only three of the 49 *E. coli* isolates that originated from a human source were unique matches to isolates obtained from aircraft wastewater samples. These three isolates were observed at the airfield outfall (SDS3) and downstream in Des Moines Creek during one storm event (May 9, 2000). These findings suggest that aircraft wastewater transfer operations may be a source of the minor and infrequent human fecal contamination in runoff from the airfield. Aircraft wastewater transfer operations should be reviewed on a

48

regular basis to determine if existing practices are adequately preventing the potential contamination of runoff from STIA,

- Deposits of human feces were observed on the banks of Des Moines Creek in the Tyee Golf Course. This observation suggests that unsanitary toilet practices may have contributed to the minor human fecal contamination observed in drainage from within and outside STIA.
- This study also collected samples of local municipal sanitary wastewater (MWW) generated by STIA, and aircraft lavatory wastewater (AWW), known as "biffy" waste. *E. coli* from these samples were genetically typed to augment the database with local human sources. Samples of MWW and AWW taken during the study have shown very high fecal coliform counts ranging from 39,000 to 48,000,000 per 100 ml (membrane filter method; APHA, 1995). Importantly, the presence of high counts in the AWW samples indicated that the tollet chemical added by the airlines has limited sanitizing effects. This aspect should be considered in spill response.

4.7.2.1.4 Measures of contamination

Another part of the MST study examines the potential relationships among several indicators of bacterial contamination. Most fecal coliform bacteria are not pathogenic, but are used to indicate potential contamination from mammalian, avian, and human fecal waste products. Washington state water quality standards (WAC 173-201A) are based on fecal coliforms. Importantly, this metric does not distinguish actual sources, whether human, animal, or interference (false positives) from other non-pathogenic coliform bacteria such as Klebsiella species. For example, recent studies in Colorado showed that Klebsiella significantly interfered with fecal coliform results, causing the potential for false exceedances of permit criteria for a WWTP and implying higher than necessary disinfectant usage (Elmund et al., 1999).



For many years, various proponents, including EPA, have suggested that other metrics which correlate better with actual measures of disease are more appropriate (U.S. EPA, 1986). In 1986, the U.S. EPA stated that *E. coli* and enterococci-based standards would serve public health better than fecal coliforms and that states should change standards, effluent limits and test methods accordingly (U.S. EPA, 1986). The U.S. EPA issued an implementation guidance document this year (U.S. EPA, 2000). Ecology's triennial review of water quality standards, currently in progress, generally concurs with EPA, and as of May 2000 Ecology is considering *E. coli* and Enterococcus as alternative standards (WDOE, 1998, 2000).

The Port's MST study found that 62 percent (1,420) of the 2,305 total fecal coliform bacteria colonies isolated tested positive for *E. coli*. The highest percentage of *E. coli* (77 percent) was observed in samples from Des Moines Creek. As mentioned above, *E. coli* concentrations are typically less than fecal coliform bacteria concentrations because of the presence of other bacteria (e.g., *Klebsiella, Enterobacter,* and *Serratia*) that also test positive for fecal coliform bacteria. Enterococcus analyses in one round of sampling done in May, 2000, were similar to fecal coliform counts. Some of these samples correlated well, but notably, the samples from the routine SDE4 monitoring location had much lower enterococcus numbers than fecal coliforms (POS 2000a).

4.8 Outfall Inspections

Appendix E summarizes the visual observations made at outfalls during the past year. The number of instances exceeds the minimum of 3 wet season inspections required by the permit and reflected in the SWPPP (POS 1998c.) Most outfalls were visited more than 10 times and the four principal outfalls were visited more than 30 times in the past year during routine monitoring equipment deployment and maintenance. Visual indications of potential sediment problems were limited primarily to outfalls SDN1, SDE4 where TSS and turbidity results



have been discussed earlier in this report. Several observations of limited amounts of foam at the SDS3 outfall did not appear to be associated with the presence of soaps and/or glycols¹¹. The annual dry-weather inspection was conducted during September 2000. Visual observations recorded during these inspections did not indicate problems associated with baseflows or other dry-weather flow.

¹¹ Foam was present at outfall during SDS3 grab sample collection for 11/8/00 storm event. In this sample, pH=7.4, TPH<0.11mg/l, fecal coliforms=2/100ml, surfactants<0.025 mg/l, TDP = 0.179 mg/l, SRP = 0.163 mg/l, and BOD₅= 14.1. None of these results appeared to indicate the presence of soaps and/or washwater

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5 CONCLUSIONS

Storm sample results from the past year continue to support the conclusions reached in previous annual reports that STIA stormwater compares favorably to other comparable regional data, even with instream stormwater data. Constituents and concentrations of concern at STIA have been generally associated with specific activities or locations, and usually not routine runoff.

The Port has implemented various BMPs to address specific findings of the stormwater monitoring program. The data generally indicate that these BMPs have been effective. Still, the Port continues to investigate other issues to resolve problems indicated by the data.

Sampling locations for certain outfalls are in-pipe or are well above the final discharge point to receiving waters. Because these locations do not account for the influence of other factors prior to discharge, namely detention, it is not appropriate to compare the STIA data to water quality standards.

In addition to completing all required routine stormwater sampling, the Port accomplished the following pro-active measures in the past year.

- 1. Completed fecal coliform source-tracing in SDE4 and other areas. This MST study report indicated fecal coliforms were attributable to animals, mainly birds, and that cross-connections with sewers were absent.
- Continuing to investigate toxicity (zinc) abatement for metal rooftop runoff in SDN1. These investigations have used state of the science techniques to evaluate emerging BMPs as potential solutions. More rooftop runoff evaluations are expected in the coming year.
- Confirmed that drainage re-routes from SDS1 to IWS reduced glycol concentrations in SDS1 discharges.
- 4. Adopted the Ecology-approved Comprehensive Stormwater Management Plan (CSMP) for the STIA Master Plan Update.

The past year's monitoring efforts lead to these suggestions:

- 1. Investigate the potential for links between surface drainage (sheet flow) in the IWS and SDS3 drainage areas near the main terminal. The GSE "drivelanes" in this vicinity may be within the apparent SDS3 boundary. The areas just to the east of these drivelanes (ramps for Concourses B and C) are drained by the IWS, and are contiguous with SDS3. This effort should determine if there is a potential for significant flows from associated IWS areas to enter the SDS3 system.
- 2. Continue to evaluate stormwater treatment technologies (media filtration) to determine if they are a technically and cost effective BMP to consider for managing metals in roof runoff.

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APPENDICES

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APPENDIX A STORM EVENT HYDROLOGIC AND HYDRAULIC DATA

Table 1

Monthly Summary of Daily Rainfall at STIA source: NWS rain gage at STIA

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NWS 0.79 1.1 1.79 3.48 6.05 5.92 5.7 4.21 3.75 2.51 1.66 1.44 actua 0.23 0.56 1.64 4.61 7.74 10.27 12.97 15.01 17.74 20.88 22.31 24.99 avg d 0.79 1.89 3.68 7.16 13.21 19.13 24.83 29.04 32.79 35.3 36.96 38.4	the second se		_									0	
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avg d 0.79 1.89 3.68 7.16 13.21 19.13 24.83 29.04 32.79 35.3 36.96 38.4													
19.13 24.63 29.04 32.79 35.3 36.96 38.4													24.99
		<u> </u>		0.00	7,10	13.21	19.13	24,83	29.04	32.79			38.4

12-month total 24.99 12-month NWS avg 38.4

departur 35%

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		_	_	_	_	_										_			
	total				%0	10.9%	4 7%	2.6%			72%	9.9%				, Logo	101		_
total percent of Airfield	Imperv				20	%6	3%	5 7%			76%	%/				eld" cet	d7 acre	in spe	-
total p	perv				%0	12%	%1				69%	12%				Note: "airfield" cetegory	Includes 17 acres of	taxiway in SDE4	
						_		 								-			
10	totat	1 4%	0.6%	4.7%	%0 0	7.2%	3.1%	15.4%	1 6%	1.4%	47 7%	6.5%	1.4%	5.1%	3.5%				
total percent of SDS	Imperv	7 4%	1.2%	2.8%	%0 0	6.2%	1.8%	22.5%	3,3%	0.2%	51.8%	48%	1.6%	0.3%	%2.0				
total	pervi	0.6%	0.1%	63%	%0'0	8 0%	4.2%	9.7%	0.3%	2.3%	44.5%	8.0%	1.3%	%0.6	5.7%				
ت آ	total	A%	3%	28%	%0	42%	18%	19%	2%	2%	68%	8%	2%	6%	4%				
total percent of each Creek	perv imperv total	16%	8%		%0	44%	12%	26%	3.9%	0.3%	61% (8%	1.9%	04%	0.9%				
total eac	perv	%0	0.4%	33%	%0	42%	22%	12%	0.3%	3%	55%	10%	2%	11%	%1				

				_	_																									,						_							
Tolal (acres)		13.5	5	459	0.0	683	30.2	165.0		149.1	15.9	132	462.3	63 4	14 D	49.6	33.9	801.4	0.8	<u>.</u>		292.0	69	08	0.3	39.8	13.8	16.5	0.0	742		165.0	%/1	12/10/201	83%	60%	23	10,212,0	68%	1967	C ANDIAL S	27%	1334.9
lmperv. (acres)		10.2	5.0	12,1	0.0		77	62.0		97 4	14 4	0.1	224.3	208	20		32	369 4	0.8	1.2		2857	0.2	07	0.3	33.3	134	16.1 2.2	0.0 2 8 0			62.0	14%	369.4	85%	47%			68%	433.3	246.34	44%	779 6
Perv. (acres)		3.3		339		429	228	103.0		517	1,5	12.2	2381	426	7.0	48.2	30.7	432.0	00	0.3		63	64	0	0.0	6.5	0.3	0.4				103.0	%61 %01	432.0	81%	78%	6.0	346.1	65%	535.3 Dev	10.0	4%	555.2
Drainage Basin	Miller Creek SDS			SDN-1 (offsile below mon pt)	SDN-2	SDN-3	SDN-4		Des Moines Creek SDS	SDE-4	SDS-1	SDS-2	SDS-3	SDS-4	~	SDS-6 (B)	SDS-5 (D)	total Other SDS	Taxi Yard	Engineering Yard	500	Primary drainace	North Snowmelt PS (SDN2)	Central Snowmelt PS (SDE4)	South Snowmelt PS	North Cargo Area PS (SDN2)	North Satellite PS (SDE4)	IWS-510 Diversion (SDS1)	Delta Hrigr/NW Hrigr South Satellite diversion (SDS1)	total diversions	SUMMARY	Müler Creek SDS	% of SDS		% of SDS	% of total	Other SDS	Instantial and	% of SDS	-+	No. of the second states of the second secon	star and a contract to the second secon	Tatal defense

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7796		
555.2		

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AR 022697

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9/2001 2:31:09 PM

Summary of Storms Sampled 7/1/00 - 6/30/01

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										•		-	. .	_									i.				
				WS bump station hunses to SON2						ł		coincided with major formum datation	coincided with major famining delating event	u (inimay) uciciliy even			u k					bunass to SDND			н		
or accurate outlible 1/ 1/00 - 0/30/07		Comment		IWS numo station								rninridad with mo	roincided with me				a					1WS pump station					
allipied /	Event	Type	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Slorm	Unknown	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Storm	NPDES Slorm	NPDES Storm			
	Load	Factor	13.3	5.7	6	1.6	6.1	22	14.0	1.1	9.8	4.1	7.7	5.6	9.1	10.0	3.2	33.0	9.7	7.8	3.2	56.8	50.5	3.9	52	6.7	11.6
	Dryant,	Days	2.4	0.9	1.0	1.3	0.8	1,8	5.3	0.9	5.1	1.2	2.3	2.6	4,2	3.2	2.3	13.8	2.3	1.7	1.1	8.2	26.3	1 .3	53 5	2.3	4.1
A INTIMA	Dryant,	hr	58	22	24	32	19	43	127	22	123	29	55	62	101	11	54	330	54	41	27	196	631	30	22	54	98
3				0.09	0,02	0.01	0.19	0.11	0	0.05	0	0.04	٥	٥	٥	٥	0	0	D	0.36	0.51	0	Ō	0.02	22	0	0.06
	24hrant,	ŋ	0	0.01	0.01	0	0.01	0	0	0.01	0	0.04	0	٥	0	0	0	0	٥	0	0	0	0	٥	22	۵	0.00
	Max Int,	in/hr	0.23	0.26	0.08	0.05	0.1	0.05	0.11	0.05	0.08	0.14	0.14	0.09	0.09	0.13	0.06	0.1	0.18	0.19	0.12	0.29	0.08	0.13	22	0.11	0.13
	Dur,			22	16	6	80	14	9	4	7	96	7	13	8	15	26	6	6	26	4	80	1:	12	22	10	16
	Depth,	e.	0.52	1.28	0.48	0.23	0.39	0.32	0.27	0.09	0.29	D.46	0.3	0.29	0.26	0.44	0.29	0.37	0.77	1.21	0.36	0.37	0.27	0.29	22	0.34	0.43
÷	Storm	Date	6/27/01	6/11/01	5/14/01	4/5/01	3/27/01	3/15/01	3/1/01	12/21/00	12/14/00	2/16/01	2/8/01	2/1/01	1/28/01	1/3/01	11/29/00	11/23/00	11/8/00	10/19/00	10/17/00	10/9/00	8/18/00	7/3/00	Count	Median	Average

Event Type defined in Procedure Manual for Stormwater Monitoring load factor = maxint (in/hr)*dryant(hrs)

AR 022698

"dur" = rainfual! duration in hours

"24hrant" and "48hrant" is the total rainfall in the 24 and 48 hours preceding the event respectively

Page 1 of 1

2001AppendixA storms

	2:30:26 PM
-	2:30:2
	9/2/6/01

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	:																													
30:26 PM			015	SDS-5	1,100	1,240	380	240	480	240	520	670	670	430	430	620	240	380		480	860	910	570	1,380	380	620	33.0	3.2	30.7	0.31
9/26701 2:30:26 PM			014	9-202	1,376	1,555	478	299	598	299	658	837	837	538	538	777	299	478	359	598	1,077	1,136	718	1,734	478	777	49 F	1.3	48,2	0.27
		0/30/01	013	=	73	83	25	16	32	16	З° С	44	44	29	29	41	16	25	19	32	57	60	38	92	25	41	0.8	0.8	0.0	0.90
		1/1/00 - 0/30/01	012		120	136	42	26	52	26	57	73	73	47	47	68	26	42	31	52	94	66	63	152	42	68	1.5	1.2	0.3	0.17
			011 SUNJ		1,300	1,470	450	280	560	280	. 620	190	790	510	510	730	280	450	340	560	1,020	1,070	680	1,640	450	730	30.2	7.6	22.6	- -
	Monito		010 SDS-7		840	950	290	180	360	180	400	510	510	330	330	470	180	290	220	360	660	690	440	1,060	290	470	14.0	7.0	0.78 D.58	
	Evente		SDS-4	9 DCO	3,400	3,430	1,060	660	1,330	660	1,460	1,860	1,860	1,200	1,200	057,1	66U	1,060	800	1,330	2,390	2,520	1,55U	000'0	1,060	1,730	63.4	20.8	42.0 0.46	•
	Storm I		SDN-3	3 EEO		4, 120	1,270	06/	06c,1	180	0+1'1	2,220	4 420	1,400	1,43U	700	0.67	1/2/1	950 1 100	080,1	2,03U	010.5	4 600	000.4	0/2'1	7 nan'z	70.0	0.12	0.50	
	m) for (007	SDN-2																											
	Rates (apm) for	900	SDN-1	1.040	1,180	USE USE	000	450	230	500	053	630	410	410	200	230	360	020	450	810	860	540	1.310	360	590	13 5	0.01	3.3	0 74	
		005	_	27,200	30,700	9 400	5,900	11.800	5.900	13.000	16.500	16,500	10,600	10,600	15.400	5,900	9,400	7,100	11.800	21,300	22,400	14,200	34,300	B.400	15,400	462.0	0.204	238.0	0.57	
1	Estimated Peak Runoff	004	SDS-2	410	460	140	68 68	180	89	200	250	250			230	89	140	110			340 2			140		_	1.0	12.2	0 30	
	ited Pe	003	SDS-1	900	1,020	310	200	390	200	430	550	550	350	350	510	200	310	230	390	200	740	470	1,140	310	510	10.7	9.2	1.5	0.81	
:	Estima		SDE-4	10,440	11,800	3,630	2,270	4,540	2,270	4,990	6,350	6,350	4,080	4,080	5,900	2,270	3,630	2,720	4.540	3,170	1,620	5,440	13,160	3,630	5,900	149.0	97.0	52.0	0.67	
					0.26	0.08	0.05	0.1	0.05	0.11					0.13			0.06					0.29 1 1	<u></u>	Marca 1		Ŷ	ac	A)((d+	
EMIS		_			_	_			_			-					-	_	_	~	_	_			7/3/00 0.	A = total Basin Area, ac	Aì ≍ impervious area, ac	Ap = pervious area, ac	W/(da)cz n+(im)ne n) - in	
			•															•				•				۲	A	₹ (5	

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Page 1 of 1 Rainfail data from Port of Seattle and/or National Weather Service Rain gage at Sea-Tac Airport Peak runoff rates based upon *rational method": Q=CIA, c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rpISWStormsRunoffRates

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2001AppendixA Peak Runoff

2:30:52 PM
9/20/01

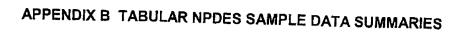
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9/2001 2:30:52 PM		015	150 000	367,000	138 000	66.000	112.000	92,000	78,000	132.000	86.000	84.000	75.000	127.000	0	84.000	84,000	107,000	221,000	347,000	104,000	107,000	78.000	84,000			30.7		10.0	286,594
9/20/01 2		014 SDE 6	187 DOO	460,000	173.000	83.000	140.000	115.000	97,000	166.000	108.000	105.000	94,000	158,000	0	105,000	105.000	133,000	277,000	435,000	130,000	133,000	97,000	105,000	40.6	5.7 6	0.85	7.07	1 346 750	358,955
	/30/01	53	10 000	25.000	10.000	5.000	8.000	7,000	6,000	000'6	6,000	6,000	5,000	9,000	0	6,000	6.000	8,000	15,000	24,000	7,000	8,000	6,000	6,000		A O		0.9 0	21 179	19,061
	/00 - 0/	012	17,000	41,000	16.000	8,000	13,000	11,000	9,000	15,000	10,000	10,000	9,000	14,000	0	10,000	10,000	12,000	25,000	38,000	12,000	12,000	000'6	10,000	1.5	1.2	0.3	0.77	40.729	31,361
	red 7/1	011 SDN 4	177,000	435,000	163.000	79,000	133,000	109,000	92,000	157,000	102,000	99,000	89,000	150,000	0	99,000	99,000	126,000	262,000	411,000	123,000	126,000	92,000	000'66	30.2	7.6	22.6	0.41	820.002	339, 133
	Monito	010 SDS-7	114.000	280,000	105,000	51,000	86,000	70,000	60,000	101,000	66,000	64,000	57,000	97,000	0	64,000	64,000	81,000	169,000	265,000	79,000	81,000	60,000	64,000	14.0	7.0	7.0	0.58	380,134	218,577
	Events	009 SDS-4	313,000	1,070,000	253,000	40,000	156,000	96,000	62,000	230,000	82,000	75,000	56,000	207,000	0	75,000	75,000	138,000	522,000	985,000	129,000	138,000	62,000	75,000	63.4	20.8	42.B	0.46	1,721,462	797,466
_	Volumes (gal) for Storm Events Monitored 7/1/00 - 6/30/01	008 SDN-3	203,000	943,000	209,000	35,000	129,000	81,000	53,000	189,000	69,000	63,000	48,000	171,000	0	63,000	63,000	114,000	388,000	852,000	107,000	114, UUU	53,000	63,000	70.0	27.0	43.0	0.50	1,900,668	951,692
	al) for	007 SDN-2							ł																					
	mes (g	006 SDN-1	161,000	439,000	134,000	22,000	83,000	52,000	34,000	122,000	44,000	41,000	31,000	110,000	0	41,000	41,000	74,000	247,000	411,000	000'60	14,UUU	34,000	41,000	13.5	10.2	3.3	0.74	366,557	271,660
	off Volui	005 SDS-3	2,676,000	8,234,000	2,403,000	394,000	1,490,000	928,000	605,000	2,182,000	791,000	726,000	548,000	1,971,000	0	726,000	726,000	1,316,000	4,289,000	1,641,000	1 345 000		000,000	726,000	462.0	224.0	238.0	0.57	12,544,409	7,089,492
	l Runc	004 SDS-2	56,000	138,000	52,000	25,000	42,000	35,000	29,000	50,000	33,000	32,000	28,000	48,000	þ	32,000	32,000	40,000	83,000	000,051			73, UUU	32,000	13.2	1.0	12.2			107,252
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		002 SDE-4	1,327	3,64	1,1	- 1	•			<u> </u>																			4	N
POS		Depth, 002 in. SDE-		1.28 3,64	•			-			0.3	0.29	0.26	0.44 2.50	60'N	0.29	0.29			12.1	0.37		17.0	0.29	A = total Basin Area, ac	AI - Impervious area, ac	Ap = pervious area, ac	Ai((qA)c2		Lr Est lundit, galin 2

Only certain outfalls sampled during a particular event

Rainfall data from National Weather Service and/or Port of Seattle rain gage at Sea-Tac Airport.

2001AppendixA Runoff Volumes





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SAMPLE DATA

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STORM CHARACTERISTICS

NPDES Grab Sample Data 9/1/94 - 6/30/01

backup dala in case short on FOG result not representative, backup FOG/TPH for March laboratory error, see letter of May 15, 1997 6 1 exceeded holding time by 9+ hours fecal coliform result not 1997 Lab errors (SDE4 data for 96 Q4 epresentative 030597 grab) Comments ; - 4000 - 4000 Fecals (MF) 1100 260 300 22 49 > 1600 Fecals (MPN) > 1600 > 1600 188 > 1600 80 R 220 220 1 23 с С ß 1218 160 20 300 1 8 CONCENTRATION, mg/L .Hd MO 1.54 3.05 2.48 < 0.05 34 2.44 2.94 1.93 -HJ-< 0.10 < 0.05 ł 1 < 0 09 < 0.05 0.09 0.84 0 Ξ. Δ 1.58 2.53 3 04 3.4 2.77 5.56 2.5 сï He H < 1.0 1 48 2.09 3 35 2.64 ; 2.8 1.1 1.2 3.8 88 9.E 1.97 6.33 103 R 3 06 -9 50 23 1.5 2.4 3.5 2.9 1.8 2 5 FOG • 10 • 10 < 1.0 1.6 2.8 ÷ 3.6 59 5.7 28 2.8 3.1 с) Г 2 18 a 6.45 6.17 6 59 Æ 6.6 69 7.8 6 39 7.31 6.61 7,06 7.15 17 7.1 8, 2 9, 2 6.72 7.03 6 86 6.93 7.03 6.94 ø Ground Deice? Yes ຊ່ຊ ž ŝ 212 ž å å £ ŝ ٩ ž ž ž Ž ۰Ŷ 2¦2 2,2 12 å 윋윋 ž i. Event 2 2 ŝ Pur-pose NPDES NPDES NPDES NPDES NPDES NPDES Stip Ag VPDES NPDES VPDES NPDES NPDES Stip Ag 14 NPDES MaxInt 24hrant 48hrantDryant In/hr In in hr 262 49 <u> 9</u>9 22 8 601 35 29 42 87 58 ø 87 62 264 360 125 288 264 t 0 0 0 0 0 01 60 0 Þ 0 O o 0 0 D 24 0.04 0 0.08 ٥ 0 ۵ 0.07 0 0.04 001 0 0 0 0.04 <u>ت</u>د ۾ 4 62 18 36 ₽ Ξ 1.2 4 6 33 28 8 38 28 10.8 33 86 0.5 5 8 8 e d f g ,c 0 28 0 29 0.21 041 0.28 9 0.21 0 49 0.27 0 29 011 0.36 0.41 0 36 1.21 0.39 1.64 047 0.98 0.03 0.09 046 0 13 0 12 0.21 0.43 7/26/95 1/7/96 4/10/95 10/25/95 2/3/96 3/22/96 96/2/6 11/11/94 4/15/96 2/30/87 Storm Date 7/17/96 12/15/96 12/19/96 1/16/97 1/27/97 3/5/97 6/16/97 3/1/98 4/9/98 5/9/98 10/28/97 12/15/97 4/7/98 7/14/98 1/23/98 5/14/98 6/24/98 1997 1997 1995 995 966 1997 996 966 986 996 1997 1997 1997 1997 8661 1998 Reported 997 1997 1998 1998 999 1999 1998 998 998 6661 SDE4 121996 GRAB SDE4 090396 GRAB SDE4 020496 GRAB SDE4 032296 GRAB SDE4 041696 GRAB SDE4 121596 GRAB SDE4 071796 GRAB SDE4 011697 GRAB SDE4 012797 GRAB SDE4 030597 GRAB SDE4 061697 GRAB SDE4 121597 GRAB SDE4 050998 GRAB SDE4 111394 grab SDE4 010795 grab SDE4 030198 GRAB SDE4 040798 GRAB SDE4 072695 grab SDE4 102695 grab SDE4 041098 GRAB SDE4 042398 GRAB SDE4 041095 grab SDE4 051498 GRAB SDE4 062498 GRAB SDE4 071498 GRAB SDE4 102897 GRAB SDE4 053097 Sample ID SDE4 SDE4 SDE4 SDE4 SDE4 SDE4 Jo j≣ SDE4 SDE4 SDE4 SDE4 SDE4 SDE4 SDE4 10 SDE4 N e ŝ ω 8 8 ğ = 5 13 4 16 5 Ξ. 24 25 26 28 1 13 ₿**1** 80 ន 22

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2000 7/299 0.3 6 0.11 0 103 NPDES 1 No 7,33 0.6 <0.05	262 SDN1up SE	ON1 062099 GRAB	1999	6/20/99	0.21	38	0.03		. o		(PDES	- -		5 85		, , ,				, i 09		• •
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Page 9 of 15 4

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269 SDN1up SDN1 032200 grab	ab 2000	0 3/22/00	0,43	Ð	0.14	0	8		: Si	. No				0.31	< 0.05	0.29	1 2 2	1		•	
270 SDN1up SDN1 041300 GRAB			0.34	12	0 08	0				N N				0 23	ā	0 13	i N V		ł	1	L
271 SDN1up SDN1 070300 grab		1	0 29	12	0 13	0 · 0	•		, s	įŽ				0.58	< 0.05	. 9 <u>5</u> 0	1 2		:		
272 SDN1up SDN1 101700 grab	ab 2001	- =	0.36		0 12	0		-	- Si	ź				1 74	< 0.05	1 72	េដ	•			
273 SDN1up SDN1 112300 grab	ab 2001	11/23/00	0.37	""ה	0.1	0	~	-		^Q X				1.86	< 0.05	1.84	1	2 ×			
274 SDN1up SDN1 121400 GRAB	RAB 2001		0.29	. '	0.08	-			,					215	2002		- 661	1			
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276 SDN110 SDN1 012801 GBAB	· a		;	•		• · •			 ; ;	2 :			<u> </u>			20.4	3	5			
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278 SDN1up SDN1 031501 GRAB	TAB 2001	3/15/01	0.32	14	ŝ		011 43	3 NPDES	ES 1	No	5 98			1 7B	< 0.05	174	130				
279 SDN1up SDN1 051401 GRAB	RAB 2001	5/14/01	0 48		80		0.02 2	24 NPDES	: Si	2	5 80			< 0 15	< 0.05	< 0 10	30	;			
280 SDN1up SDN1 062701-GRAB	RAB 2001	8/27/01	0.52	¦ ≈	0 23	10			<u>8</u>	Ŷ				17		168	> 1600				
281 SDN2 SDN2 090894 grab	ab 1995	9/8/94	0.69	: 22				an Nones		Ň		- -	<u> </u> `					•]-
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285 SDN2 SDN2 041295 grab		4/10/95	0.29	18			0 - 26	6 NPDES	່. ເ	°2	. 76	4	52				•	~ ~ ~		a	
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287 SDN2 SDN2 101695 grab	ab 1996	10/15/95	0.35	12			٥	NPDES	- -	2 N		6	012	•••• <u>-</u>		_		2 2			_
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289 SDN2 SDN2 021796 GRAB	XAB 1996	2/17/96	1.29	2			; 0	NPDES	- -	¢ N		4 	4 1 D			•	1	ļ			
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291 SDN2 SDN2 042296 GRAB	AB 1996	4/22/96	2.83	. 63			, , ,	NDDES	, v	. 4	· r						2 2				
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Page 10 of 15 79

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NPDES Grab Sample Data 9/1/94 - 6/30/01

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		Fecals (MF)				_					-	2200	¥ ,	× 7	ę,		а (<u>`</u>	<u></u> ^		-" -		` - -	·		<u> </u>	<u>_</u>	
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9/27/01 10:33:11 AM		Comments	BACKUP fog/Iph for March lab errors on SDN3 030597 grab	· · ·										taken in 2 BOTTLES FOG/TPH, and fecals								backup monhtly sample in case 3/1/98 sample didn't	qualify under new permit				thunderstorm, 0.25 in/hr	fecals exceed holding lime				concurrent WET sample	te ve de la combi derta programme de la	2001AppendixB all grab
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ć	n D D		14 NPDES	24 NPDES	26 NPDES	87 NPDES	73 NPDES	22 NPDES	48 NPDES	300 NPDES	40 NPDES	41 NPDES	32 NPDES	76 NPDES	44 NPDES	IS4 NPI	42 NPI	76 NPI	26 NPI	87 NPI	6 NPI	132 NPDES			-		792 NPDES	148 NPC	36 NPC	72 NPDES	35 NPDES	31 NPDES		
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SDN4 061800 grab 2001 BF1800 0.27 11 0.08 0 6.31 NPDES 1 No 7.38 -	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		SDN4 041300 GRAB	2000	4/13/00	0.34		08	0			-	No	- 239	,		: : : : :			ŧ [
SDN4 101700 grab 2001 1017/00 0.36 4 0.12 0 1 Nu 729 <0.05 <0.05 <0.01 701	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		SDN4 081800 grab	2001	8/18/00	0.27		-		-		-	N			i	30.0	, 11 m	55.0	5			!
SDN4 110800 grab 2001 11/4000 0 77 9 0.18 0 5 No 7.57 0 0.016 0.011 7 0 <th0< th=""> 0 0 0</th0<>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		SDN4 101700 grab	2001	10/17/00	0 36		12				-	Ż	222						~5		, t , t	i
SDN4 112300 grab 2001 11/2300 0.37 B 0.1 0 0.37 0 0.13 2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <th< td=""><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td></td><td>SDN4 110800 grab</td><td>2001</td><td>11/8/00</td><td>0 77</td><td></td><td>.18</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td>g l y</td><td>5</td><td></td><td>•</td><td>; ,</td><td>ł</td></th<>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		SDN4 110800 grab	2001	11/8/00	0 77		.18						1				g l y	5		•	; ,	ł
SDN4 112900 grab 2001 11/29/00 0.29 26 0.06 0 6 NDES 1 NO 745 0.18 < 0.05 0.16 2 < 2 < 2 SDN4 121400 GRAB 2001 12/14/00 0.29 7 0.06 0 123 NPDES 1 NO 751 < 0.05	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		SDN4 112300 grab	2001	11/23/00	037		_		m		-	12		•							۰ ۱	1
SDN4 121 400 GRAB 2001 121 4400 GRAB 2001 121 4400 GRAB 2001 31/01 0.27 6 011 43 NPDES 1 No 7.61 <0.05 0.011 <2 <2 <2 SDN4 030101 GRAB 2001 31/01 0.27 6 0.11 0.12 NPDES 1 No 7.61 <0.05	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		SDN4 112900 grab	2001	11/29/00	0.29								7.45			- !-		<u>د</u>	; N	(1) V	:	I
SDN4 020101 GRAB 2001 31/01 0 27 6 0 11 0 0 7.61 < 0.0.05	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		SDN4 121400 GRAB	2001	12/14/00	0.29		_		-			212	<u>-</u>		,		0 02	9 ¹	~ ,	64 V	,	
SDN4 031601 GRAB 2001 3/15/01 0.32 14 0.05 0 011 43 NPDES 1 No 7.24 <0.05	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		SDN4 030101 GRAB	2001	3/1/01	0 27		=		-		-	ž			·,'	1.		11	γ,	,		1
SDN4 040501 GRAB Z001 415/01 0.23 9 0.05 0 0.13 NPDES 1 No 7.33 <0.05 <0.01 <22 SDN4 051401 GRAB Z001 5/14/01 0.48 16 0.08 0.01 32 NPDES 1 No 7.33 <0.05	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		SDN4 031501 GRAB	2001	3/15/01	0 32			•	•		•	2 v	7.24							ı	I	ļ
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EY 081484 grab 1995 9/13/94 0.15 9 0.05 0 0.58 NPDES 1 No 7.5 <0.05	0 0 58 NDES 1 No 7.5 <0.15		SDN4 062701.00AD						i	•				-			- ,			-		result is an anomaly	
1995 3/6/95 2.16 114 0 480 NPDES 1 No 6.93 2.2 1995 10/13/94 0.32 14 0 480 NPDES 1 No 6.98 2.1 1995 3/6/95 2.16 114 0 88 NPDES 1 No 6.6 <1	118 NPDES 1 No 893 2.2 0 480 NPDES 1 No 6.93 2.2 0 88 NPDES 1 No 6.93 2.1 0 384 NPDES 1 No 6.5 6.5	1	EV 001404 mmh	1001			1					-[2	7.5					< 010 >	1600			i i
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	The state of the s		EY 060495 grab	1995	6/4/95		28		0		NPDES	¦	No	. 10	.5 6.5	;	•	. 1	;			٤	
		Z 🖗	Ion-Representative E FMIS/POSDFV/FMI	lata - Ri SMain n	efer to line	commer	It for d	etail			l	:											

Page 13 of 15 81-

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2001AppendixB all grab

	ŝ	SAMPLE DATA			STOR	NPDES (STORM CHARACTERISTICS	PUE CTERIS'	S Gr Tics	ab	PDES Grab Sample Data CTERISTICS		ata	9/1/	94 -	9/1/94 - 6/30/01 concenti	5/30/01 concentration, mg/L	TION, n	ia/L		
Seq	Out fall	Sample JD	Reported	Storm Date	din n	Dur Maxlr hr in/hr	ol 24hran in	lol 24hrant 48hrantDryant Ir in in hr	Jryant hr	Pur- pose Ev	Event Deì	Ground Deice? pH	—	FOG	TPH TPH- (IR) Dx	Har +	- TPH - MO	Fecals (MPN)	Fecals (MF)	Camments
382	년. 년	EY 072695 grab	1996	7/26/95	041	36		0	-	NPDES	-	40 5.B	8 41	-			-	-		
383	۵,	EY 101695 grab	1996	10/15/95	0.35	12	а	i .			1	No 1	6.5 <11	. –	; -			•	;	i ;
1984	۲. ۲.	EY 021796 GRAB	9661	2/17/96	1.29	12	*	' a	· 2 ·	NPDES)	12 12	77 <1.0	0		: :	•	!	;	1 : : : :
385		EY 042296 GRAB	1996	4/22/96	2.83	. ₽ ?		0		NPDES	; 2 -	No N	7.19 < 1.0					•		•
386	۲ ۲	EY 052296 GRAB	1996	5/21/96	0.31	8		, 0.02		Stip Ag	. 2			~				، 		•
367	۲. ۲	EY 062396 GRAB	1896	1	0.46			o	. <u>.</u>	Shia Aa	. 2		· ·	10		.		'		
368	ž	EY 070396 GRAB	1987	7/3/96	0.23	12		¢	Z	NPDES	- -		v	0				'		
	ĒΥ	EY 102196 GRAB	1997	10/21/96	0.68	. 14		٥	64 N	NPDES	- 2			0			,			
390	- ۲	EY 021197 GRAB	1997		048	18		þ		NPDES	. • Z			 				•		
391	۲. ۳	EY 030597 GRAB	1997	_	0.39	50	-	0 24		NPDES	. z									
392	۔ س	EY 060397 GRAB		6/3/97	0.26	, ði		Ð		NPDES	- 2								_,	
393	μ	EY 110697 GRAB	1998	11/6/97	0.16	4.4		0.01		NPDEC	; 2 	·		, 						
394	Ę	EY 012998 GRAB	1998		0.2	1				NPDES	- +									
195		EY 052598 GRAB	1998		0.58	:.Ŧ					- ; - ;							1		3
- 96E	Ĕ	EY 011399 GRAB	1999		107	22 - E		, ,	1		- ,	.			0.20			•		:
397	Ē	EY 062099 GRAB	1999				•	, , ,			- , ²			,				•		
388	۳. ۳	EY 013100 grab	2000	1	1.76	29 0 15	· C	 			:;; 									1
399		EY 081600 grab	2001	8/18/00	0.27			5 5			2!2 	ŧ.	ç				7F.1	,	ł	
490	¦	EY 010301 grab	2001	1/3/01							: 2 - , ,					• • •		1	ı	
401	EY.	EY 062701-GRAB	2001	6/27/01	0.52	;	;	, o	3	NPDES	z;z 	1 2) 2	\$		S. 1			;	s	:
402	:∠	TY 090694 grab	1995	9/8/94	0.69	22				NPDES	No.		20	-	-	-	-1			
4 03	ĭ	TY 101994 grab	1995	10/19/94	0.2	32	-			NPDES	: ž		> +- (1		
404	۲ ۲	TY 030495 grab	1995	3/4/95	0.18	24		a	158 NI	NPDES	1 No		57	···			•••		ł	
405	۲ ۲	TY 060495 grab	1995	6/4/95	0.7	28		0		NPDES	1 No								!	
408	₽ ₽	TY 081795 grab	1996	8/16/95	1.34	12		D 01	Ż	NPDES	1 No	0 68	2.3				-	ī		
407	ר ב'	TY 090595	1996	9/5/95					Ż	NPDES	1 No	0	. +							
408	י זי ז	TY 101695-1 grab	1996	10/15/95	0.35	- ¹²		0	z	NPDES	1 S	- <u>6</u> 7								
t	ד. ד	TY 101695-2 grab	1996	10/15/95	0.35	12		a	Ż	NPDES	- U	· · · ·							1	diministrata comolo
410	ר. בי	TY 032296 GRAB	1996	3/22/96	0.21	•		: 0	100	Slip Ag	۲ ۲	. 9		:				1		
:	·	TY 041696 GRAB	1996	4/15/96	0.49	16		0.09	Ż ?	NPDES	- Vo									•
ì	⊢ }1	TY 042296 GRAB	1996	4/22/96	2 83	8		_ 0	Ż	NPDES	1 No					-		1		•
413	TY 7	TY 070396 GRAB	1997	7/3/96	0.23	;	•	ç		NDDCS	1	7				•		•		

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2001AppendixB all grab

Page 14 of 15 42

Full Data Set (No Values Trimmed) R=Rejected Non-Representative Data - Refer to line comment for detail c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESGrabOnly

AR 022716

Emis Emis

SAMPLE DATA



R

CONCENTE	STORM CHARACTERISTICS
9/1/94 - 6/30/01	NPDES Grab Sample Data 9/1/94 - 6/30/01

Į		SAMPLE DATA			STOR	M CHAL	STORM CHARACTERISTICS	TICS							ຮ	NCEN	CONCENTRATION, mg/L	N. mg/			
Seq	tall tall	ut Sample all ID	Reported	Storm Date	tlq¤ ₽	بة الم الم	Our Maxint 24hrant 48hrantOryant hr in/hr in hr	ıl 48hran ìn	Dryant hr	Pur- pose	Event	Ground Deice?	H	FOG	HPH (R)	Hd A	- HdT D	TPH - MO	Fecals (MPN)	Fecals (MF)	Comments
414	,⊤	deng 307170 YT	1997	7/17/96	0.27	æ		D		Stip Ag	-	ź	591	6.							•
415	`∠ ``	TY 080296 GRAB	1997	B/2/96	1 01	27	•	0	325	Stip Ag	-	Ŷ	6 43	1.6		•		.,			1
416	Υ	7 TY 100496 GRAB		10/4/96	D.59	8.1		0 08	18	NPDES	-	Ŷ	7.19	1.4	1.34				•		1
417	7	TY 021197 GRAB	1997	2/11/97	048	18		0	205	NPDES	-	No No	5 72	5.1 ·							;.
418	2	TY 030597 GRAB	1997	3/5/97	0 39	20		0.24	42	NPDES	*	å	5.98	18 R			~~~~				FOG result not representative.
-				-										•		-	-	•	_	-	aboratory error, see letter of May 15, 1997
419	₹	TY 060397 GRAB	1997	16/5/9	0 26	16		0	76	NPDES	-	Ŷ	6 07	14							1
420	7	TY 111697 GRAB	1998	11/16/97	0.47	12.6		٥	222	NPDES		å	6 67 <	< 1.0							:
421	γt	TY 012998 GRAB	1998	1/29/98	0 2	14		0	107	NPDES	-	Ŷ	831	10							Matching Comp not
_												•	-	-	-	•	•	•		- '	representative, not reported
, 422	י <u>≺</u>	17 030998 GRAB	1998	3/8/98	0 86	27		۵	132	NPDES	-	οŅ	683	< 1.0	1:2	1.41	0.09	1.32			Extra Grab (has makeup Comp for 98QW)
423	≿ -	TY 061098 GRAB	1998	86/01/98	0 28	0		0	288	NPDES	-	ΡNα	,		1.2 1	1.05	< 0 05	1.03	·		
424	Ϋ́	TY 020399 GRAB	1999	2/3/99	0 28	6	0 02 0	0 61	27	NPDES		No			•••••	4.34	< 0.05	4.32			
425	2	TY 062099 GRAB	1999	6/20/99	0.21	38	0 03 0	0	48	NPDES	-	No				5.77	< 0.05	5.75	į		
426	≿	TY 070299 GRAB	2000	712/99	03	60	011 0	0	103	NPDES		No				1 25	< D 05	1 23	•		1
427	≿	TY 022100 grab	2000	2/21/00	0 28	36	0.06 0	0	72	NPDES		°ž			-	1.03	< 0.05	1.01			
428	₽	TY 022500 grab	20100	2/25/00	0 28	9	0 60 0	0	02	NPDES	-	Ŷ				2.92	< 0.05	5.9	•		• • •
429	≿	TY 031300 grab	2000	3/13/00	047	- 6	0,13 0	0		NPDES	-	°N N	,			2.42	< 0.05	2.4	<u> </u>		
430	≿	TY 020101 GRAB	2001	2/1/01	0 29	13	0 60 0	0	62	NPDES	-	No				8.28	< 0.05	8.24		ı	.1

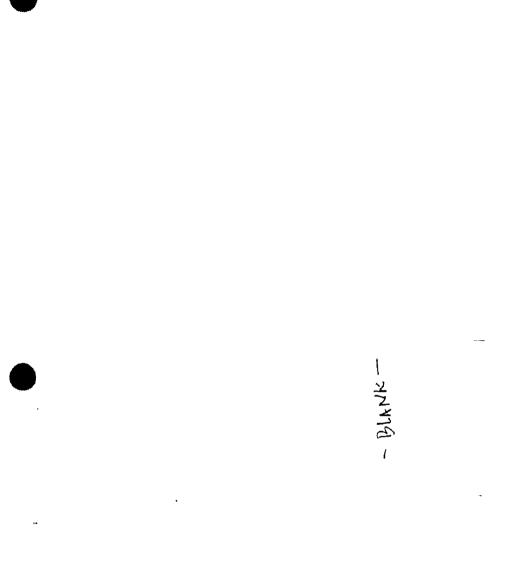
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Page 15 of 15 53 مرعاجي معطيت بلا أتحا المطالب الايم بالعار المقالات المناب الا Full Data Set (No Values Trimmed) R=Rejected Non-Representative Data - Refer to line comment for detail c\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESGrabOnly

2001AppendixB all grab

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Page 1 of 6 83

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	Values qualified as non-detect (<) calculated at 1/2 the reported detection li	C:\ENV-apps\EMIS\POSDE\/FM!SMain mdh/rotsW/kphec2.abstate
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NPDES Grab Statistics 9/1/94 - 6/30/01 CONCENTRATION, mg/L

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		15S	FOG	(FI)	μų	TPH-D	HH- MO	Fecals (MPN)	Fecals (MF)
All Outfalls	Count	364	196	203	222	222	222	299	89
	Max	_	22,0	10 00	8.66	0.84	<u>i</u>	1600	186000
	95th		81	4 28	3.57	0.07	3,55	1600	7960
	75th		27	1.18	1.55	0.03	:	240	440
	Median	71	-	0.50	0.28	0 03	0.26	30	
•	25th	6.6	05	013	0 08	- 0.03	0.05	۲ ۲	
	Min	3.5	05	0 13	0.07	0 03	0 03	, .	، 'ر
	SD	07	3.4	1.58	141	0 08	40	523	01656
	CV%	10%	149%	148%	139%	206%	144%	177%	20053
	#NonDetects	°.	06	109	79	204	81	56	17
	%NonDetects	% 0	46%	54%	36%	92%	38%	19%	25%
 SDE4 (002)	Count	33	17	20	40	40	\$	33	6
	Max	10.7	17.0	10.00	8.66	0.84	8.64	1600	186000
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	75th	71	36	3 13	3 06	0.04	301	1425	4000
	Median	68	2.8	2,28	2,05	0.03	1,95	270	1100
	25th	99;	1.6	1 73	1.21	0.03	1.18	28	260
	Min	6.0	0.5	0.13	0.08	0.03	0.05		
	CS	0.7	4.0	2.15	1.64	0.13	1.64	641	61363
	CV%	11%	106%	%22	71%	241%	73%	108%	271%
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	%NonDetects	%0	18%	7%	%Е	88%	3%	4%	20%
SDS1 (003)	Count	ខ	17	19	5	-10	-u7	16	6
	Max	78	10.0	5.40	1.56	0 18	1.54	1600	200
	95th	1 7 5	66	5.31	140	0 13	1 38	1600	165
	12Ih	12-	5.5	1.55	0.78	0.03	0 76	1600	48
	Median	6.8	11	0.83	0 72	0.03	02.0	105	~
	25th	6.3	0.5	0.50	0.72	0.03	0 59	18	. 4
	Min	4.0	5.0	0 32	0.61	0.03	0.56		; –
	SD	9.0	2.5	1,57	0.39	0,06	041	734	78
	°CV%		_	111%	44%	116%	49%	123%	169%
	#NonDetects					4	0		
	%NonDetects	%0	47%	21%	%0	80%	%0	19%	130

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NPDES Grab Statistics 9/1/94 - 6/30/01

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CONCENTRATION, mg/L.

2001AppendixB all grab stats

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9/1/94 - 6/30/01	
NPDES Grab Statistics	

CONCENTRATION mail

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	Median	74	0.5	0.13	0 14	0 03	0 11	2		
	25th	67	0.5	0 13	0 10	0 03	0.08			
	Min	6.1	0.5	0.13	0.08	. 03	30.0	 	į	
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W	Median	71	050	0.13	0.15	0.03	1			
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Page 3 of 6 the state

ES Grab Statistics 9/1/94 - 6/30/01 CONCENTRATION.mgt. CONCENTR	So IF											
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(a) TPH, (b) TPH, (c) TPH, (c) </th <th></th> <th></th> <th>•</th> <th></th> <th></th> <th>ŀ</th> <th>CONC</th> <th>ENTRA</th> <th>TION, F</th> <th>ng/L</th> <th></th> <th></th>			•			ŀ	CONC	ENTRA	TION, F	ng/L		
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7.8 6.17 452 3100 64 385 186 161 100 27 1.80 1.80 161 100 19 0.71 28 50 590 05 025 23 6 25 6.1 2.23 6 25 7% 85% 100% 190% 7% 85% 0.25 1465 6.1 7.45 45 45 0.6 7% 85% 0.0% 190% 190% 7% 85% 0.0% 190% 190% 7% 85% 0.0% 190% 100% 6 17 45 45 50 4 05 146 100 61200 1220 05 041 0.03 118 46 05 041 0.03 118 102 05 041 0.03 118 102 05 041 0.03 118 102 05 041 118 1600 1220 05 041 003 139 223 12335 05 013 013 114 2			Max	7.8	21.0	7.50				500	4000	
64 385 590 590 27 180 161 100 19 0.71 28 50 19 0.71 28 50 19 0.71 28 50 19 0.71 28 50 19 0.71 28 50 10 190% 190% 190% 2 33 0 0% 190% 4% 45 45 50 4 4% 17 45 45 50 6 17 45 45 50 6 17 45 1500 1200% 05 040 0.03 11600 51200 05 047 073 199 223 12835 05 047 013 115 46 102 05 047 013 115 46 102 05 047 013 115 46 102 05 047 013 115 46 102 05 048 7 180% 102 05 048 23% 7 19 05 106 <td></td> <td></td> <td>95th</td> <td>7.7</td> <td>17.8</td> <td>6.17</td> <td></td> <td></td> <td></td> <td>452</td> <td>3100</td> <td></td>			95th	7.7	17.8	6.17				452	3100	
27 1.80 1.61 100 1.9 0.71 28 50 0.5 0.25 6 25 6.1 2.23 186 1465 7% 85% 100% 190% 2 3 0 0% 4% 20% 190% 190% 6 17 45 45 50 6 17 45 45 50 6 17 45 45 50 6 17 45 45 50 6 17 45 100 1347 05 140 0.03 114 528 05 047 0.78 199% 05 041 100 113 05 043 1136 233 05 043 1136 102 05 043 114 528 05 104 1 199% 05 108 0.03 1065 05 108 0.03 1065 05 108 0.03 109% 05 108 256 256 05 149 177%			75th	7.4	64	3.85				290	590	
19 0.71 28 50 05 0.25 0.25 6 25 6.1 2.23 186 1465 7% 85% 100% 190% 2 3 0 0 4% 20% 0% 0% 6 17 45 45 50 4 6 17 45 45 50 4 05 430 437 0.79 496 100% 05 140 0.03 1190 43547 05 047 0.79 496 1000 51200 05 041 1900 13347 12935 05 041 103 199 23347 05 043 103 199 45 05 043 103 065 7 18 05 043 177% 199% 109% 05 108 0.03 0.16 1 7 05 116 11 528 2568 05 108 0.65 1 199% 05 108 26% 149 109% 05 116 1 <td></td> <td></td> <td>Median</td> <td>68</td> <td>27</td> <td>1.80</td> <td>-</td> <td></td> <td></td> <td>161</td> <td>100</td> <td></td>			Median	68	27	1.80	-			161	100	
05 0.25 186 1465 7% 85% 190% 190% 7% 85% 100% 190% 2 3 0 0 4% 20% 0% 0% 6 17 45 45 50 6 17 45 45 50 4 05 4.36 0.79 4.96 1600 51200 05 1.40 0.03 1.15 4.6 102 05 0.41 0.03 1.15 4.6 102 05 0.41 0.03 1.15 4.6 102 05 0.13 0.03 1.15 4.6 102 05 0.13 0.13 1.14 526 2556 05 0.13 1.14 526 2556 05 0.13 1.14 526 2556 05 1.1 4.6 102 05 0.13 1.14 526 2556 05 1.16 1.17 526 2556 05 1.16 1.17 526 2556 05 1.16 1.17 526 2566 05			25th	6.0		0.71				58	22	
1 2.23 186 1465 7% 85% 100% 190% 2 3 0 0 4% 20% 0% 0% 6 17 45 45 50 4 0 190% 190% 0% 0% 6 17 45 45 50 4 05 140 0.79 496 1600 51200 05 140 0.03 115 46 102 05 041 1003 115 46 102 05 041 0.03 115 46 102 05 013 0.03 115 46 102 05 013 0.03 115 46 102 05 013 0.13 1.14 526 2556 05 013 1.14 526 2556 05 1.16 1.13 0.13 1.14% 05 1.16 1.13 0.13 1.14% 05 1.16 1.13 0.13 1.14% 05 1.16 1.13 0.13 1.14% 05 1.16 1.13 0.1			Min	46		0.25				9	22	
7% 85% 100% 100% 100% 100% 2 3 0 0 0 0 4% 20% 45 45 50 4 Upstream location at SDN1-22, begins 6 17 45 45 50 4 Upstream location at SDN1-22, begins 05 4.30 4.97 0.79 4.96 1000 51200 05 2.64 3.41 1600 51200 45 100 05 1.40 0.03 1.15 46 102 05 0.41 1.003 0.65 7 1.8 05 0.13 0.03 0.65 7 1.8 05 0.13 0.03 0.65 7 1.9 05 0.13 0.03 0.65 7 1.8 05 0.13 0.13 1.14 526 2556 05 1.13 0.13 1.14 526 2556 05 1.14 526 2556 1.1 1.9 05 1.12 0.13 1.14 526 2556 05 1.13 0.13 1.14 526 2556 05 1.14 </td <td></td> <td></td> <td>SD</td> <td>10</td> <td>6.1</td> <td>2.23</td> <td></td> <td></td> <td></td> <td>186</td> <td>1465</td> <td></td>			SD	10	6.1	2.23				186	1465	
2 3 0 0 0 4% 20% 0% 0% 0% 6 17 45 45 45 50 4 05 4.30 4.97 0.79 4.96 1600 61200 05 2.54 3.44 0.03 1.96 4.34 1800 4.3547 05 1.50 2.01 0.03 1.99 2.23 1.2935 05 0.40 0.03 1.15 46 102 05 0.41 0.03 0.65 7 1.8 05 0.13 0.08 0.03 0.65 7 1.8 05 0.13 0.03 0.65 7 1.8 2.5566 05 0.106 1.13 0.13 1.14 528 2.5566 05 0.16 1.13 0.13 1.14 528 2.5566 05 1.14 528 2.5566 1.77 1.99% 05 1.12 0.13 1.14 528 2.5566 05 1.1 7 1 1.1 1 05 1.17% 1.99% 1.77% 1.99% 1.1 05			CV%	15%	117%	85%	-			100%	. 190%	
4% 20% 0% 0% 0% 6 17 45 45 50 4 Upstream location at SDN1-22, begins 05 4.30 4.87 0.79 4.96 1600 51200 05 2.54 3.44 0.09 3.41 1800 43547 0.5 2.64 0.03 1.98 2.23 1.2935 0.5 0.66 1.40 0.03 1.15 46 102 0.5 0.41 0.03 1.15 46 102 0.5 0.13 0.03 0.65 7 1.8 0.5 0.13 0.03 0.05 7 1.8 0.5 0.13 0.03 0.05 7 1.8 0.5 0.13 0.03 0.05 7 1.8 0.5 0.13 0.03 0.05 1.77% 1.99% 0.6 1.13 0.13 1.14 52.6 256.6 0.6 1.13 0.13 1.14 52.8 256.6 0.6 1.13 0.13 1.14 2.9% 1.99% 0.6 1.13 0.13 1.14 2.9% 1.99% 0.6 1.16			#NonDetects	• •	2	m				٥	. •	
6 17 45 45 50 4 Upstream location at SDN1-22, begins 0 5 1.50 2.01 0.79 4.96 1600 51200 0 5 2.64 3.44 0.03 1.96 51200 43547 0 5 1.50 2.01 0.03 1.96 51200 0 5 1.60 2.01 0.03 1.96 223 0 5 0.60 1.40 0.03 1.15 46 102 0 5 0.13 0.08 0.03 0.65 7 1.8 0 5 0.13 0.13 1.14 52.8 1.256 0 5 0.13 1.14 52.8 256.66 0 1 1.06 1 7 1 0 1 1.06 1 7 1 0 1 1.06 2.9% 177% 109% 0 5 1.2% 2.9% 2.9% 1.4% 2.5%			%NonDetects	%0	14%	20%				%0	%0	
05 4.30 4.87 0.79 4.95 1600 51200 0.5 254 344 009 3.41 1800 4.3547 0.5 150 2.01 0.03 1.199 2.23 12935 0.5 0.60 1.40 0.03 1.15 46 102 0.5 0.17 0.78 0.03 0.05 7 18 0.5 0.13 0.08 0.03 0.05 1 1 1 0.6 1.13 0.13 1.14 5.26 2566 0.1 1.00 1.06 1.13 0.13 1.14 5.26 2566 0.1 1.00 1.06 1.1 7 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.1 1 0.1 1.0 1.0 1.1 1 0.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0		SDN1up (006)	Count	52	٩	17	45	45	45	3	4	Upstream location at SDN1-22, begins 1997.
0.5 254 344 009 341 1800 43547 0.5 150 201 003 139 223 12935 0.5 047 0.78 0.03 115 46 102 0.5 047 0.78 0.03 0.65 7 18 0.5 013 0.08 0.03 0.05 1 7 18 0.0 1.06 1.13 0.13 1.14 526 25568 0.0 1.06 1.13 0.13 1.14 526 25568 0.0 1.06 1.13 0.13 1.14 526 25568 0.1 1.0 1 1 7 1 0.5 013 0.03 2.556 1177% 199% 10.1 1 7 1 0.5 11 40 11 7 1 0.5 0.13 0.13 1.14 556 25568 0.13 0.13 0.13 1.14 556 25568 0.14 1.77% 199% 0.12% 2.2% 89% 2.5% 147% 2.5% 0.12% 2.2% 89% 2.5% 1.14 2.5% 0.12% 2.2% 89% 2.5% 1.14 2.5% 0.11% 1.14 1.1 1 0.12% 1.14% 1.15% 1.14% 1.15% 0.13% 1.14% 1.14% 1.15% 0.13% 1.14% 1.14% 1.14% 1.14% 0.14% 1.14% 1.14% 1.14% 1.14% 0.15% 1.14% 1.14% 1.14% 1.14% 1.14% 0.15% 1.14			Max	84	05	4.30	4.97	0.79	4.95	1600	51200	
05 1.50 2.01 0.03 1.99 2.23 1.2935 0.5 0.60 1.40 0.03 1.15 46 102 0.5 0.47 0.78 0.03 0.65 7 18 0.5 0.13 0.03 0.05 1 46 102 0.6 1.13 0.03 0.66 1 1 1 0.7 1.08 1.14 5.26 2556 2556 0.9 1.06 1.13 0.13 1.14 5.26 0.9 1.06 1.13 0.13 1.14 5.26 0.9 1.06 1 7 1 1 0.9 1.08 177% 199% 109% 0.6 2 1 40 1 7 1 0.6 1.2% 2.% 1.4% 2.5% 1.4% 2.6%			95th	78	0.5	2 54	3 44	60.0	3.41	1600	43547	
0.5 060 140 0.03 115 46 102 0.5 047 078 003 0.65 7 18 0.5 013 0.08 0.03 0.65 1 1 0.6 113 0.03 0.05 11 1 0.0 1.06 113 0.13 1.14 528 25566 0.0 1.06 1.13 0.13 1.14 528 25566 0.1 1.14 528 2566 0.1 1.14 528 25566 0.1 1.17% 199% 1.17% 199% 1.17% 199%			75th	7.3	<u>9</u> 0	1.50	201	0.03	1.99	223	12935	
0.5 047 0.78 0.03 0.65 7 18 0.5 013 0.08 0.03 0.05 1 1 0.0 1.06 113 0.13 1.14 5.26 2566 0.0 1.06 113 0.13 1.14 5.26 2566 0.0 1.06 113 0.13 1.14 5.26 2566 0.1 1.7% 109% 0.1 1.7% 109% 1.77% 1.77% 109% 1.77% 109% 1.77% 1.77% 109% 1.77% 1.77% 109% 1.77% 1.77% 109% 1.77% 1.77% 109% 1.77% 1.77% 109% 1.77% 1.			Median	6,6 0	0.5	0,60	1.40	0.03	1.15	46	102	
0.5 013 0.08 0.03 0.06 1 1 1 0.0 1.06 113 0.13 1.14 528 2566 0.6 2 1 40 1 7% 100% 6 2 1 40 1 7 1 1 0.6 12% 2% 89% 2% 14% 25% 1.7 2 1 2 0.6 1 7 7 1 1 0.6 1 2 1 40 1 7 1 1 0.6 1 2 1 40 1 7 1 1 0.6 1 2 1 1 40 1 1 7 1 1 0.6 1 2 1 1 40 1 1 7 1 1 0.6 1 2 1 1 40 1 1 7 1 1 0.6 1 2 1 1 40 1 1 7 1 1 0.6 1 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			25lh	60	0.5	047	0.78	0.03	0.65	7	18	
0.0 1.06 1.13 0.13 1.14 528 2566 9% 96% 73% 227% 76% 177% 199% 6 2 1 40 1 7 1 9 9% 12% 2% 89% 2% 14% 25% 11 7 1 1 100 1 1 7 1 1 11 100 1 1 100 1 1 100 100 100 100			Min	3.5	0.5	013	0.08	0.03	0.05	-	1	
96. 86% 73% 227% 76% 177% 199% 6 2 1 40 1 7 1 7 0% 12% 2% 89% 2% 14% 2% 25% 1 2% 2% 14% 2% 14% 25%			SD	1.0	0.0	1.06	1.13	1 0.13	1.14	526	25566	
6 2 1 40 1 7 1 1 7 1 9 1 7 1 9 1 1 7 1 1 1 1 1 1			CV%	15%	%0	96%	73%	227%	76%	177%	199%	
7% 12% 2% 89% 2% 14% 25%			#NonDetects		9	2	, –	ې	; ~	~	<u> </u> -	
Page 4 of 6			%NonDetects		100%	12%	2%	89%	2%	14%	25%	
Page 4 of 6		יישרארועלע אי ארצע			-	1.1.1	£		- 1			
Page 4 of 6	Full Data Set (No Values Trimmed Values origitied as non-detect I<))) calculated at 1/2 th	terended deter	- di coio	4							
	c:/ENV-apps/EMIS/POSDEV/EMIS	SMain.mdb/rptSWh	NPDESGrahStal		1		đ	ade 4 of	e e			2001 AnnendivB all nrah stats
		• • •		}					\$			

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NPDES Grab Statistics 9/1/94 - 6/30/01 CONCENTRATION, mg/L

	Pumped to IWS as of late 1997,																																
Fecals (MF)	20	ß	52		4	N	-	,₽	122%	•	25%	7	2200	1780	420	4	2	-	832	181%	сл	43%	9	20	18	: =:	1 -		-	Ξı	150%	CN	67%
Fecals (MPN)	6	006	740	ទួ		4	ณ	319	-	, ,	%0	8	_ = 1	935	88	; = ,	2	- -	395	238%	2	25%	43	1600	1470	27	4	-	-	410	295%	16	37%
PH- TPH-D TPH- Fec Dx MO (MF	7	1.07	0.83	•	0.15		0.05	0.36	130%	. ~	29%	2	0.13	0.12	0.08	0.05	0.05	0.05	0.03		'n	71%	38	1.57	0 28	0 05	0.05	0.05	0.05	0.25	211%	30	79%
TPH- TPH-D Dx	7	0.04	0.03	0.03	0 03	0 03	0 03	00.0	14%	2	100%	7	0.07	0.06	0 03	0.03	0.03	0.03	0.02	54%	9	86%	38	0 17	0 OG	EO.0	0.03	0.03	0.03	0 03	81%	si.	95%
ΡŦ	~	1.09	0.85	0.28	0.17	0.10	0.08	0.36	120%	~	29%	- 7	0.20	0.18	0.10	0.08	0.08	0.08	0.05	47%	Ŋ	71%	86	1 59	0.32	0 12	0 08	0.08	0.08	0.25	170%	ខ្លាំ	76%
H (JI)	16	5 20	1,95	0.50		0 42	0.13	1.19	158%	5	56%	20	0.50	0.50	0.50	0.13	0.13	0.13	0 19	65%	19	95%	4	0 28	0 18	0.13	D.13	0.13	0.13	005	8 [!]	<u>ت</u> ،	%68
FOG	16	4.3	41	2.0	1.2	0.5	0.5	1.2	%62	9	38%	19		2.9	1.8	90	0.5	0.5	6.0	76%	9	53%	~	16	1.5	0.9	0.5	0.5	0.5	0.5	80%	ب ە	71%
Ha TSS	י 5	8.0	7.7	7.5	7,2	69	64	04	6%	¢	%0	, 24	7.8	7.7	74	7.2	6.8	6.3	0.4	, 6 %	0	%0	- 45	5.6	8.8	6.7	7.5	7.2	66	9.0	22	ο.	%0
	Count	Max	95th	75th	Median	25th	Min	SD	cv%	#NonDetects	%NonDetects	Count	Max	95th	75th	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	Count	Max	95th	75th	Median	25th	Min	SD	%VO	#NonDetects	%NonDetects
	SDN2 (007)											SDN3 (008)											SDN4 (011)										

Full Data Set (No Values Trimmed) Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c:\ENV-apps\EMIS\POSDEVEMISMain.mdb/rpISWNPDESGrabStats

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Page 5 of 6 89

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2001AppendixB all grab stats

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ction limit.



NPDES Grab Statistics 9/1/94 - 6/30/01

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DH FOG TPH TPH-D TPH-D TPH- Fecals Fecals

		155		(IR)	ă		ΜΟ	(NHN)	(MF)
EY (012)	Count	18	÷.	:	2	7	7		
	Max	7.7	6.5		1.79	0.03	1.76		
	95th	7.7	4.6		1.65	0.03	1.63]	1
	75th	6.8	1.9		1.28	0 03	1.26	•	
	Median	62			÷	0 03	1.09	i	
	25th	58	0.5		0.49	0 03	0.47	•	
	Min	5.1	05		0 13	0 03	0.11		
	SD	0 /	17		061	000	0 61	} :	
	%VD	12%	120%	_	65%		66%		
	#NonDetects	0	÷.		0	~	0		
	%NonDetects	D%	65%		%0	100%	°0%		
TY (013)	Count	61 ·	20	6	6	61	6 !		
	Max	5.7	22.0	1.34	8 26	60 0	8.24		
	95th	74	191	1.33	7,26	0 0 0	7,24		
	75th	6.9	4.2	1.27	4.34	0 03	4.32		
	Median		2.0	1.20	2.42	0.03	2.40		
	25th	6.1	7.	1,20	1,25	0.03	1.23		
	Min	5.5	0.5	1.20	1.03	0.03	1.01		
	CIS	0.6	5.8	0.08	2.51	0.02	2.52		
	CV%	%8	133%	8%	%6L	67%	80%	•	۹ ۱
	#NonDelects	ن ن ا	2	۵	0	8	0		s 8
	%NonDetects	%0	10%	0%0	%0	%69	%0		
Airfield (SDS3,SDS4,SDN3,SDN4)	Count	149	63	81	89	96	96	131	27
	Max	- B.3	8.3	370	2.75	0 17	2 73	1600	2200
	95th	8.0	30	0 50	0.42	0 06	0.34	1600	758
	75th	7.6	1.5	0 50	0.14	0.03	0.11	50	18
	Median	5.7	05	0.13	0.08	0.03	0.05	80	. 16
	25th	12	0.5	0 13	80.0	0.03	0.05	-	•
	Min	6.3	0.5	0.13	0.08	0.0	0.05		
	#NonDetects	•	8	69	63	84	99	38	5
	%NonDetects	%0	%09	85%	71%	93%	73%	29%	440%

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mposite Sample Data	9/1/94 - 6/30/01
STORM CHARACTERISTICS	

	SAMPLE DATA	A		STC	 DRM CH4	STORM CHARACTERISTICS	ISTICS) ኒ	210		ב				1.0/0¢/0 = +e/1/c	5	;			
			10								-				ENIR	CUNCEN IRATION, mg/L	mg/L			
Seq fa	fall D	Reported	Date	udo Li	hr in/	bur waxin zanrant 46 manunyant hr in/hr in in hr	46nranıl İn	lyant hr	-ur-	Ground Type Deice?	d 7 TSS		BOD5	Glycol	Glycol	Total Glycol	ទ	đ	Zn	Comments
1 SDE4	E4 SDE4 111394		11/11/94	0.28	14			48 N	NPDES	٩	56	99	~	°2 20	 5 	د 10 10	0 021	0 008	0.195	
2 SDE4	E4 SDE4 111994	1995	11/19/94	0 42	24	•	0 05	;	NPDES	, °2 ,			. «	< 5 < 5	μΩ V					
3 SDE4	E4 SDE4 010795	1995	1/7/95	0 21	62		. °	252 N	NPDES	No.	. 9	27	1 ^g		'		0.031	0.014	0.337	
4 SDE4	E4 SDE4 030995		3/8/95	2,16	114		0	. 88	Other	No			•				0.013	0.004	0.132	1
5 SDE4		1995	4/10/95	0.29	18		G	. 26 N	NPDES	No No	. 16		80	ې ۲	√ 21	< 10		0.011	0 263	-
6 SDE4	E4 SDE4 072695	1996	7/26/95	041	36		o	<u> </u>	NPDES	Ň	4	30	5					0 023	0 779	Zn result is outlier;
A Shea		104	10000		ţ			-	•		-		-							Suspect Lab Error
			8/16/95	134	12		0 01	2	NPDES	No		-		< 50	G.7	7.9				
			10/25/95	0.28	60		0 01	z	NPDES	No	7	27	27				0.033	0 021	0.204	2
9 SDE4		1996	2/3/96	16	8			Z	NPDES	Yes	210	·	74	12	12	28	0 054	0.104	0.279	TSS from delce sand
10 SDE4	E4 SDE4 032296	1996	3/22/96	0.21			a	S.	Stip Ag	°N N	14	: 8	12	< 5.0	< 50 < 50	! v	0.057	0.026	 0 361	
11 SDE4		1996	4/15/96	D.49	16		60 0	z	NPDES	Ň	53 ,	· =	6.54	< 5.0	< 5.0	< 10.01 ×		0.098		1
12 SDE4	E4 SDE4 051796	1996	5/17/96	0.24	15		Q	•	SES .	, <mark>9</mark>	•		į	1	1 , t		•	1000	- i -	
13 SDE4	E4 SDE4 052296	1996	5/21/96	031	30		0 02		SES	N	. 89	; ;	1 6	:	:	ļ				
14 SDE4	E4 SDE4 090396	1997	8/3/96	0 29	1.2		0	76 N	NPDES	No.		ţ,	1.607	< 50	104 1	, t 1 c 1 c			0.443 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
15 SDE4	54 SDE4 122196	1997	12/19/96	0.36	37		0		PDES	No	_									
16 SDE4		1997	1/16/97	1.21	23		, o	154 N	NPDES	20 2			1	2.50			ĩ			
17 SDE4	4 SDE4 012797	1897	1/27/97	0.41	26		-		Slin An	¦ Z	100								0.190	I as auspect deice sand
18 SDE4		1997	3/5/97	0 39	2				NPDES	12	-			0.4 7 7		4.24	150.0	0.049	0.148	!
19 SDE4	4 SDE4 060397	1997	6/3/97	0.26	16		0			EMC No			P. 4			314		520'D	0.UBB	<u>1</u> : :
20 SDE4	4 SDE4 102897	1998	10/28/97	0.47	10.8		0.08			,			107	4 . C			•	0.033		1
21 SDE4	4 SDE4 121697	1998	12/15/97	~	33		o	87 Ni					1072	4 C 2				910 D -	0.10	•
22 SDE4	4 SDE4 030198	1998	3/1/38	0.98	86		0,07						, n					150.0	791 D	
23 SDE4	4 SDE4 030998	1998	3/8/98	0 86	27								;	200	10.7					
			4								-	-	-	2		2				taken for alicitati deicing
24 SDE4		1998	4/23/98	0.46	50		0	264 NF	NPDES	SMC No	يندورانشان		20.8	< 20 < 20	< 2.0	< 4 0		0.042	0.312	
25 SDE4		1998	5/14/98	021	B2		•	125 NF	NPDES 8	EMC No			Ξ,	120	< 2.0	1 4		0.038	0.298	•
26 SDE4	4 SDE4 062498	1998	6/24/98	0.43	4	-	0		NPDES				1 96		•	1	0.024	0013	2000]
27 SDE4	4 SDE4 092598	1999	9/24/98	0.47	23 0.26	0			NPDES	EMC No	12	12	4.00	10	 2 2 	, A , A	0.037	1020 0		1
28 SDE4	4 SDE4 100398	1999	10/3/98	0.4	3 0.22	0	0.07	39 39	NPDES	EMC No		l	5.46	÷Ŷ	10	1 V				: •
29 SDE4	4 SDE4 102798	1999	10/27/98	0.64	9 0.19	10 . 0			NPDES S	!	42		478	10	1.0		9000	-		1
30 SDE4	4 SDE4 111998	1999	11/19/98	234	66 0.18	ļ	, o	73 27	NPDES S		. 89	1		· ?	1 V ,	i	0.032		, (9 , 19 , 19 , 19 , 19 , 19 , 19 , 19 , 1	Comentine MET come
31 SDE4	4 SDE4 122498	1999	12/24/98	1.19	39 0.16	0			NPDES	SMC Yes	³²⁰	145	335	13.4	808	44.3	0.005			Suspect deice sand
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Page 1 of 14 4

2001AppendixB all comps

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	EMIS					-	IDdN	SE	Con	iodt	site	Sam	ES Composite Sample Data	Data		1/94	.' <mark>9</mark> - 1	9/1/94 - 6/30/01					
		SAMPLE DATA			ST	ORM C	STORM CHARACTERISTICS	CTER	STICS								CONCE	CONCENTRATION, mg/L	iN, mgi	بر			
Seq	Out Sar fall 1	Sample ID	Reported	Storm Date	Dpth ìn	년 1 년	VlaxInt 2 in/hr	Ahrant - Ìn	Dur Maxini 24hrant 48hrantDryant hr in/hr in hr	ryant hr	Pur- pose	Type O.G	Ground Deice? T	TSS NT	NTU. B	BOD5 GI	E- Glycol G	P- Total Glycol Glycol	E m	ī		ч Х	Comments
32	SDE4 SDE4	SDE4 012299	1999	1/20/99	0 42	28	60 0	0.01	0.95	22 N	NPDES	EMC	ĝ	92		5,82	< 2.0		4 0 4 0	0.022	0 013 1	0 168	concurrent WET samole
33 SI	SDE4 SDE4	SDE4 021899	1999	2/18/99	0.6	32	0.06	0.01	0.35	20 N	NPDES	SMC	. v	131	27							< 0 005	
34 SI	SDE4 SDE4	SDE4 022399	1999	2/22/99	0.56	34	0 14	0 02	0 04	G	NPDES	EMC	No	53		< 40						0,108	ronrurrent MET cample
35 SI	SDE4 SDE4	SDE4 030899	1999	3/8/99	0.28	15	0 05	° O	; 0	96 N	NPDES	EMC	No N	14						1			
	SDE4 SDE4	SDE4 031399	1999	3/12/99	0 83	23	0 07	٥	0	71 N	NPDES	EMC	٩	52			< 2.0	• •				0.113	
37 SI	SDE4 SDE4	SDE4 032499	1990	3/24/99	0 28	19	0 08	Q	0.1 5	40 7	NPDES	EMC	°N V	41	32			V					
38 SI	SDE4 SDE4	SDE4 032699	1999	3/27/99	0.24	сл	0 02	۵	60 Q	26 N	NPDES	EMC	No No				× 2.0					-	
39 S(SDE4 SDE4	SDE4 070299	2000	7/2/99	D.3	9	0 11	Þ	0	103 NI	NPDES	ENC	No									0 141	5
40 SL	SDE4 SDE4	SDE4 110699	2000	11/5/99	0 68	12	0.11	¢	0.05	44 NI	NPDES	SMC	No	22	16	<u> </u>	, 64 A	< 2				0.082	
41 SE	SDE4 SDE4	SDE4 111799	2000	11/16/99	90	15	0.07	0 01	0 D8	23 NI	NPDES	EMC	No	17	í Si	· 4	• ~	~ 2. ~	1.4			0 077	•
42 SC	SDE4 SDE4	SDE4 120599	2000	12/4/99	0 24	10	01	0	D	60 Ni	NPDES	ENC	No.	18	94 7	7.54	0 V	\$ 7 7			0.013	0.084	l
43 SI	SDE4 SDE4(SDE4 011300	2000	1/12/00	0.37	48	0.04	0.07	0.31	10 N	NPDES	SMC	Yes		· 		, 10 , 15	7.47	12			1	
44 SL	SDE4 SDE4(SDE4 031300	2000	3/13/00	047	6	0 13	0	0	49 N	NPDES	SMC	Ŷ	76	14 5	5 62		. N		0,003 <	< 0.002	0.015	······
45 SI	SDE4 SDE4(SDE4 041300	2000	4/13/00	0.34	12	0 08	0	٥	74 NF	NPDES	SMC	Ŷ	20	2.2 8	8.88	i N V	1 7 7			_	0 139 139	1
46 SC	SDE4 SDE4(SDE4 070200	2001	7/3/00	0.29	12	0 13	0	0 02	30 NF	NPDES	EMC	No	37	<u>۽</u> ۽ ز	19.8	,	ł		-	0.024 <	< 0.005	1
47 SC	SDE4 SDE4	SDE4 101700	2001	10/17/00	0 36	4	D 12	0	051	27 NF	NPDES	EMC	۶'n	42	17	6.1	• n v	N V	0			0.104	ł
48 SC	SDE4 SDE41	SDE4 110800	2001	11/8/00	0 77	đ	0 18	0	0	54 NF	NPDES	SMC	Ňa	30	16	4 4	66	-	7.6			0.074	ì
49 SC	SDE4 SDE41	SDE4 112300	2001	11/23/00	0.37	c,	01	0	0	330 NF	NPDES	EMC	٥N	9.6	20 9	9 12	. ~ ~	< 2		0.024	0.010 0	0.144	1
50 SC	SDE4 SDE41	SDE4 121400	2001	12/14/00	0 29	2	0.08	0	0	123 NF	NPDES	SMC	°Z	86	40	15.2 3	3.96	5 66 9.	9.62 0		0.013 0	0.197	
51 SD	SDE4 SDE4 [SDE4 010401	2001	1/3/01	0 44	15	0.13	•	0	11 N	NPDES	EMC	No.	51	46 5	578 <2	< 2.00 <		< 4 00	0 012	0 003	0.089	
52 SD	SDE4 SDE40	SDE4 031501	2001	3/15/01	0 32	14	0 05	0	011	43 NF	NPDES	EMC	No	42	30	10.6 <2	< 2 00 <	< 2.00 < 4		0 017	0 010	. 10	- Manual - 4
53 SD	SDE4 SDE4 COMP	SDE4 032701 COMP	2001	3/27/01	66.0	89	D 1 (001	61 0	19 NF	NPDES 1	EMC	°N N	45	24 B	24	< 200 <	< 2.00	< 4 00 0	0 010	0 004 0	0.081	
54 SD	SDE4 SDE40 COMP	SDE4 051401 COMP	2001	5/14/01	0 48	1 5	0 08 0	0 01 0	0 02	24 NF	NPDES	EMC	No	39	- 	81	< 200 <	< 2 00 < 4	< 4.00 p	0.018 <	< 0 002 0	0.093	
55 SD	SDE4 SDE4 0 COMP	SDE4 062701- COMP	2001	6/27/01	0 52	20	0 23	0	0	58 NF	NPDES 1	EMC	۹ ۷	83	47 7.	7.62				0.025 <	< 0.002 C	0 106	i
56 SD	SDS1 SDS1 101994	101994	1995	10/19/94	D.2	32			-	120 NF	NPDES		٩	25	 	12			<u> </u>	0.084	0.006 0	0.234	
57 SD	spsi spsi 1	SDS1 111994	1995	11/19/94	042.	24		5	0 05	52 NF	NPDES		ž			46	4		14		1	; ;	•
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60 SD	SDS1 SDS1 060495	060495	1995	6/4/95 ž	0.7	28 -			0 0	384 NF	NPDES		°N N		ı چ	15		 	<u> </u>			0,29	
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NPDES Composite Sample Data 9/1/94 - 6/30/01 STORM CHARACTERISTICS CONCENTRATION, mg/L

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Seq	all Out	Sample ID	Reported	Storm Date	Dpth Ia	μ Π Π	Dur Maxhri 24hrant 48hrantDryant hr in/hr in hr	irant 48h n li	rantDrya n hr	nt Pur- pose	e Type	Ground e Deice?	d 7 TSS	Turb, NTU	8005	Б. Glycol	Glycol	Total Glycol	õ	qd	ğ	Commenis
62	SDS1	SDS1 101695	1996	10/15/95	0 35	12			0	NPDES	ŝ	Ň	8.6	3.6	2				0 042	0 005	0.116	
63	1SDS1	SDS1 011496	1996	1/13/96	0.37	20		-	Q	NPDES	s	No	3.2	4	18	< 5.0	< 5,0	< 10 0	0.019	0,006	0.104	
64	SDS1	SDS1 041696	1996	4/15/96	0.49	16		0,09	ő	NPDES	თ	ę,	74	19	23.9	< 5.0	< 50	< 10.0	0.117	0 088	0.255	
65	SDS1	SDS1 042296	1996	4/22/96	2.83	Ð			٥	Stip Ag	ġ	No		6.3	9.28	< 5.0	< 5.0	< 10.0	0.012	D.008	0.062	
99	SDS1	SDS1 052296	1996	5/21/90	0.31	30		0 02	5	SES		å	7.8	,	5g !		-		0.035	0.010	0.106	1
67	spsi	SDS1 070496	1997	213/96	0.23	12			0	NPDES	S	No	1	<u>م</u>	11.2	< 50	< 5.0	< 10.0	0.038	0 013	0.188	1
69	SDS1	SDS1 080296	1997	8/2/96	1.01	27			0 325	5 Stip Ag	Đ	No.	16	7.2	12.5				0 102	0.015	0.209	
69	sos1	SDS1 120496	1897	12/4/96	0 82	7.5		0 16	lB 44	4 NPDES	s	0N N	22	53	40 5	< 50	24	29.0	0 028	0 001	0.096	í
02	ISOS	SDS1 011697	1997	1/16/97	121	53			0 154	4 NPDES	ŝ	Νo	37	11	64	< 5.0	33 4	334	0.041	0 027	0.112	
17	SDS1	SDS1 041397	1997	4/13/97	0.31	12		0.04	4	NPDES	ຽ	No	49	57	21.2	< 5.0	< 50		0 071	0.041		
22	SDS1	SDS1 061797	1997	6/16/97	0.36	28			0 135	5 NPDES	S EMC	°N D		15	4.5	^20	< 20	< 4.0	0.038		0.119	
73	SOS1	SDS1 102897	1998	10/28/97	047	10.8		0.08	8 26	S NPDES	S EMC	່ ເບິ	. 2	49	7.18	< 20	< 2.0			0.011	0.152	4
74	SDS1	SDS1 112097	1998	11/19/97	0 65	39		0.12	2 24	NPDES	S EMC	No No			4040	< 2.0	< 2.0	40	0.013			1
75	SDS1	SDS1 121697	1998	12/15/97	-	g			0 87	V NPDES	S EMC	C No	18	6.2	6.44	< 2.0	< 2.0	•	0.013	0.003	080.0	
78	SDS1	SDS1 030898	1998	3/8/98	0.8G	27			0 132	NPDES	S SMC	с No		2 - 2	!	< 2.0	. 6	12	0.022	0 005	0.075	tuifills annual sample rgm
177	SDS1	SDS1 102798	1999	10/27/98	D.64	Q1	0.19	0	0 72	NPDES	s shc	c No		: 22	6.3	< 2	· 2			< 0 002	0.118	
78	SDS1	SDS1 070299	2000	66/2/1	0.3	9	110	Ð	0 103.	· PDES	S EMC	C No	13	13	7.68	< 2	~ ~ ~		0.366	0.009		1
52	SDS1	SDS1 012901	2001	1/28/01	0.26	8	60.0	. 0	0 101		S EMC	ເຊີ ບ	93		1	۳ ا	4.53	7,63	0.022	0.005	0.1	۱ ,
80	SDS1	SDS1 030101	2001	3/1/01	0.27	9	0.11	o	0 127	NPDES	s EMC	C No	73		!		•		0.025	0.003	0.129	:
6	SDS2	SDS2 051095	1995	5/8/82	0 12	7.5			0 102	PDES	s	No		15	۰۰ ا							
82	SDS2	SDS2 051195	1995	5/11/95	02	80		0 12	2	NPDES	s S	. 2 . 7	7.8	6.1	. →						•	• •
83	SDS2	SDS2 061095	1995	6/10/95	0.3	ĝ		-	0 96		s	Ño	- 18	8.2	80				,			
8	SDS2	SDS2 090595	1996	36/32						NPDES	s.	Ŋ		8	ъ.							
622	SDS2	SDS2 120496	1997	12/4/96	0 82	7.5		0 18	6 44		۰Ω.	°Z :	37		k 4 00				,			
86	SDS2	SDS2 011797	1997	1/16/97	121	53		-	0 154	t Stip Ag	6	δ,		6	<pre>< 4 0</pre>							!
87	SDS2	SDS2 021197	1997	2/11/97	0 4 8	18		:	0 205	Stip Ag	6	2 a	32	ĝ	< 6.0				1		•	last for stip ag
88		SDS2 111398	1999	11/11/98	0.98	62	0 15	0 005	31	NPDES	S SMC		-		¥.				0.009	0.006		
88	SDS2	SDS2 050799	1999	5/6/99	0.25	22	0.06	0	0 79	NPDES	S EMC		99	8	; 				0.007	< 0.002	0.064	annual sample
8		SDS2 070300	2001	713/00	0.29	12	0 13	0 0 02	30	NPDES	s sMC				5 82			•	0.010	< 0.002	0.006	
6	SD\$3	SDS3 090894	1995	9/8/94	0.69	ខ្ល		i	63		: 	2	· ;	1		\$2	2 × 5	< 10 < 10		4		1 1 1
85		SDS3 091494	1995	9/13/94	0.15	6			118	NPDES	10	ž	4.5	5.8	80	ļ	ł			0 004	0.031	
63	SDS3	SDS3 101394	1995	10/13/94	0.32	14		- 	0 480	NPDES	s S	z	6.7	12	22	:		•	0.053	0 003	0.076	·
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ŝ	SDS3 SDS3 070299	2299 2000	66/2/1	13 D.3	9	0 11	Q	•	103 N	NPDES 1	EMC No	11	14	44			7	0.025	< 0.002	0.028	-
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A store all and all an				0.047		0.019		0.01	0.016	D.022	0.019	0.031	0 017	0.018	0.020			•" 	0 032	0.024	0.02	0.038	0.044	0.039		_	-		0.014				}	1	Anna Kina India
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272	SDN2	SDN2 030895	1995	3/8/95	2,16	114				88 Other	ler	4 V	+			_			3	2	5	CURIMENTS
273	SDN2	SDN2 040795	1995	4/6/95	0.61	, 5 8		,		74.	, A				ţ		1		0.012	0.003	0.026	1
274	SDN2	SDN2 041295	1995	4/10/95	0.29	18						2.2	<u>ч</u> . и		<u>o</u> . g	, v ,	Ŷ		1	ť	1	1
275	SDN2	SDN2 080795	1996	8/8/95	1 0 4	i eo		•		-	: 8	2 2		١.	₹. ª	;	מ	<u>.</u>	0.025	0.003	0 098	
276	SDN2~	SDN2 101695	1996	10/15/95	0.35	12	•	,	, o	NPDES	. 23			_	ц, с				0 028	0.01	0.049	1
277	SDN2	SDN2 021796	1996	2/17/96	1 29	12			0	NPDES	18	21 <u>5</u> i			0 j 4	2	;	0	0.016	0 002	0.024	،در ۱
278	SDN2	SDN2 041696	1996	4/15/96	0.49	16		0	0 09	Stip Ap	A DA	2 N		+	P . ``			21	600 0	0.005	0.027	1
279	SDN2	SDN2 042296	1996	4/22/96	2.83	63			0	NPDES	ះ ឡ	2 2	יי נ		t 4 / 4			0.01 >				
280	SDN2	SDN2 051396	1096	5/13/96	0.99	20		Ö		12 Stip Ap									0.013	0.003	0.017	
281	SDN2	SDN2 052296	1996	5/21/96	0.31	30		0			. 2	2 N	; ;	> 						1	1	
282	SDN2	SDN2 062396 A	1996	6/23/96	0.46	\$			0	SES	· ~	o N	2 4		3.5				0.014	0.002	0.076	xtra NPDES/Stip Ag
283	SDN2	SDN2 082396	1996	6/23/96	0.46	10			0	Stip Ag	, n	• 2	6	5	18.3	650	с ц \		0.00	7200	0138	-
284	SDN2	SDN2 090396	1997	96/3/96	0.29	1.2	į		۲ 0	70 NPDES	មនា	Ň	ļ			· ·	>			Z100	0.076	xtra NPDES/Stip Ag
285	SDN2	SDN2 102196	1997	10/21/96	0 68	41			9 0		្ល	ž					4		0.033	9000	0.042	
286	SDN2	SDN2 011697	1997	1/16/97	121	۲ <u>3</u>			0 154		18	, on			15					0.002	0.020	
287	SDN2	SDN2 041997	1997	4/19/97	1 16	26			0 64			2 Z	17	~ ~	1077	- 0 - 4 - 4		6'nc	0.018	100	0 048	
288	SDN2	SDN2 062499	1999	6/24/99	1 12	24	0.35 0	03 01	0.0.8 10	NPDES	CK ENC		ţ	;	2	i i	2	2	740,	8 10.0	0.083	1
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289	SDNZ	SDN2 100900	2001	10/9/01	0.37	8	0,29	0	0 198	8 NPDES	ES EMC	AC No	- -	1	: I	·					ļ	N. Caroo (IW/S) pump
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591		SDN3 090894	1995	9/8/94	69 Q	22			93	3 NPDES	, <u>ທ</u>	Ň	2.1	5.1	2		-		0.032	0 002	0.063	
262	SDN3 S	SDN3 102694	1995	10/25/94	196	44			114	I NPDES	S	ŊO	9 Z	æ	' 1				_	1	2	
293	SDN3 S	SDN3 111994	1995	11/19/94	0.42	24		0 05	5 52	PPDES	· s	Ň			-1	ې د	< 5 <	< 10 <	1	1	_	1
294	SDN3 S	SDN3 010795	1995	117/95	0 21	62	1		0 252	NPDES	ŝ	٥N	0 62	1.6	N				0 003	0 001	0.057	
295	S ENOS	SDN3 021695	1995	2/15/95	11	56			0 86	NPDES	s S	Yes)	1	06 <	ہ ت	ہ 5	< 10 <	1			,
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,	SDN3 S	SDN3 030995	1995	3/8/95	2.16	114		-	0 88	Stip Ag		PN N	10	12		ري ، v	1 - V - V	< 10 < 10	;	. <u>.</u>	:	
238		SDN3 040595			110	4.	i		0_270			22	, , ,	1.8		; v	• • •	; 0 v			1	
	SDN3 S	SDN3 060495		6/4/95	0.7	28	t		0 384	NPDES	s	°N N	, 1	52	; **	<u>,</u>		3	0.011	0.001	0 126	
•	S ENGS	SDN3 071095	1996		0.81	د ہ		ł	0	NPDES	s S	Ŷ	7	5	2	[<u> </u>		<u>i</u>	0 004	0.18	
301	SDN3 SI	SDN3 110795	1996		3.89	48		0.09	6	NPDES	s	å	ŧö	9	10	+	!	-	0 010		0.068	1
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Full Data Set (No Values Trimmed) R=Rejected Non-Representative Data - Refer to line comment for detail c:\ENV-apps\EMIS\POSDEVCEMISMain.indb/rptSWNPDESCompositesOnly

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302	ENDS	SDN3 011496	1996	1/13/96	0.37	8			0	NPDES	ES	Ž	╀	3.8 4.7	2	< 50 < 50	< 5 0	< 10.0	0.010	0 002	0.047	
303	SDN3	SDN3 020496	1996	2/3/96	1.6	8	•		1	Stip Ag		Yes			1				1			storm after runwav delce
304	SDN3	SDN3 040196	1996	3/31/96	064	٥		Ċ,	0.01	Stip Ag	Đ Đ	No.	6	11 16	: 10)	< 50	< 5.0	 10.0 	0.015	0 002	0.01	
305	SDN3	SDN3 041696	1996	4/15/86	0.49	16		. 0	60'	NPDES	. ສ	• 2	1	27 22	v 4	× 50	< 5.0	< 10.0	·			
306	SDN3	SDN3 042296	1996	4/22/96	2.83	ø	I		, o	Stip Ag	Ag	۵N		15 95	9							xtra NPDES/Stin Ao
307	SDN3	SDN3 051396	1996	5/13/96	0 89	20		C	0 07 1	12 Stip Ag	A9	No		16 18	v 4				_			
308	SDN3	SDN3 052296	1996	5/21/96	0.31	õ		a	0 U2	Stip Ag	Å9	ΡŅ							1		•	
309	SDN3	SDN3 062396 /	A 1996	6/23/96	0 46	10			۵	SES .	s	Ν		7.3	20			_	0.004	- < 0,001	1 0.051	Į I
310	SDN3	SDN3 080396	1997	8/2/96	1.01	27			0 325	S NPDES	ES	No		26 26	. ×				0 037			0.156 delayed hydrograph. very
115	EDN's	SDN13 120406	1007	1.1.1		ц 7		. (, t	::	-		-	_						dry antecedent
			1001	08/6/21	20.0	0.7		S'			N N N	ž,		16 14	× ;	< 5.0	< 5.0	< 10.0	0.018	0.002	0.033	
312	SDN3	SDN3 122196	1997	12/19/96	0.36	37	L		0 103	13 NPDES	S :	°N N		2.6 4.5	8.00	< 5.0	< 5.0		0.011	< 0.001	1 0.045	
313	ENOS	SDN3 011797	1997	1/16/97	1.21	23			0 154	H NPDES	ES	No		13 13	4.82			!	0.012	100 0 2	1 0.043	-
314	SDN3	SDN3 030597	1997	3/5/97	0.39	20		0	0.24 4	42 NPDES	: S	, on		10 10	< 4 0 .	6.2	< 5.0		<u>.</u>			
315	SDN3	SDN3 062197	1997	6/21/97	0.27	11.8		0.01 D	0.02 2	24 NPDES		EMC No	•	22 10	14			1	÷			
318	SDN3	SDN3 111797	1998	11/16/97	0.47	12.6			0 222	2 NPDES	•	EMC ND			< 4.0		-					1
317		SDN3 121697	1998	12/15/97	. –	33			0 87	-	•	SMC No				002	002	1 4 1 4 1				
318		SDN3 122498	1999	12/24/98	1.19	39	016	. 0							16		14.7	•	2			
319	SDN3	SDN3 021399	1989	2/13/99	0 26	, no	0 04	0	0 102			EMC Yes		'	, t		1					-
320	SDN3	SDN3 120999	2000	12/8/99	0 49	27	0.09	0	0.36 40		•		2.8	8 4.9	! :-,		i					
321	SDN3	SDN3 101900	2001	10/19/00	121	26	- 019	0 0	036 41	-			·			•						l
322	ENGS	SDN3 040601 COMP	2001	4/5/01	0 23	сл	0 05	0 0	0 01 32				•• 		< 4,0				0000	< 0.002	2 0 033	:
F.																					.	-
122	SUN4	SUN4 090396	1997	9/3/96	0 29	12			92 0	76 NPDES	S	8 N	8.0	9	14 1				0.139	< 0 001	0.047	<u> </u>
324	SDN4	SDN4 120496	1997	12/4/98	0 82	75		D	D.16 44	4 NPDES	ន	Na	7.0		8.46	< 5.0	< 5.0	< 10.0			ادتمما	uayigni ouitali 😁 j
325	SDN4	SDN4 011697	1997	1/16/97	1.21	23			0 154		ទួ	, on	=		12.1		i					ł
326	SDN4	SDN4 030697	1997	3/5/97	0.39	50 ' 02		0	0.24 42		' ⁽)	No	с. С		- 4 D	< 5.0	5	001 1		_ <u>.</u>		
327	SDN4 S	SDN4 060397	1997	6/3/97	0 2G	16			0 76		ES EMC				3.12							•
328	SDN4	SDN4 102897	1998	10/28/97	0.47	10.8		00	0.08 26					<u> </u>		, , ,		,		5		•
329	SDN4	SDN4 121697	1998	12/15/97	:-	33	•				•		118	i e		0			U.U39	0.002		
330	SDN4	SDN4 030198	1998	3/1/98	0.98	86		0.07	07 8	B NPDES	•	1		,	< 40	2.0	< 20	× 4.0			0.029	
1	48. ×,	· 1999年年1999年年,	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.										•	-	-	-	-	-		_		_
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94 - (CONC	5 Glycol	< 2.0	-			< 2.0			ri V		ri V	21 2	ç V	7.0	< 2.0	< 2.D		< 2,0	< 2.0		~~	N I	N (V)	× ~ ×	* *	N N V V	<u>-</u>	< 22		< 2			- <u>-</u>
9/1/		, BOD5	4.06	-	-	5.44	52					۸ 4	× 4	v	168	< 4.0	- <4.0	36.0	< 4.0	<pre>4.0</pre>	12.5	6.94	4.06	, v		A D.A	5.62	142	6.94	4.36	9,42	5.34	27.7	
ata	ļ	NTU NTU	2 6.1	_	-	2.0 3.5	7 5.5	40 4			· _	27 23	18 5.6		, 1 2		₩ •	ند 			<u> </u>		N 4				4 1 1 2	2.5	31	4.7	3.4	1 m	6	5.8
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	Ľ		36/9/6		4/23/98	5/24/08		8/24/98	8/16/98	9/24/98	10/3/98	11/3/98	11/11/98	12/24/98	1/13/89	2/3/99	2/13/99	3/12/99	3/27/99	2/16/99	11/5/99	11/16/99	12/8/99	12/17/99	1/31/00	3/13/00	4/13/00	8/18/00	10/17/00	11/8/00	11/23/00	11/29/00	12/14/00	3/1/01
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lmo		antDrya	0 58		68	120										200	525	18	205	42		76	222	132		288	27	103	31	49	101]
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	NORM /		50		22	32	24	28	12	5		16	8)	12	31	77		ŝ	18	20		16	126	27	5	10	19	Ð	25	6	8	
ł	S		0.52		0 69	0.2	D.18	07	1.34	0 35	0.21	D 49	2,83	0.23	0.27	101		AC'D	0.48	0 39		0 26	0 47	0 86	ŝ	92.0	0 28	03	1 18	0.47	0.26	
		Storm Dale	6/27/01		9/8/94	10/19/94	3/4/95	6/4/95	- 8/16/95	10/15/95	3/22/96	4/15/96	4/22/96	36/6/1	96/21/2	8/2/96	ani Alut	0.614	2011/07	3/5/97		6/3/97	11/16/97	3/8/98			2/3/99	66/2/1	2/7/00		1/28/01 (
SAMDIE NATA	F	_		-		-			60	· ·		_		~	7	~	÷ ÷	2 7	2	m 		ß	11/1	6		ò	2	2	ล	3/13	1/20	
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		Q	EY 062701- COMP	11/ 00000 1	1 Y 090894	TY 101994	TY 030495	TY 060495	TY 081795	TY 101695-1	TY 032296	TY 041696	TY 042296	TY 070496	TY 071896	IY 080296	TY 100496		187170 1	ry 030697		TY 060397	797111 YT	TY 030998	TV 061008	Ochino J	TY 020399	TY 07029	TY 020800	TY 031300	TY 012901	
		lei	μ	2	71	≿	≿	۲	≿	≿	₹	≿	≿	۲	۔ ۲	것	- ≿	,	_	ר ∠		ד ז	ד ד	τ	۲ ۲		Y				Ì	
•		Seq	369	300	280	391	392	393	394	395	396	397	. 965	66E	400	401	402]			404 404				407 T	406 T				411 TY	412 TY	413 TY	
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Page 14 of 14

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2001AppendixB all comps

בוורבאוואי – מרביר ונו היה וערקי נווסאינציוע כוע כול אינוסי טיובאשע אנוזאאיש

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Full Data Set (No Values Trimmed) R=Rejected Non-Representative Data - Refer to line comment for detail c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESCompositesOnly

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NPDES Composite Statistics 9/1/94 - 6/30/01

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CONCENTRATION, mg/L

		TSS	Turb, NTU	BODS	Glycal	Glycol	Total Glycol	õ	1 <u>2</u>	Zn
All Outfalls	Count	387	336	334	202	202 202	204	312	312	312
	Max	4310	2650	646	260	355		-	0.104	
	95th	124	61	76	9.4	25.0	34 2			
	75th	41	25	12	2.5	2.5	50	0.037		
	Median	17	12	6.27	2.5	2.5	ິທີ		- 0 003	
	25th	7	9	4	1.0	10	20	0 015		0 026
	Min	0 62	0 63	2	-	-	2	D 001		0 002
	SD	226	148	53	18.6	29.6	35.9			
	CV%	486%	487%	291%	454%	378%	306%		6	
~~	#NonDelects	9	0	ខេ	174	158	152		103	, (0
%	%NonDelects	2%	%0	19%	86%	78%	75%	%0	33%	2%
SDE4 (002)	Count	49 ,	48	50	45	45	46	51	51	51
	Max	253	190	335	14	494	49.4	0.208	0.104	0.779
	95th	182	78	8	. 6.2	11.2	225	0.077	0.062	0.328
	75th	66	42	Ξ	2.5	2.5	5.0	0.034	0.026	
	Median	45	26.5	6 82	-		N	0 024	0 013	
	25th	4	19	ŝ	1.0	0.1	2.0	0 015	0.005	0.096
	Min	89 g.	1.5	7	-	-		0.003	0.001	0.002
	SD	53	. 33	47	2.8	. B.5	97	0.033	0 022	0.122
	CV%	88%	92%	287%	126%	225%	189%	105%	110%	75%
#	#NonDetects	O,	o	60	4	8-	Ř	0	01	, U
	%NonDetects	%0	%0	16%	89%	0.64%	83%	0%	18%	4%
SDS1 (003)	Count	8	52	22	17	17	11	24	24	24
	Max	69	72	92	260	33.4	275	0 365	0 088	0.304
	95lh	74	46	4	63 2	25.9	817	0.119	0 044	0 285
	75th	5	27	33	2.5	4.5	7.5	U 085	0.018	0 210
	Median	15	7	12,25	25	2.5	5	0.036	0 009	0 122
	25th	<u>:</u> مە: ا	8	~	0.1	10	2.0	0.022	0.005	0.103
	Min	8. 8.	9. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	۱۳ ;		-	N	0 012	0 001	0 062
	ß	52	₽,	<u>:</u> ম।	62.5	- 93	65.4	0.074	0.019	0.073
1	, cv%	<u> </u>	84%	114%	352%	152%	276%	120%	124%	47%
4%	#NonUelects	0	 i		7	21	Fil	0	- !	•t
5		0	2	9/0	94.70	2	%cg	%0	4%	%0

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Full Data Set (No Values Trimmed)

Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESCompStats

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Page 1 of 6

WNPDESCompStats

Full Data Set (No Values Trimmed) Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c.\ENV-apps\EMIS\POS\CEN\CEN\CEN\CARSANG_CARSANG

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NPDES Composite Statistics 9/1/94 - 6/30/01 concentration, mg/L

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	TSS		BOD5	Glycol Glycol	Glycol -	Tatal Glycol	J	q	zu
SDS2 (004) Count		9	6	1-			~	~~~~	
Max		39	=	!	ļ		0.010		0 213
95th			9	l !	<u> </u> 	: : 		1	108
75th	8	1 8		1		 !	600 0		0 138
Median	_	19.5	*	 5			0.00		1900
25th	17	10	2				0 008		0.035
Min		61	2				002		0.006
SD	82	=	m						2010
CV%	64%	56%	65%		,	۰ 			/01 /0 ,
#NonDetects	٥.	0	. 4	. <u></u>					8 c
%NonDetects		%0	44%				20%	67%	. 0
SDS3 (005) Count	28	55	58	43	64	43	58	82	83
Max	310	166	648	31.5	355	<u>.</u>	•		0.194
95th	62	48	149	17.3					0 136
75th	81	15	19						0.050
Median	8.95	8	10.75		25		1		
25th	, u	÷		, ,			ł		1 500 0
Min	1	20	; •	, ? •	-				0 029
	ì	3, 8	1					0.001	.002
	_		105	6.2	60.8	629	0.028	0 000	0.039
	223%	162%				33%	71% 1		76%
#NonDetects	+	0	4	31	22	2		23	: -
%NonDetects	2%	%0	7%	72%	51%	47%	%0	40%	2%
SDS4 (009) Count	22	21	23	10	10	9	23	23	, E
Max	4310	2650	83	25	2.5				Acc
95th	101	95	18	25	2.5	ĸ	4		0.047
75th	Зй	12	~	2.5	2.5		1		0.034
Median	11.5	6,5	5 C	2.5	2.5				000
25lh	20	ر م	. 4	2.5	35				
Min	2.1			} -	}		_		910 0
		2		-			<u>,</u>	0.001	0.008
<u> </u>				1	:	1	0.034	0.010 0.0	0.044
	_	417% 18	186% 2	29%	29%	29% 10	109% 25	258% 131	138%
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9/1/94 - 6/30/01	
NPDES Composite Statistics 9/	

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Ę, CONCENTRATION

i	Zu	Former location downstream, ends 10/1996			1					ı			4 Upstream location, begins 11/1996		0 0 10	5000	- 0.007	0.005	0 002	0.003	49%		25%	7 Formerly SB B	D 124	-	0.038	0.029	0.023	0.006	0.039	- 97%	10	0%
			ł	:			1			i			<u> </u>	1000	0.001 0						0%	4		-						-	•		1	
	4 				•		•	•	,			:						•	0.001	0.000			100%		0.007		0 004	0 002	1			1	, ,	¥
mg/L	Ğ						:						4	0.026	0 025	0.012	0.005	0.003	0.001	0.012	127%	-	25%	1	0.028	0.025	0 016	0 013	0 007	0 006	0 008	60%	0	0%0
ATION,	Total Glycol							_								•				;				***					•			•		4 7
CONCENTRATION, mg/L	Glycol					,								:				•		į				-						<u> </u>				
CONC	Glycol Glycol							44 - - -	•		***							:		1						· ··· ·								L
	BODS	4	15	14	~	5.5	'n	4	5	68%	0	%0	4	6.7	9	ŝ	3.09	N	N,	N.	60%	2	50%	cu.	566	ŝ	e .	2	2	8	2	53%	en ;	60%
	Turb, NTU	4	310	267	9 6	22,5	16	23	147	185%	0	0%	8	£1	1	2	3 65	ы	-	4	79%	0	%0	~ '	126	121	75	ŝ	50	14	46		•	%0
	TSS	4	88	83	64	38	16	57	37	87%	0	0%	8	12	F	8	5.8	ຕຸ	22	(7) I		0	%0	2	16	22	R	23	F.	2	62		٥!	%0
L		SDS7 (010) Count	Max	95th	75th	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	SDS7up (010) Count	Max	95th	75lh	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	SDS6 (014) Count	Max	95th	75th	Median	25th	- Mitr-	SD .			%NonDetects

Page 3 of 6 (07

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NPDES Composite Statistics 9/1/94 - 6/30/01

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CONCENTRATION, mg/L Tunb, ADDS, E. P. Total

Count 23
Max 48
95th 46 11
75th 16
Median 7.5 49
25th 5
Min
SD 15
CV% 108% 65%
#NonDetects 1
%NonDelects 4%
Count 28
Max 27
95th 24
75th 15
Median 10.5
25th 3
Min 0.62 1.6
SD 7
CV% 73% 75%
%NonDetects 11%
Count 41 41
Max 188 320
÷
75th 11
Median 4.2 5.6
25th 3
1.6
SD 33 51
CV% 224% 298%
#NonDetects 0 0
%NonDetects 0% 0%

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Page 5 of 6 109

2001AppendixB all comps stats

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NPDES Composite Statistics 9/1/94 - 6/30/01

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CONCENTRATION, mg/L Turb, Rons Even Clinoi Curva Cond

		79	8	8	0.179	10	79	. 0	%0		%(_			<u>.</u>		Q	28	27	52	2	0	2		1%
Ž		0.179														۱ 			` _				145	Ő	0 127	0 052	0.032		0.002	1	1.
qd	~	0 028	i,			3 600	0 026		%0	0	%O						•			I	•		145	0 047	0 010	D 002	0.001	0 001	0.001	72	50%
õ	-	0.020		3 600		3 600	0 020	0.000	%0	0	%0											'	146	0 180	0 082	0.039	0.027	0 018	0 003	`ت ۱	%0
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BOD5 Glycol		-	3.6	36	-	36	-	00	%0	-	100%	•	2.5	23.1	231	2.5	231	2.5	0,0	%0	~-	100%	101	315	84	25	-	10	-	85	84%
BODS	-	24.1		4	24.1	4	24 1	0	%0	0	%0			. 1	1		1		:				152	640	88	12	9	4	2	30	20%
, din MTU DTU	۳ ۲					23	43	66		0	%0	~	12	12	ę.	• دم ب	G	4	؛ ⁰	71%	0	0%0	145	2650	43	14	6.2	sa,	0.7	0	%0
TSS	24				25	5	3.2	83	122%	0	%0	ស្ត ¹	660	451	32	24	₽,	4'	161	204%	ם ' :	%0	146	4310	20	5:	7.6	4'	÷.	4	3%
	Count	Max	95th	75th	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	Count	Max	9511	75th	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	Count	Max	95th	75lh	Median	25th	Min	#NonDetects	%NonDetects
	EY (012)											TY (013)											Airfield (SDS3,SDS4,SDN3,SDN4)			;					

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Page 6 of 6 110

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APPENDIX C TABULAR DEICING EVENT SAMPLE DATA SUMMARIES

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SAMPLE DATA

Deicing Event Sample Data 9/1/94 - 6/30/01 STORM CHARACTERISTICS

	Comments						Ţ	1	20-hr avri of 8 rlierrata estimologicates			10-hr avg of 5 discrete samples. All>MDL		-			composite of bottles A1, A2, A3 for quarterly	Blycols	backup data in case short on data for 96 Q4		30-hr avg of 5 time-compositesamples, most	6-day avg of 15 time-composite samples	1201 15 BOD <mdl, 11="" 15="" <mdl<="" glycol="" of="" th=""><th>F</th><th></th><th>1</th><th></th><th>: :</th><th></th><th></th><th>24-hour time composite</th><th>•</th><th>laken lor aircraft deicing only</th><th></th><th></th></mdl,>	F		1		: :			24-hour time composite	•	laken lor aircraft deicing only		
J∕₿	Total Givcol		₽I v	ç i	2] ; v	2:	ç v	₽	8 77		26	9		21	2: v	¢ ;	82	-	÷!	¢ 1	ø	23	•	< 10	49	, 10, ,			† • •		= : ;	_		, i ,	;
CONCENTRATION, mg/L	P. Glycol	-	v V	0 I I	Ç .	<u>,</u>	v v	v v	8 0	-	12	12		011	<u>, 1</u>	v V	12	<u>_</u>	v V	ю У.	4	15	• •	ю V	49	^ ' ت	1 1			; , ,		<u>, i (</u>		· · ·	
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	Type			•		;			avg of lime comp	•	flow-wt comp	avg of time comp	" " Now-wt como	flow-wit come			avg of time comp	flow-wt nomo			avg of time comp	avg of time comp		How-wi camp	Raw-wt comp	flow-wt comp	flow-wt comp	flow-wt comp	flow-wt comp	avg of time comp	flow-wt comp	flow-wt como	flow-wt como	flow-wit comp	· · · · · · · · · · · · · · · · · · ·
	Purpose	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	R/W W/O		NPDES	SES	Stip Ad	NPDES	NPDES	NDDEC	COLURN	NPDES	Nence		KW W/O	R/W W/O		NPUES	Stip Ag	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	1947 - 1947 - 1948 - 1948
I	Dryant	46	•	52	۲. B		36	i,		•	<u> </u>			ì	76	2 4	2	72	1	2		-	-	ł.	109	43	76	26	87	, 13 -	100	13	264	15	
	MaxInt) in/hr				ł								,			7 U U	5	•												•	ł	!	1	1	1417
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	blate Type	11/11/94 NPDES Storm	11/10/94 baseflow	11/19/94 NPDES Storm	4/10/95 NPDES Storm	4/28/95 basellow	5/2/95 Other Storm	8/16/95 NPDES Storm	1/19/96 Other		2/3/96 NPUES Storm	2/3/96 Other	3/22/96 NPDES Storm	4/15/96 NPDES Slorm	9/3/96 NPDES Storm			12/15/96 Other Storm	E			12/26/96 Other	116(47 NDDES Sprim					10/28/97 NPDES Storm	12/15/97 NPDES Storm		3/1/98 NPDES Storm 0	3/8/98 NPDES Storm 0	ļ	5/14/98 NPDES Storm 0	an fi mmenting at states when the states of the
	Reported	1995	1995	1995	1995	1995	1995	1996	1996	1.000	0881	1996	1996	1996	1997	1997	-	1997	1997	1997		1997	1997		ARI	1997	1997	1998	1998	1998	1998	1998	1996	1998	
	and Q	4 SDE4 111394	•	4 SDE4 111994	1 SDE4 041095	5DE4 042895	5DE4 050295	1 SDE4 081795	SDE4 012096 AVG				SDE4 032296	SDE4 041896	SDE4 090396	SDE4 112196	A99	SDE4 121596	SDE4 122196			SDE4 010797 AVG	SDE4 011697		16/210 4305	SDE4 030697	SDE4 060397	SDE4 102897	SDE4 121697	SDE4 011398	SDE4 030198	SDE4 030998	SDE4 042398	SDE4 051498	and the state of the statement of the state of the stat
ð		SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4				SDE4	SDE4	SDE4	SDE4		SDE4	SDE4	SDE4	ŧ	SDE4	SDE4	1973		sue4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	1.0.1
L	Seq	-	2	ر م	4	'n	•	~	8	- -	<u>.</u>	2	=	12	13	7	_	5	16	17		18	19	20	3	5	ដ	ន	24	55	26	27	28	53	10

2001AppendixC all deicing

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Page 1 of 13

Full Data Set (No Values Trimmed) R=Rejected Non-Representative Data - Refer to line comment for detail c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESDe\cingEvents

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Deicing Event Sample Data 9/1/94 - 6/30/01 STORM CHARACTERISTICS

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		Camments		•	1 1	•	not representative, incomplete sample. Inw	probe error	concurrent WET sample	•	<u> </u>	not representative, too late on hydrograph	concurrent WET sample	1	concurrent WET sample	1		concurrent WET sample					runway deice		. :	:				3	24-hr In the composite, bottle 1 of 2,	Z4-hr lime composite, battle 2 of 2.	14-hr time comp, bottle 1 of 5. Coincided with major deicing event (runway)
1,25	Total	Glycol	< 4	1 4 4	-	4	×4 ۲	44	14	4	4 Å	. 4 . 4	,	' ^ 4	۸ 4	4	۸ 4	י 4	: 4	5	< 4 >	4 >	< 4	æ	4	2	4 Y	41	• ▼	13
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	POD4	RUD5	14	< 4	2		4	• •	2	•.,	335	× 14	9	4	44	· 🗜	au i	9	4 4	* 4	۸ 4	8		9	גם	9	4 4	51	5	9	131	4 4	69
	Dryant	Aircraft	ы С	e)	3	19	; =	•	52	ŝ	373	39	31	26	15 1	171	69	16	17	22	10	34	261	4	16	4	21	292	245	2	301	301	336
5		Deice? A	°2	ŝ	No	Ž	'²		° N	Na	Yes	No N	No	- 2	Ì₽	۶	, ₽	, S	No.	⁹ Z	٩٥	. 8	Yes	°N N	No	No	Ŷ	Ŷ	No	No	Yes	Yes	Yes
וקיול בעום		- 1	flow-wt comp	flow-wi comp	flow-wt comp	flow-wt comp	failed comp		flow-wt comp	flow-wt comp	flow-wt comp	failed comp	flaw-wt comp	tiow-wt comp	flow-wt comp	flaw-wt comp	flow-wt comp	flow-wt comp	llaw-wt comp	flow-wt comp	flow-wf comp	flow-wt comp	Row-wt comp	flow-wt comp	flow-wt comp	flow wit comp	flow-wi comp	βαω-νή comp	flow-vit comp	flow-wt comp	lime-comp	time-comp	lime-comp
	Pirroce	Lupose	NPDES	NPDES	NPDES	NPDES	NPDES	. 1	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES
	Dryant		- 1 28 1	148	8	72	35		73	33	153	5	33	20	8	36	7	40	26	44	23	60	10	49	74	27	57	330	123	1	55	55	73
ISTICS	F		0.16	0.26	0 22	0.19	0.48		0.18	0.03	0.16	0.05	60 Q	0 06	0 14	0 05	0.07	0 08	0 07	011	0.07	10	0 04	0 13	0.08	0 12	D 18	01	0 09 -	0.13	17	0 14	0 14
CTERIS		=	0 19 1	0 47	D.4	0.64	1.62		2.34	0 11	1 19	0.27	042	0.6	0.56	0.28	0.83	0.28	0 24	0 68	90	0.24	0.37	047	0.34	D 36		0 37	0.29	0.44	0.3	0.3	0.46
STORM CHARACTER	Storm Date Tyne		9/18/98 Other Storm	9/24/98 NPDES Storm	10/3/98 NPDES Storm	10/27/98 NPDES Storm	11/3/98 NPDES Storm		11/19/98 NPDES Slorm	12/17/98 Other Storm	12/24/98 NPDES Storm	1/9/99 NPDES Slorm	1/20/99 NPDES Storm	2/18/99 NPDES Storm	2/22/99 NPDES Storm	3/8/99 NPDES Storm	3/12/99 NPDES Storm	3/24/99 NPDES Storm	3/27/99 NPDES Storm	11/5/99 NPDES Storm	11/16/99 NPDES Slorm	12/4/99 NPDES Storm	1/12/00 NPDES Storm	3/13/00 NPDES Storm	4/13/00 NPDES Slarm	10/17/00 NPDES Slorm	11/8/00 NPDES Storm	11/23/00 NPDES Slorm	12/14/00 NPDES Storm	1/3/01 NPDES Storm	2/8/01 NPDES Storm	2/8/01 NPDES Storm	2/16/01 NPDES Starm
	Reported		1999	1989	1999	1999	1999		1999	1999	1998	1999	1999	1999	1999	1999	1999	1999	1999	2000	2000	2000	2000	2000	2000	2001	2001	2001	2001	2001	2001	2001	2001
SAMPLE DATA	Sample ID Re	- 1	SDE4 091898	SDE4 092598	SDE4 100398	SDE4 102798	SDE4 110498	t	SDE4 111998	SDE4 121798	SDE4 122498	SDE4 011099	SDE4 012299	SDE4 021899	SDE4 022399	SDE4 030899	SDE4 031399	SDE4 032499	SDE4 032899	SDE4 110699	SDE4 111799	SDE4 120599	SDE4 011300			SDE4 101700	SDE4 110800	SDE4 112300	SDE4 121400	SDE4 010401	SDE4 020801-1	SDE4 020901-2	SDE4 021601-
SA	la lei		SDE4	SDE4	SDE4	SDE4	SDE4		SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4		SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4	SDE4
	Seq		g .	Б.	8,	នេរ	स्र		8		37	8	8	40	4	42	43	44	42	46	47	1 4 8	48	8		23	23	3	22	59	21	- 28	- <u>5</u> 2

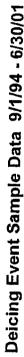
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Page 3 of 13 115

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ne?	ja O	Sample	Demontad	Storm Storm	hq0	MaxInt	Dryant			Ground	Dryant	CONC		LION L	Total	
8		SDS1 112096	- 1	11/20/96 Other	0 45	0.07	16	Purpose R/W W/O	Type time-como	Deice?	Aircraft	BOD5	Glycol			Comments
:		A1 					!		diano- errer	8	007	077	ĥ	lonaz	6682	
87	SDS1	SDS1 112396	1997	11/23/96 NPDES Slotm	0 63		72	NPDES	falled comp	Yes	112	258	์ สว	190		nol representative (<) hrs) reference only
88	SDS1	SDS1 120496	1997	12/4/96 NPDES Storm	0.82		44	NPDES	Rew-wt comp	92	92	40	م ت	24		
88	SDS1	SDS1 011697	1997	1/16/97 NPDES Slorm	1.21		154	NPDES	flow-wt comp	2 N	136 1	- 62	i i in V	. 8	1.8	
08	SDS1	SDS1 041397	1997	4/13/97 NPDES Storm	031			NPDES	flow-wt comp	Ŷ	εQ	5	, ю	2 <u>0</u>	< 10 <	· · · · · · · · · · · · · · · · · · ·
6	SDS1	SDS1 061797	1997	6/16/97 NPDES Storm	0 36		135	NPDES	flow-wt camp	٩	n	4	' N V	1 V	4	
82	SDS1 S	SDS1 102897	1998	10/28/97 NPDES Starm	047		26	NPDES	llow-wt comp	°N	, CA	~	2 V V	< 2	× 4	:
83	SDS1	SDS1 112097	1998	11/19/97 NPDES Slorm	0.65		24	NPDES	flow-wt comp	Ŋ	. B T	. 4	< 2 <	N V	v	-
64	SDS1 S	SDS1 121697	1998	12/15/97 NPDES Storm	-		87	NPDES	Now-wi comp	2	30	; co	, ci A	2 V	7	•
95	SDS1 S	SDS1 011198	1998	1/12/98 Other Storm	1.13		123	NPDES	linte-comp	Yes	457	< 12	, 4 , 5	27 V	-	24-hour time composite
8	SDS1 8	SDS1 030998	1998	3/8/98 NPDES Storm	0 86		132	NPDES	flow-wt comp	12	154		< 2 < 2	. œ	- 1-	fulfils annual sample mmt
61	SDS1	SDS1 102798	1999	10/27/98 NPDES Storm	0 64	0.19	72	NPDES	Naw-wt comp	١Ş	16	. œ	N V V	1 N	, 4 , 4	
38	SDS1 S	SDS1 121798	1999	12/17/98 Other Storm	0 11	0.03	33	NPDES	first Rush grab	No.	B	1	17	27 V	۸ 4	-
66	SDS1 S	SDS1 031299 GRAB	1998	3/12/99 NPDES Storm	0 83	0.07	71	NPDES	first flush grab	No No	69	123	(un	43		quarterly delce grab sample in first 60
100	sps1 s	SDS1 062099 GRAB 1	1999	6/20/99 NPDES Storm	0.21	0 03	48	NPDES	first flush grab	Na	-		< 2 <	× 23	< 4 4 1	foam observed below outfall
101	SDS1 S	SDS1 062099 GRAB 2	1989	6/20/99 NPDES Slorm	0.21	0.03	48	NPDES	first Rush grab	Νο			< 2	2 V	< 4	foam observed below oulfall
102	s Isos	SDS1 070299 GRAB 1	2000	7/2/99 NPDES \$lorm	0.3	0 11	103	NPDES	r first flush grab	No	م	13	< 2	× ×	, 4 k	
103	sDS1 S	SDS1 070299 GRAB 2	2000	7/2/99 NPDES Storm	0.3	0 11	103	SrcTrace	first flush grab	No	Ъ.	10	< 2	- V	4 ⁴	1 i
	SDS1 S	SDS1 070299	2000	7/2/99 NPDES Storm	03	011	EUT	NPDES	now-wt comp	No	5	8	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	< 2 < 2	< 4	
105	s isosi s	SDS1 112799 GRAB	2000	11/27/99 NPDES Slorin	Q 32	0 01	8	NPDES	hrst flush grab	No	31		22	22	4 ×	
901	SDS1 S	SDS1 010700 grab	2000	1/7/00 NPDES Slorm	0.38	0 12	23	NPDES	first flush grab	No	99		< 2	< 2]	< 4	j
102	SDS1 S	SDS1 011200 grab	2000	1/12/00 NPDES Storm	0.37	0 04	10	NPDES	first flush grab	Yes	261	_	2	199	801	runway deice
108	SDS1 S	SDS1 042100 grab	2000	4/21/00 Other Storm	01	0 04		NPDES	first flush grab	No			< 2	22 V	< 4	
60	SDS1 SI	SDS1 112300 GRAB	2001	11/23/00 NPDES Storm	0.37	01	330	NPDES	Non- Representative		292		4	9		Grab Not Representative-late on hydrograph
110	SDS1 SI	SD\$1 012901	2001	1/28/01 NPDES Slorm	0,26	60 ′0	101	NPDES	flow-wt comp	, oz	187		e.	20	~	:
Full Da R=Reje c:\ENV	ta Set (r cted No -apps/E	Full Data Set (No Values Trimmed) R=Rejected Non-Representative D2 c:\ENV-apps\EMISIPOSDEVIEMIS	immed) lative Data eVtEMISMa	Full Data Set (No Values Trimmed) R=Rejected Non-Representative Data - Refer to line comment for detail c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESDetcingEvents	for deta	ents	4 1 1	Lage	Page 4 of 13	الجاتلية والا	- 44-19 L J Anno - 12	۲. ۲.		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	4	2001AppendixCall deicing

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Deicing Event Sample Data 9/1/94 - 6/30/01

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	Comments						giveols and BOD un labiob "J 014"				1		- - -	,	3.5-day avg of 8 discrete + 8 time-comp	samples. 7 glycol, 4 TKN, 2 NH3 <mdl< th=""><th></th><th>· · · · · · · · · · · · · · · · · · ·</th><th></th><th>2-day avg uf 8 time-comp samples</th><th></th><th></th><th></th><th>B-day avg of 32 time-comp samples, 11</th><th></th><th>7-day avg of 29 lime-comp samples 12</th><th>glycol, 8 BOD, 14 NH3 <mdl< th=""><th></th><th></th><th>24-hour time composite</th></mdl<></th></mdl<>		· · · · · · · · · · · · · · · · · · ·		2-day avg uf 8 time-comp samples				B-day avg of 32 time-comp samples, 11		7-day avg of 29 lime-comp samples 12	glycol, 8 BOD, 14 NH3 <mdl< th=""><th></th><th></th><th>24-hour time composite</th></mdl<>			24-hour time composite
T	_	1	40	5	< 10	< 10 </td <td>< 10 G</td> <td></td> <td>; 2</td> <td>12</td> <td>: 0 . v</td> <td>. 5 5</td> <td>< 10</td> <td>1 e</td> <td></td> <td>''''</td> <td>13</td> <td>115</td> <td>1 5</td> <td>29 2</td> <td>, <u>1</u>01 ,</td> <td>1 0 V</td> <td>10</td> <td>28</td> <td>78</td> <td></td> <td></td> <td>¢ 10 1</td> <td>1 2</td> <td>Ϋ́ Ωι ι</td>	< 10 G		; 2	12	: 0 . v	. 5 5	< 10	1 e		''''	13	115	1 5	29 2	, <u>1</u> 01 ,	1 0 V	10	28	78			¢ 10 1	1 2	Ϋ́ Ωι ι
CONCENTRATION. mail.	ol Glyco	4	44	4	< 5	v v			< 5 <	1 5	· ; 10 ; 12			< 5			45	19	131	13	v 5		ک	15	101	14			ې ۲. ۲.	2
r I Fratio	ol Glycal		5	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	5	'n	5	ۍ د		: UD	מו'			< 5	25		28	96	18	16		v v	ما ۷	14	[_ 8	10				1
ONCENT	5 Glycol	<u> </u>				5 5		v 	4 V	~	· ·	· ·	<u> </u>	v 8		-	~				v 	v ور	۷ •	•	, ,		- :	< 5	2° 1	<u> </u>
58	BOD5		_												118			210	130	162	_		v	75	: 75	- 252	.,	10	4	12
	Dryant Aircraft	301	336	336	ŀ				·	1		•	!	ł	•	į		l		•		•	; ₽	260	112	256		136	5	457
	Ground Dryant Deice? Aircraft	Yes	, Yes	Yes	Ž	°N N	No	Ň	Ň	Ÿ	۰ <mark>۵</mark>	å	1 Ž	19	Yes		Yes	Yes	Yes	Yes.	Ň	١ĝ	å	Yes	7.95 7.05		ł	뮏	z	Yes
וואוב המומ	Type	first flush grab	first flush grab	lirst Rush grab			flow-wt comp						random grab	- flow-wt comp	avg of time comp	!				/ to of time comp	llow-wt comp	flow-wt comp	flow-wi comp	avg of time comp	flow-wt comp	avg of time comp	:	flaw-wt comp	Row-wt comp	line-comp
	Purpose	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	RW W/O		SES	SES	SES	RW W/O	Stip Ag	NPDES	NPDES	RW W/O	Stip Ag	RW W/O		NPDES	NPDES	NPDES
	Dryant hr	55	29	53	63		52		56		36	,			ىتىنىي								64	9	72	į	į	5	42	123
ERISTICS	Maxint In/hr	0.14	D, 14	0.14								-											,	0 07	•		:		i	
CTERIS	Dpth N	0.3	- 0 46	0.46	690	٥	0 42	Ð	0.29	٥	0.42	0	O	0.37	1.8				1	1,6	021	0 49	0.68	0 45	0.63	1.12	ļ	1.21	0.39	1.13
STORM CHARACTI	Storm Date Type	2/6/01 NPDES Storm	2/16/01 NPDES Storm	2/16/01 NPDES Storm	9/8/94 NPDES Storm	11/18/94 baseflow	11/19/94 NPDES Storm	2/8/95 basellow	4/10/95 NPDES Storm	4/28/95 baseflow	5/2/95 Other Storm	9/29/95 baseflow	9/29/95 baseflow	1/13/96 NPDES Storm	1/19/96 Other Storm	,	1/28/96 baseflow	1/30/96 baseflow	2/1/96 basellow	2/3/96 Other Storm	3/22/96 NPDES Storm	4/15/96 NPDES Storm	10/21/96 NPDES Slorm	11/20/96 Other	11/23/96 NPDES Slorm	12/26/96 Other		1/16/97 NPDES Storm	3/5/97 NPDES Storm	1/12/98 Other Storm
	Reparted	2001	2001	2001	1995	1995	1995	1995	1995	1995	1995	1896	1996	1996	1996		1996	1996	1996	1996	1996	1996	1997	1997	1997	1997	-			1998
SAMPLE DATA	Sample ID	SDS1 020801 GRAB	SDS1 021601- G1 GRAB	SDS1 021701- G2 GRAB	SDS3 090894	SDS3 111894	SDS3 111994	SDS3 020895	SDS3 041295	SDS3 042895	SDS3 050295	SDS3 093095	SDS3 093095 GRAB	SDS3 011496	SDS3 012296	f R	SDS3 012896	SDS3 013096	SDS3 020196	SDS3 020696 AVG	sds3 032296	SDS3 041696	SDS3 102196	SDS3 112896 AVG	SDS3 112396	SDS3 010297	AVG	SDS3 011697	SDS3 030597	SDS3 011298
7S	fall Fall	SDS1	SDS1	SDS1	SDS3	SDS3	SDS3	SDS3	SDS3	SDS3	SDS3	SDS3	SDS3	SDS3	ESQS		SDS3	SDS3		SD53	SD53	SDS3	SD\$3	SDS3	SDS3	SDS3				SDS3
	Seq	111	112	113	114	115	118	117	118	119	120	121	122	123	124					128	129	130	131	132	133	134				137

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Page 5 of 13 || 7 9/27/01 10:31:31 AM

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Deicing Event Sample Data 9/1/94 - 6/30/01

		ents		1	backup monhtly sample in case 3/1/98	sample didn't qualify under new permit		·· ···································	not representative, extended into post-slorm	basellow period Absorbe marchine bioch bionnal discontinue of the	- Mar and and another and and and and and and and and and and			condurrent WET sample		-		concurrent WET and WER			,	1	2		3			•	deice	1 1 1 1				문화 주실 <mark>라고만 만</mark> 하는 것이 있는 것이 있는 것이 것 같아. 이 것이 있는 것이 같아.
		Comments	-	•		sample		1		-	_	,				ŧ		_		:	!		i					ŧ.	runway deice		1.	1 1	ł	Same Yahred
	ng/L	Total Glycol	÷	•		•	4 ×	41	4	, «	, A	Сч	. 0	12	5	113	ង	11	. "	158	۲. · ·	. 4 .	< 4	- T V	4 4		21	24	364	10	. 4	× 4	8	
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10/0	CONCENTRATION, mg/L	Glycol G	L.	× 7	23	-	20 V	20	× 2	\$	- ~~ ~	· ດ V	ar	. Q	i N	32	æ	• v	4 N	~	i N V	× 2	~ ~ ~	× 2	× ×	2 2	109	i N V	6	< 2 ×	Ň	121	£	- United
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	-	Storm Date Type	1/29/98 NPDES Storm	3/1/98 NPDES Storm	3/8/98 NPDES Slorm	4/73/08 NDDFS Storm		5/14/98 NPDES Storm	9/18/98 Other Storm	9/24/98 NPDES Storm	10/3/98 NPDES Storm	10/27/98 NPDES Storm	11/3/98 NPDES Storm	11/11/98 NPDES Storm	12/17/98 Other Storm	12/24/98 NPDES Storm	1/9/99 NPDES Storm	1/13/99 NPDES Storm	2/3/99 NPDES Storm	3/8/99 NPDES Storm	3/12/99 NPDES Slorm	3/24/99 NPDES Storm		11/5/99 NPDES Slorm	11/5/99 NPDES Slorm	11/16/99 NPDES Slorin	12/4/99 NPDES Slorm	12/8/99 NPDES Storm	1/12/00 NPDES Storm		4/13/00 NPDES Storn	0/17/00 NPDES Storm	11/23/00 NPDES Storm	and the second strategy and the second s
	ſ	Reported	1998	1998	1998	1908		1998	RAAL	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	2000	2000	2000	2000	2000	2000	2000	2000			2001	amed)
SAMPLE DATA		Sample ID	SDS3 013098	SDS3 030198	SDS3 030898	SDS3 042398		5053 (15) 498	956160 5 COC	SDS3 092598	SDS3 100398	SDS3 102798	SDS3 110498	SDS3 111398	SDS3 121798	SDS3 122598	SDS3 011099	SDS3 011499	SDS3 020399	SD53 030999	SDS3 031399	5DS3 032599	SDS3 110699	SDS3 110699 COMP 2	SDS3 110699 GRAB 2	SDS3 111699	SDS3 120599	SDS3 120999	SDS3 011300	SDS3 031300	SDS3 041400	SDS3 101800	SDS3 112300	Full Data Set (No Values Trimmed)
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Page 6 of 13

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2001AppendixC all deicing

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Form Substrate DATA STORM CARACTERISTICS Decicing Event Sample Data 9/1/94 6/30/01 SAPPLE DATA STORM CARACTERISTICS STORM CARACTERISTICS STORM CARACTERISTICS CONCENTRATION, mpt. Sapple m m m mont point mont point point <tdp< th=""><th></th><th></th><th>Comments</th><th></th><th>•</th><th></th><th></th><th>- (-</th><th>1</th><th>14-hr time comp. bottle 1 pl 7 Coincided</th><th>with major (runway) detoring event 14-hr time comp, bottle 2 of 7 Coincided</th><th>14-hr lime comp, bottle 3 of 7 Coincided</th><th>with major (runway) deicing event 9-br time comp, bottle 4 of 7. Coincided with</th><th>major (runway) deicing event 14-hr time comp. bottle 5 of 7. Colncided</th><th>with major (runway) deicing event 14-hr time comp, bottle 6 of 7. Coincided</th><th>win major (runway) deicing event 14-hr time comp, botile 7 of 7 Coincided</th><th>www.mejor (runway) decang event overall event 92-hr lime-composite of bottles</th><th>event</th><th></th><th>•</th><th></th><th>!]</th><th></th><th>-br avg of 6 discrete samples 4 mbrod</th><th></th><th></th></tdp<>			Comments		•			- (-	1	14-hr time comp. bottle 1 pl 7 Coincided	with major (runway) detoring event 14-hr time comp, bottle 2 of 7 Coincided	14-hr lime comp, bottle 3 of 7 Coincided	with major (runway) deicing event 9-br time comp, bottle 4 of 7. Coincided with	major (runway) deicing event 14-hr time comp. bottle 5 of 7. Colncided	with major (runway) deicing event 14-hr time comp, bottle 6 of 7. Coincided	win major (runway) deicing event 14-hr time comp, botile 7 of 7 Coincided	www.mejor (runway) decang event overall event 92-hr lime-composite of bottles	event		•		!]		-br avg of 6 discrete samples 4 mbrod		
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2001AppendixC all deicing

Page 7 of 13 119

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nlo Date 0/1/01 - 6/30/01 U **Naicing Event**

Deicing Event Sample Data 9/1/94 - 6/30/01 registics	Purpose Type Deice? Aircraft BOD5 Glycol Glycol Glycol Comments	SES avg of time comp Yes 242 13 18 31 12-hr avg of 5 discrete samples. all BOD-result	flow-wt comp No 5 <5 < 10			Row-witcomp No 6 <5 <5	10w-wt comp No 92 <4 <5 <5 <10	NPDES Row-witcomp No 9 4 <5 <5 <10	NPDES lime-comp Yes 457 < 12 < 2 < 4 24 hour time composite	No 1	NPDES flow-witcomp No 52 <4 <2 <2 <4	RvW W/O avg of time comp Y es 7b 6 6 6 12 24-hr avg of 3 time-comp samples. 2 glycol <mdl< th=""><th>NPDES No 6 <5 <5 <10</th><th>Other No 11 <5 <5 < 10 basellow</th><th>NPDES No . <5 <10 .</th><th>Yes 5 <5</th><th>NPDES Yes 31 8 <5 6</th><th>44 - 55 - 55 - 55 - 55 - 55 - 55 - 55 -</th><th></th><th>random grab No 4 < 5 < 5</th><th>No 5 <5</th><th>NPDES No 40 <5 <5 <10</th><th>llow-wt comp Yes 15 < 5 < 5 < 10</th><th>Slip Ag first flush grab No 44 <5 <5 <10 baseflow, no storm</th><th>flow-wt comp No 17 15 <5 <5</th><th>How-wt comp No <4 <5 <5</th><th>llow-wt comp No 5 <5</th><th></th><th>flow-wt comp No 2 4 <5 <5</th><th>Slip Ag random grab No 12 <5 <5 <10</th><th>0</th></mdl<>	NPDES No 6 <5 <5 <10	Other No 11 <5 <5 < 10 basellow	NPDES No . <5 <10 .	Yes 5 <5	NPDES Yes 31 8 <5 6	44 - 55 - 55 - 55 - 55 - 55 - 55 - 55 -		random grab No 4 < 5 < 5	No 5 <5	NPDES No 40 <5 <5 <10	llow-wt comp Yes 15 < 5 < 5 < 10	Slip Ag first flush grab No 44 <5 <5 <10 baseflow, no storm	flow-wt comp No 17 15 <5 <5	How-wt comp No <4 <5 <5	llow-wt comp No 5 <5		flow-wt comp No 2 4 <5 <5	Slip Ag random grab No 12 <5 <5 <10	0
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	Reported	1996	1998			1997	1997	1997	1998	1998	1999	1996	1996	1995	1995	1995	1995	1995	1995	1995	1995	1995	1996	1996	1996	1896	1996		1996	1986	
SAMPLE DATA		SDS4 020496 AVG	SDS4 041696		SUS4 042296	SDS4 070496	SDS4 120496	SDS4 6 SDS4 041997	SDS4 011298	SDS4 030998	SDS4 111998	SDW3 020496 AVG	SDN1 111994	SDN1 010595	SDN1 020895	SDN1 021395	SDN1 021695	SDN1 030595	SDN1 030995	SDN1 031595	SDN1 040595	SDN1 040795	SDN1 020496	SDN1 040596 GRAB	SDN1 041296	SDN1 041696	SDN1 042296	SDN1 042596	SDN1 051396	SDN1 052296 GRAB	
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Seq			Reported	Dale Type		Maxini L In/hr	uryant hr	Purpose	Type	Ground Dryanl Deice? Aircraft	Dryant Vircraft	BODS	Glycol G	Gycol Gycol	Total Glycol	Comments
221	I SDN1		1996	6/23/96 NPDES Storm	0.46			Stip Ag	flow-wt comp	No		8	2 2 2	12	Ę	
222	2 SDN1	SDN1 070496		7/3/96 NPDES Storm	0.23		F	NPDES	flow-wi como	Ŷ	;	1 2). 10 V			
223	SDN1	i 1	1987	7/17/96 NPDES Storm	0.27			Slip Ag	flow-wt comp	Ŷ	f	55) uc V	, v		
224	t SDN1	SDN1 080296	1997	6/2/96 NPDES Storm	1.01		325	Stip Ag	flow-wt comp	; N	-		, \$2 \$		i Ş	· · · · · · · · · · · · · · · · · · ·
225			1997	9/3/96 NPDES Storn	0.29		76	Stip Ag	flow-wh comp	No	ŝ	10	ي ۷	د ت د	, 10 0	
228		SDN1 091496	1997	9/13/96 NPDES Storm	0.72		144	Stip Ag	flow-wi comp	No.	0	10	ہ ت	< 5 <	< 10	!
221	INDS 1	SDN1 091996	1997	9/18/96 NPDES Slorm	0 38		28	Stip Ag	Row-wt comp	No	· 0	× 4	م م	د د ک	< 10	•
228	1 SDN1	SDN1 100496	1997	10/4/96 Other Storm	0.59		18	Slip Ag		Ŷ	2	9	טי v	۰ ، ۱		
229		SDN1up SDN1 121597	1998	12/15/97 NPDES Storm	•		87	NPDES	flaw-wt comp	Ŷ	R	10	< 2 < 2	2 7 7	_	
230		SDN1up SDN1 091898	1999	9/18/98 Other Storm	019	D.16	456	NPDES	flow-wt comp	Ŋ	ų	σ		, ,	· ~ `	
231		SDN1up SDN1 122598	1999	12/24/98 NPDES Storm	1.19	0.16	153	NPDES	llow-witcomo	Yes	373	116	1	; ;	ä	
232		SDN1up SDN1 111699	2000	11/16/99 NPDES Storm	0.6	0.07	: 83	NPDES	flow-wt como	ž	`¢	. 4		1	;	
233		SDN1up SDN1 041300	2000	4/13/00 NPDES Storm	034	0.08	74	NPDES	low-when	2	5.å	۲ ۲	4 C		_	
234		SDN1up SDN1 031501	2001	3/15/01 NPDES Slorm	0.32	0.05	43	NPDES	llow-wt como	Ż	2 2	- «	; , , ,	v r / v		
235	SDN2	SDN2 111994	1995	11/19/94 NPDES Storm	0.42		5	NPINES						- - -		Biyous not redo
236			1995	3/4/95 NPDES Shorm	0 18	,	1.8		. :	2:1	1	2	n v	v 1	2 }	
237			1006	attante Othor Clam			3 3			2	•	~ 12	35	, • •	8	
			CRR .		67.0		77	Stip Ag	random grab	No.		2	v S	Ŷ	10	
2007		56/060 ZN/182	1995	4/6/95 NPDES Slorm	061		9	Stip Ag	3	۶ ۷		15	< 5 ×	ŝ	< 10 <	
538		SDN2 041295	1995	4/10/95 NPDES Storm	0 29		56	NPDES		No		30	× 5	19	ነ በ በ	
240		SDN2 121095	1996	12/9/95 Other Storm	0.82			SES	flow-wt comp	۵N			د ۲۰	< 5 <	: • • • •	• E I I
241	SDN2	SDN2 012296 AVG	1996	1/19/96 Other Starm	1.8			RW WO	RW W/O SOavg of time comp	ip Yes	3	21	22	24		4-day avg of 17 time-composite samples 8
							-	ł			•	• •		• •		lycol. 5NH3, and 5 BOD <mdl< td=""></mdl<>
757	SUUS	SUN2 020496 GRAB	1996	2/3/96 NPDES Storm	16		-	RW W/O	first flush grab	Yes		180	18	26	44 S	storm after runway deice
543	SDN2	SDN2 020696 AVG	1996	2/3/96 Other Storm	1.6			RW W/O	avg of lime comp	p Yes	-	108		14	23 2	2.5-day avg of 8 lime-composite samptes 3
244	SDN2	SDN2 021796	1996	2/17/96 NPDES Storm	1.29		-	NPDES	low-witzomo	Ņ	H	4			-	glycol, 6 NH3 <mdl< td=""></mdl<>
245	SDN2	SDN2 032996	1996	3/29/96 Other Starm	0 13	•	120	Stip Ag	first flush grab	່າຊ		, <u>6</u>	ير. مر د	- 10 V	- - - - - - - - - - - - - - - - - - -	
246	SDN2	SDN2 040596	1998	4/5/96 baseflow				Slip An	first flush orah	12				- 1,		
	;	GRAB			:		- ;	i			-	;	<u>,</u>	0 V		asellow, no storm
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Page 9 of 13 121 9/27/01 10:31:34 AM

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Ĵ		Dath in	2.16	0.23	0 17	0,37	-	1.6	0 I C	0 64		0.21	0.49	0.09	2.83	0.31			65 0	0.31	0.82	0 36	0.39	-	1,19	0.82	0.39	0.47	-	1 13	
	2		Storm	tarm	Storm	Slorm	am	Storm	larm	Slorm	5	шо	Slorm	ат	Slorm	шо		_	Slorm	Storm	Slorm	Slorm	Slorm	Storm	Slorm	storm	Storm	storm	lom,	Ē	
NGOT		Type	NPDES	Other S	NPDES	NPDES	Other Starm	NPDES	other S	NPDES	baseflow	Other S	VPDES	Other SI	VPDES	Diher Sl	asellow	asellow	IPDES	PDES	PDES	PDES	PDES	PDES	PDES	PDES	PDES	PDES	PDES :	ther Sto	
U		Storm Date	3/8/95 NPDES Slorm	113/95	4/4/95 NPDES Storm	1/13/98 NPDES Slorm	96/61/1	2/3/96 NPDES Storm	3/29/96 Other Storm	3/31/96 NPDES Storm	4/5/96 baseflow	4/11/96 Other Storm	4/15/96 NPDES Storm	4/19/96 Other Starm	4/22/96 NPDES Storm	4/25/96 Other Storm	5/7/96 baseflow	5/10/96 basellow	5/13/96 NPDES Slorm	5/21/96 NPDES Storm	12/4/96 NPDES Slorm	2/19/96 NPDES Slorm	3/5/97 NPDES Slorm	2/15/97 NPDES Storm	12/24/98 NPDES Slorm	12/4/96 NPDES Storm	3/5/97 NPDES Storm	10/28/97 NPDES Storm	12/15/97 NPDES Slorm	1/12/98 Other Storm	
	ŀ					_		_							_	_					12	<u>5</u>	e o	<u> </u>		5	ຕ.	10/2			
		Reported	1995 :	1995	1995	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1997	1997	1997	1998	1999	1997	1997	1998	1998	1998	
DATA		bie	30995	31595	40595	11496	12096	20496	33096	40196	40596	41296	11696	1996	12296	12596	96209	1096	1396	2296	0496	2196	0597	1697	2498	0496	0597	2897	1697	1298	Acta L.
SAMPLE DATA		sample ID	SDN3 030995	SDN3 031595	SDN3 040595	SDN3 011496	SDN3 012096 AVG	SDN3 020496	SDN3 033096 GRAB	SDN3 040196	SDN3 040596 GRAB	SDN3 041296 GRAB	SDN3 041696	SDN3 041996	SDN3 042296	SDN3 042596	SDN3 050796 GRAB	SDN3 051096 GRAB	SDN3 051396	SDN3 052296	SDN3 120496	SDN3 122196	SDN3 030597	SDN3 121697	SDN3 122498	SDN4 120496	SDN4 030597	SDN4 102897	SDN4 121697	SDN4 011298	ر م ا
SAN	l	<u>z</u> e	1		SDN3	ENDS	SDN3	SDN3	SDN3	SDN3 5	SDN3 S	SDN3	S ENDS	SDN3 S	S ENUS	SDN3 S	SDN3 S	SDN3 S	s ends		S CNOS				SDN3 S		SDN4 SI		SDN4 SI	SDN4 SI	
		Seq		275 S	276 S	277 S		279 S	280 \$	281 S	282 SI	283 SI	284 SI	285 SI	206 SI	287 SI	286 SI	289 SI	290 SI		292 SC				296 SC		298 SD		300 SD	301 SD	
	-				- -				·····						,						1.4		~	~	<u>~</u>],	N	~	Ń	m 	ñ	

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2001AppendixC all deicing

가 수 나무 않는 데는 우리 것 ~ 이 것을 다 가격 ~ 이 것을 수가 있었다. 나무가 해 있는 것 같 데 내가 잘 수가 있다.

يەلەيلەر بى ھائىيات (يەردى) بەلەيلەر كەردىكىيەك كەلەيلەرلەرلەرلەرلەرلەرلەرلەر بەلەيكەلىرى ، ك

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Page 11 of 13 123 9/27/01 10:31:35 AM

POS	EMIS
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- 6/30/01	CONCENTRAT
9/1/94 - 6/	5
J Event Sample Data	
Event S	
Deicing	RACTERISTICS
	NRACT

	Comments		backup monhtly sample in case 3/1/98 sample didn't quality under new parmit	-	3 blycols may be high biased, dupe was <mdl< p=""></mdl<>	-	1 not representative, insufficient duration (~1hr)		concurrent WET sample	1		a concurrent WET sample				-				1										 18-hr lime comp, bottles 1+2 of 7, coincided with major (runway)delcing event 	1 12-hr time comp. bottle 3 of 7, coincided with major (runway)deicing event	用 속하는 지수지 : 14 1888년 14 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		2001AppendixC all delcing
mg/L	Total Glycol	4	4 4	4		· 4	× 4	4 4	A 4	4 4	37	v	v	4	4	~ 4	× 4			~	*	4 4	v v	9		۸ 4	ت .	452	144	12	33	475-473 7 7		
ATION,	Giycol	< 2	, <u>, 2</u>	, <u>2</u> , .	~	2 2 2	< 2 < 2	< 2 < 2	~	Ş	- 23	< 2	< 2	<2	~ 7	Ŷ	< 2	67	~ 2 ~ 2	< 2	< 2	N V	< 2	~ ~	ų	< 2	₽.	351	116	e	24	1.011 /1010		
CONCENTRATION, mg/L	Glycol Glycol	× 2	, ²	× 2	. *	< 2	< 2	< 2	2 2	< 2	7	< 2	< 2 2	< 2	2	ŝ	∾ 7	< 2	2 2	< 2	< 2	2 2 2	27 V	ŝ	< 2	< 2	3	101	, 28 ,	9	` <u>.</u>	THE SECOND		
NOS	BOD5	4 4	•1 	ີນດ ເ	- 7	< 4	5	4 4	4 ×	ι.	168	۸ 4	A 4	4	< 4	~	4	c،	4 4 4	< 4	4	8	1	4	8	ۍ	28	661	211	=	368	1. v.1867 -		•,
	Dryant Aircraft	=	: <u>15</u>	. ~	, e	1 03	16 1	7	26	33	373	37	18	69	1	22	10	43	Ξ	2	44	16	4	21	292	8	245	301	301	336	336			
	Ground Deice?	£	2	Ŷ	N ²	No	Š	No.	Νo	۵N	Yes	Ž	å	å	°N N	No	No	٥N	Ŷ	٩	å	Νo	٩	No	Ño	۶	å,	Yes	Yes	Yes	Yes	a salar a		
	Type D	flow-wt comp	flow-wt comp	flow-wt comp	flow-wt comp	flow-wt comp	tailed comp	flow-wt camp	flow-wt comp	flow-wt comp	Now-wt comp	flow-wt comp	flow-wt comp	flow-wt comp	flow-wi comp	flow-wi comp	flow-wt comp	Now-wt comp	flow-wt comp	flaw-wt comp	flow-wt comp	flow-wt comp	flow-wt comp	Πανινή σοτηρ	llow-wi comp	flow-wt comp	Now-wt comp	first flush grab	time-comp	time-comp	lime-comp	and the second second second second second second second second second second second second second second second		Page 12 of 13
	Purpose	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES		ſ	Page
	Dryant	9	132	87	148	36	72	35	31	33	153	85	27	11	26	44	23	40	26	6	49	74	27	55	330	54	123	55	35	29.	58	5		
STICS	MaxInt ìn/hr			,	D 26	0 22	61 0	0 48	0 15	0 03	0 16	0.16	0.07	0.07	0 07	0 11	20.0	0.09	0 08	0 15	0.13	0 08	0 12	0 18	0.1	0 06	0 08	0 14	0.14	0.14	0.14		_	ents
CTER	Deft Ha	0.98	0.86	0.58	0.47	04	0.64	1 62	0,93	D 11	1 19	1.07	0 28	0.83	0.24	0.68	06	049	0,34	1 76	0.47	0.34	0 36	177	0.37	67 O	0.29	0.3	0.3	046	0.46	(1.10) (C.14)	for detai	icingEv
STORM CHARACTERISTICS	Storm Date Type	3/1/98 NPDES Storm	3/8/98 NPDES Storm	5/24/98 NPDES Storm	9/24/98 NPDES Storm	10/3/98 NPDES Storm	10/27/98 NPDES Storm	11/3/98 NPDES Storm	11/11/98 NPDES Storm	12/17/98 Other Storm	12/24/98 NPDES Storm	1/13/99 NPDES Storm	2/3/99 NPDES Storm	3/12/99 NPDES Storm	3/27/99 NPDES Storm	11/5/99 NPDES Storm	11/16/99 NPDES Storm	12/8/99 NPDES Starm	12/17/99 NPDES Storm	1/31/00 NPDES Storm	3/13/00 NPDES Slorm	4/13/00 NPDES Storm	10/17/00 NPDES Storm	11/8/00 NPDES Storm	11/23/00 NPDES Storm	11/29/00 NPDES Storm	12/14/00 NPDES Storm	2/8/01 NPDES Storm	2/8/01 NPDES Storm	2/16/01 NPDES Storm	2/16/01 NPDES Storm	(14) 2017年3月11日7月1日からからかます。 (14) 11 - 11 - 1211-1211-1	R=Rejected Non-Representative Data - Refer to line comment for detail	c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESDetcingEvents
	Reported	1998	1998	1998	1999	1999	1999	1999	1999	1999	1999	1999	1989	1939	1999	2000	2000	2000	2000	2000	2000	2000	2001	2001	2001	2001	2001	2001	2001	2001	2001	nmed)	ive Data	VEMISM
SAMPLE DATA	Sample ID Re	SDN4 030198	SDN4 030998	SDN4 052598	SDN4 092598	SDN4 100398	SDN4 102798	SDN4 110498	SDN4 111398	SDN4 121798	SDN4 122598	SDN4 011499	SDN4 020499	SDN4 031399	SDN4 032899	SDN4 110699	SDN4 111699	SDN4 120999	SDN4 121799	SDN4 013100	SDN4 031400	SDN4 041300	SDN4 101800	SDN4 110800	SDN4 112300	SDN4 113000	SDN4 121400	SDN4 020801 GRAB	SDN4 020901	SDN4 021601- B1-2	SDN4 021701- B3	Full Data Set (No Values Trimmed)	ion-Represental	EMIS/POSDEV
SA	an Out	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	5DN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	la Sel (scled N	/-apps/
ļ	Seq	302	303	304	. 305	306	307	308	308	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	Full Da	R=Rej(c:\EN\

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Deicing Event Sample Data 9/1/94 - 6/30/01

	Commenis	111 hr time comp, bottle 4of 7, coincided with major (runway)deicing event	14-hr lime comp, botte 5 of 7, coincided with major (runway)deicing event	14-hr lime comp, bottle 8 of 7, coincided with major (runway)deicing event	12-hr time comp, bottle 7 of 7, coincided with major (runway)deicing event	overall event 86-hr time comp of bottles 1-7, coincided with major (runway) theiring event			 	· · · · ·	glycol and metals data not reqd, analyzed for tupe only	glycol dala not reqd
9/L	Total Glycol	4	4 >	< 4	< 4	7	4 ×	3	< 4	< 4	< 4	0 2
CONCENTRATION, mg/L	P- T Glycol G	22	< 2	~	× 7	9	4 7	N	v v	< 2 < 2	- V	< 5
INTRAT	Glycol G	22	< 2	< 2 <	< 2	< 2 < 2	4 4 7	< 2	\$2	× 2	8 7	د در
CONCE	BOD5 G	4	29	0	9	100	90	10	4	, c o	24	
1		336	336	336	336	336	91	50		1 1	12	
	Ground Dryant Deice? Aircraf	Yas	Yes	Yes	Yes	Yes	Ñ	No No	Ňo	۲ <mark>۶</mark>	No	Ŷ
-	Type	lime-comp	lime-comp	lime-comp	time-comp	lime-comp	now-wit comp	flow-wt comp	Row-wt comp	llaw-wt carnp	llaw-wt carnp	
	Purpose	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES	NPDES
	Dryant hr	52	29	59	29	29	127	43	32	24	<u>а</u>	158
RISTICS	Maxin 1 in/hr	0 14	0.14	0 14	0 14	0 14	0.11	0.05	0 05	0 08	0 15	
CTERIS	Dpth /	D 46	0.46	0 46	0 46	046	0.27	0 32	0 23	D.48	176	0.18
STORM CHARACTEI	Type	2/16/01 NPDES Storm	2/16/01 NPDES Storm	2/16/01 NPDES Storm	2/16/01 NPDES Storm	2/16/01 NPDES Storm	3/1/01 NPDES Storm	3/15/01 NPDES Storm	4/5/01 NPDES Slorm	5/14/01 NPDES Slorm	1/31/00 NPDES Slorm	3/4/95 NPDES Storm
•••	Slorm Date	2/16/01	2/16/01	2/16/01	2/16/01	2/16/01	3/1/01	3/15/01	4/5/01	5/14/01	1/31/00	3/4/95
	Reported	2001	2001	2001	2001	2001	2001	2001	2001	2001	2000	1995
SAMPLE DATA	Sample ID	SDN4 021701- B4	SDN4 021801- B5	SDN4 021801- B6	SDN4 021901- B7	SDN4 021901	SDN4 030201	SDN4 031601	SDN4 040601 COMP	SDN4 051401 COMP	EY 013100	TY 030495
SA	Cut fall	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	SDN4	ЕY	≥
	Seq	332	333	334	335	336	337	936	338	340	341	342

"Dryant aircraft" = total number of aircraft deiced at STIA in dry period prior to and including day of sampling

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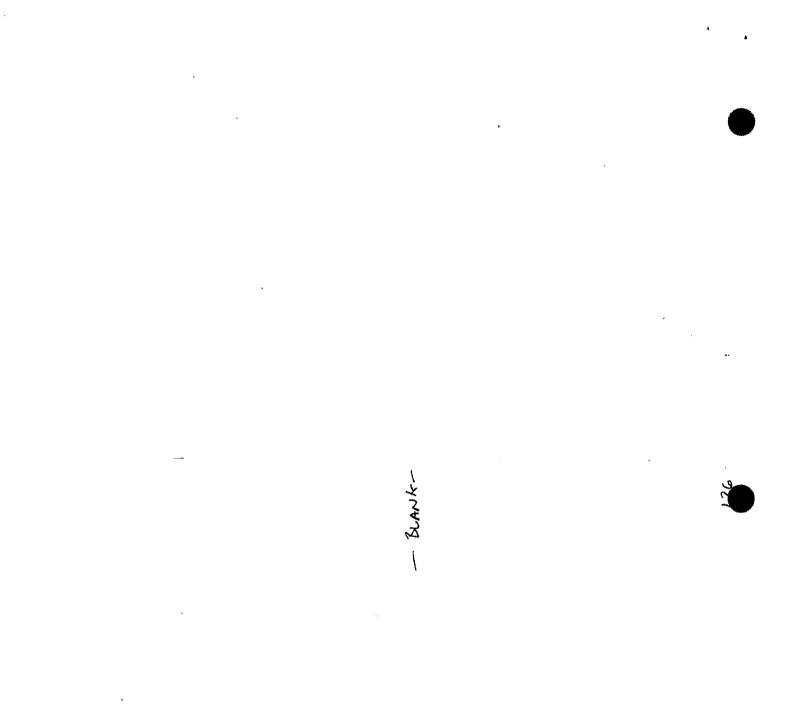
مار م Full Data Set (No Values Trimmed) R=Relected Non-Representative Data - Refer to line comment for detail c:\ENV-apps\EMIS\POSDEVCEMISMain.mdb/rptSWNPDESDeicingEvents Page 13 of 13

2001AppendixC all delcing

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Deicing Event Statistics 9/1/94 - 6/30/01

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CONCENTRATION, mg/L

		Т]	-	-		***							1-								_		-
ıg/L			• • •		i					•	·			A Row Manual - Street	i	•	ł	I	€ 		3				ı	L	1	ł		1			1	•
CONCENTRATION, mg/L	Total Glycol	344	6220	4			00	۰ ۱		718%		66%	68	82	43,3	80	س ا	2.0	- N	15.3	163%	, 55	66%	46	6220	8752	33.0	20	2.0	1	8.999	403%		57%
CENIK	Glycel	342	- un	<u>.</u>	· .			ł	358 5			1	67	2	34.6	5.2	,	0.1	- !	12.8	193%	146	%69	· 546	5900			;	1,0		955 1	420%	28	61%
5	Glycol Glycol	342	+	·	<u>.</u>		,	;		383%		i	67	5	13.4	25	;	1.0		4.2	139%	5	81%	46	320	96.6	4.7		12	 !	61.6	290%	ສ	65%
	BODS	ĝ				ھ 	<u>م</u>		134	Ň			8	335	132	14	е) 	s.	~~	56	208%	1	18%	28	690	369	100	20	. ~	5	152	177%	8	7%
	Dryant Aircraft	188	457	360	. 136	31	1	-	135	119%	0	%0	47	457	326	141	31	16	N	134	113%	a	0%	24	457	331	502	65	18	·	131	119%		%0
		All Outfalis Count	Max	95th	75th	Median	25th	Min	SD	CV%	#NonDelects	%NonDetects	SDE4 (002) Count	Max	95th	75th	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	SDS1 (003) Count	Max	95th	75th	Median	25th	Min	SD	GV%	#NonDetects	%NonDetects

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Full Data Set (No Values Trimmed) Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c:/ENV-apps/EMIS/POSDEV/EMISMain.mdb/rptSWNPDESDeicingEventStats

Page 1 of 5

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	ŏ	sicing	Б К	nt s	tatis	itics	Deicing Event Statistics 9/1/94 - 6/30/01	b/3U/1	11
	ļ			CONC	CONCENTRATION, mg/L	TION,	ng/L		
		Dryant Alrcraft	BODS	Glycol Glycol	P- Glycol	Total Glycol			
SDS3 (005)	Count	42	63	11	71	12			
	Max	457	927	96	536	248		l	
	95lh	334	448	24.8	219.5	-	, 1		
	75th	150	112	53	21.4	35.6	:	2	
	Medìan	æ	18	en.		₽	1		
	25th	16	ര	- 1.0	2.5				
	Min	ы	2	-	-	2			
	SD	139	186	13 1	964	99.6			
	CV%	104%	179%	191%	2	204%			
#Nor	#NonDelects	0	'n	45	30	29			
%Nar	%NonDetects	%0	5%	63%	42%	41%			
SDS4 (009)	Count	ъ -	9	16	16	16			
	Max	457	242	14	18	31	•		
	95th	396	164	13.3	9.9	23.6			
	75th	154	8	2.5	2.5	50			
	Median	92	9	U	e	ŝ			
	25th	52	4	2.5	2.5	5.0			
	Min	6	7	-	-	2			
	SD	164	68	3.9	41	7.7			
	CV%	107%	200%	109%	114%	108%	_		
#Nor	#NonDetects	O	4	13	£† .	13			
%Nor	%NonDetects	%q	25%	81%	81%	81%			
SDS7 (010)	Count		-	-	1	F			Former location downstream, ends 10/1996
	Max		26	9	ę	12			
	95lh		'n	50	50	50			
. 114	75th		ŝ	50	50	50			
	Median		76	9	6	12			
	25th		<u>ں</u>	50	50	50		ı	
	Min		76	g	9	12			
•	SD		0	00	00	0.0		1	
	CV%		%0	, %0	%0		i	,	
uoN#	#NonDetects	:	; •	. 0	; 0	. 0	•	,	
NON%	%NonDetects	•	76V	7%U		: 20		ı	•
			5	2	20	0.70		_	

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Deicing Event Statistics 9/1/94 - 6/30/01

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CONCENTRATION, mg/L E- | P- | Total |

		Includes both SDN1 and SDN1up				,		1				·	Pumped to IWS as of late 1997		:		· · ·	 -	•			÷ 3	:			1	•		[r ,	· • • • •			
g/L				•										:		•		I	1	(ł	i						: , 	:	• •		Ì
CONCENTRATION, mg/L	Total Glycol	33	28	5.4	5.0	ŝ	50	5	38	75%	31	94%	34	684	8 05	18.6	ດ	5.0	1 N	118.2	327%	23	68%	28	15	5.8	50	ŝ	5.0	- 01	2.0		36%
ENTRA	Glycol	ŝ	12	2.5	2.5	Ċ,	25	-	1.8	71%	32	97%	34	370	80 1	8,9	ę	2.5	-	66.1	308%		74%	28	14	2.5	10	en)	2.5		22		78%
CONC	Glycol	33	14	3.9	2.5	m	2.5	-	2.2	80%	3	9 4%	3	315	32.7	3.8	n	2.5	-	53.7	359%	55	74%	28	9	25	2.5	e	2.5		0.8	-	32%
ľ	BOD5	32	116	42	4	6	c)	~	21	144%	· N	%9	30	1180	218	51	8	'n	-	218	311%		20%	26	222	75	ш; цр.	n N	7	-	46		284%
	Dryant Aircrait	12	373	195	20	8	e		95	259%	0	0%	13	260	258	56	=	ŝ	N	104		0	%0	6	373	261	76	30	9	3	112		155%
		SDN1 (006) Count	Max	95th	75th	Median	25th	Min	SD	CV%	#NonDetects	%NonDetects	SDN2 (007) Count	Max	95lh	75th	Median	25th	Min	S D	CV%	#NonDetects	%NonDetects	SDN3 (008) Count	Max	95th	75th	Median	25th	Min	SD		CV%

Full Data Set (No Values Trimmed) Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c:\ENV-apps\EMIS\POSDEVVEMISMain.mdb/rptSWNPDESDeicingEventStats

2001AppendixC all deicing

Page 3 of 5 129

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Deicing Event Statistics 9/1/94 - 6/30/01

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CONCENTRATION. mg/L		44	101 351	B3 26.9 34.0 2	1.0 2.2	1 1 2	10 1.0 20	1 1 2		345% 411% 397%	37 33 33	84% 75% 73%		1 1 2	2.0 2.0	2.0 2.0 2.0	1 2 .	2.0 2.0 2.0	-,	0.0 0.0 0.0	%0 %0	-	6 100% 100% 100%		а	20 20 2.0	20 20 20 20	2 2 2 2 2 2 2 2 2 2 2 2 2 2	2.0 2.0 2.0	3	0 0.0 0.0	0% 0% 0%		100% 100% 100%	rannantira an antara a ta ta ta tanàn dia katana anin' ara mandriada dia katanatra mila
	Dryant Aircraft BOD5		421			an 30 5	ith 12 2	Min 3 2	SD 144 119	% 114% 275%	ts 0 13	sts 0% 30%	Int 1	ax 12 24	5th 12 2	3th 12 2	an 12 24	5th 12 2	12	SD 0	%0 D%	cts 0 0	cts 0% 0%	Int	Max	lth	Sth	an	25th	Min	sp	0%/	cts]		יש ואמרט, שע געש אנסט אנטע ב ארפנע ביאב
		SDN4 (011) Count		951h	75th	Median	25th	~	S	CV%	#NonDetects	%NonDetects	EY (012) Count	Max	95th	75th	Median	25th	2		CV%	#NonDetects	%NonDetects	TY (013) Count	M	95th	75	Median	25	2		CV%	#NonDetects	%NonDelects	ata Sat MA Values Trimmed)

Full Data Set (No Values Trimmed) Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c:\ENV-apps\EMIS\POSDEV\EMISMain.mdb/rptSWNPDESDeicingEventStats

Page 4 of 5 130

2001AppendixC all deicing





9/2/001 10:31:55 AM

Deicing Event Statistics 9/1/94 - 6/30/01

CONCENTRATION, mg/L

			,	i	<u> </u>				
Total Glycol	159		· ,	11,3	a	2.0	N	66	62%
Glycol Glycol	158	536	119.4	9.0	m.	1,0		ē	64%
E- P- Total BOD5 Glycol Glycol	158	<u>10</u>	19.3	2.5	3	1.0	-	120	76%
BODS	148	927	335	۶	~	4	-	31	21%
Dryant Aircraft	16	457	373	102	37	16	2	D	%0
	Count	Max	95th	75th	Median	25th	Min	#NonDetects	%NonDetects
	Airfield (SDS3,SDS4,SDN3,SDN4)							hon#	%Nor

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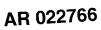
Full Data Set (No Values Trimmed)

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Values qualified as non-detect (<) calculated at 1/2 the reported detection limit. c\ENV-apps\EMIS\POSDEVEMISMain.mdb/rpISWNPDESDetcingEventStats



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APPENDIX D OTHER SAMPLE DATA

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Field	Field OC Samples 7/1/00 - 6/30/01	10/01			-		L	L	-								$\left \right $			
Outlell	·y. Clisod · ;] #	-V. Pupose	StormDate	Event :-	SampleType Comments	Comnitor	ta 185		Turb NTU BODS	5 Cu	8	~ VZ	EGlycol	PGlycol	EGlycol PGlycol TotelGlycold	Facels (MPN) 19H	101	TPH-D	XO'HAT O	ONCHUT
SDS1	SDS1 012901	1 INPOES	28-Jan 01	28-Jan 01 NPDES Storm COMP	COMP		_8_	_7.		0 022	0.05	ē.		14 53	1 53				, 	
SDS1	SDS1 012901D	Flothup	10-naL-82	28-Jan 0 NPDES Storm COMP FidDup	COMP FidDup	X Oda	<u>68</u> % .	35		0.025	0 005 0%	0 095 5%	40%	39%	4 06 60%				- #914-94#	
SDN1u	SDN1up SDN1 030101	NPDES	D1 Mar-01	D1 Mar-01 NPDES Storm COMP	OMP		127	_F_	ţū'	000	0.01	0 195							<u> </u>	
ALINOS	SDVIVP SDN1 0301010	FidOup	01-Mar 01	01-Mar 01NPDES Slovin COMP FUDup	COMP FINDUP	RPD	132	22 28	102	600.02 %E	100	197				• 	<u> </u>		_	1. 1 1
SDS 3	103160 2203	NPDES	15-Mar 01	16-Mar 01 NPDES Storm COMP	- divido	_	22	<u>.</u>	412	0.034	100 a	90096	7	52 52	. 92	•				1
\$D\$J	d1081E0 2808	Fldoup	15-Mar 01	15-Mar 01 NPDE\$ Storm COMP FldDup	-	, aPD, %	32%	95	÷,	100 0	100 0 X0	103	N 8.	267	26.7 -3%			<u>}</u>	j	1
PNQS	SDN4 052801-COMP	NPDES		27-Jun-DI NPDES Storm COMP	-ino:		45	99	4 70	0 031	0.001	800 B				~				
PNOS	SDN4 062801 DUP COMP FidDup	FidDup	27-Jun D1	27 Jun DI NPDES Storm COMP FidUup	COMP FIdUup	RPD. %	4 12%	5 6	4 64	0 024	1001	0 005	3		•			• • • • • • •	• 1	
SDS7 SDS7	5057 101700 5057 101700 D turnp	NPDES	17-04-00	17-Oct-00 NPDES Storm COMP	COMP FIGUR	RPD, 36	7 D 9 4 29%	%G.	655 60	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.001 0.005 0.001 0.005					<u></u>			
	BLANKS								•. •		• •				1	4 ~		·	; ,	
5DS3	SDS3 0202016	FidBlank	01-Feb 01	01-Feb 01 NPDES Storm COMP Blank	OMP Blank			019	<pre>4 100</pre>	0 004	< 0 002 0 D08		22	383	556				.	
£505	SDS3 020101B GRAB	FldBlank	02-Feb-01	02-Feb-01 NPDES Storm GRAB Blank	RAB Blank											24	28.	7 j< D 15	87 <0 15 <0 37	< D 22
2DS3	SDS3 0515018 GRA8	FidBlank	14-May-01.	14-May-D1.NPDES Storm CRAB Blank	RAB Blank					< 0 002	< 1 UU < 0 002 < 0 002 0 01	10.0	5 5 6 7 8	< 2 00		_		، - -	۽ حد .	1
	non-detected, value shown is 1/	hown is 1	12 MDL														H			

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Non-B	Non-Benesentative Samples 7/1	les 7/10	100-6/30/01					ŀ	F		-	-	┝		-		_		
S						1. A C	3i	100	7	121 115	19 19 19	10	「中」の下	01 <u>6</u> 600	WI2 FAD	Acta Par	102.00	21. A	
Oulfail	* POSID	ğ	StormDate	Event	SampleType	ase StomDate Event Sambarype 1433 25 Commenta 1753 NTU 8005 101 1356 24	T83	NTU B	005	J) () - P		hi EG	PG PG	ol Gr	oli (up		DH4	世代が	
				NPDES				-	-	-					_		_		_
SD\$7up	SUS7up , SOS7 101700	NPDES	10/17/00	Storm	NonRep COMP	10/17/00 Storm NonRep COMP Too Early - Non Representative 7	~	55	10	0 006 < 0 002 < 0 005	102 401	<u>8</u>							
				NPDES		Comp Not Representative-Missed 9		•		•					•		:	!	
SDN1up	SDN1up, SDN1112200	NPDES	11/23/00	Storm	11/23/00 Storm NonRep COMP of 18 aliquots	of 16 aliquots	2	36	36	6 36 0 UZ1 0 D09 0 167	3 0 16	~							
				NPDES		Not Representative-Started too late			1						•••••	۱ ۱		1	
SDS7up	SUS7up SDS7 113000	NPDES	11/29/00	Storn	NonRep-COMP	11/29/00 Storm NumRep-COMP on hydrograph	ŝ	-	ē	0 006 < 0 002 0 006	000 200								_
			نبہ۔ -	NPDES					-										
SOS7up	SDS7up SDS7 101700 grab	INPOES	10/17/00	Storm	NonRep-GRAB	10/17/00 Sturm 'NonRep-GRAB Too Early - Non Representative		~						_	2	1 69	7.69 < 0.21 < 0.42 < 0.31	< 0.42	10.05
			- <u>-</u>	NPDES		•												j	, ,
SDS1	SDS1 112300 GRAB NPDES	NPDES	11/23/00	Storm	NonRep-GRAB	Grab Not Representative-Too late	_					4 41	441 571	ē	10 12 170	7 45	7 45 < 0 05 8 70 8 72	870	8 72
				NPDES		NPDES Not Representative Started too late	<u> </u>					_		t					; ;
SDS7up	SDS7un SDS7 (12900 GRAB NPDES	NPDES	11/29/00	Sloren	11/29/00 Storm NonRep-GRAB on hydrograph.	on hydrograph.							_		8	E7 B	ja 73 < 0 US 10 49 0 S1	6¥ 0)	051

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APPENDIX E OUTFALL INSPECTION SUMMARY

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					At AVIsual Observations	
500	2000 Dry Weather Inspection for Permitted Outfalls Conducted on <u>9/27/00</u>	Dry Weather Insp r Permitted Outfa conducted on <u>9/27/00</u>	bection alls 0			· · · · · ·
2 2			AINPAC		Useu) Joio) Joio	
Cuttail Name 7 - Outfall # 2 2 point (1) 2 date	Outfall #	inspection,	: 🖸	depth of flow	S D	
SDE4	002	manhole SDE4-47	27-Sep	trickle	0 0 0 0 0 0	insignificant flow (<<1 gpm), no baselfow sample possible
SDS1	003	outfall	27-Sep	no Ìlow	no discharge	no flow. pipe was dry
SDS2	004	outfall	27-Sep	no flow	no discharge	pipe and ditch were dry
s0S3	005	outfall	27-Sep	Irickle	0 0 0 0 0	insignificant discharge (too little to sample), no problems apparent
SDN1	006	manhole SDN1-22	27-Sep	no tlaw	no discharge	no flow, pipe was barely damp
SDN2	007	manhole	27-Sep	no flow	no discharge	no flow from pump station
ENGS	008	oulfall	27-Sep	trickle	no discharge	pipe was barely damp, no flow
SDS4	600	outfall	27-Sep	no flow	no discharge	no flow onlystanding backwater from creek
SDS7	010	manhole	27-Sep	no flow	no discharge	pipe barely damp, no discharge
SUN4	110	outfall	27-Sep	no Now	no discharge	tikpe dry
Eng Yard	012	drain inlet	27-Sep	no flow	no discharge	area dry
Taxi Yard	013	drain inlet	27-Sep	no flow	no discharge	area dry
SDS6	014	outfall	27-Sep	no tlow	no discharge	pipe and ditch were dry
SDS5	015	outfall	27-Sep	no flow	no discharge	pipe and ditch were dry
notes: 1 Inspected visu 2 Monthly sampl 3 Depths of flow	ally from surfa Ing sites visite are approxim	ice lhrough in d on numerou ate, unless re	lets, or by p us other dati sgistered by	umped sample es during the pe tocal monitoring	••• note presence and magnitude • tor outfalls with monitoring point eriod, noted in remarks • g equipment	notes: 1 Inspected visually from surface through inlets, or by pumped sample for outfalls with monitoring pounts requiring contined-space entry (SDE4, SDN1, SDN2, EY, TY) 2 Monthly sampling sites visited on numerous other dates during the period, noted in remarks 3 Depths of flow are approximate, unless registered by focal monitoring equipment
Other observations at non-permit locations:	ons at non-pe	Irmit location	;;			
S 28th St outfall	e/u	outfall		-		optional location not inspected
DM Creek above SDS1	n/a	creek	27-Sep	1 1 1	0 0 0 0 0 0	llow was clear
DM Creek Weir at Golf Course	n/a	creek	9/27/00	-4-	0 0 0 0 0	llow was clear
DM Creek al SDS4 L. Reba outlet	e/n IVa	creek outlet	27-Sep 27-Sep	, 4 , 3		tiow was clear liow was clear
Scott Tobiason					-	Outlins

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outfall	sin 10 Inu 10103	0-10-10 1511 10 1011	Oring-EO		o in to	oinrso	0-10-10-80	Doinry 1	Do-Inp. 02	10-inn-12	Do-Inn-62	Do-Ing-sz	0-5nv-20	0-6ny-80	0-6
SDE4	48														`
sps1	16										×				1
SDS2	7		s			-					×				r
SDS3	52						W				W				1
SDS4	6								W			Σ			1
SDS5	17									Σ					
SDS6	6									W					
SDS7	=									W					·
1NGS	38	N	s, D								2				1
SDN2	19										£				1
SDN3	12	Σ								Σ				Σ	
SDN4	50							AN		Ŵ	≥				
ΕY	14									¥				W	
ΥĽ	6									Z				Σ	
N.Cargo	7												DĽ		
Information from site visit log books, chain S= Sample M = visi D = duplicate sample taken DL= D2 B = btank sample taken NA = sa	<i>rom site vi</i> ; s sample ta mple taken	pood g	(s, <i>chain-of-custodies</i> , <i>and lield data</i> (M = visited for set up, maintenance, DL= Data download from flowmeter NA = sample not analyzed	-of-custodies, and field data sheets. ted for set up, maintenance, or data ata download from flowmeter imple not analyzed	s, <i>and lie.</i> p. mainte 1 from flor alyzed	<i>ld data sl</i> nance, o wmeter	-of-custodies, and field data sheets. ted for set up, maintenance, or data download ata download from flowmeter imple not analyzed	mload		n#: note number ab#: observation	n#: note number ab#: observation number	per			-

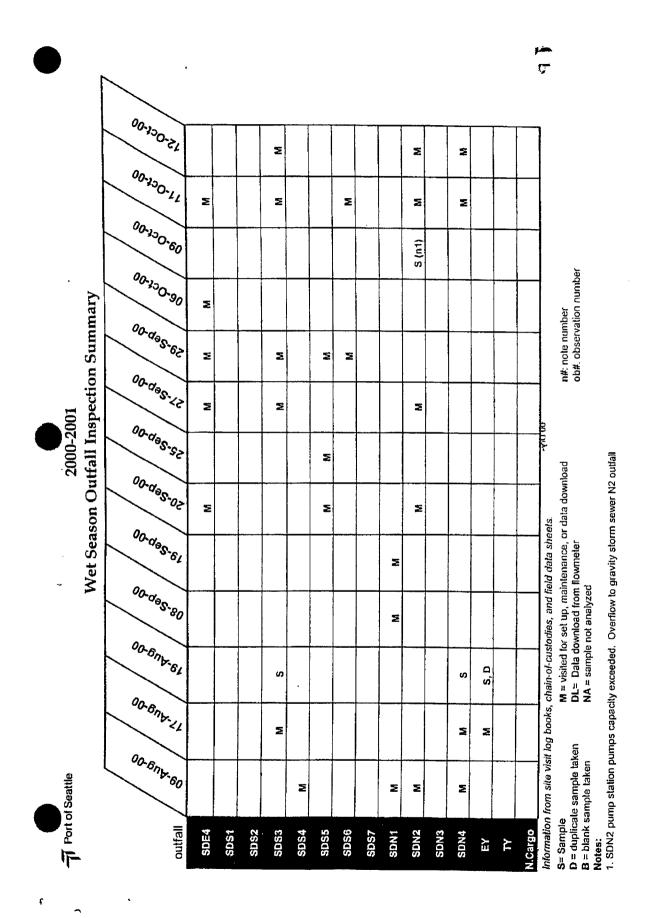
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Max Set Set <td></td> <td>- ³50</td> <td>00.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>00.</td> <td>00-00-00-00-00-00-00-00-00-00-00-00-00-</td> <td></td> <td>On No</td> <td>00,00</td> <td>00</td> <td>00-10</td>		- ³ 50	00.						00.	00-00-00-00-00-00-00-00-00-00-00-00-00-		On No	00,00	00	00-10
M S (ob1) M M<	outfall	r-21	r.81						V-20	v-80		v.12	/ 2 ⁵	×:2-V	
M N	SDE4	¥	S (ob1)				W		W		W		W	æ	
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	ĒΥ		¥	W	S(ob3)										·
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M = visited for set up, maintenance, or data download DL≖ Data download from flowmeter NA = sample not analyzed S= Sample D = duplicate sample taken B = blank sample taken Observations:

n#: note number ob#[.] observation number

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SDE4: grab sample high turbidity (3/5)
 SDN1: grab sample high turbidity (3/5) and solids (3/5)
 EY: suspended solids 3/5 in grab sample
 EY: suspended solids 3/5 in grab sample
 SDS3: while foam observed at outfall. Manual grab taken; analyzed for surfactants, SRP, and TDP

2001 Wet-Wx insp

Page 3

s (n3) s	Port of Seattle Wet Season Outfil SDE4 S (obs) Wet Season Outfil SDE4 S (obs) N SDS3 S (obs) N SDS4 N N SDS4 N N SDS4 N N SDS5 N N SDS4 N N SDS5 N N SDS4 N N SDS5 N N SDS5 N N SDS4 N N SDS5 N N SDS4 N N SDS5 N N SDS5 N N SDS5 N N SDS5 N N SDS4 N N SDS5 N N SDS5 N N SDS5 N SDS
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Wet Season Outfall Inspection Summary 2000-2001

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	10-UE	10-4e	10-UE	10-48 10-48	40-90	40-90	10-93	40-90	40-90	40-90	40-90	40-90	40-90
outfall	~ ₁	2 ² 22											
sbe4							M (n5)	M (n5)	S (n6)		M (n5)	M (n5)	S (n6)
sos1		Σ	v	S(ob9), D				S (n6)				S (n6)	S (n6)
SDS2													
sps3	æ	¥	X	s	æ	S, B	M (n5)	S (ob11)	S (n6)		M (n5)	M (n5)	S (n6)
SDS4													
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SDS6													
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SDN3													
SDN4							M (n5)	S(ob11)	S (n6)	W	M (n5)	M (n5)	S (n6)
ЕY													
ТY		W	Σ	S(ob9)	N	S (ob10)							
N.Cargo			:										
ormation	from site v	Information from site visit log books, chain-of-custodies, and field data sheets.	ks, chain-oi	f-custodies,	and field da	ta sheets.						-	

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M = visited for set up, maintenance, or data download DL= Data download from flowmeter NA = sampte not analyzed

 S= Sample
 M = visited for set u

 D = duplicate sample taken
 DL= Data downloac

 B = blank sample taken
 DL= Data downloac

 B = blank sample taken
 NA = sample not an

 Observations:
 NA = sample not an

 9 S1 grab turbidity {4/5}, orange-brown color
 EY comp turb. 4/5, orange-brown color

 10. EY: grab sample only; susp. solids 3/5
 11. S3: while foam observed at outfall

Notes: 5. Stations setup for snow/ice de-icing event (time paced composites) 6. Glycol sampling for de-icing event

n#: note number ob#: observation number

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		10.	1eW-62		<u> </u>														1	event utfall discharge
										Ì		Σ		Σ	Σ	Σ				e-icing ted at o Due to
			18 W. 82				5 (001/, n7)	s												Notes: 6. Glycol sampling for de icing event 7. Increased flow recorded at outfall after storm hydrogaph. Due to discharge
į	2	40	10 W 12	Ð			Σ	Σ											Cer	Notes: 6. Glycol si 7. Increase after storm
•	ummai		JEW-EZ				W												mber Jation numb	outfall.
	ction 5		Jews1	1 1 2 1			S		s		s	S (ob15)			s				n#: note number ob#: observation number) observed al
2000-2001	Inspe		Sew-SI				X		W		W	W			¥			25		urbidity (3/5 ck of foam t
200	Outtal		Sew-PL		X		M (ob14)		W		W	W			N				wmload	p sample tu rox. 1/2" thì
	Wet Season Outtall Inspection Summary		Suew-21				Z	V				W			¥				a <i>sheets.</i> , or data do ar	16. E4: comp sample lurbitity (3/5) 17. S3. approx. 1/2" lhick of foam observed al outfall.
- 14	Wet 5		-Jew-80				Σ												<i>nd field dati</i> laintenance im flowmete	• •
			wew.zo		S (ob13)							S,D (ob12)			s				s, chain-of-custodies, and field data sheels. M = visited for set up, maintenance, or data download DL = Data download from flowmeter NA = sample not analyzed	oidity (3/5) (approx. 1 sq. ft.)
			SJEW-10		W		×					W			Σ				(s, chain-of-c M = visited f DL= Data d NA = sample	h turbidity (3 rved (appro ali
		10	90 J-61				S (n6)								S (n6)				it log book: ken	sample hig foam obse ved at outfe
Seattle	l	10	1983-81	S (n6)			S (n6)								S (n6)				Information from site visit log books, chain-of-custodies, and field data sheets. S= Sample D = duplicate sample taken B = blank sample taken NA = sample not analyzed	Ubservations: 12. N1: grab and comp sample high turbidity (3/5) 13. S1: small amounl of foam observed (approx. 1 14. S3: light foam observed at outfall
Fort of Seattle			outfall /	SDE4	SDS1	SDS2	SDS3	SDS4	SDS5	SDS6	SDS7	SDN1	SDN2	SDN3	SDN4	ΕY	Τ	N.Cargo	Information I S= Sample D = duplicate B = blank sa	Observations: 12. N1: grab and comp sample high turbidi 13. S1: small amount of foam observed (ap 14. S3: light foam observed at outfall

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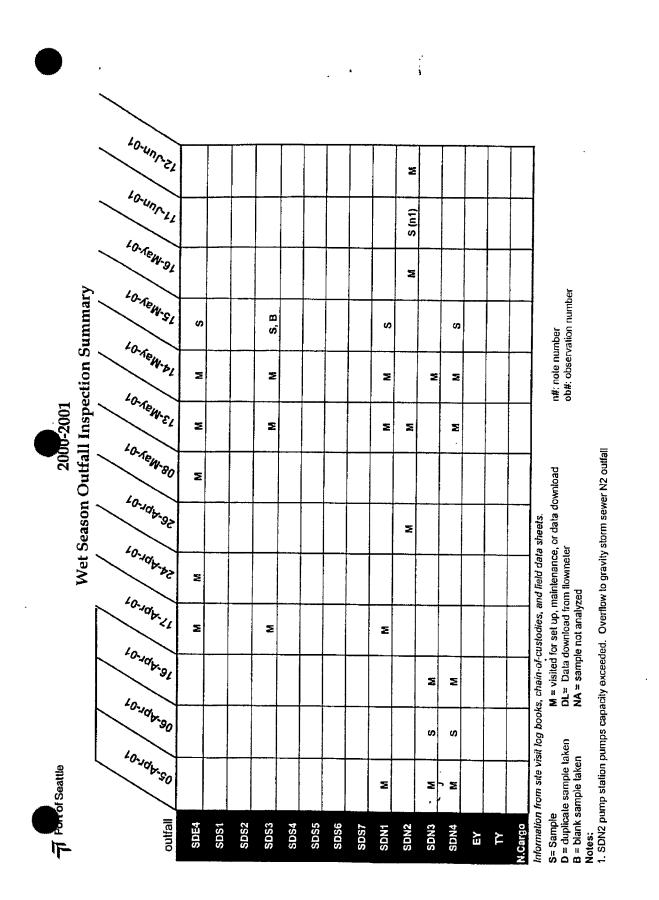
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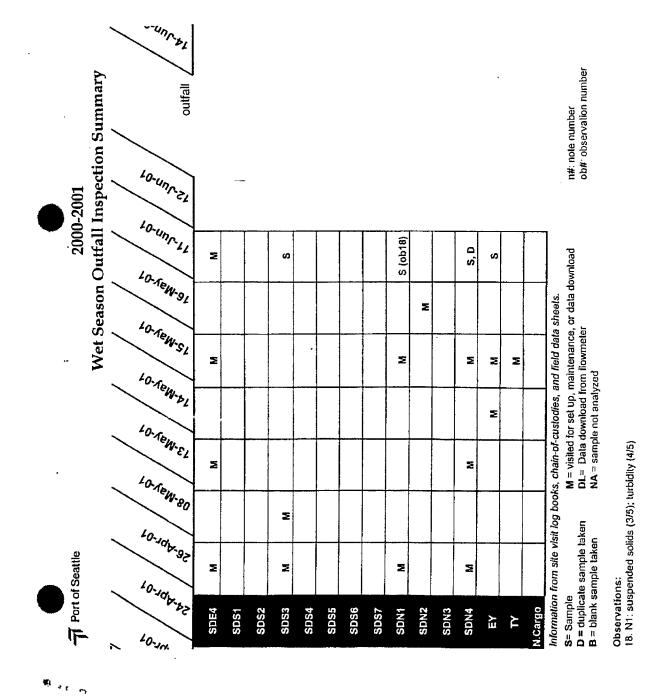


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Page 7

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Page 8

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