Port of Seattle

January 24, 2001

Mr. Ed Abbasi, P.E.
Washington Department of Ecology
Northwest Regional Office
3190 160th Ave SE
Bellevue, Washington 98008

RE: Request for Administrative Order for Lagoon #3 Bypass
Seattle-Tacoma International Airport (NPDES Permit WA-002465-1)

Dear Mr. Abbasi:

Enclosed you will find the request for an administrative order prepared under Special Condition S5.B of the NPDES permit for Seattle-Tacoma International Airport. The Port is currently expanding the capacity of Lagoon #3. The Engineering Report submitted to Ecology in December 1995 described the remediation and expansion of the capacity of Lagoon #3 as part of "all known, available and reasonable treatment" (AKART) for the Port's industrial waste treatment plant. In order to remediate and line the facility, it will be necessary to take the existing Lagoon #3 out of service this year from 1 April to 31 December.

The enclosed plan describes the alternatives considered by the Port and the preferred alternative. With Lagoon #3 off line, the Port must rely on the storage capacity of Lagoons #1 and #2. The Port will take every effort to treat all IWS flows between 1 April and 31 December, but there is a possibility that some of the flows may have to be released to Des Moines Creek untreated. These would be unavoidable bypasses necessary for construction. Because construction is anticipated to start in the near future, we would appreciate your prompt attention to this request.

If you have questions regarding this letter, please call Tom Hubbard of my staff at 206/248-7135.

Sincerely,

Michael Feldman
Director, Aviation Facilities & Environmental Programs

Enclosure

cc: Tom Hubbard, POS/AV/ENV

Seattle-Tacoma
International Airport
P.O. Box 68727
Seattle, WA 98168 U.S.A.
TELEX 703433
FAX (206) 431-59[illegible]

New SEPA Proposals for Monday, January 28, 2002

County King
Region NW
Lead Agency Port of Seattle
Contact David McCraney
Phone (206) 988-5605 **Ext.**
LA File 02-01
Ecology File 200200442
Type ADDENDDNS
Description Industrial Wastewater System Lagoon 3 Upgrades and Expansion; intended to benefit surface and groundwater and increase the lagoon capacity from 26 mil gal to 76 mil gal and allow for future expansion; more
Location SeaTac International Airport on Port own property south of S 188th St and east of 16th Ave S
Applicant Port of Seattle
Date issued 01/25/2002
Date mailed
Date entered 01/28/2002
Comments due
Coordinator NW
Sent To NW SEPA Coordinator NWWQ
NW SEPA Coordinator NWSEAWet

Port of Seattle

POS SEPA No. 02-01
January 25, 2002
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Addendum to
Industrial Wastewater System Lagoon #3 Upgrades and Expansion
Seattle-Tacoma International Airport
Determination of Non-Significance

DNS-99-8253

This document is an addendum to the SEPA Determination of Non-Significance (DNS) for the Industrial Wastewater System (IWS) Lagoon #3 Upgrades and Expansion. This addendum and the original DNS were prepared in accordance with the provisions of the Washington State Environmental Policy Act (SEPA) under Chapter 43.21C. Revised Code of Washington (RCW), Chapter 197-11, Washington Administrative Code (WAC), and Resolution 3028, Port of Seattle, SEPA Policies & Procedures.

The IWS Lagoon #3 Upgrades and Expansion DNS was issued by the Port of Seattle on December 22, 1999 and is available for review at the Port of Seattle Administrative Offices, Pier 69, 2711 Alaskan Way, Seattle, Washington, 8:00AM to 4:30 PM weekdays (POS SEPA File No. 99-27).

Name of Project: Industrial Wastewater System Lagoon #3 Upgrades and Expansion

Project Sponsor: Port of Seattle, P.O. Box 1209, Seattle, WA 98111

Nature of Project: The IWS Lagoon #3 upgrade and expansion project is intended to benefit surface and groundwater quality. The completed project will increase the lagoon capacity from 26 million gallons to 76 million gallons. This expansion will allow for future implementation of "AKART" (all known available and reasonable treatment) methods which would send treated IWS effluent to the King County's South Treatment Plant at Renton for further treatment prior to discharge into Puget Sound. The improvements also include lining the expanded lagoon and rebuilding the lagoon berms. These improvements will reduce the potential for untreated IWS water to seep into the ground and will allow for more efficient sediment removal.

Background: The Port of Seattle issued a DNS for this proposal on December 22, 1999 for public and agency comment pursuant to WAC 197-11-340. Four comment letters on the DNS were received and responded to. This Addendum supplements and amends the environmental evaluation presented in the original DNS to reflect changes made to the project.

Summary of Revisions: The project changes evaluated in this addendum are 1) the project is expected to be completed by March 2003 rather than October 2001, 2) Lagoon #3 will be out of service from April 2002 through December 2002 rather than during the two construction seasons of May to October 2000 and 2001, and 3) the route of the Lagoon #3 temporary bypass pipeline has been determined.

Seattle-Tacoma
International Airport
P.O. Box 68727
Seattle, WA 98168 U.S.A.
TELEX 703433
FAX (206) 431-5912

1/25/02

Water quality standards are expected to be maintained in the event that the planned outage of Lagoon #3 leads to a bypass of the IWTP. Environmental samples collected from IWS water discharged to Des Moines Creek during previous IWS bypass events showed that the bypass water met the IWTP effluent standards specified in the NPDES permit (*Request for Administrative Order*, January 2002.) The IWTP will operate at the maximum flow rate possible to keep the water levels in Lagoons #1 and #2 as low as possible. In the event a storm occurs that exceeds the combined storage volume of Lagoons #1 and #2 with the IWTP processing at maximum rate, a bypass will be initiated by the IWTP operator to avoid an uncontrolled spill from Lagoons #1 and #2. Ecology will be notified of any releases in accordance with the NPDES spill control, containment, and countermeasures plan.

Plants. A small amount of vegetation will be removed for construction of the bypass. The vegetation will be replanted following construction.

SEPA Review: The Port of Seattle has reviewed this proposal and determined that it is a minor change that is within the scope of the original Industrial Wastewater System Lagoon #3 Upgrades and Expansion project and would result in no significant adverse impacts.

Date Addendum Issued: January 25, 2002

SEPA Lead Agency: Port of Seattle (POS File No. 02-01)

Contact Person: David McCraney, Environmental Program Manager, Port of Seattle, 17900 International Blvd., Suite 301, Seattle, WA 98188. Telephone: 206/988-5605.

SEPA Responsible Official: Michael Feldman, Director, Aviation Development & Maintenance, Port of Seattle, P.O. Box 68727, Seattle, WA 98168, (206) 728-3363.

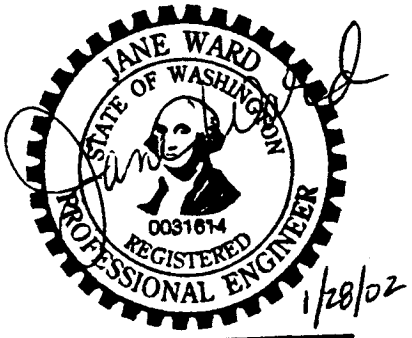
Signature  Date: January 25, 2002

Kennedy/Jenks Consultants

530 South 336th Street
Federal Way, WA 98003

Request for Administrative Order
Lagoon #3 Expansion Project

January 2002



Prepared for

Port of Seattle
Seattle-Tacoma International Airport

K/J Project No. 026001.00

REQUEST FOR ADMINISTRATIVE ORDER

LAGOON #3 EXPANSION PROJECT

SEATTLE-TACOMA INTERNATIONAL AIRPORT

January 2002

K/J 026001.00

Prepared for

PORT OF SEATTLE

Prepared by

KENNEDY/JENKS CONSULTANTS

530 South 336th Street
Federal Way, Washington 98003
(253) 874-0555

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List of Appendices

Section 1: Introduction

Kennedy/Jenks Consultants has prepared this document on behalf of the Port of Seattle (POS) to request an Administrative Order from the State of Washington, Department of Ecology (DOE) for a possible anticipated industrial wastewater bypass at Seattle-Tacoma International Airport (STIA). This report contains the elements required in Section S5.2 of the STIA's NPDES Permit No. WA – 002465-1 for an "Anticipated Bypass that has the Potential to Violate Permit Limits or Conditions." Bypass of untreated industrial wastewater may become necessary due to the expansion and lining of Industrial Wastewater System (IWS) Lagoon #3, which will be in its final year of construction during 2002. The POS will take measures to prevent or minimize any bypass; however, this construction project is necessary to provide an expanded and lined storage lagoon for the IWS.

Lagoon #3 is being expanded to increase on-site storage capacity and thereby greatly reduce the likelihood of IWS overflows in the future. In order to complete the expansion, Lagoon #3 will be taken out of service from approximately 1 April 2002 until 31 December 2002. Lagoon #3 currently has a storage capacity of approximately 26 million gallons (MG). Upon completion of the expansion, Lagoon #3 will have a storage capacity in excess of 76 MG. The expanded lagoon will have a 100-mil high-density polyethylene (HDPE) liner system designed to protect the underlying soil and groundwater. Documents submitted previously to DOE pertaining to this project include the Engineering Report for Lagoon #3 Expansion (March 2000), Contract Drawings and Specifications (March 2000), and a State Environmental Policy Act (SEPA) checklist and Determination of Non-Significance (December 1999).

IWS Lagoons #1 and #2 have a combined storage capacity of approximately 4.9 MG. The Industrial Wastewater Treatment Plant (IWTP) will process IWS water during the Lagoon #3 outage using Lagoons #1 and #2 as the storage lagoons. The IWTP currently can process and release up to 7.1 million gallons per day (MGD), or 4,930 gallons per minute (gpm), through the existing outfall to Puget Sound. With Lagoon #3 out of service, it is anticipated that the available storage capacity of Lagoons #1 and #2, even with the IWTP operating at its maximum treatment rate, may not be sufficient to store all of the IWS water during peak storm events. In this event, a controlled bypass or overflow would be necessary in order to prevent overtopping the berms at Lagoons #1 and #2. Potential consequences of an uncontrolled overflow from the lagoons include localized flooding and erosion; release of contaminants to soil, surface water, and groundwater; compromise of the lagoon berms; and impacts to South 188th Street, a major traffic arterial.

See Comp. Schedule of the Permit.

According to Section S5 of the NPDES permit, an overflow of untreated industrial wastewater from the IWS lagoons due to stormwater flows in excess of the design criteria will not be considered a bypass. The design event for the IWS is a 10-year, 24-hour storm. Therefore, for the purposes of this report, an "overflow" is a release of untreated IWS water resulting from an event that exceeds a 10-year, 24-hour storm. As defined herein, overflows to Des Moines Creek are allowed under the current NPDES permit.

Include design criteria & Expected flow under the 10 yr 24 hr storm.

A "bypass" occurs when runoff from a storm event less than or equal to the design storm cannot be contained in the lagoons and results in a controlled release of untreated IWS water to

2.

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Des Moines Creek. This report addresses bypasses that may occur during construction of the Lagoon #3 expansion in 2002.

It is anticipated that without Lagoon #3, the system can contain and process slightly more runoff than results from a 6-month, 24-hour storm. Therefore, bypasses to Des Moines Creek may become necessary if rainfall events exceeding the 6-month, 24-hour storm occur during the Lagoon #3 outage. The number and duration of bypass events will depend upon the intensity, duration, and frequency of rainfall events that actually occur during the Lagoon #3 outage.

The following sections of this report discuss in greater detail the required elements of the request for Administrative Order. The section headings correspond to the specific requirements listed in Section S5.2 of the permit, and are presented in the same order as in the permit.

show me what capacity you need when treating at full capacity for the design storm. anything more than that we can discuss.

Section 2: Description of the Bypass and Its Cause

The potential anticipated bypass would consist of untreated industrial wastewater (stormwater runoff primarily from terminal and air cargo areas, hangars, and maintenance areas at STIA) that may be routed away from the IWS lagoons during or after a heavy rainfall event. A bypass may become necessary when Lagoon #3 is out of service and the combined capacity of Lagoons #1 and #2 is exceeded while the IWTP is processing at the maximum rate possible without exceeding permit limitations. The IWTP's maximum treatment rate is limited by the hydraulic capacity of the existing 18-inch effluent line to Midway Sewer District's ocean outfall. The IWTP can treat flows up to 8.3 MGD; however, the effluent line's maximum hydraulic capacity is 7.1 MGD. Therefore, for purposes of this report, the plant's maximum treatment rate is assumed to be 7.1 MGD.

2.1 Projected Frequency of Bypass

As Table 1 indicates, the maximum combined storage capacity of Lagoons #1 and #2 is 4.9 MG. Even if the IWTP is processing, Lagoons #1 and #2 may fill rapidly during storm events. For example, rainfall events equaling 1.5 inches per day, although infrequent, have occurred at STIA during the period April through December. If 1.5 inches of rain falls on the 365-acre IWS drainage area (333 acres of which are impervious surfaces), approximately 13.5 MG of water will reach the IWS lagoons, assuming 100% runoff from the impervious surfaces. The storage capacity of Lagoons #1 and #2 will be exceeded in this event, even with the treatment plant operating at its maximum rate.

Table 1 Bottom and Full Elevations and Capacities for IWS Lagoons #1 and #2

Lagoon	Bottom Elevation (feet above sea level)	Full Elevation (feet above sea level)	Top Elevation (feet above sea level)	Capacity at Full Elevation (gallons)
#1	331.5 – 330.5	338.65	339.55	1,643,000
#2	Sloped to outlet structure with average elevation about 332	338.65	339.55	3,272,000

At maximum capacity, the IWTP can treat and release 7.1 MGD, which equals 295,800 gallons per hour (gph). A flow of 295,800 gph equates to a rainfall of approximately 0.03 inch per hour (0.75 inch per day) falling on the IWS collection area, assuming a "worst case" condition of 100% runoff from impervious surfaces within the runoff area. Therefore, runoff from a storm event of 0.75 inch per day or greater may result in an accumulation of water in the lagoons. When Lagoons #1 and #2 are full and the storm runoff exceeds the IWTP processing rate, bypass or overflow may become necessary to prevent overtopping the lagoon berms.

In order to estimate the likelihood of a bypass during the 2002 construction season, 20 years (1974–1994) of rainfall data collected at SeaTac, Washington, were analyzed. The analysis consisted of a mathematical calculation of the total number of days between April 1 and December 31 when the recorded rainfall would have resulted in flows exceeding the IWTP peak treatment rate, assuming the following conditions:

1. 100% of the runoff from impervious areas within the IWS collection area will reach the lagoons. This is a very conservative assumption, not considering effects of evaporation or potential losses in the system.

2. The IWTP is operating at the maximum treatment rate of 7.1 MGD throughout the rainfall event. This assumption does not take into account the effects of downstream conditions on flow. For instance, during storm events IWTP flows may have to be reduced due to head conditions in the Midway outfall line.

3. A total of 4.9 MG of IWS storage is available in Lagoons #1 and #2.

4. Twenty years of recorded rainfall data can be used as a predictor of future possible bypass events.

Based on the calculated flows, each day during which water would be released was reported as an overflow or bypass event. The calculations accounted for the effects of consecutive storms during which IWS water accumulated in Lagoons #1 and #2. The analysis was a calculation based on hypothetical conditions, and is considered very conservative. In fact the IWS has historically managed storm events much greater than the design storm without having to bypass or overflow.

According to this hypothetical data analysis, a bypass or overflow would have been necessary 41 times during the 20-year period, with frequencies ranging from 0 to 8 occurrences per year. Only a few storms during the 20-year period of study were approximately equal to the 10-year, 24-hour design storm. These storms resulted in 12 predicted overflow events. The remaining 29 predicted events were bypasses, resulting from storm events less intense than the design storm.

As shown in Table 2, predicted bypasses occurred most frequently in November and December. The average calculated bypass volume for the study period was 4.2 MG, with the largest calculated bypass being 14.8 MG. According to the recorded rainfall data, no bypasses would have been necessary during 11 of the 20 years analyzed.

How does this is compared with the real data, 20 yrs, how many bypass we had during 20 yrs considering actual rain measurement

Table 2 Predicted Overflows and Bypasses from 20 Years of Data

Month	Number of Predicted Overflows, 1974-1994	Number of Predicted Bypasses, 1974-1994
April	4	0
May	0	0
June	0	1
July	0	0

Month	Number of Predicted Overflows, 1974-1994	Number of Predicted Bypasses, 1974-1994
August	0	2
September	0	2
October	3	3
November	5	5
December	0	16
Totals:	**12**	**29**

Some of the 41 events predicted using the 20-year rainfall data were due to the cumulative effect of back-to-back storms, resulting in release of water over several consecutive days. For example, the analysis predicted 8 bypass events over the period 14 December through 21 December 1979. Daily recorded rainfall during this period ranged from 0.04 inch to 1.67 inches, with a total rainfall of 7.15 inches over the 8 days. During this period, 60.7 MG of IWS water would have been released, with a maximum calculated release of 14.8 MG in a single day.

To reduce the probability of bypass, the POS will make every effort to complete the construction of the Lagoon #3 expansion project and put the lagoon into service earlier than currently scheduled. However, based on the actual job site conditions and work accomplished over the last two years, the additional time through December 2002 may be necessary in order to complete the project.

2.2 Projected Volume of Water During Bypass

Based upon results of the data analysis, it is predicted that at least one bypass will occur during the 2002 Lagoon #3 outage. The most likely time for a bypass, based on historical data, is November or December. Of course, the volume and duration of the event(s) will depend upon the actual rainfall frequency, duration, and intensity during the construction period.

According to the calculations, the IWS can accommodate slightly more than an isolated 6-month, 24-hour storm (1.3 inches) with Lagoon #3 out of service. However, the cumulative effects of consecutive storms may reduce the system's capacity to accommodate such a storm. Other factors not considered in the calculations, such as downstream conditions, may also effect the volume of actual bypasses.

For the 20-year study period, calculated daily bypass volumes ranged from 0.07 to 14.8 MG. The average volume of the 29 predicted bypasses was 4.2 MG, and the mean was 1.8 MG. Over the study period, the highest predicted bypass volumes occurred in November and December. average ? mean

How much, what is the ratio?

During storm events, when bypasses are most likely to occur, stormwater flows into Des Moines Creek are expected to be high. Therefore, the effects of the additional bypass flow on the creek may be incidental. In addition, the existing energy dissipation structure at the proposed outfall to the creek is sufficiently designed to handle the excess flows, thus minimizing potential scour of the creek bed.

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2.3 Quality of Water During Bypass

Even though calculations based on historical rainfall events indicate a high likelihood of bypass during the Lagoon #3 outage, and even though several million gallons of IWS water may be bypassed, the actual environmental effect on Des Moines Creek is expected to be low.

Studies indicate that a rainfall event of sufficient magnitude to equal the IWTP's maximum flows, 0.75 inch per day, would flush any accumulated deicing fluid, petroleum products, and other contaminants through the IWS collection system to the lagoons. Assuming available volume in Lagoons #1 and #2, this material would be captured in the lagoons and treated. Typically, the bypassed flows would contain a lower concentration of contaminants.

As further discussed in Section 9, environmental samples obtained during two previous IWS overflows from Lagoon #3 were found to meet water quality criteria. Therefore, it is expected that the IWS runoff resulting from a bypass during Lagoon #3 construction would not adversely affect downstream water quality.

Section 3: Analysis of All Known Alternatives That Would Eliminate, Reduce, or Mitigate the Need for Bypassing

The purpose of this section is to identify and analyze alternatives that would eliminate, reduce, or mitigate the need for bypassing. A number of possible alternatives are briefly summarized in this section, and the relative cost-effectiveness each alternative is discussed in Section 4. Given the options identified, Alternative 1, providing a temporary bypass line to the storm drain system (SDS), is considered the most feasible and reasonable alternative with the least potential for long-term adverse environmental effects.

3.1 Alternative 1 - Temporary Bypass Line to SDS

Alternative 1 would involve installing a bypass line directly to the SDS, allowing excess IWS water to be diverted through the SDS to Des Moines Creek. The existing 42-inch line from IWS manhole (MH) 1019 (formerly MH 334C) to Lagoon #3 would be temporarily rerouted to the SDS through a 42-inch Class 52 ductile iron bypass pipeline. A Hydrogate valve actuated remotely from the IWTP Control Room currently controls the 42-inch line to Lagoon #3. The temporary 42-inch bypass line would be connected to storm drain MH SDS3, which discharges to Des Moines Creek.

3.2 Alternative 2 - Temporary Storage Tanks

Alternative 2 would involve providing temporary tanks for IWS water storage when the volume of IWS runoff exceeds the storage capacities of Lagoons #1 and #2 with the IWTP processing at the maximum rate. It is estimated that a maximum of 30 temporary tanks (21,000 gallons each) could be mobilized to the Lagoon #1 and #2 vicinity, providing an additional 630,000 gallons of storage. It is assumed that six transfer pumps (rated at 5,000 gpm for the head conditions) would be used to transfer IWS water between Lagoons #1 and #2 and the temporary storage tanks.

3.3 Alternative 3 - Temporary Lagoon

Alternative 3 would involve constructing a temporary lagoon for excess IWS water storage when the volume of IWS runoff exceeds the capacities of Lagoons #1 and #2 with the IWTP processing at the maximum rate. It is estimated that a 718,000-gallon lagoon (approximately 240 ft long by 80 ft wide) could be constructed immediately north of Lagoons #1 and #2. It is assumed that six transfer pumps (rated at 5,000 gpm for the head conditions) would be used to transfer IWS water between Lagoons #1 and #2 and the temporary lagoon.

3.4 Alternative 4 - Temporary Expansion of IWTP

Alternative 4 would involve the mobilization of temporary tanks equipped for chemical treatment (coagulation, flocculation, and settling) to remove suspended solids and oil/grease from the

excess IWS flows. It is estimated that six temporary tanks (21,000 gallons each) could be operated in the IWTP vicinity in this manner. Assuming 120 minutes of batch treatment per tank, 10 minutes to fill/empty each tank, and six transfer pumps (rated at 5,000 gpm for the head conditions), an additional treatment rate of 970 gpm (1.4 MGD) could be achieved. In order for this alternative to be feasible, it is assumed that a dilute concentration of contaminants would be present in the excess IWS water. The tank effluent would be discharged to storm drain SDS3 leading to Des Moines Creek, rather than the existing 18-inch IWTP outfall to Puget Sound, because of the hydraulic restrictions on the existing effluent line.

3.5 Alternative 5 - Offsite Hauling of IWS Water

Alternative 5 would involve the use of vacuum trucks to transfer excess IWS water to an offsite pre-treatment facility for processing. The trucks would be filled directly from Lagoons #1 and #2 during peak rainfall events. It is anticipated that approximately ten 5,000-gallon capacity vacuum trucks, operating continuously, would be required for this purpose. The trucks can be filled/emptied at a rate as high as 5,000 gpm. Assuming a 1-hour cycle time, this alternative would provide approximately 50,000 gph (833 gpm) of additional treatment.

3.6 Alternative 6 - Non-completion of Lagoon #3 Expansion Project

Alternative 6 would involve not completing the Lagoon #3 Expansion Project in order to avoid anticipated IWS bypasses to Des Moines Creek during construction.

Section 4: Cost-Effectiveness Analysis of Alternatives Including Comparative Resource Damage Assessment

This section analyzes the cost effectiveness of the alternatives identified in Section 3. Other issues affecting the feasibility of the alternatives are also discussed.

4.1 Alternative 1 - Temporary Bypass Line to SDS3

This alternative involves routing anticipated bypasses to storm drain MH SDS3 upstream of Des Moines Creek at a total cost of approximately $30,000. The analysis provided in Section 5 indicates that none of the identified alternatives can eliminate the possibility of bypass to Des Moines Creek, using the 1974 through 1994 rainfall data. As further discussed in Section 9, environmental samples obtained during previous IWS bypasses to Des Moines Creek during peak storms have been found to meet downstream water quality criteria. Therefore, it is likely that the IWS runoff resulting from a bypass through the SDS during a peak storm event would not adversely affect Des Moines Creek. The effluent structure downstream of SDS3 is designed to provide energy dissipation and can accommodate the additional anticipated IWS bypass flows.

Alternative 1 appears to be the most cost-effective of the identified alternatives. In addition, this alternative does not present the potential wildlife, safety, or hazard concerns associated with the other alternatives.

4.2 Alternative 2 - Temporary Storage Tanks

As described in Section 5.2, this alternative may not eliminate the need to bypass to Des Moines Creek, based upon the 1974 through 1994 rainfall data, but it may slightly reduce the probability. The cost of thirty 21,000-gallon capacity rental tanks, transfer pumps, and piping is estimated at approximately $512,000 for the 9 months when Lagoon #3 will be out of service. However, the bypass line to SDS3 leading to Des Moines Creek would still need to be constructed as a precaution at a total cost of approximately $30,000. Alternative 2 does not appear to be cost effective because the probability of bypassing to Des Moines Creek is only minimally reduced by this alternative, at a high cost.

The configuration and location of 30 temporary tanks in the vicinity of Lagoons #1 and #2 must be carefully coordinated to avoid violating the airfield safety zone. Sufficient space may not be available in the near vicinity, resulting in higher pumping costs.

4.3 Alternative 3 - Temporary Lagoon

As described in Section 5.3 below, this alternative may not eliminate the need to bypass to Des Moines Creek, based upon the 1974 through 1994 rainfall data, but it may slightly reduce the probability. The cost of the 718,000-gallon capacity temporary lagoon, transfer pumps, and piping is estimated to be approximately $510,000. However, the bypass line to SDS3 leading to

Des Moines Creek would still need to be constructed as a precaution at a total cost of approximately $30,000. Alternative 3 does not appear to be cost effective because the probability of bypassing to Des Moines Creek is only minimally reduced by this alternative, at a high cost.

In addition to cost issues, sufficient space may not be available to construct a large temporary lagoon and associated piping and pumping systems near existing Lagoons #1 and #2. Locating the system elsewhere would require additional pumping capacity. Other issues associated with this alternative include possible bird attraction and potential violation of the airfield safety zone.

4.4 Alternative 4 - Temporary Expansion of IWTP

As described in Section 5.4, this alternative may not eliminate the need to bypass to Des Moines Creek, based upon the 1974 through 1994 rainfall data, but it may slightly reduce the probability. The cost of the six 21,000-gallon rental tanks, transfer pumps, piping, treatment chemicals, and sludge disposal is estimated at approximately $360,000. However, the bypass line to SDS3 leading to Des Moines Creek would still need to be constructed as a precaution at a total cost of approximately $30,000. Alternative 4 does not appear to be cost effective because the probability of bypassing to Des Moines Creek is only minimally reduced by this alternative, at a high cost.

Even if the treatment capacity of the IWTP were temporarily increased, the hydraulic capacity of the existing 18-inch line to Midway's outfall would limit the maximum effluent flow to 7.1 MGD. To take advantage of the increased capacity, additional down-stream storage or additional temporary effluent piping would be required, at a significant additional cost. Other issues include finding sufficient space to locate the temporary treatment facilities near the existing IWTP without violating airfield safety zone requirements.

4.5 Alternative 5 - Offsite Hauling of IWS Water

As described in Section 5.5, this alternative may not eliminate the need to bypass to Des Moines Creek, based upon the 1974 through 1994 rainfall data, but it may slightly reduce the probability of bypass. The cost of hauling IWS water to an offsite facility for treatment is approximately $0.25 per gallon. If it is assumed that 2 days of hauling are necessary during the period April 1 through 31 December 2002, then 2.4 MG would be hauled offsite at a total cost of approximately $600,000. However, the bypass line to SDS3 leading to Des Moines Creek would still need to be constructed as a precaution at a total cost of approximately $30,000. Alternative 1 does not appear to be cost effective because the probability of bypassing to Des Moines Creek is only minimally reduced by this alternative, at a high cost.

In addition to the anticipated cost impacts, potential adverse effects of Alternative 5 include increased traffic on and off airport property and associated air quality impacts.

4.6 Alternative 6 - Non-completion of Lagoon #3 Expansion Project

Alternative 6 would involve not completing the Lagoon #3 Expansion Project in order to avoid anticipated IWS bypasses to Des Moines Creek during construction. Although this alternative would serve to avoid bypasses in 2002, it would fail to expand Lagoon #3 to the size necessary to avoid future permitted overflows to Des Moines Creek during peak storm events.

High costs and inefficiency would result from terminating the existing construction contract when the Lagoon #3 expansion is approximately 60% complete (as of January 2002). Therefore, Alternative 6 appears to be less cost effective than Alternative 1.

Section 5: Minimum and Maximum Duration of Bypass Under Each Alternative

The alternatives were evaluated to estimate minimum and maximum duration of bypass. The analysis is dependent upon, and therefore limited by, the rainfall events occurring during 1 April through 31 December 2002. For alternatives 1 through 5, the minimum duration would be zero (no bypass) if no storm event greater than a 6-month, 24-hour storm occurs during 1 April to 31 December 2002. The maximum duration of any bypass is dependent upon the size of the storm or consecutive storms that exceed the IWS system capacity during the Lagoon #3 outage.

5.1 Alternative 1 - Temporary Bypass Line to SDS3

The duration of a bypass depends upon the storm intensity and resulting head conditions in pipeline SDS3 at the time of bypass. The highest daily bypass volume calculated using the 1974 through 1994 rainfall data was 14.8 MG. Over a 24-hour period, the resulting average flow rate would be 10,278 gpm of IWS water to the bypass system.

5.2 Alternative 2 - Temporary Storage Tanks

Temporary storage tanks would increase the IWS capacity by approximately 0.63 MG. Using the rainfall data for 1974 to 1994, a need to bypass to Des Moines Creek would arise 34 times during the 20-year time frame, even with an increase of 0.63 MG of IWS storage. Alternative 2 alone would be insufficient to eliminate the possibility of bypass to Des Moines Creek during the 20 years analyzed. However, the additional available capacity would eliminate some of the smaller bypasses. As a result, the average volume of bypass would increase from 5.2 to 5.5 MG. The largest volume of bypass would decrease from 14.8 to 14.1 MG. An increase in IWS capacity of 14.8 MG (202%) would be necessary to eliminate the need to bypass to Des Moines Creek, based on the 1974 through 1994 rainfall data.

5.3 Alternative 3 - Temporary Lagoon

The temporary lagoon would increase the IWS capacity by approximately 0.72 MG. Using the rainfall data from 1974 to 1994, a need to bypass to Des Moines Creek would arise 33 times during the 20-year time frame, even with an increase of 0.72 MG of IWS storage. This alternative would reduce the total number of predicted bypasses, but would be insufficient to eliminate all bypasses to Des Moines Creek during the period analyzed. Using this alternative, some of the smaller bypass events would be eliminated; therefore, the average volume of bypass would increase from 5.2 to 5.6 MG. The largest volume of bypass would decrease from 14.8 to 14.0 MG. An increase in IWS capacity of 14.8 MG (202%) would be necessary to eliminate the need to bypass to Des Moines Creek, based on the 1974 through 1994 rainfall data.

5.4 Alternative 4 - Temporary Expansion of IWTP

The temporary treatment plant expansion would increase the IWTP treatment capacity by approximately 1.4 MGD. Using the rainfall data from 1974 to 1994, a need to bypass to Des Moines Creek would arise 24 times during the 20-year time frame, even with an increase of 1.4 MGD of IWTP treatment capacity. This alternative alone would reduce the total number of predicted bypasses, but would be insufficient to eliminate all bypasses to Des Moines Creek during the period analyzed. Using this alternative, some of the smaller bypass events would be eliminated; therefore, the average volume of bypass would increase from 5.2 to 5.6 MG. The largest volume of bypass would decrease from 14.8 to 14.0 MG. An increase in IWTP treatment capacity of 11.7 MGD (164%) would be necessary to eliminate the need to bypass to Des Moines Creek, based on the 1974 through 1994 rainfall data.

5.5 Alternative 5 - Offsite Hauling of IWS Water

Offsite hauling would effectively increase the IWTP capacity by approximately 833 gpm (50,000 gph or 1.2 MGD). Using the rainfall data from 1974 to 1994, a need to bypass to Des Moines Creek would arise 24 times during the 20-year time frame, even with the 1.2-MGD capacity increase. Alternative 5 alone would not be sufficient to eliminate the possibility of bypass to Des Moines Creek during the 20 years analyzed, but would eliminate some of the bypass events. The average volume of bypass would drop from 5.2 to 5.1 MG, and the largest volume of bypass would decrease from 14.8 to 11.9 MG. An effective increase in IWTP treatment capacity of 11.7 MGD (164%) would be necessary to eliminate the need to bypass to Des Moines Creek, based on the 1974 to 1994 rainfall data.

5.6 Alternative 6 - Non-completion of Lagoon #3 Expansion Project

Under Alternative 6 construction would be suspended, therefore no bypasses due to construction would occur. However, because Lagoon #3 is currently being expanded to avoid such circumstances, overflows to Des Moines Creek during future peak storm events can be anticipated.

Section 6: Recommendation of the Preferred Alternative for Conducting the Bypass

Kennedy/Jenks Consultants' recommended alternative for bypass during the Lagoon #3 expansion is to install a temporary 42-inch bypass line to SDS3. The recommended IWTP Standard Operating Procedure for the bypass is described in Appendix A.

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Section 7: Projected Date of Bypass Initiation

Insufficient data exists to accurately predict the actual date(s) of bypass during 1 April through 31 December 2002. The occurrence, volume, and duration of bypass events will depend to a large extent upon the rainfall events that occur.

Some very general predictions may be drawn from the analysis of rainfall data for 1974 to 1994. A mathematical model using these data, assuming only the available storage volume in Lagoons #1 and #2 and the treatment plant operating at its maximum capacity, yielded the following results:

- No bypasses would have occurred in 11 (55%) of the 20 years studied
- Bypasses were more likely to occur in December (16 of 29 occurrences, or 55%) or in November (5 of 29 events, or 17%) than any other months
- Bypasses occurred with frequencies from 0 to 9 per year over the study period
- Bypass events extended over periods from 1 to 8 consecutive days
- Of the 29 predicted occurrences, calculated daily bypass volumes ranged from 0.07 to 14.8 MG, with an average of 4.2 MG and a mean of 1.8 MG.

Based on these results, it can be anticipated that bypass will be most likely to occur in November or December of 2002, and may extend over several consecutive days. A conservative estimate of maximum daily bypass volume would be 15 MG.

Section 8: Statement of Compliance with SEPA

A SEPA Determination of Non-Significance (DNS) for the IWS Lagoon #3 Upgrades and Expansion was issued by the POS on 22 December 1999 for public and agency comment pursuant to WAC 197-11-340. An addendum to the SEPA DNS is currently being prepared and will be submitted to DOE under a separate cover. The proposed addendum will supplement and amend the environmental evaluation presented in the original DNS to reflect the changes made to the project.

The following project changes will be evaluated in the addendum:

- The project will be completed by December 2002, rather than October 2001
- Lagoon #3 will be out of service from 1 April through 31 December 2002, rather than May to October 2001 as originally anticipated
- A temporary lagoon bypass pipeline to SDS3 has been proposed.

Section 9: Request for a Water Quality Modification, as Provided for in WAC 173-201A-110

A request for Administrative Order is being submitted because the quality of discharge during a bypass event cannot be guaranteed or accurately predicted, and therefore the potential exists for the bypassed water to violate permit limitations or conditions. However, a bypass is not expected to cause an exceedence of downstream water quality criteria; therefore, a short-term water quality modification as provided for in WAC 173-201A-110 is not needed.

WAC 173-201A-110 is applicable when the proposed activity will cause a discharge that temporarily fails to meet the water quality criteria or special conditions contained in the permit. In this case, the possible bypass event is not expected to cause an exceedence of the permit's effluent limits or any long-term adverse effects on downstream water quality. Bypass flows are not expected to interfere with characteristic water uses for Des Moines Creek.

Water quality criteria apply at the point where the receiving stream enters the waters of the State. In this case, the point of compliance with water quality criteria is the outlet from the Northwest Ponds into the West Tributary of Des Moines Creek, downstream of the SDS3 outfall.

Downstream sampling was conducted during two previous overflows of Lagoon #3. Both overflows occurred during large storm events. The first overflow consisted of two releases from Lagoon #3, on 30 December 1996 and 1 January 1997. The second overflow occurred over the period 14 November to 15 November 2001. In both cases, samples taken from the discharge point of Cell 3 of the Northwest Ponds indicated no violations of water quality criteria had occurred. Based on these results, it is anticipated that a short-term water quality modification is not required for possible bypasses from the IWS during Lagoon #3 construction.

In order to reduce the probability of bypass, the POS will make every effort to complete the construction and put the expanded lagoon into service earlier than currently scheduled. Should a bypass become necessary, the duration will be restricted to the minimum time required for the lagoon storage capacity to "recover" and for the IWTP flows to equal or exceed the runoff inflow. The IWTP will be operated at the maximum treatment rate possible in keeping with the NPDES permit requirements. Bypass will be initiated only when necessary to prevent overtopping the berms at Lagoons #1 and #2.

Because bypasses occur as a result of rainfall events in excess of the system's capacity to handle the flows, stormwater flow into Des Moines Creek is expected to be high at the time of bypass. Therefore, the additional bypass flows may be incidental to the total flows and may have little effect on total water quality. This is supported by downstream data collected during previous overflow events. The existing energy dissipation structure at the SDS3 outfall to Des Moines Creek is designed to handle the additional anticipated volume of bypass flows. Therefore, the potential for scouring the creek bed will not be significantly increased by the additional flows.

Section 10: Steps Taken or Planned to Reduce, Eliminate, and Prevent Recurrence of the Bypass

The Standard Operating Procedure (SOP) for the IWTP during the Lagoon #3 outage in Appendix A indicates that Lagoons #1 and #2 will be kept empty as often as feasible. The IWTP will process water from Lagoons #1 and #2 at the maximum flow rate possible (7.1 MGD), assuming effluent water quality does not exceed NPDES permit limitations. If a storm occurs that exceeds the combined storage volume of Lagoons #1 and #2, with the IWTP processing at the maximum rate possible, a bypass will be initiated only when necessary to avoid overtopping Lagoons #1 and #2.

To reduce the probability of bypass, the POS will make every effort to complete the construction of the Lagoon #3 expansion project and put the expanded lagoon into service prior to the scheduled 31 December 2002 completion date. However, based on the actual job site conditions and work accomplished over the last two years, the additional time through December 2002 may be necessary in order to complete the project.

References

State Environmental Policy Act (SEPA) Determination of Non-Significance (DNS) for the IWS Lagoon #3 Upgrades and Expansion. Port of Seattle. 22 December 1999.

Engineering Report for Lagoon #3 Expansion, Industrial Wastewater System, Seattle-Tacoma International Airport. Kennedy/Jenks Consultants for the Port of Seattle. March 2000.

Contract Drawings, Seattle-Tacoma International Airport Industrial Wastewater System Lagoon #3 Expansion Project, Work Order C-100888, Project No. STIA-0009. Port of Seattle Aviation Division. 13 March 2000.

Project Manual Including Specifications for Seattle-Tacoma International Airport Industrial Wastewater System Lagoon #3 Expansion Project, Work Order C-100888, Project No. STIA-0009. Port of Seattle Aviation Division. 16 March 2000.

NPDES Permit No. WA-002465-1, Port of Seattle, Seattle-Tacoma International Airport. State of Washington, Department of Ecology. Renewed 29 May 2001.

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Appendix A

IWTP Standard Operating Procedure for IWS Bypass
During Lagoon #3 Outage

APPENDIX A IWTP STANDARD OPERATING PROCEDURE FOR IWS BYPASS DURING LAGOON #3 OUTAGE

1.1 Introduction

The purpose of this document is to provide a plan for managing runoff during the final phase of the Lagoon #3 expansion, a component of the Port of Seattle, Seattle-Tacoma International Airport's (STIA's) Industrial Waste System (IWS). Lagoon #3 is currently being expanded from an original capacity of about 26 million gallons (MG) to an expanded capacity exceeding 76 MG.

The lagoon expansion project is expected to require one additional construction season, April through December 2002. The enlarged lagoon is scheduled to be returned to service by 31 December 2002.

During the construction phase when Lagoon #3 is out of service, the IWTP operators will be responsible for rapid, yet effective, processing of IWS runoff water. The Standard Operating Procedure (SOP) should be to maintain empty lagoons (Lagoons #1 and #2). The inflow rate will vary greatly depending on storm intensity. Operators should be prepared for bypass when water levels in Lagoons #1 and #2 reach 5 feet.

Compliance with the treated effluent quality conditions established in the NPDES permit must be maintained.

1.2 Storage and Treatment Capacities

Table A-1 indicates that without processing, Lagoons #1 and #2 will fill quickly during the Lagoon #3 outage. It is uncommon but possible for 1.5 inches or more of rainfall to occur in the SeaTac, Washington area during April through December. When 1.5 inches of rain falls on the 365-acre IWS drainage area (333 acres of impervious surface), approximately 13.5 MG of water reaches the IWS lagoons, exceeding the capacity of Lagoons #1 and #2 in conjunction with the IWTP operating at 7.1 MGD.

Table A-1 Bottom and Full Elevations and Capacities for IWS Lagoons #1 and #2

Lagoon	Bottom Elevation (feet above sea level)	Full Elevation (feet above sea level)	Top Elevation (feet above sea level)	Capacity at Full Elevation (gallons)
#1	331.5 – 330.5	338.65	339.55	1,643,000
#2	Sloped to outlet structure with average elevation about 332	338.65	339.55	3,272,000

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this basis, the IWTP can process approximately 0.75 inch of rain per day, assuming that the rain falls and runs off at a rate less than 295,800 gph. Any flow greater than the IWTP capacity will result in an accumulation of water in the lagoons. Bypass will be necessary if Lagoons #1 and #2 are full and the storm intensity exceeds the IWTP processing rate. However, bypassing from the IWS lagoons shall be avoided unless the above-referenced peak conditions exist.

A.3 Contractor Responsibility

The Contractor may pump water from excavation dewatering to Lagoon #3 or the existing Lagoon #3 pump station (for transfer to the IWTP), discharge directly to a nearby SDS manhole, or discharge to the Erosion Control System for sedimentation and discharge to the SDS. Surface runoff also flows to the onsite Erosion Control System. The Contractor is responsible for assuring that water from excavation dewatering does not result in an exceedance of the water quality limits established in the NPDES permit. The Contractor must assure that the water meets a turbidity level in compliance with the NPDES permit in order to discharge to the IWS or SDS.

A.4 Low Lagoon Levels

When lagoon levels are low and precipitation is not occurring or forecast, the plant should be operated at a sufficiently slow rate in order to adequately remove suspended solids. If necessary, the IWTP is configured to allow a portion of the effluent to be recirculated to improve water quality.

The plant recirculation pump is located in the sump in the chemical mix room. The suction line from this pump extends to the effluent manhole. The discharge from the pump is recirculated from the effluent manhole to the flash mix tanks. Gate valves on each flash tank are opened manually to allow for recirculation into the operating DAF tanks. The pump is controlled by a push button located on the east wall of the Treatment Room. The pump is run only in manual mode and is not connected to the Programmable Logic Controller (PLC). No flowmeter is installed on the pump, but operational data indicates a recirculation capacity of about 350 gpm.

A.5 High Lagoon Levels

Bypass is necessary if Lagoons #1 and #2 exceed a depth of 5 feet and inflow exceeds the treatment plant capacity. Lagoons #1 and #2 are approximately 7 feet deep. Beyond a depth of 5 feet, 2 feet of freeboard represents approximately 380,000 gallons of additional storage in Lagoon #1 and 571,000 gallons in Lagoon #2. When the lagoon level reaches the bypass depth and water is still flowing into the lagoons, it should be assumed that even the maximum plant processing rate would not significantly lower the lagoon levels.

A.6 Sampling during Bypass Events

During expansion of Lagoon #3, the 42-inch outfall from IWS MH 1019 (formerly 334C) will be temporarily rerouted to Des Moines Creek via a new 42-inch Class 52 ductile iron line. The 42-inch line is controlled by a Hydrogate valve, actuated remotely from the IWTP Control Room. The Hydrogate valve controller is identified on the IWTP control panel as the "Lagoon 3 Influent Valve." The temporary outfall will be connected to SDS3, between IWS MH 1019 (formerly 334D) and SDS3-595 (formerly SDS3-27). SDS3 discharges to Des Moines Creek. An automatic sampler will be located at the outfall. The sampler will be programmed with a special sampling procedure to be activated by the IWTP operators in the event of a bypass condition.

A.7 Bypass Procedure

- Operate plant at maximum flow rate (about 4,930 gpm) with sludge drives operated intermittently (enough to prevent float carryover to the effluent).
- Prepare to bypass when the levels of Lagoons #1 and #2 begin to rise above 5 feet. Raising the level above 5 feet will require careful observation and rapid response to open the bypass valve. At least two operators should attend to this lagoon filling process.
- Contact the Maintenance Duty Officer (MDO) (phone: 206-433-5406) when potential overflow is suspected (Lagoons #1 and #2 at 5.0 feet). The MDO will contact the IWTP Engineer, Foreman, and Surface Water Manager.
- Open the IWS MH 1019 (formerly 334C) Hydrogate valve when the levels of Lagoons #1 and #2 begin to rise above 5 feet.
- Shut off flow to Lagoons #1 and #2.
- Trigger the automatic sampler located at the SDS3 outfall. The sampler will be preprogrammed to perform a line purge and collect a specified volume of water. Before collecting the samples, verify that the automatic sampler has operated in purge mode. Submit the samples to the laboratory for analysis for total petroleum hydrocarbons (TPH), biological oxygen demand (BOD), TSS, and pH. A minimum of 4 liters of sample should be collected for the preceding analyses. Consult the Plant Engineer (Jeff Paradee) or Airport Surface Water Manager (Tom Hubbard) to determine whether additional analyses are necessary. Alert Stormwater Specialist (Scott Tobiason) that stormwater system sampling has been activated.
- Call the MDO when the bypass valve to SDS3 is opened. The Surface Water Manager (or designee) will call the Department of Ecology Spill Line (425-649-7000).
- The Airport Surface Water Manager will contact the Department of Ecology and authorities at affected municipalities as soon as possible, but no later than the following business day.
- Sample the treatment plant effluent and submit it to the laboratory for analyses for Oil & Grease, TPH, TSS, pH, and BOD.
- Record the start and stop times and estimate the percent of bypass valve opening.

- Sample Des Moines Creek downstream of the SDS3 inlet and submit it to the laboratory for analyses for Oil & Grease, TPH, TSS, pH, and BOD.