STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (425) 649-7000

December 27, 1999

CERTIFIED MAIL
Z 212 537 022

The Honorable Lloyd Furman, Mayor
City of Langley
PO Box 366
Langley, WA 98260

Dear Mayor Furman:

RE: NPDES Permit Issuance
City of Langley Wastewater Treatment Plant; Permit No. WA-002070-2
Expiration Date: June 30, 2004

Under the provisions of Chapter 90.48 RCW Water Pollution Control Laws as amended and the Federal Water Pollution Control Act (The Clean Water Act) Title 33 United States Code, Section 1251 et seq., the enclosed NPDES Permit No. WA-002070-2 is hereby issued to the City of Langley Wastewater Treatment Plant located at 4999 Coles Road, Langley, WA (Island County).

The permit authorizes the Permittee to discharge secondary treated and disinfected effluent to the Saratoga Passage subject to the terms and conditions of the permit.

Pursuant to RCW 90.48.465, a permit fee will be assessed. Semi-annual notices for payment will be mailed to you from our office in Olympia.

Any person feeling aggrieved by this NPDES permit may obtain review thereof by application, within 30 days of receipt of this permit, to the Washington Pollution Control Hearings Board, Post Office Box 40903, Olympia, WA 98504-0903. Concurrently, a copy of the application must be sent to the Department of Ecology, Post Office Box 47600, Olympia, WA 98504-7600. These procedures are consistent with the provisions of Chapter 43.21B RCW and the rules and regulations adopted thereunder.

Any appeal must contain the following in accordance with the rules of the hearings board:

a) The appellant's name and address;
b) The date and number of the permit appealed;
c) A description of the substance of the permit, that is the subject of the appeal;
d) A clear, separate, and concise statement of every error alleged to have been committed;
e) A clear and concise statement of facts which the requester relies to sustain his or her statements of error;
f) A statement setting forth the relief sought; and
g) A copy of the order, decision, or application appealed from.

An application for permit renewal must be made at least 180 days prior to the expiration date of this permit. If at any time during the term of this permit a question should arise regarding the permit or discharge, or if there is a significant change in the discharge or operation, please contact Dave Nunnallee at (425) 649-7050.

Enclosed is Ecology's Fact Sheet and a pre-printed Discharge Monitoring Report (DMR) forms with a key for codes used. Please note that your permit limits, frequency, and sample type are printed in the shaded areas of you DMR. If no discharge occurs during a monitoring period, you must still submit a DMR with a statement that no discharge occurred.

Sincerely,

John H. Glynn
Water Quality Manager
Northwest Regional Office

JHG:TM:tm
Enclosures

cc: Rick Hill, Director of Public Works, City of Langley
Kelly Wynn, Operator, City of Langley WWTP
Bev Poston, Permit Fee Unit
Laura Fricke, Municipal Unit Supervisor
Dave Nunnallee, Facility Manager
Chris Smith, WPLCS
Central Files: WQ 1.1, WA-002070-2

Issuance Date: December 27, 1999
Effective Date: January 1, 2000
Expiration Date: June 30, 2004

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT No. WA-002070-2

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504-8711

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

City of Langley

P. O. Box 366

Langley, Washington 98260

Plant Location: 4999 Coles Road Langley, WA 98260 Island County	Receiving Water Saratoga Passage Class A, Marine
Water Body I.D. No.: WA-06-0010	Discharge Location Latitude: 48° 02' 39" N Longitude: 122° 24' 40" W
Plant Type: Sequencing Batch Reactor (Activated Sludge)	

is authorized to discharge in accordance with the special and general conditions that follow.

John H. Glynn
Water Quality Manager
Northwest Regional Office
Washington State Department of Ecology

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GENERAL CONDITIONS

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.	Discharge Monitoring Report	Monthly	
G1.	Notice of Change in Authorization	as necessary	
G7.	Application for permit renewal	1/permit cycle	December 30, 2003

SPECIAL CONDITIONS

S1. DISCHARGE LIMITATIONS

A. Effluent Limitations

All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration date the Permittee is authorized to discharge municipal wastewater at the permitted location subject to the following limitations:

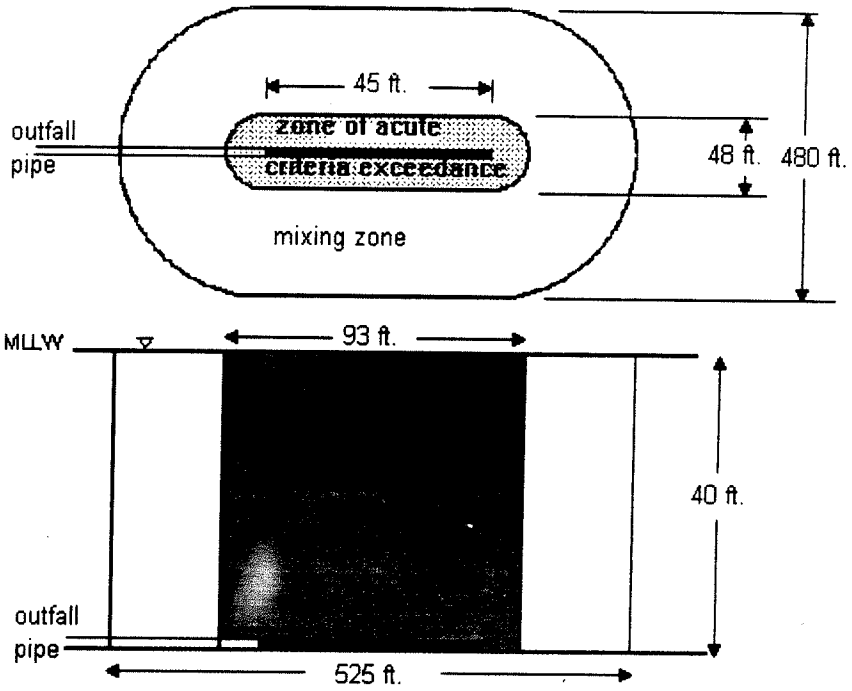
EFFLUENT LIMITATIONS: OUTFALL # 001		
Parameter	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand[a] (5 day)	30 mg/L, 38 lbs/day	45 mg/L, 56 lbs/day
Total Suspended Solids[a]	30 mg/L, 38 lbs/day	45 mg/L, 56 lbs/day
Fecal Coliform Bacteria	200 /100 mL	400 /100 mL
pH[b]	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	
Parameter	**Average Monthly**	**Maximum Daily[c]**
Total Residual Chlorine (TRC)	0.43 mg/L	1.13 mg/L
[a]The average monthly effluent concentration for BOD5 and Total Suspended Solids shall not exceed 30 mg/L or 15 percent of the respective monthly average influent concentrations, whichever is more stringent.		
[b]Indicates the range of permitted values. When pH is continuously monitored, excursions between 5.0 and 6.0 , or 9.0 and 10.0 shall not be considered violations provided no single excursion exceeds 60 minutes in length and total excursions do not exceed 7 hours and 30 minutes per month. Any excursions below 5.0 and above 10.0 are violations. The instantaneous maximum and minimum pH shall be reported monthly.		
[c] The maximum daily effluent limitation is defined as the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day.		

B. Mixing Zone Descriptions

The maximum boundaries of the mixing zones are defined as follows: The maximum mixing zone allowed to meet the chronic criteria in the State water quality standards shall not extend more than 240 feet from the outfall - the chronic dilution factor is 400:1. The maximum allowable zone of acute criteria exceedance shall not extend more than 24 feet from the outfall - the acute dilution factor is 87:1.

The mixing zone is shown graphically below:

Schematic of mixing zone for estuarine marine discharge for a 45 ft. long diffuser in 40 ft. of water



S2. MONITORING REQUIREMENTS

A. Monitoring Schedule

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Wastewater Influent	BOD_5	mg/l	Influent	1 / Week	24-Hr. Composite
"	TSS	mg/l	Influent	1 / Week	24-Hr. Composite
Wastewater Effluent	Flow	MGD	Final Effluent	Continuous	Recording
"	BOD_5	mg/l	Final Effluent	1 / Week	24-Hr. Composite
"	TSS	mg/l	Final Effluent	1 / Week	24-Hr. Composite
"	pH	Std. Units	Final Effluent	6 / Week	Grab
"	Fecal Coliform	# / 100 ml	Final Effluent	1 / Week	Grab concurrently with TRC samples
"	Total Residual Chlorine (TRC)	mg/l	Final Effluent	6 / Week	Grab

B. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit shall be representative of the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit shall conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 or to the latest revision of *Standard Methods for the Examination of Water and Wastewater* (APHA), unless otherwise specified in this permit or approved in writing by the Department of Ecology (Department).

C. Flow Measurement

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and

reliability of measurements of the quantity of monitored flows. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements are consistent with the accepted industry standard for that type of device. Frequency of calibration shall be in conformance with manufacturer's recommendations and at a minimum frequency of at least one calibration per year. Calibration records shall be maintained for at least three years.

D. Laboratory Accreditation

All monitoring data required by the Department shall be prepared by a laboratory registered or accredited under the provisions of, *Accreditation of Environmental Laboratories*, Chapter 173-50 WAC. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. Conductivity and pH shall be accredited if the laboratory must otherwise be registered or accredited. Crops, soils and hazardous waste data are exempted from this requirement pending accreditation of laboratories for analysis of these media by the Department.

S3. REPORTING AND RECORDKEEPING REQUIREMENTS

The Permittee shall monitor and report in accordance with the following conditions. The falsification of information submitted to the Department shall constitute a violation of the terms and conditions of this permit.

A. Reporting

The first monitoring period begins on the effective date of the permit. Monitoring results shall be submitted monthly. Monitoring data obtained during the previous month shall be summarized and reported on a form provided, or otherwise approved, by the Department, and be received no later than the 15 day of the month following the completed monitoring period, unless otherwise specified in this permit. Priority pollutant analysis data shall be submitted no later than 45 days following the monitoring period. The reports shall be sent to the Department of Ecology, Northwest Regional Office, 3190 - 160 Ave SE, Bellevue, Washington 98008.

In addition to the monthly report, a monthly summary report form (EPA No. 3320-1) shall be received no later than the 15th day of the following month. This report is limited to the parameters specified in condition S2.

B. Records Retention

The Permittee shall retain records of all monitoring information for a minimum of three years. Such information shall include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. This period of retention shall be extended

during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Director.

C. Recording of Results

For each measurement or sample taken, the Permittee shall record the following information: (1) the date, exact place, method, and time of sampling; (2) the individual who performed the sampling or measurement; (3) the dates the analyses were performed; (4) who performed the analyses; (5) the analytical techniques or methods used; and (6) the results of all analyses.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Condition S2. of this permit, then the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Permittee's self-monitoring reports.

E. Noncompliance Notification

In the event the Permittee is unable to comply with any of the permit terms and conditions due to any cause, the Permittee shall:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the violation, and correct the problem;

2. Repeat sampling and analysis of any violation and submit the results to the Department within 30 days after becoming aware of the violation;

3. Immediately notify the Department of the failure to comply; and

4. Submit a detailed written report to the Department within thirty days (5 days for upsets and bypasses), unless requested earlier by the Department. The report should describe the nature of the violation, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of the resampling, and any other pertinent information.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

F. Reporting - Shellfish Protection

Unauthorized discharges such as collection system overflows, plant bypasses, or failure of the disinfection system, shall be reported immediately to the Department of Ecology and the Department of Health, Shellfish Program. The Department of Ecology's Northwest Regional Office 24-hr. number is (425) 649-7000 and the Department of Health's Shellfish 24-hr. number is 360-753-5992.

S4. FACILITY LOADING

A. Design Criteria

Flows or waste loadings of the following design criteria for the permitted treatment facility shall not be exceeded:

Average flow for the maximum month:	0.15 MGD
Average BOD_5 loading for maximum month:	425 lb/day
Average TSS loading for maximum month:	425 lb/day

B. Plans for Maintaining Adequate Capacity

When the actual flow or wasteload reaches 85 percent of any one of the design criteria in S4.A. for three consecutive months, or when the projected increases would reach design capacity within five years, whichever occurs first, the Permittee shall submit to the Department, a plan and a schedule for continuing to maintain capacity at the facility sufficient to achieve the effluent limitations and other conditions of this permit. This plan shall address any of the following actions or any others necessary to meet this objective.

1. Analysis of the present design including the introduction of any process modifications that would establish the ability of the existing facility to achieve the effluent limits and other requirements of this permit at specific levels in excess of the existing design criteria specified in paragraph A above.

2. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.

3. Limitation on future sewer extensions or connections or additional wasteloads.

4. Modification or expansion of facilities necessary to accommodate increased flow or wasteload.

5. Reduction of industrial or commercial flows or waste loads to allow for increasing sanitary flow or wasteload.

Engineering documents associated with the plan must meet the requirements of WAC 173-240-060, "Engineering Report," and be approved by the Department prior to any construction. The plan shall specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

C. Notification of New or Altered Sources

The Permittee shall submit written notice to the Department whenever any new discharge or increase in volume or change in character of an existing discharge into the sewer is proposed which: (1) would interfere with the operation of, or exceed the design capacity of, any portion of the collection or treatment system; (2) is not part of an approved general sewer plan or approved plans and specifications; or would be subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act. This notice shall include an evaluation of the system's ability to adequately transport and treat the added flow and/or wasteload.

S5. OPERATION AND MAINTENANCE

The Permittee shall at all times be responsible for the proper operation and maintenance of any facilities or systems of control installed to achieve compliance with the terms and conditions of the permit.

A. Certified Operator

An operator certified for at least a Class 2 plant by the State of Washington shall be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class 1 plant shall be in charge during all regularly scheduled shifts.

B. O & M Program

The Permittee shall institute an adequate operation and maintenance program for their entire sewage system. Maintenance records shall be maintained on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records shall clearly specify the frequency and type of maintenance recommended by the manufacturer and shall show the frequency and type of maintenance performed. These maintenance records shall be available for inspection at all times.

C. Short-term Reduction

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limitations on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee shall give written notification to the Department, if possible, 30 days prior to such activities, detailing the reasons for, length of time of, and the potential effects of the reduced level of treatment. This notification does not relieve the Permittee of their obligations under this permit.

D. Electrical Power Failure

The Permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electrical power failure at the treatment plant and/or sewage lift stations either by means of alternate power sources, standby generator, or retention of inadequately treated wastes. The Permittee shall maintain Reliability Class II (EPA 430-99-74-001) at the wastewater treatment plant, which requires primary sedimentation and disinfection.

E. Prevent Connection of Inflow

The Permittee shall strictly enforce their sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system.

F. Bypass Procedures

The Permittee shall immediately notify the Department of any spill, overflow, or bypass from any portion of the collection or treatment system.

The bypass of wastes from any portion of the treatment system is prohibited unless one of the following conditions (1, 2, or 3) applies:

1. Unavoidable Bypass -- Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   If the resulting bypass from any portion of the treatment system results in noncompliance with this permit the Permittee shall notify the Department in accordance with condition S3.E "Noncompliance Notification."

2. Anticipated Bypass That Has The Potential to Violate Permit Limits or Conditions -- Bypass is authorized by an administrative order issued by the Department. The Permittee shall notify the Department at least 30 days before the planned date of bypass. The notice shall contain (1) a description of the bypass and its cause; (2) an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing; (3) a cost-effectiveness analysis of alternatives including comparative resource damage assessment; (4) the minimum and maximum duration of bypass under each alternative; (5) a recommendation as to the preferred alternative for conducting the bypass; (6) the projected date of bypass initiation; (7) a statement of compliance with SEPA; (8) if a water quality criteria exceedence is unavoidable, a request for modification of water quality standards as provided for in WAC 173-201A-110, and (9) steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above shall be considered during preparation of the engineering report or facilities plan and plans and specifications and shall be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

The Department will consider the following prior to issuing an administrative order:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of the permit.

b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, the Department will approve or deny the request. The public shall be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by the Department under RCW 90.48.120.

3. Bypass For Essential Maintenance Without the Potential to Cause Violation of Permit Limits or Conditions -- Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of the permit, or adversely impact public health as determined by the Department prior to the bypass.

G. Operations and Maintenance Manual

The approved Operations and Maintenance Manual shall be kept available at the treatment plant and all operators shall follow the instructions and procedures of this Manual.

S6. PRETREATMENT

A. General Requirements

The Permittee shall work with the Department to ensure that all commercial and industrial users of the publicly owned treatment works (POTW) are in compliance with the pretreatment regulations promulgated in 40 CFR Part 403 and any additional regulations that may be promulgated under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

B. Wastewater Discharge Permit Required

The Permittee shall not allow significant industrial users (SIUs) to discharge wastewater to the Permittee's sewerage system until such user has received a wastewater discharge permit from the Department in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.

C. Duty to Enforce Discharge Prohibitions

1. In accordance with 40 CFR 403.5(a), the Permittee shall not authorize or knowingly allow the discharge of any pollutants into its POTW which cause pass through or interference, or which otherwise violates general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The Permittee shall not authorize or knowingly allow the introduction of any of the following into the its POTW:

   a. Pollutants which create a fire or explosion hazard in the POTW (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).

b. Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.

c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTW.

d. Any pollutant, including oxygen demanding pollutants, (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.

e. Petroleum oil, nonbiodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.

f. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

g. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40°C (104°F) unless the Department, upon request of the Permittee, approves, in writing, alternate temperature limits.

h. Any trucked or hauled pollutants, except at discharge points designated by the Permittee.

i. Wastewaters prohibited to be discharged to the POTW by the Dangerous Waste Regulations (Chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. All of the following are prohibited from discharge to the POTW unless approved in writing by the Department under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or the need to augment sewage flows due to septic conditions):

a. Noncontact cooling water in significant volumes.

b. Stormwater, and other direct inflow sources.

c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The Permittee shall notify the Department if any industrial user violates the prohibitions listed in this section.

S7. RESIDUAL SOLIDS

Residual solids include screenings, grit, scum, primary sludge, waste activated sludge and other solid waste. The Permittee shall store and handle all residual solids in such a manner so as to prevent their entry into state ground or surface waters. The Permittee shall not discharge leachate from residual solids to state surface or ground waters.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Department shall be signed and certified.

A. All permit applications shall be signed by either a principal executive officer or a ranking elected official.

B. All reports required by this permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to the Department, and

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

C. Changes to authorization. If an authorization under paragraph B.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of B.2. must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. RIGHT OF ENTRY

The Permittee shall allow an authorized representative of the Department, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit;

B. To have access to and copy at reasonable times any records that must be kept under the terms of the permit;

C. To inspect at reasonable times any monitoring equipment or method of monitoring required in the permit;

D. To inspect at reasonable times any collection, treatment, pollution management, or discharge facilities; and

E. To sample at reasonable times any discharge of pollutants.

G3. PERMIT ACTIONS

This permit shall be subject to modification, suspension, or termination, in whole or in part by the Department for any of the following causes:

A. Violation of any permit term or condition;

B. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;

C. A material change in quantity or type of waste disposal;

D. A material change in the condition of the waters of the state; or

E. Nonpayment of fees assessed pursuant to RCW 90.48.465.

The Department may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. REPORTING A CAUSE FOR MODIFICATION

The Permittee shall submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a material change in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application shall be submitted at least 60 days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G5. PLAN REVIEW REQUIRED

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications shall be submitted to the Department for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities shall be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in the permit shall be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. DUTY TO REAPPLY

The Permittee must apply for permit renewal at least 180 days prior to the specified expiration date of this permit.

G8. REMOVED SUBSTANCES

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

G9. TOXIC POLLUTANTS

If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Clean Water Act for a toxic pollutant and that standard or prohibition is more stringent than any limitation upon such pollutant in the permit, the Department shall institute proceedings to modify or revoke and reissue the permit to conform to the new toxic effluent standard or prohibition.

G10. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G11. ADDITIONAL MONITORING

The Department may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G12. PAYMENT OF FEES

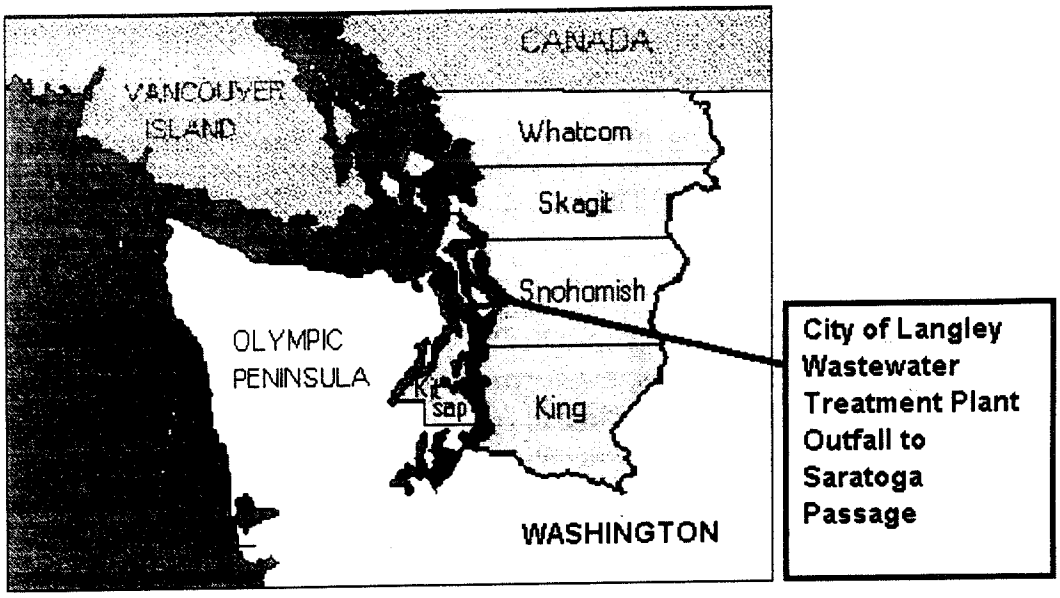
The Permittee shall submit payment of fees associated with this permit as assessed by the Department. The Department may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G13. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be and be deemed to be a separate and distinct violation.

FACT SHEET FOR NPDES PERMIT WA-002070-2
CITY OF LANGLEY WASTEWATER TREATMENT PLANT



SUMMARY

This fact sheet is a companion document to the draft National Pollutant Discharge Elimination System (NPDES) Permit for the Langley Wastewater Treatment Plant (WWTP). The fact sheet explains the nature of the proposed discharge, the Department of Ecology's (the Department's) decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions. The fact sheet and draft permit are available for review (see Appendix A--Public Involvement for more detail on the Public Notice procedures). This proposed permit contains few changes to the effluent limits from the previous permit. Effluent monitoring will be reduced, with ammonia monitoring no longer required, and less process control monitoring specified.

GENERAL INFORMATION	
Applicant	City of Langley P.O. Box 366 Langley, WA 98260 Phone (360) 221-4246
Facility Name and Address	Langley Wastewater Treatment Plant 4999 Coles Road, Langley, WA 98260 Phone (360) 221-4274
Responsible Official	Honorable Lloyd Furman, Mayor
Type of Treatment:	Sequencing Batch Reactor (Secondary Treatment)
Discharge Location	Saratoga Passage, Class A Marine Latitude: 48° 02' 39" N Longitude: 122° 24' 40" W.
Plant Contact	Kelly Wynn, Contract Operator, Water & Wastewater Services

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement) of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix C--Response to Comments.

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The Langley wastewater treatment plant (WWTP) was originally built in 1963 at the foot of Anthes Street near the shoreline in town. The original plant was a spirogester (a type of Imhoff tank); a chorine contact chamber was added in 1973.

The City of Langley constructed a secondary plant in 1991-92 at the current location outside of the downtown area. The Department provided a grant for part of the cost of the new plant. The new plant went on-line in October of 1992.

The treatment process at the plant consists of a grit chamber, an influent grinder, two sequencing batch reactors (SBR), and a chlorine contact chamber. Sewage flows through the grinder and is aerated intermittently for about seven hours in the SBR. Effluent is decanted from the top of the SBR, disinfected in the chlorine contact chamber for a minimum of one hour, and discharged to Saratoga Passage. Flows alternate between the two SBR's; one processes wastewater while the other fills with wastewater. A plant layout diagram of the treatment facility is shown in Appendix D.

The sewage system generally flows to the old plant location at the foot of Anthes Street. From there sewage is pumped through two lift stations to the new treatment plant. Inflow and infiltration were investigated in the 1990 Facilities Plan for Secondary Treatment. The plan identified several sources of inflow and infiltration, and recommended corrections. Significant inflow problems were corrected during construction of the new treatment plant.

Flows to the plant are predominantly domestic sewage. No significant industrial users contribute to the system. The plant is classified as Class 2. A Class 2 and a Class 1 contract operator operate the plant during the day. The plant is not staffed during the night, but an alarm system at the plant is wired to City facilities and to the contract operators residences to notify them of problems that occur during the night.

Secondary treated and disinfected effluent is discharged from the facility into Saratoga Passage. The outfall is located about 1000 feet offshore in forty feet of water at mean lower low water. A 100-foot long diffuser with 10 ports was installed when the new treatment plant was built.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary clarifier, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

Waste activated sludge is digested in two aerobic digesters and treated with flocculents, de-watered on a belt press, and then composted for eventual land application. Grit is disposed of at a local landfill. Some of the composted sludge is applied to municipal property near the treatment plant, and some is provided to local residents for private use. Several years ago the City submitted sludge analysis data for metals. The metals content revealed by that analysis are well below standards promulgated by the Environmental Protection Agency (EPA) in 40 CFR 503.

PERMIT STATUS

The previous permit for this facility was issued on February 4, 1994. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Residual Chlorine.

An application for permit renewal was submitted to the Department on August 5, 1998, and accepted by the Department on November 13, 1998.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility was last inspected on May 20, 1998, a compliance inspection with sampling.

During the history of the previous permit, the Permittee has remained in nearly complete compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. All reported effluent data were reviewed for the 5-year period of January 1994 through January 1999. During this time period, the following violations were noted:

Date	Parameter	Limit	Reported Value
Nov. 1998	Mo. Avg. BOD, Mg/L	30	43
Nov. 1998	Wk. Avg. BOD, Mg/L	45	86
Jan. 1999	Mo. Avg. BOD, Mg/L	30	32

These violations have been attributed to mechanical failures, which have been corrected, and to a power outage. No other violations have been reported, nor has the facility exceeded its design flows or loadings.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows, as summarized from Discharge Monitoring Report data (see Appendix E):

Table 1: Wastewater Characterization (all data are shown as 5-year averages):

Parameter	Concentration
minimum pH	6.98
maximum pH	7.41
BOD, Mg/L	9
BOD, % Removal	97
BOD, ppd	6.0
TSS, Mg/L	7
TSS, % Removal	96
TSS, ppd	5
Chlorine residual, Mg/l	0.25
Chlorine, ppd	0.17
Flow, mgd	0.081
Fecal Coliform, #/100 ml	6
NH_3-N, Mg/L	0.56

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are as follows:

Table 2: Design Standards for the Langley WWTP.

Parameter	Design Quantity
Monthly average flow (max. month)	0.150 MGD
Annual average flow	0.135 MGD
Instantaneous peak flow	0.300 MGD
BOD_5 influent loading	425 lbs./day
TSS influent loading	425 lbs./day

The previous permit and fact sheet contained conflicting information regarding mass loading (lbs/day) design information for BOD and TSS. The previous fact sheet documented the numbers shown above, but the previous permit indicated the following:

Avg. BOD loading for maximum month = 486 lb/day

Avg. TSS loading for maximum month = 550 lb/day

The approved 1991 plans for the treatment facility lists treatment plant design loadings of 425 lb/day for BOD and TSS, but also lists maximum daily design loadings for septage of 58 lb/day BOD and 125 lb/day of TSS. In the previous permit, these septage loadings were added to the

plant design loadings to obtain the design loadings of 486 lb/day and 55[illegible]/day for BOD and TSS, respectively. This is now believed to have been in error; it appears to be improper to add maximum *daily* design loadings (septage) to *monthly average* design loadings (overall plant). It is believed that the septage numbers were intended to have been included in the overall plant loadings, rather than added to them.

For the current permit, the maximum monthly average design loadings of 425 lb/day for BOD and TSS are considered to be the approved design parameters for the overall plant, and the permit has been modified to reflect these lower numbers.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC:

Table 3: Technology-based Limits.

Parameter	**Limit**
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The existing permit has chlorine limits of 0.43 mg/L monthly average, and 1.13 mg/L maximum daily concentrations, and the facility is able to comply with them. The proposed permit includes the same limits.

Monthly effluent mass loadings were calculated as the maximum monthly design flow (MGD) x concentration limit (Mg/L) x 8.34 (conversion factor) = mass limit (lb/day). The weekly average

effluent mass loadings were calculated as 1.5 x monthly loading, in lbs/day. The resulting mass loading limitations for this permit are:

Parameter	Average Monthly Mass Limit	Average Weekly Mass Limit
Biochemical Oxygen Demand (5 day)	38 lbs/day	56 lbs/day
Total Suspended Solids	38 lbs/day	56 lbs/day

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condit with the highest potential for adverse impact on the aquatic biota, human health, and ex g or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

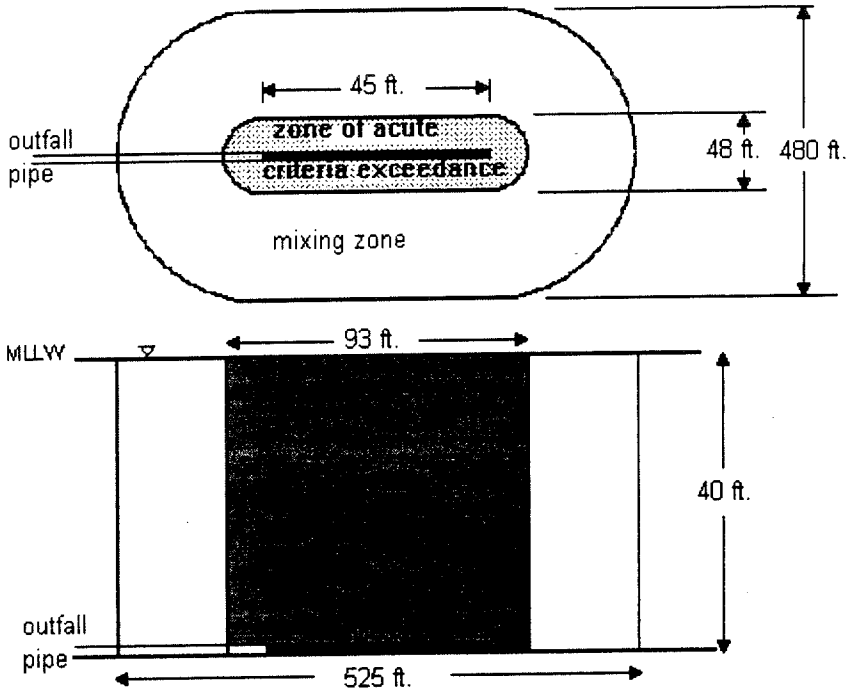
The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Because of the reasonable potential for pollutants (chlorine) in the proposed discharge to exceed water quality criteria, a mixing zone will be authorized. The Permittee provides secondary treatment of sewage, and thus meets the AKART requirement for the Department to authorize a mixing zone. WAC 173-201A-100 requires the mixing zone not extend further than 240 feet (= 200 ft + depth of diffuser) from the outfall diffuser and the zone of acute criteria exceedance not extend further than 24 feet (= 10% of chronic mixing zone) from the outfall diffuser. The Department has determined that the dilution at the boundary of the mixing zone is **400:1**, and the dilution at the edge of the zone of acute criteria exceedance is **87:1**.

The extent of effluent dilution in the receiving water was determined by the use of the EPA Plumes interface - the UM Model. Data used for the modeling included July, 1970 current speed data for Saratoga Passage from the National Oceanic and Atmospheric Administration in Seattle, Washington (see Appendix J), and ambient monitoring data collected in Saratoga Passage from 1989 through 1992 by the Department's Environmental Investigations Laboratory. The critical conditions for dilution are based on severe stratification of fresh water and salt water that occurred during December of two different years. Velocities for the modeling are based on the 90% probability low velocity for Saratoga Passage current. Chronic dilution is based on net

current velocity in Saratoga Passage. Mixing zone calculations and summaries are shown in Appendix K.

Schematic of mixing zone for estuarine marine discharge for a 45 ft. long diffuser in 40 ft. of water



DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Saratoga Passage, which is designated as a Class A Marine receiving water in the vicinity of the outfall. There are no other nearby point source outfalls, nor are there any known significant nearby non-point sources of pollutants. Characteristic uses include the following:

> Water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	6 mg/L minimum
Temperature	16 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Utilizing the mixing zone information, modelling results and effluent data for the discharge, the following determinations have been made:

BOD_5--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD_5 was placed in the permit.

Temperature--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of ___.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The impact of cadmium, chromium, copper, lead, nickel, and zinc were modeled during the previous permit cycle, using the method described by EPA using dilution factors described above. The analysis showed no reasonable potential to violate State water quality standards for any of those toxic substances. The permit contains a limit for chlorine because its concentration is directly controlled by the treatment plant staff. As discussed under "Technology-Based Effluent Limitations," chlorine discharge limits are based on previous permit limitations.

The previous permit required characterization testing for ammonia on a monthly basis to provide information for a detailed analysis during this permit cycle. The reported ammonia data are shown in Appendix H, and the acute and chronic criteria for ammonia are shown in Appendices F and I. Based on these data, together with the Reasonable Potential Calculation (Appendix G), ammonia levels in the Langley discharge are found to be far below those which would have a reasonable potential to violate water quality standards. Therefore, no limit is proposed for ammonia. Furthermore, no additional characterization testing for this parameter will be required in this permit.

Whole Effluent Toxicity

In addition to the requirement not to exceed specific chemical parameters, the Water Quality Standards require that the effluent not cause toxic effects in the receiving waters. Unidentified sources of toxicity are not expected to be present in the effluent from this small municipal discharge. No whole effluent toxicity testing is required in this permit.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED FEBRUARY 4, 1994:

Except for chlorine, all effluent limits proposed for the Langley permit are technology-based, and are therefore identical to those in the previous permit. Also, as the approved design flow for this plant is unchanged from the previous permit cycle, the mass emission (pounds per day) limitations are likewise unchanged. And, as discussed earlier, chlorine limits are based on the previous permit as well. Therefore, the existing limits and proposed limits are identical. These limits are shown below:

EFFLUENT LIMITATIONS		
Parameter	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5 day)	30 mg/L, 38 lbs/day	45 mg/L, 56 lbs/day
Total Suspended Solids	30 mg/L, 38 lbs/day	45 mg/L, 56 lbs/day
Fecal Coliform Bacteria	200 /100 mL	400 /100 mL
pH	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	
Parameter	**Average Monthly**	**Maximum Daily**
Total Residual Chlorine	0.43 mg/L (0.54 lb/day)	1.13 mg/L

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's Permit Writer's Manual (July 1994) for Activated Sludge plants with design flow less than 2.0 MGD.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, Accreditation of Environmental Laboratories. The laboratory at this facility is accredited for General Chemistry and Microbiology.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 273-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to

take the actions detailed in proposed permit requirement S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the Island County Health Department.

PRETREATMENT

WASTEWATER PERMIT REQUIRED

RCW 90.48 and WAC 173-216-040 require Significant Industrial Users (SIUs) to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

DUTY TO ENFORCE DISCHARGE PROHIBITIONS

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

Condition G1 requires responsible officials or their designated representatives to sign submittals to the Department. Condition G2 requires the Permittee to allow the Department to access the treatment system, production facility, and records related to the permit. Condition G3 specifies conditions for modifying, suspending or terminating the permit. Condition G4 requires the Permittee to apply to the Department prior to increasing or varying the discharge from the levels stated in the permit application. Condition G5 requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G6 prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Conditions G7 relates to permit renewal. Condition G8 prohibits the reintroduction of removed substances back into the effluent. Condition G9 states that the Department will modify or revoke and reissue the permit to conform to more stringent toxic effluent standards or prohibitions. Condition G10 incorporates by reference all other requirements of 40 CFR 122.41 and 122.42. Condition G11 notifies the Permittee that additional monitoring requirements may be established by the Department. Condition G12 requires the payment of permit fees. Condition G13 describes the penalties for violating permit conditions.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

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1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

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1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

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1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on November 18 and 25, 1998, in The Whidbey Press, to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on September 1, 1999, in The Whidbey Press to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 - 160 Ave. S.E.
Bellevue, WA 98008.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7201, or by writing to the address listed above.

This permit and fact sheet were written by David Nunnallee.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--RESPONSE TO COMMENTS

No comments were received during the public comment period.

OTHER APPENDICES:

APPENDIX D -- PLANT LAYOUT DIAGRAM

APPENDIX E -- DISCHARGE MONITORING REPORT DATA

APPENDIX F -- SELECTED WATER QUALITY CRITERIA

APPENDIX G -- REASONABLE POTENTIAL CALCULATION

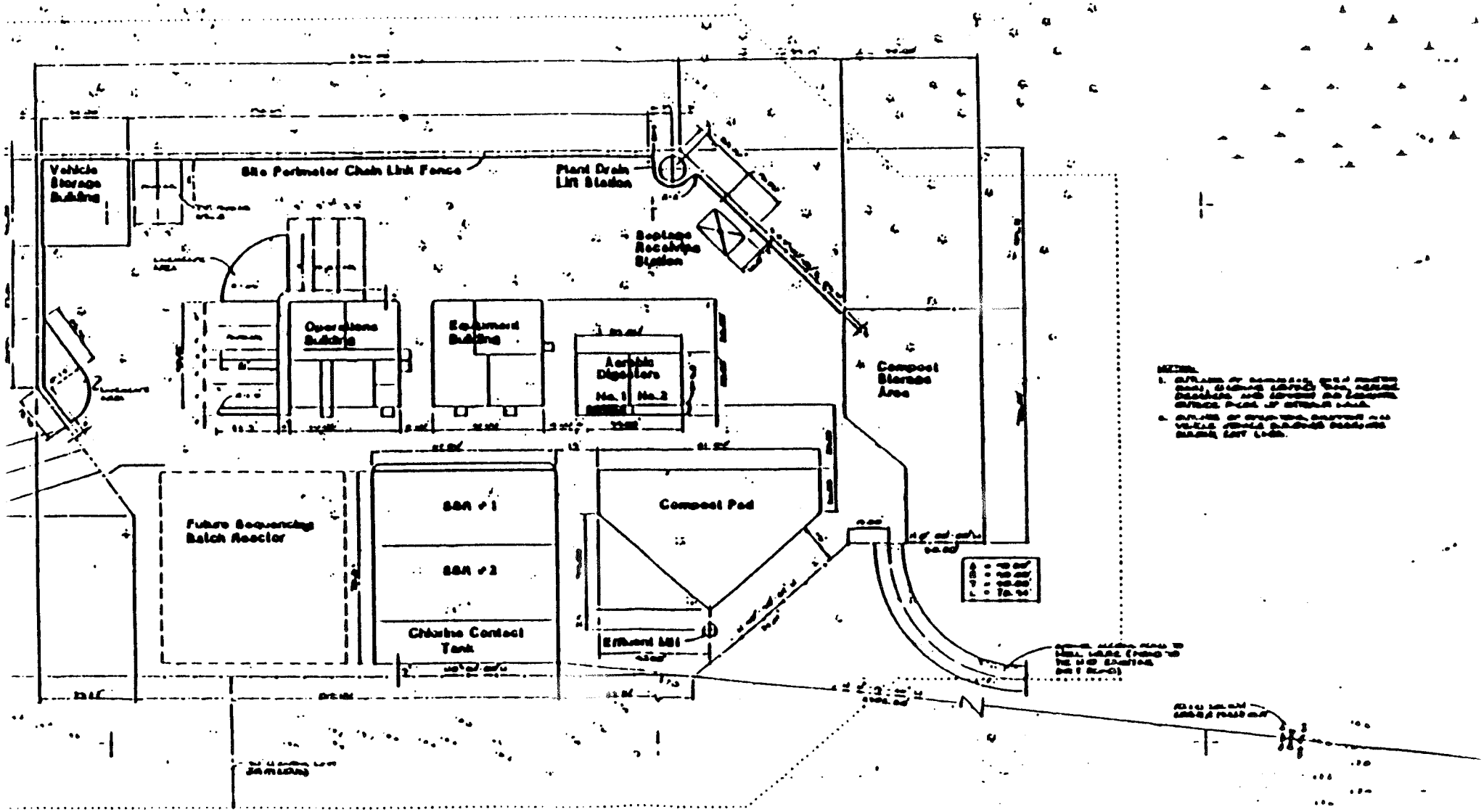
APPENDIX H -- CHLORINE & AMMONIA EFFLUENT DATA

APPENDIX I -- SALTWATER AMMONIA CALCULATIONS

APPENDIX J -- CURRENT VELOCITIES

APPENDIX K -- MIXING ZONE CALCULATIONS & SUMMARIES

APPENDIX D -- PLANT LAYOUT DIAGRAM



APPENDIX E – DISCHARGE MONITORING REPORT DATA

MONITOR POINT	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	EFF.	INF.	INF.	INF.	INF.	EFF.	EFF.	EFF.	EFF.
	pH, Std. Units	pH, Std. Units	BOD, Mg/L	BOD, Mg/L	BOD, % Rem.	BOD, ppd	BOD, ppd	TSS, Mg/L	TSS, Mg/L	TSS, % Rem	TSS, PPD	TSS, PPD	Cl2, Mg/L	Cl2, Mg/L	Q, MGD	Q, MGD	BOD, Mg/L	BOD, PPD	TSS, Mg/L	TSS, PPD	F. Coli /100	F. Coli /100	Cl2, PPD	NH3-N, Mg/L
DATE	MIN.	MAX.	AVG.	WK. AVG.	AVG.	AVG.	WK. AVG.	AVG.	WK. AVG.	AVG.	AVG.	WK. AVG.	AVG.	MAX.	AVG.	MAX.	AVG.	AVG.	AVG.	AVG.	AVG.	MAX.	AVG.	AVG.
1/1/94	7	7.3	4	6	99	2	3	4	6	99	2	3			0.061	0.079	251		207		2	4		
2/4/94	7.1	7.2	4	4	98	2	2	5	6	97	3	3	0.32	0.38	0.068	0.103	239		181		1	5	0.17	0.27
3/1/94	7.1	7.2	3	5	98	2	2	3	4	98	2	2	0.28	0.42	0.07	0.091	221		201		0	1	0.16	0.23
4/1/94	7.1	7.3	3	3	99	1	2	3	4	99	2	2	0.24	0.48	0.068	0.094	247		200		2	3	0.22	
5/1/94	7.2	7.3	4	7	99	3	4	4	5	99	2	3	0.18	0.28	0.072	0.091	275		211		3	8	0.11	0.19
6/1/94	7.2	7.4	3	4	99	2	3	4	5	99	2	3	0.12	0.28	0.071	0.091	276		224		2	4	0.07	0.22
7/1/94	7.1	7.4	3	3	99	2	2	3	4	99	2	3	0.15	0.44	0.075	0.095	308		223		4	10	0.09	0.24
8/1/94	7.1	7.4	6	11	98	4	8	6	14	98	4	9	0.33	0.6	0.081	0.113	337		234		14	62	0.23	0.2
9/1/94	7.2	7.5	4	4	99	2	3	4	5	99	2	2	0.18	0.33	0.068	0.083	333		221		16.8	F	0.1	0.28
10/1/94	7.2	7.4	5	10	97	3	5	6	9	96	3	5	0.37	0.53	0.064	0.079	304	151	220	109	2	4	0.2	0.27
11/1/94	7.1	7.3	4	7	98	2	4	5	8	97	3	6	0.4	0.53	0.068	0.087	287	154	196	106	3	6		
12/1/94	7	7.2	4	4	98	3	4	4	4	98	3	6	0.4	0.76	0.088	0.131	228	152	184	125	2	4		0.23
1/1/95	7	7.2	4	4	99	3	3	4	4	98	3	4	0.32	0.54	0.078	0.097	247	161	181	118	0.8	2	0.2	0.12
2/1/95	6.8	7.6	5	6	98	3	3	5	5	98	3	3	0.27	0.46	0.069	0.093	247	140	199	112	4	11	0.15	0.27
3/1/95	7.1	8	3	4	98	2	3	3	4	97	2	3	0.27	0.43	0.085	0.118	219	140	137	107	5	9	0.19	0.07
4/1/95	6.8	7.5	3	5	99	2	3	4	5	98	3	3	0.26	0.95	0.077	0.106	252	140	168	98	2	2	0.17	0.19
5/1/95	7	7.4	2	2	99	2	2	5	7	98	3	6	0.22	0.66	0.073	0.094	249	146	203	117	2	3	0.14	0.27
6/1/95	6.9	7.6	4	7	98	2	3	6	9	96	3	4	0.24	0.67	0.065	0.079	271	144	160	82	10	24	0.12	0.27
7/1/95	7.1	7.5	4	6	99	2	3	3	4	99	2	2	0.15	0.53	0.066	0.102	291	150	221	115	4	5	0.08	0.45
8/1/95	6.8	7.4	2	2	99	1	2	3	4	98	2	2	0.12	0.18	0.074	0.111	306	166	196	105	2	4	0.12	0.19
9/1/95	6.7	7.5	4	5	99	2	3	3	6	94	2	2	0.26	0.37	0.062	0.093	334	190	181	105	1	2	0.16	0.27
10/1/95	7	7.7	4	4	95	3	4	5	7	95	3	5	0.27	0.4	0.075	0.102	204	131	184	113	3	11	0.14	0.1
11/1/95	6.9	7.5	9	11	97	6	8	11	19	95	8	14	0.3	0.95	0.08	0.119	237	163	206	142	2	10	0.21	0.15
12/1/95	7	7.3	10	14	97	8	13	20	36	90	16	35	0.18	0.94	0.098	0.163	305	250	213	163	20	34	0.15	0.05
1/1/96	6.9	7.4	9	14	98	7	12	15	20	90	11	15	0.14	0.29	0.09	0.212	380	292	173	127	14	290	0.1	0.19
2/1/96	7.1	7.8	9	11	98	6	8	9	13	96	5	9	0.17	0.36	0.089	0.13	368	268	220	155	10	140	0.13	0.1
3/1/96	7.2	7.6	7	10	97	5	9	19	31	93	14	23	0.3	0.72	0.083	0.124	278	194	267	190	7	320	0.21	0.11
4/1/96	7.2	7.5	9	11	96	7	11	12	15	94	9	11	0.33	0.92	0.084	0.121	254	203	201	162	4	176	0.24	0.45
5/1/96	7.3	7.6	11	15	97	8	12	16	40	95	12	33	0.19	0.88	0.089	0.104	355	267	352	272	11	250	0.14	0.55
6/1/96	7.2	7.6	5	6	98	3	4	3	4	99	2	2	0.18	0.59	0.079	0.13	328	207	233	147	8	40	0.13	0.35
7/1/96	7.2	7.6	6	10	98	4	6	4	7	98	3	4	0.18	0.37	0.081	0.115	377	243	237	155	13	42	0.12	0.23
8/1/96	7.1	7.6	4	4	99	3	3	3	5	98	2	3	0.2	0.54	0.083	0.107	349	225	171	108	4	114	0.15	0.36
9/1/96	7	7.4	8	14	98	5	8	3	4	99	2	3	0.18	0.49	0.079	0.086	433	273	211	121	34	95	0.11	0.05
10/1/96	6.7	7.5	6	9	98	5	7	5	7	99	4	5	0.29	0.51	0.079	0.121	321	220	336	235	7	88	0.019	0.41
11/1/96	7	7.4	9	14	97	6	8	8	10	96	5	7	0.29	0.69	0.08	0.107	321	192	226	133	10	20	0.17	0.4
12/1/96	7	7.4	10	16	97	7	10	8	9	96	6	7	0.27	0.44	0.098	0.235	294	219	190	149	13	52	0.23	0.17
1/1/97	7.1	7.3	12	15	94	13	26	13	24	92	13	22	0.36	0.82	0.119	0.243	198	194	160	158	32	314	0.54	0.03
2/1/97	7	7.3	8	13	97	5	7	8	12	96	5	8	0.32	0.91	0.088	0.102	263	173	179	117	8	200	0.25	0.11
3/1/97	6.8	7.3	15	27	94	11	18	11	21	95	8	14	0.24	0.71	0.088	0.122	234	166	207	146	10	130	0.17	0.64
4/1/97	7	7.5	10	17	97	7	13	8	11	97	5	8	0.17	0.87	0.082	0.112	305	203	277	121	5	50	0.11	0.028
5/1/97	7.1	7.3	12	14	95	9	14	8	14	95	6	9	0.17	0.27	0.081	0.122	229	168	151	112	0	0	0.17	0.03
6/1/97	7	7.4	8	13	97	5	9	4	4	96	3	3	0.18	0.37	0.079	0.094	259	185	183	128	1	2	0.12	0.028
7/1/97	7	7.4	11	12	97	7	8	4	5	98	3	3	0.13	0.45	0.082	0.092	329	232	247	174	3	10	0.09	0.028
8/1/97	7.1	7.6	15	24	95	10	14	19	26	91	12	19	0.29	1.08	0.084	0.119	321	198	203	132	11	380	0.25	0.028
9/1/97	7	7.3	15	22	96	10	14	8	17	96	5	11	0.24	0.92	0.077	0.104	338	211	184	115	2	6	0.15	0.028
10/1/97	6.9	7.5	6	8	98	4	5	3	4	99	2	3	0.25	0.93	0.08	0.103	281	182	214	139	2	6	0.16	0.05
11/1/97	6.6	7.5	8	11	97	6	9	4	7	98	3	6	0.27	0.51	0.1	0.134	264	190	168	124	2	11	0.23	0.03
12/1/97	6.7	7.2	11	18	96	8	13	5	13	98	4	8	0.25	0.69	0.085	0.109	283	193	212	150	2	5	0.17	0.056
1/1/98	6.7	7.1	14	21	94	12	19	4	5	98	3	4	0.15	0.26	0.101	0.149	220	163	162	122	3	64	0.13	0.5
2/1/98	6.8	7.1	11	13	96	7	8	4	8	98	3	4	0.21	0.69	0.086	0.1	272	169	191	120	3	43	0.15	6.7
3/1/98	6.9	7.2	8	12	97	5	10	4	5	98	3	4	0.16	0.36	0.086	0.109	293	206	210	145	2	4	0.11	0.03
4/1/98	6.9	7.1	10	21	97	7	13	5	10	98	3	6	0.16	0.35	0.082	0.102	363	238	207	134	1	2	0.11	0.03
5/1/98	6.9	7.4	12	13	97	9	9	12	27	95	8	17	0.22	0.66	0.079	0.091	365	249	261	177	2	6	0.14	0.6
6/1/98	6.7	7.3	12	20	96	11	24	12	27	95	12	33	0.33	1.1	0.093	0.155	281	216	221	173	6	90	0.25	0.028
7/1/98	6.9	7.5	8	17	97	6	12	7	8	97	5	5	0.33	0.67	0.082	0.096	316	214	279	194	2	10	0.22	3.5
8/1/98	6.9	7.3	9	13	98	6	9	5	6	99	3	4	0.3	0.69	0.084	0.118	519	352	510	356	2	25	0.21	0.28
9/1/98	6.8	7.6	8	9	98	5	6	5	7	97	3	4	0.29	0.97	0.08	0.123	344	224	194	121	4	16	0.19	1.7
10/1/98	7	7.4	17	25	94	10	15	5	9	97	3	5	0.25	0.72	0.072	0.088	287	168	151	89	27	39	0.15	1.7
11/1/98	7	7.4	43	86	86	23	46	7	9	95	4	6	0.38	0.88	0.083	0.196	298	169	141	77	2	7	0.29	0.03
12/1/98	6.9	7.2	26	44	92	17	25	11	20	91	7	13	0.27	0.65		0.101	306	198	123	78	3	21	0.19	6.5
1/1/99	6.8	7.2	32	41	88	22	34	13	21	85	8	13	0.32	0.86	0.088	0.163	273	184	87	58	2	3	0.23	1.9
AVERAGE	6.98	7.41	8.8	13.1	96.9	6.0	9.3	6.8	11.0	96.4	4.7	7.9	0.25	0.61	0.081	0.116	295	197	208	137	6	55	0.17	0.56

APPENDIX F
SELECTED WATER QUALITY CRITERIA

SPREADSHEET REV. 1-92 BY G. SHERVEY									
Last revision date 3/98	FILENAME:		Langley-tsdcalc7-1999.xls						
FACILITY: City of Langley WWTP	RUN DATE:		5/10/99						
	PREPARED BY:		D. Nunnallee						
WATER QUALITY CRITERIA (in ug/L unless otherwise noted)									
	PRIOR	CAR	Water Quality Criteria				Human Health		
	ITY	CIN	Fresh		Marine		Criteria		Source and
Pollutant, CAS No. & Application Ref. No.	PLTNT?	GEN?	acute	chronic	acute	chronic	Fresh	Marine	Comments
AMMONIA unionized -see seperate spreadsheets for FW criteria	N	N			233	35			WAC 173-201A
CHLORINE	N	N	19	11	13	7.50			WAC 173-201A

APPENDIX G

REASONABLE POTENTIAL CALCULATION

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

				State Water Quality Standard		Max concentration at edge of...											
Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) ug/L	Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L	LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Ammonia, unionized				233	35	11.83	2.57	NO	0.95	0.950	1027	0.60	0.55	58	1.00	87	400
Chlorine				13	7.5	12.61	2.74	NO	0.95	0.950	1100	0.60	0.55	59	1.00	87	400

APPENDIX H

CHLORINE & AMMONIA EFFLUENT DATA

Langley Wastewater Treatment Plant

DATE	Cl2, Mg/L AVG.	Cl2, Mg/L MAX.		NH3-N, Mg/L AVG.	Unionized
2/4/94	0.32	0.38		0.27	0.041
3/1/94	0.28	0.42		0.23	0.035
4/1/94	0.24	0.48			
5/1/94	0.18	0.28		0.19	0.029
6/1/94	0.12	0.28		0.22	0.034
7/1/94	0.15	0.44		0.24	0.037
8/1/94	0.33	0.6		0.2	0.031
9/1/94	0.18	0.33		0.28	0.043
10/1/94	0.37	0.53		0.27	0.041
11/1/94	0.4	0.53			
12/1/94	0.4	0.76		0.23	0.035
1/1/95	0.32	0.54		0.12	0.018
2/1/95	0.27	0.46		0.27	0.041
3/1/95	0.27	0.43		0.07	0.011
4/1/95	0.26	0.95		0.19	0.029
5/1/95	0.22	0.66		0.27	0.041
6/1/95	0.24	0.67		0.27	0.041
7/1/95	0.15	0.53		0.45	0.069
8/1/95	0.12	0.18		0.19	0.029
9/1/95	0.26	0.37		0.27	0.041
10/1/95	0.27	0.4		0.1	0.015
11/1/95	0.3	0.95		0.15	0.023
12/1/95	0.18	0.94		0.05	0.008
1/1/96	0.14	0.29		0.19	0.029
2/1/96	0.17	0.36		0.1	0.015
3/1/96	0.3	0.72		0.11	0.017
4/1/96	0.33	0.92		0.45	0.069
5/1/96	0.19	0.88		0.55	0.084
6/1/96	0.18	0.59		0.35	0.054
7/1/96	0.18	0.37		0.23	0.035
8/1/96	0.2	0.54		0.36	0.055
9/1/96	0.18	0.49		0.05	0.008
10/1/96	0.29	0.51		0.41	0.063
11/1/96	0.29	0.69		0.4	0.061
12/1/96	0.27	0.44		0.17	0.026
1/1/97	0.36	0.82		0.03	0.005
2/1/97	0.32	0.91		0.11	0.017
3/1/97	0.24	0.71		0.64	0.098
4/1/97	0.17	0.87		0.028	0.004

APPENDIX H

CHLORINE & AMMONIA EFFLUENT DATA

Langley Wastewater Treatment Plant

DATE	Cl2, Mg/L AVG.	Cl2, Mg/L MAX.		NH3-N, Mg/L AVG.	Unionized
5/1/97	0.17	0.27		0.03	0.005
6/1/97	0.18	0.37		0.028	0.004
7/1/97	0.13	0.45		0.028	0.004
8/1/97	0.29	1.08		0.028	0.004
9/1/97	0.24	0.92		0.028	0.004
10/1/97	0.25	0.93		0.05	0.008
11/1/97	0.27	0.51		0.03	0.005
12/1/97	0.25	0.69		0.056	0.009
1/1/98	0.15	0.26		0.5	0.077
2/1/98	0.21	0.69		6.7	1.027
3/1/98	0.16	0.36		0.03	0.005
4/1/98	0.16	0.35		0.03	0.005
5/1/98	0.22	0.66		0.6	0.092
6/1/98	0.33	1.1		0.028	0.004
7/1/98	0.33	0.67		3.5	0.536
8/1/98	0.3	0.69		0.28	0.043
9/1/98	0.29	0.97		1.7	0.261
10/1/98	0.25	0.72		1.7	0.261
11/1/98	0.38	0.88		0.03	0.005
12/1/98	0.27	0.65		6.5	0.996
1/1/99	0.32	0.86		1.9	0.291
AVERAGE	0.25	0.61		0.56	0.086

APPENDIX I
SALT WATER AMMONIA WATER QUALITY STANDARD CALCULATION

Excel File HAMPSON.xls: Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004.

INPUT

	Hampson's Regression of Whitfield Model B for pKa8
Temperature (deg C)	20.0
pH	8.7
Salinity (g/Kg)	15.0
Pressure (atm; EPA criteria assumes 1 atm)	1.0

OUTPUT

Molal Ionic Strength (not valid if >0.85)	0.303
pKa8 at 25 deg C (Whitfield model "B")	9.280
Percent of Total Ammonia Present as Unionized	15.325%
Unionized ammonia criteria (mg UINH3/L) from EPA 440/5-88-004	
Acute	0.233
Chronic	0.035
Total Ammonia Criteria (mg NH3 /L)	
Acute	1.52
Chronic	0.23
Total Ammonia Criteria (mg N /L) - USED FOR REASONABLE POTENTIAL CALCULATION	
Acute	1.25
Chronic	0.19

APPENDIX J
CURRENT VELOCITIES
IN SARATOGA PASSAGE

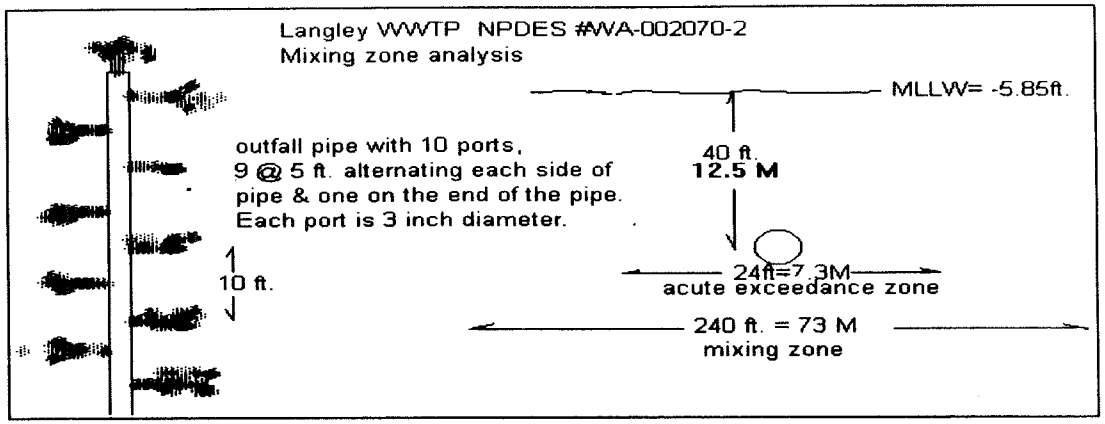
		scalar velocity				vector		90% max	90% min	80% of
Depth (ft.)	Depth (M)	mean cm/s	min cm/s	max cm/s	std dev	net vel	azimuth	velocity	velocity	min vel
3.3	1	31.2	0	70.3	10.8	16.6	5	45	17	14
16.4	5	22.7	0	51	7.8	4.2	16	33	13	10
32.8	10	18.9	2.1	37.9	5.2	0.8	155	26	12	10
49.2	15	17.9	0	32.4	5.3	2.3	193	25	11	9
82.0	25	12.7	0	29.4	4.7	2.2	219	19	7	5
114.8	35	12	0	29.2	5.2	1.5	207	19	5	4
164.1	50	11.9	0	32	6	1	189	20	4	3
262.5	80	14.5	0	58.4	9.1	0.2	13	26	3	2

Summary of current velocities in Saratoga Passage taken from NOAA study at a station in the middle of the passage about 10 miles north of the Langley outfall. The data was collected for 20 consecutive days in July, 1970. Current speeds at the Langley outfall are probably lower.

APPENDIX K

MIXING ZONE CALCULATION SUMMARY FOR LANGLEY OUTFALL

LANGLEY WWTP
NPDES #
WA 002070-2



effluent temperatures centigrade

Nov. '92	14.7
Dec '92	11.1
Jan. '93	9.4
Feb. '93	10.5
Mar '93	12.6
Apr. '93	14.3
May '93	16.7
Jun '93	18.8
Jul '93	19.7
Aug '93	19.7
Sep '93	19.3

CASE	VELOCITY (SOURCE)	SALINITY & TEMP SOURCE	FARFIELD VELOCITY m/sec	effl temp. cent	ACUTE DILUT	CHRON DILUT	COMMENTS
1	avg crnt data	aug, 92 ambient	0..19	20	390	1470	
2	80% of min vel	aug, 92 ambient	0.19	20	650	1000	
3	2 to 4 cm/s	aug, 92 ambient	0.04	20	<350	490	
4	90% max	aug, 92 ambient	0.02	20	337	2293	
5	1 to 2 cm/sec	aug, 92 ambient	0.01	20	<253	663	
6	90% max	aug, 92 ambient	0.26	20	325	1570	
7	80% of min, slow bottom	aug, 92 ambient	0.19	20	850	850	
8	min vel	aug, 92 ambient	0.12	20	600	1148	
9	min vel., slow bottom	aug, 92 ambient	0.12	20	650	1060	
10	min. vel, slow bottom	aug, 92 ambient	0.12	16	<560	989	
11	avg vel	Sept. 92 ambient	0.19	19	425	1160	
12	80% of 90% min vel	Sept. 92 ambient	0.19	19	<500	810	
13	2 to 4 cm/s	Sept. 92 ambient	0.04	19	300	418	
14	90% max	Sept. 92 ambient	0.02	19	400	1964	
15	1 to 2 cm/sec	Sept. 92 ambient	0.01	19	<238	612	
16	not used						
17	not used						
18	not used						
19	90% min vel	Dec-90	0.12	11.4	203	240	
20	90% max, slow bottom	Dec-90	0.12	11.4	180	200	
21	avg. vel, slow bottom	Dec-90	0.19	11.4	180	204	error Brooks(chronic value) not valid

APPENDIX K

MIXING ZONE CALCULATION SUMMARY FOR LANGLEY OUTFALL

CASE	VELOCITY (SOURCE)	SALINITY & TEMP SOURCE	FARFIELD VELOCITY m/sec	effl temp. cent	ACUTE DILUT	CHRON DILUT	COMMENTS
22	90% max, slow bottom	Dec-90	0.26	11.4	180	185	error Brooks(chronic value) not valid
23	90% min vel	Dec-90	0.12	11.4	270	312	
24	80% of 90% min vel	Mar-91	0.1	12.6	500	665	
25	90% max	Mar-91	0.26	12.6	375	860	
26	90% max	May-91	0.26	16.4	425	900	
27	80% of 90% min vel	May-91	0.1	16.4	540	660	
28	80% of 90% min vel	Jul-91	0.1	20	394	445	
29	90% max	Jul-91	0.26	20	330	550	
30	90% max	Dec-91	0.26	11.4	225	258	error Brooks(chronic value) not valid
31	90% min vel	Dec-91	0.1	11.4	192	241	error Brooks(chronic value) not valid
32	90% max with .3 MGD	Dec-91	0.26	11.4	165	203	error Brooks(chronic value) not valid
33	90% min vel with .3 MGD	Dec-91	0.1	11.4	150	183	
34	90% min vel with .3 MGD	Dec-90	0.12	11.4	166	194	error Brooks(chronic value) not valid
35	90% max with .3 MGD	Dec-90	0.26	11.4	223	226	error Brooks(chronic value) not valid
36	net velocity 15 mGD	Dec-90	0.02	11.4	~~86~~	355	for chronic only
37	net velocity 15 mGD	Dec-91	0.02	11.4	~~42~~	197	for chronic only
38	90% min vel with .3 MGD	Dec-91	0.1	11.4	196	244	begin using exact numerical profile data
39	90% max with .3 MGD	Dec-91	0.26	11.4	289	294	
40	90% max with .3 MGD	Dec-90	0.26	11.4	89	91	
41	90% min vel with .3 MGD	Dec-90	0.1	11.4	[illegible]	109	error Brooks(chronic value) not valid
42	Net vel, 0.15 MGD	Dec-90	0.015	11.4	~~130~~	572	for chronic only
43	Net vel, 0.15 MGD	Dec-91	0.015	11.4	~~80~~	401	Brooks error, plume diam 1.3/1.52
44	et vel, 0.15 MGD, with (-) vel. (vector)	Dec-91	0.015	11.4	~~75~~	367	Brooks error, plume diam 1.43/1.52
45	et vel, 0.15 MGD, with (-) vel. (vector)	Dec-90	0.015	11.4	**********	420	one negative concentration - valid run?
46	0.1 cm/sec	Dec-91	0.001	11.4	<500	2817	arbitrary slow velocity
47							
48							
49							
50							

APPENDIX K
CORMIX OUTFALL ANALYSIS
CRITICAL ACUTE DILUTION CONDITIONS (Case 41)

May 20, 1999, 11:53:48 ERL-N PROGRAM PLUMES, Ed 3, 3/11/94 Case: 41 of 49
Title ACUTE ZONE based on Dec., 1990 & 90% low velocity nonlinear

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far dis
0.01314	10	0.001314	1.524	0.0	11.4	25	100
port dep	**port dia**	**plume dia**	**total vel**	**horiz vel**	**vertl vel**	**asp coeff**	**print frq**
12.	0.07620	0.05951	0.4724	0.4724	0.000	0.10	100
port elev	**ver angle**	**cont coef**	**effl den**	**poll conc**	**decay**	**Froude #**	**Roberts F**
0.4572	0.0	0.61	-0.371508	100	0	4.467	9.387
hor angle	**red space**	**p amb den**	**p current**	**far dif**	**far vel**	**K:vel/cur**	**Stratif #**
90	1.524	18.7823	0.1150	0.000453	0.12	4.107	0.001316

depth	current	density	salinity	temp	amb conc	N (freq)	red grav.
5	0.13	13.7000	17.62	8.15	0	0.06385	0.1879
8.5	0.123	16.9142	21.89	9.07	0	buoy flux	puff-ther
9	0.122	16.9270	21.92	9.15		0.0001620	0.2385
9.5	0.121	16.9166	21.91	9.17		jet-plume	jet-cross
10	0.12	17.0241	22.05	9.18		0.2502	0.2166
10.5	0.11	17.1445	22.21	9.21		plu-cross	jet-strat
11	0.112	17.2195	22.31	9.23		0.1624	0.6246
11.5	0.114	17.6339	22.85	9.27		plu-strat	
12	0.115	18.7823	24.36	9.45		0.9869	
12.5	0.08	19.6799	25.56	9.69		hor dis>=	

CORMIX1 flow category algorithm is turned off.
4.107 0 to 100 range
Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: LANGLEY.VAR;
UM INITIAL DILUTION CALCULATION (nonlinear mode)

plume dep	plume dia	poll conc	dilution	hor dis	
m	m			m	
12.00	0.05951	100.0	1.000	0.000	
11.99	0.1056	50.00	1.981	0.1494	
11.93	0.1752	25.00	3.943	0.3882	
11.84	0.2762	12.50	7.869	0.6488	
11.71	0.4227	6.250	15.72	0.9686	
11.54	0.6331	3.125	31.43	1.442	
11.45	0.7671	2.225	44.15	1.805	-> trap level
11.34	0.9322	1.563	62.87	2.419	
11.24	1.108	1.136	**86.48**	4.008	

-> local maximum rise or fall
Plumes not merged, Brooks method may be invalid.
FARFIELD CALCULATION (based on Brooks, 1960, see guide)
Farfield dispersion based on wastefield width of 14.82m

--4/3 Power Law--		-Const Eddy Diff-			Time	
conc	dilution	conc	dilution	distance		
				m	sec	hrs
1.132	**86.8**	1.134	**86.7**	25.00	174.9	0.0
1.067	92.2	1.094	89.8	50.00	383.3	0.1
0.9616	102.4	1.032	95.4	75.00	591.6	0.2
0.8584	114.9	0.9691	101.6	100.0	799.9	0.2

APPENDIX K
CORMIX OUTFALL ANALYSIS
CRITICAL CHRONIC DILUTION CONDITIONS (Case 43)

May 20, 1999, 11:55:51 ERL-N PROGRAM PLUMES, Ed 3, 3/11/94 Case: 43 of 49
Title CHRONIC 2 - Dec. 1991 0.15 Mgd Net velocity for chronic linear

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far dis
0.006572	10	0.0006572	1.524	0.0	11.4	25	100
port dep	**port dia**	**plume dia**	**total vel**	**horiz vel**	**vertl vel**	**asp coeff**	**print frq**
12.	0.07620	0.05951	0.2362	0.2362	0.000	0.10	100
port elev	**ver angle**	**cont coef**	**effl den**	**poll conc**	**decay**	**Froude #**	**Roberts F**
0.4572	0.0	0.61	-0.371508	100	0	2.036	0.02811
hor angle	**red space**	**p amb den**	**p current**	**far dif**	**far vel**	**K:vel/cur**	**Stratif #**
90	1.524	22.7000	0.01400	0.000453	0.015	16.87	0.0007932

depth	current	density	salinity	temp	amb conc	N (freq)	red grav.
5	0.042	19.01			0	0.05430	0.2263
8.5	0.018	20.83			0	buoy flux	puff-ther
9	0.0148	21.17				0.00009761	0.2262
9.5	0.011	21.76				jet-plume	jet-cross
10	0.008	21.89				0.1140	0.8900
10.5	0.0095	21.97				plu-cross	jet-strat
11	0.011	22.31				54.21	0.4790
11.5	0.0125	22.62				plu-strat	
12.0	0.014	22.7				0.9818	
12.5	0.0155	22.7				hor dis>=	

CORMIX1 flow category algorithm is turned off.
16.87 0 to 100 range
Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: LANGLEY.VAR;
UM INITIAL DILUTION CALCULATION (linear mode)

plume dep	plume dia	poll conc	dilution	hor dis	
m	m			m	
12.00	0.05951	100.0	1.000	0.000	
11.96	0.1034	50.00	1.977	0.1330	
11.78	0.1496	25.00	3.932	0.2721	
11.48	0.2208	12.50	7.842	0.3928	
11.01	0.3360	6.250	15.66	0.5172	
10.28	0.5396	3.125	31.31	0.6742	
9.429	0.8209	1.820	53.76	0.8524	-> trap level
9.177	1.005	1.563	62.62	0.9155	
9.035	1.295	1.379	70.94	0.9659	-> begin overlap

Plumes not merged, Brooks method may be invalid.
FARFIELD CALCULATION (based on Brooks, 1960, see guide)
Farfield dispersion based on wastefield width of 15.01m

--4/3 Power Law--		-Const Eddy Diff-				
conc	dilution	conc	dilution	distance	Time	
				m	sec	hrs
0.7031	140.7	0.9636	102.2	25.00	1602	0.4
0.3827	259.8	0.7336	134.8	50.00	3269	0.9
0.2482	**401.4**	0.6147	161.1	75.00	4936	1.4
0.1774	562.1	0.5394	183.8	100.0	6602	1.8