



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (206) 649-7000

February 4, 1994

CERTIFIED MAIL

P 311 404 881

The Honorable Vicki Lash, Mayor
City of Langley
P O Box 366
Langley, WA 98260

Dear Mayor Lash:

RE: NPDES Permit Issuance
City of Langley Wastewater Treatment Plant
NPDES Permit No. WA-002070-2
Expiration Date: February 4, 1999

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 located at 999 Coles Road, Langley, Island County, Washington.

The permit authorizes the Permittee to discharge treated municipal wastewater to 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.

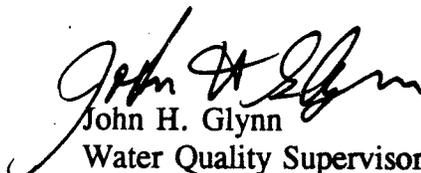
The Honorable Vicki Lash, Mayor
City of Langley
February 4, 1994
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Any appeal must contain the following in accordance with the rules of the hearings board:

- 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; and
- f) A statement setting forth the relief sought.

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 Mr. Jerry Shervey at (206) 649-7215.

Sincerely,


John H. Glynn
Water Quality Supervisor
Northwest Regional Office

JHG:CJS:cs
Enclosures

cc: Permit Fee Unit
EPA-WOO, Olympia
Jerry Shervey, Permit Manager
WPLCS

Page 1 of 21
Permit No. WA-002070-2
Issuance Date: February 4, 1994
Effective Date: February 4, 1994
Expiration Date: February 4, 1999

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:
999 Coles Road
Langley, WA 98260
Island County

Receiving Water:
Saratoga Passage

Waterway Segment Number:
03-06-07

Plant Type:
Sequencing Batch Reactors
(Activated Sludge)

Water Body I.D. No.:
WA-06-0010

Discharge Location:
Latitude: 48° 02' 39" N
Longitude: 122° 24' 40" W

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

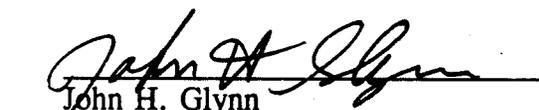

John H. Glynn
Section Supervisor
Water Quality Program
Northwest Regional Office

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SUMMARY OF SUBMITTALS

Permit Section	Submittal	Frequency	First Submittal Date
S3.	Discharge Monitoring Report	Monthly	March 15, 1994
G17.	Application for permit renewal	1/permit cycle	180 days prior to expiration of permit

SPECIAL CONDITIONS

S1. EFFLUENT LIMITATIONS

A. Beginning on the effective date of this permit and lasting through the expiration date the Permittee is authorized to discharge subject to meeting the following limitations:

CONVENTIONAL POLLUTANTS	EFFLUENT LIMITATIONS^a	
	<u>Monthly Average</u>	<u>Weekly Average</u>
<u>Parameter</u>		
5-day Biochemical Oxygen Demand ^b (BOD ₅)	30 mg/l 38 lbs/day	45 mg/l 56 lbs/day
Total Suspended Solids ^b (TSS)	30 mg/l 38 lbs/day	45 mg/l 56 lbs/day
Fecal Coliform Bacteria	200/100 mL	400/100 mL

pH shall not be outside the range 6.0 to 9.0

^aThe monthly and weekly averages are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.

^bThe monthly average effluent concentration for BOD and TSS shall not exceed 30 mg/L or 15 percent of the respective monthly average influent concentrations, whichever is more stringent.

CHEMICAL POLLUTANTS	<u>Average Monthly Limit (AML)</u>	<u>Average Monthly Limit (AML)</u>	<u>Maximum Daily Limit (MDL)</u>
Total Residual Chlorine	0.43 mg/L	0.54 lbs/day	1.13 mg/L

B. **Mixing Zone Description:** 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.

S2. TESTING SCHEDULE

The Permittee shall monitor the wastewater and sludge according to the following schedules:

A. Compliance Testing Schedule:

<u>Tests</u>	<u>Sample Point</u>	<u>Sampling Frequency</u>	<u>Sample Type</u>
Flow	Effluent	Continuous	on line
BOD ₅	Influent, Chlorinated Effluent	1/week 1/week	24 hour composite 24 hour composite
TSS	Influent, Chlorinated Effluent	1/week 1/week	24 hour composite 24 hour composite
Fecal Coliform	Chlorinated Effluent	1/week	grab - concurrently with chlorine samples
Total Available (Residual) Chlorine	Chlorinated Effluent	6/week	grab
pH	Chlorinated Effluent	6/week	grab

B. Sludge Monitoring Schedule:

<u>Tests</u>	<u>Sample Point</u>	<u>Sampling Frequency</u>	<u>Sample Type</u>
arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc	Digested Sludge or compost ²	once per year	composite sample composed of at least 3 grabs
Pathogen Reduction ¹ (Fecal Coliform or Salmonella)	Digested Sludge or compost ²	once per year	composite sample composed of at least 3 grabs
Vector Attraction Reduction ¹	Digested Sludge or compost ²	once per year	composite sample composed of at least 3 grabs

S2. TESTING SCHEDULE: (Continued)

Nitrogen:(TKN, NH3-N, NO3-N)	Digested Sludge or compost ²	once per year	composite sample composed of at least 3 grabs
---------------------------------	--------------------------------------------	------------------	-----------------------------------------------------

¹The Permittee shall report the method used to meet the pathogen reduction and the vector attraction reduction requirements.

²The Permittee will sample and analyze the sludge in which ever form it is applied to the ground. If both digested sludge and composted digested sludge are land applied, then each form of the sludge shall be sampled and analyzed.

C. Process Control Testing:

The Permittee shall perform process control testing in compliance with the requirements contained in the approved Operations and Maintenance Manual for the Langley wastewater treatment plant. COD testing required by that Manual may be waived at the Permittee's discretion.

D. Characterization Testing: (Note - laboratory accreditation is not required for this test procedure.)

<u>Tests</u>	<u>Sample Point</u>	<u>Sampling Frequency</u>	<u>Sample Type</u>
Ammonia(as NH ₃ -N)	Chlorinated Effluent	1/month	24 hour composite

S3. MONITORING AND REPORTING

The Permittee shall monitor the operations and efficiency of all treatment and control facilities and the quantity and quality of the waste discharged. A record of all such data shall be maintained. The Permittee shall monitor the parameters as specified in Condition S2. of this permit.

A. Reporting

Monitoring results obtained during the previous month shall be summarized and reported on a form provided, or otherwise approved, by the Department, to be submitted no later than the 15th day of the month following the completed reporting period. The report shall be sent to the Department of Ecology, Northwest Regional Office 3190 160th Avenue SE, Bellevue, Washington 98008-5452. The monitoring schedule in this permit shall be started on the effective date of this permit, and the first report is due on the 15th day of the following month. In addition to the monthly report, a monthly summary report form (EPA No. 3320-1 or approved equivalent) shall be submitted at the same time. This summary report is limited to the parameters specified in condition S1.A. and flow.

S3. MONITORING AND REPORTING: (Continued)

B. Records Retention

The Permittee shall retain for a minimum of three (3) years all records of monitoring activities and results, including all reports of recordings from continuous monitoring instrumentation. The Permittee shall retain for a minimum of five (5) years all records pertaining to the monitoring of sludge. 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 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. Representative Sampling

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

E. Test Procedures

All sampling and analytical methods used to meet the wastewater monitoring requirements specified in this permit shall, unless approved otherwise in writing by the Department, conform to the Guidelines Establishing Test Procedures for the Analysis of Pollutants, contained in 40 CFR Part 136.

Sludge monitoring requirements specified in this permit shall be conducted according to test procedures specified in 40 CFR Part 503.

F. 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 volume of monitored discharges. 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 or at a minimum frequency of at least one calibration per year.

S3. MONITORING AND REPORTING: (Continued)

G. Laboratory Accreditation

After July 1, 1994, all monitoring data, except for flow, temperature, ammonia, and internal process control parameters, shall be prepared by a laboratory registered or accredited under the provisions of, Accreditation of Environmental Laboratories, Chapter 173-50 WAC. Soils and hazardous waste data are exempted from this requirement pending certification of laboratories for analysis of these media by the Department.

H. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit (S2.) the monitoring should be done using acceptable test procedures and the results of this monitoring shall be included in the Permittee's self-monitoring reports.

I. Signatory Requirements

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

1. All permit applications shall be signed by either a principal executive officer or ranking elected official:
2. 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:
 - a. The authorization is made in writing by a person described in I.1. and submitted to the Department, and
 - b. 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).
3. Changes to authorization. If an authorization under paragraph I.2.b 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 I.2.b must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

S3. MONITORING AND REPORTING: (Continued)

4. 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 willful violations."

J. 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 Ecology 24-hr number is 206-649-7200, and the Department of Health Shellfish 24-hr number is 206-753-5992.

S4. PREVENTION OF FACILITY OVERLOADING

A. Design Criteria

Flows or waste loadings shall not exceed the design criteria for the permitted treatment facility. The design criteria are as follows:

Flow and influent loading

Average flow for the maximum month	0.15 MGD
Influent BOD ₅ loading for maximum month	483 lb/day
Influent TSS loading for maximum month	550 lb/day

B. Plans for Maintaining Adequate Capacity

When the actual flow or waste load reaches 85 percent of the design capacity (paragraph A above) 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.

S4. PREVENTION OF FACILITY OVERLOADING: (Continued)

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 waste loads.
4. Modification or expansion of facilities necessary to accommodate increased flow or waste load.
5. Reduction of industrial or commercial flows or waste loads to allow for increasing sanitary flow or waste load.

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) would increase the total system flow or influent waste loading by more than 10 percent; (3) 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 waste load.

S5. OPERATION AND MAINTENANCE OF MUNICIPAL FACILITIES

A. Certified Operator

In accordance with Chapter 173-230 WAC, the Permittee shall provide an adequate operating staff which is qualified to carry out the operation, maintenance, and testing activities required to ensure compliance with the conditions of this permit.

S5. OPERATION AND MAINTENANCE OF MUNICIPAL FACILITIES: (Continued)

An operator certified for 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. A Class 1 or Class 2 operator shall be present at the facility during all shifts when operational changes are made to the treatment process.

B. O & M Manual

The approved operation and maintenance manual shall be kept available at the treatment plant. The operation and maintenance manual shall be updated as necessary; the Permittee shall submit any proposed changes to the Department review and approval. The operation and maintenance manual shall contain the plant process control monitoring schedule. All operators are responsible for being familiar with, and using, this manual.

C. 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.

D. Short-term Reduction

If a Permittee contemplates a reduction in the level of treatment that would cause an exceedance of permit effluent 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. If such a reduction involves a bypass, the requirements of Conditions G5. and S6. will apply.

E. 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.

S5. OPERATION AND MAINTENANCE OF MUNICIPAL FACILITIES: (Continued)

F. 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.

S6. CONSTRUCTION OR MAINTENANCE-RELATED OVERFLOW OR BYPASS

Bypasses of untreated or partially treated sewage during construction or maintenance shall be avoided if at all feasible.

If a construction or maintenance-related overflow or bypass is contemplated, the Permittee shall submit to the Department, not less than 90 days prior to the contemplated overflow or bypass, a report which describes in detail any construction work which will result in overflow or bypass of wastewater. The report shall contain: (1) an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing; (2) a cost-effectiveness analysis of alternatives including comparative resource damage assessment; (3) the minimum and maximum duration of bypass under each alternative; (4) a recommendation as to the preferred alternative for conducting the bypass; (5) the project date of bypass initiation; (6) a statement of compliance with SEPA; and (7) a request for a water quality modification, as provided for in WAC 173-201A-110.

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.

Final authorization to bypass may be granted after review of the above information, in accordance with General Condition G5. Authorization to bypass will be by administrative order.

S7. RESIDUAL SOLIDS

A. Residual Solids Handling

The Permittee shall handle, utilize, and dispose of all residual solids in such a manner as to prevent its entry into state ground or surface waters.

S7. RESIDUAL SOLIDS: (Continued)

B. Leachate

The Permittee shall not allow leachate from their residual solids to enter state surface waters without providing all known, available and reasonable methods of treatment, nor allow such leachate to violate the State Water Quality Standards, Chapter 173-201A WAC, or cause any adverse effect on state ground waters. The Permittee shall apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

C. Land Disposal or Utilization

Disposal or utilization of residual solids on land shall be in accordance with the requirements of the jurisdictional health department and 40 CFR Part 503.

D. Solids Management Plan

The Permittee shall manage all residual solids generated at the plant site in accordance with the residual solids management plan submitted with the permit application. Any proposed change or revision to the residual solids management plan shall be submitted to the Department for review and approval 30 days prior to the change. No response within 30 days of the submittal shall constitute Department approval. The Permittee shall comply with any approved plan modifications. The Permittee shall submit an update of the residual solids management plan with the application for permit renewal 180 days prior to the expiration date of this permit.

E. Applicable Federal Law

This permit shall be modified, or alternatively, revoked and reissued to comply with any applicable standard or limitation promulgated under Section 405(d) (Disposal of Sewage Sludge) of the Clean Water Act, if the standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any condition in the permit; or
2. Controls any pollutant not limited in the permit.

The Permittee shall comply with the standard or limitation by no later than the compliance deadline specified in the applicable regulations as required by Section 405(d)(2)(D) of the Clean Water Act. The permit as modified or reissued under this paragraph shall also contain any other requirement of the Act then applicable.

S7. RESIDUAL SOLIDS: (Continued)

F. Permit Modification, Revocation, Reissuance

The Department may establish specific sludge management requirements beyond those identified in this permit by permit modification or administrative order.

S8. PRETREATMENT

1. The Permittee shall work cooperatively with the Department to ensure that all industrial users of the wastewater treatment system are in compliance with the pretreatment regulations promulgated in 40 CFR Part 403 and any additional pretreatment regulations that may be promulgated under Section 307(b) and reporting requirements under Section 308 of the Federal Clean Water Act.
2. If required by the Department, the Permittee shall perform an industrial user survey, or other activities (e.g., industrial user ordinance and local limits development), which are necessary for the proper administration of a state pretreatment program.
3. Significant commercial and industrial operations shall not be allowed to discharge wastes to the Permittee's sewerage system until they have received prior authorization from the Department in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.
4. General Prohibitions - In accordance with 40 CFR 403.5(a), non-domestic discharges which would pass through the treatment works or interfere with their operation or performance, shall not be discharged into the sewerage system.
5. Specific Prohibitions - In accordance with 40 CFR 403.5(b), the following non-domestic discharges shall not be discharged into the system.
 - a. Pollutants that create a fire or explosion hazard in the Publicly Owned Treatment Works (POTW) including, but not limited to waste streams with a closed cup flash point of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21.
 - b. Pollutants that will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0 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.

S8. PRETREATMENT: (continued)

- 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. 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 exceeds 40°C (104°F) unless the Department, upon request of the Permittee, approves, in writing, alternate temperature limits.
- f. Petroleum oil, non biodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.
- g. 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.
- h. Any trucked or hauled pollutants, except at discharge points designated by the Permittee.

GENERAL CONDITIONS

G1. Discharge Violations:

All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any pollutant 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.

G2. Proper Operation and Maintenance:

The Permittee shall at all times properly operate and maintain all facilities and systems of collection, treatment, and control (and related appurtenances) which are installed or used by the Permittee for pollution control.

G3. Reduced Production for Compliance:

The Permittee, in order to maintain compliance with its permit, shall control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

G4. Non-compliance Notification:

If for any reason, the Permittee does not comply with, or will be unable to comply with, any of the discharge limitations or other conditions specified in the permit, the Permittee shall, at a minimum, provide the Department with the following information:

- A. A description of the nature and cause of non-compliance, including the quantity and quality of any unauthorized waste discharges;
- B. The period of non-compliance, including exact dates and times and/or the anticipated time when the Permittee will return to compliance; and
- C. The steps taken, or to be taken, to reduce, eliminate, and prevent recurrence of the non-compliance.

In addition, the Permittee shall take immediate action to stop, contain, and clean up any unauthorized discharges and take all reasonable steps to minimize any adverse impacts to waters of the state and correct the problem. The Permittee shall notify the Department by telephone so that an investigation can be made to evaluate any resulting impacts and the corrective actions taken to determine if additional action should be taken.

G4. Non-compliance Notification: (Continued)

In the case of any discharge subject to any applicable toxic pollutant effluent standard under Section 307(a) of the Clean Water Act, or which could constitute a threat to human health, welfare, or the environment, 40 CFR Part 122 requires that the information specified in Sections G4.A., G4.B., and G4.C., above, shall be provided not later than 24 hours from the time the Permittee becomes aware of the circumstances. If this information is provided orally, a written submission covering these points shall be provided within five days of the time the Permittee becomes aware of the circumstances, unless the Department waives or extends this requirement on a case-by-case basis.

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

G5. Bypass Prohibited:

The intentional bypass of wastes from all or any portion of a treatment works is prohibited unless the following four conditions are met:

- A. Bypass is: (1) unavoidable to prevent loss of life, personal injury, or severe property damage; or (2) necessary to perform construction or maintenance-related activities essential to meet the requirements of the Clean Water Act and authorized by administrative order;
- B. There are no 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 temporary reduction or termination of production;
- C. The Permittee submits notice of an unanticipated bypass to the Department in accordance with Condition G4. Where the Permittee knows or should have known in advance of the need for a bypass, this prior notification shall be submitted for approval to the Department, if possible, at least 30 days before the date of bypass (or longer if specified in the special conditions);
- D. The bypass is allowed under conditions determined to be necessary by the Department to minimize any adverse effects. The public shall be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible.

"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. Severe property damage does not mean economic loss caused by delays in production.

G5. Bypass Prohibited: (Continued)

After consideration of the factors above and the adverse effects of the proposed bypass, the Department will approve or deny the request. Approval of a request to bypass will be by administrative order under RCW 90.48.120.

G6. 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.

G7. Permit Modifications:

The Permittee shall submit a new application or supplement to the previous application where facility expansions, production increases, or process modifications will (1) result in new or substantially increased discharges of pollutants or a change in the nature of the discharge of pollutants, or (2) violate the terms and conditions of this permit.

G8. Permit Modified or Revoked:

After notice and opportunity for public hearing, this permit may be modified, terminated, or revoked during its term for cause as follows:

- A. Violation of any terms or conditions of the permit;
- B. Failure of the Permittee to disclose fully all relevant facts or misrepresentations of any relevant facts by the Permittee during the permit issuance process;
- C. A change in any condition that requires either a temporary or a permanent reduction or elimination of any discharge controlled by the permit;

G8. Permit Modified or Revoked: (continued)

- D. Information indicating that the permitted discharge poses a threat to human health or welfare;
- E. A change in ownership or control of the source; or
- F. Other causes listed in 40 CFR 122.62 and 122.63.

Permit modification, revocation and reissuance, or termination may be initiated by the Department or requested by any interested person.

G9. Reporting a Cause for Modification:

A Permittee who knows or has reason to believe that any activity has occurred or will occur which would constitute cause for modification or revocation and reissuance under Condition G8. or 40 CFR 122.62 must report such plans, or such information, to the Department so that a decision can be made on whether action to modify or revoke and reissue a permit will be required. The Department may then require submission of a new application. Submission of such application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G10. 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.

G11. Plan Review Required:

Prior to constructing or modifying any wastewater control facilities, detailed plans shall be submitted to the Department for approval in accordance with Chapter 173-240 WAC. Facilities shall be constructed and operated in accordance with the approved plan.

G12. Other Requirements of 40 CFR:

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

G13. 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.

G14. Additional Monitoring:

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

G15. Revocation for Non-Payment of Fees:

The Department may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G16. 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.

G17. Duty to Reapply:

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

**FACT SHEET FOR NPDES PERMIT WA-002070-2
City of Langley Wastewater Treatment Plant**

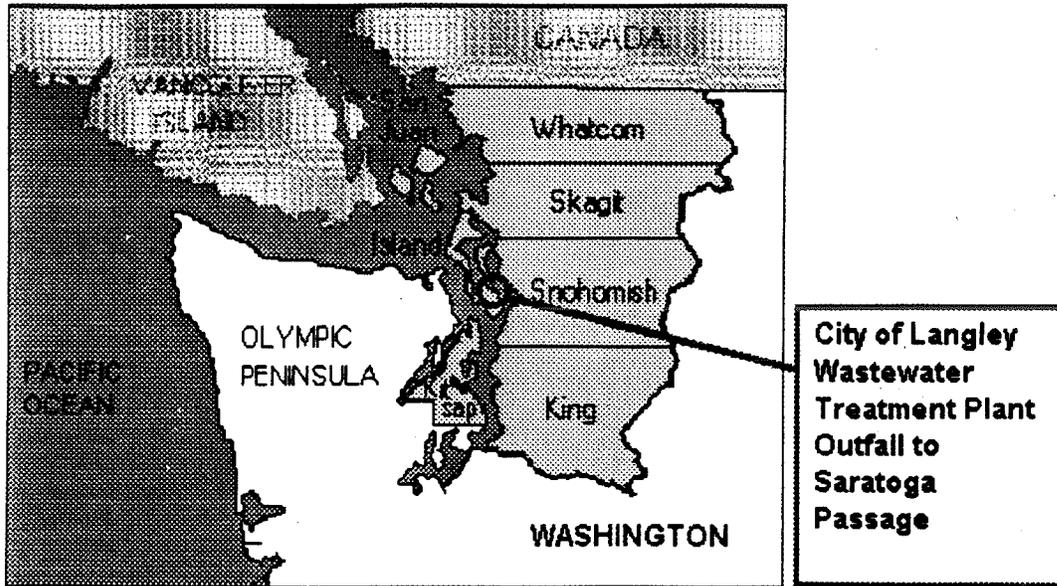
INTRODUCTION

This fact sheet is a companion document to the National Discharge Elimination System (NPDES) Permit No. WA-002070. The Department of Ecology (the Department) is proposing to issue this permit to the City of Langley, which will allow discharge of treated municipal wastewater from the City's domestic wastewater treatment plant to waters of the State of Washington.

This fact sheet explains the nature of the proposed discharge, the Department's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions. Public involvement information is contained in Appendix A. Definitions are included in Appendix B.

SUMMARY

The Department proposes renewing the NPDES permit for discharge from the Langley Wastewater Treatment Plant (WWTP). Allowable loading and mass limits for conventional pollutants are increased in relation to the existing permit. The increase reflects a treatment plant upgrade, completed in 1991, which increased the plant capacity. Monitoring frequencies for some conventional pollutants are increased to current agency standard minimums. Conditions added to this new permit, which were not included in the existing permit, are as follows: limits for chlorine, monthly monitoring for ammonia, and monitoring requirements for sludge based on the requirements of 40 CFR 503. The permit provides a mixing zone authorization for meeting water quality standards. Laboratory accreditation is required by July, 1994.



GENERAL INFORMATION

Applicant: City of Langley

Facility Name: City of Langley Wastewater Treatment Plant

Address: 999 Coles Road, Langley, WA 98260

Type of Treatment: Activated Sludge - Sequencing Batch Reactors

Discharge Location: Sarotoga Passage
Latitude: 48° 02' 39" N
Longitude: 122° 24' 40" W

Water Body ID Number: WA-06-0010

Waterway segment number: 03-06-07

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BACKGROUND INFORMATION

DESCRIPTION OF THE RECEIVING WATER

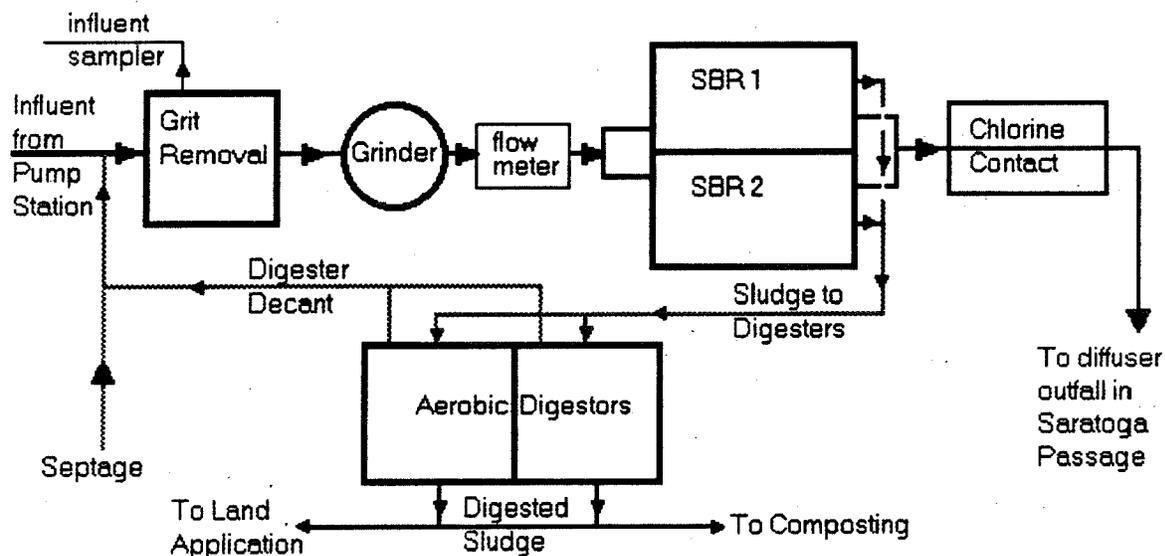
Saratoga Passage is designated as a Class A marine water¹ in the vicinity of the outfall. Characteristic uses include the following: water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; recreation; commerce and navigation. Saratoga Passage is considered an estuary for the purpose of assigning a mixing zone.

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 chlorine 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.



Flow Schematic for City of Langley WWTP

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.

The City is currently obtaining permits to apply sludge to municipal property near the treatment plant. The facility submitted sludge analysis data for metals. The metals contents revealed by that analysis are well below standards promulgated by the Environmental Protection Agency (EPA) in 40 CFR 503.

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 city is preparing to begin accepting sewage from septic tanks. The plant is classified as Class 2. A Class 2 operator and a Class 1 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 the 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.

PREVIOUS PERMIT LIMITATIONS

The previous permit for this facility was issued on November 19, 1982. The previous permit limited the effluent as shown in the following table:

<u>Parameter</u>	<u>Monthly Average</u>	<u>Weekly Average</u>
5-day Biochemical Oxygen Demand (BOD ₅)	30 mg/l, 22 lbs/day	45 mg/l, 33 lbs/day
Total Suspended Solids (TSS)	45 mg/l, 21 lbs/day	45 mg/l, 33 lbs/day
Fecal Coliform	200/100 mL	400/100 mL
pH	shall not be outside the range 6.0 to 9.0	

The limits shown above were amended by Administrative Order no. 82-549, issued by the Department, to limits appropriate for a primary treatment plant.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The Department inspected the facility on May 20, 1993. Since the new plant came on line in October, 1992, the Permittee has remained in compliance based on Discharge Monitoring Reports (DMR's) and inspections conducted by the Department. Prior to that time, the Permittee failed to meet secondary treatment standards due to the lack of secondary treatment facilities.

Graphs 1, 2, and 3 on the following page show the change in compliance status following the upgrade of the old plant to a secondary plant in October, 1992. The graphs are based on DMR data submitted by the Permittee. Graphs 4 and 5 on page 8 show the organic loading (graph 4) and the hydraulic loading (graph 5). Data submitted prior to October, 1992 is suspect due to poor flow recording equipment and lack of 24-hour composite sampling. Based on the data submitted since October, 1992, the plant is operating within design parameters.

WASTEWATER CHARACTERIZATION

An application for permit renewal was submitted to the Department on March 27, 1990. The town submitted another application on September 29, 1993 to reflect conditions at the new treatment plant; that application was accepted by the Department on September 30, 1993.

The annual average daily discharge as described in the NPDES application is characterized for the following regulated parameters:

<u>Parameter</u>	<u>Average Daily Discharge</u>	<u>Analysis Frequency</u>
Flow	0.07 MGD	continuously
5-day biochemical oxygen demand (BOD ₅)	7 mg/L	2/month
Total suspended solids (TSS)	8 mg/L	2/month
Fecal coliform	< 45 colonies/100 mL	1/week
pH	6.7 to 7.2	daily
Ammonia	0.18 mg/L	once
Residual chlorine	0.23 mg/L	daily
trace metals - see Reasonable Potential Calculation in appendix C		

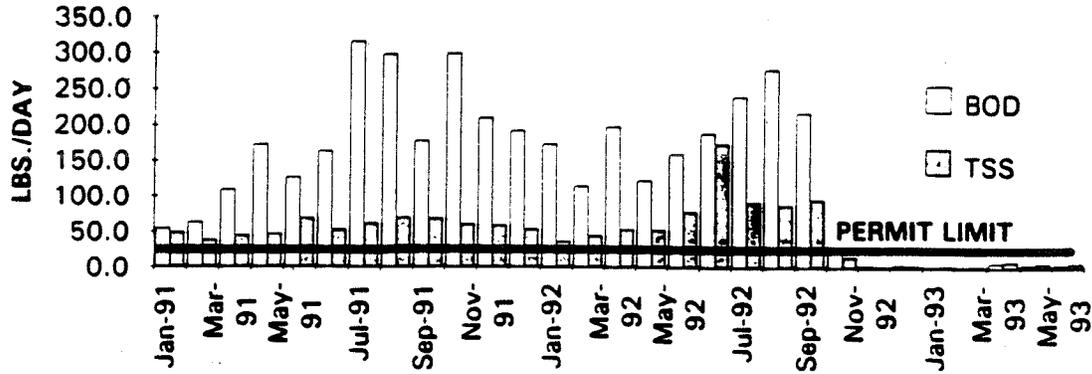
PROPOSED PERMIT LIMITATIONS AND CONDITIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology-based or water quality-based. Technology-based limitations are set by regulations (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Water Quality Standards (Chapter 173-201A WAC). The Department selects the more stringent of these two limits for each of the parameters of concern. Each of these types of limits is described in subsequent sections.

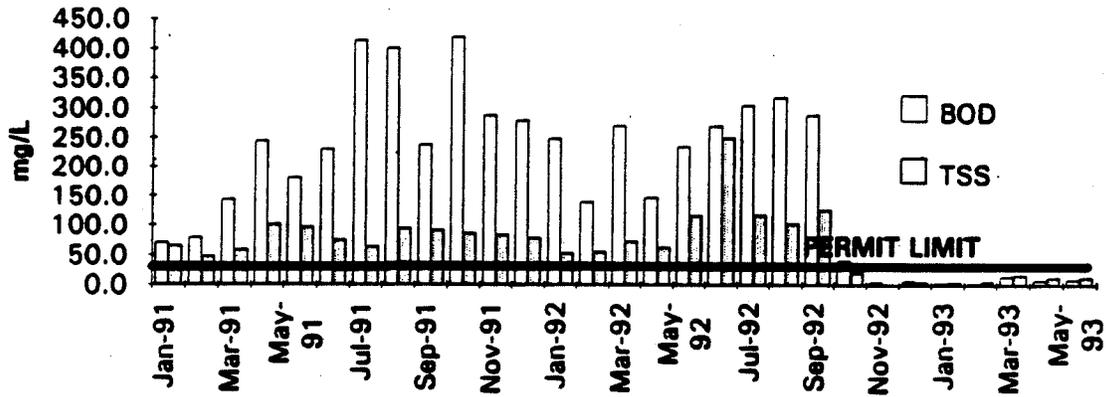
DESIGN CRITERIA

In accordance with Washington Administrative Code (WAC) 173-220-130(1)(a), effluent limitations shall not be less stringent than those based upon the design efficiency for the facility, including removal efficiencies, which are contained in approved engineering plans, reports, or approved revisions. Also, in accordance with WAC 173-220-150(1)(g), flows or waste loading shall not exceed approved design criteria.

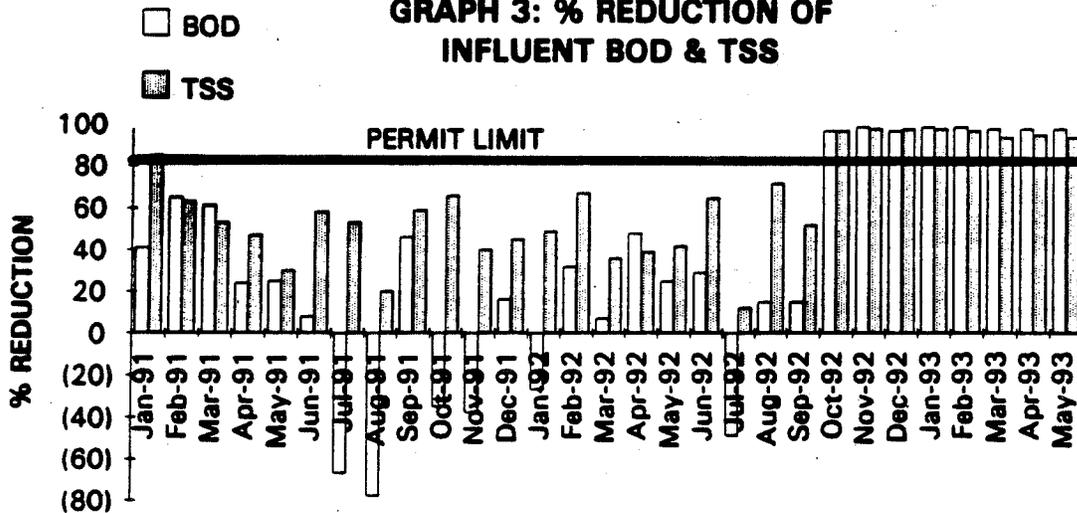
GRAPH 1: MONTHLY AVE. EFFLUENT BOD & TSS

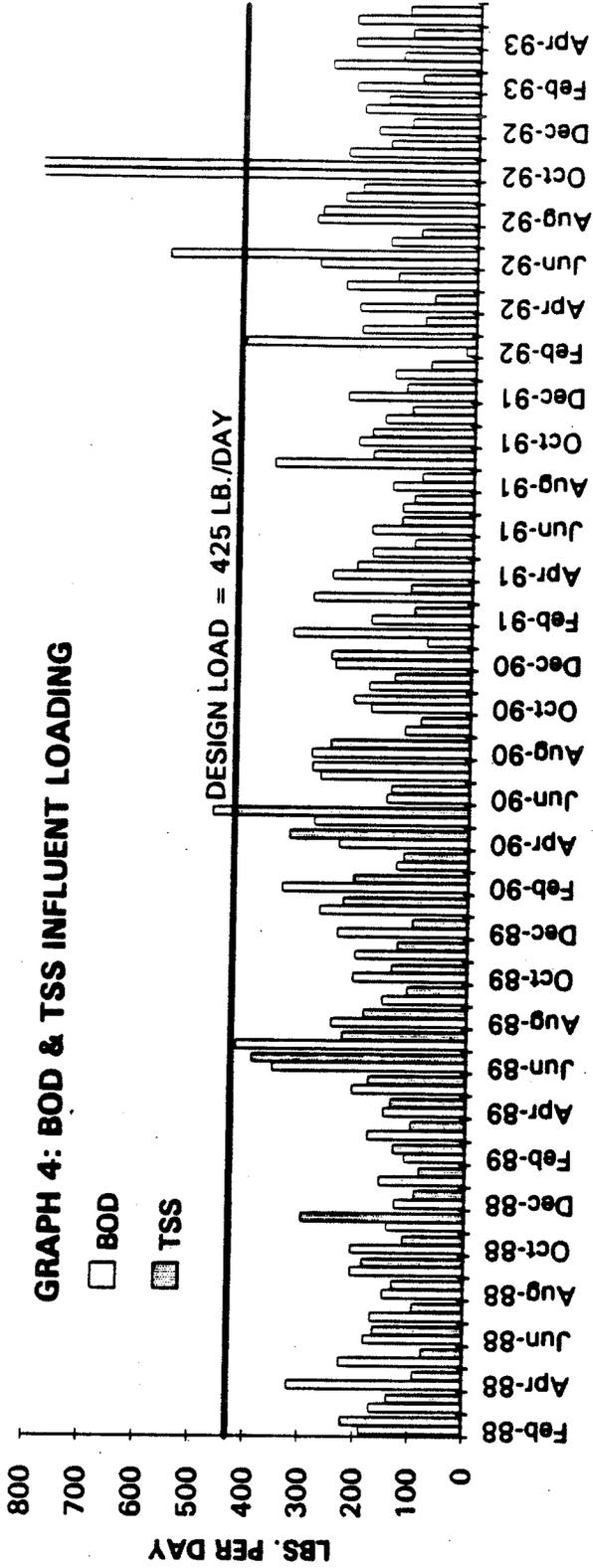


GRAPH 2: MONTHLY AVE. EFFLUENT BOD & TSS CONCENTRATION

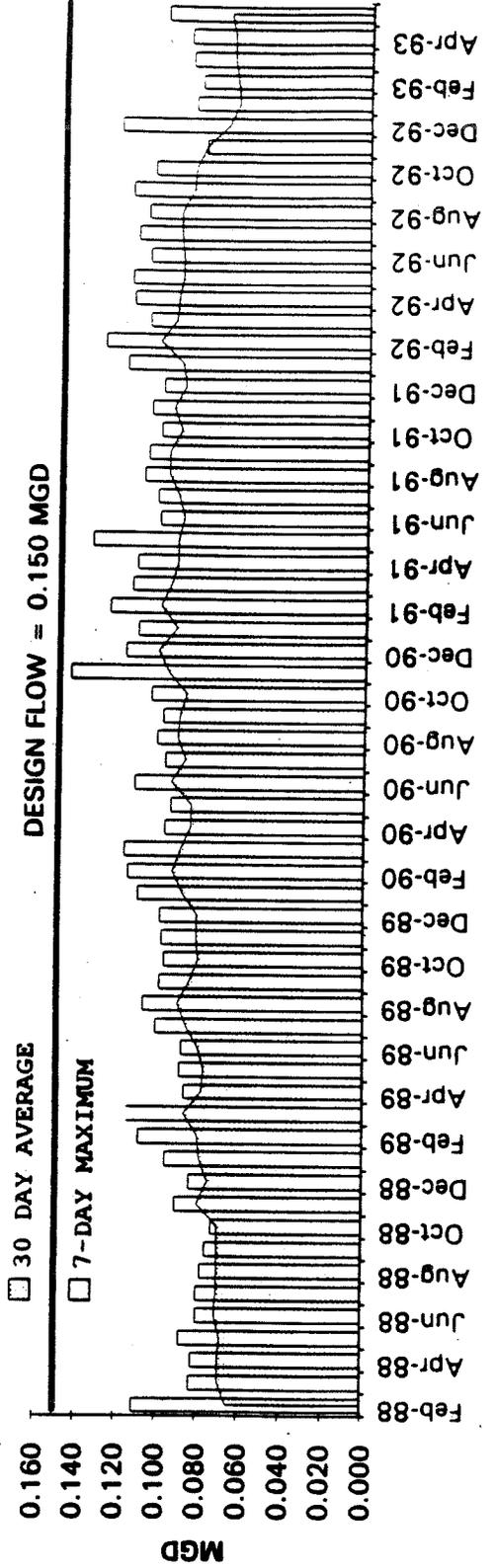


GRAPH 3: % REDUCTION OF INFLUENT BOD & TSS





GRAPH 5: MONTHLY FLOW - AVERAGE AND 7-DAY MAX



The design criteria for this treatment facility are as follows:

Average flow for maximum month	0.150 mgd
Monthly average flow	0.135 mgd
Instantaneous peak flow	0.300 mgd
BOD influent loading	425 lbs/day
TSS influent loading	425 lbs/day

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 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of treatment (AKART) for municipal wastewater.

The following technology-based limits are taken from Chapter 173-221 WAC:

pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 colonies/100ml Weekly Geometric Mean = 400 colonies/100ml
5-day Biochemical Oxygen Demand (BOD ₅)	Average Monthly Limit is the most stringent of the following: - 30mg/L - may not exceed fifteen percent (15%) of the average influent concentration
Total Suspended solids (TSS):	Average Monthly Limit is the most stringent of the following: - 30mg/L - may not exceed fifteen percent (15%) of the average influent concentration

The following technology-based limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Effluent mass loading (lbs/day) of BOD and TSS were calculated as follows:

$$\text{Average design flow (0.15 mgd)} \times \text{Concentration limit (30 mg/L)} \times 8.34 \text{ (conversion factor)} = \text{mass limit } \underline{37.5 \text{ lbs/day.}}$$

$$\text{Weekly average effluent mass loading} = 1.5 \times \text{monthly loading} = \underline{56.3 \text{ lbs/day.}}$$

The permit limitations listed above serve as the permit limits unless a water quality-based limitation is more stringent for one of the pollutants listed above.

WATER QUALITY-BASED EFFLUENT LIMITATIONS

The Washington State Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the waters of the state. WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Water Quality Standards. Major elements of the State's Water Quality Standards establish numerical criteria, narrative criteria, antidegradation policy, and mixing zones applicable to the discharge.

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards (Chapter 173-201A WAC), which specify the allowable levels of pollutants in a receiving water. WAC 173-201A-030 contains numerical criteria for dissolved oxygen, bacteria, temperature, pH and turbidity for water bodies in the State. Numerical criteria are also listed for many toxic substances including chlorine and ammonia (WAC 173-201A-040). Numeric criteria set forth in the Water Quality Standards are one method to derive the effluent limits in a discharge permit. When water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) are used to limit acute and chronic toxicity, radioactivity, and other deleterious materials, and prohibit the impairment of the aesthetic value of the waters of the state. Narrative criteria describe the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

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.

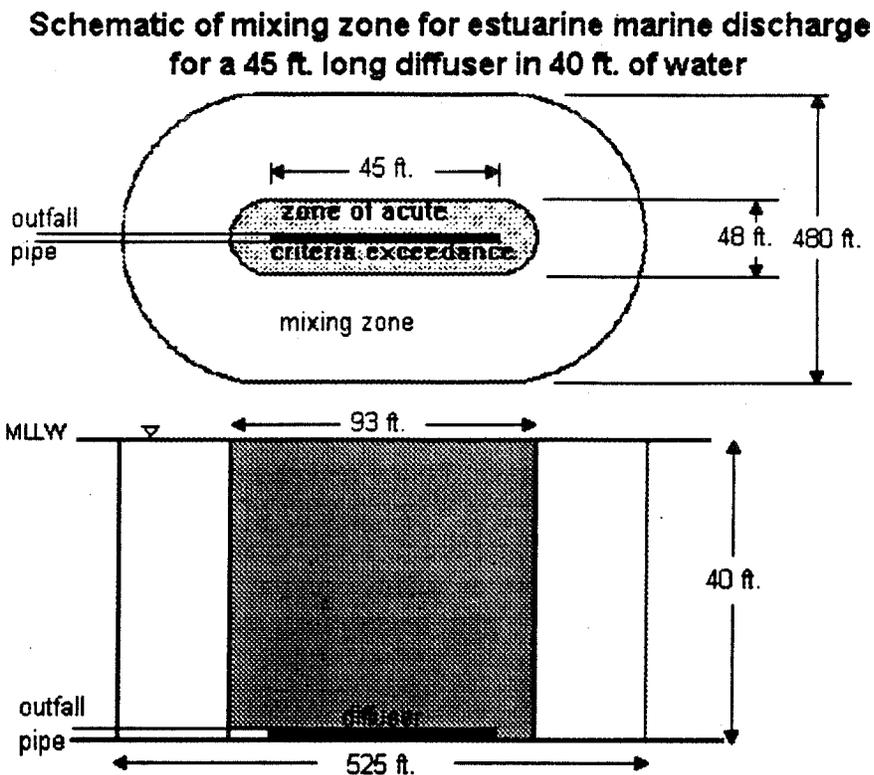
The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment at the point of discharge. The concentration of pollutants at the edge 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 and control.

Mixing Zone Authorization

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 from the outfall diffuser and the zone of acute criteria exceedance not extend further than 24 feet 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 EPA Plumes interface - the UM Model³. Data used for the modeling was July, 1970 current speed data for Saratoga Passage from the National Oceanic and Atmospheric Administration in Seattle, Washington. 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.



Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. A pollutant such as BOD may be a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water. Water quality-based limits are derived for the *critical condition* of the waterbody, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota and existing or characteristic water body uses.

Dissolved Oxygen (DO)-EPA provides a methodology for assessing the impact of BOD on dissolved oxygen in the receiving water in publication number EPA/430/9-82-011⁷. Using EPA's methodology, worst case assumptions for the receiving water, and the technology based discharge standard of 45 mg/L for BOD, DO depletion due to the discharge is less than 0.2 mg/L, the maximum allowed by state water quality standards. The technology-based limit for BOD₅ is more stringent than the water-quality based limit. The permit contains the technology-based effluent limitation for BOD₅.

Temperature - Temperature effects of the effluent are negligible with 400:1 dilution. The resulting temperature from a 20 degree C effluent discharge to 1 degree C receiving water would result in a temperature of $[400(1) + 1(20)]/401 = 1.04$ degrees C. This extreme case demonstrates the discharge will comply with the water quality standard for temperature increase at the edge of mixing zone. No effluent limitation for temperature was placed in the permit.

Fecal coliform - The technology-based limit for fecal coliform bacteria of 400 colonies/100mL will meet the water quality standard of 14 colonies/100 mL. The technology based limit restricts bacteria to one colony per 100 mL at the edge of the mixing zone (400 colonies/100mL / 400 = 1 colony/100mL).

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 Standards¹².

Toxic Substances - 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 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 or from having water quality-based effluent limits.

The impact of chlorine, ammonia, cadmium, chromium, copper, lead, nickel, and zinc were modeled using the method described by EPA¹⁰ using dilution factors described above (see Reasonable Potential Calculation in appendix C). 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. Effluent limits for chlorine were calculated using methods from EPA¹⁰ as shown in Appendix D. The permit requires characterization testing for ammonia on a monthly basis to provide information for future permits. The Permittee submitted one sample result for ammonia in the effluent; additional data will provide verification that ammonia in the discharge will not violate water quality standards.

The resultant effluent limits are as follows:

<u>Parameter</u>	<u>Average Monthly Limit</u>	<u>Maximum Daily Limit</u>
Residual Chlorine	0.43 mg/L	1.13 mg/L

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

The conditions in this permit seek to protect aquatic life from toxic effects. It is assumed that protecting aquatic life will also protect the health of humans. If the Department finds that this permit does not protect human health, the permit will be modified to incorporate new conditions as needed.

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 Permittee performed an analysis of sediment characteristic at the outfall in 1991 to obtain an aquatic land lease from the State Department of Natural Resources for an outfall extension⁶. The analysis demonstrated that the Permittee's discharge complies with State aquatic sediment standards. No further sediment analysis will be required during the life of this permit.

Residual Solids Control & Limitations

Residual solids generated at the plant include grit, scum, and waste activated sludge. The plant disposes of grit at a sanitary landfill. Sludge (scum and wasted sludge) is aerobically digested and then composted. The plant is currently obtaining approval from Island County Health Department to apply biosolids to land. The Permittee submitted a solids handling plan along with the permit application. The proposed permit contains a condition which requires an update of the residual solids management plan whenever the plant changes its solids handling methods.

40 CFR 503 regulates the application of sludge to land. Land application requirements depend on the type of sludge processing employed and several variables. For the process used at the Langley WWTP, aerobic digestion and composting, the relevant variables are metals concentrations, fecal coliform counts in the processed sludge, mean cell residence time and temperature in the anaerobic digester, and percent volatile solids reduction during the digestion process. Metals standards for sludge application to land are as listed in the following table.

<u>1. Pollutant</u>	<u>2. Ceiling Concentration</u>	<u>3. Pollutant Concentrations</u>	<u>4. Cumulative Pollutant Loading Rate</u>
	mg/kg	mg/kg	kg/ha
arsenic	75	41	41
cadmium	85	39	39
chromium	3000	1200	3000
copper	4300	1500	1500
lead	840	300	300
mercury	57	17	17
molybdenum	75	18	18
nickel	420	420	420
selenium	100	36	100
zinc	7500	2800	2800

The ceiling concentration (2.) sets a maximum concentration of pollutants which the sludge can contain if it is to be applied to agricultural lands. If any of the pollutant concentrations exceed the value listed under column 2 then the sludge can not be land applied. Pollutant concentration (3.) and cumulative pollutant loading rates (4.) set two alternative limits for amount of pollutant applied to agricultural land, forest, a public contact site, or a reclamation site. The applicator can meet either the pollutant concentration limit (3.) in the sludge, or not exceed the loading limit (4.) on the application site.

40 CFR 503 sets two operational standards for sludge application sites: Class A and Class B. The requirements for sites which receive Class A sludge are less restrictive than for sites which receive Class B sludge. Examples of methods for the Permittee to meet the requirements for designating the sludge produced at the plant as Class A in terms of vector attraction reduction and pathogen standards per the regulations in 40 CFR 503 are as follows:

- Pathogens reduction requirement in section 503.32(a)(7):
 1. The fecal coliform count in the sludge must be less than 1000 Most Probable Number per gram, or the density of Salmonella sp. bacteria in the sludge shall be less than three Most Probable Number per four grams (weight on a dry weight basis).
 2. Use one of the Processes to Further Reduce Pathogens list in appendix B of part 503. Number 1 in that list requires the Permittee to compost the sludge in windrows and maintain the temperature at a minimum of 55 degrees C for at least 15 days. During the period the temperature is maintained at 55 degrees C, the windrow shall be turned at least 5 times.

- Vector attraction reduction
 1. Meet the requirement of section 503.33 (b)(1) - Reduce the mass of volatile solids in the sewage sludge by a minimum of 38% during digestion; or (b)(4) reduce the specific oxygen uptake rate to 1.5 milligrams or less per hour per gram of dry weight of solids.

40 CFR 503 contains many other methods of meeting federal standards for Class A residual solids designation. If the plant meets none of those requirements, the sludge shall be classified Class B. Class B sludge has more strict application and sampling requirements. The Island County Health Department regulates land application of residual solids.

MONITORING AND REPORTING

Effluent monitoring, recording, and reporting are required (WAC 173-220-210) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved. Condition S2. in the permit specifies the monitoring and testing schedule for permit compliance. 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 frequencies of monitoring listed in S2. are considered to be the minimum frequency to document compliance.

Monitoring of sludge quantity and quality is necessary to determine whether or not a discharger will be considered a sludge generator and to determine the appropriate uses of the sludge. Sludge monitoring is required in accordance with 40 CFR 122.44(a)(2). Monitoring frequency for residual solids is dependent on sludge generated per year on a dry weight basis. The permit application predicts dry solids generation of 25 to 50 tons per year. 40 CFR 503 requires analysis of the sludge once per year for Permittees who produce less than 290 metric tons per year.

Process control monitoring is specified in the Operation and Maintenance (O & M) Manual for the Langley WWTP. The permit requires the Permittee to monitor in accordance with the O & M Manual except for the requirement to monitor Chemical Oxygen Demand (COD). The COD test generates hazardous waste; the Department discourages generation of hazardous wastes.

OTHER PERMIT CONDITIONS

PREVENTION OF FACILITY OVERLOADING

Over loading of the treatment plant may result in 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 permit requirement S4. 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 S4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O & M)

The proposed permit contains special condition S5. 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 occurring from the improper storage, handling, or disposal of solid wastes, the Permittee is required in permit condition S7. to handle and dispose of all residual solids in accordance with the requirements of RCW 90.48.080 and the jurisdictional health department; the Department-required management plan (WAC 173-240-060(3)(m)); State Water Quality Standards; and applicable federal laws.

INDUSTRIAL USERS

An industrial user survey may be required to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations (40 CFR 403 and Sections 307(b) and 308 of the Clean Water Act), with state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances.

GENERAL CONDITIONS

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

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 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 5 years.

REVIEW BY THE PERMITTEE

A proposed permit was reviewed by the Permittee for verification of facts. Only factual items were corrected in the draft permit.

BIBLIOGRAPHY

1. Water Quality Standards for Surface Waters of the State of Washington - Washington Administrative Code chapter 173-201A.
2. Environmental Protection Agency National Pollution Discharge Elimination System application forms 1 and 2C filed by the City of Langley, signed September 28, 1993 by Mayor Vicki Lash.
3. Baumgartner, D.J., Frick, W.E. , Roberts, P.J.W., Bodeen, C.A., Dilution Models for Effluent Discharges. (PLUMES) USEPA Pacific Ecosystems Branch, ERL-N, Newport, Oregon. June, 1993.
4. Facilities Plan for Secondary Treatment - Final Plan for the City of Langley, prepared by Research Planning Associates. June 15, 1990.
5. Discharge Monitoring Reports for NPDES Permit No. WA002070-2 January, 1988 to June, 1993.
6. Correspondence from Dale Elliot, Mayor for City of Langley to Celia Barton, Washington Department of Natural Resources Aquatic Lands Division dated June 24, 1991, re: Sediment testing in the vicinity of the outfall, City of Langley, Secondary Treatment Project - report on results of the sampling.
7. Revised Section 301h Technical Support Document (draft) (EPA/430/9-82-011); U. S. Environmental Protection Agency, 1982.
8. Dept. of Ecology Inspection Report for Langley Wastewater Treatment Plant by Gerald Shervey, May 20, 1993.
9. Discharge Standards and Effluent Limitations for Domestic Wastewater Facilities - Chapter 173-221 Washington Administrative Code.
10. Technical Support Document For Water Quality-based Toxics Control (EPA/505/2-90-001); U. S. Environmental Protection Agency, 1991.
11. National Pollutant Discharge Elimination System Permit Program - Chapter 173-220 Washington Administrative Code.
12. Permit Writer's Manual; Washington State Department of Ecology, October, 1991.
13. Code of Federal Regulations: Title 40, Chapter I, Subchapter O, Part 503 - Standards for the Use or Disposal of Sewage Sludge.

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the City of Langley. The permit contains conditions and effluent limitations which are described in this fact sheet.

Public notice of application was published on October 12, 1993 and October 19, 1993 in the South Whidbey Record to inform the public that an application had been submitted and to invite comment on the issuance of this permit.

The Department published a Public Notice of Draft on January 4, 1994 in the South Whidbey Record to inform the public that a draft permit and fact sheet were 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 4:30 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 160th Avenue SE
Bellevue, WA 98008-5452

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, (206) 649-7201, or by writing to the address listed above.

APPENDIX B--DEFINITIONS

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.

BOD₅--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 BOD₅ 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.

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

Class 1 Inspection--A walk-through inspection of a facility that includes a visual inspection and some examination of facility records. It may also include a review of the facility's record of environmental compliance.

Class 2 Inspection--A walk-through inspection of a facility that includes the elements of a Class 1 Inspection plus sampling and testing of wastewaters. It may also include a review of the facility's record of environmental compliance.

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.

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.

Mixing Zone--An area 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.

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.

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 is the particulate material 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.

Water Quality-based Effluent Limit--A limit on the concentration 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

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.

PARAMETER	AMBIENT CONC.		MAX CONCENTRATION AT EDGE OF		STATE WATER QUALITY STANDARD		LIMIT REQ'D?	COMMENTS
	ug/L	ug/L	ACUTE MIXING ZONE	CHRONIC MIXING ZONE	ACUTE	CHRONIC		
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		
AMMONIA		12.82	2.79	1250.00	190.00			expressed as ug N / L
CADMIUM		0.06	0.01	37.20	8.00			
CHLORINE		10.51	2.29	13.00	7.50			
CHROMIUM (HEX)		0.43	0.09	1100.00	50.00			detect limit
COPPER		1.78	0.39	2.50	50000.00			
LEAD		0.14	0.03	151.10	5.80			
NICKEL		0.71	0.15	71.30	7.90			detect limit
ZINC		8.55	1.86	84.60	76.60			

Spreadsheet prepared by G. Shervy, WA Dept. of Ecology, NW Regional Office on 2-5-93. Last revised 8-30-93.

APPENDIX C
REASONABLE POTENTIAL CALCULATION

PARAMETER	PROB'TY BASIS	Pn	EFFLUENT MAX CONC. ug/L	COEFF			# OF SAMPLES n	ACUTE DIL'N FACTOR		CHRONIC DIL'N FACTOR	
				VAR	CV	σ		PLIER	FACTOR	FACTOR	FACTOR
AMMONIA	0.95	0.05	180.00	0.60	0.60	0.55	1	6.20	87	400	400
CADMIUM	0.95	0.05	0.83	0.60	0.60	0.55	1	6.20	87	400	400
CHLORINE	0.95	0.95	900.00	0.60	0.60	0.55	55	1.02	87	400	400
CHROMIUM (HEX)	0.95	0.05	6.00	0.60	0.60	0.55	1	6.20	87	400	400
COPPER	0.95	0.05	25.00	0.60	0.60	0.55	1	6.20	87	400	400
LEAD	0.95	0.05	2.00	0.60	0.60	0.55	1	6.20	87	400	400
NICKEL	0.95	0.05	10.00	0.60	0.60	0.55	1	6.20	87	400	400
ZINC	0.95	0.05	120.00	0.60	0.60	0.55	1	6.20	87	400	400
	0.95	0.05		0.60	0.60	0.55	1	6.20	87	400	400

APPENDIX D
 WATER QUALITY BASED
 PERMIT LIMIT CALCULATIONS

11/12/93 2:52 PM
 [LANGLEY.XLM]LIMIT.XLS

DILUTION FACTOR IS THE INVERSE OF PERCENT EFFLUENT CONCENTRATION AT THE EDGE OF THE ACUTE OR CHRONIC ZONE	PERMIT LIMIT CALCULATION SUMMARY					
	ACUTE DIL'N FACTOR ratio	CHRONIC DIL'N FACTOR ratio	STATE WATER QUALITY STANDARD ACUTE ug/L	STATE WATER QUALITY STANDARD CHRONIC ug/L	AVERAGE MONTHLY LIMIT (AML) ug/L	MAXIMUM DAILY LIMIT (MDL) ug/L
chlorine	87.0	400.0	13.00	7.50	432	1131
<p>This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. 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 99.</p>						

APPENDIX E
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)	1.5

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	15.323%
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	<u>1.25</u>
Chronic	<u>0.19</u>

Nov 23, 1993, 11: 9:13 ERL-N PROGRAM PLUMES, Jun 11, 1993 Case: 43 of 4
 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 d
 0.006572 10 0.0006572 1.524 0.0 11.4 25 1
 port dep port dia plume dia total vel horiz vel vertl vel asp coeff print f
 12. 0.07620 0.05951 0.2362 0.2362 0.000 0.10 1
 port elev ver angle cont coef effl den poll conc decay Froude # Roberts
 0.4572 0.0 0.61 -0.371508 100 0 2.036 0.0010
 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 0.00079
 depth current density salinity temp amb conc N (freq) red gra
 5 0.042 19.01 0 0.05430 0.22
 8.5 0.018 20.83 0 buoy flux puff-th
 9 0.0148 21.17 0.0001488 0.22
 9.5 0.011 21.76 jet-plume jet-cro
 10 0.008 21.89 0.1140 0.89
 10.5 0.0095 21.97 plu-cross jet-str
 11 0.011 22.31 54.21 0.47
 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.

to rang

Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: langley;
 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-		distance	Time	
conc	dilution	conc	dilution		m	sec
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

Nov 23, 1993, 11:15:19 ERL-N PROGRAM PLUMES, Jun 11, 1993 Case: 44 of 4
 Title CHRONIC 3 - DEC, '91 & net vector velocity linear
 tot flow # ports port flow spacing effl sal effl temp far inc far d
 0.006572 10 0.0006572 1.524 0.0 11.4 25 1
 port dep port dia plume dia total vel horiz vel vertl vel asp coeff print f
 12. 0.07620 0.05951 0.2362 0.2362 0.000 0.10 1
 port elev ver angle cont coef effl den poll conc decay Froude # Roberts
 0.4572 0.0 0.61 -0.371508 100 0 2.036 0.0010
 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 0.00079
 depth current density salinity temp amb conc N (freq) red gra
 5 -0.042 19.01 0 0.05430 0.22
 8.5 -0.007 20.83 0 buoy flux puff-th
 9 -0.002 21.17 0.0001488 0.22
 9.5 0.003 21.76 jet-plume jet-cro
 10 0.008 21.89 0.1140 0.89
 10.5 0.0095 21.97 plu-cross jet-str
 11 0.011 22.31 54.21 0.47
 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.

0.015 m/s, 0.04921 ft/s

>0.0 to 2.0 m/s rang

Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: langley;

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	
9.428	0.8113	1.845	53.02	0.8486	-> trap level
9.057	1.090	1.563	62.62	0.9324	
8.929	1.432	1.499	65.28	0.9848	-> 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 15.15m

--4/3 Power Law-- -Const Eddy Diff-

conc	dilution	conc	dilution	distance	Time	
				m	sec	hrs
0.7678	128.8	1.050	93.8	25.00	1601	0.4
0.4185	237.5	0.7994	123.7	50.00	3268	0.9
0.2716	366.8	0.6699	147.8	75.00	4934	1.4
0.1942	513.4	0.5879	168.7	100.0	6601	1.8

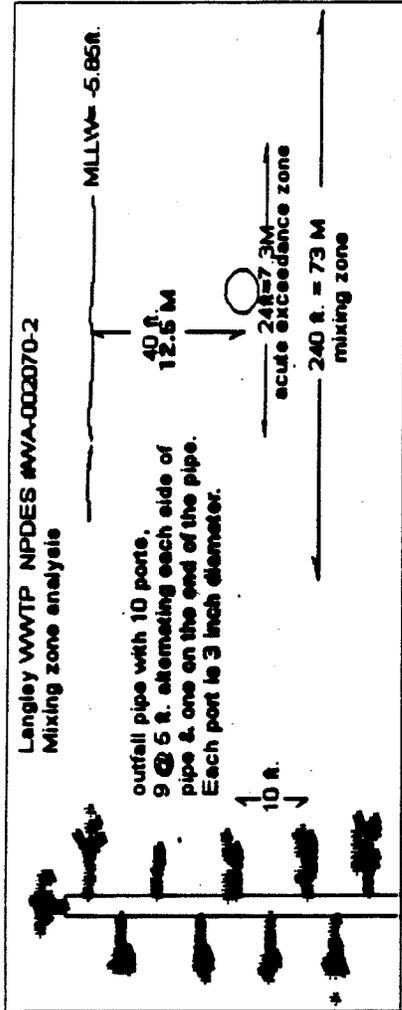
APPENDIX F
 MIXING ZONE CALCULATIONS FOR LANGLEY OUTFALL

CASE	VELOCITY (SOURCE)	SALINITY & TEMP		FARFIELD		ACUTE DILUT	CHRON DILUT	COMMENTS
		SOURCE	temp. cent	temp. cent	emf			
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		109		error Brooks(chronic value) not valid
42	Net vel. 0.15 MGD	Dec-90	0.015	11.4	430			for chronic only
43	Net vel. 0.15 MGD	Dec-91	0.015	11.4	80			Brooks error, plume diam 1 3/1 52
44	X vel. 0.15 MGD, with (-) vel. (vect)	Dec-91	0.015	11.4	76			Brooks error, plume diam 1 43/1 52
45	X vel. 0.15 MGD, with (-) vel. (vect)	Dec-90	0.015	11.4				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								

ACUTE DILUTION
 CHRONIC DILUTION

APPENDIX F
MIXING ZONE CALCULATIONS 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		VELOCITY		FARFIELD		CHRON		COMMENTS
		SOURCE	cent	m/sec	cent	DILUT	DILUT	DILUT		
1	avg cmt data	avg, 92 ambient	20	0.19	20	390	1470			
2	80% of min vel	avg, 92 ambient	20	0.19	20	650	1000			
3	2 to 4 cm/s	avg, 92 ambient	20	0.04	20	<350	490			
4	90% max	avg, 92 ambient	20	0.02	20	337	2293			
5	1 to 2 cm/sec	avg, 92 ambient	20	0.01	20	<253	663			
6	90% max	avg, 92 ambient	20	0.26	20	325	1570			
7	80% of min, slow bottom	avg, 92 ambient	20	0.19	20	850	850			
8	min vel	avg, 92 ambient	20	0.12	20	600	1148			
9	min vel, slow bottom	avg, 92 ambient	20	0.12	20	650	1060			
10	min. vel, slow bottom	avg, 92 ambient	16	0.12	16	<560	989			
11	avg vel	Sept, 92 ambient	19	0.19	19	425	1160			
12	80% of 90% min vel	Sept, 92 ambient	19	0.19	19	<500	810			
13	2 to 4 cm/s	Sept, 92 ambient	19	0.04	19	300	418			
14	90% max	Sept, 92 ambient	19	0.02	19	400	1984			
15	1 to 2 cm/sec	Sept, 92 ambient	19	0.01	19	<238	612			
16	not used									
17	not used									
18	not used									
19	90% min vel	Dec-90	11.4	0.12	11.4	203	240			
20	90% max, slow bottom	Dec-90	11.4	0.12	11.4	180	200			
21	avg. vel, slow bottom	Dec-90	11.4	0.19	11.4	180	204			error Brooks(chronic value) not valid
22	90% max, slow bottom	Dec-90	11.4	0.26	11.4	180	185			error Brooks(chronic value) not valid
23	90% min vel	Dec-90	11.4	0.12	11.4	270	312			
24	80% of 90% min vel	Mar-91	12.6	0.1	12.6	500	665			

Nov 23, 1993, 10:59:35 ERL-N PROGRAM PLUMES, Jun 11, 1993 Case: 41 of 4
 Title ACUTE ZONE based on Dec., 1990 & 90% low velocity non-line

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far d
0.01314	10	0.001314	1.524	0.0	11.4	25	1
port dep	port dia	plume dia	total vel	horiz vel	vertl vel	asp coeff	print f
12.	0.07620	0.05951	0.4724	0.4724	0.000	0.10	1
port elev	ver angle	cont coef	effl den	poll conc	decay	Froude #	Roberts
0.4572	0.0	0.61	-0.371508	100	0	4.467	0.36
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	0.0013
depth	current	density	salinity	temp	amb conc	N (freq)	red gra
5	0.13	13.7000	17.62	8.15	0	0.06385	0.18
8.5	0.123	16.9142	21.89	9.07	0	buoy flux	puff-th
9	0.122	16.9270	21.92	9.15		0.0002469	0.23
9.5	0.121	16.9166	21.91	9.17		jet-plume	jet-cro
10	0.12	17.0241	22.05	9.18		0.2502	0.21
10.5	0.11	17.1445	22.21	9.21		plu-cross	jet-str
11	0.112	17.2195	22.31	9.23		0.1624	0.62
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.

to rang

Help: F1. Quit: <esc>. Configuration: ATNO0. FILE: langley;
 UM INITIAL DILUTION CALCULATION (non-linear mode)

plume dep	plume dia	poll conc	dilution	hor dis
m	m			m
12.00	0.05951	100.0	1.000	0.000
11.99	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

-> end curvature, cylinder entrainment -> 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-		distance	Time	
conc	dilution	conc	dilution		m	sec
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

•• CALCULATION USED FOR ACUTE DILUTION FACTOR

Nov 23, 1993, 11: 4:37 ERL-N PROGRAM PLUMES, Jun 11, 1993 Case: 42 of 4
 Title CHRONIC 1 - Dec. 1990, net velocity for chronic non-line

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far d
0.006572	10	0.0006572	1.524	0.0	11.4	25	1
port dep	port dia	plume dia	total vel	horiz vel	vertl vel	asp coeff	print f
12.	0.07620	0.05951	0.2362	0.2362	0.000	0.10	1
port elev	ver angle	cont coef	effl den	poll conc	decay	Froude #	Roberts
0.4572	0.0	0.61	-0.371508	100	0	2.234	0.0013
hor angle	red space	p amb den	p current	far dif	far vel	K:vel/cur	Stratif
90	1.524	18.7823	0.01400	0.000453	0.015	16.87	0.0013
depth	current	density	salinity	temp	amb conc	N (freq)	red gra
5	0.042	13.7000	17.62	8.15	0	0.06385	0.18
8.5	0.018	16.9142	21.89	9.07	0	buoy flux	puff-th
9	0.0148	16.9270	21.92	9.15		0.0001235	0.24
9.5	0.011	16.9166	21.91	9.17		jet-plume	jet-cro
10	0.008	17.0241	22.05	9.18		0.1252	0.89
10.5	0.0095	17.1445	22.21	9.21		plu-cross	jet-str
11	0.011	17.2195	22.31	9.23		45.01	0.44
11.5	0.0125	17.6339	22.85	9.27		plu-strat	
12	0.014	18.7823	24.36	9.45		0.8299	
12.5	0.0155	19.6799	25.56	9.69		hor dis>=	

CORMIX1 flow category algorithm is turned off.

to rang

Help: F1. Quit: <esc>. Configuration: ATN00. FILE: langley;
 UM INITIAL DILUTION CALCULATION (non-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	0.1060	50.00	1.981	0.1365
11.79	0.1566	25.00	3.944	0.2928
11.47	0.2366	12.50	7.872	0.4354
10.98	0.3740	6.250	15.73	0.5960
10.18	0.6070	3.125	31.46	0.8139
9.533	0.8495	2.091	47.02	0.9879 -> trap level
9.078	1.120	1.573	62.48	1.137 -> trap level
9.068	1.128	1.563	62.91	1.141
8.917	1.242	1.408	69.80	1.201 -> trap level
8.615	1.542	1.113	88.35	1.345 -> merging
8.431	1.918	0.9356	105.1	1.459 -> begin overlap

FARFIELD CALCULATION (based on Brooks, 1960, see guide)

Farfield dispersion based on wastefield width of 15.63m

--4/3 Power Law--		-Const Eddy Diff-		distance	Time	
conc	dilution	conc	dilution		m	sec
0.4922	201.4	0.6634	148.9	25.00	1569	0.4
0.2683	370.9	0.5042	196.5	50.00	3236	0.9
0.1741	572.6	0.4221	235.1	75.00	4903	1.4
0.1245	801.3	0.3703	268.3	100.0	6569	1.8

- USE 400:1 FOR CHRONIC DILUTION FACTOR. CASE 42
- through 45 taken together result in a conservative estimate of 400:1 for chronic dilution. The only case below 400:1 is case 44 at 367:1. That run contains an error message that results in the model under-estimating dilution

Nov 23, 1993, 11:18:54 ERL-N PROGRAM PLUMES, Jun 11, 1993 Case: 45 of 49
 Title CHRONIC 4 - Dec. 1990, net vector velocity for chronic non-linear

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far di
0.006572	10	0.0006572	1.524	0.0	11.4	25	10
port dep	port dia	plume dia	total vel	horiz vel	vertl vel	asp coeff	print fr
12.	0.07620	0.05951	0.2362	0.2362	0.000	0.10	10
port elev	ver angle	cont coef	effl den	poll conc	decay	Froude #	Roberts
0.4572	0.0	0.61	-0.371508	100	0	2.234	0.00132
hor angle	red space	p amb den	p current	far dif	far vel	K:vel/cur	Stratif
90	1.524	18.7823	0.01400	0.000453	0.015	16.87	0.00131
depth	current	density	salinity	temp	amb conc	N (freq)	red grav
5	-0.042	13.7000	17.62	8.15	0	0.06385	0.187
8.5	-0.007	16.9142	21.89	9.07	0	0.0001235	0.240
9	-0.002	16.9270	21.92	9.15	0	jet-plume	jet-cros
9.5	0.003	16.9166	21.91	9.17		0.1252	0.890
10	0.008	17.0241	22.05	9.18		plu-cross	jet-stra
10.5	0.0095	17.1445	22.21	9.21		45.01	0.441
11	0.011	17.2195	22.31	9.23		plu-strat	
11.5	0.0125	17.6339	22.85	9.27		0.8299	
12	0.014	18.7823	24.36	9.45		hor dis>=	
12.5	0.0155	19.6799	25.56	9.69			

CORMIX1 flow category algorithm is turned off.

to range

Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: langley;

UM INITIAL DILUTION CALCULATION (non-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	0.1060	50.00	1.981	0.1365
11.79	0.1566	25.00	3.944	0.2928
11.47	0.2366	12.50	7.872	0.4354
10.98	0.3740	6.250	15.73	0.5960
10.18	0.6070	3.125	31.46	0.8139
9.528	0.8341	2.134	46.05	0.9859 -> trap level
9.080	1.023	1.746	56.31	1.109 -> trap level
8.882	1.104	1.618	60.77	1.164 -> trap level
8.786	1.143	1.563	62.91	1.190
8.242	1.618	1.287	76.39	1.338 -> merging
8.330	2.033	1.269	77.45	1.431

-> end curvature, cylinder entrainment -> local maximum rise or fall
 -> begin overlap

FARFIELD CALCULATION (based on Brooks, 1960, see guide)

Farfield dispersion based on wastefield width of 15.75m

--4/3 Power Law--		-Const Eddy Diff-		distance	Time	
conc	dilution	conc	dilution		m	sec
0.6694	148.0	0.9011	109.6	25.00	1571	0.4
0.3655	272.3	0.6853	144.6	50.00	3238	0.9
0.2374	420.0	0.5738	172.9	75.00	4905	1.4
0.1698	587.4	0.5033	197.3	100.0	6571	1.8

APPENDIX F
CURRENT VELOCITIES
IN SARATOGA PASSAGE

Depth (ft.)	Depth (M)	scalar velocity			vector		90% max velocity	90% min velocity	80% of min vel	
		mean cm/s	min cm/s	max cm/s	std dev	net vel				azimuth
3.3	1	31.2	0	70.3	10.8	16.6	5	45	17	14
16.4	5	22.9	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
<p>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.</p>										

APPENDIX G

Nov 17, 1993, 15:19: 2 ERL-N PROGRAM PLUMES, Jun 11, 1993 Case: 47 of 40
 Title Dec. 1991 0.15 Mgd Net velocity for DO linear
 tot flow # ports port flow spacing effl sal effl temp far inc far d
 0.006572 10 0.0006572 1.524 0.0 11.4 76.2 15
 port dep port dia plume dia total vel horiz vel vertl vel asp coeff print f
 12. 0.07620 0.05951 0.2362 0.2362 0.000 0.10 1
 port elev ver angle cont coef effl den poll conc decay Froude # Roberts
 0.4572 0.0 0.61 -0.371508 100 0 2.036 0.0010
 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 0.00079
 depth current density salinity temp amb conc N (freq) red gra
 5 -0.042 19.01 0 0.05430 0.22
 8.5 -0.007 20.83 0 buoy flux puff-th
 9 -0.002 21.17 0.0001488 0.22
 9.5 0.003 21.76 jet-plume jet-cro
 10 0.008 21.89 0.1140 0.89
 10.5 0.0095 21.97 plu-cross jet-str
 11 0.011 22.31 54.21 0.47
 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.

76.2 m, 250.0 ft

>0.0 to any m rang

Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: langley;

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	
9.428	0.8113	1.845	53.02	0.8486	-> trap level
9.057	1.090	1.563	62.62	0.9324	
8.929	1.432	1.499	65.28	0.9848	-> 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 15.15m

--4/3 Power Law--
 conc dilution

-Const Eddy Diff-
 conc dilution

distance	Time	DAYS
m Ft	sec hrs	
76.20 250'	5014 1.4	0.06
152.4	10090 2.8	0.12
228.6	15170 4.2	
304.8	20250 5.6	
381.0	25330 7.0	
457.2 1500	30410 8.4	0.35
533.4	35490 9.9	
609.6	40570 11.3	
685.8	45650 12.7	
762.0	50730 14.1	
838.2	55810 15.5	
914.4 3000	60890 16.9	0.70
990.6	65970 18.3	
1067	71050 19.7	
1143	76130 21.1	
1219	81210 22.6	
1295	86290 24.0	

0.2668	<u>373.4</u>	0.6651	148.9
0.1148	<u>869.8</u>	0.4830	205.6
0.06706	<u>1489.8</u>	0.3981	249.8
0.04519	2211.3	0.3464	287.2
0.03307	3022.1	0.3108	320.4
0.02555	<u>3913.1</u>	0.2842	350.4
0.02050	<u>4877.7</u>	0.2635	378.0
0.01691	5910.6	0.2468	403.7
0.01427	7007.7	0.2329	427.9
0.01224	8165.3	0.2212	450.7
0.01066	9380.5	0.2110	472.5
0.009388	<u>10650.6</u>	0.2021	493.3
0.008351	<u>11973.3</u>	0.1943	513.3
0.007492	13346.7	0.1873	532.5
0.006770	14769.0	0.1810	551.1
0.006158	16238.4	0.1753	569.0
0.005632	17753.5	0.1701	586.4

Appendix G

0.005177	19313.1	0.1653	603.3	1372	91370	25.4
0.004781	20915.8	0.1610	619.8	1448	96450	26.8
0.004432	<u>22560.6</u>	0.1569	635.8	1524 ⁵⁰⁰⁰	101500	28.2
0.004432	22560.6	0.1569	635.8	1524	101500	28.2

DAYS

1.8

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JAN 11 1994

DEPT. OF ECOLOGY



City of Langley

"On beautiful Whidbey Island"

112 Second Street

Post Office Box 366

Langley, Washington 98260

[206] 221-4246

Vicki Lash, Mayor

To: Mr. Gerald Shirvey P.E.
 Department of Ecology
 From: Rainer Bastian
 City of Langley
 Re: NPDES Permit
 Date: January 8, 1994

Dear Gerry,

In regards to the draft NPDES permit, I would like to negotiate the following changes:

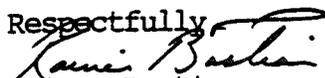
Regarding the limitations set on septage receiving at 1000 gallons per day, I would like to see that changed to an unspecified amount with the understanding that the reception of septage combined with the current B.O.D. loading rate, does not exceed the 425 lbs. established in the permit. As the influent loading increases through the years, the amount of septage receiving would decrease proportionately.

Regarding the pH, chlorine residual and dissolved oxygen testing 7 days a week, I would like to see that changed to 5 or at most 6 days a week for the following reasons:

The dissolved oxygen and pH in the aeration basins and the effluent have been extremely stable as shown in the discharge monitoring reports for the past year. The influent pH has never exceeded 6.0-9.0 since we have no industrial discharge.

Also, the Chlorine Residual testing results have been very stable as shown in the reports. The chlorination system has proved to be very dependable. The water supply to the ejector is provided by 2 alternating booster pumps and a manually operated rotameter to control the chlorine dose rate. The chlorination system is monitored by the computer's P.L.C. and will notify the operators via telephone if there is a problem with the system such as high/low vacuum, low water pressure (for which there is a emergency bypass to watermain pressure), chlorine gas leak alarm and the emergency generator to operate the system in case of a power failure. The chlorine contact tank has a capacity of 50,700 gallons and is designed to provide a plug flow thereby giving the effluent a 4 hour contact time between decants which could explain the near zero fecal coliform counts. With chlorine being volatile in nature, by the time the effluent has been in the contact chamber and traveling through over a mile of pipe, the chlorine residual is almost zero at the outfall. Enclosed is the section from the O&M manual covering the chlorination system in greater detail.

Thank you for considering these comments and I thank you for the vast amount of time and effort you took in preparing the permit.

Respectfully

 Rainer Bastian
 Utility Supervisor
 City of Langley

For attachment to this page, see...
 See Operations & Maintenance MANUAL PAGE 3-84

3-98 G.D. revised 1-20-94