



Preliminary Cost Benefit and Least Burdensome Analysis
For Proposed Amendments to
CHAPTER 173-308 WAC, Biosolids Management

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SUMMARY

Ecology is proposing amendments to WAC 173-308. The Administrative Procedures Act RCW 34.05.328(d) requires Ecology to determine that:

- The probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the statute being implemented.
- The rule being adopted is the least burdensome alternative for those required to comply with it.

Ecology analyzed the proposed amendments and determines that some of them will increase costs and others will decrease costs. We also determine that the probable benefits will exceed the probable costs; we can proceed with the proposed rule, and further evaluation of the amendments.

The present value¹ of the cost of the proposed amendments is in the range of \$3.7 million for a 5-year period. Ecology estimated these costs based on data provided by facility managers who responded to a survey (see Appendix 2 for the surveys and Appendix 3 for a detailed summary of results).

The purpose of the biosolids rule is to prevent diseases. In Washington State, the annual costs of these diseases are around \$310 million due to lost work and school days. This does not include the cost of medical treatment. The 5-year present value of these diseases is nearly \$1.5 billion. In addition, the direct costs of the rule are being reduced by \$300,000.

Clearly, the nearly \$1.5 billion in disease is larger than the \$3.5 million in costs. Because people rarely know where they have picked up a disease the share of this loss affected by the proposed amendments is not known. However, if the share of the disease load affected is greater than 0.13% then there will be a net benefit. This percentage value is conservative in that it does not include either the cost of treatment or the cost of long term disability arising from disease. In other words, if the proposed rule prevents 12 in 10,000 cases of disease there will be a net gain. Ecology believes this level of disease reduction is possible. Further, the proposed rule provides a level playing field so that facilities that follow safe practices do not have to compete with facilities that do not.

Given that some of the protections reduce the risk of the transmission of disease-causing organisms by vectors and some of the protections involve demonstrating that protections are maintained, Ecology believes that the probable benefits outweigh the probable costs.

PROPOSED RULE AMENDMENTS

Note: A more detailed explanation of the amendments is provided in Appendix 1. This document only evaluates the proposed amendments that create a legal change for the biosolids businesses. Appendix 1 also explains which amendments create a legal change,

¹ Present value: The value of something today that does not accrue until a future date. Ecology uses average I bond rates to estimate this value.

why some amendments were not included in the research, and any changes to the amendments in response to comments received.

Ecology is proposing the following amendments. The ones marked with an “*” reduce costs.

- Combining the previous classifications of Class I, Class II, and Class III septage into a single definition of “septage”.
- Imposing a requirement that all facilities which land apply septage or treat septage for land application obtain a permit from the department.
- Imposing the same site management and access restrictions requirements for sites receiving septage whether the material is pH-stabilized or not.
- *Providing a categorical exemption from the rule for composting toilet systems whose output is transferred to a facility permitted to manage it and an exemption from the permitting and reporting requirements for owners of composting toilet systems even if they land-apply the output.
- Imposing a requirement that facilities that transport or contract for the transportation of their solids submit a *Spill Prevention & Response Plan*.
- Eliminating the options for Class A-Alternative 3 and Class A-Alternative 4.
- Imposing a requirement that biosolids sold or given away in a bag or other container meet the criteria to be classified as exceptional quality.
- Imposing a requirement that all applicable facilities submit an Annual Biosolids Report and submit all requested information.
- Imposing a requirement for applications for coverage under a new biosolids general permit to be submitted within 90 days following the issuance of the permit but allowed for a case-by-case extension up to 180 days.
- *Providing exemptions from the reporting and permitting requirements for research projects conducted in accordance with a department-approved research plan and occurring on 10 acres or less.
- Imposing a requirement for public notice each permit cycle for facilities that land apply non-exceptional quality biosolids but limited the extent of the notice.
- *Eliminating the need for new public notice when applying for coverage under a new general permit if notice was done previously, the facility is in compliance, the facility does not land apply non-exceptional quality biosolids, and the facility is not proposing any significant changes in biosolids management practices.
- *Eliminating the need to do any notice if proposing an “insignificant” change either when applying for coverage under a new general permit or when proposing insignificant changes while covered under a permit.
- *Reducing the number of newspaper notices, when required, from 2 to 1.

- Imposing a requirement for a significant removal of “manufactured inerts”² for all biosolids and septage. Facilities will have 2 years to attain this standard or up to 4 years, if they submit a plan within 1 year explaining how they will meet the standard within 4 years.
- *Providing exemptions to the storage requirements for storage covered under another environmental permit and for “temporary/small-scale storage”.
- Imposing a requirement that biosolids stored in the field meet one of the vector attraction reduction (VAR) standards or the storer must provide the department with a plan addressing how field storage of non-VAR biosolids will not pose an undue risk to human health.
- *Providing for the “grandfathering in” of surface impoundments meeting the WAC 173-304-430 requirements but imposed the WAC 173-350-330 surface impoundment requirements for new or upgraded surface impoundments.
- Clarifying and simplifying the requirements for the importation of biosolids from facilities outside the state (includes tribal lands) by requiring an approval but not a permit if bulk material is sent to an Ecology-permitted facility or bagged material is distributed and requiring a full permit if the exporter seeks to manage their own operation within the state. In all cases, fees would be assessed based upon the percent of material produced that is exported into the state.
 - Adding a requirement that preparers of biosolids or sewage sludge maintain the following records:
 - The amount stored onsite.
 - The amount transferred to another facility for further treatment and the name of the other treatment facility.
 - The amount transferred for incineration and the name of the incineration facility.
- Adding a requirement that appliers of non-exceptional quality biosolids maintain the following records:
 - The location, by street address, if applicable, a copy of the assessor's plat map(s) with the application area(s) clearly shown or the latitude and longitude of the approximate center of each land application site, and the section, township and range of each quarter section on which biosolids are applied.
 - The number of acres in each site on which biosolids were applied.
 - The date biosolids were applied to each site.
 - The annual nitrogen requirement for the crop or vegetation grown on each site.
 - The rate, in dry tons per acre per year, at which biosolids are applied to each site.
 - The amount, in dry tons, of biosolids applied to each site.

Costs

The direct cost change of the proposed rule amendments has a present value of about \$3.7 million over a 5-year permit span. Ecology has listed the costs in Table 1: Survey Results in rows that are Green. The items that increase costs include:

² Manufactured inerts are defined in the draft revised rule as, “...wastes such as plastic, metals, ceramics and other manufactured items that remain relatively unchanged during wastewater or biosolids treatment processes.”

- **The cost of spills plans for facilities that transport biosolids and septage who still do not have a spills plan.** This would include at most 25% of facilities. Total cost of this single point in time requirement is approximately \$47,400.³ Companies that have a permit will not experience new costs. Ecology is evaluating this cost because we are shifting the requirement from the permit into the rule. The current biosolids general permit already requires facilities that transport to submit a spill plan. We addressed the costs associated with this requirement in the permit in the *Economic Impact Analysis* conducted on the biosolids general permit in December 2004.
- **Submitting an annual biosolids report for facilities that did not have to do so in the past.** This will affect about 60% of the Wastewater Treatment Plant (WWTPs) and the Beneficial Use Facility (BUFs). Ecology expects the total annual cost of this new requirement to be \$279,000 with a present value of \$1.3 million. Businesses that have a permit will not experience new costs. The reason for this is that Ecology already requires all facilities to submit an annual report through the current rule. All facilities have been complying with this requirement since 1999. The reason Ecology is evaluating this cost is because the proposed amendments move this requirement from policy into rule.
- **Submitting the permit application within 90 days of the adoption of a general permit.** This may affect about 30% of facilities that had more time in the past. The impact of this proposed amendment is disproportionate for those facilities that are affected. Ecology estimates this cost at \$22,000.
- **Some Septage Management Facilities (SMFs) will have to get a permit.** This will affect 40% of the SMFs. We estimate the cost is \$140,000.
- **Screening to remove garbage from biosolids.** The screening requirements for facilities that have excessive garbage in the biosolids was based on data collected from facilities that have more than 5% garbage in the biosolids. Ecology expects the costs of adding screening equipment to be \$1 million. Ecology changed the initial proposed rule amendment after the survey based on comments related to high costs. The language now requires “a significant removal of manufactured inerts” in biosolids. We explain this change further in Appendix 1. The change made between the survey and the rule proposal will likely reduce this cost.
- **Reducing the risk from disease vectors from field storage of biosolids that do not meet a vector attraction reduction requirement.** The total present value of costs to write plans (which must show how the facility is reducing risks to human health⁴) is expected to cost \$843.
- **New requirements for Class A - Alternatives for four possibly affected facilities.** The original proposed amendments required facilities, who want to use the Class A-Alternative 3 or Class A-Alternative 4, to submit a pre-approval sampling plan. However, upon further consideration and in response to comments, Ecology is proposing to eliminate both alternatives from the entire rule. We describe this in more detail in Appendix 1. Following this decision by the department, a new survey question was written, and each of the four potentially affected facilities was asked to respond. At this time, only one response has come in. That facility was concerned about the ability to get the lab work done and felt it would be

³ Based on Average cost for WWTP*number of WWTPs*percent affected+ Average cost for SMFs*number of SMFs*percent affected + Average cost for BUF*number of BUFs*percent affected)+High Cost Outlier

⁴ In some cases this may be as simple as a map showing the distance between the site and other people’s homes.

very expensive. The expected present value of these costs is \$100,000 based on the results from the original survey prior to the amendment. This number will be revised in the final CBA if there are more responses.

- **Management changes for unstabilized septage.** The original proposal required facilities with mixtures of septage that contain more than 25% by volume of “unstabilized” septage to be managed as biosolids from a wastewater treatment plant. However, Ecology received comments on this amendment during the pre-proposal stage that suggested very high costs. Therefore, Ecology changed this proposed amendment after we completed the cost survey. Under the proposed rule, facilities can pH-stabilize such mixtures and still land apply the septage, but the application rate may be stricter. Ecology believes the costs listed in Table 1 are over stated. The costs are based on three to six Septage Management Facilities (SMFs) that plan to land apply unstabilized septage. We estimated the total cost of this was about \$200,000 per year with a 5-year present value of \$963,000 and may now be closer to zero.
- **Site management requirements for five to ten SMFs that land apply septage and do not limit access for cattle or the public.** The estimated cost is \$1,600 per year with a 5-year present value of \$7,600.

Table 1: Survey Results –Total Present Value

Rule Changes by Type	Present Value
Spill Response Plan	-\$47,675
Submit Annual Biosolids Report	-\$1,338,961
Obtaining a permit (SMFs)	-\$145,840
Timing for Submitting a Permit Application	-\$21,833
Public Notice Requirements for Non-exceptional Quality Biosolids or Septage	+\$113,950
Insignificant Changes	+\$31,796
Exemptions for Certain Research	+\$184,245
Screening Requirements	-\$1,061,995
Deferral to Other Permits for Storage	+\$13,411
Field Storage Vector Attraction Reduction	-\$843
Class A Alternatives	-\$100,000
Sale or Give Away?	\$0
Management of Unstabilized Septage	-\$963,304
Site Management for pH-stabilized Septage	-\$7,639

Benefits

The primary benefits of the rule derive from potential reductions in disease and reductions in the costs of existing compliance.

Reductions in Disease

The benefit of the rule is the potential reduction in disease and the ability to use the resources available in the biosolids. The diseases include:

- Salmonella
- Typhoid
- Shigellosis
- Gastro-enteritis
- Cholera
- Poliomyelitis
- Meningitis
- Pneumonia
- Hepatitis
- Encephalitis
- Respiratory Infections
- Cryptosporidiosis
- Acute Enteritis
- Giardiasis
- Chronic Diarrhea
- Toxoplasmosis
- Hookworm Disease
- Taeniasis
- Cyclospora

The impacts of these diseases range from a few days of illness to death.

These diseases used to have a massive impact on public health but over time, multiple regulations and a heavy investment in sewage handling equipment have reduced their impact. The benefits of reducing these diseases have been large over time. Better toilets, the building of sewers and treatment plants, and other activities at the start of the last century were and continue to be responsible for huge public health gains and a near doubling of the average human life span. Now, it is difficult for the bacteria to make it through the gauntlet of sewers and wastewater treatment plants in American cities. Therefore, this rule is only a tiny part of the overall disease reduction that has taken place. It allows beneficial use of biosolids, which would be dangerous if facilities did not handle them properly.

Ecology estimates the potential cost of work and school day losses from diseases originating from human exposure to disease-causing organisms in biosolids for the state of Washington at \$550 million per year.

We calculated the current losses primarily from statistics at the Center for Disease Control (CDC). For most of the identified diseases, the CDC listed a range of the number of cases in the United States annually, as well as a range of the length of each infection. With this information, we were able to find the average number of days the infection is expected to last, and that became the number of days a person would typically be absent from work or school due to each particular disease. We used 2% of the annual occurrences in the US to extrapolate Washington's share of the diseases because approximately 2% of the US population lives in Washington. Multiplying the extrapolated cases for WA by the number of days a person would be absent, gives the total number of days lost due to that disease.

Ecology based the value of lost workdays on wages. The Bureau of Labor Statistics quotes the mean hourly wage as of May 2005 for the state of Washington at \$19.93. By multiplying the total number of lost days, times an 8-hour work day, times the mean wage of \$19.93, the product is the total value lost due to the particular disease. The summation of all the diseases, divided by 2 to account for half of the lost days being due to children missing school days, the results come out to nearly 2 million lost days of work at a lost cost of almost \$310 million per year. This comes to a 5-year present value of nearly \$1.5 billion.

Ecology did not estimate several benefits from the proposed amendments such as the reduced costs of medical treatment. The treatment costs for some of these diseases may be large.

However, we can predict how often the proposed rule will prevent disease. The cost of long-term losses from diseases that affect infant development may also be high. For example, Toxoplasmosis is common in the adult population but can have serious long-term effects for infected infants.⁵

Ecology modified the original number of sick days used to analyze the proposed amendments to be more conservative. According to the Compensation Data annual survey for 2006, the west averages 7.9 sick days per employee per year. This is the lowest region across the US. This number multiplied by the total number of people employed in Washington (2,653,320) shows that approximately 21 million days of sick leave are taken every year. The diseases considered would then account for about 10% of these lost workdays.⁶ The numbers selected seem accurate because cold symptoms and flu are reported as the most common reasons for work absenteeism.⁷ Most of the diseases people can get from biosolids have symptoms that are easily confused and misinterpreted as a cold or flu.

Reduced Compliance Costs

The proposed amendments provide several features to reduce costs for individuals or facilities that do not increase health costs. We have listed the reduced costs in Table 1, above. The rows in yellow show the reduced costs. This direct savings has a present value of approximately \$343,000 over a 5-year permit cycle.

The proposed amendments provide for:

- Exemptions that eliminate substantive requirements for some entities:
- Exemption from the rule or significant portions of the rule for composting toilet systems. Since these are not facilities, the savings is unknown.

⁵ The value of Toxoplasmosis may be evaluated for the final analysis. Estimating the number of Toxoplasmosis cases per year is a difficult. In the US, the frequency depends on the incidence of primary infection in women of childbearing age. The earlier a woman acquires an infection, the less likely she is to transmit it to her child. Indirect estimates can be calculated from the incidence rate of primary infection during pregnancy by multiplying the number of mothers who acquire infection during pregnancy by the transmission rate of the parasite to the fetus. According to data from the National Health and Nutrition Examination Survey during 1989-1994, the incidence of primary infection for seronegative pregnant women was 0.27%. With 4 million births per year and an overall transmission rate of 33%, approximately 3,500 infected children should be born in the US every year. About 70, 2% of these would be in Washington. Some infants with toxoplasmosis will have medical conditions that include problems with the brain, eyes, heart, kidneys, blood, liver or spleen. Long term effects may include seizures, mental retardation, cerebral palsy, deafness and blindness. Many infected infants will show no signs at birth, but long-term studies show that up to 90 percent of those infected develop problems including hearing and/or vision loss, or developmental delays. These symptoms can appear months or even several years after birth. A report conducted by USDA's Economic Research Service concluded that one half of the toxoplasmosis cases in the United States are caused by eating contaminated meat. The estimated economic burden of these infections is \$7.7 billion each year, primarily from congenital toxoplasmosis. \$154 million of this would accrue to Washington. Sources: Costs:

<http://www.cdc.gov/MMWR/preview/mmwrhtml/rr4902a5.htm>,

Long Term Effects of: <http://www.otispregnancy.org/pdf/toxoplasmosis.pdf>.

⁶ Numbers of sick days: http://www.jobbankusa.com/news/business_human_resources/sick_day_policy.html, <http://ajp.psychiatryonline.org/cgi/content/full/157/8/1274>,

http://www.hse.ubc.ca/mgmt_systems/management/files/AnnualReport2004_TimeLossManagement.pdf (Canada).

⁷ Causes of Sick Days: Colds and Flu- (common symptoms of many of our diseases),

<http://news.bbc.co.uk/2/hi/business/3866213.stm>, Migraines

<http://www.sciencedaily.com/releases/2005/01/050111154753.htm>, Stress

<http://news.bbc.co.uk/1/hi/business/1406449.stm>.

- Exemptions from the reporting and permitting requirements for research projects conducted in accordance with a department-approved research plan and occurring on 10 acres or less. The total savings from this exemption is estimated at \$192,000 over a 5-year period.
- Exemptions to the storage requirements for storage covered under another environmental permit and for “temporary/small-scale storage”. The savings from this exemption are estimated at \$14,000 over a 5-year period.
- Reducing the number of newspaper notices, when required, from two to one and eliminating the need for new public notice when applying for coverage under a new general permit if notice was done previously and the facility is not land-applying non-exceptional quality biosolids. The savings from this set of exemptions is estimated at \$113,000 once every 5-years.
- Eliminating the need to do any notice if proposing an “insignificant” change either when applying for coverage under a new general permit or when proposing insignificant changes while covered under a permit. The savings from this exemption is estimated at \$33,000.
- Grandfathering facilities into the new requirements. This will allow facilities to continue their current activities, while still increasing the requirements for new activities. This is for surface impoundments meeting the WAC 173-304-430 requirements. However, the revised WAC 173-350-330 surface impoundment requirements are imposed for new or upgraded surface impoundments. This does not provide a savings by comparison with the existing rule but simply avoids imposing a high cost for the existing facilities.
- Delay compliance by allowing for an extension of the timeline for submitting permit applications to up to 180 days. This is twice the length of time otherwise allowed. This will offset some of the additional costs estimated for submitting the permit applications within 90 days after the issuance of a general permit.
- Extending the period for which to comply with the “significant removal of manufactured inerts” by allowing facilities up to 4 years to comply if they submit a plan to explain how they will comply by that time. Ecology made this change after we conducted the survey. Therefore, we cannot determine the reduction in the estimated costs due to this change. However, it will likely result in a significant reduction in costs because it will potentially allow a facility an additional 2 years to comply.

Net Benefits

Ecology cannot calculate the net benefits of the proposed rule amendments because the number of potential diseases avoided is unknown. However, dividing the cost of the existing number of diseases into the cost of the rule gives the percentage reduction in diseases that would be required for net benefits to occur.

$$0.22\% = (\text{Direct Cost of the rule} - \text{Direct cost savings}) / \text{Cost of existing related disease} = \$3.3 \text{ million}^8 / \$1.4 \text{ billion}$$

⁸ \$3.5 million in direct costs minus \$300,000 in direct cost reductions from the proposed rule.

If 0.22% or \$22 per \$10,000 of the disease load were removed by this proposed rule amendment then the benefits would equal the cost. This ratio is conservative because the cost of treatment has not been included and the losses due to long-term damages from the permanent effects of the diseases have not been included. Thus, if this ratio is probable, then there are net benefits.

Ecology has evaluated the likelihood of this and finds that such a ratio is possible

LEAST BURDENSOME ALTERNATIVE

Ecology has determined that this rule is the least burdensome version of the rule, which meets the requirements of the law. Ecology has included all the changes that reduce compliance costs but do not create a significant increase in health risks. The section on Reduce Compliance Costs lists these. The 5-year present value of the savings from these changes is \$343,000.

APPENDIX 1: REVIEW OF AMENDMENTS FOR WHICH THE SURVEY INSTRUMENTS WERE DEVELOPED AND ANY CHANGES RESULTING FROM COMMENTS RECEIVED

Septage

Revised the definition of Class II septage to state that the material cannot be land applied unless it composes no more than 25% of a mixture with Class I septage or a stabilized Class III septage or it is managed as biosolids from a wastewater treatment plant.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Class II septage is generally untreated material such as that from a portable toilet.
Requirement under current rule.	Class II can be directly land-applied if it's pH-stabilized.
Why revision is needed.	(A) Protection of human health and the environment from pathogens. (B) Protection of the environment from unknown sanitizers/deodorizers used in the material.
Suggested revisions that were more stringent.	Complete ban on Class II application. This was rejected because it was deemed to be economically infeasible.
Addressed in survey? If "no", why?	Yes.
Was the proposal significantly amended after the survey was conducted? If "yes", explain.	Yes. Following comments received, the department decided to consolidate the various classes of septage into a single definition of "septage". In addition, the department decided to eliminate the originally proposed requirement that mixtures of septage containing more than 25% by volume of unstabilized septage be managed as biosolids from a wastewater treatment plant. As allowed under the current rule, such mixtures can be land applied as septage if they are pH-stabilized. However, the department also included an allowance to impose stricter application rates for such mixtures if the conditions warrant.

Revised the definition of Class III septage to state that it's considered Class I septage if it's been largely stabilized, but its considered Class II septage if it's not been largely stabilized.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Class III septage is material that is generated at a commercial facility. Such material can be managed as septage if the department determines the material to be “domestic in quality”. The extent of treatment of such material ranges from extended to very short periods in septic tanks.
Requirement under current rule.	Class III septage is considered to be the equivalent of Class I septage in terms of management requirements.
Why revision is needed.	Protection of human health and the environment from pathogens.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	Yes. Following comments received, the department decided to consolidate the various classes of septage into a single definition of “septage”. In addition, the department decided to eliminate the originally proposed requirement that mixtures of septage containing more than 25% by volume of unstabilized septage be managed as biosolids from a wastewater treatment plant. As allowed under the current rule, such mixtures can be land applied as septage if they are pH-stabilized. However, the department also included an allowance to impose stricter application rates for such mixtures if the conditions warrant.

Imposed a requirement that all facilities who land apply septage or treat septage for land application obtain a permit from the department.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Program policy has been to only require a permit for such facilities if they manage septage from multiple pumpers.
Requirement under current rule.	A permit is required for septage land appliers only when the department specifies that the facility is a treatment works treating domestic sewage.
Why revision is needed.	To ensure compliance with the rule by septage land appliers. Protection of human health and the environment from pollutants and/or pathogens.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Imposed the same site management and access restrictions requirements for sites receiving septage whether the material is pH-stabilized or not.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Effectively all this requires in addition to the current rule requirements is that grazing of domestic animals not occur for at least 30 days following application of pH-stabilized septage and that sites are posted for 30 days or 1 year following application (depends on the degree of likelihood of public contact). This is already a requirement in the biosolids general permit.
Requirement under current rule.	If septage is pH-stabilized, there is no requirement for grazing restrictions or site posting.
Why revision is needed.	(A) Protection of human health and the environment from pathogens. (B) Consistency with the biosolids general permit. (C) Simplification.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Provided a categorical exemption from the rule for composting toilet systems whose output is transferred to a facility permitted to managed it and an exemption from the permitting and reporting requirements for owners of composting toilet systems even if they land-apply the output.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	However, the draft rule revisions define a septage management facility and require a permit for such a facility. Composting toilet systems could be considered to meet this proposed definition.
Requirement under current rule.	The output of composting toilets is considered to be septage by the department and the Department of Health, but a permit has not been required for its management. If the material is sent to a permitted facility for management, the operation is exempt from the rule. If the material is land applied, the operation must meet the management and recordkeeping requirements.
Why revision is needed.	(D) Clarification for those who currently transfer the material for management. (E) To avoid a requirement that small-scale composting toilet systems obtain a permit if land-applying, as requiring a permit would be impractical.
Suggested revisions that were more stringent.	Require a full permit without exemptions. This approach was rejected because it was deemed to be infeasible from a practical, regulatory standpoint and overly burdensome on the owners of such systems—especially small-scale systems.
Addressed in survey? If “no”, why?	No. This was not addressed in the survey because the department has not been requiring a permit for composting toilets. Thus, this is more of a formalization of program policy than a significant change.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Transportation

Imposed a requirement that facilities that transport or contract for the transportation of their solids submit a *Spill Prevention & Response Plan*.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	This is already a requirement in the biosolids general permit.
Requirement under current rule.	There is no requirement for a plan.
Why revision is needed.	(F) To minimize the risk of spillage of biosolids or sewage sludge during transportation. (G) To reduce the risk of impacts to human health and the environment from pollutants and/or pathogens when a spill occurs during transportation. (H) To provide consistency with the biosolids general permit.
Suggested revisions that were more stringent.	Impose a 24-hour notice requirement for spills in addition to the plan. This was rejected because such a requirement is more appropriate in the biosolids general permit
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Class A-Alternatives 3 & 4

Imposed a requirement that facilities proposing to use Class A-Alternatives 3 or 4 receive pre-approval from the department for a sampling plan prior to initiating sampling.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Class A biosolids is considered to be effectively pathogen-free. These alternatives allow facilities to show Class A through testing rather than imposing a process requirement as required under all other Class A alternatives. Such material can be distributed to the public. The department and EPA have concerns about the testing methods and the accuracy of results. Program policy already requires this for Class A-Alternative 4.
Requirement under current rule.	No sampling plan is required to be submitted to the department. The only requirement is that sampling be “representative” of the material being tested.
Why revision is needed.	(I) Protection of human health and the environment from pathogens. (J) Consistency with program policy which has been in place for Class A-Alternative 4 for nearly 2 years.
Suggested revisions that were more stringent.	Delete the alternatives from the rule entirely. This was rejected because the alternatives provide permittees with an option to show Class A that may not be available otherwise.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	Yes. After reviewing comments, reviewing numerous technical documents, and discussing the issue with a senior microbiologist from EPA, the department decided to eliminate the two alternatives entirely from the rule. The 3 facilities now using either of the alternatives would need to either use another Class A alternative (for example, Alternative 6, Equivalency Determination) or manage the material as Class B.

Biosolids Sold or Given Away In a Bag or Other Container

Imposed a requirement that biosolids sold/given away in a bag or other container meet the criteria to be classified as exceptional quality.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Such material can (and usually is) distributed to the public. This is already a requirement in the biosolids general permit. The federal biosolids rule is expected to be revised in the future to require this also.
Requirement under current rule.	The current rule allows biosolids to be distributed to the public via sale/give away in a bag/other container even if they exceed the Table 3 pollutant limits as long as they do not exceed the Table 1 limits and information on how much can be applied annually is provided to the recipient.
Why revision is needed.	(K) Protection of human health and the environment from pollutants. (L) Consistency with the biosolids general permit. (M) Preparation for anticipated federal program changes.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Reporting

Imposed a requirement that all applicable facilities submit an Annual Biosolids Report and submit all requested information.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Each year the department sends a letter and a copy of a report form to all facilities. This is considered to be a written request from the department for completion of an annual report.
Requirement under current rule.	Only majors and Class I facilities have to report. Others must report only upon a request from the department.
Why revision is needed.	(N) Information obtained in the reports is deemed necessary to ensure compliance with the rule. (O) Implementation of a long-standing program policy
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Timeline for Submitting Permit Applications

Imposed a requirement for applications for coverage under a new biosolids general permit to be submitted within 90 days following the issuance of the permit but allowed for a case-by-case extension up to 180 days.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	This is already a requirement under the biosolids general permit for some facilities (majors, Class I facilities, out-of-compliance minors, private septage management facilities, and beneficial use facilities).
Requirement under current rule.	The date of submittal depends on facility size, class, compliance status, and timelines under other permits. and compliance
Why revision is needed.	Simplification of requirements and to provide an allowance for facility-specific considerations.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Research Exemption

Provided exemptions from the reporting and permitting requirements for research projects conducted in accordance with a department-approved research plan and occurring on 10 acres or less.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The department hopes to encourage legitimate, useful research of biosolids-related issues. Requiring a permit without exception has had the effect of discouraging some research according to some researchers.
Requirement under current rule.	Research projects are required to obtain a permit and to go through the entire permitting process.
Why revision is needed.	Simplification of the requirements for legitimate, useful research.
Suggested revisions that were more stringent.	Require a permit without exemptions. This was rejected because the department does not believe that requiring a permit for small-scale research substantially enhances protection of human health and the environment.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Public Notice

Imposed a requirement for public notice each permit cycle for facilities that land apply non-exceptional quality biosolids but limited the extent of the notice.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The current draft limits the extent of the notice by requiring that it occur in the newspaper in the county(ies) where application may occur but not at land application sites if this was done previously.
Requirement under current rule.	The department's interpretation has been that notice is not required each permit cycle if the facility has previously conducted notice, is in compliance, and is not proposing any significant changes. However, EPA objected to this interpretation.
Why revision is needed.	(P) Deemed necessary to be more consistent with the federal biosolids program policy. (Q) Simplification of where notice is conducted, resulting in a reduction in notice costs.
Suggested revisions that were more stringent.	Require notice at land application sites and in the newspaper. This approach was rejected because posting in newspapers (which requires that information on site locations be included) is deemed to be adequate to reach the interested public without providing an undue economic burden to the permittee. Posting at sites is already required during the initial public notice process. Posting at sites is often overlooked and only reaches a small portion of the public in any case.
Addressed in survey? If "no", why?	Yes.
Was the proposal significantly amended after the survey was conducted? If "yes", explain.	No.

Eliminated the need for new public notice when applying for coverage under a new general permit if notice was done previously, the facility is in compliance, the facility does not land applying non-exceptional quality biosolids, and the facility is not proposing any significant changes in biosolids management practices.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	This is related to #12, above.
Requirement under current rule.	This was the interpretation of the current rule for all such facilities, including those that land apply non-exceptional quality biosolids. However, EPA objected to this interpretation
Why revision is needed.	Clarification.
Suggested revisions that were more stringent.	Require full public notice for all facilities each permit cycle. This approach was rejected because it was deemed to be unnecessary and overly burdensome to permittees who are not engaging in any activities that pose a risk to human health or the environment. The focus of public notice should be on operations that land apply non-exceptional quality biosolids.
Addressed in survey? If “no”, why?	No. This was not specifically addressed in the survey because this was already the interpretation of the current rule.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Eliminated the need to do any notice if proposing an “insignificant” change either when applying for coverage under a new general permit or when proposing insignificant changes while covered under a permit.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Generally an “insignificant” change is one that improves the quality of biosolids or one that would result in a reduction in management requirements.
Requirement under current rule.	Any change in management after final coverage is issued—whether significant or insignificant—requires full public notice.
Why revision is needed.	(R) Simplification of requirements. (S) To not discourage changes to biosolids management programs that improve the quality of the material or reduce the risk to human health or the environment.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Reduced the number of newspaper notices, when required, from 2 to 1.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Only 1 notice is required under the general permit rule (Chapter 173-226 WAC) and the SEPA rule (Chapter 197-11 WAC).
Requirement under current rule.	When newspaper notice is required, 2 notices must be run at least 1 week apart, and a public comment period begins after the 2 nd notice.
Why revision is needed.	(T) Simplification. (U) Reduction in public notice costs.
Suggested revisions that were more stringent.	Maintain the current requirement of 2 notices. This approach was rejected because the 2 nd notice seems unnecessarily burdensome without achieving a substantial increase in the likelihood of reaching the public.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Added a requirement that facilities submit a copy of an *Affidavit of Publication* at the completion of newspaper notice when newspaper notice is required.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The department already commonly requires submittal of an <i>Affidavit of Publication</i> in order to ensure that newspaper notice was run correctly.
Requirement under current rule.	The permittee must provide a copy of the notice and an explanation of all places where and when the notice was or will be published or posted.
Why revision is needed.	Simplification of requirements.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	No. This was not addressed in the survey because the cost was deemed to be minimal. An <i>Affidavit of Publication</i> is already being sent to the facility when they’ve run a newspaper notice. The additional cost associated with this new requirement would simply be the cost of copying and mailing (or emailing) what is typically a 1-page document.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	Yes. In response to comments received, the department decided to add an allowance for a facility to submit a copy of the notice that was run in place of the affidavit. This was already allowed under the existing rule.

Reduction in Recognizables

Imposed a requirement for a 95% removal of “manufactured inert wastes” for all biosolids and septage. Facilities will have 2 years to attain this standard.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The department is required to have a state biosolids program that encourages the maximum beneficial use of biosolids. The existence of garbage in biosolids limits the options for beneficial use. Grinding has been allowed to reduce recognizables, however, grinding only reduces the size of garbage in biosolids, it does not remove it.
Requirement under current rule.	Only septage has any form of requirement regarding recognizables. This requirement mandates that screening or grinding or another approved method be used to remove or reduce recognizables in septage.
Why revision is needed.	(V) Protection of human health from the potential to come into contact with sharps in unscreened biosolids. (W) Ensure that only garbage-free material is land-applied or distributed to the public. (X) Maximize the opportunities for beneficial use of all biosolids products. (Y) Apply a consistent approach for septage and other biosolids.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	Yes. In response to comments received, the department decided to replace “manufactured inert wastes” with “manufactured inerts” because the latter already had a definition in Ecology’s, <i>Interim Guidelines for Compost Quality</i> . More importantly, the department decided to remove the objective standard of a 95% removal and to replace this with the subjective standard of “significantly remove manufactured inerts”.

Storage

Provided exemptions to the storage requirements for storage covered under another environmental permit and for “temporary/small-scale storage”.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The proposed revision would allow deferral to other environmental permits that address storage and to exempt all temporary/small-scale storage from any permitting requirements unless there is sufficient reason to require a permit. The current rule has no provisions for deferral.
Requirement under current rule.	Storage of solids requires a biosolids permit, and storage must be addressed when applying for a permit
Why revision is needed.	(Z) Simplification for permittees. (AA) Reduction in the workload for program staff. (BB) Elimination of a permitting requirement for storage that does not pose any risk to human health or the environment.
Suggested revisions that were more stringent.	Do not allow exemptions for storage under a non-biosolids permit and require a separate biosolids permit for biosolids storage. This was rejected because it adds another permitting requirement without a clear improvement of protection of human health and the environment. If another permit is adequately protective, the department does not want to unnecessarily impose a separate permit.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Imposed a requirement that biosolids stored in the field meet one of the vector attraction reduction (VAR) standards or the storer must provide the department with a plan addressing how field storage of non-VAR biosolids will not pose an undue risk to human health.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Non-VAR biosolids are not considered to be adequately stabilized to reduce their attractiveness to potential vectors. Leaving such biosolids in a field where they are available to potential vectors increases the risk of the transfer of pathogens to humans by vectors.
Requirement under current rule.	Biosolids not meeting a VAR standard can be stored in the field as allowed by a permit.
Why revision is needed.	Protection of human health from the potential transfer of pathogens by vectors.
Suggested revisions that were more stringent.	Require that all field-stored biosolids meet VAR standards prior to storage. This was rejected because it could impose an extreme economic hardship upon some permittees, and the department believes that a similar level of protection of human health can be achieved by requiring the storer to submit a plan describing how their storage does not pose an undue risk to human health or how any undue risk posed would be mitigated.
Addressed in survey? If “no”, why?	Yes.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Provided for the “grandfathering in” of surface impoundments meeting the WAC 173-304-430 requirements but imposed the WAC 173-350-330 surface impoundment requirements for new or upgraded surface impoundments.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The surface impoundment standards in WAC 173-350-330 were developed in part to address biosolids/sewage sludge/septage storage.
Requirement under current rule.	Storage in surface impoundments must meet the WAC 173-304-430 standards.
Why revision is needed.	Reduce the risk to the environment from the potential release of pollutants in stored biosolids/sewage sludge/septage in surface impoundments.
Suggested revisions that were more stringent.	Impose the WAC 173-350-330 standards on all surface impoundments storing biosolids/sewage sludge/septage, regardless of the date of construction. This approach was rejected because it seemed to be an undue economic burden on facilities currently storing in accordance with the WAC 173-304-430 standards who are not posing a risk to the environment.
Addressed in survey? If “no”, why?	No. This was not addressed in the survey because it is being addressed separately by contacting 4 facilities who have installed surface impoundments under the WAC 173-350-330 standards and by using numbers provided by SWFAP engineers.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Importing/Exporting Biosolids

Clarified and simplified the requirements for the importation of biosolids from facilities outside the state (includes tribal lands) by requiring an approval but not a permit if bulk material is sent to an Ecology-permitted facility or bagged material is distributed and requiring a full permit if the exporter seeks to manage their own operation within the state, In cases where bulk biosolids are exported into the state, fees would be assessed based upon the percent of material produced that is exported into the state.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	Program policy that has developed has set-up an inconsistent approach for tribal facilities and other out-of-state entities. Currently a few facilities from ID export solids for further treatment into WA, and a few tribal facilities either do the same or send their solids to landfills within the state.
Requirement under current rule.	Not addressed.
Why revision is needed.	(CC) Correct the inconsistent approach being taken on solids from tribal lands and those from other states/nations. (DD) Simplify the requirements for those who send material to Ecology-permitted facilities. (EE) Collect a fair fee from exporters.
Suggested revisions that were more stringent.	Require a full permit and payment of a full fee for any out-of-state facilities sending solids into WA. This approach was rejected because the department believes that if the solids are sent to an Ecology-permitted facility, protection of human health and the environment can be attained without imposition of the burden of a permitting an out-of-state entity and the risk that enforcing such a permit might entail.
Addressed in survey? If “no”, why?	No. This was not addressed in the survey because the change would not impact any existing permittees. Thus, there was no one on the facilities list that could be surveyed.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Record Keeping

Added a requirement that preparers of biosolids or sewage sludge maintain the following records:

- The amount stored onsite.
- The amount transferred to another facility for further treatment and the name of the other treatment facility.
- The amount transferred for incineration and the name of the incineration facility.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The department has consistently requested such information as part of the annual biosolids reports since 1998. Thus, facilities are already keeping such records.
Requirement under current rule.	There is no requirement to maintain these records.
Why revision is needed.	Such information is necessary so that the department can monitor biosolids and sewage sludge management practices across the state.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	No. This was not addressed in the survey because facilities are already maintaining such records and providing such information with their annual biosolids reports.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

Added a requirement that applicers of non-exceptional quality biosolids maintain the following records:

- The location, by street address, if applicable, a copy of the assessor's plat map(s) with the application area(s) clearly shown or the latitude and longitude of the approximate center of each land application site, and the section, township and range of each quarter section on which biosolids are applied.
- The number of acres in each site on which biosolids were applied.
- The date biosolids were applied to each site.
- The annual nitrogen requirement for the crop or vegetation grown on each site.
- The rate, in dry tons per acre per year, at which biosolids are applied to each site.
- The amount, in dry tons, of biosolids applied to each site.

Information on the Proposed Amendment and Its Assessment in the Survey

Comments/additional information.	The department has consistently requested such information as part of the annual biosolids reports since 1998. Thus, facilities are already keeping such records.
Requirement under current rule.	There is no requirement to maintain these records.
Why revision is needed.	Such information is necessary to ensure compliance with the rule and permits.
Suggested revisions that were more stringent.	None.
Addressed in survey? If “no”, why?	No. This was not addressed in the survey because facilities are already maintaining such records and providing such information with their annual biosolids reports.
Was the proposal significantly amended after the survey was conducted? If “yes”, explain.	No.

APPENDIX 2: SURVEY INSTRUMENTS

#1 - Wastewater Treatment Plant and Composter Questionnaire

Thank you for filling out this survey. It will help Ecology estimate the cost of changes to the rule.

Please put in your code _____.

When you answer the questions please consider all your costs including things that people usually forget such as:

- reporting
- record keeping
- compliance costs
- professional services (e.g. lab costs, consultant costs, contractor costs)
- equipment
- supplies
- labor, staff time
- increased administrative costs
- lost sales or revenue

Transportation of Biosolids or Septage

Ecology is proposing to add the current biosolids general permit requirement that all facilities that transport biosolids or septage for management submit a Spill Prevention/Response Plan with the permit application. Ecology previously developed a simple template that facilities can use.

Do you transport biosolids or septage? Yes No

If YES, have you submitted a spill prevention and response plan using the plan template that Ecology developed? Yes No

If YES, how much did it cost you to complete the plan using the template? \$ _____

Class A-Alternatives 3 and 4

(This question should be asked only to: EVERETT, GRANDVIEW, PASCO, and WENATCHEE.)

Ecology is proposing to require that facilities using Class A-Alternatives 3 or 4 receive written, pre-approval of a sampling plan prior to conducting the sampling required for these alternatives. For Class A-Alternative 3, the approval would only have to occur prior to the first sampling event. For Class A-Alternative 4, the approval would have to occur prior to each sampling event.

(a) Do you use Class A-Alternatives 3 or 4? Yes No

If YES, how much did it cost you to write the sampling plan? \$ _____

(b) If you had to wait up to 60 days for approval of your sampling plan, how much would it cost you to hold the material for that time? \$ _____

(c) If you can't hold the material for up to 60 days, how much would it cost you to manage the material in another manner? \$ _____

Sale or Giveaway in a Bag or Other Container

(This question should be asked only to: ARLINGTON, BUCKLEY, CENTRAL WWTP #1 (TACOMA), CHENEY, CLARK PUBLIC UTILITIES (LaCENTER), COLUMBIA COMPOST, GRANITE FALLS, GROCO, INC., LANGLEY, LYNDEN, MILLER CREEK, OMAK, THREE RIVERS REGIONAL, and WESTPORT.)

Ecology is proposing to implement the current biosolids general permit requirement that biosolids that are sold or given away in a bag or other container (i.e. one holding less than 1 metric ton; e.g. a pick-up truck) meet the exceptional quality standards.

Do you sell or give away biosolids in quantities of less than 1 metric ton in a bag or other container? Yes No

If YES, do the biosolids always meet Table 3 limits? Yes No

If NO, how much would it cost you to handle the biosolids in another way (include forgone sales)? \$ _____

Submittal of an Annual Biosolids Report

Under the current rule only major WWTPs and septage management facilities are absolutely required to submit an annual report. However, Ecology can request a report from others and has always done so. Ecology is proposing to implement the current biosolids general permit requirement that every facility submit an annual report.

Is your facility considered to be a "minor" facility (i.e. it serves <10,000 persons AND has design flow rate of <1 million gallons/day)? Yes No

If YES, what does it cost you to submit an annual biosolids report? \$ _____

Timing for Submittal of a Permit Application

Ecology is proposing to require all facilities to submit an application for coverage under an applicable general permit within 90 days after the permit is issued. Under the current rule, there are widely varying requirements.

(a) Have you applied for coverage under the biosolids general permit? Yes No

If YES, please estimate the cost of your last application. \$ _____

(b) Were you allowed more than 90 days after the general permit was issued in order to apply for coverage? Yes No

If YES, please estimate how much more it would have cost you to submit the application within 90 days? \$ _____

Public Notice Requirements for Non-exceptional Quality Biosolids or Septage

Ecology is proposing to require that public notice be conducted by all facilities that apply non-exceptional quality (non-EQ) biosolids or septage each time they apply for coverage under a new general permit. However, the notice would only have to be posted one time in a newspaper and not at the land application sites if the sites have been posted in the past.

(a) How much did it cost you the last time you had to do full public notice for your permit (e.g. newspaper posting, site posting, SEPA)? \$ _____ N/A

(b) How much would you have saved if you only had to do a single public notice in the newspaper instead of two notices? \$ _____ N/A

(c) How much would you have saved if you did not have to post your land application sites? \$ _____ N/A

Insignificant Changes

Ecology is proposing to eliminate the need to do public notice if a facility is proposing “insignificant changes” to their biosolids program. The current rule defines “significant change” generally as changes that result in more stringent management requirements (e.g. changing from a grain crop to a root crop) or changes to certain requirements (e.g. a reduction in buffer distances or a reduction in site monitoring).

In the past 5 years, how often have you proposed changes to your biosolids management practices that would be considered to be “insignificant”? _____

Exemptions for Certain Research

Ecology is proposing to exempt certain research projects from the permitting and reporting requirements of the rule on sites that are less than 10 acres.

Have you engaged in or had your non-EQ biosolids or septage used for research on plots of land that are 10 acres or less and that were not previously covered under a permit? Yes No

If YES, what was the cost of permitting the site and reporting to Ecology for that site?

\$ _____

Screening Requirements

Ecology is proposing to require screening of all biosolids (including septage) so that the final product is at least 95% free of garbage prior to end use. Grinding will be allowed only after initial screening.

Do you currently handle biosolids or septage that HAS NOT met this standard? Yes No

If YES, please estimate what it would cost you to install a screen and associated equipment and other related costs in order to achieve this standard? \$ _____

Deferral to Other Permits for Storage

Ecology is proposing to allow for the deferral to other environmental permits for certain storage of biosolids or septage (e.g. deferral to NPDES Permits, State Waste Discharge Permits, Conditional Use Permits, Solid Waste Permits).

Do you currently store biosolids or septage at your facility (note: this would include storage in tanks or similar devices and storage in lagoons, but it would not include material in treatment lagoons)? Yes No

If YES, do you have another environmental permit that addresses this storage? Yes No

If YES, please estimate what would it save you if you did not have to address this storage in your biosolids permit? \$ _____

Field-storage and Vector Attraction Reduction Requirements

Ecology is proposing to require that field-stored biosolids and septage either meet one of the vector attraction reduction (VAR) standards prior to storage or that a simple plan be submitted that addresses how the current storage minimizes risk to human health.

Do you store biosolids in the field prior to application that has not met the VAR standards? Yes No

If YES: Please estimate the cost of writing and submitting a simple plan addressing how you would minimize risk to human health (e.g. a plan might show that the site is a sufficiently lengthy distance from any neighboring properties or a plan might provide for some sort of temporary cover or a plan might state that material is only stored during winter when cold temperatures and snow cover limit pathogen activity and exposure to potential vectors).
\$ _____

LAST QUESTION

In order for us to calculate the relative impacts of the rule changes, the law requires us to calculate the costs on a per employee basis. For this reason we are asking, how many employees does your entire company, agency, or utility have? _____

#2 - Septage Management Facility Questionnaire

Thank you for filling out this survey. It will help Ecology estimate the cost of changes to the rule.

Please put in your code _____.

When you answer the questions please consider all your costs including things that people usually forget such as:

- reporting
- record keeping
- compliance costs
- professional services (e.g. lab costs, consultant costs, contractor costs)
- equipment
- supplies
- labor, staff time
- increased administrative costs
- lost sales or revenue

Management of Unstabilized Septage

Ecology is proposing to require that Class II septage and unstabilized Class III septage either be managed as biosolids or be taken to a WWTP unless it's mixed with Class I septage at a rate of 25% or less.

Do you currently land-apply Class II septage or unstabilized Class III septage (Do NOT count if mixed with Class I septage at a rate of 25% or less.)? Yes No.

If YES, please estimate the cost for either managing the material as biosolids from a WWTP (This would include the cost of sampling for metals and nitrogen and meeting at least the Class B pathogen reduction standards) **OR** the cost of taking the material to a WWTP.

\$ _____

Site Management Requirements for Septage

Ecology is proposing to implement the current general permit requirement that the same site management and access restrictions apply to all septage whether it has been pH-adjusted or not.

Do you now or have you ever applied pH-adjusted septage to:

- (a) Land used for grazing cattle? Yes No
(b) Land with a high potential for public exposure? Yes No
(c) Land with a low potential for public exposure? Yes No

If you answered YES to (a), did you allow livestock to graze within 30 days? Yes No

If YES, what would it cost you to wait 30 days? \$ _____

If you answered YES to (b), did you restrict public access for 1 year? Yes No

If NO, what would it cost you to restrict public access for 1 year (e.g. site posting)?
\$ _____

If you answered YES to (c), did you restrict public access for 30 days? Yes No

If NO, what would it cost you to restrict public access for 30 days (e.g. site posting)?
\$ _____

Transportation of Biosolids or Septage

Ecology is proposing to add the current biosolids general permit requirement that all facilities that transport biosolids or septage for management submit a Spill Prevention/Response Plan with the permit application. Ecology previously developed a simple template that facilities can use.

Do you transport biosolids or septage? Yes No

If YES, have you submitted a spill prevention and response plan using the plan template that Ecology developed? Yes No

If YES, how much did it cost you to complete the plan using the template? \$ _____

Submittal of an Annual Biosolids Report

(This question should only be asked of: B & B FARMS and CHEYNE.)

Under the current rule only major WWTPs and septage management facilities are absolutely required to submit an annual report. However, Ecology can request a report from others and has always done so. Ecology is proposing to implement the current biosolids general permit requirement that every facility submit an annual report.

What does it cost you to submit an annual biosolids report for the BUF portion of your program?
\$ _____

Timing for Submittal of a Permit Application

Ecology is proposing to require all facilities to submit an application for coverage under an applicable general permit within 90 days after the permit is issued. Under the current rule, there are widely varying requirements.

(a) Have you applied for coverage under the biosolids general permit? Yes No

If YES, please estimate the cost of your last application. \$ _____

(b) Were you allowed more than 90 days after the general permit was issued in order to apply for coverage? Yes No

If YES, please estimate how much more it would have cost you to submit the application within 90 days? \$ _____

Public Notice Requirements for Non-exceptional Quality Biosolids or Septage

Ecology is proposing to require that public notice be conducted by all facilities that apply non-exceptional quality (non-EQ) biosolids or septage each time they apply for coverage under a new general permit. However, the notice would only have to be posted one time in a newspaper and not at the land application sites if the sites have been posted in the past.

(a) How much did it cost you the last time you had to do full public notice for your permit (e.g. newspaper posting, site posting, SEPA)? \$ _____ N/A

(b) How much would you have saved if you only had to do a single public notice in the newspaper instead of two notices? \$ _____ N/A

(c) How much would you have saved if you did not have to post your land application sites? \$ _____ N/A

Insignificant Changes

Ecology is proposing to eliminate the need to do public notice if a facility is proposing “insignificant changes” to their biosolids program. The current rule defines “significant change” generally as changes that result in more stringent management requirements (e.g. changing from a grain crop to a root crop) or changes to certain requirements (e.g. a reduction in buffer distances or a reduction in site monitoring).

In the past 5 years, how often have you proposed changes to your biosolids management practices that would be considered to be “insignificant”? _____

Exemptions for Certain Research

Ecology is proposing to exempt certain research projects from the permitting and reporting requirements of the rule on sites that are less than 10 acres.

Have you engaged in or had your non-EQ biosolids or septage used for research on plots of land that are 10 acres or less and that were not previously covered under a permit? Yes No

If YES, what was the cost of permitting the site and reporting to Ecology for that site? \$ _____

Screening Requirements

Ecology is proposing to require screening of all biosolids (including septage) so that the final product is at least 95% free of garbage prior to end use. Grinding will be allowed only after initial screening.

Do you currently handle biosolids or septage that HAS NOT met this standard? Yes No

If YES, please estimate what it would cost you to install a screen and associated equipment and other related costs in order to achieve this standard? \$ _____

Deferral to Other Permits for Storage

Ecology is proposing to allow for the deferral to other environmental permits for certain storage of biosolids or septage (e.g. deferral to NPDES Permits, State Waste Discharge Permits, Conditional Use Permits, Solid Waste Permits).

Do you currently store biosolids or septage at your facility (note: this would include storage in tanks or similar devices and storage in lagoons, but it would not include material in treatment lagoons)? Yes No

If YES, do you have another environmental permit that addresses this storage? Yes No

If YES, please estimate what would it save you if you did not have to address this storage in your biosolids permit? \$ _____

Field-storage and Vector Attraction Reduction Requirements

Ecology is proposing to require that field-stored biosolids and septage either meet one of the vector attraction reduction (VAR) standards prior to storage or that a simple plan be submitted that addresses how the current storage minimizes risk to human health.

Do you store biosolids in the field prior to application that has not met the VAR standards? Yes No

If YES: Please estimate the cost of writing and submitting a simple plan addressing how you would minimize risk to human health (e.g. a plan might show that the site is a sufficiently lengthy distance from any neighboring properties or a plan might provide for some sort of temporary cover or a plan might state that material is only stored during winter when cold temperatures and snow cover limit pathogen activity and exposure to potential vectors).
\$ _____

LAST QUESTION

In order for us to calculate the relative impacts of the rule changes, the law requires us to calculate the costs on a per employee basis. For this reason we are asking, how many employees does your entire company, agency, or utility have? _____

#3 - Biosolids Beneficial Use Questionnaire

Thank you for filling out this survey. It will help Ecology estimate the cost of changes to the rule.

Please put in your code _____.

When you answer the questions please consider all your costs including things that people usually forget such as:

- reporting
- record keeping
- compliance costs
- professional services (e.g. lab costs, consultant costs, contractor costs)
- equipment
- supplies
- labor, staff time
- increased administrative costs
- lost sales or revenue

Transportation of Biosolids or Septage

Ecology is proposing to add the current biosolids general permit requirement that all facilities that transport biosolids or septage for management submit a Spill Prevention/Response Plan with the permit application. Ecology previously developed a simple template that facilities can use.

Do you transport biosolids or septage? Yes No

If YES, have you submitted a spill prevention and response plan using the plan template that Ecology developed? Yes No

If YES, how much did it cost you to complete the plan using the template? \$ _____

Submittal of an Annual Biosolids Report

Under the current rule only major WWTPs and septage management facilities are absolutely required to submit an annual report. However, Ecology can request a report from others and has always done so. Ecology is proposing to implement the current biosolids general permit requirement that every facility submit an annual report.

What does it cost you to submit an annual biosolids report? \$ _____

Timing for Submittal of a Permit Application

Ecology is proposing to require all facilities to submit an application for coverage under an applicable general permit within 90 days after the permit is issued. Under the current rule, there are widely varying requirements.

(a) Have you applied for coverage under the biosolids general permit? Yes No

If YES, please estimate the cost of your last application. \$ _____

(b) Were you allowed more than 90 days after the general permit was issued in order to apply for coverage? Yes No

If YES, please estimate how much more it would have cost you to submit the application within 90 days? \$ _____

Public Notice Requirements for Non-exceptional Quality Biosolids or Septage

Ecology is proposing to require that public notice be conducted by all facilities that apply non-exceptional quality (non-EQ) biosolids or septage each time they apply for coverage under a new general permit. However, the notice would only have to be posted one time in a newspaper and not at the land application sites if the sites have been posted in the past.

(a) How much did it cost you the last time you had to do full public notice for your permit (e.g. newspaper posting, site posting, SEPA)? \$ _____ N/A

(b) How much would you have saved if you only had to do a single public notice in the newspaper instead of two notices? \$ _____ N/A

(c) How much would you have saved if you did not have to post your land application sites? \$ _____ N/A

Insignificant Changes

Ecology is proposing to eliminate the need to do public notice if a facility is proposing “insignificant changes” to their biosolids program. The current rule defines “significant change” generally as changes that result in more stringent management requirements (e.g. changing from a grain crop to a root crop) or changes to certain requirements (e.g. a reduction in buffer distances or a reduction in site monitoring).

In the past 5 years, how often have you proposed changes to your biosolids management practices that would be considered to be “insignificant”? _____

Exemptions for Certain Research

Ecology is proposing to exempt certain research projects from the permitting and reporting requirements of the rule on sites that are less than 10 acres.

Have you engaged in or had your non-EQ biosolids or septage used for research on plots of land that are 10 acres or less and that were not previously covered under a permit? Yes No

If YES, what was the cost of permitting the site and reporting to Ecology for that site? \$ _____

Screening Requirements

Ecology is proposing to require screening of all biosolids (including septage) so that the final product is at least 95% free of garbage prior to end use. Grinding will be allowed only after initial screening.

Do you currently handle biosolids or septage that HAS NOT met this standard? Yes No

If YES, please estimate what it would cost you to install a screen and associated equipment and other related costs in order to achieve this standard? \$ _____

Deferral to Other Permits for Storage

Ecology is proposing to allow for the deferral to other environmental permits for certain storage of biosolids or septage (e.g. deferral to NPDES Permits, State Waste Discharge Permits, Conditional Use Permits, Solid Waste Permits).

Do you currently store biosolids or septage at your facility (note: this would include storage in tanks or similar devices and storage in lagoons, but it would not include material in treatment lagoons)? Yes No

If YES, do you have another environmental permit that addresses this storage? Yes No

If YES, please estimate what would it save you if you did not have to address this storage in your biosolids permit? \$ _____

Field-storage and Vector Attraction Reduction Requirements

Ecology is proposing to require that field-stored biosolids and septage either meet one of the vector attraction reduction (VAR) standards prior to storage or that a simple plan be submitted that addresses how the current storage minimizes risk to human health.

Do you store biosolids in the field prior to application that has not met the VAR standards? Yes No

If YES: Please estimate the cost of writing and submitting a simple plan addressing how you would minimize risk to human health (e.g. a plan might show that the site is a sufficiently lengthy distance from any neighboring properties or a plan might provide for some sort of temporary cover or a plan might state that material is only stored during winter when cold temperatures and snow cover limit pathogen activity and exposure to potential vectors).
\$ _____

LAST QUESTION

In order for us to calculate the relative impacts of the rule changes, the law requires us to calculate the costs on a per employee basis. For this reason we are asking, how many employees does your entire company, agency, or utility have? _____

APPENDIX 3: COST SURVEY RESULTS

Note: Ecology based the results in this appendix on surveys received before December 20, 2006. The results may not include last minute updates from late surveys and may be revised if additional respondents send in their survey instruments.

Survey Data:

The survey sample covered 7% of WWTPs (given a 59% response rate), 45% of the SMFs and all of the BUFs.

For purposes of this analysis large facilities are those with employment of over 50 people and small facilities may have up to 50 people. The 4 large facilities have an average of 2400 employees. The 34 small facilities have an average of 7 employees. 5 respondents did not report the number of employees.

Some facilities are part of government. These facilities have been incorporated into the survey because they sometimes have data on costs that will eventually affect businesses. Once data was collected, the governmental facilities could not be separated out because the data was collected in such a way that the identity of the respondent is unknown. This anonymity is necessary in order for businesses and individuals to feel comfortable giving accurate data to Ecology.

Septage

Survey Data on Class II and unstabilized Class III land application: The total cost of this is about \$201,000 per year with a 5-year present value of \$963,000. Only 3 respondents land apply Class II or unstabilized Class III septage at rate greater than 25% of the load. These respondents gave widely varying numbers for the costs. The estimates ranged from \$500 per load, and one respondent gave a cost of \$200,000. This latter respondent also gave other estimates well outside of the normal range of values given.

Survey Data on restricting access: Respondents found this question confusing. The estimated cost is \$1,600 per year with a 5-year present value of \$7,600. One respondent who applies septage on land and then allows cows on it indicates the cost will be \$200 per month to keep the cows off. One respondent applies septage to land with a high potential for public exposure and reported it may cost between \$200,000 and \$400,000 if they have to restrict access for 1 year. They believe they may lose the land use. However they already post the area and thus would be in compliance. Others report lower costs in the range of \$20 to \$100 for a 1-year restriction. For respondents applying on land with a low potential for public exposure the expected costs ranged from \$50 to \$150 for a 30 day restriction.

Transportation

Survey Data: The total cost of this single point in time requirement is approximately \$48,400.⁹ Over half of the respondents report that they transport biosolids. This varies by type of respondent: 73% of SMFs transport while only 40% of BUFs transport. Nearly half of those (23% of the total) who transport used the template to write a spills plan. Those using the

⁹ Based on Average cost for WWTP*number of WWTPs*percent affected+ Average cost for SMFs*number of SMFs*percent affected + Average cost for BUF*number of BUFs*percent affected)+High Cost Outlier

template reported average costs of \$1,040. One company reported a very high cost, \$10,000. Prior to the development of the template, in 2004, facilities reported average costs of \$650 to write the spill plan on their own. It is unlikely that the template raised the costs. The \$10,000 reported cost is 44 standard deviations higher than the average for all the other businesses. For all other businesses the average reported cost was \$245. Ecology will use the \$10,000 for that company and the lower value for extrapolation to other facilities.

For those facilities reporting costs, the average cost per employee for small facilities with fewer than 50 employees was \$72. For facilities, with over 50 employees, the cost was \$0.11 per employee.

Class A-Alternatives 3 & 4

Survey Data: The respondents using Class A Alternatives 3 and 4 indicated the cost of holding waste for 60 days ranged from \$0 to \$100,000. The total cost of changes due to this requirement are expected to be \$100,000. The respondent who could not hold it indicated that the cost of alternative storage/management would be \$12,500 however they indicate they don't use the Alternative 3 and 4. The costs for the only large facility affected were \$0 and are lower than the costs for the small facility of \$6,250.

Biosolids Sold or Given Away In a Bag or Other Container

Survey Data: No respondents reported any costs related to biosolids that are sold or given away.

Reporting

Survey Data: 32% of the respondents report they did submit an annual biosolids report. Respondents who were able to report on the cost of producing an annual report indicated an average cost of \$1,695. The expected total cost of newly required biosolids reports is \$279,000 with a 5-year present value of \$1.3 million. Within this group some of the respondents reported employment. The average cost per employee that small facilities provided was \$527. The average cost per employee reported by large facilities was \$0.24.

Timeline for Submitting Permit Applications

Survey Data: 30% of the respondents report that they had more than 90 days to submit their permit application. These respondents indicated an additional cost of \$21,800 to submit the application within 90 days. This cost includes an outlier. One facility reported the added cost would be \$10,000, where all other applicants indicated it would cost between \$0 and \$500. The average without this facility is \$109. The \$10000 figure is 91 standard deviations above the mean value without the facility. Thus the mean without the facility is used for general application. The estimated cost of this proposed amendment is \$21,300.

Only one of the respondents who indicated they had more than 90 days to submit their permit application also had over 50 employees. That facility had zero costs. The remaining small businesses had costs of \$54 per employee.

Research Exemption

Survey Data: Only 2 respondents had research projects spreading biosolids on plots of land less than 10 acres. The average savings reported is \$6,865.

Public Notice

Survey Data: The average reported savings for the change in public notice requirements for non-exceptional biosolids is \$272. For small facilities the savings is \$59 per employee and for large facility it is \$3.75.

Survey Data: The average number of times that respondents proposed an insignificant change to their program over the last 5 years was .59 per respondent. This would mean an average savings of \$160 per facility over the life of a permit. The average savings per employee for small facilities is \$22.76 and for large facilities is \$0.06. The present value of total savings is estimated to be \$32,000.

Reduction in Recognizables/Screening Requirements

Survey Data: 13 respondents reported that they handle biosolids or septage that does not meet a 95% garbage free level. For these businesses, the average actual cost or expected cost of meeting the requirements \$57,000. All WWTP plants reported costs of over \$85,000. SMFs reported costs from \$500 to \$35,000. No BUFs reported costs. The expected cost of adding equipment that allows screening for garbage is \$1 million.

Small facilities reported average costs of \$9,200 per employee. Only one large facility reported costs of \$405 per employee. One company indicated they will be unable to comply, given their current lagoon system.

Storage

Survey Data: 7 respondents reported that they store septage and have another environmental permit that they could use to defer the need for new permit deferral. For these respondents, the average expected savings is \$265. The average savings per employee for small facilities is \$28. The average savings per employee for large facilities is \$1.25.

Survey Data: Only 2 businesses reported that they field store biosolids and septage prior to meeting the vector attraction reduction standards. These respondents expect average costs of \$275 to write a plan to show how they will reduce the risk to human health. All these respondents are small facilities. The average cost per employee is \$55. The total present value of costs to write plans show reducing human health risks is expected to be \$843.

APPENDIX 4: BACTERIA IN MUNICIPAL WASTEWATER AND SEWAGE SLUDGE

- **Samonellosis:** Salmonellosis is an infection with a bacteria called Salmonella. Most persons infected with Salmonella develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. Salmonella infections usually resolve in 4 to 7 days and often do not require treatment unless the patient becomes severely dehydrated or the infection spreads from the intestines. Persons with severe diarrhea may require rehydration, often with intravenous fluids. Antibiotics are not usually necessary unless the infection spreads from the intestines, then it can be treated with ampicillin, gentamicin, trimethoprim/sulfamethoxazole, or ciprofloxacin. Unfortunately, some Salmonella bacteria have become resistant to antibiotics, largely as a result of the use of antibiotics to promote the growth of feed animals. They are microscopic living creatures that pass from the feces of people or animals, to other people or other animals.

Every year, approximately 40,000 cases of salmonellosis are reported in the United States. Because many milder cases are not diagnosed or reported, the actual number of infections may be thirty or more times greater. Salmonellosis is more common in the summer than winter. Children are the most likely to get salmonellosis. Young children, the elderly, and the immunocompromised are the most likely to have severe infections. It is estimated that approximately 600 persons die each year with acute salmonellosis.

- **Typhoid:** Typhoid fever is a life-threatening illness caused by the bacterium *Salmonella* Typhi. In the United States about 400 cases occur each year, and 75% of these are acquired while traveling internationally. Typhoid fever is still common in the developing world, where it affects about 21.5 million persons each year. *Salmonella* Typhi lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *S.* Typhi in their feces (stool).

People can get typhoid fever if they eat food or drink beverages that have been handled by a person who is shedding *S.* Typhi or if sewage contaminated with *S.* Typhi bacteria gets into the water they use for drinking or washing food. Therefore, typhoid fever is more common in areas of the world where hand washing is less frequent and water is likely to be contaminated with sewage.

Once *S.* Typhi bacteria are eaten or drunk, they multiply and spread into the bloodstream. The body reacts with fever and other signs and symptoms.

Even if the symptoms seem to go away, people may still be carrying *S.* Typhi. If so, the illness could return, or they could pass the disease to other people. In fact, if they work at a job where they handle food or care for small children, they may be barred legally from going back to work until a doctor has determined that they no longer carry any typhoid bacteria.

- **Shigellosis:** caused by *Shigella* which causes **bacillary dysentery**. Shigellosis is an infectious disease caused by a group of bacteria called *Shigella*. Most who are infected with *Shigella* develop diarrhea, fever, and stomach cramps starting a day or two after they are exposed to the bacterium. The diarrhea is often bloody. Shigellosis usually resolves in 5 to 7 days. In some persons, especially young children and the elderly, the diarrhea can be so severe that the patient needs to be hospitalized. A severe infection with high fever may also be associated with seizures in children less than 2 years old. Some persons who are infected may have no symptoms at all, but may still pass the *Shigella* bacteria to others.

There are several different kinds of *Shigella* bacteria: *Shigella sonnei*, also known as "Group D" *Shigella*, accounts for over two-thirds of the shigellosis in the United States. A second type, *Shigella flexneri*, or "group B" *Shigella*, accounts for almost all of the rest. Other types of *Shigella* are rare in this country, though they continue to be important causes of disease in the developing world. One type found in the developing world, *Shigella dysenteriae* type 1, causes deadly epidemics there.

About 3% of persons who are infected with one type of *Shigella*, *Shigella flexneri*, will later develop pains in their joints, irritation of the eyes, and painful urination. This is called Reiter's syndrome. It can last for months or years, and can lead to chronic arthritis which is difficult to treat. Reiter's syndrome is caused by a reaction to *Shigella* infection that happens only in people who are genetically predisposed to it.

Every year, about 18,000 cases of shigellosis are reported in the United States. Because many milder cases are not diagnosed or reported, the actual number of infections may be twenty times greater. Shigellosis is particularly common and causes recurrent problems in settings where hygiene is poor and can sometimes sweep through entire communities. Shigellosis is more common in summer than winter. Children, especially toddlers aged 2 to 4, are the most likely to get shigellosis. Many cases are related to the spread of illness in child-care settings, and many more are the result of the spread of the illness in families with small children.

- **Acute Gastroenteritis:** Gastroenteritis means inflammation of the stomach and small and large intestines. Viral gastroenteritis is an infection caused by a variety of viruses that result in vomiting or diarrhea. It is often called the "stomach flu," although it is not caused by the influenza viruses.

The main symptoms of viral gastroenteritis are watery diarrhea and vomiting. The affected person may also have headache, fever, and abdominal cramps ("stomach ache"). In general, the symptoms begin 1 to 2 days following infection with a virus that causes gastroenteritis and may last for 1 to 10 days, depending on which virus causes the illness.

For most people, it is not a serious illness. People who get viral gastroenteritis almost always recover completely without any long-term problems. Gastroenteritis is a serious illness, however, for persons who are unable to drink enough fluids to replace what they lose through vomiting or diarrhea. Infants, young children, and persons who are unable to care for themselves, such as the disabled or elderly, are at risk for dehydration from loss of fluids. Immune compromised persons are at risk for dehydration because they may get

a more serious illness, with greater vomiting or diarrhea. They may need to be hospitalized for treatment to correct or prevent dehydration.

- **Cholera:** Cholera is an acute, diarrheal illness caused by infection of the intestine with the bacterium *Vibrio cholerae*. The infection is often mild or without symptoms, but sometimes it can be severe. Approximately one in 20 infected persons has severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. In these persons, rapid loss of body fluids leads to dehydration and shock. Without treatment, death can occur within hours.

In the United States, cholera was prevalent in the 1800s but has been virtually eliminated by modern sewage and water treatment systems. However, as a result of improved transportation, more persons from the United States travel to parts of Africa, Asia, or Latin America where epidemic cholera is occurring. U.S. travelers to areas with epidemic cholera may be exposed to the cholera bacterium. In addition, travelers may bring contaminated seafood back to the United States; food borne outbreaks have been caused by contaminated seafood brought into this country by travelers.

Cholera can be treated by immediate replacement of the fluid and salts lost through diarrhea. Patients can be treated with oral rehydration solution, a prepackaged mixture of sugar and salts to be mixed with water and drunk in large amounts. This solution is used throughout the world to treat diarrhea. Severe cases also require intravenous fluid replacement. With prompt rehydration, fewer than 1% of cholera patients die.

Antibiotics shorten the course and diminish the severity of the illness, but they are not as important as rehydration. Persons who develop severe diarrhea and vomiting in countries where cholera occurs should seek medical attention promptly.

- **Poliomyelitis:** Poliovirus is a member of the enterovirus subgroup, family Picornaviridae. Enteroviruses are transient inhabitants of the gastrointestinal tract, and are stable at acid pH. Picornaviruses are small, ether-insensitive viruses with an RNA genome.

The incubation period for poliomyelitis is commonly 6–20 days with a range of 3–35 days. The response to poliovirus infection is highly variable and has been categorized on the basis of the severity of clinical presentation. Up to 95% of all polio infections are inapparent or asymptomatic. Estimates of the ratio of inapparent to paralytic illness vary from 50:1 to 1,000:1 (usually 200:1). Infected persons without symptoms shed virus in the stool and are able to transmit the virus to others.

Approximately 4%–8% of polio infections consist of a minor, nonspecific illness without clinical or laboratory evidence of central nervous system invasion. This clinical presentation is known as abortive poliomyelitis, and is characterized by complete recovery in less than a week. Three syndromes observed with this form of poliovirus infection are upper respiratory tract infection (sore throat and fever), gastrointestinal disturbances (nausea, vomiting, abdominal pain, constipation or, rarely, diarrhea), and influenza-like illness. These syndromes are indistinguishable from other viral illnesses.

Nonparalytic aseptic meningitis (symptoms of stiffness of the neck, back, and/or legs), usually following several days after an initial symptom similar to that of minor illness, occurs in 1%–2% of polio infections. Increased or abnormal sensations can also occur. Typically these symptoms will last from 2 to 10 days, followed by complete recovery.

- **Meningitis:** Meningitis is an infection of the fluid of a person's spinal cord and the fluid that surrounds the brain. People sometimes refer to it as spinal meningitis. Meningitis is usually caused by a viral or bacterial infection.

Knowing whether meningitis is caused by a virus or bacterium is important because the severity of illness and the treatment differ. People usually recover from viral meningitis within a week or two. The time that symptoms appear varies depending on the type of virus. People can usually spread the virus to someone else beginning about three days after they are infected until about ten days after they develop the symptoms. Viral meningitis is rarely fatal. Bacterial meningitis can result in death and must be treated right away. Bacterial meningitis can be spread to others for as long as the bacteria are present in secretions from the nose and mouth. A person is no longer infectious within 24 to 48 hours after starting antibiotic treatment.

Bacterial meningitis can be treated with a number of effective antibiotics. It is important, however, that treatment be started early in the course of the disease. Appropriate antibiotic treatment of most common types of bacterial meningitis should reduce the risk of dying from meningitis to below 15%, although the risk is higher among the elderly.

- **Pneumonia:** Until 2000, *S. pneumoniae* infections caused 100,000-135,000 hospitalizations for pneumonia, 6 million cases of otitis media, and 60,000 cases of invasive disease, including 3300 cases of meningitis. Incidence of sterile-site infections showed geographic variation from 21 to 33 cases per 100,000 population. Disease figures are now changing due to conjugate vaccine introduction.; in 2002, the rate of invasive disease was 13 cases per 100,000 in the United States.

Death occurs in 14% of hospitalized adults with invasive disease. Neurologic sequelae and/or learning disabilities can occur in meningitis patients. Hearing impairment can result from recurrent otitis media. With treatment, most types of bacterial pneumonia can be cured within one to two weeks. Viral pneumonia may last longer, and mycoplasmal pneumonia may take four to six weeks to resolve completely. The eventual outcome of an episode of pneumonia depends on how ill the person is when he or she is first diagnosed.

- **Hepatitis:** Hepatitis A is an inflammation of the liver caused by a virus, the hepatitis A virus (HAV). There is no chronic (long-term) infection. Once you have had hepatitis A you cannot get it again. About 15% of people infected with HAV will have prolonged or relapsing symptoms over a 6-9 month period. Signs and symptoms include jaundice, fatigue, abdominal pain, loss of appetite, nausea, diarrhea, and fever. It varies in severity, running an acute course, generally starting within two to six weeks after contact with the virus, and lasting no longer than two or three months.
- **Encephalitis:** The majority of human infections are asymptomatic or may result in a nonspecific flu-like syndrome. Onset may be insidious or sudden with fever, headache,

myalgias, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic sequelae. Fortunately, only a small proportion of infected persons progress to frank encephalitis. Aseptic meningitis or encephalitis. Many cases have only fever with headache but can progress to focal paralysis, intractable seizures, coma and death. Incidence varies with occurrence and intensity of epidemic transmission; usually 150-3,000 cases/year.

Costs of \$150 million - includes estimated cost of vector control and surveillance activities. For most forms of encephalitis, the acute phase of the illness (when symptoms are the most severe) usually lasts up to a week. Full recovery can take much longer, often several weeks or months.

- **Respiratory Infections:** Respiratory syncytial virus (RSV) is the most common cause of bronchiolitis and pneumonia among infants and children under 1 year of age. Illness begins most frequently with fever, runny nose, cough, and sometimes wheezing. During their first RSV infection, between 25% and 40% of infants and young children have signs or symptoms of bronchiolitis or pneumonia, and 0.5% to 2% require hospitalization. Most children recover from illness in 8 to 15 days. The majority of children hospitalized for RSV infection are under 6 months of age. RSV also causes repeated infections throughout life, usually associated with moderate-to-severe cold-like symptoms; however, severe lower respiratory tract disease may occur at any age, especially among the elderly or among those with compromised cardiac, pulmonary, or immune systems.
- **Cryptosporidiosis:** Cryptosporidiosis is a diarrheal disease caused by microscopic parasites of the genus *Cryptosporidium*. Once an animal or person is infected, the parasite lives in the intestine and passes in the stool. The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine-based disinfectants. Symptoms of cryptosporidiosis generally begin 2 to 10 days (average 7 days) after becoming infected with the parasite. In persons with healthy immune systems, symptoms usually last about 1 to 2 weeks. The symptoms may go in cycles in which patients may seem to get better for a few days, then feel worse again before the illness ends.
- **Giardiasis:** A diarrheal illness caused by a one-celled, microscopic parasite, *Giardia lamblia*. Once an animal or person has been infected, the parasite lives in the intestine and is passed in the stool. Because the parasite is protected by an outer shell, it can survive outside the body and in the environment for long periods of time. During the past 2 decades, *Giardia* infection has become recognized as one of the most common causes of waterborne disease (found in both drinking and recreational water) in humans in the United States. *Giardia* are found worldwide and within every region of the United States. Symptoms of Giardiasis normally begin 1 to 2 weeks (average 7 days) after becoming infected. In otherwise healthy persons, symptoms of Giardiasis may last 2 to 6 weeks. Occasionally, symptoms last longer.
- **Diarrhea:** Diarrhea that lasts for more than 2 weeks is considered persistent or chronic. In an otherwise healthy person, chronic diarrhea may be a nuisance problem, or, for someone who has a weak immune system, a life-threatening illness. Diarrhea caused by

an infection can often be treated with antibiotics. However, the correct diagnosis must be made so the proper medication can be prescribed.

- **Toxoplasmosis:** A single-celled parasite called *Toxoplasma gondii* causes a disease known as toxoplasmosis. While the parasite is found throughout the world, more than 60 million people in the United States may be infected with the *Toxoplasma* parasite. Of those who are infected, very few have symptoms because a healthy person's immune system usually keeps the parasite from causing illness. However, pregnant women and individuals who have compromised immune systems should be cautious; for them, a *Toxoplasma* infection could cause serious health problems especially for their infants.

Most people who become infected with *Toxoplasma* are not aware of it. Some people who have toxoplasmosis may feel as if they have the "flu" with swollen lymph glands or muscle aches and pains that last for a month or more. Severe toxoplasmosis, causing damage to the brain, eyes, or other organs, can develop from an acute *Toxoplasma* infection or one that had occurred earlier in life and is now reactivated. Severe cases are more likely in individuals who have weak immune systems, though occasionally, even persons with healthy immune systems may experience eye damage from toxoplasmosis.

- **Anemia:** This is one side effect of some of the organisms in this list. Young children are at great risk of iron deficiency because of rapid growth and increased iron requirements. Iron deficiency can occur due to lack of iron in the diets. If this continues, anemia results. Anemia is a manifestation of iron deficiency when it is relatively severe. Iron deficiency anemia significantly impairs mental and psychomotor development in infants and children. Although iron deficiency can be reversed with treatment, the reversibility of the mental and psychomotor impairment is not yet clearly understood. Thus, prevention and treatment need to be emphasized more than detection. In addition, iron deficiency increases a child's susceptibility to lead toxicity. Lead replaces iron in the absorptive pathway when iron is unavailable.
- **Acute Enteritis:** Amebiasis is a disease caused by a one-celled parasite called *Entamoeba histolytica*. On average, about one in 10 people who are infected with *E. histolytica* becomes sick from the infection. The symptoms often are quite mild and can include loose stools, stomach pain, and stomach cramping. Amebic dysentery is a severe form of amebiasis associated with stomach pain, bloody stools, and fever. Rarely, *E. histolytica* invades the liver and forms an abscess. Even less commonly, it spreads to other parts of the body, such as the lungs or brain. Once infected, one would usually become sick 1 to 4 weeks later but sometimes more quickly or more slowly. Persons can expect to be sick for 3-10 days after beginning medication.
- **Hookworm Disease:** Hookworm is an intestinal parasite of humans that usually causes mild diarrhea or cramps. Heavy infection with hookworm can create serious health problems for newborns, children, pregnant women, and persons who are malnourished. Hookworm infections occur mostly in tropical and subtropical climates and are estimated to infect about 1 billion people -- about one-fifth of the world's population. A species, *Necator americanus*, was widespread in the southeastern United States early in this century. The Rockefeller Sanitary Commission was founded in response, and hookworm infection has been largely controlled.

The most serious results of hookworm infection are the development of anemia and protein deficiency caused by blood loss. When children are continuously infected by many worms, the loss of iron and protein can retard growth and mental development, sometimes irreversibly. Hookworm infection can also cause tiredness, difficulty breathing, enlargement of the heart, and irregular heartbeat. Sometimes hookworm infection is fatal, especially among infants. In countries where hookworm is common and reinfection is likely, light infections are often not treated. In the United States, hookworm infections are generally treated for 1-3 days with medication prescribed by your health care provider. The drugs are effective and appear to have few side effects. Another stool exam should be repeated 1 to 2 weeks after therapy. If the infection is still present, treatment will be given again. Iron supplements will be ordered if you have anemia.

- **Taeniasis:** Taeniasis is the infection of humans with the adult tapeworm of *Taenia saginata* or *Taenia solium*. Humans are the only definitive hosts for *T. saginata* and *T. solium*. Eggs or gravid proglottids are passed with feces. The eggs can survive for days to months in the environment. In the human intestine, the cysticercus develops over 2 months into an adult tapeworm, which can survive for years. The adult tapeworms attach to the small intestine by their scolex and reside in the small intestine. Length of adult worms is usually 5 m or less for *T. saginata* (however it may reach up to 25 m) and 2 to 7 m for *T. solium*. The adults produce proglottids which mature, become gravid, detach from the tapeworm, and migrate to the anus or are passed in the stool (approximately 6 per day)
- **Cyclospora:** *Cyclospora cayetanensis* is a parasite composed of one cell, too small to be seen without a microscope. The first known human cases of illness caused by *Cyclospora* infection (that is, cyclosporiasis) were reported in 1979. Cases began being reported more often in the mid-1980s. In the last several years, outbreaks of cyclosporiasis have been reported in the United States and Canada. *Cyclospora* is spread by people ingesting something, for example, water or food that was contaminated with infected stool. For example, outbreaks of cyclosporiasis have been linked to various types of fresh produce. *Cyclospora* needs time (days or weeks) after being passed in a bowel movement to become infectious. Therefore, it is unlikely that *Cyclospora* is passed directly from one person to another. It is not known whether or not animals can be infected and pass infection to people.

The time between becoming infected and becoming sick is usually about 1 week. If not treated, the illness may last from a few days to a month or longer. Symptoms may seem to go away and then return one or more times (relapse).

APPENDIX 5: TABLE OF DISEASES

Disease	Severity	Incubation Period	Length of Infection	Occurrence	ICD-9 Code	Total Payment	Number of Clients	Notes	References
Salmonellosis	can cause death	12- 72 hours	4-7 days	40,000 cases reported/year in US- mild cases not reported, may be 30+ times greater	003.0	\$40,614	17		http://www.cdc.gov/ncidod/d/bmd/diseaseinfo/salmonellosis_g.htm
Typhoid	life threatening	10-20 days		400 cases/year	V02.1	\$468	9	may be legally barred from the work place	http://www.cdc.gov/ncidod/d/bmd/diseaseinfo/typhoidfever_g.htm
Shigellosis	not very not very- if unable to replenish fluids, then serious	1-2 days	5-7 days	18,000 reported/year in US- mild cases not reported, may be 20+ times greater	004	10	48		http://www.cdc.gov/ncidod/d/bmd/diseaseinfo/shigellosis_g.htm
Gastroenteritis		1-2 days	1-10 days	3.5million+ infants, results in 500,000+ office visits, 55,000 hospitalizations, 30 deaths	008.0	\$2,417	3		http://www.cdc.gov/ncidod/d/vrd/revb/gastro/faq.htm
					008.61	\$14,571	7		
					009.0	\$80,547	381		
					009.1	\$74,174	553		
Cholera	mild, but can be severe (1 in 20) with out treatment- death	hours-5 days (avg 2-3 days)		virtually eliminated	001	56	72	treated with immediate fluid replacement	http://www.cdc.gov/ncidod/d/bmd/diseaseinfo/cholera_g.htm
Polio-myelitis	varies	3-35 days	less than a week	virutally eliminated since the 1970s	138	\$12,389	6		http://www.emedicine.com/MED/topic856.htm http://www.cdc.gov/nip/publications/pink/polio.pdf http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1473032
Meningitis	viral- less severe, bacterial- quite severe	3-10 days	viral- a week or 2	bacterial- 1,361 cases in 2004, viral- very common and impossible to quote accurately	viral- 047.8	\$2,525	1		http://www.cdc.gov/ncidod/d/bmd/diseaseinfo/meningococcal_g.htm
					047.9	\$26,669	6		http://www.musa.org/top_20_questions.asp
					bacterial- 320	\$4,255	1		
					320.1	\$17,567	1		
					320.81	\$104	1		
Pneumonia	14% result in death	4-6 days	1-2 weeks	100,000-135,000 hospitalizations/year, 13 cases per 100,000 in the US	481	\$33,971	10		http://www.cdc.gov/ncidod/d/bmd/diseaseinfo/streppneum_t.htm
Hepatitis	15% have prolonged or relapsing symptoms	6-9 months	2-6 weeks	1-2 weeks	070.1	\$21,476	85		http://www.cdc.gov/ncidod/diseases/hepatitis/a/afact.pdf http://www.cfsan.fda.gov/~mow/chap31.html
Encephal-itis	may be fatal, but only very few do	7-14 days	acute phase up to a week, full recovery several weeks or months	150-3,000/year	323.8	\$9,016	1	**Costs of \$150 million - includes estimated cost of vector control and surveillance activities	http://www.cdc.gov/ncidod/d/vbid/arbtor/arbofact.htm
					323.9	\$94	1		
Respiratory Infections	0.5-2% require hospitalization	1-3 days	8-15 days		487.1	\$56,168	34		http://www.cdc.gov/ncidod/d/vrd/revb/respiratory/rsvfeat.htm
Cryptosporidiosis	not very	2-10 days	1-2 weeks, symptoms go in cycles of feeling better then worse	approximately 3,000 cases reported/year	007.4	\$11,018	3		http://www.cdc.gov/ncidod/d/pd/parasites/cryptosporidiosis/factsht_cryptosporidiosis.htm
									http://www.emedicine.com/MED/topic484.htm
Acute Enteritis	mild	1-4 weeks	3-10 days after beginning medication	1-5% of the US population	555	\$23,578	5		http://www.cdc.gov/ncidod/d/pd/parasites/amebiasis/factsht_amebiasis.htm
Giardiasis	less severe	1-2 weeks	about 2 weeks	2% of the US population	007.1	\$55,384	31		http://www.cdc.gov/ncidod/d/pd/parasites/giardiasis/factsht_giardia.htm http://www.cfsan.fda.gov/~mow/chap22.html
Chronic Diarrhea	less severe	about 10 days	over 2 weeks, treated with antibiotics		009.3	\$35	1		http://www.cdc.gov/ncidod/d/pd/parasites/diarrhea/factsht_chronic_diarrhea.htm
Toxoplasmosis	less severe	5-23 days	few weeks to months	60 million people in the US- only 3,500 show symptoms					http://www.cdc.gov/ncidod/d/pd/parasites/toxoplasmosis/factsht_toxoplasmosis.htm http://www.emedicine.com/PED/topic2271.htm
Hookworm Disease	less severe	varies w/ # parasites, few weeks-many months	1-3 days- another stool sample 1-2 weeks later	as high as 14.8% among school children					http://www.cdc.gov/ncidod/d/pd/parasites/hookworm/factsht_hookworm.htm http://www.emedicine.com/med/topic1028.htm
Taeniasis									
Cyclospora	less severe	1 week	if not treated may last from a few days to a month, with treatment, a couple days	an estimated 16,264 cases/year in the US					http://www.cdc.gov/ncidod/d/pd/parasites/cyclospora/factsht_cyclospora.htm http://www.emedicine.com/MED/topic3393.htm