




WASHINGTON STATE
DEPARTMENT OF
E C O L O G Y

Economic Impact Analysis

General Permit for Dairy Farms

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Economic Impact Analysis

General Permit for Dairy Farms

Prepared by:

Washington State Department of Ecology
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Olympia, Washington 98504-7600
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Executive Summary

Introduction

Under WAC 173-226-120, the Waste Discharge General Permit Program rule, an Economic Impact Analysis must be prepared on all draft general permits which are intended to directly cover small businesses. A small business is defined as a profit-seeking enterprise, which is independently owned and operated from all other businesses, and which has fifty or fewer employees.

The EIA must describe the costs of complying with the rule. It must compare the compliance costs of small and large businesses to determine whether the rule disproportionately impacts small business. Disproportionate impacts of rules on small businesses must be mitigated if that is legal and feasible in meeting the stated objective of the statutes which are the basis of the proposed rule.

The Dairy Farm General Permit

Dairy Farms That Are Required to be Covered by the General Permit. All dairy farms designated as Concentrated Dairy Animal Feeding Operations must obtain coverage under the general permit. In general, a concentrated dairy animal feeding operation is a dairy farm that meets one of the following criteria:

1. Has more than 700 mature dairy cattle that are confined
2. Has more than 200 mature dairy cows that are confined, and either:
 - a) Discharges pollutants into navigable waters through a ditch, flushing system, or other similar manmade device, or
 - b) Discharges pollutants directly into surface or ground waters of the state, which originate outside of and pass through the farm or otherwise come into contact with the farm's cows.
3. The director of the Department of Ecology designates the dairy farm as a concentrated dairy animal feeding operation after determining that the farm is a significant contributor of pollution.

However, no dairy animal feeding operation is a Concentrated Animal feeding Operation if it only discharges to surface waters during a 25-year, 24-hour or larger rainfall event.

The Department intends to issue permits to farms, whether large or small, that cause water pollution problems. The review of individual farms for compliance will occur through implementation of the inspection requirements in the 1998 Dairy Nutrient Management Act (DNMA)(Chapter 90.64 RCW), in response to complaints, through implementation of Total Maximum Daily Load water cleanup plans, or on the Department's initiative. Permits will not be issued to farms that do not cause water pollution problems unless permit coverage is voluntarily requested by the dairy farm. Farms that fully implement their waste management plans on a continuing basis will be allowed an opportunity to be exempted from permit coverage. The requirements of the permit are described below.

Nutrient Management Plan. All dairy farms covered by the permit must develop and implement a current nutrient management plan consistent with the Minimum Elements for Nutrient Management planning approved by the Washington Conservation Commission in December, 1998. Consistent with Chapter 90.64 RCW, These plans must be formally approved by the local conservation district as meeting these Minimum Elements and formally certified as being fully implemented by both the local conservation district and the dairy producer. The plan provides the farm with information and methods for proper dairy waste collection, storage, handling, agronomic utilization, and system operation and maintenance. It must be adequate for the existing herd size.

Waste Storage Facilities. As part of the Minimum Elements for nutrient management planning, all new waste storage facilities contained in a new or updated animal waste management plan must be sited, designed, constructed, operated, and maintained to meet all applicable standards and specifications in the U.S. Natural Resource Conservation Service Field Office Technical Guide. The storage facility must be designed, constructed, and operated to contain all process wastewater, plus annual average rainfall minus evaporation on the lagoon surface, plus runoff from a 25-year, 24-hour rainfall event. All manure, wash down waters, contaminated storm water, and other contaminated wastewater must be collected and stored in a waste storage facility.

Field Application of Process Wastewater. Process wastewater and process solids will be applied to crops at or below agronomic rates. Process wastewater will not be land applied in a manner such that it pollutes the state's surface or ground waters by runoff, seepage, or any other means. Land application of process wastewater and process solids will be conducted in accordance with the Nutrient Management Plan developed specific to the dairy

Best Management Practices for Diversion of Runoff and Containment of Manure . When appropriate, uncontaminated drainage or runoff will not come into contact with wastewater or solid waste. Ditches, gutters, and downspouts will be used where appropriate to divert uncontaminated drainage or runoff away from the waste storage facility.

Best Management Practices for Dry Storage Solids and Silage. Dry storage solids, silage, and leachate from dry stacked manure and silage will be collected, recycled, stored, or treated in a manner to assure that no seepage or runoff to state surface or ground waters occurs.

Animal Access to Surface Waters . Plans may require that cows not come into direct contact with surface waters of the state. Nutrient management plans may include fences or other barriers to limit access.

Conclusions of Economic Analysis

The economic analysis used the ratio of the annualized cost of complying with the general permit to the number of cows that the farm owns as the measure of the permit's impact. If the compliance-cost-per-cow ratio is higher for small business than for large business, then small businesses are disproportionately impacted and mitigation of the cost is necessary.

All dairy farms have fewer than 50 employees. Therefore, all dairy farms are small businesses.

Cost estimates were made for three scenarios. One estimate calculated the full cost of complying with the permit, assuming that no water pollution control costs of any sort have already been incurred. Cost estimates were also made assuming that the dairy farm was already partially in compliance with the permit. A third scenario calculated the cost of compliance when using the dry stack system.

The following two tables show the range of cost-per-cow ratios for farms using scraping under scenarios 1 (totally out of compliance) and 2 (partially in compliance) assuming that the NRCS cost-share is \$50,000. This level of cost-share should be common. Scraping is the most common method of manure collection.

Cost-Per-Cow Ratios Scraping Totally Out of Compliance NRCS \$50,000			
Size of Herd	Annual Cost Per Cow		
	Eastern Washington	Western Washington W/out Seasonal Water Table	Western Washington w/Seasonal Water Table
100	\$62	\$69	\$86
200	42	48	59
400	20	27	42
700	13	22	31

Cost-Per-Cow Ratios Scraping Partially in Compliance NRCS \$50,000			
Size of Herd	Annual Cost Per Cow		
	Eastern Washington	Western Washington W/out Seasonal Water Table	Western Washington w/Seasonal Water Table
100	\$31	\$31	\$31
200	19	19	19
400	12	12	12
700	10	10	10

The cost-per-cow ratios of small farms are greater than the cost-per-cow ratios for large farms. As measured by the cost-per-cow ratio, the general permit has a proportionally greater impact on small farms than on large farms.

When it is assumed that the NRCS cost-share is \$100,000, cost-per-cow ratios of small farms again are greater than the cost-per-cow ratios for large farms.

Cost-per-cow ratios for farms that are already partly in compliance are lower than those for farms that are totally out of compliance.

Mitigation of Impact on Small Business

If the cost-to-sales ratio is higher for small business than for large business, then small businesses are disproportionately impacted. The general permit rule requires that disproportionate economic impacts of general permits on small businesses be reduced when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the state Water Pollution Control act. Cost impacts on small businesses may be reduced by modifying conditions of the permit.

Ecology took the following steps to mitigate the impact of the dairy farm general permit:

1. Many farms will not be required to be covered by the general permit. The Department intends to issue permits only to farms, whether large or small, that cause real water pollution problems.

2. Financial aid from the USDA's Natural Resources Conservation Service and from the Washington Conservation Commission through local conservation districts is currently available for the construction of lagoons, purchase of land application equipment, and construction of agricultural BMPs.
3. The Department will normally give dairy farms 24 months within which to write and implement their nutrient management plans.
4. The permit's monitoring and recordkeeping requirements are considered very minimal compared with other NPDES permits.
5. Permit fees for small businesses covered by the dairy farm general permit were decreased by about fifty percent in 1998 revisions to the state Water Pollution Control act (Chapter 90.48 RCW).
6. The state Water Pollution Control act requires Ecology to consider whether a water quality enforcement action will contribute to conversion of commercial agricultural land to non-agricultural use (see RCW 90.48.450). Ecology must try to minimize the possibility of conversion.

These mitigation measures are described below.

Necessity to Comply with State and Federal Laws and Regulations . The general permit rule states that mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the State Water Pollution Control act. If a proposed mitigation measure violates federal law or regulations or if it violates state statutory law or rules, then it cannot be undertaken.

The conditions of the dairy farm general permit that are based on federal regulations are requirements of federal law. Significant mitigation of these conditions would be a violation of federal NPDES program regulations, which set effluent limits for dairy farms. Because these conditions are a consequence of federal law, they cannot be mitigated and the compliance costs associated with them cannot be reduced.

Permit conditions required to meet the AKART requirement of the state Water Pollution Control act (RCW 90.48.010) are also legal requirements that Ecology cannot allow permit holders to violate. Thus, compliance costs related to permit conditions based on the AKART requirement also cannot be mitigated.

Compliance costs associated with permit conditions based on these state and federal laws and regulations cannot legally be mitigated. These circumstances restrict the Department's ability to reduce cost impacts on small businesses. Only costs imposed by permit conditions that are stricter than those required by these laws can legally be mitigated.

Impact of Mitigation on Effectiveness of General Permit in Controlling Water Pollution. The general permit rule states that mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the state Water

Pollution Control act. Even if a proposed mitigation measure is legal, if it would limit the general permit's effectiveness in controlling water pollution too much, it should not be undertaken.

All dairy farms are small businesses. Therefore, the economic impact of the permit on dairy farms cannot be significantly reduced without reducing the effectiveness of the permit in controlling water pollution. Costs can be reduced by exempting small businesses from conditions of the permit, using less stringent conditions for small businesses, and giving small businesses more time to comply with the permit. In all of these cases, the effectiveness of the permit in reducing water pollution is reduced.

Mitigation measures for small businesses are described below.

Some Dairy Farms Are Not Required to be Covered by the General Permit. The Department intends to issue permits only to farms, whether large or small, that cause real water pollution problems unless voluntary permit coverage is requested by the farm. Farms that fully implement their waste management plans on a continuing basis will be exempted from continuing permit coverage. See Section 3.3 of this document for a complete description of which farms must be covered.

Government Financial Aid. The three major sources of financial assistance are cost-share from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), cost-share from the Washington Conservation Commission through local conservation districts and low interest loans from the Washington Department of Ecology.

The U.S. Natural Resources Conservation Service administers a cost-share program under the Environmental Quality Incentives Program (EQUIP). Each year about \$1 million in cost-share funds are available to dairy farmers to help offset the costs of implementing best management practices (BMPs) in Nutrient Management Plans such as long-term waste storage structures. The maximum amount available under EQUIP is \$50,000 per dairy. However, it is possible to provide \$50,000 per spouse for married couples increasing the total amount to \$100,000.

The Washington Conservation Commission has recently typically been provided \$750,000 per year for cost-share to help dairy farmers offset the costs of installing BMPs. These dollars are administered locally by conservation districts. The percent cost-share varies from fifty to seventy-five percent depending upon the location and type of BMP. Fifty percent is typical. The maximum amount of cost-share available is \$25,000 in any two-year period.

The Washington Department of Ecology administers a State Revolving Fund low interest loan program with a total of \$1.5 million dollars to assist dairy farmers implementing BMPs. Under federal law, permitted farms cannot utilize these loans for waste storage facilities. This program provides one-time five year loans at a 3.0 percent interest rate. Typically, loans are for about \$15,000 - \$25,000.

Compliance Schedules. The permit gives dairy farms 24 months within which to write and implement their dairy nutrient management plans. This provision delays and spreads out the costs of complying with the general permit.

Recordkeeping and Reporting. The recordkeeping and reporting requirements in the permit are considered minimal, particularly in comparison to these requirements contained in other NPDES permits administered by Ecology.

Permit Fees. Permit fees for dairy farms are also considered minimal in comparison to the annual permit fees for other holders of NPDES permits. Also, 1998 revisions to the state Water Pollution Control act reduced fees in effect at that time by about fifty percent and placed maximum caps on the fee for larger herd sizes.

Requirement to Consider Conversion Potential for Agricultural Land. The state Water Pollution Control act requires Ecology to consider whether a water quality enforcement action will contribute to conversion of commercial agricultural land to non-agricultural use (see RCW 90.48.450). In taking enforcement actions, Ecology must try to minimize the possibility of conversion. This law could be used to mitigate the impact of enforcement actions on dairy farms when there is a possibility of conversion to non-agricultural uses. This provision could benefit some small farms.

1. Introduction

Under WAC 173-226-120, the Waste Discharge General Permit Program rule, an Economic Impact Analysis (EIA) must be prepared on all draft general permits which are intended to directly cover small businesses. A small business is defined as a profit-seeking enterprise, which is independently owned and operated from all other businesses, and which has fifty or fewer employees.

The EIA must describe the costs of complying with the rule. It must compare the compliance costs of small and large businesses to determine whether the rule disproportionately impacts small business. Disproportionate impacts of rules on small businesses must be mitigated if that is legal and feasible in meeting the stated objective of the statutes which are the basis of the proposed rule.

Purpose of the EIA

The sole purpose of the EIA is to determine whether the cost impacts of the general permit on small businesses should be reduced (WAC 173-226-120(2)). The EIA requirement is only concerned with small businesses. It is not concerned with the economic impact of the general permit on large businesses, governments, or individuals.

The EIA compares the costs of compliance for small and large business in order to determine whether the rule disproportionately impacts small business. The cost comparison compares proportionate compliance costs for small business and large business. Usually, the cost-to-sales ratio is the correct measure of proportionate cost. To calculate the ratio, annualized compliance cost is divided by average annual sales. The comparison determines whether mitigation is necessary. If the compliance cost ratio is higher for small business than for large business, then small businesses are disproportionately impacted and mitigation is necessary. Economic impact is reduced by modifying some of the conditions of the permit in order to reduce compliance costs.

Note that the EIA does not examine the profits or net income of any business. It never compares costs to profits. This is an important point that must be understood in order to understand the analysis carried out in the EIA.

Mitigation

Mitigation of the impact of the permit on small businesses is required when there are disproportionate cost impacts and when mitigation is legal and feasible in meeting the stated objectives of the Clean Water Act and the State Water Pollution Control act (Chapter 90.48 RCW) (see WAC 173-226-120(2)). The legality of mitigation measures is an important constraint on the amount of mitigation that can be granted.

Necessity to Comply with State and Federal Laws and Regulations

The general permit rule states that mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the state Water Pollution Control act. This provision is an important restriction. If mitigation violates federal law or regulations or if it violates state law or rules, then mitigation is not required.

Federal National Pollutant Discharge Elimination System (NPDES) regulations set effluent standards for discharges to surface waters. The conditions of general permits that are contained in federal regulations are requirements of federal law. They cannot be mitigated and the compliance costs associated with them cannot be reduced. There is no provision in federal law that allows violation of federal effluent standards in order to mitigate their impact on small businesses.

Conditions required to meet the AKART (All Known, Available, and Reasonable Treatment) requirement of the state Water Pollution Control act (RCW 90.48.010) are also legal requirements that Ecology cannot allow permit holders to violate. Compliance costs related to permit conditions based on the AKART requirement also cannot be mitigated.

Only costs imposed by permit conditions that are stricter than those required by state and federal laws and regulations and state water quality standards can legally be mitigated. Therefore, Ecology's ability to reduce cost impacts on small businesses is somewhat limited. Because most of the major conditions of a general permit are needed to comply with the above laws, usually only minor mitigation measures can be undertaken. This point must be understood in order to understand the amount of mitigation that is undertaken.

Impact of Mitigation on Effectiveness of General Permit in Controlling Water Pollution

Mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the state Water Pollution Control act. Thus, even if a proposed mitigation measure is legal, if it will limit the general permit's effectiveness in controlling water pollution too much, then it cannot be undertaken.

2. Dairy Farms and Water Pollution

Both federal and state laws require dairy farms that pollute surface or ground waters to obtain wastewater discharge permits to regulate their discharge of pollutants. Generally, such farms include those that support more than 200 mature animals that discharge pollutants directly to surface or ground waters of the state. Any size dairy farm may be required to obtain permits only if an Ecology site inspection determines they are significant contributors of pollution.

Animal manure, wash down water, contaminated storm water (which includes storm water runoff from pastures and from fields where manure is applied), and silage leachate, are the primary sources of wastewater from dairy farms.

It is common practice in dairy farming for manure and wash down water to be collected from the milking parlor, animal confinement areas, and animal passageways. The collected wastewater is stored in a waste storage facility or lagoon. In some cases wastewater goes through a solids separator before it is stored in the lagoon. Wastewater is commonly stored throughout the non-growing season. During the growing season, manure and wastewater are applied to field crops as a beneficial source of nutrients.

The most common pollutants in dairy farm wastewaters are suspended solids, biochemical oxygen demand, bacteria, nitrogen, phosphorous, and organics.

Contamination of surface and ground water can occur due to improper collection of wastewater, contamination of storm water runoff, inadequate or poorly designed waste storage facilities, improper timing or over-application of waste during field application, improper containment of silage effluent, improper storage of dry stack manure, and over-application of wastewater.

3. Requirements of the General Permit

3.1 Introduction

The EIA must include a brief description of the compliance requirements of the general permit. The description must include:

- Minimum state and federal technology-based treatment requirements. Both treatment processes and source-control BMPs must be included.
- Monitoring requirements.
- Reporting and recordkeeping requirements.
- Plan requirements.

The description must include equipment, supplies, labor, and increased administrative costs. Professional services needed to comply with the permit must be included. This chapter describes the requirements of the dairy farm general permit.¹

3.2 State and Federal Water Pollution Regulations

The federal Clean Water Act requires that “point source” dischargers to surface waters obtain National Pollutant Discharge Elimination System (NPDES) waste discharge permits. Dairy farms meeting the definition of a “Concentrated Animal Feeding operation” (see 40 CFR 122.23 and Section 3.3 below) are point sources requiring NPDES permits. The 1998 Washington State Dairy Nutrient Management Act (Chapter 90.64 RCW) also defines and designates certain dairy farms as Concentrated Dairy Animal Feeding operations, which require waste discharge permits for discharges to either surface or ground waters. The state Water Pollution Control act (Chapter 90.48 RCW) also requires a waste discharge permit for any source discharging to surface or ground waters.

Federal NPDES regulations establish Best Practical Technology (BPT) and Best Available Technology (BAT) effluent limits for confined animal feeding operations, which include dairy farms. The deadline for compliance with BPT effluent limitations was July 1, 1977. The deadline for compliance with BAT effluent limitations was July 1, 1984. Ecology's dairy farm general permit must impose a level of pollution control that is at least as strict as that set by federal regulations.²

Ecology must also ensure that AKART (All Known Available and Reasonable Treatment) levels of pollution control as required by the state Water Pollution Control act (see RCW 90.48.010) are established in the general permit. AKART is a state--not a federal--requirement.

¹ This description does not contain all the details of the permit. It only contains summary and selective descriptions of the permit requirements which impose costs. The permit itself is the authoritative source for its conditions.

² USEPA's BAT effluent limit for dairy farms are contained in 40 CFR 412.13.

3.3 Requirements of the General Permit

Dairy Farms That Are Required to be Covered by the General Permit

All dairy farms meeting the definition “Concentrated Dairy Animal Feeding Operations” legally must obtain coverage under the general permit (definitions are contained in RCW 90.64 and 40 CFR 122.23). In general, a concentrated dairy animal feeding operation is a dairy farm that meets one of the following criteria:

1. Has more than 700 mature dairy cows that are confined.
2. Has more than 200 mature dairy cows that are confined, and either:
 - i. Discharges pollutants into navigable waters through a ditch, flushing system, or similar manmade device, or
 - ii. Discharges pollutants directly into surface or ground waters of the state, which originate outside of and pass through the farm or otherwise come into contact with the farm's cows.
3. The Director of the Department of Ecology designates any size dairy farm as a concentrated dairy animal feeding operation after determining that the farm is a significant contributor of pollution.

However, no dairy animal feeding operation is a Concentrated Animal feeding Operation if it only discharges to surface waters during a 25-year, 24-hour or larger rainfall event.

(Condition S1.D.4).

A dairy farm is also required to obtain coverage under the-general permit if it is designated as a “significant contributor of pollution”. (Condition S1.D.4). In designating a significant contributor of pollution as a concentrated dairy animal feeding operation, the Department of Ecology will consider the following factors:

- The size of the farm and the amount of wastes that reach the waters of the state.
- The location of the farm relative to the waters of the state.
- The means used to convey animal wastes and process waters into waters of the state.
- The slope, vegetation, rainfall, and other factors affecting the frequency of discharge of animal wastes and process waters into waters of the state.

(Condition S1.D.4).

The Department intends to issue permits to farms that cause water pollution problems. The review of individual farms for compliance will occur implementing the inspection program identified in the 1998 Dairy Nutrient Management Act, in response to complaints or on the Department's initiative. Permits will not be issued to farms that do not cause water pollution problems unless requested by the dairy farmer. Farms that fully implement their waste management plans on a continuing basis will be exempted from permit coverage (Condition S7).

Animal Waste Management

All dairy farms covered by the permit must develop and fully implement a current nutrient management plan (Condition S3.). The plan provides the farm with information and methods for proper dairy waste collection, storage, handling, agronomic utilization, and system operation and maintenance. Many of these methods are referred to as Best Management Practices (BMPs). Implementation of the plan will prevent pollution of ground and surface waters. The plan must conform to the requirements of Chapter 90.64 RCW including meeting the minimum elements for dairy nutrient management planning established by the Washington Conservation Commission and also be formally approved and certified. The plan must be adequate for the existing herd size.

Once a farm is covered by the general permit, it will need to develop and implement a nutrient management plan as described above in order to be in compliance with the permit. Once the plan is completed and implemented, the farm must comply with the terms and conditions of the plan.

Effluent Limitations

The permit contains several provisions regulating discharges:

- There shall be no discharge of process wastes to surface waters of the state, except when chronic or catastrophic events cause an overflow from facilities designed constructed and operated to contain all process generated wastewater plus average annual precipitation, minus evaporation, plus the runoff from a 25-year, 24-hour rainfall event for that location.
- The permit holder must land apply process wastewater and process solids to lands as specified in its animal waste management plan.

(Condition S2).

Waste Storage Facility

All waste storage facilities contained in a new or updated animal waste management plan must be sited, designed, constructed, operated, and maintained consistent with the dairies nutrient management plan developed under Condition S3.A of the permit. (Condition S4).

Animal herd size must not exceed the capacity of the waste storage facility for the farm. Prior to increasing the number of cows above the capacity of the waste storage facility specified in the current waste management plan, the farm must:

- Update the plan.
- Upgrade all system components identified in the updated plan as needing upgrading.
- Send a copy of the updated plan to the Department of Ecology.

(Condition S6).

Ecology has determined that BAT (40 CFR 412.13) and AKART for dairy farms is that there shall be no discharge of process wastes to surface waters of the state, except when chronic or catastrophic events cause an overflow from facilities designed, constructed, and operated to contain all process generated wastewater, plus average annual precipitation, minus evaporation, plus the runoff from a 25-year, 24-hour rainfall event for that location. All manure, wash down waters, contaminated storm water, and other contaminated wastewater must be collected and stored in a waste storage facility.

Monitoring

If a discharge to surface waters occurs that is not authorized by the Surface Water Effluent Limitation (Condition S2.A) the following information must be reported: 1) description and cause of discharge; 2) date, time, and duration of discharge; 3) estimate of discharge volume; 4) name and location of receiving water; and 5) corrective action taken (Condition S5.A). The discharge must be reported to the Department of Ecology within 24 hours of the discharge. A written report must be submitted within 5 days. (Condition S5.B)

Best Management Practices

The remainder of this section contains descriptions of the Best Management Practices (BMPs) that typical nutrient management plans will contain.

Best Management Practices for Diversion of Runoff and Containment of Manure. When appropriate, uncontaminated drainage or runoff will not come into contact with wastewater or solid waste. Ditches, gutters, and downspouts will be used where appropriate to divert uncontaminated drainage or runoff away from the waste storage facility. Animal waste will be contained within the animal confinement area and the waste management system. Curbing, earth contours, and other structures will be used to contain manure within the confinement area.

Best Management Practices for Dry Storage Solids and Silage. Dry storage solids, silage, and leachate from dry stacked manure and silage will be collected, recycled, stored, or treated in a manner to assure that no seepage or runoff to state surface or ground waters occurs.

Field Application of Process Wastewater. Process wastewater and process solids will be applied to crops at or below agronomic rates. Process wastewater will not be land applied in a manner such that it pollutes the state's surface or ground waters by runoff, seepage, or any other means. Land application of process wastewater and process solids will be conducted in accordance with the USDA NRCS Washington State Nutrient Management Practice Standard Supplement Number 590.

Animal Access to Surface Waters. Plans may require that cows not come into direct contact with surface waters of the state within animal confinement areas. Animals' access to surface waters outside of confinement areas may be limited. Nutrient management plans may include fences or other barriers to limit access.

4. Economic Analysis: Introduction

4.1 Introduction

The EIA must estimate the costs of complying with the general permit. It also must compare the costs of compliance for small businesses to the costs of compliance for large businesses in order to determine whether the permit disproportionately impacts small businesses. Chapter 5 makes this comparison for the dairy farm general permit.

The economic analysis in Chapter 5 uses the ratio of the annualized cost of compliance to the number of cows that the farm owns as the measure of the permit's proportional impact. If assumptions are made about milk price and cow productivity, this cost-per-cow ratio can be converted into a cost-to-sales ratio. (See Appendix A.)

All dairy farms have fewer than 50 employees. Therefore, all dairy farms are small businesses.

4.2 Range of Sizes of Dairy Farms

Although all dairy farms are classified as small businesses, they differ widely in size. This is true whether size is measured by number of cows or by sales of milk and cows. This section presents some statistics that show the wide variation in the size of dairy farms.

Dairy farms earn money both from sales of milk and from sales of cows and calves. The 1997 Census of Agriculture can be used to calculate the following distribution of average dairy farm sales by size of farm:

SALES PER FARM Washington, 1997		
Number of Cows	Number of Dairy Farms	Average Sales per Farm*
1-9	24	\$13,806
10-19	34	25,471
20-49	94	96,564
50-99	128	188,597
100-199	266	348,383
200-499	253	823,464
500-999	88	1,833,660
1,000 or more	36	4,911,667

* Sales of cattle, calves, and milk products.

Source: 1997 Census of Agriculture, Geographic Area Series:
Washington, U.S. Department of Commerce

Washington State University Cooperative Extension bulletin, **1992 Dairy Enterprise Budget: 200 Cow Herd** (referred to below by its number, EB 0927), made estimates of the revenues, expenses, and returns of a hypothetical 200 cow Washington dairy farm. The table below uses the sales calculation method used in EB 0927 to estimate the sales of several sizes of dairy farms. Prices and other values have been updated to reflect 1997 conditions.

SALES PER FARM EB 0927	
Number of Cows	Sales per Farm*
100	\$280,000
200	560,000
400	1,120,000
700	1,960,000
* Includes revenue from sales of milk, cows, and calves. Also includes the value of manure used as fertilizer	

Productivity is assumed to be 20,000 pounds of milk per cow per year. The milk price is assumed to be \$13.00 per hundred weight. For each size of farm, methods used by EB 0927 were used to estimate the sales of calves and cull cows and to estimate the value of manure produced. Table 2 of EB 0927 contains the other assumptions used in making the 1992 estimates.

4.3 Baseline for Calculating Cost Impact

The EIA estimates the compliance costs for the permit conditions that exceed baseline conditions at permitted facilities. What is the baseline?

The baseline is the cost of producing milk without making any effort to comply with the water pollution control laws. It is assumed that the farm has spent nothing on complying with water pollution control regulations.

The cost estimates presented in Chapter 5 are estimates of the full costs of complying with the dairy farm general permit and the accompanying nutrient management plan. They do not include any production costs.

The farm is typical in terms of the amount of land that it has and in terms of its manure collection and land application practices. It is assumed that the farm uses scraping to collect manure. The farm is assumed to have a collection tank with a storage capacity of five to seven days of manure. The cost of

the collection system, including the collection tank, is not viewed as a cost of complying with the permit. Instead, it is a cost of production.

As explained in the next section, some farms have already incurred some of the costs of complying with the general permit. In particular, some farms already have some type of lagoon and many farms have adequate land application equipment. Thus, in Chapter 5, cost estimates are also made for farms that are already partly in compliance with the permit. The cost estimates for these farms are lower than the full cost of compliance.

However, even though a certain compliance cost has been incurred in the past, it is still a cost of compliance. It is not a cost that the farmer must incur in order to produce milk. It is a cost that the farmer incurs in order to comply with the water pollution control laws. When existing equipment wears out and needs to be replaced, it will be replaced not because it is needed to produce milk but because it is needed to keep the farm in compliance with the general permit.

Therefore, the cost estimates for farms that are already partly in compliance with the permit are not truly estimates of the cost of compliance. Instead, they are estimates of the remaining costs that the dairy farmer must incur in order to comply with the permit.

4.4 Current Level of Compliance with the General Permit

Dairy farms are presently in variable levels of compliance with the general permit's conditions. Based upon the 1998 dairy farm registration process conducted by Ecology, the dairy industry reported sixty four percent of all dairy farms have nutrient management plans and fifty four percent of all farms are fully implementing a nutrient management plans.

It should be noted, it is not clear if these nutrient management plans are current for the existing herd size. Also, a very small percentage of these plans have been formally approved or certified as meeting the minimum element for nutrient management planning required under the proposed permit and Chapter 90.64 RCW.

4.5 Three Cost Scenarios

In Chapter 5, cost estimates are made for three different scenarios. The first two scenarios are for the typical or average dairy farm. These two scenarios assume that:

- All farms use scraping to collect manure.
- 100 and 200 cow farms use custom pumping to land apply manure.
- 400 and 700 cow farms use a big reel sprinkler to land apply manure.

The first two scenarios are as follows:

1. **Totally Out of Compliance.** This scenario estimates the full cost of compliance with the general permit. It assumes that no water pollution control costs of any sort have been incurred. It includes the full costs of all BMPs. This scenario is applicable to some farms. This scenario yields a cost estimate at the high end of the compliance cost range. See the cost estimate tables on pages 18 and 19.

2. **Partially in Compliance.** This scenario assumes that the farm is presently partially in compliance with the general permit. It is assumed that the farm has already incurred some of the costs of compliance. The cost estimate for this scenario calculates the remaining costs that the dairy farmer must incur in order to comply with the permit. For this scenario, it is assumed that the farm already has: 1) an adequately sized waste storage lagoon; and 2) adequate field application equipment. See the cost estimate tables on pages 21 and 22.

3. **Dry Stack System.** The dry stack system is an alternative method of collecting, storing, and land applying manure. See the cost estimate tables on pages 24 and 25.

Full details of all three scenarios are presented in the appropriate sections of Chapter 5.

5. Economic Analysis: Small Business Impact

5.1 Introduction

Compliance costs are dependent on herd size. As the size of the herd varies, compliance costs per cow vary. Compliance costs are also dependent on the location of the farm: rainfall is greater in Western Washington than Eastern Washington, and, thus, storage lagoons in Western Washington must be sized to accommodate that larger rainfall. Also, the cost of constructing facilities may be lower in areas of the state that have high concentrations of dairy farms than in areas that have fewer dairy farms. There are determinants of the compliance costs in addition to herd size and location. The cost estimates do not take into account all the farm characteristics and conditions that can cause compliance costs to vary. Thus, the cost estimates are averages. They ignore some of the possible variations in cost.

The EIA was performed using cost and sales data for 100, 200, 400, and 700 cow herds in Western and Eastern Washington.

As the table on page 10 shows, there are some dairy farms with fewer than 100 cows. In order to reduce the number of compliance cost estimates that had to be made, estimates were not made for dairy farms with fewer than 100 cows. It is believed that compliance costs per cow for these smaller farms are definitely higher than those for 100 cow dairy farms.

The USDA Soil Conservation Service made the compliance cost estimates for the 1994 dairy general permit Small Business economic Impact Statement. BMP cost estimates were made using cost data from recently constructed facilities at that time.

5.2 Cost Estimates

Cost estimates for all investments and actions required for permit compliance have been updated from levels reported in 1994 and are summarized in the tables on pages 18, 19, 21, 22, 24 and 25. This section and sections 5.3 through 5.6 describe the assumptions and information sources from which the estimates were derived.

Capital costs were annualized in order to be able to compare them to dairy farms' annual sales. It is necessary to annualize costs because some costs are annual (that is, recurring) costs while some costs are capital costs. For example, the construction of a lagoon is a one-time capital cost while recordkeeping is an annual cost that must be incurred every year. In addition, because the lifetimes of some capital goods vary, costs must be annualized costs in order to make them comparable.

Capital costs were annualized using a 12 percent interest rate and varying assumptions as to the lifetime of the capital investments.

Animal Waste Management Plan

The local conservation districts and the USDA Natural Resources Conservation Service (NRCS) write dairy nutrient management plans for dairy farms. All dairy farmers are eligible for this technical assistance within available conservation district and NRCS resources.

It is assumed that the cost to the dairy farm of writing a nutrient management plan is zero.

Waste Storage Facility

The size of the waste storage facility and, thus, its cost, is dependent on: 1) herd size; and 2) the area's rainfall, which varies between Eastern and Western Washington.

It is assumed that the manure lagoon is lined with compacted soil. The cost estimate for a dirt-lined lagoon assumes that suitable soil is available on-site or nearby. The cost estimate will be higher if suitable soil must be brought in from 20 miles or more away from the site.

Lagoons with compacted soil liners will only be required for farms without existing waste storage facilities. Farms with existing, adequately-sized, unlined lagoons will not be required to replace them with lined lagoons.

The cost of the manure collection system is not treated as a cost of complying with the general permit. Instead, it is a cost of production that must be incurred regardless of whether the general permit is issued. None of the costs of manure collection are included in the compliance cost estimates. In particular, the cost of a collection tank is not included. It is assumed that most dairy farms would scrape as their method to collect manure³.

Some portion of the costs of storing and land applying wastewater and manure must be incurred regardless of the general permit's requirements in order to get the animals out of the manure, keep the farm clean, and utilize the wastewater and manure. Therefore, a portion of these costs are not part of the cost of complying with the permit.

Lagoons at sites with seasonally high water tables must be built above the ground surface. Excavating into high water tables is not allowed.

The lagoon's lifetime is assumed to be ten years.

Operation and maintenance costs are also included in the cost estimates described in Sections 5.4 through 5.6 and shown in the tables on pages 18, 19, 21, 22, 24 and 25.

³ Flushing is another, cheaper, method of collection. However, it is usually only feasible for new construction (retrofitting is rare).

The value of the land on which the lagoon is built is not viewed as a cost of compliance because most farms already own the land that they will use to construct the lagoon on.

Best Management Practices for Diversion of Runoff and Containment of Manure

The nutrient management plan will require that, when appropriate, uncontaminated drainage or runoff not come into contact with wastewater. Diversions consist of ditches, gutters, and pipes. It is assumed that the typical dairy farm will need to install ditches in order to implement this part of its plan.

Operation and maintenance costs are also included in the cost estimates shown on pages 18, 19, 21, 22, 24 and 25.

Best Management Practices for Dry Storage Solids and Silage Storage

Dry storage solids, silage, and leachate from dry stacked manure and silage will be collected, recycled, stored, or treated in a manner to assure that no seepage or runoff to state surface or ground waters occurs.

For the typical dairy farm, any costs that are related to this part of the nutrient management plan are primarily costs of production. Therefore, the cost of complying with this part of the plan is assumed to be zero.

Field Application of Animal Wastes

Different sizes of dairy farms tend to use different methods of field application. The typical cost scenario assumes that: 1) 100 and 200 cow farms use custom pumps; and 2) 400 and 700 cow farms use big reel sprinklers to land apply manure. Use of honey wagons is declining.

The cost impact of the general permit on land application costs consists of:

- The full cost of a manure solids separator.
- A share of the cost of custom pumping or a big reel sprinkler system.

Some share of the costs of the land application system are not compliance costs. Instead, they are costs of production. Regardless of the requirements of the general permit, wastewater and manure must be collected and disposed of. Therefore, some of the costs of land applying wastewater must be incurred regardless of the general permit's requirements in order to dispose of the wastewater and manure. Only a share of the second of the above costs is a cost of compliance. The remaining share is a cost of production.

One hundred percent of the cost of the solids separator is assumed to be a cost of compliance. To estimate compliance costs for 400 and 700 cow farms, it is assumed that 30 percent of the pump cost and 100 percent of the cost of the big reel sprinkler are costs of compliance.

For 400 and 700 cow dairies, compliance costs are 63 percent of the total cost of the sprinkler system costs. It is assumed that 100 and 200 cow farms use custom pumpers. For these farms, it is also assumed that compliance costs are 63 percent of the total cost of custom pumping.

Land for Application of Wastewater. It is assumed that the typical farm has enough land to properly land apply wastewater. Therefore, the cost of acquiring land to land apply wastewater is assumed to be zero.

Some farms may have to acquire access to additional land in order to properly land apply wastewater. A few will have to gain access to significant amounts of land. The cost of purchasing or renting land or finding a crop farmer to take the wastewater can be highly variable (the common situation is to find a crop farmer to take the wastewater). The number of additional acres that a farmer may need to acquire will vary from farm to farm.

Value of Manure as Fertilizer. The use of manure as fertilizer produces benefits that partially offset costs of compliance. WSU Cooperative Extension Bulletin EB 0927 estimates that each cow produces manure containing \$40.95 of fertilizer value per year at 1992 prices that have been updated in the tables on pages 19, 22 and 25.⁴ However, the calculation of this value assumes that the manure/wastewater is spread within a day or two after it is excreted by the cow. The estimated value should be reduced to one-half of \$40.95 for wastewater from a lagoon, which is applied to land well after it is excreted. This estimate of the value of manure is used for all sizes of farms in all geographical locations. This is a benefit produced by land application of wastewater. It offsets a portion of the cost of land application.

It has been claimed that using manure as fertilizer is unprofitable. It is argued that because it is expensive to manage and apply manure as fertilizer, it is cheaper to apply commercial fertilizer than to apply manure. However, this argument does not mean that manure used as fertilizer has no value. Instead it means that the cost of using manure as fertilizer exceeds the value that it produces as fertilizer. Costs exceed benefits and, therefore, the use of manure as fertilizer is unprofitable. However, because the costs of land applying manure (both equipment and management costs) are included in the costs of compliance, the value of manure as fertilizer must also be included.

All sizes of farms are assumed to need a manure solids separator. Cost estimates are included in the tables on pages 19 and 22 as part of “field application” costs. Other assumptions include;

- Operation and maintenance costs are also included in the cost estimate;
- 100 and 200 cow farms use custom pumpers to land apply.

⁴ In EB 0927, the value of manure as fertilizer is treated as revenue to the farm. See Table 2 of EB 0927.

- 400 and 700 cow farms use big reel sprinklers to land apply.
- Operation and maintenance costs are also included in the cost estimate. These costs include the costs of repairs, power, and labor.

Waste Management

For farms that are currently partially in compliance, it is assumed that they will have to spend additional time on land application. Additional waste management costs consist of the added cost of giving increased attention to waste management. That is, giving increased attention to the lagoon and the use of the land application system.

For farms that are partially in compliance, it is assumed that an additional one-half hour per day must be devoted to waste management. The wage is assumed to be 10 dollars per hour. Total cost is thus \$1,825 (= 0.5 hrs. X \$10 per hr. X 365 days). This cost is the cost per farm. The cost is constant for all sizes of farms.

For farms that are currently totally out of compliance, it is assumed that installation of manure storage lagoons will allow them to reduce the amount of hours that they currently must spend land applying manure continuously throughout the year. Thus, it is assumed that they will not increase their labor costs for waste management.

Animal Access to Surface Waters

Some nutrient management plans may require that cows do not come into direct contact with surface waters while the animals are within animal confinement areas. Cows' access to surface waters outside of confinement areas may also be limited. Access limitations primarily consist of fencing.

Monitoring

The permit requires the reporting of information on discharges to surface waters which occur that are not consistent with the permits Surface Water Effluent Limitation. If the farm complies with the permit's limit on discharges to surface waters, this reporting will be rare. Under the minimum elements for nutrient management planning some monitoring of the nutrient content in farm soils is also required as part of the farms nutrient management plan

5.3 Financial Assistance for Implementing Waste Management Plans

There are several state and federal programs that give financial assistance to farms to control water pollution. To the extent that dairy farmers can get financial assistance from these programs, the cost impact on them is lessened. Subsidization of compliance costs reduces the general permit's impact on dairy farms' profits. Government assistance programs are more fully described on page 18.

Technical Assistance for Writing BMP Plans. The local conservation districts and the USDA Natural Resources Conservation Service (NRCS) write dairy nutrient management plans for dairy farms. All dairy farmers are eligible for this technical assistance, within available conservation district and NRCS resources.

5.4 Total Costs: Totally Out of Compliance

This cost estimate looks at the cost of compliance for a typical dairy farm. This cost estimate includes the total cost of complying with the general permit. It assumes that no costs of complying with the permit have been incurred. It includes the full costs of all actions required to comply with the permit.

The only cost differences between Eastern and Western Washington are the costs of the lagoon and the costs of land application. These two costs differ between the two parts of the state because they are functions of wastewater volume, which differs between the two parts of the state due to rainfall differences.

The tables on pages 18 and 19 present the total costs of compliance for differing sizes of dairy farms in Eastern and Western Washington. The last section of the table shows the annualized total cost-per-cow ratios for Eastern and Western Washington farms.

COMPLIANCE COSTS: TOTAL CAPITAL COSTS and COST-SHARE - UPDATED APRIL 1999

**Scraping
Totally Out of Compliance**

TREATMENT/BMP	EASTERN WASHINGTON				WESTERN WASHINGTON Without Seasonal Water Table				WESTERN WASHINGTON With Seasonal Water Table			
	Number of Cows				Number of Cows				Number of Cows			
	100	200	400	700	100	200	400	700	100	200	400	700
<u>CAPITAL COSTS</u>												
Waste Storage Facility	\$13,250	\$18,285	\$24,500	\$37,000	\$15,900	\$22,790	\$38,160	\$66,780	\$36,570	\$47,700	\$71,020	\$99,640
Diversions	1,654	3,308	6,615	11,576	1,654	3,308	6,615	11,576	1,654	3,308	6,615	11,576
Field Application	22,200	27,750	63,825	69,375	22,200	27,750	63,825	69,375	22,200	27,750	63,825	69,375
<u>Access Limits</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>
TOTAL	41,325	55,948	106,314	136,476	43,975	60,453	119,974	166,256	64,645	85,363	152,834	199,116
<u>COST-SHARE LEVEL</u>												
No Financial Assistance	0	0	0	0	0	0	0	0	0	0	0	0
NRCS \$50,000	24,795	33,569	50,000	50,000	26,385	36,272	50,000	50,000	38,787	50,000	50,000	50,000
NRCS \$100,000	24,795	33,569	63,788	81,886	26,385	36,272	71,984	99,754	38,787	51,218	91,700	100,000
<u>TOTAL CAPITAL COSTS WITH COST-SHARE</u>												
No Financial Assistance	41,325	55,948	106,314	136,476	43,975	60,453	119,974	166,256	64,645	85,363	152,834	199,116
NRCS \$50,000	16,530	22,379	56,314	86,476	17,590	24,181	69,974	116,256	25,858	35,363	102,834	149,116
NRCS \$100,000	16,530	22,379	42,525	54,591	17,590	24,181	47,989	66,503	25,858	34,145	61,133	99,116
<u>ANNUALIZED TOTAL CAPITAL COSTS WITH COST-SHARE</u>												
No Financial Assistance	\$7,314	\$9,903	\$18,818	\$24,156	\$7,784	\$10,700	\$21,235	\$29,427	\$11,442	\$15,109	\$27,052	\$35,244
NRCS \$50,000	2,926	3,961	9,968	15,306	3,113	4,280	12,385	20,577	4,577	6,259	18,202	26,394
NRCS \$100,000	2,926	3,961	7,527	9,663	3,113	4,280	8,494	11,771	4,577	6,044	10,821	17,544

COMPLIANCE COSTS: ANNUALIZED CAPITAL COSTS and OPERATIONS & MAINTENANCE COSTS

**Scraping
Totally Out of Compliance**

TREATMENT/BMP	EASTERN WASHINGTON				WESTERN WASHINGTON Without Seasonal Water Table				WESTERN WASHINGTON With Seasonal Water Table			
	Number of Cows				Number of Cows				Number of Cows			
	100	200	400	700	100	200	400	700	100	200	400	700
ANNUALIZED TOTAL CAPITAL COSTS												
WITH COST-SHARE												
No Financial Assistance	\$7,314	\$9,903	\$18,818	\$24,156	\$7,784	\$10,700	\$21,235	\$29,427	\$11,442	\$15,109	\$27,052	\$35,244
NRCS \$50,000	2,926	3,961	9,968	15,306	3,113	4,280	12,385	20,577	4,577	6,259	18,202	26,394
NRCS \$100,000	2,926	3,961	7,527	9,663	3,113	4,280	8,494	11,771	4,577	6,044	10,821	17,544
OPERATIONS & MAINTENANCE COSTS												
Waste Management Plan	0	0	0	0	0	0	0	0	0	0	0	0
Waste Storage Facility	136	185	266	396	163	230	396	682	368	487	718	1,015
Diversions	87	173	340	587	84	169	336	599	84	171	336	597
Field Application	4,711	7,816	5,401	7,520	5,237	8,790	5,675	7,997	5,204	8,741	5,655	8,104
Waste Management	0	0	0	0	0	0	0	0	0	0	0	0
Access Limits	264	386	627	983	264	387	636	998	265	384	627	996
Monitoring	457	568	775	1,101	460	568	818	1,098	460	563	778	1,107
TOTAL	5,656	9,128	7,409	10,586	6,207	10,143	7,860	11,373	6,381	10,346	8,114	11,819
MANURE VALUE	2,376	4,750	9,500	16,626	2,376	4,750	9,500	16,626	2,376	4,750	9,500	16,626
ANNUALIZED TOTAL CAPITAL AND O&M COSTS												
WITH COST-SHARE												
No Financial Assistance	10,595	14,281	16,726	18,116	11,615	16,093	19,595	24,174	15,448	20,705	25,665	30,436
NRCS \$50,000	6,206	8,339	7,876	9,266	6,945	9,673	10,745	15,324	8,583	11,855	16,815	21,586
NRCS \$100,000	6,206	8,339	5,436	3,622	6,945	9,673	6,854	6,517	8,583	11,640	9,434	12,736
ANNUALIZED TOTAL COSTS PER COW												
No Financial Assistance	\$106	\$71	\$42	\$26	\$116	\$80	\$49	\$35	\$154	\$104	\$64	\$43
NRCS \$50,000	62	42	20	13	69	48	27	22	86	59	42	31
NRCS \$100,000	62	42	14	5	69	48	17	9	86	58	24	18

5.5 Total Costs: Partially in Compliance

Some farms are presently in partial compliance with the general permit. They have already incurred some of the costs of complying with the permit.

To estimate compliance costs for these farms, it is assumed that the farm already has:

- An adequately-sized unlined lagoon.
- Adequate field application equipment.

Ecology will not require the unlined lagoon to be lined. Therefore, the costs of these two items are assumed to be zero.

It is assumed that if a farm has an adequate lagoon, then it will have adequate land application equipment. The purpose of the lagoon is to allow wastewater to be land applied properly. However, it is assumed that the farm does not land apply manure correctly. Therefore, it is assumed that the farm must incur the costs of additional waste management.

Because it is assumed that the farm already has a lagoon and field application equipment, it is also assumed that the farm already receives the fertilizer value of the land-applied manure.

This scenario should be applicable to many farms. A number of farms have some or adequate waste storage and/or adequate land application equipment.

It is assumed that the farm must still incur the following costs:

- BMPs for diversion and containment.
- Waste Management.
- Access limitations.
- Monitoring.

The tables on pages 21 and 22 present the total costs of compliance for differing sizes of dairy farms in Eastern and Western Washington. The last section of the table shows the annualized total cost-per-cow ratios for Eastern and Western Washington farms.

COMPLIANCE COSTS: TOTAL CAPITAL COSTS and COST-SHARE - UPDATED APRIL 1999**Scraping
Partially In Compliance**

TREATMENT/BMP	EASTERN WASHINGTON				WESTERN WASHINGTON Without Seasonal Water Table				WESTERN WASHINGTON With Seasonal Water Table			
	Number of Cows				Number of Cows				Number of Cows			
	100	200	400	700	100	200	400	700	100	200	400	700
<u>CAPITAL COSTS</u>												
Waste Storage Facility	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Diversions	1,654	3,308	6,615	11,576	1,654	3,308	6,615	11,576	1,654	3,308	6,615	11,576
Field Application	0	0	0	0	0	0	0	0	0	0	0	0
<u>Access Limits</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>
TOTAL	5,875	9,913	17,989	30,101	5,875	9,913	17,989	30,101	5,875	9,913	17,989	30,101
<u>COST-SHARE LEVEL</u>												
No Financial Assistance	0	0	0	0	0	0	0	0	0	0	0	0
NRCS \$50,000	3,525	5,948	10,793	18,061	3,525	5,948	10,793	18,061	3,525	5,948	10,793	18,061
NRCS \$100,000	3,525	5,948	10,793	18,061	3,525	5,948	10,793	18,061	3,525	5,948	10,793	18,061
<u>TOTAL CAPITAL COSTS WITH COST-SHARE</u>												
No Financial Assistance	5,875	9,913	17,989	30,101	5,875	9,913	17,989	30,101	5,875	9,913	17,989	30,101
NRCS \$50,000	2,350	3,965	7,195	12,041	2,350	3,965	7,195	12,041	2,350	3,965	7,195	12,041
NRCS \$100,000	2,350	3,965	7,195	12,041	2,350	3,965	7,195	12,041	2,350	3,965	7,195	12,041
<u>ANNUALIZED TOTAL CAPITAL COSTS WITH COST-SHARE</u>												
No Financial Assistance	\$1,040	\$1,755	\$3,184	\$5,328	\$1,040	\$1,755	\$3,184	\$5,328	\$1,040	\$1,755	\$3,184	\$5,328
NRCS \$50,000	416	702	1,274	2,131	416	702	1,274	2,131	416	702	1,274	2,131
NRCS \$100,000	416	702	1,274	2,131	416	702	1,274	2,131	416	702	1,274	2,131

COMPLIANCE COSTS: ANNUALIZED CAPITAL COSTS and OPERATIONS & MAINTENANCE COSTS												
Scraping												
Partially In Compliance												
TREATMENT/BMP	EASTERN WASHINGTON				WESTERN WASHINGTON Without Seasonal Water Table				WESTERN WASHINGTON With Seasonal Water Table			
	Number of Cows				Number of Cows				Number of Cows			
	100	200	400	700	100	200	400	700	100	200	400	700
<u>ANNUALIZED TOTAL CAPITAL COSTS</u>												
<u>WITH COST-SHARE</u>												
No Financial Assistance	\$1,040	\$1,755	\$3,184	\$5,328	\$1,040	\$1,755	\$3,184	\$5,328	\$1,040	\$1,755	\$3,184	\$5,328
NRCS \$50,000	416	702	1,274	2,131	416	702	1,274	2,131	416	702	1,274	2,131
NRCS \$100,000	416	702	1,274	2,131	416	702	1,274	2,131	416	702	1,274	2,131
<u>OPERATIONS & MAINTENANCE COSTS</u>												
Waste Management Plan	0	0	0	0	0	0	0	0	0	0	0	0
Waste Storage Facility	0	0	0	0	0	0	0	0	0	0	0	0
Diversions	83	166	331	578	83	166	331	578	83	166	331	578
Field Application	0	0	0	0	0	0	0	0	0	0	0	0
Waste Management	1,916	1,916	1,916	1,917	1,916	1,916	1,916	1,917	1,916	1,916	1,916	1,917
Access Limits	256	375	613	972	256	375	613	972	256	375	613	972
Monitoring	455	560	769	1,084	455	560	769	1,084	455	560	769	1,084
TOTAL	2,710	3,017	3,629	4,552	2,710	3,017	3,629	4,552	2,710	3,017	3,629	4,552
<u>MANURE VALUE</u>												
	0	0	0	0	0	0	0	0	0	0	0	0
<u>ANNUALIZED TOTAL CAPITAL AND O&M COSTS</u>												
<u>WITH COST-SHARE</u>												
No Financial Assistance	3,750	4,771	6,813	9,880	3,750	4,771	6,813	9,880	3,750	4,771	6,813	9,880
NRCS \$50,000	3,126	3,718	4,903	6,683	3,126	3,718	4,903	6,683	3,126	3,718	4,903	6,683
NRCS \$100,000	3,126	3,718	4,903	6,683	3,126	3,718	4,903	6,683	3,126	3,718	4,903	6,683
<u>ANNUALIZED TOTAL COSTS</u>												
<u>PER COW</u>												
No Financial Assistance	\$38	\$24	\$17	\$14	\$38	\$24	\$17	\$14	\$38	\$24	\$17	\$14
NRCS \$50,000	31	19	12	10	31	19	12	10	31	19	12	10
NRCS \$100,000	31	19	12	10	31	19	12	10	31	19	12	10

5.6 Total Costs: Dry Stack System

The dry stack system does not use scraping as the manure collection method. Under the dry stack system, no lagoon is required. Dry covered storage replaces the lagoon.

This estimate presents the total cost of complying with the general permit for new farms. It assumes that no water pollution control costs of any sort have been incurred. No cost estimates are made for scenarios that assume full or partial compliance.

This cost estimate excludes all costs of waste collection. It includes the full cost of the waste storage facility.

Only a share of the cost of field application is a cost of compliance. The remaining share is a cost of production. For dairy farms that use scraping, compliance costs are 63 percent of the total cost of the costs of land application. For dry stack systems, it was also assumed that the share of total field application costs that is compliance costs is 63 percent.

Costs for diversions, silage storage, waste management, access limitations, monitoring, and permit fees are the same for the dry stack system as for the scraping system. Manure value and NRCS cost-share are also the same as for scraping. None of these costs differ between Eastern and Western Washington.

The tables on pages 24 and 25 present the total costs of compliance for differing sizes of dairy farms using the dry stack system. Because very few farms use this system, full details of the cost estimates are not presented in this EIA.

The last section of the table on page 27 shows the annualized total cost-per-cow ratios for Eastern and Western Washington farms.

COMPLIANCE COSTS: TOTAL CAPITAL COSTS and COST-SHARE - UPDATED APRIL

Dry Stack

1999

Totally Out of Compliance

TREATMENT/BMP	EASTERN & WESTERN WASHINGTON			
	Number of Cows			
	100	200	400	700
<u>CAPITAL COSTS</u>				
Waste Storage Facility	\$96,970	\$193,939	\$387,878	\$678,787
Diversions	1,654	3,308	6,615	11,576
Field Application	0	0	0	0
<u>Access Limits</u>	<u>4,221</u>	<u>6,606</u>	<u>11,374</u>	<u>18,525</u>
TOTAL	102,844	203,852	405,867	708,889
<u>COST-SHARE LEVEL</u>				
No Financial Assistance	0	0	0	0
NRCS \$50,000	50,000	50,000	50,000	50,000
NRCS \$100,000	61,707	100,000	100,000	100,000
<u>TOTAL CAPITAL COSTS</u>				
<u>WITH COST-SHARE</u>				
No Financial Assistance	102,844	203,852	405,867	708,889
NRCS \$50,000	52,844	153,852	355,867	658,889
NRCS \$100,000	41,138	103,852	305,867	608,889
<u>ANNUALIZED TOTAL CAPITAL COSTS</u>				
<u>WITH COST-SHARE</u>				
No Financial Assistance	\$18,203	\$36,082	\$71,838	\$125,473
NRCS \$50,000	9,353	27,232	62,988	116,623
NRCS \$100,000	7,281	18,382	54,138	107,773

COMPLIANCE COSTS: ANNUALIZED CAPITAL COSTS and OPERATIONS & MAINTENANCE COSTS				
Dry Stack				
Totally Out of Compliance				
	EASTERN & WESTERN WASHINGTON			
	Number of Cows			
TREATMENT/BMP	100	200	400	700
ANNUALIZED TOTAL CAPITAL COSTS				
WITH COST-SHARE				
No Financial Assistance	\$18,203	\$36,082	\$71,838	\$125,473
NRCS \$50,000	9,353	27,232	62,988	116,623
NRCS \$100,000	7,281	18,382	54,138	107,773
OPERATIONS & MAINTENANCE COSTS				
Waste Management Plan	0	0	0	0
Waste Storage Facility	0	0	0	0
Diversions	82	183	365	638
Field Application	5,646	11,293	22,607	39,556
Waste Management	0	0	0	0
Access Limits	309	387	649	992
Monitoring	<u>463</u>	<u>574</u>	<u>796</u>	<u>1,130</u>
TOTAL	6,500	12,438	24,418	42,316
MANURE VALUE	2,376	4,750	9,500	16,626
ANNUALIZED TOTAL CAPITAL AND O&M COSTS				
WITH COST-SHARE				
No Financial Assistance	22,328	43,770	86,756	151,163
NRCS \$50,000	13,478	34,920	77,906	142,313
NRCS \$100,000	11,406	26,070	69,056	133,463
ANNUALIZED TOTAL COSTS				
PER COW				
No Financial Assistance	\$223	\$219	\$217	\$216
NRCS \$50,000	135	175	195	203
NECS \$100,000	114	130	173	191

5.8 Conclusion on Disproportionality of Cost Impact

The EIA compares the costs of compliance for small and large businesses in order to determine whether the rule disproportionately impacts small, business. This is the fundamental requirement that the EIA satisfies. This comparison determines whether mitigation is necessary.

The cost comparison compares proportionate compliance costs for small businesses and large businesses. With few exceptions, absolute compliance costs will be greater for large businesses than for small. Therefore, costs are normalized in order to make the comparison valid. Any one of the following three ratios may be used to compare costs:

- Cost per employee.
- Cost per hour of employee.
- Cost per one hundred dollars of sales.

Using the cost-to-sales ratio as the measure of proportionate impact usually makes the most sense. It is an approximate estimate of the percentage rise in costs caused by the permit. This is how the permit holder looks at compliance costs. This economic analysis uses the ratio of the annualized cost of complying with the general permit to the number of cows that the farm owns as the measure of the permit's proportional impact. If assumptions are made about milk price and cow productivity, this cost-per-cow ratio can be converted into a cost-to-sales ratio. (See Appendix A.) If the compliance-cost-per-cow ratio is higher for small businesses than for large businesses, then small businesses are disproportionately impacted.

The following two tables show the range of cost-per-cow ratios for farms using scraping under scenarios (1) totally out of compliance, and (2) partially in compliance assuming that the NRCS cost-share is \$50,000. This level of cost-share should be common. Scraping is the most common method of manure collection.

COST-PER-COW RATIOS			
Scraping			
Totally Out of Compliance			
NRCS \$50,000			
Size of Herd	Annual Cost Per Cow		
	Eastern Washington	Western Washington w/out Seasonal Water Table	Western Washington w/Seasonal Water Table
100	\$62	\$69	\$86
200	42	48	59
400	20	27	42
700	13	22	31

COST-PER-COW RATIOS Scraping Partially in Compliance NRCS \$50,000			
Size of Herd	Annual Cost Per Cow		
	Eastern Washington	Western Washington w/out Seasonal Water Table	Western Washington w/Seasonal Water Table
100	\$31	\$31	\$31
200	19	19	19
400	12	12	12
700	10	10	10

The cost-per-cow ratios of small farms are greater than the cost-per-cow ratios for large farms. As measured by the cost-per-cow ratio, the general permit has a proportionally greater impact on small farms than on large farms. This is also true for other cost-share levels.

When it is assumed that the NRCS cost-share is \$50,000, cost-per-cow ratios of small farms again are greater than the cost-per-cow ratios for large farms (see Sections 5.4 and 5.5 for cost-per-cow ratios).

Cost-per-cow ratios for farms that are already partly in compliance are lower than those for farms that are totally out of compliance.

The ratios for the dry stack system give results contrary to those for the two scraping scenarios: cost-per-cow ratios rise as herd size increases. See the two tables on pages 24 and 25.

6. Mitigation of Impact on Small Business

Introduction

If the compliance-cost-per-cow ratio is higher for small businesses than for large businesses, then small businesses are disproportionately impacted. The general permit rule requires that disproportionate economic impacts of general permits on small businesses be reduced when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the state Water Pollution Control act (WAC 173-226-120(2)).

Mitigation must include one or more of the following measures:

- Use of differing compliance or reporting requirements or timetables for small businesses.
- Clarify, consolidate, or simplify the general permit's compliance and reporting requirements for small businesses.
- Establish performance rather than design standards.
- Exempt small businesses from some conditions of the general permit.

Cost impacts on small businesses may be reduced by modifying conditions of the permit and by other measures.

Ecology took the following steps to mitigate the impact of the dairy farm general permit:

1. Many farms will not be required to be covered by the general permit. The Department intends to issue permits only to farms, whether large or small, that cause real water pollution problems.
2. Financial aid from the USDA's Natural Resources Conservation Service and from the Washington Conservation Commission through local conservation districts is currently available for the construction of lagoons, purchase of land application equipment, and construction of agricultural BMPs.
3. The Department will normally give dairy farms 24 months within which to write and implement their nutrient management plans.
4. The permit's monitoring and recordkeeping requirements are considered very minimal compared with other NPDES permits.
5. Permit fees for small businesses covered by the dairy farm general permit were decreased by about fifty percent in 1998 revisions to the state Water Pollution Control act (Chapter 90.48 RCW).
6. The state Water Pollution Control act requires Ecology to consider whether a water quality enforcement action will contribute to conversion of commercial agricultural land to non-agricultural use (see RCW 90.48.450). Ecology must try to minimize the possibility of conversion.

Necessary to Comply with State and Federal Laws and Regulations

The general permit rule states that mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the state Water Pollution Control act. This provision is an important restriction. If a proposed mitigation measure violates federal law or regulations or if it violates state statutory law or rules, then it cannot be undertaken.

The conditions of the general permit that are based on federal regulations are requirements of federal law. Significant mitigation would be a violation of federal NPDES program regulations, which set effluent limits for dairy farms. Because these conditions are a consequence of federal law, they cannot be mitigated and the compliance costs associated with them cannot be reduced. The dairy farm permit must be at least as strict as federal effluent limit. There is no provision in federal law that allows violation of federal effluent standards in order to mitigate their impact on small businesses. Only the compliance costs associated with permit conditions that are stricter than those of federal regulation can be mitigated.

Permit conditions required to meet the AKART requirement of the state Water Pollution Control act (RCW 90.48.010) are also legal requirements that Ecology cannot allow permit holders to violate. Thus, compliance costs related to permit conditions based on the AKART requirement also cannot be mitigated.

Compliance costs associated with permit conditions based on these state and federal laws and regulations cannot legally be mitigated. These laws and regulations are not at issue here: the general permit has no authority to alter them or to allow violations of them. These circumstances restrict the Department's ability to reduce cost impacts on small businesses. Only costs imposed by permit conditions that are stricter than those required by these laws can legally be mitigated.

Impact of Mitigation on Effectiveness of General Permit in Controlling Water Pollution

The general permit rule states that mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the Clean Water Act and Chapter 90.48 RCW, the State Water Pollution Control act. Even if a proposed mitigation measure is legal, if it would limit the general permit's effectiveness in controlling water pollution too much, it should not be undertaken.

All dairy farms are small businesses. The economic impact of the general permit on dairy farms cannot be significantly reduced without reducing the effectiveness of the permit in controlling water pollution. Costs can be reduced by exempting small businesses from conditions of the permit, using less stringent requirements for small businesses, and giving small businesses more time to comply with the permit. In all of these cases, the effectiveness of the permit in reducing water pollution is reduced to some degree.

Mitigation

Mitigation measures are discussed in this section.

Some Dairy Farms Are Not Required to be Covered by the General Permit. All dairy farms are not legally required to obtain coverage under the dairy general permit. Only those farms meeting the (1) federal definition of a Concentrated Animal Feeding Operation, or (b) state definition of a Concentrated Dairy Animal Feeding Operation, or (3) meeting either the state or federal definition of a Significant Contributor of Pollution. Generally, this means Ecology intends to issue permits only to farms, whether large or small, that cause water pollution problems. Farms that fully implement their waste management plans on a continuing basis will be able to apply for an exemption from continuing permit coverage. See Section 3.3 for a complete description of which farms must be covered.

Government Financial Aid. The three major sources of financial assistance are cost-share from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), cost-share from the Washington Conservation Commission through local conservation districts, and low interest loans from the Washington Department of Ecology.

The U.S. Natural Resources Conservation Service administers a cost-share program under the Environmental Quality Incentives Program (EQUIP). Each year about \$1 million in cost-share funds are available to dairy farmers to help offset the costs of implementing best management practices (BMP's) in Nutrient Management Plans such as long-term waste storage structures. The maximum amount available under EQUIP is \$50,000 per dairy. However, it is possible to provide \$50,000 per spouse for married couples increasing the total amount to \$100,000.

The Washington Conservation Commission has recently typically been provided \$750,000 per year for cost-share to help dairy farmers offset the costs of installing BMP's. These dollars are administered locally by conservation districts. The percent cost-share varies from fifty to seventy-five percent depending upon the location and type of BMP. Fifty percent is typical. The maximum amount of cost-share available is \$25,000 in any two-year period.

The Washington Department of Ecology administers a State Revolving Fund low interest loan program with a total of \$1.5 million dollars to assist dairy farmers implementing BMP's. Under federal law, permitted farms cannot utilize these loans for waste storage facilities. This program provides one-time five-year loans at a 4.5 percent interest rate. Typically, loans are for about \$15,000 - \$25,000.

Compliance Schedules. Dairy farms generally will be given 24 months by Ecology within which to write and implement their dairy waste management plans. This provision delays and spreads out the costs of complying with the general permit.

Recordkeeping and Reporting. The recordkeeping and reporting requirements in the permit are considered minimal, particularly in comparison to these requirements contained in other NPDES permits administered by Ecology.

Permit Fees. Permit fees for dairy farms are also considered minimal in comparison to the annual permit fees for other holders of NPDES permits. Also, 1998 revisions to the state Water Pollution Control act reduced fees in effect at that time by about fifty percent and place maximum caps on the fee for larger herd sizes.

Requirement to Consider Conversion Potential for Agricultural Land. The state Water Pollution Control act requires Ecology to consider whether a water quality enforcement action will contribute to conversion of commercial agricultural land to non-agricultural use (see RCW 90.48.450). In taking enforcement actions, Ecology must try to minimize the possibility of conversion. This law could be used to mitigate the impact of enforcement actions on dairy farms when there is a possibility of conversion to non-agricultural uses. This provision could benefit some small farms.

Appendix A

Conversion of Cost-per-Cow Ratios To Cost-per-Sales Ratios

Cost-per-cow figures can be converted to cost per hundred pounds of milk and cost per milk sales by using the following formulas:

1. Cost per hundred lbs. = (cost per cow)/(cow productivity)
2. Cost per milk sales = (cost per hundred lbs.)/price

Differing sets of assumptions as to milk prices and cow productivity can be used in making the above two estimates:

1. Price: \$12, \$13, and \$14 per hundred pounds of milk.
2. Productivity: 18,000, 20,000, and 22,000 pounds per cow per year.

Milk prices have been in the 12 to 14 dollar range for the last ten years and are expected to continue to be in this range in the future. Average statewide productivity was 19,422 pounds per cow in 1992.⁵ Productivity is constantly increasing.

For each size of farm, methods used by EB 0927 can be used to estimate the sales of calves and cull cows and to estimate the value of manure produced.⁶ Table 2 of EB 0927 contains the assumptions that can be used in making these estimates.

⁵ Washington State Department of Agriculture, **Washington Agricultural Statistics**, 1992-1993 (1992), p. 94.

⁶ Washington State University, **1992 Dairy Enterprise Budget: 200 Cow Herd** (1991)