5. DISPOSAL

5.1 INTRODUCTION

The purpose of this chapter is to:

- Present existing and proposed waste disposal activities in Clallam County.
- Identify the needs, problems, or opportunities not yet addressed by the existing disposal facilities and programs.
- Meet the requirements of Chapter 70.95 RCW.

The solid waste management activities discussed in this chapter are organized into the following sections:

5.2 INCINERATION

5.3 IN-COUNTY LANDFILLING

5.4 IMPORT/EXPORT

5.5 ALTERNATIVE DISPOSAL METHODS

5.2 INCINERATION

5.2.1 Existing Conditions

Incineration is used to reduce the weight and volume of waste requiring landfill disposal. With an energy recovery system, it can also be a method of producing electricity and/or heat (steam). There are currently no incinerators in Clallam County permitted for general solid waste disposal. However, there are examples of conversion of specific waste streams such as wood into heat and/or power. These opportunities are discussed in Section 5.5. This section of the CSWMP discusses the incineration of municipal solid waste.

City of Forks Waste-to-Energy Feasibility Study

A study prepared for the City of Forks (SCS 1988) examined the feasibility of a waste-to-energy facility for the west end of Clallam County. This study was funded in part by the Economic Development Administration (U.S. Department of Commerce). The major reason for conducting the study was the imminent closure of the nearby Lake Creek Landfill. The study, completed in 1988, concluded that a waste-to-energy facility for general solid wastes would not be cost effective either for Forks or for the west end of Clallam County. The study also concluded that a pile burner/lumber dry kiln might be cost-effective for disposal of wood waste only. A biomass-to-energy study has more recently been completed, and is discussed in Section 5.5 below.

City of Port Angeles Waste-to-Energy Feasibility Study

A study prepared for the City of Port Angeles (Beck 1988) analyzed a variety of options for waste-to-energy facilities. It concluded that costs would range from $63.18 per ton to $129.42 per ton (1988 dollars, levelized costs for a period of twenty years). The least expensive option assumed sale of steam to Daishowa America (now Nippon Paper Industries), a matching grant from Ecology for 50 percent of the capital costs, and some form of flow control. Flow control (no longer an option legally) would be necessary to ensure a steady supply of waste to the incinerator, and waste would need to come from an area larger than the city's boundaries. The study recommended that the City and County work together to

develop a solid waste management plan that would provide the framework for further exploration of a waste-to-energy facility.

Existing Incinerators in Other Areas

There are a few facilities in Washington that currently incinerate solid waste. The City of Spokane operates an incinerator using mass burn technology. This facility is functioning well although it has experienced occasional problems with air quality and other issues, and the cost of operation has not dropped to the lower levels of earlier projections. As a result, the Spokane area has one of the highest disposal costs in the state. Washington State University (WSU) in Pullman opened a new incinerator in 1999. The WSU incinerator supports teaching, research, and support missions for medical and pathological waste in a clean and cost effective fashion.

5.2.2 Needs and Opportunities

While there is a need in the County for disposal of solid wastes now and in the future, these needs are currently being met adequately by the Port Angeles Landfill (until late 2006) and soon by the Port Angeles Transfer Station. When the landfill closes, waste will be exported from the County for disposal, using the new transfer station. The cost of municipal solid waste incineration could not compete with waste export. The two most recent studies of incineration in Clallam County (described above and now nearly twenty years old) concluded that the cost of incineration is considerably higher than landfill disposal. Furthermore, the cost projected by one study (Beck 1988) would be considerably higher now due to adjustments for twenty years of inflation and because large grants for capital equipment from Ecology and flow control are no longer available.

The feasibility of energy recovery may be better for landfill gas. The presence of recoverable amounts of landfill gas presents both a need and an opportunity. There is a need to collect and control landfill gas to prevent it from migrating off-site (and possibly causing explosion hazards and odor problems). Collection of this gas at the landfill also provides an opportunity to recover energy. Landfill gas-to-energy would be more feasible if the cost of energy increases, but at this time insufficient amounts of gas are being produced to maintain a cost-effective energy recovery program. The City of Port Angeles should continue to evaluate gas production rates and possibly consider further evaluation of a gas-to-energy program in the future.

5.2.3 Alternative Methods

Incineration of solid waste is an effective method of volume reduction, although the greater expense of incineration compared to landfilling is a limiting factor. Incineration is generally considered where there are environmental concerns with other disposal options, a lack of suitable land (including a high groundwater table that prevents siting a landfill), a market exists for energy recovered from waste combustion, and/or where population densities are high and land is scarce. At the present time, there appear to be no factors that would strongly favor incineration over other disposal methods in Clallam County.

The Port Angeles Landfill is currently using a flare system to burn off landfill gas. There is not sufficient clean gas being generated to burn the flare continuously or to support an alternative method of handling it (such as energy recovery).

5.2.4 Recommendations

The following recommendations are being made for incineration facilities:

- Evaluate new proposed incineration projects for select waste streams and/or locations based on an objective review of the potential impacts to human health and environmental quality, as well as a comparison to alternative disposal methods. (I1)
- Consider energy recovery from landfill gas in the future if and when this becomes economically feasible. (I2)

Table ES-1 identifies the responsible implementing agency, the preliminary implementation schedule, and estimated cost for each of these recommendations.

5.3 IN-COUNTY LANDFILLING

5.3.1 Existing Conditions

Three disposal sites are currently operating in Clallam County: the Port Angeles Landfill, the Neah Bay Landfill, and a limited purpose landfill (Lawson Landfill near Port Angeles). Other sites are closed or engaged in closure and post-closure activities (see Table 5-1).

Table 5-1. Current Landfills in Clallam County

Site Name	Operator	Facility Type and Tonnage	Permitted?	Comp. WAC[a]	Operational Status
Lawson Landfill, Port Angeles	Nippon	Limited purpose landfill	YES	Yes	Operating
Neah Bay Landfill, Neah Bay	Makah Tribal Council	Solid waste landfill	NA[b]	No	Operating
Port Angeles Landfill, Port Angeles	City of Port Angeles	Solid waste landfill	YES	Yes	Operating

a Comp. WAC = Complies with WAC 173-351

b NA = Not Applicable

Current standards for municipal solid waste landfills are primarily contained in the State's Criteria for Municipal Solid Waste Landfills (WAC 173-351), which contains standards for planning, siting, operations, and closure of landfills. Standards are also contained in the County Solid Waste Regulations.

The above landfills are described below. The limited purpose landfill, Lawson Landfill, is discussed further in Chapter 7.

City of Port Angeles Landfill

The City of Port Angeles owns and operates this landfill, which is located within city limits. This landfill provides disposal services to residential, commercial, and industrial customers throughout Clallam County. The Port Angeles Landfill is currently the only disposal site in Clallam County that is open to the general public for solid waste disposal (although there are also transfer stations that accept waste from the general public).

Self-haulers arriving with brush or other yard wastes are directed to dump it separately where these items are stockpiled for later chipping and composting. In addition to disposal and composting, a recycling program is conducted at the landfill site. White goods (large appliances), scrap metal, yard waste, aluminum and tin cans, glass bottles, plastic bottles,

mixed waste paper, cardboard, newsprint, catalogs, magazines, used oil, antifreeze, and car and truck batteries are collected for recycling.

The Port Angeles Landfill will operate until late 2006. Reserve accounts for closure and post-closure costs have been established and are being funded by a portion of the landfill tipping fee. Following the landfill closure, a transfer station, a recycle area, a moderate risk waste facility, and a co-compost facility will continue to operate on the site.

Neah Bay Landfill

This disposal site is located on the Makah Reservation at Neah Bay. Much of the waste deposited at this site is burned to reduce its volume. The facility is under the jurisdiction of the Makah Tribal Council and technically not the responsibility of Clallam County.

The Makah Tribal Council commissioned the preparation of a comprehensive solid waste management plan in 1982 to develop overall solid waste management strategies for the entire reservation including the existing disposal site. This plan was completed in 1983 and was approved by the Tribal Council and Ecology (PSR 1983). The Makah Plan recommended closure of the Neah Bay Landfill and construction of a transfer station to haul waste to the nearest permitted disposal facility.

Currently, preliminary funding has been obtained, and a transfer station is being designed for the Makah Reservation area. The Tribe is seeking additional funds for construction of the station, which seems unlikely to occur before 2007. After the transfer station is constructed and operational, the Tribe will seek additional funds to close the landfill.

Lawson Limited Purpose Landfill

The Lawson Landfill is the only permitted limited purpose disposal site remaining in Clallam County. Nippon Paper Industries disposes of approximately 40,000 cubic yards of ash per year in this landfill. The landfill is estimated to have remaining capacity adequate until the year 2018. Chapter 7, Special Waste, provides additional discussion.

5.3.2 Needs and Opportunities

As discussed below, alternatives are being developed for when the two municipal solid waste landfills are closed.

The possible closure of the Neah Bay Landfill has been discussed for years. Since this landfill does not meet current environmental standards, this activity should be made a high priority. This landfill, however, and the Makah reservation in general, are not within the jurisdiction of the County or state.

5.3.3 Alternative Methods

Port Angeles Landfill

A new transfer station is currently being constructed at the Port Angeles Landfill site. This transfer station is scheduled for completion in 2006, and will replace the current solid waste landfill operation at the site which is scheduled to be discontinued in late 2006.

Neah Bay Landfill

Currently, a transfer station is being designed for the Makah Reservation area, so the Neah Bay Landfill can eventually be closed. Waste collected at the transfer station would be hauled to a disposal or waste export facility inside or outside of the county.

Other Landfills

Limited-purpose landfills, such as wood waste or inert landfills for other materials, have occasionally been operated in Clallam County and will possibly be proposed again in the future to handle wastes from specific companies or other sources. This type of landfill typically provides a cost-effective disposal option for local industries without excessive environmental impacts.

5.3.4 Recommendations

The following recommendations are made for the disposal system in Clallam County:

- Encourage and support the closure of the Neah Bay Landfill. If the Neah Bay Transfer Station does not proceed, consider directing the waste generated on the Makah Reservation to one of the other two transfer stations in Clallam County. (LF1)
- Consider proposals and options to develop special-purpose landfills, such as wood waste or construction and demolition waste landfills, as they are proposed. (LF2)

Table ES-1 identifies the responsible implementing agency, the preliminary implementation schedule, and estimated cost for each of these recommendations.

5.4 IMPORT/EXPORT

5.4.1 Existing Conditions

Existing Waste Import Activities

No waste is currently imported from outside Clallam County.

Existing Waste Export Activities

Exporting solid waste to disposal sites outside of the County began in November 1998 with the export of waste by West Waste. Previously, waste export had not been used for Clallam County wastes, except for small quantities of special wastes (such as animal carcasses and biomedical waste) that are sent to special facilities. Through 2006, the need to export was avoided because of the availability of the Port Angeles Landfill.

Clallam County also partners with Jefferson County for the management of certain special wastes.

5.4.2 Needs and Opportunities

Waste Import Needs and Opportunities

There are currently no needs relating to waste import from outside Clallam County.

Waste Export Needs and Opportunities

With the closure of the Port Angeles Landfill in late 2006 and construction of a new transfer station on the landfill site, waste generated in Clallam County will be exported to a regional landfill outside of the county. As described in Chapter 4, an ILA has been executed between the City of Port Angeles and Clallam County for coordinating, implementing, and operating this system (Appendix C).

5.4.3 Alternative Methods

Waste Import Alternatives

Waste import alternatives are not applicable since no waste is currently imported for sources outside Clallam County.

Waste Export Alternatives

Waste export is a system of shipping wastes to a large regional landfill. The three regional landfills used by communities in the Pacific Northwest are located in areas that reduce operating expenses due to low precipitation, favorable soils and hydrogeological conditions, and other factors. The use of these facilities by large communities (Seattle, Snohomish County and Portland, Oregon) has further reduced the disposal cost at regional landfills by creating significant economies of scale. Although transportation costs to send waste to these landfills from Clallam County is significant, the low disposal cost makes this option cost-competitive with other disposal options. The Solid Waste Disposal Feasibility Study conducted for the City of Port Angeles (Parametrix 1993) concluded that waste export would be less expensive than the other disposal options evaluated, including the continued use of the Port Angeles Landfill.

The potential benefits associated with waste export include:

- Solid waste disposal becomes largely a variable cost, thus making it easier to realize savings associated with waste prevention and recycling.
- Additional cost savings occur due to a reduced regulatory burden.
- Significant reductions in long-term liability and environmental risks are possible, although jurisdictions using a large regional landfill, in combination with other jurisdictions and private companies, may be liable for future environmental damage under the CERCLA.
- The waste is sent to landfills that are more environmentally optimal (e.g., better terrain and climate).

The exporting of waste from Clallam County was selected as the preferred waste disposal alternative when the Port Angeles Landfill closes in late 2006. Currently, Waste Connections (under contract with the City of Port Angeles) is constructing a transfer station at the landfill site. Chapter 4 presents a discussion of the existing and proposed in-County transfer system. Waste Connections will accumulate waste at the new Port Angeles Landfill Transfer Station and transport the waste to Finley Buttes Landfill for ultimate disposal.

The Finley Buttes Landfill is located 13 miles southeast of Boardman in Morrow County, Oregon. This landfill was purchased by Waste Connections in February 1999. This landfill is located on 1,200 acres of rangeland and receives about 9 inches of precipitation a year. The landfill has an estimated capacity of 40 million tons, or about 200 years of capacity at the current waste flow. The landfill currently receives waste from Clark County, Washington and Morrow County, Oregon.

5.4.4 Recommendations

Waste Import

No recommendations are being made for waste import.

Waste Export

The following recommendations are made for waste export:

- As planned, export solid waste from the new Port Angeles Landfill Transfer Station to the Waste Connections Finley Butte Landfill in Boardman, Oregon following closure of the Port Angeles Landfill at the end of 2006. (WE1)
- Encourage West Waste to continue their waste export activities and to possibly expand these activities as needed to serve additional west end customers who are currently self hauling waste to the Port Angeles Landfill. (WE2)
- Require any contracts with private businesses for waste export services to identify alternative disposal plans, including alternative routes and modes of transportation, should natural disaster or other conditions require re-routing. Any regional solid waste landfill used for Clallam County waste must meet or exceed all MFS requirements. (WE3)

Table ES-1 identifies the responsible implementing agency, the preliminary implementation schedule, and estimated cost for each of these recommendations.

5.5 ALTERNATIVE DISPOSAL METHODS

This section is intended to address disposal methods that are not already addressed in other sections of this chapter. It specifically addresses:

- Biomass-to-energy
- Biogas-to-energy

These alternative disposal strategies are important because of the amount of organic waste currently generated in Clallam County and the potential for future changes to increase the amount of wood waste that must be addressed through the solid waste system (see Section 7.5).

5.5.1 Biomass-to-Energy

Biomass-to-energy facilities operate on similar principals as incinerators although instead of using trash to produce electricity, organic material known as “biomass” is used as fuel for the incinerator. Energy recovery by a biomass-to-energy facility may be even greater than that of landfill gas. The only biomass-to-energy facilities currently operating in Clallam County are some of the mills, which generate steam to produce heat and electricity (e.g., Nippon).

A joint document between Ecology and WSU on the inventory of biomass in the state concludes that a significant amount of biomass exists in Clallam County (Ecology & WSU 2005). According to the joint document, organic waste in Clallam County totals 520,181 tons, which equates to 518.97 million kilowatts of energy. This figure does not account for the commercial waste generated by cedar mills in the western part of the county. The cedar mills, Allen’s Logging, and Portac generate an estimated 92,700 green tons (versus dry ton) of mill and wood waste annually (Siemens, 2006). The majority of this waste stream is in the form of hog fuel. The remaining is used in some cases for production of paper products.

As a result of the closure of wigwam and cyclone wood burners (described in Section 2.2.2.10), the City of Forks, the UW Olympic Natural Resource Center, and the Clallam County Economic Development Council (EDC) undertook a study (RTI 2005) to see what alternatives could be available in the short and long term to producers of wood waste (i.e., shake and shingle manufacturers) that previously used burning to remove such waste. The study recommended an approach to biomass energy conversion. Further discussions with ORCAA, EPA, Ecology and the CCEH reaffirmed that simple storage for future waste hauling would have a limited period of permitted time. Bioenergy options were then fully pursued. In June 2006, Siemens provided the EDC and its associated study partners (Clallam County, PUD, Port of Port Angeles, City of Port Angeles, and the City of Forks) with a report that indicates that a portion of this waste stream could be utilized in two separate but compatible projects:

- First, a 1.2 mW heat system or 3.2 mW combined heat and power system could be implemented in the industrial park. The determining factor for the size of the system depends on the users of the steam output. The City of Forks is reviewing the potential users in the industrial park and, together with the Port of Port Angeles, is pursuing implementation of this project.
- The second project consists of the installation of two smaller wood chip boilers. One would generate only heat for a swimming pool facility, and the second boiler would generate heat for the school district. These boilers would remove the facilities' dependence on fossil fuels and would consume almost all of the cedar waste (i.e., amounting to less than 5 percent of the total wood waste generate by the cedar mills, Allen's logging, and PorTac). The City of Forks is pursuing the implementation of the two boilers.

These facilities would take wood waste only. All would require very specific ORCAA and EPA permits. Until those are in place, the cedar mill owners are long hauling the waste that was previously burned locally.

5.5.2 Biogas to Energy

Clallam County has received a request to study a waste biomass to biogas to energy alternative. Under this alternative, yard debris, food waste, and manure are anaerobically decomposed to create electricity. Alternatives such as this one are worth considering given the State's focus on reducing organics in MSW, as described in *Beyond Waste*, as well as the amount of organic waste generated in the County.

5.5.3 Recommendations

The following recommendations are made for alternative technologies:

- Pursue the development of a biomass-to-energy facility in Clallam County. (ADM1)
- Consider proposals for alternative disposal methods, such as biogas to energy, on a case by case basis. (ADM2)